Research Article

Final Year Nursing Students' Knowledge of Genomic Concepts and Readiness for Use in Practice in Selected Federal Institutions in Southwest Nigeria

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Abstract

Introduction: Final year nursing students are the nursery of the nursing profession and tomorrow's professionals. This group of people are expected to apply personalized care in clinical practice in order to give holistic nursing care to the patient. Therefore, the researcher seeks to assess their knowledge of genomic concept and readiness for using this knowledge in practice.

Methods: Descriptive cross-sectional design was employed in this study. A total of 347 nursing students from six schools participated in the study. Validated Genetic Nursing Concept Inventory (GNCI) on knowledge and self-developed questionnaire that assessed participants perceived readiness and curriculum content were used to elicit information. Descriptive statistics were used to present results and hypotheses were tested with chi-square $p \leq 0.05$.

Results: All the 347(100%) of students had poor knowledge of genetics and genetic disorders. lesser than half of the respondents 122(35.2%) responded positively that they will be ready to learn about genetics and majority 103(29.7%) affirmed that there was no genetic content in their school curriculum.

INTRODUCTION

In the 80's genomics was first described as the study of all genes in the human genome as well as their interactions with other genes, and the environment, through the influence of cultural and psychosocial factors [1,2]. According to [2], the study of individual genes and their impact on relatively rare single gene disorders is called Genetics. The application of genomic concepts in clinical practice is expected to be part of nursing care to ensure

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that patients get the best quality of services. Genomics is critical to the practice of all nurses most especially family health history assessment and the genomics of common complex diseases [3]. Basically, a nurse is expected to apply genomic concepts in clinical practice, must understand the social and psychological implications of genetics, and also know-how and when to make a referral to a genetic professional [2]. Genomic Nursing Concept Inventory (GNCI) that was created by Ward [4] used in this paper, stated the differences in the term genomics from genetics by outlining that multiple genes and environmental influences involve genomic conditions, whereas a genetic condition involves a single gene. It is important to note that the two terms overlap and will continue to evolve as genome research continues. For the purposes of this paper, both terms were used and were often coupled together to encompass the slight differences of the definitions.

Genomic nursing emerged as a discipline that involved the use of genomic information for diagnostic or therapeutic decision making of individual as part of clinical care [5]. Therefore, the Human Genome Project laid the foundation for genomic nursing, offering a means of defining disease at the molecular level and giving the correct and current information about genetics [2].

Human Genome project has fueled important biological discoveries where advances in genotyping and sequencing technologies were discovered. Today, genomic nursing aims to build on this foundation, translating these discoveries into clinical practice, with the ultimate goal of personalized medicine and nursing care [6].

Furthermore, Genomics nursing is an area within genetics that is concerned with the protection, promotion, and optimization of health and abilities, prevention of illness and injury, alleviation of suffering through the diagnosis of human response [7]. Therefore, genomic nursing is making an impact in the fields of oncology, pharmacology, infectious, rare, and undiagnosed diseases. It is gaining momentum across the entire clinical continuum from risk assessment in healthy individuals to genome-guided treatment in patients with complex diseases [6].

In developed countries, studies have shown that nursing students' knowledge of genomic concepts improved following the inclusion of genomic in their curriculum [2,8,9] and there is no evidence of such from developing countries such as Nigeria. Nonetheless, studies abound in the area regarding genetics in Nigeria, but to mention a few include that of Breast Cancer Genetics Knowledge and Testing Intentions among Nigeria Professional Women [10] and knowledge of genetic counselling among patients with breast cancer and their relatives at a Nigerian teaching hospital [11].

Studies in African countries reported that African health practitioners seem to have little or no genetics/genomics knowledge, even when these healthcare workers are key to the anticipated successful inclusion of Genomic Medicine/ Nursing into routine healthcare procedures [12,13], thus reflecting shortcomings of current curricula. Therefore, continued failure to incorporate genetics and genomics into curricula in Africa will result in healthcare workforces incapable of keeping up with their evolving role in the Genomic Medicine era – thereby amplifying the already existing gap in healthcare and research [14]. Therefore, to the best of our knowledge, there is a paucity of evidence among nursing students on the knowledge of genetics / genomic nursing in developing countries such as Nigeria. Also, there is a dearth of information in Southwest Nigeria on knowledge of genomic nursing and readiness for use in practice among nursing students in selected settings. Yet, this group of people is not only the nursery of the profession who will translate knowledge to practice but are also the future professionals who will think genetically and provide genetic services. Hence, the need to assess their knowledge and practice preparedness.

MATERIALS AND METHODS

Study design

A cross-sectional descriptive design was used in the study. This involved using a self-administered questionnaire to gather information about final year nursing students' knowledge of genomic concepts and readiness for use in practice in selected federal institutions in Southwest Nigeria.

Study setting

Nigeria is divided into six geopolitical zones majorly and these include North West, North East, North Central, South-South, South East, and South West. The zoning has also led to the establishment of a total of thirty-six (36) federal universities approved by the National University Commission (NUC) of which twenty-seven (27) are federal universities, three (3) are federal Universities of agriculture, and six (60) are federal universities of technology. The present study was conducted in each department of nursing, of a federal university and its teaching hospital School of Nursing. As such, the following states were selected Oyo (Department of Nursing University of Ibadan and School of Nursing, University College Hospital Ibadan); Osun (Department of Nursing Obafemi Awolowo University, Ile Ife and School of Nursing Obafemi Awolowo University Teaching Hospital Complex); Lagos (Department of Nursing, University of Lagos, School of Nursing, Lagos State University Teaching Hospital). These settings were purposively selected because these universities are known for the education of undergraduate nurses within South-west Nigeria, with a five-year nursing programme while, the schools of nursing are known for a 3years diploma programme and they were also willing to participate in the study.

Sampling technique

Convenience sampling technique which is a non-probability sampling that focuses on the judgement of the researcher was used to select the three hundred and forty-seven (Obafemi Awolowo University, Department of Nursing, Ile Ife Osun State: 81; Obafemi Awolowo University Teaching Hospitals Complex, School of Nursing, Ile Ife, Osun State: 80; University of Lagos, Lagos State: 55; Lagos State University Teaching Hospital School of Nursing, Lagos State: 50; University of Ibadan, Department of Nursing, Ibadan, Oyo State: 27; University College Hospital, School of Nursing, Ibadan, Oyo State: 54) final year nursing students in selected study settings within the 2018/19 Academic session.

Data collection

Questionnaires were administered through the Departmental head and set coordinators of each schools. The questionnaires were administered to the students at the end of the close of lectures to ensure that they were well relaxed. Data were collected from July-December, 2019.The instrument for data collection is a validated instrument known as the Genetic Nursing Concept Inventory (GNCI) developed by Ward (2011) is a "scale to measure understanding of the genetic/genomic concepts most critical to nursing practice" and a semi-structured questionnaire developed by extensive literature review and expert consultation in genetics and genomic nursing because the GNCI instrument could not answer the research questions in full. The GNCI was revalidated for the purpose of the present study in the study country. The Instrument utilized consist of three parts, Section A had three items that elicited information on socio-demographic characteristics of the respondents such as age, sex, tribe, and training institution. Section B was the GNCI questionnaire that elicited information about the knowledge of genetic nursing. The section contains 60 items with varying options with the correct option attracting "1" while the incorrect response attracts "0". Therefore, the knowledge score was categories and scores (0-30) as "poor" and a score of (31-60) were categorized as "good".

Section C comprised items on the student's readiness for use in practice in the selected settings. There are 10 items on a five-point Likert Scale viz: Strongly Disagree, Disagree, Undecided, Agree, and Strongly Disagree scores 5, 4, 3, 2, 1 respectively. Section D contained items on if there are genetic content in the nursing student curriculum. The section contains 8 items on a five-point Likert Scale viz: Strongly Disagree, Disagree, Undecided, Agree, and Strongly Disagree scores 5, 4, 3, 2, 1 respectively. Furthermore, Cronbach Alpha of the instrument is 0.7. The participants completed the questionnaire within 10-15minutes and retrieved.

Inclusion Criteria

Final year nursing students who gave consent

Final-year nursing students from tertiary institutions in Southwest Nigeria

Exclusion Criteria

Final-year nursing students who were ill or indisposed throughout the period of data collection.

Final year nursing students who refuse to participate in the study

Final-year nursing students that had undergone a genetic training or programme.

Data analysis

The coded data were analyzed using SPSS 23.0 forms with considerable missing data were excluded from that specific data point analysis. Descriptive statistics were used to describe the quantitative and categorical variables. Continuous variables were expressed as mean _ standard deviation (SD) and the chi-square test at the 0.05 significance level was used to compare the association between variables.

ETHICAL CONSIDERATIONS

Ethical approval for the study was obtained from the institutional review board; NHREC/05/01/2008a and UI/UCH ethical committee assigned number UI/EC/19/0575. An informed consent form accompanied the questionnaire to participants providing information on the essence of the study and seeking the respondents' consent to take part in the study. The researchers adhere to the ethical principles that guide the study which are the principles of informed consent, respect for persons, beneficence, non-maleficence, and justice. All of these were done to ensure that the participation was voluntary and that respondents were aware of confidentiality and anonymity. Confidentiality was maintained by not giving out participant's information obtained during the study. Also, the participants were asked to endorse their forms with any identifier to ensure anonymity. Participants were made to know that they are free to withdraw their consent at any time and end their participation in the research without any fear of retribution or withdrawal of privileges.

RESULTS

Table 1 shows that majority of the respondents in the selected schools were within the age of (18-27years). More than half of the participants were female and Obafemi Awolowo University, Ile Ife had (86.4%). Also, the majority of the respondents were Yoruba.

Table 2 shows that, all the respondents 347(100%) had poor knowledge of genomics and genetics.

Table 3 showed close to half of the respondents 157 (45.2%) affirming that they will like to learn genomic nursing, some 133 (38.3%) of the respondent agreed that genomics will be difficult to understand. Furthermore, slightly above average out of the respondents 199 (57.4%) felt that understanding genomics will be important in practice. More than a third of the respondents 171 (49.3%) wish to utilize the genomics being taught in school in the care of my patient and 108(31.1%) of the respondents could not decide if they will do courses related to genomic after school.

As reflected in table 4, more than half of the respondents 201(57.9%) agreed that there is no genomic content in their school curriculum, 95(27.4%) could not decide on the rating of the genetic content in their school curriculum. However, less than half of the respondents 125(36.0%) were not even sure of the capacity of their teachers in teaching genomic content in the curriculum.

Table 5 shows that there was no significant difference between sex, tribe, and the selected schools of the respondents. Also, there is no significant relationship found between respondents' readiness for genomics and their knowledge of genomics. However, there was a significant association between the age of the respondents and their knowledge of genomics.

DISCUSSION

Genomic nursing is a growing area in nursing which is very significant to the care of patients. This study assessed the final year nursing students' knowledge of genomic concepts and

Table 1: Showing the Frequency distribution of Demographic Characteristics of Participants.

Variables			School Type			
	OAU [N=81]	**OAUTHC [N=80]**	**UNILAG [N=55]**	**LUTH [N=50]**	**UI [N=27]**	**UCH [N=54]**
Age Group	f (%)	f (%)	f (%)	f (%)	f (%)	f (%)
18-27 years	31 (38.3)	68 (85.0)	31 (56.4)	34 (68.0)	23 (85.2)	43 (79.6)
28-37 years	24 (29.6)	5 (6.2)	14 (25.4)	6 (12.0)	1 (3.7)	4 (7.4)
38-47 years	9 (11.1)	1 (1.2)	6 (10.9)	2 (4.0)	1 (3.7)	0 (0.0)
48-57 years	1 (1.2)	0 (0.0)	1 (1.8)	2 (4.0)	0 (0.0)	1 (1.9)
No response	16(19.8)	6 (7.4)	3 (5.5)	6 (12.0)	2 (7.4)	6 (11.1)
Sex						
Male	4 (4.9)	14 (17.5)	9 (16.4)	5 (10.0)	4 (14.8)	6 (11.1)
Female	70 (86.4)	65 (81.2)	43 (78.1)	40 (80.0)	22 (81.5)	44 (81.5)
No response	7(8.6)	1(1.3)	3(5.5)	5(10.0)	1(3.7)	4(7.4)
Tribe						
Igbo	6 (7.4)	4 (5.0)	5 (9.1)	15 (30.0)	5 (18.5)	6 (11.1)
Yoruba	69 (85.2)	71 (88.8)	47 (85.5)	25 (50.0)	12 (44.4)	31 (57.4)
Hausa	0 (0.0)	0 (0.0)	1 (1.8)	5 (10.0)	2 (7.4)	2 (3.7)
No response	6 (7.4)	5 (6.2)	2 (3.6)	5 (10.0)	8 (29.6)	15 (27.8)

Abbreviations: Obafemi Awolowo University (OAU); Obafemi Awolowo University Teaching Hospitals Complex (OAUHC); University of Lagos (UNILAG); Lagos University Teaching Hospital (LUTH); University of Ibadan (UI); University College Hospital (UCH).

Table 2: Showing the distribution of Knowledge of Genomics among respondents per institution *N=347*.

Institution names	Poor knowledge f (%)	Good knowledge f (%)
OAU	81(23)	0(0)
OAUTHC	80 (23)	0(0)
UNILAG	55 (16)	0(0)
LUTH	50 (14)	0(0)
UI	27 (8)	0(0)
UCH	54 (16)	0(0)

Abbreviations: Obafemi Awolowo University (OAU); Obafemi Awolowo University Teaching Hospitals Complex (OAUHC); University of Lagos (UNILAG); Lagos University Teaching Hospital (LUTH); University of Ibadan (UI); University College Hospital (UCH).

Table 3: Distribution of Readiness for genomic nursing use in practice among respondents in the selected settings.

Questions	SD f (%)	D f (%)	UD f (%)	A f (%)	SA f (%)	No Response f (%)
I will like to learn Genomic nursing	34(9.8)	42(12.1)	74(21.3)	81(23.3)	76(21.9)	40(11.5)
I feel genomics will be difficult to understand	51(14.7)	82(23.6)	62(17.9)	91(26.2)	29(8.4)	32(9.2)
The genomics that will be taught in school will be useful in understanding another subject	33(9.5)	50(14.4)	50(14.4)	128(36.9)	65(18.7)	21(6.1)
Understanding genomics will be important in my nursing practice	44(12.7)	25(7.2)	48(13.8)	120(34.6)	79(22.8)	31(8.9)
I might decide to do courses related to genomic after I leave school	31(8.9)	71(20.5)	108(31.1)	78(22.5)	33(9.5)	25(7.2)
I plan to utilize the genomics being taught in school in the care of my patient	34(9.8)	25(7.5)	90(25.9)	122(35.2)	49(14.1)	27(7.8)
Genomics knowledge that will be acquired will enhance my client in making informed decision about their care	34(9.8)	38(11.0)	56(16.1)	121(34.9)	67(19.3)	31(8.9)
I will avoid the use of genomics in practice even if being taught when I leave school	101(29.1)	78(22.5)	58(16.7)	50(14.4)	30(8.6)	30(8.6)
I feel I will be satisfied practicing genomics	31(8.9)	34(9.8)	104(30.0)	99(28.5)	50(14.4)	29(8.4)
I feel practicing genomics is lucrative to venture into	24(6.9)	53(15.3)	97(28.0)	91(26.2)	58(16.7)	24(6.9)

Abbreviation: Strongly Disagree: SD; Disagree: D; Undecided: UD; Agree: A; Strongly Agree: SA

Table 4: Showing the distribution of Genomic /genetic content in the nursing student curriculum.

Questions	SD f(%)	D f(%)	UD f(%)	A f(%)	SA f(%)	No response f(%)
There is genomic content in my school curriculum	103(29.7)	98(28.2)	62(17.9)	13(3.7)	48(13.8)	23(6.6)
The genomic/genetic content in my school curriculum is of best global practice	98(28.2)	87(25.1)	68(19.6)	24(6.9)	42(12.1)	28(8.1)
Presently in terms of rating, I can rate the extent of genomic/genetic content in the curriculum to be high in my school	89(25.6)	89(25.6)	95(27.4)	23(6.6)	25(7.2)	26(7.5)
I can rate the extent of genomic/genetic content in the curriculum to be low in my school	64(18.4)	70(20.2)	73(21.0)	38(11.0)	73(21.0)	29(8.4)
The genomic/genetic content in my school curriculum is clear/well understood and not ambiguous	69(19.9)	85(24.5)	103(29.7)	29(8.4)	25(7.2)	36(10.4)
There is adequate time to finish up the genomic/genetic content in my school curriculum	93(26.8)	75(21.6)	93(26.8)	42(12.1)	16(4.6)	28(8.1)
My school has capable teachers who teach these contents	76(21.9)	51(14.7)	125(36.0)	34(9.8)	37(10.7)	24(6.9)
I am satisfied with the genomic/genetic content in my school curriculum	105(30.3)	64(18.4)	95(27.4)	26(7.5)	26(7.5)	31(8.9)

Abbreviation: Strongly Disagree: SD; Disagree: D; Undecided: UD; Agree: A; Strongly Agree: SA

Table 5: Showing bivariate analysis for selected socio-demographic variable (Age, sex, schools, and tribe) and knowledge of the genomic concept.

		Knowledge of Genomics		Chi-square	p value
		Poor knowledge	Good knowledge		
Age	18-27 years	137 (81.1%)	93(66.9%)		
	28-37 years	20(11.8%)	34(24.5%)		
	38-47 years	10(5.9%)	9(6.5%)	9.467	0.024**
	48-57 years	2(1.2%)	3(2.2%)		
Sex	Male	21(12.5%)	21(13.3%)	0.045	0.831
	Female	147(87.5%)	137(86.7%)		
Tribe	Igbo	24(15.1%)	17(11.6%)	0.824	0.662
	Yoruba	130(81.8%)	(85.0%)		
	Hausa	5(3.1%)	5(3.4%)		
Institution name	OAU	37(20.0%)	44(27.2%)	6.838	0.233
	OAUTHC	47(25.4%)	33(20.4%)		
	UNILAG	24(13.0%)	31(19.1%)		
	LUTH	28(15.1%)	22(13.6%)		
	UI	17(9.2%)	10(6.2%)		
	UCH	32(17.3%)	22(13.6%)		
Readiness for Genomic concept	Low Readiness	64(48.9%)	56(40.9%)	1.724	0.189
	High Readiness	67(51.1%)	81(59.1%)		

Abbreviate= ** significant at ≤ 0.05

readiness for use in practice in selected tertiary institutions in southwest Nigeria. Similarly, the study verified the need for nursing students to have training on genetics and genomics as part of their nursing training.as indicated by their documented readiness to learn. Therefore, it is worthy to note that genomic nursing aims to build on this foundation that student nurses are incorporated into genetics since they are the nursery of the profession, as such this group of people will then translating these discoveries into clinical practice, with the ultimate goal of personalized medicine and nursing care [6].

The findings of the study showed that majority of the nursing students from the selected schools were between the ages of 18-27years as shown in table 1. This is because the entry point for the Nigerian educational system for a higher degree is set

to be 18years. Also, there were more female participants in the selected schools and majority of the respondents were Yoruba. This is probably because nursing is a female dominating profession in the country. This finding is similar to the report of [17] in a study on effects of genetic nursing education on nurses' competencies in Nigerian Hospitals where a larger percentage of their respondents were females.

The knowledge score of the participants on GNCI ranges from a minimum of 0 to maximum of 26, therefore students from all the selected school had poor knowledge of genetics and genomics. Our study is similar to that of a study carried out among 120 generic undergraduate bachelors of Science in nursing students at a large university in Florida. It was found out that the knowledge of genomic was poor before training was introduced among the participants [2]. A similar study also shows that majority (93.9%) of the nursing students in Turkey reported very little knowledge of genetics and genetic disorders [15]. This could be attributed to the absence of genetic nursing in the nursing school curricular.

In this present study, majority of the nurses affirms that they will like to learn genomic nursing, more than half of the respondents agreed that genomics will be difficult to understand. This could be that students see genetics as phenomena that is invisible and inaccessible. Perhaps, genetics requires a certain level of abstract thought and this is one of the reasons accounting for the difficulty of understanding genetics. Furthermore, for genomic nursing to be reflected in practice, there must be a corresponding interest to learn and acquire appropriate knowledge about it. As regards the readiness of participants on genomic concepts in practice, majority of the respondents feel that understanding genomics will be important in practice, less than half of the participants were willing and agreed to learn about genetic nursing while majority were either undecided or unwilling. Perhaps the participants feel undecided because they don't receive training. This is at variance with a study carried out by [16], where 92% of the primary health care physician in the USA was willing to participate in clinical studies to assess the safety and effectiveness of emerging genetic technologies. The findings from this present study shows that attitudinal change is crucial and essential to practice. There is a need to ensure that the content of genomics to be integrated in the nursing student curriculum is presented in a simple, easy to comprehend approach to breach the gap of difficulties encountered in learning a new concept as most of the students opined that genomics will be difficult to understand. This might be due to the fact that there are many terms which are look-alike and sound-alike in genetics and there are many similar words involved in genetic terms, and this leads to students' confusing these terms and having difficulties in understanding genetics. A larger percentage of respondents agreed that genomics taught in school will be useful in understanding other subjects. This is consistent with [3]. Application of genomics concepts in clinical practice is expected to be part of nursing care in order to ensure that patients get the best quality of services. Genomics is critical to nursing practice and such nursing students must be well groomed with the basics and fundamentals of common complex diseases. These findings are in line with the study conducted in Turkey by Vural [15], where 93.9% of nursing students stated that they would like to receive more education related to genetic diseases and genetic

counseling. Majority of the respondents in our study agreed that understanding genomics will be important to their nursing practice.

On the contrary, Munroe [2], reported in their study that nursing students did not feel ready to use knowledge of genomic acquired in the clinical practice when they leave school. In Adejumo's [17] finding, more than one-third of the study participants in Nigeria hospitals agreed that advanced knowledge is needed to possess more skill in genomics as such it shows that nurses are ready to acquire more knowledge to its utilization in practice [17].

In this study, many of the students are undecided about whether they might decide to do something related to genomic after leaving school.it is essential to have the students well stimulated about genomics while in school so that the interest will not wane off when they are out of school irrespective of their area of practice. It is also somewhat encouraging that they will be inclined towards genomics after school. This response can be boosted by adequate stimulation and exposure to practical aspects of genomics while in training. In the same vein, quite a lot of the respondent's plan to utilize the genomics being taught in school in the care of their patient. This implies that the knowledge impacted during the nursing training must have motivated their decision to apply genomics in their practice.

It is also important to know that more of the student nursing students agreed that genomics knowledge will enhance their clients in making informed decision about their care. This implies that adequate knowledge acquired by the nurse will be transferred to clients during health care counseling to enable the client make an informed choice about their health.

In considering a positive attitudinal change to acquiring new knowledge, more than half of the participants 179 (51.6%) disagreed with the statement to avoid the use of genomics in practice post training even after being exposed to it. This is highly commendable and shows that the student nurses' readiness to utilize the genomic concept learnt while in training for practice. Feeling of satisfaction in nursing practice is very vital for effectiveness and productivity. About one third of the respondents were undecided whether they will feel satisfied practicing genomics or not. This may be due to a mixed feeling of being faced with various choices while in school and most of the students are not certain of where they will likely practice after training.

In the overall, the responses above show some evidences that the students are ready to initiate the genomic concept into their nursing practice. One can infer that these groups of nurses lucidly believe in the new trends in personalized medicine vis a viz innovation in nursing and the 21st century.

It is evident in the present study that, respondents claimed there is no genomic content in their school curricula and majority could not decide on the rating of the genetic content in their school curriculum. Also, the participants were not sure if their teachers are capable of teaching genomic content in the curriculum. This calls for an immediate action if the current trend as obtained in the developed countries is to be implemented as far as nursing and genomics is concerned in Nigeria. Other studies also reported

that integrating knowledge of genomic concepts in the curricular can improve nursing students' knowledge and readiness for use in practice [8,9]⬚. When asked if the genomic/genetic content in participants' school curriculum is of best global practice, a 1ittle above average among respondents are of the opinion that content is not of best global practice.

As regards the adequacy of time allotted to finish the genetic content of the school curriculum, about half of the respondents attested that time are not enough to explore the contents, only 71(20.5%) of the respondent reported that their school has capable teachers who teaches the content of genomics. A small number of the students, claimed they were satisfied with the genomic/genetic content in their school curriculum. It can be inferred that the Nigerian nursing educational system has not embraced the concept of genomics and genetic which seems relatively new. Nevertheless, according to literature, the genetics concept was proposed as far back as 1962 in nursing curricular and it should have been included in it [17].

The little proportion of this concept which may have been taught in other courses may likely not meet the global best practices and are also rated low by the students. There is also no sufficient evidence to prove that there are sufficient teachers versed in genomics in these schools to handle the subject of discourse.

The current study also revealed that there was no significant difference between sex and tribe, of the selected schools of the respondents, likewise, their readiness (x^2= 0.045, df=1, p= 0.831; x^2= 0.824, df=2, p= 0.662). This implies that these socio-demographic characteristics, knowledge, and readiness related variables are not affected modifiers or confounders in the present study; they do not have a direct effect on knowledge score. Therefore, this is similar to the findings of Adejumo [17] where there was no significant relationship between selected sociodemographic data and knowledge on genomic, a study carried out among nurses about their competencies in genetic counselling in Nigeria hospital. However, the present study revealed that there is significant relationship between knowledge of genomic and age of the students (x2= 9.467, df=3, P= 0.024) This is at variance with the study carried out by Pandya [18], were they reported that the age of final year Nursing students in India was not significantly associated with their knowledge on genetic. This shows the disparity on knowledge of genomic among the different age groups of nursing students.

LIMITATION OF THE STUDY

The study was limited to the undergraduate and schools of nursing students in southwest Nigeria, therefore this might not be a true representation of the findings in Nigeria. Therefore, similar studies can be conducted in other geopolitical zones in the country.

CONCLUSION

The findings of this study provided useful information on students' knowledge of genetics and genomics, as well as background understanding of genetic concepts and readiness for use in practice. This study will help students who will become registered nurses to demonstrate good knowledge of genetic and genomic information after the concept is incorporated into their curriculum.

Furthermore, policymaking in terms of developing curriculum and integration of genetic/genomics in teaching and practice is very essential. Likewise, the nursing and midwifery council of Nigeria should mandate the integration of genomic/genetic concept into the school curricular at schools of nursing and baccalaureate programmers level. This can be achieved by training the trainers on genetic nursing in various schools, be it private or public institutions of nursing in Nigeria.

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