



Education and involvement of medical students in health policy as a long-term strategy to attain health goals in developing countries

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ABSTRACT

Background: The extent of a country's development depends on the growth of its economy, the level of literacy, as well as the advancements in public health and the national healthcare system. Barriers to a sustainable development in the health sector of a country include financial and socio-political aspects as well as intergenerational communication and transfer of knowledge. Literature on health policy training in developing nations is scarce. **Methods:** This scoping review was carried out through academic literature search on related articles published from 2014 to 2024, supplemented with indirectly related articles, older academic articles and recent non-academic publications where necessary due to information insufficiency - in order to answer three main research questions regarding the trend in academic interest in this topic, the landscape of health policy education for medical students in developing countries and evidence that the students' participation in health policy roles can have a positive impact on national healthcare. **Findings:** 56 articles on medical students' health policy education and involvement were retrieved, which mostly originated from developed countries. Further investigation found some records of this topic in developing countries, which enabled its discussion and comparison to its counterparts in developed nations. **Conclusion:** Improving the delivery of health policy education in developing countries is crucial for sowing future physicians' interest and ability in controlling and advocating for national health issues-which is ultimately important for the development of the national healthcare structure and its capability to overcome not only short term, urgent crises, but also satisfy the long-term needs in a continuously developing nation. **Novelty/Originality of this article:** No literature has previously been published as an overview of health policy education and involvement of medical students in developing countries and its comparative analysis with the scenario in developed countries as a means of development goal strategy mapping.

KEYWORDS: developing country; health policy; medical student.

1. Introduction

Health policy is defined as the recommendations, verdicts and rulings regarding the administration, financing and implementation of healthcare which are put in place by an organization, an institution or a government at a national, state, city and district level in order to attain a determined set of healthcare goals (O'Brien et al., 2020). Health policies developed and established by the government of a nation holds a central function in public health, through the governance of health promotion, education of healthcare professionals, national measures for disease prevention and health insurance regulations. In general

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public policies fall into three main categories, which are regulations, legislations and litigations (Porter et al., 2018). Health legislations are a broader description or a statutory law which is put in place by an elected legislative body. Health regulations refer to the details regarding the enactment and enforcement of such legislations which protect the public by ensuring the safe and competent delivery of healthcare through laws regarding healthcare markets, as well as disease management and detection at national entry ports (Rogers et al., 2024). Whereas, the body of public policy derived from judicial rulings is referred to as health litigation (Porter et al., 2018). There is no doubt that health policy affects a plethora of trivial aspects in the everyday delivery of healthcare, from the coverage of health insurance for necessary medical procedures, the standard of healthcare delivery, the licensing process and standard of healthcare workforce, medical research and development, among others (Crosson et al., 2023). The establishment of health policies which are preferable and suitable to the current context of public health in a particular nation, including social, political, economic and cultural factors, is a major determinant (Buse et al., 2023) in fulfilling many of the targets of the third Sustainable Development Goals (SDGs), including Target 3.3 regarding the cessation of endemic diseases caused by tropical diseases (O'Brien et al., 2020).

There are various existing theories and frameworks for health policy development and assessment; the more common structures include the framework of advocacy coalition, the multiple stream theory by Kingdon, the heuristic stages approach, the health policy triangle (O'Brien et al., 2020) and, most recently, the health policy cube framework (Buse et al., 2020). The health policy triangle framework by Gilson and Walt in 1994 is a revised policy structure which states that health policy previously often concentrated around the contents of the policy - failing to address actors such as authoritative persons, assemblies and conglomerate bodies, systemic aspects like social, political, cultural and economical context, as well as specifications about how the health policy will be commenced, formulated, developed, adjudicated, liaised, implemented and assessed. The health policy triangle framework, which is centered on and correlates policy contents, context and processes with the actors, has exerted its influence on the direction of health policy research in various developed and developing countries since its emergence (O'Brien et al., 2020). Furthermore, the more recent health policy cube framework proposed by Buse et al. (2020) suggested that the health policy changes made to address the World Health Organization's (WHO) "Best Buys" non-communicable disease (NCD) management and prevention in six sovereign states with lower human development index would be more efficiently assessed through a triple axes. The first dimension on this policy cube referred to policy comprehensiveness, measured by the number "Best Buys" a policy would address, with the purpose of diminishing NCD incidence rate. Political prominence and implementary effectiveness made up the second axis, while social equity and inclusivity made up the third axis (Buse et al., 2020). Scaling down and cutting out the "Best Buys" for the NCDs will help fulfil some of the targets of the SDGs by 2030 as they are linked causatively (Bennett et al., 2018).

In order to be involved with the policy process in any level of organization, it is crucial for one to comprehend the several types of policy framework since it defines the guiding principles and objectives that direct an organization's planning and development and gives policy documents a structure (OECD, 2020). As mentioned in the health policy triangle framework, it is equally important for an individual working with health policy to not only understand the theoretical structure of policy, but also be fluent in the real time social climate and public health issues which need to be addressed (O'Brien et al., 2020). Educational training is well-established and implemented adequately within the public health workforce, however the training is still deficient in the realm of influencing policy changes and other social determinants of public health (Sellers et al., 2015). A policy training curriculum is not only needed for policy analysts, economists, administrators and government officials - it is also imperative that health professionals are supplied with this element of knowledge in order to be adequately equipped to assume their roles and perform their duties efficiently in the health policy sector (Heiman et al., 2016). Currently, health

policy is not part of the core curriculum structure which is taught uniformly to all medical undergraduates (Crosson et al., 2023) and are mostly taught as elective subjects or studied independently by medical students in a health policy studies department in student-run organizations even in developed countries (Kaymaz et al., 2019; Mou et al., 2011) despite the framework for such a curriculum being proposed for various levels of learners from undergraduate, postgraduate to health professionals in various research papers and professional opinion papers since the early 2000s (Chinitz et al., 2002; Longest Jr, 2004; Patel et al., 2011; Riegelman, 2006). The population of medical students of today will form the health professional workforce of tomorrow. Beyond just catering to a small percentage of this population who will be assuming the administrative roles in public health and policy, there are also years of national costs and investments in education and infrastructure that should be utilised to the maximum capacity in order to secure the public health circumstance and healthcare environment of the future. Consequently, there needs to be a more widespread and progressive uptake of health policy into the core curriculum of medical students in preparation to meet the country's long term health goals (Crosson et al., 2023).

The degree of development of a nation is defined by the average income per capita, the mean level of literacy, as well as the overall health condition and health outcomes of said nation (Fialho et al., 2017). Therefore, it comes as no surprise that the third goal of the SDGs enacted by the United Nations as part of the initiative to lay out the specific, measurable goals for developing countries to reach by 2030 focuses on the promotion of health and well-being for all (United Nations, n.d.). Since the sustainability of a national development program is determined by its ability to fulfil the needs of the current generation without compromising the same opportunities for the generations to come, it is imperative that the youth partake in these conversations as the natural inheritors of the nation and as the potential health leaders of the future (Crosson et al., 2023). Although implementing health policy studies at an undergraduate level today may not directly aid in realizing the third goal of the SDGs due to the constraint of time to meet them by the year 2030, the policy landscape including health policy plays a major role in determining the direction of development in a developing country in the long run (Levin et al., 2022; Poursheikhali et al., 2022). This literature review paper aims to contribute to the literature by answering the following research questions: What is the trend in academic interest in health policy education for medical students in the past ten years? What is the current documented landscape of health policy education for medical students in developing countries? What proof is there that students' active interest and participation in health policy-making will be impactful for the nation's development?

2. Methods

A scoping review was conducted on literature published anywhere from the year 2014 to the year 2024 available from the online databases Google Scholar, ScienceDirect and PubMed using Boolean operators to combine the following key search terms: "medical student" AND "health policy". Literary works including research articles, opinion papers and reports which are relevant to the research questions for this scoping review were filtered out from the search results by their titles and abstracts. Full articles were downloaded and those which did not meet the inclusion criteria were excluded from this review. Additional information for the qualitative synthesis in this research paper due to the scarcity of academic resources on the topic were obtained from academic articles which were not mainly discussing the topic of health policy education for medical students, those published before 2014, from recent newspaper articles, national archives and documents available from medical student association official websites and archives. These supplementary articles and resources were not included in the flow diagram for identification of literature. The identification of literature and documents relevant for this literature review was facilitated by the Preferred Reporting Items for Systematic reviews and Meta-Analyses

(PRISMA) 2020 flow diagram for new systematic reviews (Page et al., 2021) with modifications by the author to better suit this review.

The following was the inclusion criteria for literature search: The document must be in the form of a original research article, opinion paper, editorial, report, or letter to editor. The document must be in English, Malay or Indonesian. The document must be published between the year 2014 and 2024. The subjects of the study or report must be, or must include, students pursuing an undergraduate medical degree. The article must address at least one of the research questions for this review paper. The following was the exclusion criteria for literature search: The full-text document was not available or not accessible to the author. The article was a systematic review or scoping review.

3. Result and Discussion

3.1 Literature identification

A total of 18,335 documents were identified from the digital databases - of which 2113 duplicates, 58 articles not available in the languages listed in the inclusion criteria, and 11,733 articles which were not accessible by the author in full-text form were removed before screening. A total of 4431 articles were then screened by their titles and abstracts - of which 4370 articles were excluded due to being irrelevant to the research questions for this review or the study being conducted on other types of healthcare students. Eligibility assessment was carried out by downloading 61 articles and excluding five review articles. The remaining 56 articles were included in this review as published academic literature on health policy in regards to medical students (Fig. 1).

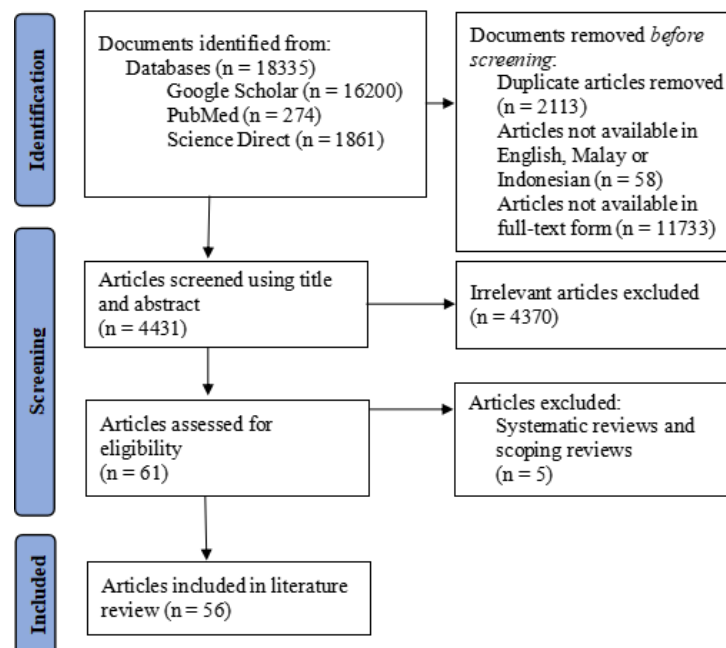


Fig. 1. Flow diagram for identification of literature via digital databases

3.2 Trend in academic interest in health policy education for medical students in the past decade

The 55 academic articles included in this review were categorized by the year they were published in order to assess the trend in academic interest in health policy education for medical students in the past ten years by plotting a graph (Figure 2). Health policy education has been an interesting topic in academic literature, with a steadily heightened interest in research from 2017 to 2022. This suggests that there may be new curricular developments in health policy education or new findings regarding the existing health policy curriculum,

emerging concerns for medical students' grasp on health advocacy and policy, or potential breakthroughs in medical students' involvement in health policy roles.

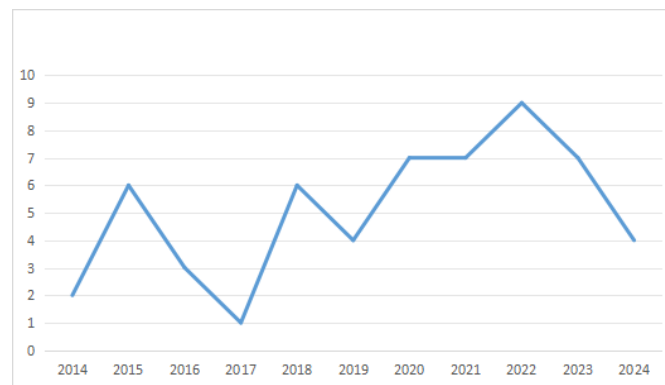


Fig. 2. Number of academic articles published on health policy in relation to medical students

The 55 included articles were also categorized based on the country where the study was conducted or where the expert which wrote the opinion paper originated from (Table 1). This showed that most of the retrieved published works of literature listed under “developed countries” in Table 1 were from the United States, but there were also articles from several other developed or high income countries such as the United Kingdom (Bath et al., 2020; Malik et al., 2017), Canada (Bhate et al., 2015; Emil et al., 2014; Hayman et al., 2020), the United Arab Emirates (Rahma et al., 2023) and Israel (Malatskey et al., 2022). Articles listed under “developing countries” in Table 1 were studies in and reports from countries listed as developing countries according to the United Nations (2024) classification - which did not entirely translate to lower income and lower-middle income countries according to The World Bank (2025). The article by Haque et al. (2022) was a cross-sectional study set in Malaysia, which is an upper-middle income country, whereas the articles by Qamar et al. (2023) and Chaudhry (2024) were both analyses in the context of medical students in Pakistan, which is a lower-middle income country according to The World Bank (2025).

Table 1. Categorization of academic literature based on year and country development

Year Published	Developed Countries	Developing Countries
2014	Emil et al. (2014), Patel et al. (2014).	
2015	Bhate et al. (2015), Dugger et al. (2015), Kagan & Armstrong (2015), Meurer et al. (2015), Press et al. (2015), Vidwan et al. (2015).	
2016	Jeney et al. (2016), McFarland et al. (2016), Phillips et al. (2016).	
2017	Malik et al. (2017).	
2018	Bales et al. (2018), Ditrio et al (2018), Enyioma et al. (2018), Nur et al. (2018), Sears (2018), Theophanous et al. (2018).	
2019	Bernhardt et al. (2019), Kaymaz et al. (2019), Rook et al. (2019), Thomas et al. (2019).	
2020	Bath et al. (2020), Hayman et al. (2020), Luke et al. (2020), Reddy et al. (2020), Rook et al. (2020), Sola (2020), Walton et al. (2020).	
2021	Carmody et al. (2021), Chimonas et al. (2021), Gogineni (2021), Griffiths et al. (2021), Kucirek et al. (2021), Muller et al. (2021), Payan (2021).	
2022	Chang et al. (2022), Clithero-Eridon et al. (2022), Kyanko et al. (2022), Liu et al. (2022), Malatskey et al. (2022), Murugan et al. (2022), South et al. (2022), Thomas et al. (2022).	Haque et al. (2022).

2023	Baughman (2023), Crosson et al. (2023), Kieran et al. (2023), Leonard et al. (2023), Rahma et al. (2023), Sola et al. (2023).	Qamar et al. (2023).
2024	Krishnamoorthi et al. (2024), Metzger (2024), Zhu et al. (2024).	Chaudhry (2024).

Although there was a heightened academic interest in health policy education for medical students in the past decade, there were varying themes that were focused on in different research articles and opinion papers, namely the structural aspect of health policy curriculum for medical students, whether it should remain an elective subject or be made into a core subject, or whether the government should support student-led organizations in their independent navigation of the subject, the effectiveness of the existing health policy curriculum taught at specific institutions, medical students' interest in studying health policy whether as a classroom subject or under vocational training or internship, how medical students can potentially be involved in health policy roles, how much medical students have already contributed in their health advocacy and policy roles in the past, as well as the health policy attitudes of medical students. The academic publications included in this review were categorized based on the four general supersets of topics of discussion (Table 2). Some of the articles were included in more than one category as they discussed issues in multiple topics, for example the article by Haque et al. (2022) which discussed details about both the medical student's interest in health policy education and their previous involvement in health policy roles.

Table 2. Categorization of academic literature based on topic of discussion

Topic of discussion	Publication
Health policy curriculum for medical students	Bath et al. (2020), Bhate et al. (2015), Baughman (2023), Bernhardt et al. (2019), Clithero-Eridon et al. (2022), Crosson et al. (2023), Emil et al. (2014), Gogineni (2021), Hayman et al. (2020), Kagan & Armstrong (2015), Kieran et al. (2023), Krishnamoorthi et al. (2024), Kucirek et al. (2021), Kyanko et al. (2022), Liu et al. (2022), Luke et al. (2020), Malatskey et al. (2022), Murugan et al. (2022), Nur et al. (2018), Payan (2021), Qamar et al. (2023), Rahma et al. (2023), Reddy et al. (2020), Sola (2020), Sola et al. (2023), South et al. (2022), Thomas et al. (2022), Walton et al. (2020), Zhu et al. (2024).
Medical students' interest in studying health policy	Bales et al. (2018), Carmody et al. (2021), Chimonas et al. (2021), Ditrio et al. (2018), Emil et al. (2014), Griffiths et al. (2021), Haque et al. (2022), Leonard et al. (2023), Liu et al. (2022), McFarland et al. (2016), Nur et al. (2018), Patel et al. (2014), Reddy et al. (2020), Sears (2018), Sola et al. (2023), Theophanous et al. (2018), Thomas et al. (2019).
Medical students' involvement in health policy roles	Chang et al. (2022), Chaudhry (2024), Enyioma et al. (2018), Haque et al. (2022), Hayman et al. (2020), Kaymaz et al. (2019), Malik et al. (2017), Metzger (2024), Qamar et al. (2023), Thomas et al. (2022).
Health policy attitudes of medical students	Chaudhry (2024), Chimonas et al. (2021), Dugger et al. (2015), Emil et al. (2014), Meurer et al. (2015), Muller et al. (2021), Phillips et al. (2016), Press et al. (2015), Rook et al. (2019), Rook et al. (2020), Vidwan et al. (2015).

3.2.1 The shift in health policy curriculum for medical students

This categorization of academic literature showed that the majority of the research in the past decade is still focused on the curricular aspect of health policy education - which is reasonable since the curriculum for health policy education in medical school is not yet well-established and still rapidly evolving (Crosson et al., 2023; Hayman et al., 2020). An effective health policy curriculum should equip students with practical skills such as, research on social determinants of health, navigation and mobilization of professional organizations,

legislative advocacy and health journalism - as theoretical classroom knowledge alone would be inadequate in enabling these future physicians to make any meaningful changes in healthcare (Baughman, 2023; Bhate et al., 2015; Zhu et al., 2024). This was proven to be achievable by a survey-based study which assessed the medical students' mastery on these aspects of health advocacy before and after receiving the tailored curriculum (Zhu et al., 2024). Regarding health journalism, a pilot study has also proposed op-ed writing as part of a health policy curriculum for medical students as healthcare leaders (Krishnamoorthi et al., 2024). It was suggested by Crosson et al (2023) that the basic knowledge on health policy could be taught to all medical students as a mandatory part of their education through lectures, assignments and discussion of cases - but that this should also be supplemented by an elective health policy curriculum that was higher in intensity and which included a clerkship which could build real health advocacy skills. However, there also needs to be more up-to-date and vigorous research on developing a health policy curriculum which would more effectively equip future physicians with the knowledge and skill in health policy for the benefit of the nation (Crosson et al., 2023; Patel et al., 2011; Thomas et al., 2022). An efficient delivery of education will affect the effectiveness of that teaching on the students' knowledge - and ultimately make the education system more cost-effective (Witte & López-Torres, 2015).

A comparative study for medical students' grasp on health policy when taught in-person versus when taught online during the COVID-19 pandemic showed that the knowledge transfer was more effective when taught offline in a physical classroom (Kieran et al., 2023). Meanwhile, a study which used multiple choice questions to assess medical students' accurate understanding of healthcare showed that Canadian students had better knowledge of their local healthcare policy and health systems (OR=1.73) than American students did of their own health policy structure and systems (OR=0.95). This aligned with the students' own judgement of the adequacy of health policy education in their respective institutions' curriculum, whereby the American medical students were more likely to be dissatisfied with the quantity of health policy instruction in their curriculum (73.1%) compared to their Canadian counterparts (57.5%). This further validates concerns expressed in previous reports published in the United States about the adequacy of health policy education at a compulsory level (Mou et al., 2011; Patel et al., 2011). Studies have also reported that medical students' apprehension towards involving themselves in health policy roles stems from their lack of knowledge on the subject (Malik et al., 2017). Although health policy is largely not taught yet at medical schools in developing countries, this finding provides some insight as to which developed country's health policy curriculum model developing countries should potentially assimilate their medical health policy curriculum to in the future, in order to achieve the best outcome.

3.2.2 Medical students' perception and interest regarding health policy studies

Questionnaire-based studies generally showed that the majority of medical students in all regions were interested to learn about health policy and healthcare systems (Malik et al., 2017; Haque et al., 2022; Leonard et al., 2023), and even agreed with compulsory teaching of a health policy curriculum (Malik et al., 2017; Haque et al., 2022). Although, various studies on the opinion of medical students from developed countries on their curriculum showed that they believed their health policy education was not appropriate or sufficient for them to be able to maximize their potential in real health policy roles (Malik et al., 2017; Patel et al., 2014). A study by Patel et al. (2014) found that while American medical students felt they were relatively adequately educated about policy principles, health systems, quality and safety, they did not feel that they were sufficiently enlightened in the aspects of medical equity, value, politics, economics, regulation and licensure. Internship-based programs may be more effective in delivering associated, contextual knowledge and a tailored skill set in advocacy on health systems and policy to medical students and future advocates of health (Gogineni, 2021; Hayman et al., 2020). There was no study which reported that medical

students perceived that the health policy education they received as part of their curriculum was excessive or unnecessary.

Alongside health policy teaching in the compulsory medical curriculum, medical students in developed countries often also supplement their knowledge through health policy studies and advocacy training through their participation in medical student associations like the American Medical Student Association (AMSA) and the Latino Medical Student Association (LMSA) (Sola et al., 2023). Kagan & Armstrong (2015) from the United States expressed their concerns about medical students' health policy knowledge being largely derived from unreliable mainstream media, potentially causing misconception of health policy, political bias, and misinformation in delivering patient education - urging the national medical education liaison committee to include health policy education as part of the compulsory curriculum within medical school, and to assess health policy knowledge in the national medical exam board. This risk should also be a consideration in the development of health policy education in developing countries in their respective quests to attain development goals. When a compulsory health policy curriculum was already implemented, a larger percentage of medical students trusted the instruction taught by their institution rather than the information available on other media platforms (Leonard et al., 2023). In congruence with the global shift in health policy curriculum from classroom-based learning to internship-based skill training, students who have undergone such a health policy clerkship in developed countries also reported that it had provided them with more comprehensive knowledge and applicable advocacy skills which also increased their confidence and interest in pursuing a career in public health or health policy in the future (Chang et al., 2022; Metzger, 2024; Rahma et al., 2023).

3.2.3 Health policy attitudes of medical students

Questionnaire-based studies generally found that medical students who received health policy instruction in medical school has a positive and constructive health policy attitude which was congruent with the health system of their respective countries (Press et al., 2015; Rahma et al., 2023; Rook et al., 2019; Vidwan et al., 2015). A study found that Canadian medical students (86.8%) were far more likely than American medical students (51.1%) to advocate for a universal healthcare coverage, which are policies that ensure every individual will have access to good quality healthcare without having to endure financial hardship (Emil et al., 2020); a different study found that while the majority of American medical students believed that everyone is entitled to adequate medical care regardless of their ability to pay and also believed that the 2010 Affordable Care Act (ACA) was effective in improving the public's access to healthcare, the majority of medical students also felt that there needed to be more health reform in the United States in order to minimize social and racial healthcare disparity and reduce patients' out-of-pocket healthcare costs (Meurer et al., 2015). Meurer et al. (2015) found that political stance was also a major determinant of whether a medical student would support or oppose the ACA, regardless of their perception of its effectiveness. This shows that alongside understanding the healthcare system, the state of public health and health policy - the students' comprehension of social context and the students' political perspective may also influence their health policy attitudes. In low-income developing countries, political corruption can actually attenuate income disparity (Keneck-Massil et al., 2021) - which means that the youth in medicine in these countries may potentially be enticed to adopt destructive health policy attitudes which may further exacerbate the precariousness of the nation's health system, especially in regards to national health crises (Ali & Ali, 2022).

The study by Dugger et al. (2015) showed that American medical students favoured the use of recommended or gold standard treatment for illnesses, even if they were relatively expensive; they did not think that cost-effectiveness data was relevant in a medical physician's decision-making regarding therapy as it could potentially compromise the quality of healthcare delivered. Medical students from lower-income developing countries cannot afford to exemplify this type of health policy attitude as, on a national level, they do

not have the financial means nor facilities to systematically and collectively adhere to the highest standard of diagnostics and therapy - more so relying on simple, affordable, and accessible non-definitive medical tests and local disease patterns to diagnose illnesses and focusing on disease mitigation (Aranda et al., 2022; Yadav et al., 2021). The prototypical health policy curriculum for medical students in developing countries should also address the issue of redirecting the students' health policy attitudes to more plausible and feasible ones in the context of their respective health systems.

3.3 Current scenario of health policy education for medical students in developing countries

There is insufficient information regarding the current scenario of health policy education for medical students in developing countries from academic literature, as the online database search only found three academic articles on this topic in the past decade (Chaudhry, 2024; Haque et al., 2022; Qamar et al., 2023). The cross-sectional questionnaire-based study at the National Defense University of Malaysia found that the vast majority of their medical students (83.6%) believed that health policy education should be incorporated into the compulsory preclinical curriculum as such a curriculum had not yet been implemented before, which consequently also meant that most of the respondents (72.6%) were never previously nor currently involved in health policy roles due to their lack of knowledge concerning this subject matter (Haque et al., 2022). The articles by Qamar et al. (2023) and Chaudhry (2024) were in the form of analytical autoethnographies by medical students who were involved in health policy studies and advocacy in Pakistan. Qamar et al. (2023) reported on the active involvement and achievements of the medical students at the Aga Khan University of Pakistan throughout the past 7 years in advocating for newborn screening for rare inherited metabolic disorders through online and offline campaigns. The most extensive academic literature on this health policy advocacy through medical student associations which is discoverable through the online databases included in this review was the research paper by Chaudhry (2024). Chaudhry (2024) explains that the medical student and resident doctors' representative organizations in Pakistan are fragmented due to political disagreement, however the medical student associations from universities in each of the four provinces are unified under a few national-level entities, including the Private Medical Students Union Pakistan, the Provincial Doctors Association, Young Doctors Association (YDA) Punjab, YDA Sindh, YDA Balochistan and YDA Pakhtunkhwa - and this article mapped out the landscape of the related organizations throughout Pakistan. The 18th amendment meant that each province was responsible for its own health policies, which were then studied and scrutinized by medical student associations in each of their respective provinces, where they continue to operate despite the national outlawing of students' involvement in politics in Pakistan in 1984 (Chaudhry, 2024).

Due to the scarcity of academic literature on health policy studies and involvement of medical students in developing countries, the information for the current landscape on medical student health policy curriculum and involvement in developing countries to answer the research question of this review must hence be supplemented by academic literature which were not mainly discussing this topic, articles published before 2014, recent newspaper articles, national archives and documents published by medical student associations on their media platforms. Considering the finding that health policy education is currently not yet taught as part of the preclinical curriculum for medical students at all in most institutes in developing countries, and that it is instead more extensively studied independently in student-led organizations and projects - it is therefore fundamentally important to understand the background and landscape of medical student associations in developing countries.

In other parts of South Asia, such as in India and Bangladesh health policy is not explicitly nor extensively taught in the core curriculum of most medical school, although there is a growing emphasis on incorporating basic health policy concepts, particularly through the study of "Community Medicine" which covers aspects of public health, and health policy implications (Hasan et al., 2025; Pandey et al., 2012; Rahman et al., 2024). In

India, student organizations such as the Federation of All India Medical Association and the Federation of Resident Doctors' Association (FORDA) have played a critical role in the socio-political development of the country (Saurabh, 2023), through advocating for the rights and well-being of medical students and professionals (Sriram et al., 2021), and against the overworking and underpaying of medical professionals which would affect healthcare adversely on a national scale (Times of India, 2022) which then gained the attention and prompt response from the Ministry of Health and Family Welfare of India. Similarly, in Bangladesh, medical student organizations organized protests for low salaries, compensation, safety and security of healthcare workers during the COVID-19 pandemic, as well as the government policy for extension of the housemanship duration for improved medical competency (Daily Sun, 2023; Jackman, 2019; The Business Standard, 2023; The Financial Express, 2020).

In Southeast Asia, health policy is generally included in the curriculum for medical students in Malaysia, Indonesia, Singapore, Thailand and the Philippines. However, this term is used loosely, with most medical schools incorporating public health and medicolegal aspects within their teaching, which allows students to learn about relevant health policies within the national healthcare system; the depth and specific focus on policy varies greatly between institutions. There was literature which suggested that most medical schools in Indonesia have integrated education on healthcare policy, health financing and the social determinants of health into their lecture-based curriculum as well as community-based projects (Kadir et al., 2021). Conversely, there was also literature which stated that public health and health policy education for Indonesian medical students is not adequately regulated nor assessed (Suswati & Rahayu, 2019) - as the Indonesian Medical Educator Association for Public Health, Preventive Medicine and Community Medicine was not included in the 2012 Indonesian Standard for Doctor Competency nor the 2019 Indonesian National Standard for Medical professional Education (Kadir et al., 2023), which are the two national medical education standards which Indonesian medical schools may choose to base their curriculum on (Indonesian Medical Council, 2012). The landscape on health policy education for medical students is still elusive in Malaysia; not every medical school has a health policy curriculum (Haque et al., 2022) and it is still not included in the latest national standard for medical education (Malaysian Medical Council, 2019). In contrast, health policy and public health education for medical students in the Philippines is part of their national guidelines for the doctor of medicine program (Commission on Higher Education, 2016) and is greatly influenced by western curriculum, curated based on WHO's 6 Building Blocks for quality health systems (Guingona et al., 2021; Punzalan et al., 2023). Based on the available resources, this review finds that the health policy curriculum for medical students is also well-established in Thailand (Aung et al., 2024; Mei et al., 2022; WHO, 2009) and Singapore (Fang et al., 2022; Lum et al., 2018; Ministry of Health Singapore, 2014).

There was no readily available comprehensive statement confirming the existence of a dedicated "health policy" course within the standard medical curriculum in Laos. However, there is evidence that medical students in Laos do receive some level of training related to health policy, in particular through public health components within their medical education. These training programs often take place in rural areas and include students' exposure to the country's healthcare system, policies on primary health care, and relevant regulations (Jönsson et al., 2015; Keio Times, 2018; Kilpatrick et al., 2019). The same can be said for Vietnam (Duong et al., 2022) and Timor-Leste (Ferrinho et al., 2015). The author did not find much information regarding health policy curriculum in other Southeast Asian countries such as Brunei and Myanmar. Meanwhile, this scoping review found that countries such as Cambodia do not have the topic of health policy integrated into their medical curriculum (Lim et al., 2024). While health policy is not universally taught in the developing countries in the continent of Africa, there is plenty of literature describing a well-established health policy and public health curriculum in countries with a more developed healthcare system, such as South Africa (Clithero-Eridon et al., 2020; Stock, 2015; Mabuza & Moshabela, 2024; Mabuza & Moshabela, 2023; Sui et al., 2019) - which is expected, since South Africa is the largest economy in the African continent (The World Bank, 2025). There are also records

of a limited health policy curriculum for medical students in some other developing countries in Sub-Saharan Africa, including Botswana, Ethiopia, Kenya, Mozambique, Nigeria, Tanzania, Uganda, Zambia and Zimbabwe (Talib et al., 2017).

3.4 Impact of medical student involvement in health policy roles

In the context of developed countries, academic literature on American medical students' involvement in health policy described their roles in discussing issues regarding the medical physicians' licensing and eligibility to practice medicine (Carmody et al., 2021), as well as the single-payer healthcare reform and the effectiveness of the 2010 ACA, whether through writing papers or at conferences (Metzger, 2024; Meurer et al., 2015; Rook et al., 2019). Medical students' participation in health policy in Europe through the deliverance of their perspectives and invitation of health stakeholders to create change through the curation of health policy research documents effectively mitigated public health issues like noncommunicable diseases and climate change, as well as the delivery of primary healthcare, which resonated with WHO's "ten threats to global health in 2019". At the 12th European Public Health Conference, the European Medical Students' Association (EMSA) produced policy research documents which focused more on the particular health issues in Europe, including healthy and sustainable lifestyle and the promotion of health; whereas, the International Federation of Medical Students' Associations (IFMSA) contributed to policy documents which were more associated with global health challenges such as the mitigation of infectious disease outbreaks (Kaymaz, 2019). This does not mean that all medical students from western developed countries are interested or involved in health policy roles; there is also literature which supports the opposing statement. A study conducted on medical students in the United Kingdom found that 96% of the respondents had never participated in a health policy role and that 61% had no interest in future participation nor career in a health policy-related field (Malik et al., 2017).

In the context of developing countries, the article by Qamar et al. (2023) reported on how medical students were the driving force behind the 2023 national movement for rare disease screening in neonates, citing the WHO actionable guideline in communicating for health as one of the standard of their project's execution and rationale for its timing. In Pakistan, medical student organizations have been leveraging a vast assortment of media platforms for communication as a means to reach internal stakeholders in the national health system and convey their collective concerns regarding public health and health education issues and advocate for their solutions - including press releases, formal and informal assemblies, social media platforms, and even direct ward rounds (Chaudhry, 2024). The vast majority of issues highlighted by these medical student organizations were administrative issues such as the lack of a role of law in hospitals which led to unfit individuals inappropriately appointed key positions in hospital organizational charts, ultimately causing interference of politics, conflict among actors in positions of powers, poor performance and corruptions of hospitals and medical institutes. YDA Sindh has also previously expressed an outright rejection towards the the Sindh Public Service Commission's interview process for the recruitment of dental surgeons as there were substantial concerns regarding the meritocracy and transparency of the process - which could lead to further issues like favoritism, medical incompetence and negligence (Chaudhry, 2024).

In Southeast Asia, a prominent example of impactful medical student involvement in health policy roles was that of medical students in Indonesia. Interestingly, despite its relatively large population size compared to other Southeast Asian countries and vast number of medical schools - since 1981, Indonesia has a well-established and entrenched national level medical student association, Ikatan Senat Mahasiswa Kedokteran Indonesia (ISMKI), whose members and board of directors are made up of medical students from 90 campuses out of all 93 public and private medical schools in Indonesia - which makes it the largest, most inclusive and arguably most structured medical student association in Southeast Asia (UPNVJ, 2023). The main purpose of ISMKI's Health Policy Studies (HPS)

division, which has collaborated with the Indonesian Medical Strategy Studies Association (IMKA), is to monitor the movement of national health issues and health policies. In September 2024, representatives of ISMKI held an audience with the Deputy Minister of Health of Indonesia at the Kemenkes building discussing the attitudes of medical students towards several articles in Government Regulation No. 28 of 2024 on Implementation of the Health Law (ISMKI, 2024). This discussion included the recent issue of temporary suspension of anesthesiology specialist study program activities at Diponegoro University on the basis of preventing bullying and excessive workload, Article 658-668 on Import of Foreign Medical Personnel to address shortage of experts in certain specializations, as well as the recent controversy over the opening of a new medical faculties to meet the demand for doctors in Indonesia to meet the WHO doctor to population ratio standard of at least 1:1000 (WHO, 2025) to meet SDGs Target 3.c (United Nations, n.d.) without compromising the quality of Indonesian medical graduates. This discussion of legal and policy issues is in line with SDGs Target 3.c on increasing the recruitment, development, training and retention of the health workforce in developing countries. Article 116 on the Legalization of Abortion for rape victims and life-threatening pregnancy conditions was also discussed, which partially fulfils SDGs Target 3.7.1 on access to family planning for women of reproductive age (ISMKI, 2024). As a supplement to the curriculum on health policy administered in medical schools, ISMKI's HPS division has also published various research documents analyzing changes in the national health policy and regulations over the years, including the recent controversies regarding the health law omnibus which was passed in August of 2023 on switching from lecture-based to hospital-based residency (ISMKI, 2023a), the recruitment of foreign medical doctors to supplement the healthcare workforce shortage (ISMKI, 2023b), and the health cadre formation (ISMKI, 2023c).

3.5 Problems faced in implementing health policy in developing countries

In order to make lasting improvements to the public health of a nation - there needs to be health policy changes made from time to time in accordance with the concurrent national health issues including motor vehicle safety, NCDs like obesity (Porter et al., 2018) as well as control of tobacco advertisement, import and sales - which are part of the NCD "Best Buys" and Target 3.a of the SDGs (United Nations, n.d.). This is a difficult issue to tackle because tobacco industries dominate economies of many lower-middle income countries and control legislations which restrict health policy changes which may impede their financial gain (Gilmore et al., 2015). The need to meet urgent healthcare demands frequently clashes with the aspiration to implement long-term, sustainable solutions for public health and the national healthcare system. Developing countries are usually locked in a vicious cycle of spending money on short-term fixes for pressing health issues at the expense of long-term, crucial expenditures (Kakade et al., 2023). Developing countries face the scarcity of resources and may have healthcare needs and epidemics which make the healthcare scene much different than those in developed countries; health policy plays a pivotal role in the delivery of healthcare which is targeted, fair, affordable and effective in these countries in accordance to their respective circumstances (Dang et al., 2016; Saif-Ur-Rahman et al., 2019). Several other issues faced by developing countries in the implementation of health policy besides insufficient funding include deficiencies in infrastructure and facilities such as unsatisfactory road networks and limited accessibility of healthcare for people residing in remote areas, as well as the shortage of competent healthcare workers due to low salary, inhumane working conditions, overworking, limited mental health support and restricted opportunities for professional development (Kakade et al., 2019). The mix between public and private healthcare sectors which prevails in lower-middle income countries also compromises health equity in those nations (Nishtar, 2010).

Inconsistent policy frameworks resulting from unstable political settings in developing countries can impede long-term planning and the steady advancement of healthcare initiatives, hampering the development of the country in many aspects, including health (Gao et al., 2023; Kakade et al., 2023). The political instability and lack of a secure healthcare

system in one developing country may even adversely affect the health state in its neighbouring developing countries (Ndokang & Tsambou, 2015) or make it dependent on a neighbouring country's healthcare system (Abdullah et al., 2019; Nazem & Mohamed, 2015; Risnawati & Nadjib, 2023). The students of today are the leaders of tomorrow - all the education and skill gaps in the future leaders must be gone over with a fine-tooth comb and promptly addressed to maximize their managerial competencies and leadership capabilities so that the apparent heirs of the nation can sustain the current achievements in development goals and ramp up the evolution of the national systems (Ghasemy et al., 2023; Good et al., 2016). It is crucial that all youth in medicine realize the weight of the role they can play in engaging with real-world issues - which can subsequently serve to cultivate inspiration to pursue health academics or to become future public health leader candidates to invigorate health policy change. Consequently, revamping the education of the future medical workforce in developing countries, especially lower-middle income to lower income economies, is vital to the development of a global health system (Beth et al., 2020). Medical students' involvement in health policy and advocacy roles can generate a self-amplifying cycle - as witnessing and participating in the operation of organized medicine first-hand can help fill the educational gaps in their understanding of policy, systems and healthcare contexts through learning on-the-job, while also improving their confidence and reinforcing the students' cognizance of how impactful their voices can be in determining the future of healthcare in their nation (Baughman, 2023; Metzger, 2024; WHO, 2020).

3.6 Recommendation for further action

This review found that only three out of 55 academic journal articles on health policy education of medical students available on the included databases originated from developing countries over the past decade. The author hence implores academia in medicine and health sciences, medical councils, ministries of health and ministries of education in all developing countries to implement measures through policy and national or institutional budget allocations which prioritise the development, surveillance, documentation and reporting on the health policy education for future healthcare workers, especially future doctors as one of the main determinants in overcoming health challenges and attaining health goals in their respective nations (Al-Worafi, 2024). These efforts should also be supported by international organizations such as WHO, United Nations Educational, Scientific and Cultural Organization (UNESCO) and other such international non-government organizations and think tanks such as the Global Health Council and Human Rights Careers, as they are in line with the founding principles and goals of these global entities (Global Health Council, 2024; Human Rights Careers, 2020; UNESCO, 2022; WHO, 2020). There first needs to be sufficient reliable records with wide coverage on the health policy education of these future health leaders in developing nations before its true landscape can be assessed, evaluated, reformed and improved - as is currently being done in developed nations (Crosson et al., 2023; Kaymaz et al., 2019; O'Brien et al., 2020).

This review found ample reporting of relatively significant impact of medical student involvement in health policy roles. However, a large portion of the sources of such reports in Southeast Asian countries such as Indonesia were mostly self-written by student-led private organizations (ISMKI, 2023a; ISMKI, 2023b; ISMKI 2023c; ISMKI, 2024; UPNVJ, 2023) which may sometimes reflect bias, lack peer review and may serve specific vested interests - which makes the validity lower and more dependent on context. When there are more peer-reviewed, evidence-based academic reports on the involvement of medical students on health policy roles in developing countries, like the published journal articles from Pakistan (Chaudhry, 2024; Qamar et al., 2023) - there can also be more structured way to appraise these movements and to supplement them with up-to-date frameworks for implementation (Cairney et al., 2022; Ogugua et al., 2024). These efforts, when supplemented with academic knowledge, expert opinions and directed to specific targets can be more well-organized and more efficiently aid in attaining health goals and battling major health challenges which otherwise seem "trivial" for governments in middle to lower

income countries such as tobacco control. There are already existing updates on the policy framework implementation strategies in academic literature (Hoe et al., 2019) – but there needs to be a rise in educated advocacy and active execution of these strategies in order to fulfil Target 3.a of the SDGs as an example of a short-term goal (United Nations, n.d.), and as a necessary step in the long-term plan to breach the gap where developing countries, which host 80% of the smoking population in the whole world (WHO, 2025), fall behind compared to developed countries in entering the tobacco endgame (Tamil Selvan et al., 2024). This is especially applicable in developing countries with high prevalence of smokers and booming tobacco industry like Indonesia where a well-established national level medical-student-led health policy studies sector already exists, where there is reason to expect a more significant national impact of student-led advocacy in health policy if it was more adequately supplemented by academic institutions.

4. Conclusion

This review found that there has been a steady rise in academic interest in health policy education and involvement of medical students from the years 2017 to 2022, although the topic has stayed relatively relevant throughout the past decade. This result was expected – as there surely needs to be a means to continuously reevaluate and refine the delivery and assessment of knowledge on health policymaking among future physicians and health leaders, as well as to gauge their interest and stimulate their involvement in this field. While a health policy curriculum is more widely, uniformly and extensively taught in developed countries, students generally found the curriculum inadequate in preparing them for involvement or careers in health policy and suggested that an internship or other experience-based learning may improve their advocacy skills for real world application. Meanwhile, there is an extreme diversity in health policy education in developing countries, namely in Southeast Asia where there are countries which have established and developed their medical health policy curriculum for many years—while others have not begun to implement such a curriculum yet at all, or in most of the medical schools in their country. The level of knowledge of the national health policy among medical students is reflected in their level of involvement in health policy roles and the contributions they make to the development of their country's public health and health education system. Medical students' lack of or insufficient exposure to health policy education and practical skills in health advocacy is a hindrance to their interest in getting involved in health policy roles. This review shows evidently that when medical students were involved in health policy roles, they were able to invoke the government's response through rallies and forums with stakeholders, which improved public health, healthcare delivery and medical education in their nations.

This scoping review also found an astounding scarcity of documentation on medical students' health policy education and involvement in developing countries in published academic literature. Conflicting interests between achieving short term health goals and contriving sustainable long-term solutions has been a long-standing issue which plagues the health systems in developing countries. There needs to be an open space for intergenerational discussion and criticism of the efficiency and effectiveness of current policies in order to devise innovative strategies for improvement. The instability of the health policy framework in developing countries caused by the constant transition of leadership roles from generation to generation can be overcome with extensive research and rigorous enforcement of an improved education and training structure. There needs to be more academic investigation and coverage on the subject of education and involvement of medical students in health policy in developing countries as a more comprehensive grasp of the curriculum structure and gaps in education and skill is necessary in order to address them and build on the existing infrastructure in the pursuit of a better education for medical students – ultimately producing higher quality future physicians in developing countries with the necessary knowledge and skills to advocate and fight for the legislation of better healthcare for the general public. The development of an adequate health policy curriculum,

its regulation and implementation, and its administration to medical students over a generation will be a time-consuming process. The fruits of these efforts may not be measurable in a short time, for instance it may not have produced its impact yet by the deadline of the United Nations' SDGs in 2030. Nevertheless, the evolution of developing countries should ideally be in continuous motion regardless of the ever-changing names of programs and targets to measure these developments.

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