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Brooke Gresham

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Assessing Undergraduate's Knowledge with an Interest in Health Professions of Medical Genetics and Genetic Counseling

Author: Brooke Gresham

School of Health Professions Honors Program, University of Alabama at Birmingham, Birmingham, AL

Genetics in medicine and genetic counseling as a profession are growing quickly with the new era of personalized medicine and the completion of the Human Genome Project in 2000. President Obama's Precision Medicine Initiative displays how the scope of genetics is expanding in medicine. As a result, there will be an increased demand for genetic health professionals such as genetic counselors. Undergraduate students with an interest in healthcare may not have an accurate understanding of this field of study. The purpose of this project was to assess the knowledge and awareness of undergraduate students at the University of Alabama at Birmingham (UAB) about the fields of medical genetics and genetic counseling. Gathering this data was completed through an Institutional Review Board (IRB) approved survey administered to students within the School of Health Professions and the School of Public Health at UAB. The results of this study revealed that the majority of students have little familiarity with genetic counseling and have not completed UAB genetics based courses. This implies that there is a potential gap in the current undergraduate education about genetics and genetic counseling. This information may be useful in improving the education and awareness of undergraduate students with an interest in health professions. Due to the lack of research regarding undergraduate students and their knowledge of genetics, it is difficult to compare the results to other studies. I hope the findings of this survey will serve as a catalyst for further research with a larger sample population in the future.

Introduction/Literature Review

The first Master's Program in Genetic Counseling began in 1969 at Sarah Lawrence College and the National Society of Genetic Counselors (NSGC) was formed in 1979. In1975, the first definition of genetic counseling was given and it described many clinical roles of genetic counseling[1]. Hence, genetic counseling is a relatively new profession. The first president of NSGC researched "non-traditional" roles of genetic counseling and found that genetic counseling can adapt depending on the diverse settings. This opened up many possibilities for the field of genetic counseling, such as clinical, educational, and administrative roles. Some of these new, non-clinical responsibilities included education, scientific research, test development, and marketing. Genetic counselors played a major role in specific case management skills such as representing the patients' interests, providing clinical perspective in the laboratory, empowering clients, or utilizing a background in ethics[2]. In a public health study surveying genetic counselors on their job description, four main themes were reported. These themes included genetic assessments, evaluating genetic testing, designing population interventions, and communication and information processing. The most common activity was educating the public and other healthcare providers about genetic testing. The second most common activity was reported to be population-based screenings such as newborn or maternal screenings. Genetic counseling training programs are urged to find undergraduates with strong backgrounds in public health and communication studies[3].

President Obama presented the Precision Medicine Initiative to gain a better understanding of the biology of diseases. Precision medicine is a new approach to disease prevention and treatment that considers individual variability in genes, environment, and lifestyle for each person[4]. An immediate goal of the Precision Medicine Initiative is to expand efforts in cancer genomics to create a variety of successful prevention and treatment solutions. A long-term goal of the initiative is to advance precision medicine to all areas of healthcare[4]. The President's Precision Medicine Initiative displays how the scope of genetics is expanding in medicine. As a result, there will be an increased demand for genetic health professionals such as genetic counselors and medical geneticists.

In the article "Enriching the Genetic Counseling Recruitment Pipeline: A National Cross-Sectional Study of Public High School Counselors", studies were conducted to evaluate the extent to which school counselors informed their students about genetic counseling as a career option[5]. The results reported that only 17% of responding school counselors provided genetic counseling as a career option[5]. These school counselors however do offer various healthcare fields as career options such as nursing, medicine, and pharmacy. High school counselors indicated two common barriers to providing genetic counseling as a career option: 1) school counselors' lack of knowledge of the field and 2) students lack of interest[5]. The results from this study provide much evidence that the genetic counseling profession needs to broadcast the field.

The purpose of this study is to assess the knowledge and awareness of undergraduate students at UAB about the fields of medical genetics and genetic counseling. The findings from the literature review show the significance of genetics in a medical setting as well as the importance of better educating undergraduates wanting to pursue a career in health professions. This study is timely due to the rapid growth of genetics since the completion of the Human Genome Project in 2000 as well as the advances being made in President Obama's Precision Medicine Initiative. Undergraduate students pursuing careers in healthcare are being studied because these students are potential future medical providers. The results of this study will show where improvements can be made in the education of these health professions students. If more efficient education involving genetics is given to undergraduates pursuing a career in health professions, then better information can be given to patients in the future.

Methodology

An online survey was developed through the survey tool, TypeForm and consisted of 21 questions. The questions regarded basic demographics questions and questions specific to genetic counseling. The survey was administered through a link provided in an email by advisors within the School of Health Professions and the School of Public Health at UAB. The sample population included only UAB undergraduate students majoring in Biomedical Sciences (BMD), Public Health (PUH), and Healthcare Management (HCM). These participants have remained anonymous. The timeline to complete the survey was four weeks during the month of April in 2016. The study was approved by the UAB IRB. Only the principal investigator, honors advisor, and researcher had access to the results of the survey. The results of the survey revealed the amount of information undergraduate students pursuing a career in health professions know about genetics in a medical setting and genetic counseling as a profession.

Results

There were 32 respondents to the survey and all respondents were enrolled in the School of Health Professions and the School of Public Health. Table 1 below describes the study population. 94% of participants were interested in a career in health professions. 59% of respondents were Healthcare Management students, 28% were Biomedical Sciences students and 13% were Public Health students. 56% of the students were seniors, 16% were juniors, 13% were sophomores and 16% were freshmen. 81% of participants had a GPA greater than a 3.0. Six percent of respondents had completed Competencies in Genetics (CDS 420) and 22% had completed Genetics (BY 210). Sixty-one percent had completed Introduction to Biology I (BY 123) and 34% had completed Introduction to Biology II (BY 124).

Table 2 below describes the respondents' exposure to genetic counseling as a profession. The majority of survey participants (97%) had heard of the term genetic counseling. The most common place that students were introduced to the topic was in a college course followed by media such as TV, magazine, etc. The remainder of students were introduced to the profession through friends, academic advisors, coworkers, family members, and high school courses. The majority, 53% of respondents, indicated that they had little familiarity with genetic counseling while 9% were very familiar with genetic counseling.

Download (pdf): Table 1 | Study populations' characteristics (n=32) AND Table 2 | Respondents' exposure to genetic counseling as a profession (n=32)

When asked about the perception of genetic counselors' job description, students were less likely to select ordering tests and working in a lab as compared to talking to patients and working with geneticists. When asked about the responsibilities of genetic counselors, students were less likely to select patient medical management as compared to providing education to patients, interpreting genetic tests, and helping those with specific disorders adapt to medical, psychological, and familial implications. When asked about the areas that genetic counselors can specialize in, students were less likely to select cardiovascular, neurology, metabolic disease, and pharmacogenomics as compared to pediatrics, prenatal, cancer, and genomic medicine. When asked about the significance of genetic testing, students were less likely to select confirming a diagnosis of a specific disease and tailoring treatment options to the individual as compared to analyzing DNA for variations and determining the risk factors for developing a disease. Thirty-five percent of students that participated in the study were not aware of the genetic counseling program at UAB.

Discussion

Genetics in a medical setting and genetic counseling as a profession are growing quickly with the new era of personalized medicine. We attempted to learn more about undergraduates' knowledge of genetics and genetic counseling. The results indicated that the majority of students have little familiarity with genetic counseling and the full professional scope of genetic counselors. This implies that there is a potential gap in the current undergraduate education about genetics and genetic counseling. This information will be useful in improving the education and awareness of undergraduates with an interest in healthcare. Inclusion of these topics in current undergraduate courses or in genetics focused courses could be required or more heavily advised for students interested in health professions in order to increase their awareness of these topics and their applications. Previous research about this topic involving undergraduate students is almost nonexistent; therefore, comparisons of the results are not likely to be made. This study may serve as a catalyst for future research that should be conducted with a larger sample.

Limitations of This Study

Limitations exist due to the small sample size of respondents. Also, UAB undergraduate students may not be a reflection of other undergraduates' knowledge of medical genetics pursuing a career in health professions in the United States.

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