
NURSES' PERCEPTIONS OF THE RELEVANCE OF TOPICS IN MICROBIOLOGY TO NURSING PRACTICE

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Abstract

Microbiology courses are an essential component of the Nigerian nursing training program. This study explored nurses' perceptions of the importance of microbiology topics in nursing practice. One hundred ninety-eight Registered Nurses (RNs) practicing in various institutions in Edo state, Nigeria, completed the survey. A Likert-type scale rated 1 (no significance) to 5 (extreme significance) was used to ascertain the relevance of various microbiological topics. The highest-rated topics were infection control, hospital-acquired infections, disease transmission, and handling of patient specimens. The lowest rated were microscope use and the Gram stain procedure. In addition, the respondents expressed little interest in molecular testing methods. Thus suggesting a gap in their understanding of the uses of these tests, which could be bridged in a microbiology course. The present study suggests that nurses are most interested in microbiology topics that significantly impact patient care. The findings have implications for improving teaching in microbiology education in pre-nursing and nursing curricula.

Keywords: nursing, microbiology, topics, nursing schools

Introduction

Nursing is an essential part of the healthcare sector focused on providing care to people with healthcare needs. Their responsibilities encompass caring for individuals and communities seeking medical attention to recover the finest health and quality of life. Nurses may be distinguished from other healthcare providers by their method of patient care, training, and scope of practice. Nurses in Nigeria practice professionally after undergoing rigorous and thorough educational and clinical training and have passed required professional examinations. There are several training paths available to achieve this professional status. Becoming a nurse in Nigeria requires nursing training in either a School of Nursing, a School of Basic midwifery, or a university. The training in the School of Nursing is a hospital-based Certificate in General Nursing award. The curriculum is set up such that the nursing student can spend half of the training term in the classroom and the other half on clinical placements. Similarly, the School of Basic Midwifery provides a three-year training program for midwives. Although this pathway is no longer popular, it is gradually being phased out. Nurses are also trained in several universities in Nigeria.

Microbiology is the study of microorganisms (Ergüven & Ökten, 2022; Ezemba & Ezeuko, 2022; Mane et al. et al., 2023; Singh & Satyanarayana, 2017; Surendar, 2018), which includes bacteria, viruses, fungi, and parasites. Nursing programs presently include microbiology. As a result, it is critical that whatever microbiology topics they address are relevant to nursing practice (Durrant et al., 2017). Nurses need to understand microbiology and its principles. This knowledge can assist nurses in preventing, diagnosing, and treating infections in their patients, as well as performing a variety of roles in clinical nursing practice, such as collecting specimens, administering antibiotics, preparing specimens for transport and delivery, educating patients and families, communicating results to the healthcare team, and developing care plans based on microbiology study results and patient immunological status (Durrant et al., 2017). Microbiology is an integral part of nursing studies and a significant part of nursing. It provides the essential foundation for the nursing profession. The successful implementation of microbiology in nursing indicates a deep understanding of the interaction of the microbial world with human beings (Anju, 2019).

The accomplishment of an introductory microbiology course is a solid indicator of how students will perform in further nursing courses and clinical areas (Iqbal & Khan, 2020). Nurses are exposed to knowledge of essential microbiology to integrate their knowledge into clinical practice. Accordingly, Iqbal and Khan (2020) noted that nurses in hospital settings mostly use their knowledge for infection control, hospital-acquired infection, disease transmission, and control of microorganisms. Those working primarily in community settings utilize their microbiology knowledge to collect and handle specimens, understand the medically essential microorganisms, and combat infection in the immune-compromised host.

Relevance of the various topics in microbiology is critical to student success and engagement and the proper application of information in the healthcare workplace (Andrew et al., 2015; Cheek & Jones, 2003; Davis, 2010). The objective of the present paper was to assess nurses' perceptions of the importance of microbiology topics to nursing practice.

Methods

The present study was a cross-sectional questionnaire study comprising practicing nurses in public and private hospitals in Edo state, Nigeria. Approval was obtained from the relevant hospital authorities. The convenience sampling method was followed in this study. A total of 206 practicing nurses were approached between May and August 2023 and asked to participate in the study. Those who consented were given the study instrument to fill on the spot. A questionnaire was designed in simple English to identify the relevance of current microbiology education to nursing practice. The questionnaire asked nurses about their educational background in microbiology and related topics, their use of microbiology knowledge in their current work, and the relevance of various microbiology course topics in the workplace. The nurses also provided information about their demographic and job affiliation. The microbiology topics included in the survey were generated from the general nursing microbiology course syllabus.

Results

One hundred ninety-eight questionnaires were adequately filled and returned, while ten were inappropriately filled and discarded. Data were analyzed using the Statistical Package for Social Sciences (SPSS, V 23). The primary analysis focused on descriptive statistics. Representation across all years of work experience is shown in Table 1. Most respondents work in hospitals (81.9%); the rest are in community settings (18.1%). Most respondents indicated having a formal microbiology course before or during their program (77.3%), and over half (55.1%) had a microbiology lab.

Table 1 shows respondent demographics.

No of years	<i>n</i>	%
1-10	75	58.3%
11-20	38	12.8%
21-30	36	12.1%
31-40+	49	16.1%

In this study, nurses were questioned about the microbiological-related tasks they usually performed, the specimens they most collected for testing, and the types of illnesses they most frequently saw in patients. Among the most common responsibilities were administering intravenous and oral antibiotics, instructing patients in the collection of specimens, and explaining the causes of their diseases (Table 2). Urine, feces, blood, and sputum were the four most common specimens collected by nurses (Table 3). The most common infections experienced by responders were wound infections and UTIs (Table 4). Almost as many people (43.6%) reported regularly experiencing fungal infections as did (45%) those who regularly experienced upper respiratory tract infections (43.9%).

A Likert-type scale rated 1 (no significance) to 5 (extreme significance) was used to ascertain the relevance of various microbiological topics. The findings showed that infection control, hospital-acquired infections, and disease transmission were the most relevant topics in microbiology. However, it was observed that the use of a microscope and the Gram stain procedure were regarded as less important.

Table 2 shows the typical responsibilities of the nurses.

Obligations	%
Administering intravenous (IV) antibiotics	64.5
Enlightening patients on sputum, stool, and urine collection.	59.8
Giving oral antibiotics	60.8
Informing patients about their infections	61.1
Assessing and communicating laboratory results	38.5
Transport specimens from the hospital or clinic to the laboratory.	33.8
Identify Group A Streptococcus from throat cultures injected on agar plates.	3.4
Gram stains procedures	1.7
Inoculate specimens to culture media and streak the agar plates for isolation of bacteria	0.7

Table 3. Microbiology specimens are typically collected.

Specimen Type	%
Anaerobic culture	24.3
Blood culture from central venous catheter	42.2
Blood culture from peripheral vein	39.9
Cervical/vaginal culture for STI	10.8
Ova and parasites	19.6
Skin scraping	7.8
Sputum culture	40.2
Stool culture	53
Urine culture	67.2
Wound culture	35.1
None	22.0

Table 4 typical infections encountered

Infection Type	%
Bone	26.7
Central nervous system	23
Central venous catheter/central line	41.9
Ear	19.9
Eye	25
Fungal	43.6
Gastrointestinal	55.1
Joint	26.4
Lower respiratory tract	57.4
Obstetric/perinatal	12.2
Parasitic	17.2
Sepsis	54.7
Sexually transmitted	20.3
Skin	53
Upper respiratory tract	43.9
Urinary tract	68.6
Viral	52
Wound	68.9

Discussion

The present study examined nurses' perceptions of the relevance of various topics in microbiology to nursing practice. One hundred and ninety-eight nurses responded to the survey. The result indicated that the respondents assigned significant relevance to infection control, hospital-acquired infections, and disease transmission. This reflects the importance of these topics in nursing practice and patient care. Accordingly, the findings indicate that these subjects should be emphasized throughout the nursing pre-requisite microbiology course. A solid foundational understanding of microbiology is crucial for the 21st-century physician (Melber et al., 2021). Indeed, the result is aligned with previous studies that have established a link between microbiology courses and effective nursing practice in various

aspects. For example, Yano et al. (2019) found that simple and short microbiology practical improves undergraduate nursing students' awareness of bacterial traits and ability to avoid spreading infections. Similarly, Cox et al. (2014) identified microbiology training as an underpinning element of infection control practice in nursing.

Given the frequency of nurses encountering infections in their workplace, training colleges should prioritize microbiology courses. They should also emphasize the unique characteristics of disease-causing agents and the nature of infections in human hosts. The information presented must be helpful. Examples of topics that could be covered in a microbiology course include why certain antibiotics are effective against bacteria but not fungi and the correlation between the amount of time it takes to obtain the results of fungal culture and the growth rates of the most common fungal pathogens.

It is hardly unexpected that the nurses ranked Gram stain procedures and microscope use as the least essential topics in microbiology. Perhaps Gram stain knowledge is crucial in the diagnosis and interpretation of Gram stain results and, thus, should be significantly prioritized in a nursing microbiology course, possibly with little emphasis on microscope use. With this basic knowledge, the nurse can detect when a Gram stain result may demand intervention in a patient's treatment. Though this obligation is more aligned with the scope of practice in the nursing profession in many institutions that are not captured in this survey, the ability to match organism morphology to the suspected pathogen(s) and the subsequent review of the care plan (e.g., antimicrobial therapy) can make a difference in patient outcome.

The comparatively low mean relevance rating for molecular testing methods may point to an opportunity to teach nursing students about how these methods might be used to help patients. Many nurses may not be unaware that a Group B Streptococcus polymerase chain reaction test is significantly more sensitive and quicker than a standard culture. Although the physician or nurse practitioner is usually responsible for molecular test results, nurses should be aware that quickly recognizing a pathogen from a positive blood culture bottle and initiating appropriate care intervention can considerably improve patient morbidity and mortality.

Conclusion

The results from this study suggest that nursing practitioners view a broad range of medical microbiology topics as intensely relevant to nursing practice. Thus, the findings suggest the need to improve microbiology teaching in the nursing training schools in Nigeria, especially in microscope use and the Gram stain procedure. Reducing or eliminating these topics from the core bioscience curricula required of nurses may be inappropriate because they contribute to furthering effective nursing practice and increasing healthcare delivery. Enhancing essential topics such as infection management, healthcare-associated infections, and disease broadcasting will prepare nurses for efficient healthcare delivery and recognition of communicable diseases and appropriate patient care interventions.

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