

Examining Nursing Students' Interest and Performance in Chemistry in Nigeria Colleges of Nursing Sciences: Emerging Issues

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Abstract:- Nurses require a good understanding of chemistry as a result of the interrelationship of many chemistry concepts with nursing both in the classroom and in applications hence, the indispensable nature of chemistry to nursing. However, most nursing students have consistently found chemistry as one of their major nightmares in the course of their studies. This is evident in their performances and interest. This paper aims to critically examine the causes of the increasing decline in nursing students' interest in chemistry in Nigerian nursing colleges in relation to how they are negatively impacting in their chemistry performances. The paper relied on both primary and secondary sources and on careful analysis found out the major challenging issues as: foundational problems, unqualified candidates/examination malpractice, faulty/fraudulent admission procedures, lack of laboratories/learning materials and the ease of cross border migration. While the problems obviously maybe more than as elucidated, in chatting a way forward, some strategies suggested as recommendations include proper result verification process, guiding the students through the use of problem-solving skills, the provision of well-equipped laboratories and the adoption and the implementation of digital mode of teaching and learning. Even though they may not be exhaustive, but they have been carefully chosen as highlighted and would go a long way to help if fully implemented.

Keywords:- Examining, Nursing Students, Interest, Performance, Chemistry.

I. INTRODUCTION

Chemistry is a science that is concerned with our everyday way of life. It deals with the study and the investigating of the properties, composition, and structure of matter; the chemical reactions and associated changes that matter undergoes. Chemistry is a natural science that is interrelated with many disciplines among which are physics, earth sciences, engineering medicine, nursing, and other health sciences. In essence, chemistry performs the function

of gate keeper or a pre-requisite to further study in all sciences at tertiary education level, be it clinical, pure, basic, medical, allied medical, agricultural, or environmental sciences. Any student who is deficient in chemistry and has good grades in other science subjects will hardly be able to offer any course in the faculties of science, medicine, and engineering in the universities, [1]. This implies that, for a successful nursing career to be achievable, a sound knowledge of chemistry is a major requirement. This is so because several chemistry concepts form the building block of vital nursing courses. For such nursing courses to be understood with ease, foundational chemistry knowledge of the student inevitably must not be faulty. These concepts range from the nature of matter, elements, compounds, mixtures, separation techniques, acids, bases, salts, electrolytes, carbon, organic chemistry, titration, nuclear energy and so on. The student must understand these concepts in order to be able to appreciate their applicability to nursing practice.

[2] averred that many health science courses share both a common scientific language and body of knowledge, yet some aspects of bioscience, particularly chemistry, are perceived as difficult by many students. The extent of knowledge and understanding of chemistry by those qualified in the health sciences, including nurses, varies considerably, as do their practices and responsibilities. However, as nurses continue to develop and expand their roles, a commensurate increase in their need to understand the principles of chemistry may underpin many future practices [3]. A limited familiarity with chemistry has been reported as a cause for concern during the expansion of the independent prescribing of medicines by non-medically qualified practitioners [4], and while physiology was perceived as essential for a comprehensive undergraduate nurse education, knowledge of the chemistry which underpinned undergraduate physiology was limited [5]. [6] stated that knowledge of chemistry was perceived by health professionals as important, essential for questioning medical decisions and ensuring patient safety.

Despite the numerous importance of chemistry to the practice of nursing as elucidated by several authors, it is quite unfortunate that many nursing students do not have interest in the study of chemistry and hence impacts negatively on their performance in chemistry. This portends a grave danger for nursing practice and nursing education in Nigeria. Many Students perception of chemistry as a burden to be endured than as an experience to be valued results in phobia for chemistry thereby impeding effective learning of the subject [7]. Many students see chemistry as an abstract subject, boring and challenging; hence, only tolerate it because they need it to further their education. While some of the problems could be attributed to the students, others are to be attributed to schools, parents, the society, and the government.

Students must possess the right attitude towards the learning of chemistry. The promotion of favorable attitudes towards chemistry has long been a component of the education process, however the concept of an attitude towards the subject of chemistry is somewhat nebulous, often poorly articulated, and not well understood [8]. A positive attitude to chemistry by student nurses may facilitate a deeper understanding of the biological chemistry which underpins physiology. It may also increase the confidence of student nurses when dealing with chemical phenomena, for example, acid-base balance disturbances, in a clinical situation [3]. Teaching and learning of chemistry revolve around a complex interaction between passionate lecturers, willing and serious students, use of appropriate pedagogy, requisite facilities as well as a most enabling environment for the actualization of a predetermined learning outcomes, [9], [10]. However, this ideal framework has been distorted by the widespread presence of examination practices where students who had not engaged in meaningful learning coupled with lackadaisical attitude of some teachers thriving in a dysfunctional environment resort to diverse cheating techniques to obtain credit pass in chemistry in the School Certificate Examinations [11]. The illusion of obtaining credit pass in chemistry rather than gaining mastery of the subject becomes the rat race [12].

Learning of chemistry produce good results in students only if they develop learning attitudes that are right. But right attitude alone isn't enough as chemistry has to be taught in a conducive environment and a well-equipped laboratory. According to [13], optimal learning climate varies from region of a country and with seasons of the year. However, a conducive learning environment must have the following components such as acoustic value furniture, ventilation and thermal comfort provided [14]. The level of development of any country in this age and time is direct function of the scientific knowledge of her citizenry. Progress in science depends upon continuous scientific investigations. Many researchers have reported that, well-organized and well-equipped laboratories are essential in science teaching [14].

The aim of this examination is to critically examine the causes of the increasing decline in nursing students' interest in chemistry in Nigerian nursing colleges in relation to how

they are negatively impacting in their chemistry performances.

II. EMERGING ISSUES

➤ *Foundational Problems*

It is evidently obvious that Nigerian colleges of Nursing Sciences are inheriting students with very poor science background from their secondary schools. This is not limited to their abysmal performance in applied chemistry but also in other general science causes such as microbiology, applied physics and anatomy and physiology. A good number of Students in Colleges of Nursing Sciences have deficiency in chemistry and have almost zero knowledge of the basic essentials for chemistry laboratory practical. Most of these students happened to have been taught by unqualified teachers in secondary schools, some attended secondary schools with no chemistry teachers, some had teachers, but the schools had no chemistry laboratories while others just had no interest in chemistry. Such students are always the crop of students in Colleges of Nursing Sciences who are always in the habit of requesting for areas of concentration so they could memorize such areas when it's time for examinations. Some Lecturers who do not want to record many failures yield to such cheap demand, but a few lecturers insist on hard work and requisite understanding of the principles and mastering of the entire course content that have been taught.

➤ *Unqualified Candidates/Examination Malpractice*

This is responsible for the poor performance of more than half of students in the nation's colleges of nursing sciences. A good number of them are unqualified and the word 'unqualified' here signifies that these students had no science education background in secondary schools. They have never attended a chemistry class nor seen a chemistry laboratory in their secondary schools. Some were either in arts class or some in social science class. But because of the way nursing has become lucrative globally, high demand for nursing services and the ease of cross-border migration, which is another issue we will discuss shortly, is now the driving force that has aroused the interest of many (unqualified inclusive) to take up the nursing career.

Hence, to get a science result that would qualify them for admission into a college of nursing sciences, they indulge in examination malpractice. Some hire the services of other people to seat for the senior schools' certificate examination for them or enroll in schools that have been termed 'miracle examination centers' where the principal and the teachers indulge in all manner of malpractice to ensure they deliver a good result to their clients. A student who obtained his/her senior school certificate in this manner, presents such a certificate to a college of nursing sciences for admission and such students would always underperform in chemistry examination, constitute nuisance in class and in examination hall and also indulge in malpractice to pass if not properly monitored and supervised.

➤ *Faulty/Fraudulent Admission Procedures*

The admission process of most colleges of nursing sciences is marred with so many irregularities. The reasons are not far-fetched as they have been highlighted before. It is an open secret that admission these days in most colleges of nursing sciences has been hijacked by politicians and the high and mighty in the society. The situation is so awful to the point that no matter how qualified you are, you may not be able to secure admission into some colleges of nursing sciences if you do not know a prominent politician, a first-class traditional ruler, or a highly placed personality in the society. In some worst-case scenarios, admission slots are reserved for the highest bidder.

As reported by [15], investigation into the admission scandal in Bida college of Nursing revealed that the admission of candidates was marred by fraud because a large number of candidates who passed all the due process of the admission were refused to be admitted into the college. Also, in the same report, 64 students out of 131 students withdrew from the program, leaving only 67 students due to poor performance. How could this have happened if deserving and qualified students were given admission in the first place?

In the same vein, [16], reported how politicians, traditional rulers impose less qualified candidates on Nigerian Nursing colleges. It was reported how aggrieved candidates lamented corrupt and shady admission processes in the colleges of nursing and other related health institutions across the country. In the report, some of the affected candidates lamented how some nursing colleges now have a culture of selling very many admission forms to aspiring students only to choose a few that were “anointed candidates” of politicians and influential people. It was also reported how a top official of the Katsina State College of Nursing and Midwifery confirmed that politicians, government officials and traditional rulers had hijacked the schools of nursing to put their relatives with less qualifications and below par academic requirements, at the detriment of those who are qualified to get admissions.

➤ *Lack of Laboratories/Learning Materials*

Stimulating and engaging environment provide the necessary driving force for effective teaching and learning of chemistry. This kind of ambience should be characterized by standard laboratory with current equipment, chemicals, and other consumables. The working conditions and safety standards in the chemistry laboratory must be above average [12]. Most schools of nursing get it very wrong on this as most of them do not have laboratories and even the few that have laboratories, they are not equipped. Most of them focus only on the ‘core courses’ and pay very little attention to chemistry and other courses categorized as ‘general studies courses. They would invest heavily on equipping the skills laboratory for nursing and midwifery simulations, stock up the library with nursing and midwifery textbook/publications while paying no attention to the demand of chemistry and other science course forgetting that several chemistry concepts form the building block of vital nursing courses. For such nursing courses to be understood with

ease, foundational chemistry knowledge of the student inevitably must not be faulty.

➤ *The Ease of Cross-Border Migration*

Apart from the fact that nursing is now highly lucrative and sort after, the ease of cross-border migration is the main reason why many people have developed sudden interest and passion for nursing including those who are grossly unqualified. Many people have come to term that the easiest way for them to escape the economic hardship, suffering, misrule, corruption of the political class and leave the shores of this country is to become nurses. No gainsaying that the services of nurses are of high demand abroad hence, not every student seeking for nursing admission does so out of passion but rather as an easy gateway ticket to travel abroad.

[17] reported the data released by the development Research and Project Centre (dRPC) at a symposium in Abuja, put together to discuss the brain drain in Nigeria’s health sector and its implications for sustainable child and family health service delivery and financing in the context of new national priorities. Quoting the data from the register of Nursing and Midwifery Council (NMC) of the UK, dRPC said the number of Nigeria-trained nurses increased by 68.4 percent from 2,790 in March 2017 to 7,256 in March 2022. The data also shows that 225 nurses and midwives migrated to the UK in 2019; 626 in 2021; and 663 in 2022. According to the report, within the ten months of the year in question, 2,946 nurses and midwives have relocated to the UK to seek greener pastures.

III. THE WAY FORWARD

From the critical review and analysis aforesaid, it would be correct to posit that the crop of some students in our colleges of nursing who have very low interest in chemistry and the attendant challenge of teaching such students which eventually leads to poor performance originated from the country’s faulty secondary school systems. These problems are shouting in nature and are very glaring as articulated and to nip the ugly challenge, copious and intentional attempts must be made and implemented in order to reverse the trend. To achieve this some strategies are hereby recommended as a way forward:

➤ *Proper Result Verification*

There is no gainsaying that nursing is a branch of science and any student who wishes to become a nurse must be a science student all through his/her senior secondary classes. The concept ‘science student’ basically implies that such student has been thoroughly taught and made to go through the entire curriculum of science subjects such as mathematics, chemistry, physics, and biology. Suffice to say that it is not enough that a candidate upon admission is able to tender a senior school certificate that shows a credit pass in the mentioned science subjects. With the proliferation of mushroom secondary schools coupled with the menace of examination malpractice in every part of the country, anybody either arts or social science oriented can easily go to such schools and enroll for science subjects, have the examination written for him/her and eventually get a good

result to parade as a science result. This is one of the root causes of our problems and our colleges of nursing must start to do more with result verification of newly admitted students. Apart from the traditional system of just result for the senior school certificates of candidates, they should be made to submit a duly signed and stamped transcript from schools' head/board and such a school must be verified to be government accredited.

➤ *Guiding the Students Through the use of Problem-Solving Skills*

Chemistry as a science subject is sometimes considered abstract by students because of its mathematical nature and involves the use of many unfamiliar words. Their inability to solve problems in chemistry is a major factor that inhibit their interest and also performance in chemistry. For teachers to effectively teach certain concepts to the students, the teacher must carefully choose the teaching method to adopt in order to capture their interest. One of such very good and effective method is the use of problem-solving method. Interest is mostly described as an individual's tendency to be attracted towards a certain class of activities. When a teacher's teaching method becomes boring, the teacher eventually loses the interest of the students. Problem-solving skills is the ability to solve problems in an effective and timely manner without any impediments. It involves being able to identify and define the problem, generate alternative situations, evaluate, and select the best alternative and implement the selected solutions [18]. In a typical chemistry classroom, students usually face problems in their learning and some of these problems are more complex than others. Irrespective of the degree of this complexity, problem-solving skills helps effectively as it plays an important role in the acquisition and organization of knowledge in a meaningful way [19]. Chemistry teachers are encouraged to adopt appropriate methods in teaching chemistry to instill problem solving skills in them to arouse their interest and improve performance.

➤ *Provision of well-equipped Laboratories*

Many colleges of nursing sciences in the country are guilty of paying little or no needed attention to the needs of the basic sciences especially in the provision of well-equipped chemistry laboratories and other science laboratories. The erroneous thought that these science courses are thought only in the first year and hence not important must be corrected immediately if the students must excel even in nursing because nursing itself is a science. Their performance in the nursing courses is a function of their interest and performance in the basic sciences. Same attention and emphasis that is given to equipping the nursing, midwifery and public health nursing skills laboratories must also be replicated in the basic sciences as the role of the laboratory in the teaching and learning of chemistry cannot be over emphasized. As it has been reported that the non-availability of well-equipped laboratories and lack of other relevant instructional materials in the teaching of science are established issues of concern [20]. Just as it is also established that the use of science laboratories enhances students' retention in chemistry and

very effective in learning, helps improve students' achievement in chemistry [21].

➤ *Adoption and Implementation of Digital Mode of Teaching and Learning.*

The conventional methods of lecture method, demonstration approach and discussion are no longer adequate for transmission of knowledge to students. The twenty-first century students favor different values and learning styles. The current generation of students are much better motivated by the concept of flipped classroom and blended model. The flipped classroom is a departure from the traditional mode of lecturers engaging in copious disperse of information to student using class time. It involves students having access to lecture materials from their portals, already studied same prior to the actual face-to-face lecture. It is very effective because students already have knowledge of the lecture contents and only come to class to clarify ambiguities, fill identified gaps in knowledge, ask relevant questions, and are able to understand concepts and principles better as well as concretize ideas previously gleaned from the materials. The flipped classroom system is normally complemented by the blended class model which involves a combination of learning in the form of watching video lectures, listening to podcasts, perusing enhanced e-book contents or online collaboration with peers and face-to-face classroom lectures [12]. In addition to the fact that the digital model allows students access to materials online, it can also create a very flexible platform for lecturers to have real time classes with students without necessarily coming face to face with them. This is made possible via the use of various internet platforms such as zoom, telegram, google meetings, etc. incorporating this model of teaching and learning chemistry will go a long way to help build interest, improve understanding and performance of college nursing students.

IV. CONCLUSION

It is an open secret that a good knowledge chemistry is a basic requirement to becoming a successful nursing student. The knowledge of chemistry can prop up an understanding of human physiology, human nutrition, pharmacology, and even medical surgical nursing. Evidence suggests that apparent fear and lack of interest in basic sciences chemistry inclusive, may prevail in college nursing students. So many factors have been found to contribute to the lack of interest and poor performance in chemistry by many college nursing students. Some of which have been identified as foundational problems, unqualified candidates/examination malpractice, faulty/fraudulent admission procedures, lack of laboratories/learning materials and the ease of cross border migration. While the problems obviously maybe more than as elucidated, copious, and intentional attempts must be made to ensure that the trend is reversed. To achieve this some strategies have been suggested as recommendations even though they may not be exhaustive, but they have been carefully chosen as highlighted and would go a long way to help if fully implemented.

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