

Designing an undergraduate phase one MBBCh genomic medicine syllabus

C4ME SUPPLEMENT

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Background

Genomic medicine (GeMed) is “an emerging medical discipline that involves using genomic information about an individual as part of their clinical care”. (1) In 2009, it was recommended that “use of genomic tools for diagnosis ...and choice of treatment should form an important part of the undergraduate medical curriculum”. (2) However, 10 years later, GeMed has rapidly advanced but is still not widely integrated into undergraduate medical curricula. A systematic review summarizing the current GeMed curricula for healthcare students contained only two UK-based studies, one from 2001, and one aimed at pharmacy students, (3) demonstrating the lack of current literature. A widening knowledge gap threatens the incorporation of GeMed into clinical medicine, with increasing numbers of clinicians feeling ill-equipped to diagnose genetic disorders. (4) In this precision medicine era, it is vital that tomorrow’s doctors are equipped with the skills and knowledge required to utilize GeMed to provide optimal patient care.

Furthermore, with the increasing technological complexities, and ethical and social dilemmas, associated with GeMed, (5) it is important to embrace the medical humanities to motivate ethically intelligent clinicians capable of recognising, communicating and managing sensitive situations. Therefore, when designing a phase one (1st/2nd year) GeMed syllabus, medical humanities should be considered.

Undergraduate medical students must receive GeMed education to adequately prepare them to deal with the challenge of applying the extensive density of knowledge required to deliver on the promise of GeMed. Therefore, this study will recommend key GeMed topics for inclusion in a phase one medical syllabus.

Methods

This study was mixed methods. The online questionnaire, designed using Online Surveys, allowed recruitment of participants from throughout the UK, achieving a more nationally representative view. The sample included curriculum directors/co-directors, researchers, clinicians and/or lecturers working in genomics. Respondents were recruited using convenience sampling through professional contacts and identifying email addresses from NHS and University websites (n=386). Participants ranked a list of 31 genomics topics, derived from existing genomics syllabi, (the APHMG's core curriculum, the AAMC core competencies, and the UK master's curriculum), using a 5-point Likert scale. The results were analysed using IBM SPSS, then ranked to identify the most important topics for inclusion in the phase one GeMed syllabus.

The novel small group consensus building method encouraged comprehensive discussion by utilizing an iterative method that used mini-consensus groups (MCGs) to achieve a consensus between two expert panels. Panel 1=medical humanities (n=3), and panel 2=biomedical researchers and clinicians (n=3). Participants were recruited through convenience sampling and snowballing. Each panel was interviewed twice. The MCGs were audio recorded and transcribed verbatim. In the first round of MCGs, participants brainstormed topics for inclusion and produced a list of ten topics. In the second round, they reduced the other panel's list to 2-5 core topics. The debate and justifications surrounding consensus were analysed and the final list of topics were mapped against the GMC's *Outcomes for Graduates*. (6)

The School Research Ethics Committee approved this study.

Results

The questionnaire received a 22% response rate, n=85. The most popular topics for inclusion in a GeMed syllabus, were 'Mendelian disorders', and 'patterns of inheritance and pedigree analysis', followed by 'molecular pathogenesis/mechanisms of disease', and 'genetic variation and common disease'.

MCGs lasted a mean length of 58 minutes, totaling 231 minutes. The MCGs highlighted seven key topics to include in a GeMed syllabus: 'Fundamentals of Human Genetics', 'Genomics Terminology and Techniques', 'How to use genomic tests', 'Diagnostic Odyssey', 'Pharmacogenomics', 'Sharing, Ownership

and Management of Data', and 'Cultural and Religious Viewpoints'. When the topics were mapped to Outcomes for Graduates, most topics mapped to >1 outcomes, with multifaceted topics 'Cultural and religious viewpoints' and 'How to use genomic tests' mapping to ≥6 outcomes across all domains, a reflection of the complex debate occurring within the MCGs.

Discussion

This study informs the future design of the Cardiff Phase 1 syllabus. The findings concur with current literature: the topics raised are included in the HEE GeMed master's curriculum, (7) demonstrating the current move to GeMed, and largely align with the most commonly taught topics in American medical schools. (8)

Additionally, the topics derived from the questionnaire and MCGs overlap considerably. 'Fundamentals of human genetics' is an umbrella term from the MCGs that could include questionnaire topics 'Mendelian disorders', 'patterns of inheritance and pedigree analysis', and 'genetic variation and common disease'.

Currently in genetics education, genetics topics are integrated into other topics, encouraging students to apply pre-existing knowledge to clinical examples. (8) This was confirmed during the MCGs and could be an effective way to incorporate GeMed.

Due to the small, localized MCG sample it would be beneficial to carry out a UK-wide Delphi study to confirm the topics that arose in this study.

The exploration of medical humanities views makes this study unique, to the best of our knowledge, and demonstrates their importance in counteracting the concerning loss of empathy throughout medical education to inspire reflective, empathetic clinicians. (9)

Lessons Learnt

We initially planned to use the Delphi Process as this is a well-recognised approach for reaching consensus on a syllabus. (10) However, GeMed is an emerging field and due to time limitations, it was not possible to recruit sufficient participants. Therefore, we developed a novel small group consensus building method.

I was initially unaware how difficult recruitment would be. When we realised Delphi would not be possible, I was concerned this would be detrimental to my project.

Therefore, we adapted aspects of the Delphi process to develop a novel method that still aimed to reach a consensus but using two smaller groups and this approach produced insightful, meaningful results.

Our approach allowed us to explore the views of medical humanities experts and encouraged thorough discussion of each topic, so we could identify the reasoning and justification behind decisions made when reaching a consensus. Keeping the two panels separate prevented one group deferring to another and having two iterations forced a consensus between the two panels so we could identify the key topics.

Key lesson: It is vital to consider recruitment carefully during method selection.

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