Teaching Genetics and Genomics from Bioethics & Multicultural Perspectives: A Quality Improvement for Health Curricula
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Abstract
As university students of all majors, particularly in the health professions, move into the genetic and genomic era, curricular development must keep pace with their learning needs, particularly if they are to succeed in successful management of careers where this knowledge base is essential to succeed over a forty to fifty year span. The purpose of this quality improvement (QI) project is to demonstrate how such course has done so, and to share the initial success of that course in an undergraduate, baccalaureate nursing curriculum. The curricular change was made based on the American Nurses Association Consensus Panel's (2008) Essentials of Genetic and Genomic Nursing: Competencies, Curriculum Guidelines, and Outcome Indicators (2nd ed.). Content delivery is based on a Writing Intensive (WI) approach that gives students a number of learning strategies other than objective examinations in order to apprehend content of a complex nature. Teaching strategies include traditional classroom style-content presentation, online group testing, group breakout sessions, scholarly writing, informal classroom writing exercises, group project presentations on either assigned or group selected topics, use of online resources such as the National Human Genome Research Institute (NHGRI) of the National Institute of Health (NIH) and even poetry related to Genetics and Genomics, just for fun. Students with different levels of educational talent and skill respond well to this curricular quality improvement that is taught as a survey course which helps us relate knowledge about genetics and genomics to realistic clinical situations. Education of this nature evokes a quality of narrative medicine for students that is nearly lost in the fast-moving 21st century, where there is an inordinate reliance on objective testing as a measure of quality.

Course Objectives & Assignments
This course explores genetic concepts and principles as major determinants of population health. Genetic theory and research is discussed with an emphasis on how genes interact with each other and the environment in ways that predispose individuals to common health conditions such as congenital anomalies, genetic illnesses, heart disease, arthritis, diabetes, cancer, and immune-pathologies. Translation of genetic and genomic principles into clinical practice, including recognition of disease patterns among genetically related groups is emphasized. Application of ethical principles to clinical practice situations is examined, based on national ethics standards. This is a writing intensive course. In all writing-intensive courses, students learn the conventions and the kinds of writing used in the course's discipline (in this case, nursing). The following are the writing objectives for this course:

1. Engage in scholarly exploration of genetic disease through literature review; resulting in a creative and scholarly class presentation (group project);
2. Create a scholarly paper that synthesizes information obtained from research studies, expert opinion, and evidence-based sources on a controversial issue related to genetic/genomic advances in health care;
3. Incorporate peer and faculty feedback on both content and writing style in the preparation of the scholarly paper;
4. Appreciate the professional demeanor and respect required in evaluating the work of colleagues;
5. Recognize ethical and legal responsibilities in managing genetic and genomic information.

Upon participating in this course, students will be able to:
1. Assess individuals and families for genetic and genomic risk;
2. Describe the importance of genetics and genomics in relationship to chronic diseases;
3. Discuss the ramifications of gene therapy at experimental and prescriptive level;
4. Articulate Federal regulatory processes involved in the approval of gene therapy;
5. Advocate for the ethical treatment of individuals and populations at genetic risk.

Assignments Include: Family Pedigree Assignment – My Family Health Portrait

http://familyhistory.nih.gov/Using My Family Health Portrait you can: Enter your family health history. Learn about your risk for conditions that can run in families. Explore different ways people are using their family health history.

2014 Junior Student Comments
1. I found it helpful that topics overlapped with OB & pediatrics. It also makes me, as a healthy individual, greatly & deeply appreciate how blessed I am not to have a genetic problem or ethical issue decision at hand.
2. I felt that I learned a lot by writing my scholarly paper. I personally find it easier to learn something when it moves in a progression & I think that G & G encompasses so much that it is hard to learn in a linear fashion.
3. When I took genetics at another university, my biological focus being genetics, I fell in love with it. We had 4 hour labs with our course, but it was a science...This course brought a whole different aspect... I never stopped to consider ethical or social implications before.

4. I feel this class tied up a lot of loose ends left over from biology, micro & high school. This course took it a step further & related it in a way that I can use as a nurse.

5. I believe that this was a “genomic awareness” class. This is a compliment. There are too many genetic anomalies to lecture about in 1 semester. Doing so would be stressful & perhaps boring. In fact, we learned how to research certain issues & conditions.

6. I learned about a number of different genetic & ethical issues including familial diseases, genetic testing bias in different religions & the rights to privacy & consent in genetic & experimental research. I thoroughly enjoyed the class as a whole.

7. There is a lot of controversy regarding ethics in G & GI

Selected Scholarly Paper Titles
1. Genetically Modified Foods: Do the Risks Outweigh the Supposed Benefits?
2. The Stem Cell Debate: Should Ethics Play a Role in Research?
3. Knowing is Half the Battle: The Genetics, Genomics and Ethics of Cancer
5. Ethical Concerns Involving Pre-implantation Diagnosis to Select for Genetic Deafness
6. The Ethical Issue of Multifetal Pregnancy Reduction

Key References & Weblinks
Genome.gov: www.genome.gov
NHGRI: www.nhgri.nih.gov
ACMG: www.acmg.net
March of Dimes: www.marchofdimes.com
NHGRI Strategic Planning Committee: http://www.genome.gov/Genome_Policy/Strategic_Planning/Strategic_Plan/
ACMG: http://www.acmg.net/Events/RecentEvents/G8082086.pdf
American College of Medical Genetics: http://www.genome.gov/Pages/Health/Genetics-Genomics
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