



Florida Atlantic University  
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*Increasing Genetics/Genomics Competency of Diverse  
RN-BSN Students to Improve Health through an Innovative  
Online Learning Module in a Public Health Nursing Course*

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## Background

- Nurses play a critical role in advancing precision medicine:  
*an approach to disease prevention and treatment that takes into account individual variability in genes, environment, and lifestyle.*
- However, little is known about how diverse RN-BSN students currently use genetics in nursing practice to improve health and prevent diseases among individual patients, families, and underserved communities.

## Aims

The purpose of this study was to:

- 1) analyze narrative responses of RN-BSN students from online discussion boards in a public health nursing course
- 2) explore RN-BSN students' experience with using genetics or genetic testing in nursing practice
- 3) increase genetics/genomics competency of nurses through an innovative online genetics learning module.

## Methods

Our genetics module focused largely on introducing RN-BSN students to basic concepts of:

- DNA, genes
- chromosomes
- cancer genetics
- collecting family history
- constructing a 3-generation pedigree
- identification of genetic “red flags” and hereditary patterns of cancer and other chronic diseases that warrants genetic counseling or referral for genetic testing.





Do you know your  
family history?  
Family history is  
important because...

...it contributes to  
personalized  
health care.

...it encourages  
individuals to become  
active participants in  
their health care.

...it allows patient and  
provider to take the  
necessary steps in order  
to reduce risk for many  
health problems.

Developed by the Academy  
Genetic Nursing Expert Panel

## Methods cont.

- Students participated in online discussion boards using the Canvas e-learning platform.
- Student data were de-identified prior to analysis.
- We used a qualitative conventional content analysis technique to derive coding categories from narrative responses of RN-BSN students ( $N = 37$ ) enrolled in a public health nursing course, from which themes emerged.
- Carper's Ways of Knowing (1978), *Empirical*, *Personal*, *Aesthetic*, and *Ethical*, guided the thematic analysis.

## MODULE 3: GENETICS IN PUBLIC HEALTH

### Nursing and Genetics and Genomics

**BRCA Testing**

**DNA the molecule of life**

Trillions of cells  
Each cell:

- 46 human chromosomes
- 2 meters of DNA
- 3 billion DNA subunits (the bases: A, T, C, G)
- Approximately 30,000 genes code for proteins that perform most life functions

chromosomes  
gene  
DNA  
protein  
cell

**genetics**

variation distribution organisms  
bacteria structural combinations origi pattern  
physical method theoretical biology  
discrete characteristics  
study  
viruses theory  
acquired aspect nature trace pattern  
inherit different types essential genes  
organisms inheritance distinct functioning  
behavior genetic information science  
traits population molecule

## Results

- Few ( $n = 5$ , 13.5%) of the RN-BSN students who are currently practicing nursing reported that they currently use genetics or genetic testing in their nursing practice.
- Students reported that specific use of genetics were in the areas of oncology research, organ donation, premarital genetic testing, neonatal intensive care (NICU), and emergency room (ER).

## Results cont.

Themes that emerged were:

- *Empirical Knowing* (lack of knowledge and limited use of genetics in nursing);
- *Personal Knowing* (sharing stories about individual and family use of genetics);
- *Aesthetic Knowing* (recognizing the value of genetics in improving health and preventing diseases);
- *Ethical Knowing* (understanding disparities that exists in the use of genetics and advocating for change to promote health equity).

## Empirical Knowing

“Honestly, I have not really used genetics in my current nursing practice.”

“Obviously this is a genetic condition. But, I have never researched with the family to know if the father is also color blind or to learn which family member is. I guess I didn't think it mattered from whom the gene was acquired.”

“I have not used genetics or assisted my patients in genetic testing in my current nursing practice.”

“I have no experience with assisting patients in genetic testing.”

“I have had very little experience using genetics in my nursing practice. I think the most similar experience I have with genetics would be educating family members of patients who have diabetes or obesity.”

# Personal Knowing

In my personal case, I went through the whole process; from testing to genetic counseling. Sixteen years ago, my first son was born with sickle cell disease and diagnosed during my fifth month of pregnancy.”

“My husband was tested to see if he was a carrier for CF to determine if it was possible for our son to be born with Cystic Fibrosis. Thankfully my husband is not a carrier of CF. Due to the fact that I am a carrier for CF, my sister and her husband opted to have genetic testing for Cystic Fibrosis prior to trying to conceive.”

“In my unofficial nursing work (the work where you are the medical “go to” person for family members who, for whatever reason, don’t want to ask their nurse practitioner or physician their burning question), genetics comes up quite a bit!”

“I did however, learn that my grandmother died from colon cancer and I have one uncle who has been diagnosed with prostate cancer. This assignment has left me somewhat confused on my personal genetic blue print.”

## Aesthetic Knowing

“With my knowledge in genetic testing I will educate my patients further on the importance of becoming genetically tested especially if there is a family history of genetically inherited diseases.”

“Going forward, I will incorporate the knowledge of genetics into my nursing practice in order to provide effective and individualized care to my patients.”

“In the future, if it becomes part of my scope of practice, I hope to provide the most up to date information to assist in their decisions.”

“I have not had the opportunity in assisting patients in having a genetic test, but after reinforcing my knowledge from this module, I’m very interested in putting this knowledge into practice.”

“It is evident that nursing can incorporate genetic guidelines in their practice in order to provide better care for their patients. It is a growing science that is moving forward...”

# Ethical Knowing

“I have seen many overweight and obese students. Sometimes I do wonder if the cause is nature or nurture. I guess because now I do the screening and not the follow up, I don't really interact with the students and their families with the screening results.”

“We always ask to disclose any family history or cause of death of any close relatives because we utilize the data to have a better picture of the patient, and develop a plan of care that is beneficial for the person.”

“I will use my knowledge of genetics in order to help empower patients of mine to foresee health problems they could face in the future based on their current lifestyle and genetic background.”

“As a nurse, I would bring up the possibility of a genetic consult, explain what it is, list the possible benefits, and answer any questions the patient may have.”

Although nurses asked the questions about family history of stroke, cancer, heart disease and diabetes, there were no further inquiries about the matter. Eventually, it was taken out of the admission process and only asked during a history and physical with the physician and sometimes, not at all. ”

## Conclusion/Relevance to Public Health

- Genetic/genomic competency is critical for nurses in an era of precision medicine.
- Integrating genetics/genomics content into public health nursing courses can have a positive impact on increasing genetic competency among nurses.
- Our work is aligned with the Healthy People 2030 goal of improving health and preventing harm with valid genomic tools.
- Healthy People 2030 recognizes the health benefits of using genetic tests and family health history to guide clinical and public health interventions.

# Discussion



## References

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