ORIGINAL ARTICLE

Knowledge and Readiness Towards Genomic Nursing among Nursing Students at a Select Nursing College in Mangalore

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Abstract

Background and aim: The process of investigating, analysing, diagnosing, treating, and recommending preventive measures for human health and disease has been revolutionized by genetics. A thorough understanding of genomics has paved the way for individualized methods of providing health care that makes use of a person's environment and genes to help treat, diagnose, or prevent disease. Being the backbone of the healthcare team, nurses need to be prepared to keep up with advances in genomics and the resulting transformation of the healthcare industry. The aim of the present research was to assess the knowledge and readiness in genomic nursing practice.

Methods: Using a convenient sampling, 148 third- and fourth-year BSc nursing students were recruited for this cross-sectional descriptive design study. A standardized knowledge questionnaire on genomic nursing and a readiness rating scale was used to gather data. Both descriptive and inferential statistics were applied to analyze the data.

Results: The results revealed that more than half of the respondents 99 (67%) had poor, 45 (30%) had satisfactory and 4 (3%) had a good level of knowledge regarding genomic nursing. Majority of the respondents, 78% (115) reported non-readiness in practicing genomic nursing, whereas only 22% (33) were ready to practice genomic nursing. There was no significant correlation between baseline variables and knowledge scores regarding genomic nursing at 0.05 level of significance.

Conclusion: The results of the current study revealed that among 148 participants (third and final year BSc nursing students), majority of students lacked knowledge regarding genomic nursing. With regards to confidence in practicing genomic nursing, majority were somewhat confident, only a few students were very confident and some were not at all confident. The study recommends a greater focus on genomic concepts, as inclusion of genomics in health care can revolutionize the treatment.

Keywords: Knowledge, Readiness, Genomic nursing, Nursing students

Introduction

Genomics is the field involving the study of partial or complete genetic sequences and provides information about organisms. Its goal is to understand the arrangement and functioning of these sequences and the resulting biological products. Genomics in the area of health focuses on analyzing molecular processes, their interaction with medical treatments, and the impact of environmental elements on diseases.[1] Genetics and Genomics are often mistakenly thought to be interchangeable terms. However, genetics focuses on the study of heredity, while genomics is specifically concerned with the study of genes, their functions, and associated methodologies. The significant difference between genetics and genomics lies in the fact that genetics examines the individual gene's structure and functions, whereas genomics delves into the collective analysis of all genes and their interactions to understand their cumulative effect on the organism's growth and maturation.[2]

Biotechnologies related to human genomics research have the potential to achieve many goals in the field of public health. Providing poor nations with robust, cost-effective, and efficient means of detecting, preventing, and treating common diseases that have a detrimental effect on their communities is one of the goals, along with reducing global health disparities.[3]

Human genomics has the potential to impact an individual's capacity to evaluate their health risks, regardless of whether these risks are hereditary or have arisen from interactions with the environment, psychosocial factors, or cultural influences.[4] Nurses play a critical role in utilizing human genomics to enhance patient outcomes, regardless of their academic qualifications, clinical expertise, and research knowledge. Taking into consideration the shifts in healthcare trends, evolving treatment methods for different diseases, and the crucial role of nurses in advancing genomic nursing, researchers were interested in selecting this study for the project.

Objectives

1. To assess knowledge regarding genomic nursing among nursing students.

2. To assess readiness in practicing genomic nursing among nursing students.

3. To find the association between knowledge regarding genomic nursing and selected baseline variables.

4. To find the association between readiness in practicing genomic nursing and selected baseline variables.

Materials and Methods

Research approach

In the current study, a quantitative method was applied to determine the knowledge and readiness of nursing students regarding genomic nursing in chosen nursing colleges in Mangalore.

Research design

For the study, a cross-sectional descriptive survey design was selected.

Sample

In the current study, the sample comprised of nursing students studying BSc Nursing (third year and final year) at a selected nursing college in Mangaluru.

Sample size and sampling technique

In the current study, 148 nursing students from a selected nursing college in Mangalore were included. The estimated sample size at $Z\alpha = 1.96$ and 5% level of significance with 10% attrition rate was 62.

Sampling criteria

Inclusion criteria

Students enrolled were the third and final year Bachelor of Science (BSc) Nursing program students available at the time of data collection and study excluded those who were not willing to participate.

Description of the tool

Tool I: Baseline Proforma: The five items on the baseline proforma used to collect data were age in years, gender, year of placement of study, prior information regarding genomic nursing, source of information regarding genomic nursing, and confidence in practicing genomic nursing.

Tool II: Knowledge questionnaire on genomic nursing: It consisted of 30 multiple-choice questions which were organized under three areas - understanding genomic concepts (10), techniques and importance of genomics in healthcare (8), and application of genomics in nursing (12). The interpretation of the knowledge score was, those who scored 75% and above were considered to have good knowledge (23-30), a score of 50-75% was considered as moderate knowledge (15-22), and less than 50% as poor knowledge (1-14).

Tool III: Readiness in practicing genomic nursing: Consisted of seven statements on a five-point Likert scale and rated from "strongly disagree" to "strongly agree".

Validity and reliability

Five professionals from the nursing field verified the tool. One statement was changed based on the experts' opinion. Data were collected from 15 subjects to check the internal consistency. The reliability attained was 0.96, thus the tool was found to be reliable.

Data collection procedure

After obtaining ethical clearance, permission was obtained from the authorities. Official consent was obtained from the participants after detailing the need for the study along with the duration. The data collection was conducted in April 2023. Subjects were chosen by a convenient sampling method. The subjects were given a baseline proforma, followed by a knowledge questionnaire and readiness scale, following which data analysis was done.

Results

Baseline Proforma

In the current study, the average age of the samples was 20.97±0.869 years. More than half of the respondents 58.1% (86) were third year B.Sc. nursing students and 41.9% (62) were final-year BSc nursing students. 58.8% (87) of students reported that they did not have any previous knowledge regarding genomic nursing, whereas 41.2% reported that they had previous knowledge regarding genomic nursing. Among the 61 respondents who had previous knowledge on genomic nursing, 39.3% (48) of students got information through the literature on genomic topics, 8.2% (10) students got the information from a previous genomic course, 4.1% (5) students got information from previous genomic workshop and 48.4% students received information from other sources. With regards to confidence in practicing genomic nursing majority 70.9% (105) were somewhat confident, only 21.6% (32) of students were very confident in practicing genomic nursing and 7.4% (11) of students were not at all confident.

Knowledge regarding genomic nursing

Data in Figure 1 depicts that more than half of the respondents 99 (67%) had a poor level of knowledge, 45 (30%) of them had a satisfactory level of knowledge, whereas only 4 (3%) had a good level of knowledge regarding genomic nursing.
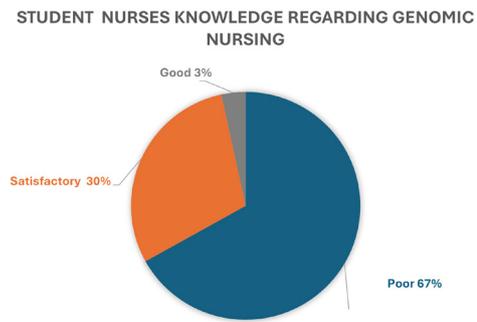

Figure 1: Student nurses' knowledge regarding genomic nursing

Table 1: Different ranges regarding knowledge of genomic nursing

Sl No	Theme	Range	Mean ± SD
1.	Understanding genomic concepts	1 - 10	6.15 ± 2.38
2.	Techniques and importance of genomics in healthcare	1-8	2.85 ± 1.57
3.	Application of genomics in nursing	1 - 12	5.55 ± 2.16
	Overall score	1- 30	14.54 ± 4.91

The data in Table 1 demonstrates that the respondents had maximum knowledge in the area of understanding genomic concepts with mean and SD (Standard Deviation) of 6.15±2.38. In the area of application of genomics in nursing, the obtained mean and standard deviation was 5.55±2.16. The lowest knowledge score was obtained in the area of techniques and importance of genomics in health care, with a mean and standard deviation of 2.85±1.57. The overall knowledge score obtained was 14.54 ± 4.91.

Readiness in practicing genomic nursing

Data in Table 2 shows that more than half 55.4% (82) of the respondents opined that genetic counseling and genomics practices will serve as strong tools for preventing congenital disorders. About 52.7% (78) respondents wanted to learn more about genomic nursing, 51.4% (76) believed that genomic knowledge can help the client to make informed decisions. About 47.3% (70) of them opined that understanding genomics will be important in nursing practices and 45.9% (68) agreed that they will be satisfied by practicing genomic nursing.

Table 2: Readiness in practicing genomic nursing

Readiness to practice genomic nursing	SD		D		UD		A		SA	
	f	%	F	%	f	%	f	%	f	%
I would like to learn more about genomic nursing.	15	10.1	12	8.1	43	29.1	48	32.4	30	20.3
I feel the concept of genomic nursing will be difficult to comprehend.	18	12.1	36	24.3	52	35.1	30	20.3	12	8.1
Including genomics in nursing curriculum will be beneficial in clinical practice.	21	14.2	53	35.8	41	27.7	16	10.8	18	12.2
Understanding genomics will be important in nursing practices.	17	11.5	17	11.5	44	29.7	44	29.7	26	17.6
I feel I will be satisfied practicing genomic nursing.	20	13.5	23	15.5	37	25	52	35.1	16	10.8
Genomic knowledge will help the client to making informed decisions.	9	6.1	20	13.5	43	29.1	46	31.1	30	20.3
I feel genetic counselling and genomics practices will be strong tool to prevent congenital disorder	15	10.1	16	10.8	35	23.6	47	31.7	35	23.7

However, 28.4% (48) reported the concept of genomic nursing to be difficult to comprehend. 23% (34) believed that including genomics in nursing curriculum will be beneficial in clinical practice. Overall, three-quarters of the subjects, i.e., 78% (115) showed non-readiness in practicing genomic nursing and only 22% (33) were ready to practice genomic nursing.

Association of knowledge and readiness towards genomic nursing and baseline variables

There was no significant relationship between the baseline variable and knowledge/ readiness scores regarding genomic nursing at a 0.05 level of significance. Therefore, research hypothesis H1 was rejected and null hypothesis H01 was accepted that there will be no significant association between knowledge/ readiness regarding genomic nursing and baseline variables.

Discussion
Section I: Baseline characteristics

In the current study, the average age of the samples was 20.97±0.869 years. More than half of the respondents,

58.1% (86) were third year B.Sc. nursing students and 41.9% (62) were final-year BSc nursing students. 58.8% (87) of students reported that they did not have any previous knowledge regarding genomic nursing, while 41.2% reported that they had previous knowledge regarding genomic nursing. The current study results were congruent with a study carried out in Canada where the mean age was found to be 23.85±5.49.[3]

Section II: Knowledge regarding genomic nursing

In the current research, the overall mean knowledge score regarding genomic nursing obtained by the students was 14.54±4.91. More than half of the respondents, 99 (67%) had a poor level of knowledge, 45 (30%) of them had a satisfactory level of knowledge, while only 4 (3%) had a good level of knowledge regarding genomic nursing.

The present study findings were congruent with other studies conducted in Canada, Finland, Philippines, and Nigerian University where the majority (89%) of the students had poor knowledge, while only 11% of

students had good knowledge, with the scores in genomic basics concept reported to be poor.[2,3,5,6]

Section III: Readiness in practicing genomic nursing

The present study results point that three-quarters of the subjects, i.e., 78% (115) demonstrated non-readiness in practicing genomic nursing, while only 22% (33) were ready to practice genomic nursing. The present study findings were congruent with the findings of a study conducted among Nigerian University students where more than half of students (66%) were not ready to practice genomic nursing, while 34% were ready to practice genomic nursing.[2] This indicates the necessity to build interesting course content on genomics and its application and motivating the students to include in the clinical practice.[7]

Limitations

The present study was limited to third and final year BSc nursing students of a selected nursing college in Mangalore.

Conclusion

There is a rapid increase in the recognition and incorporation of genetic and genomic information in providing individualized care to clients based on their genetic makeup. The inclusion of genomic nursing in providing nursing care has been a boon to many chronic disease conditions and will have several implications in the future of nursing care. This calls for sensitizing the nurses on genomic nursing and developing their core competencies.

Conflict of interest

The authors declare that there's no conflict of interest for the work.

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