


Education about planetary health and sustainable healthcare: A national audit of health professions education curricula in South Africa

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Background. Climate change and environmental degradation have severe public health impacts. Education about planetary health (PH) and sustainable healthcare (SH), or the interdependence of health and healthcare and planetary ecosystems, is developing globally to enable health professionals to protect public health from these threats, and to build sustainable healthcare systems.

Objective. To assess the status of PH and SH in health professions education in South African (SA) faculties of health sciences as a foundation for future work.

Methods. Educators at all 24 SA faculties of health sciences were surveyed regarding undergraduate and postgraduate faculty courses with PH- and SH-related learning objectives and outcomes, learning activities and assessments. Pivot tables were constructed to analyse their responses.

Results. Forty-one responses were received, representing 9 health professions from 15 of 24 faculties of health sciences in SA (62.5%). More than half (53.7%) were unaware of any courses with PH and SH content at their faculties. Nineteen respondents from 11 faculties reported 44 courses and provided data on 18 non-duplicate courses. Learning activities included advising patients about environmental and health co-benefits of their lifestyle choices (33.3%); written assignments (38.9%); oral presentations (55.6%); and community-based research (38.9%). Nine courses (50%) reported PH- and SH-related assessments, most commonly oral presentations (88.9%); reflective essays (77.8%); multiple-choice or short assessment questions (55.6%); and research outputs (55.6%).

Conclusion. Education about PH and SH is starting to develop in SA faculties, although with a limited variety of learning activities and assessments. This study provides a useful baseline for curriculum development and assessment of progress.

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Climate change has been widely recognised as a major and growing threat to global health in the 21st century, which is amplifying environmental risks to health.^[1,2] Educating current and future health professionals to protect health from climate change, to promote behaviour to mitigate and adapt to a changing climate, and to work for the environmental sustainability of health services, is therefore increasingly important.^[3] Advocacy on climate change is recognised as a duty of health professionals, especially given their proximity to those most vulnerable to climate-health impacts, their expertise and experience in treating such impacts, their influence in promoting more sustainable healthcare (SH), and the high levels of public trust placed in them.^[4]

SH aims to provide high-quality healthcare, without compromising the ability of the healthcare system to meet future health needs. Promoting health and the timely delivery of quality healthcare benefits patients and the ecosystems on which their health depends.^[5] Education for sustainable healthcare (ESH) has been defined as the organisation of health professions education to develop knowledge, skills and attitudes about the interdependence of health and healthcare and planetary ecosystems.^[6,7] This includes the effects of rapid climate and environmental changes on health, and conversely, the impacts of healthcare systems on the environment. There is growing international practice and research about integrating sustainability into various educational contexts and health professions education curricula

that need to be adapted appropriately for local settings.^[8-12] The *Consensus Statement on Planetary Health and Education for Sustainable Healthcare*,^[13] developed by the Association for Medical Education in Europe (AMEE), is an important milestone in the field. It describes the knowledge, skills and values required to practise SH, and has proposed learning objectives, activities and assessments to promote multidisciplinary learning. ESH mainstreams, as a cross-cutting curricular theme, the concept of planetary health (PH), which encompasses the health and wellbeing of human civilisation and the state of the natural systems on which it depends.^[14]

With the wide-ranging social and health impacts of global climate change and environmental degradation, the concept of environmental accountability has emerged as an aspect of the social accountability of health educational institutions. It recognises that institutional policies and practices that reduce environmental impact, and educating graduates to promote PH and SH, are ways in which educational institutions can address public health needs in a rapidly changing environment.^[15-17] The World Health Organization (WHO) *COP26 Special Report on Climate Change and Health*^[18] has urged that health workers be trained to help build low-carbon and climate-resilient healthcare systems. The WHO-Civil Society Working Group to Advance Action on Health and Climate Change has called on health education stakeholders to incorporate climate change into curricula for preparing health professionals ‘to recognise and address the health risks and impacts of climate change and to ensure functioning healthcare systems in a climate-changed future’.^[19] An ESH curriculum for the UK^[20] was published by the UK Medical Schools Council in 2022 in support of the Outcomes for Graduates framework of the General Medical Council (GMC),^[21] which requires application of the principles of population health and SH.

Common barriers to integrating ESH include perceptions that existing curricula are overloaded; poor integration, alignment and assessment of current content on environmental sustainability; and faculty leaders, educators and students who doubt the relevance and worth of ESH, or fail to see what health professionals can do, especially in the face of more apparently urgent ‘downstream’ health challenges.^[5,6] Common enablers of integration include strong institutional leadership; increasing public awareness of climate and environmental crises, creating greater interest among educators and students; sharing of case studies and learning resources; and opportunities for change that arise from periodic curriculum reviews.^[5,6] Partnerships between educators and students, supported by international collaboration, have been critical for the successful integration of PH and SH into health professions curricula in other settings.^[22,23]

Southern Africa is highly vulnerable to environmental and climate risks to health, such as malnutrition and trauma arising from destructive extreme weather events.^[24-26] South Africa (SA) has therefore adopted climate change policies and plans to build capacity in climate change awareness and adaptation.^[27,28] Progress on including environmental accountability in health professions education in SA has been slow, despite calls to do so.^[29] It should therefore be a priority for enabling future health professionals to identify and appropriately treat climate-sensitive conditions, to promote healthy behaviour and to advocate for sustainable healthcare systems.

However, the status of PH and SH in health professions education in SA faculties of health sciences is uncertain. The Education for Sustainable Healthcare Special Interest Group (ESH SIG) of the Southern African Association of Health Educationalists (SAAHE) was established in July 2021 to promote education regarding PH and SH in SA and southern Africa. This article describes a national audit in late 2021 of PH and SH in health

professions education in faculties of health sciences in SA to provide a foundation for future work of the ESH SIG and others.

Methods

Design

The audit is a cross-sectional survey and the first of three phases of a mixed methods study design for the development of SA health professionals as advocates for PH and SH.

Study population and sampling

The study population comprised educators at all 24 SA faculties of health sciences. They were surveyed using a form based on the AMEE Consensus, which achieved broad consensus on a set of proposed learning objectives, activities and assessments.^[13] The audit was endorsed by the national board of SAAHE and piloted on members of the ESH SIG executive, which helped to improve the clarity of the survey form. The invitation to participate in the audit was then shared widely with educators at all SA faculties of health sciences via SAAHE and several other networks (Box 1). The 2021 *COP26 Special Report on Climate Change and Health*^[18] was referenced in communications to highlight the topicality of the study and to encourage timely responses.

Data collection and analysis

The survey questions pertained to all undergraduate and postgraduate faculty courses that contained content regarding PH and SH, which were defined as the interdependence of health and healthcare and planetary ecosystems^[13] (Supplementary File: <https://www.samedical.org/file/2089>). Respondents were asked to report on PH- and SH-related course learning objectives and outcomes, learning activities and formative or summative assessments, using checklists derived from the AMEE Consensus,^[13] with provision for any further responses. They were requested to separately email course learning outcomes (defined as the specific questions that the convener wants the course to raise) and course learning objectives (i.e. specific, measurable knowledge and skills that the student should gain) for thematic analysis. Survey data were captured via Google Forms and responses were viewed in Google Sheets Excel pivot tables, constructed by JI, to analyse the frequency of key variables in the responses.

Ethical approval

Ethical approval was obtained in August 2021 from the Research Ethics Committee, Faculty of Health Sciences, University of Cape Town (UCT) (ref. no. HREC 358/2021).

Results

Forty-one responses were received from educators, representing 9 of the 17 professions (Box 2) registered with the Health Professions Council of SA (HPCSA) and the SA Nursing Council (SANC). All were included in the analysis. The most common professions that responded were medical practitioners ($n=13$; 31.7% of sample) and environmental health practitioners (EHP) ($n=5$; 12.2%). Fifteen of the 24 faculties of health sciences in SA were represented in the sample (62.5%), 8 faculties more than once, but by different departments and courses. The faculties of UCT and the University of Pretoria had the most representatives, with 8 and 7 respondents, respectively. The respondents were nearly evenly split between the ranks of professor, associate professor, senior lecturer

Box 1. Organisations and networks sharing the audit invitation

The Southern African Association of Health Educationalists (SAAHE) is an association of health sciences educators from South African (SA) universities, non-governmental organisations (NGOs) and government and private sectors for improving the quality of teaching and learning in health sciences education to enhance the delivery of high-quality, affordable and sustainable healthcare to South Africans in the public and private sector (<https://saahe.org.za>; accessed 17 January 2022)

The Network: Towards Unity for Health (TUFH) is an international, intersectoral, intergenerational organisation that fosters equitable community-orientated health services, education and research with the goal of improving health locally and globally (<https://thenetworktufh.org>; accessed 17 January 2022). It includes the following SA institutions: Central University of Technology; Department of Family Medicine and Primary Care, University of the Witwatersrand; Stellenbosch University; Nelson Mandela University School of Nursing; University of the Free State; University of Cape Town; University of KwaZulu-Natal; University of the Western Cape

The Primary Care and Family Medicine Network for sub-Saharan Africa (PRIMAFAMED) is an international institutional network that aims to develop and strengthen family medicine higher education and training through capacity building, curricula enhancement and academic research development (<https://primafamed.sun.ac.za>; accessed 17 January 2022). It has >320 members and includes the following SA universities: Cape Town, Stellenbosch, Free State, Witwatersrand, Pretoria, Sefako Makgatho, Limpopo, KwaZulu-Natal and Walter Sisulu

Climate-Migration-Health (ClimigHealth) is an international network focusing on climate change, migration and health(care) research, education and the public awareness project (<https://twitter.com/climighealth>; accessed 4 November 2021)

The Rural Doctors Association of Southern Africa (RuDASA) strives to inspire others towards rural healthcare in SA. Their aim is to support and empower those committed to making healthcare available to all South Africans (<https://rudasa.org.za/home>; accessed 17 January 2022)

Wits Health Consortium; Africa Centre; centres for rural health/primary healthcare; schools of medicine; departments of allied health sciences in faculties of health sciences

The Sub-Saharan Africa-FAIMER Regional Institute (SAFRI) is a 2-year fellowship programme for health professions faculty who have the potential to improve medical education at their schools. FAIMER (Foundation for Advancement of International Medical Education and Research) is designed to teach education methods, scholarship and leadership skills, and to develop an active, supportive professional network (<https://safri.faimerfri.org>; accessed 17 January 2022)

The Forum of University Nursing Deans of SA (FUNDISA) is a registered non-profit organisation for SA's nursing and midwifery education programmes in higher education, which represents 21 members of university nursing departments and 2 associate members (<https://fundisa.ac.za>; accessed 13 January 2022)

The Public Health Association of SA (PHASA) aims to provide leadership and a collective voice to improve health through knowledge sharing, capacity building and partnership in SA (<https://phasa.org.za>; accessed 2 October 2021)

Health Professions Council of SA (HPCSA)/SA Nursing Council (SANC) professions: audiologist/hearing therapist; clinical associate; clinical technologist; dental practitioner; dietician; emergency care practitioner; environmental health practitioner; medical practitioner; medical technologist; nursing professional; nutritionist; occupational therapist; optometrist; physiotherapist; psychologist; radiographer; speech and language therapist

Box 2. Health Professions Council of SA (HPCSA)/SA Nursing Council (SANC) professions

Audiologist/hearing therapist; clinical associate; clinical technologist; dental practitioner; dietician; emergency care practitioner; environmental health practitioner; medical practitioner; medical technologist; nursing professional; nutritionist; occupational therapist; optometrist; physiotherapist; psychologist; radiographer; speech and language therapist

and lecturer. They most often described their occupations as undergraduate or postgraduate educators in environmental health or SH, and less often as researchers, health promoters or as engaging directly with communities (Supplementary Table 1: <https://www.samedical.org/file/2089>).

Their reporting of faculty courses with PH and SH content ranged from no courses ($n=22$; 53.7% of respondents) to ≥ 4 courses ($n=4$; 9.8%). Overall, 44 courses were reported by 19 respondents from 11 faculties. Data were provided for 21 of the courses, but as 3 of these courses were duplicate reports by 2 respondents at the same faculties, their responses were combined to provide data on 18 unique courses at 11 faculties.

Eight of these were undergraduate courses, 7 were postgraduate courses, and 3 were offered to both undergraduates and postgraduates in different disciplines. Three of the 8 undergraduate courses (29.4%) were offered exclusively within MB ChB programmes, 2 exclusively to EHPs (25%), 1 to physiotherapists only, and the remaining 2 (25%) to several disciplines. Of the 7 postgraduate courses reported, 5 were Master in Public Health (MPH) programmes, 1 an MMed (Community Health) programme and 1 a Postgraduate Diploma in Occupational Health. The existence of PH- and SH-related course learning outcomes was reported for 15 courses (83.3%) and learning objectives for 17 (94.4%) of the 18 courses (Supplementary Table 2: <https://www.samedical.org/file/2089>).

The response to the request for emailed detail on the learning outcomes and objectives elicited only a few responses; therefore, no meaningful qualitative analysis was possible.

Learning activities

Over all 18 courses, the average reported frequency of the 11 learning activities proposed by the AMEE Consensus was 4 (22.2%) per course, ranging from 0 to 9 activities. The most frequent learning activities related to PH and SH were oral presentations on such topics ($n=9$; 50.0%); community-based research about key environmental determinants of health ($n=7$; 38.9%); written assignments ($n=7$; 38.9%); and advice to real or role-played patients about the environmental and health co-benefits of their lifestyle choices ($n=5$ courses; 27.8%). The following learning activities were each employed by 3 of the 18 courses (16.7%): designing a public health strategy to address environmental health impacts; concept mapping the relationships between the environment, disease and healthcare; and debating issues of ecological justice, eco-ethics and eco-advocacy by health professionals (Table 1). The 10 courses that included a postgraduate offering had twice the average number of forms of learning activities than the 8 undergraduate courses (Supplementary Table 2: <https://www.samedical.org/file/2089>).

Assessments

Nine of the 18 courses (50.0%) reported formative and/or summative assessments of PH and SH content (Supplementary Table 3: <https://www.samedical.org/file/2089>). The most common types of assessments were essays or individual reflections on learning ($n=8$; 88.9%); oral presentations with a rubric ($n=8$; 88.9%); written assignments ($n=6$; 66.7%); and multiple-choice or short assessment questions (MCQs/SAQs) ($n=6$; 66.7%). Environmental history taking and advice about sustainable and healthy lifestyles at observed structured clinical examination (OSCE) stations ($n=1$; 11.1%), and advice regarding sustainable and healthy lifestyles at OSCEs, were reported least often. Overall, more formative ($n=36$) than summative types of assessment ($n=22$) were reported (Table 2).

Discussion

The responses received related to 18 undergraduate and postgraduate courses. Overall, the quantity and variety of course learning activities and assessments regarding PH and SH were limited compared with those proposed by the AMEE Consensus,^[13] especially at the undergraduate level. More traditional forms of learning and assessment predominated, such as oral presentations, writing assignments and MCQs/SAQs. More innovative forms suggested by the AMEE Consensus that were seldom reported include reflecting on and debating sustainability and eco-ethical challenges; investigating viable eco-friendly alternatives to tests and treatments with high environmental impacts; and environmental history taking and advice about sustainable and healthy lifestyles in OSCEs and during real or role-played patient consultations. These appear to be significant missed opportunities to test the application of knowledge in the psychomotor and affective domains, given how important these skills and values are for health professionals in promoting sustainability in clinical care and patient self-care. More authentic approaches that allow for multiple assessments of progress and for individual creativity are needed to foster such skills and values.^[13]

Table 1. Learning activities related to planetary health and sustainable healthcare ($n=18$ courses)

| Learning activities | Courses, n | Frequency, % |
|--|--------------|--------------|
| Advice about eco-friendly and healthy lifestyles | 5 | 27.8 |
| Advice about eco-friendly treatments | 1 | 5.6 |
| Community-based research about environmental determinants of health | 7 | 38.9 |
| Concept mapping environment, disease and healthcare relationships | 3 | 16.7 |
| Debating ecological justice/eco-ethics/eco-advocacy | 3 | 16.7 |
| Designing a public health strategy to address environmental health impacts | 3 | 16.7 |
| Minimising tests and interventions with high environmental impact | 0 | 0.0 |
| Oral presentations | 9 | 50.0 |
| Reflections on personal and professional eco-ethical challenges | 2 | 11.1 |
| Taking an environmental history | 5 | 27.8 |
| Writing assignments | 6 | 33.3 |
| Other | 1 | 5.6 |
| Don't know | 4 | 22.2 |

Table 2. Assessments related to planetary health and sustainable healthcare ($n=9$ courses)

| Forms of assessment | Summative only, n | Formative only, n | Summative and formative, n | Courses with assessment, % |
|--|---------------------|---------------------|------------------------------|----------------------------|
| Assessments of concept mapping exercise | 1 | 2 | 0 | 33.3 |
| Assessments of debates with a rubric | 2 | 0 | 1 | 33.3 |
| Group discussion about eco-ethics in clinical care | 1 | 2 | 1 | 44.4 |
| Individual essay/reflections on learning | 1 | 7 | 0 | 88.9 |
| MCQs or SAQs on core topics | 4 | 2 | 0 | 66.7 |
| Oral presentations with a rubric | 1 | 7 | 0 | 88.9 |
| OSCE station: environmental history taking | 1 | 0 | 0 | 11.1 |
| OSCE station: SH advice to patients | 0 | 0 | 0 | 0.0 |
| Patient consults that include environmental history taking and SH advice | 0 | 2 | 0 | 22.2 |
| Peer feedback on oral presentations | 3 | 2 | 0 | 55.6 |
| Project supervisor assessment reports | 2 | 2 | 0 | 44.4 |
| Research report/presentation/journal article | 3 | 2 | 0 | 55.6 |
| Role-play | 0 | 4 | 0 | 44.4 |
| Written assignments with a rubric | 2 | 3 | 1 | 66.7 |
| Other | 1 | 1 | 0 | 22.2 |

MCQ = multiple-choice questions; SAQ = short assessment questions; OSCE = observed structured clinical examination; SH = sustainable healthcare.

Communicating sustainability values so that patients, their families and clinical colleagues understand how care for the environment is essential for health and wellbeing, is recognised in the UK curriculum for ESH as an important competency of professionalism and leadership for change.^[20] Students should therefore learn how to take an environmental history from their patients and have conversations about their climate-health risks, as well as co-beneficial opportunities for personal and public health by means of eco-friendly lifestyle choices about energy, transport, food and waste disposal. Such conversations could also promote available sustainable alternatives to excessive medicalisation, investigation and treatment, while respecting the priorities and socioeconomic circumstances of the patient. Hence, general practitioners may have particularly good opportunities to empower patients and promote low-carbon alternatives, which are key principles of sustainable clinical practice.^[30,31] However, such 'social prescribing' of non-medical options can also be readily practised by other disciplines, and may be especially effective in well-functioning health teams with a deep understanding of the determinants of health in their communities. The multidisciplinary student profile of many of the courses also provides a good opportunity for learning approaches to health and healthcare from a variety of health professionals.

Common examples of social prescribing include exercise and mindfulness classes; recreational and food gardening; active commuting on foot or by bicycle; and minimising, recycling and composting waste.^[20] Involving students in such activities for communities that they serve can be a powerful learning experience. Students' learning should include the population-based community-orientated primary care (COPC) approach that can help to identify interventions to reduce climate vulnerabilities, to empower communities' responses to climate emergencies and to address specific environmental determinants of health. It should also include learning about the prevailing public health challenges and potential interventions to develop greater resilience to environmental and climate risks to health and healthcare, such as flooding, high temperatures, poor waste management, displacement, migration and the changing epidemiology of diseases.^[32] Interventions to mitigate the considerable climate and environmental impacts of health facilities, and their leadership implications for health professionals and facility managers, should also be examined, using guidelines and local case studies from projects such as the Global Green and Healthy Hospitals (GGHH) initiative.^[33]

Sustainability issues can be readily linked to existing topics in many specialties and build on students' prior knowledge of climate and environmental change. Discussions of current extreme weather events reported in the media, such as floods, droughts, heatwaves and wildfires that heavily impact health and healthcare services, could include the vital role of health professionals in climate mitigation, healthcare adaptation, and disaster preparedness and response. Integrating such discussions with lectures, self-directed learning and hands-on learning about clinical skills and case management, both longitudinally throughout the years of study and collaboratively across the disciplines, could deepen learning in a well-constructed curriculum. A systems thinking approach is therefore important for broadening the focus from managing the patient within a healthcare setting, to addressing the social and environmental determinants of health and disease.^[20]

Similar barriers and enablers for integrating PH and SH as reported in the literature are likely in SA health professions education curricula; therefore, a strong case needs to be made. Determining the perceptions of national

educators about the importance of PH and SH in the unique SA context, and what they think key learning objectives, activities and assessments should be, will help to build this case. A companion article^[34] describes the subsequent Delphi panel phase of the mixed methods study to assess the relevance and applicability to SA of the learning objectives, activities and assessments proposed by the AMEE Consensus.

Study limitations

Despite extensive efforts to disseminate the survey across multiple networks of educators, the 41 responses received from 15 faculties are a limited representation of health professions and academic ranks at faculties of health sciences in SA. Regular follow-up and reminders by the principal investigator helped to boost the survey response rate at a time when academic year-end pressures and COVID-19-related academic disruptions were a major barrier. Data collection of longer duration - earlier in the year - may have yielded a larger and more representative response rate. The limited response may also reflect a disinclination to respond due to low awareness and understanding of the concepts of PH and SH, and perceptions of minimal relevance, as there are few courses with such content. The requested details on course learning outcomes and objectives are missing owing to a very low follow-up response rate, as explained above. Finally, further detail about learning activities and assessments was not requested to limit the burden of data collection on respondents and hence to achieve a higher overall response rate.

Conclusion

As far as we are aware, this is the first systematic attempt to survey education regarding PH and SH in health professions education in SA. We found that such education is starting to develop in SA health sciences faculties, albeit with a limited variety of learning activities and assessments of PH and SH content. Further research using deeper qualitative approaches would be helpful to address the study limitations.

Respondents recognised the growing importance and relevance of PH and SH to health professions education and practice, particularly in a country such as SA that is highly vulnerable to the health and social impacts of climate change and environmental degradation. Further work is therefore required in curriculum development in SA faculties of health sciences, enabled by strong institutional leadership, faculty staff and student involvement, sharing of ESH resources and continual monitoring and evaluation of progress. As such work is central to the mission of the ESH SIG of SAAHE, this audit provides a helpful baseline for the group's future activities, as well as informing the subsequent phases of the mixed methods study (a national Delphi panel; and a case study of the Faculty of Health Sciences, UCT).

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