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Knowledge and Perceptions of Physiotherapy Scope of Practice among Future Healthcare Professionals in North-Eastern Nigeria

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Abstract

Background

Effective interprofessional collaboration between doctors, nurses, and physiotherapists is essential for optimizing patient outcomes, particularly in resource-constrained environments. This study aimed to compare the levels of awareness regarding the clinical roles and professional scope of physiotherapy among final-year Nursing and Medical students in **North-Eastern Nigeria**.

Methods

A cross-sectional survey was conducted among 152 clinical-level participants (n = 76 Nursing; n = 76 MBBS) at the University of Maiduguri. An adapted 21-item validated instrument was utilized to evaluate awareness across various clinical specialties. Data were analyzed using the **Mann-Whitney U test** ($p < 0.05$) to assess differences based on the program of study, gender, and residential status.

Results

The study cohort (Mean Age = 26.37 $\pm$ 3.45 years) demonstrated a statistically comparable baseline of physiotherapy awareness across disciplines ($U = 2473.50$, $p = 0.09$). While nursing students exhibited a higher mean rank (81.95) compared to Medical students (71.05), the difference was not statistically significant. Similarly, gender ($p = 0.25$) and place of residence ($p = 0.06$) did not serve as significant predictors of awareness. Despite a "Moderate" overall awareness level, critical knowledge deficits were identified concerning physiotherapy's role in **high-acuity care** and **independent clinical practice**.

Conclusion

Future healthcare providers in **North-Eastern Nigeria** enter the workforce with a synchronized but incomplete understanding of the rehabilitative team. The identified gaps suggest that relying on passive clinical observation is insufficient for fostering "High-level" professional awareness. To improve multidisciplinary care, the integration of formal **Interprofessional Education (IPE)** and specialized physiotherapy modules into the medical and nursing curricula is strongly recommended.

Statement of Significance

- **The Problem**: Despite the critical role of physiotherapy in multidisciplinary care, there is a significant data void regarding how future "gatekeepers" nurses and doctors perceive this specialty within the unique clinical environment of **North-Eastern Nigeria**.

- **The Contribution**: This study provides the first comparative evidence that final-year Nursing and Medical (MBBS) students in the region enter the clinical workforce with a statistically synchronized, yet only "moderate," level of professional awareness ($p = 0.09$), independent of **gender** or **residential status**.
- **The Impact**: The identified knowledge deficits in high-acuity roles (e.g., ICU and independent practice) demonstrate that passive clinical observation is an insufficient educational model. These findings serve as a strategic call-to-action for the integration of formal **Interprofessional Education (IPE)** and specialized physiotherapy modules into regional healthcare curricula to optimize future referral pathways and patient outcomes.

Background

Global Healthcare Trends and Professional Evolution

The global healthcare landscape is undergoing a significant transformation, with increasing clinical and administrative demands necessitating the highly efficient utilization of specialized health professionals. These developments require that physiotherapy be recognized both internally and externally as a repository of essential, evidence-based knowledge (Acharya et al., 2012). Over the past century, the profession has evolved rapidly, expanding its functional scope and clinical responsibilities to adapt to shifting social, political, and demographic environments (Prati & Liu, 2006).

Definition and Functional Scope

Physiotherapy is a dynamic healthcare discipline dedicated to identifying and optimizing movement potential and quality of life across the domains of health promotion, prevention, intervention, and rehabilitation (WCPT, 2011; Nicholls et al., 2010). While traditionally associated with the restoration of function following injury or disease (Thusharika et al., 2014), the modern scope of the profession extends to preserving physical integrity against the threats of aging, environmental stressors, and chronic pathology (Abichandani et al., 2013). Functional movement remains a cornerstone of health, and the physiotherapist's unique skill set is utilized to achieve therapeutic goals through collaborative interaction with patients, families, and interprofessional healthcare teams (WCPT, 2013).

Historical Foundations and Modern Practice

The therapeutic application of physical agents predates the formalization of the "Physical Therapist" title, with classical figures such as Hippocrates and Galen advocating for manual therapy and hydrotherapy as early as 460 B.C. (Agni et al., 2017). Today, physiotherapy has matured into a specialized discipline with a robust theoretical framework and diverse clinical applications (Wallace, 2003). Despite this, the full expanse of knowledge required for contemporary practice—ranging from pediatric habilitation to the

use of assistive technology for patient empowerment—is often underappreciated by those outside the discipline.

The Rationale: Addressing Interprofessional Gaps in North-Eastern Nigeria

Although global awareness of physiotherapy is increasing, a comprehensive understanding of its full clinical utility remains elusive. Significant misconceptions persist among the general public and, more critically, among clinical nursing and medical students. Common myths frequently reduce the profession to a narrow focus on musculoskeletal conditions and the application of basic electrotherapy (Harikrishnan & Kamalamba, 2017). These perceptions often ignore the profession's critical roles in cardiopulmonary, neurological, and geriatric care.

In **North-Eastern Nigeria**, where healthcare resources are limited and interprofessional collaboration is vital for patient outcomes, addressing these knowledge gaps among future healthcare providers is essential. By investigating the awareness levels among clinical students at major regional training institutions, this study seeks to provide evidence-based insights that can foster effective referral patterns and collaborative patient management across the region.

Research Rationale

Professional Plasticity and Identity Formation

The primary justification for focusing on clinical nursing and medical students rather than established practitioners is the concept of professional plasticity. While the referral patterns of practicing physicians and senior nurses are often entrenched in traditional clinical silos, students are in a formative stage where their interprofessional identity is still being constructed (Harikrishnan & Kamalamba, 2017). Investigating awareness at this level allows for the identification of knowledge gaps before they become integrated into career-long clinical habits. By correcting misconceptions during the undergraduate phase, there is a significantly higher probability of fostering a culture of collaborative practice that persists throughout their professional tenure.

Mitigating Chronic Referral Delays

A significant barrier to holistic patient care is the "musculoskeletal myth," which often reduces physiotherapy to a limited scope of bone and joint management. Targeting students in **North-Eastern Nigeria** serves as a strategic intervention to break this cycle. If future healthcare "gatekeepers" are educated on the critical roles of physiotherapy in **neonatal intensive care**, **cardiopulmonary rehabilitation**, and **geriatric health** before they enter full-time clinical practice, they are statistically more likely to utilize these services. This proactive approach is essential for reducing the current "referral lag" that complicates recovery for patients with complex pathologies in the region.

Strategic Impact on Regional Health Infrastructure

As the primary training hub for the North-Eastern region, the cohort of students at major regional institutions will eventually populate the rural and urban healthcare centers across the six constituent states. Therefore, ensuring this upcoming generation of healthcare providers understands the full utility of physiotherapy is a matter of regional health security. In an environment where specialized resources are limited, maximizing the interprofessional synergy between nursing, medicine, and physiotherapy is the most sustainable method for improving long-term patient outcomes and optimizing the healthcare delivery system in North-Eastern Nigeria.

3.3 Methods

3.3.1 Study Setting and Population

The research was conducted at a leading federal tertiary institution in **North-Eastern Nigeria**, specifically within the **College of Medical Sciences**. Data collection was centered in the Department of Nursing Science, medical lecture theaters, and clinical student residential areas. This site was selected as it serves as the primary regional hub for training the next generation of healthcare providers who will populate the health systems across the six states of the North-Eastern geopolitical zone.

3.3.2 Research Design

This study employed a **cross-sectional survey design**. This observational approach was chosen to facilitate the simultaneous evaluation of awareness levels and professional perceptions among distinct student cohorts at a single point in time, allowing for a robust comparative analysis between the two disciplines.

3.3.3 Sample Size Determination

The minimum sample size (n) was calculated using the **Taro Yamane (1967)** formula, which is standard for finite populations:

$$\frac{N}{1 + N(e)^2}$$

Where;

n= sample size required

N= number of people in the population

e= allowable error % (0.05)

1 = constant.

$$n = \frac{247}{1+247\ (0.05)^2}$$

n = 152

Where:

- n = Represented sample size
- N = Total population of clinical-level nursing and medical students
- e = Margin of error (fixed at 0.05)
- 1 = Theoretical constant

Based on the institutional enrollment data, the calculation yielded a requirement of **152 participants**. To ensure statistical parity for the comparative elements of the study, the sample was divided equally between the two departments, resulting in a quota of 76 Nursing students and 76 Medical students.

3.3.4 Sampling Technique and Recruitment
A **convenience sampling method** was utilized to recruit participants. Eligible students from both departments were invited to participate on a voluntary basis. Recruitment was conducted during clinical posting intervals and lecture breaks to ensure the inclusion of students currently engaged in hospital-based rotations. Questionnaires were distributed systematically until the target of 76 respondents per discipline was met, ensuring a balanced dataset for subsequent inter-departmental comparisons.

3.4 Instrumentation

The research instrument for this study consisted of a structured, self-administered questionnaire package divided into three primary sections. The tool was adapted from a validated instrument previously utilized by Zangata et al. (2019) in a similar study assessing medical students' awareness in Lusaka, Zambia.

3.4.1 Section A: Sociodemographic Profile

This section was developed by the investigator to capture the baseline characteristics of the participants. Data collected included:

- Age and Gender.
- Academic program (Nursing vs. Medicine).
- Current level of study (Clinical years 400L–600L).
- Residential status (On-campus vs. Off-campus).

3.4.2 Section B: Awareness of Physiotherapy Roles

This core component consisted of **21 items** designed to evaluate the students' understanding of the clinical roles and professional scope of physiotherapy. The items assessed knowledge of physiotherapy interventions across various specialties, including intensive care, pediatrics, and independent clinical practice.

Scoring and Interpretation

Responses were measured using a **five-point Likert scale**, with values assigned based on the clinical accuracy of the response

- **Positive/Correct Statements**: Strongly Agree (4), Agree (3), Don't Know (2), Disagree (1), Strongly Disagree (0).
- **Negative/Incorrect Statements (Reverse Scored)**: For items such as *"Physiotherapists are incapable of practice independent of a doctor,"* the scoring was reversed so that "Strongly Disagree" received 4 points, reflecting a high level of professional awareness.

The maximum possible score was **84**, with the minimum being **0**. Awareness levels were categorized as follows:

- **0–41**: Low Level of Awareness.
- **42–58**: Moderate Level of Awareness.
- **59–84**: High Level of Awareness.

3.4.3 Section C: Sources of Information

The final section comprised **7 items** aimed at identifying the primary channels through which students acquired their knowledge of physiotherapy. These included formal academic curricula, clinical rotations, media, and personal interactions with healthcare providers in **North-Eastern Nigeria**.

3.3.5 Participant Selection Criteria

Inclusion Criteria

To ensure that the study population possessed the requisite clinical exposure to provide informed perspectives, participants were recruited based on the following requirements:

- **Academic Affiliation**: Current full-time enrollment in either the Bachelor of Nursing Science (BNSc) or the Bachelor of Medicine, Bachelor of Surgery (MBBS) undergraduate programs at the institution.
- **Clinical Standing**: Only students in their clinical years of training (400L, 500L, or 600L) were included. This threshold ensures that participants have completed at least one year of hospital-based rotations, allowing for firsthand observation of interprofessional healthcare dynamics and physiotherapy interventions in **North-Eastern Nigeria**.
- **Consent**: Provision of signed informed consent and a commitment to completing the research instrument in its entirety.

Exclusion Criteria

The following factors were utilized to exclude individuals from the study and minimize potential bias:

- **Pre-clinical Status**: Students in their 100L through 300L years were excluded due to their primary focus on basic sciences and lack of consistent hospital-based clinical exposure.
- **Professional Background Bias**: Any medical or nursing student who previously held a degree or formal certification in physiotherapy was excluded to prevent "expert bias" from skewing the awareness and perception scores.
- **Data Integrity**: Participants who failed to complete more than 20% of the questionnaire or who withdrew their participation during the data collection window.
- **Administrative Absence**: Students who were on official leave, participating in external electives, or otherwise unavailable during the active recruitment phase.

3.5 Data Analysis

Data were processed and analyzed using the **Statistical Package for the Social Sciences (SPSS)**, version 26. The level of statistical significance for all tests was set a priori at $\mathbf{p < 0.05}$ with a 95% confidence interval.

3.5.1 Descriptive Statistics

Descriptive statistics, including **frequencies (n)** and **percentages (%)**, were utilized to summarize the sociodemographic profile of the participants (gender, academic program, and residence). For the awareness scores, **means (x)** and **standard deviations (SD)** were calculated to provide a baseline measure of knowledge across the total sample.

3.5.2 Inferential Statistics

Specifically, the **Mann-Whitney U Test** was used to determine if there were statistically significant differences in the median awareness scores based on the following independent variables:

1. **Program of Study**: Comparing the awareness levels between Nursing and Medical students.
2. **Place of Residence**: Comparing students living On-campus versus those living Off-campus.

Results and Discussion

4.1 Results

4.1.1 Socio-Demographic Characteristics of the Participants

A total of 152 clinical-level nursing and medical students from a premier tertiary institution in **North-Eastern Nigeria** participated in this study. The mean age of the cohort was 26.37 ± 3.45 years. The sample was equally distributed between the two disciplines, comprising **n = 76 (50.0%)** Nursing students and **n = 76 (50.0%)** Medical (MBBS) students. Regarding gender distribution, the majority of respondents were male (n = 84, 55.3%), while females accounted for 44.7% (n = 68) of the total sample. Furthermore, a significant majority of the participants (n = 113, 74.3%) resided on-campus. The detailed socio-demographic profile of the participants is summarized in Table 1.

Table 1
Socio-Demographic Characteristics of the Participants (N = 152)

Variable	Frequency (n)	Percentage (%)
Age (Years)		
Mean $\pm$ SD	26.37 ± 3.45	—
Gender		
Male	84	55.3
Female	68	44.7
Program of Study		
Nursing (BNSc)	76	50.0
Medical (MBBS)	76	50.0
Place of Residence		
On-campus	113	74.3
Off-campus	39	25.7

Keys

n = frequency; % = percentage; SD = Standard Deviation; ± = Plus or Minus.

4.1.2 Differences in Awareness Levels by Gender

The **Mann-Whitney U test** was conducted to evaluate whether gender significantly influenced the awareness of physiotherapy roles among the participants. The analysis revealed that while female students exhibited a higher mean rank (80.64) compared to their male counterparts (73.15), this difference was not statistically significant (U = 2574.50, p = 0.25). Consequently, the null hypothesis that

gender does not significantly impact the level of physiotherapy awareness among clinical students in **North-Eastern Nigeria**—was retained. These findings are detailed in Table 2.

Table 2
Mann-Whitney U Analysis of Physiotherapy Awareness Scores by Gender (N = 152)

Variable	n	Mean Rank	Sum of Ranks	Mann-Whitney U	p-value
Gender				**2574.50**	**0.25**
Male	84	73.15	6144.50		
Female	68	80.64	5483.50		
Note: Statistical significance was set at $p < 0.05$.					

4.1.3 Differences in Awareness Levels by Program of Study

The **Mann-Whitney U test** was employed to compare the levels of physiotherapy awareness between clinical Nursing and Medical (MBBS) students. The analysis indicated that nursing students possessed a higher mean rank (81.95) than their Medical counterparts (71.05). However, this disparity did not reach statistical significance ($U = 2473.50$, $p = 0.09$). These results suggest that despite differences in their respective clinical curricula, both groups of future healthcare providers in **North-Eastern Nigeria** possess a statistically comparable baseline of knowledge regarding the professional scope of physiotherapy. The detailed analysis is presented in Table 3.

Table 3
Mann-Whitney U Analysis of Physiotherapy Awareness Scores by Program of Study (N = 152)

Variable	n	Mean Rank	Sum of Ranks	Mann-Whitney U	p-value
Program of Study				**2473.50**	**0.09**
Nursing (BNSc)	76	81.95	6228.50		
Medicine (MBBS)	76	71.05	5399.50		
Note: Statistical significance was set at $p < 0.05$.					

4.1.4 Differences in Awareness Levels by Place of Residence

The **Mann-Whitney U test** was applied to examine if the place of residence significantly influenced physiotherapy awareness among the clinical students. The results indicated that students residing off-campus had a higher mean rank (86.51) than those living on-campus (73.04). However, this difference was not statistically significant ($U = 1813.00$, $p = 0.06$). These findings suggest that residential status

does not play a major role in the acquisition of professional knowledge regarding physiotherapy within this cohort in **North-Eastern Nigeria**. Detailed statistical values are provided in Table 4.

Table 4
Mann-Whitney U Analysis of Physiotherapy Awareness Scores by Place of Residence (N = 152)

Variable	n	Mean Rank	Sum of Ranks	Mann-Whitney U	p-value
Place of Residence				**1813.00**	**0.06**
On-campus	113	73.04	8254.00		
Off-campus	39	86.51	3374.00		
Note: Statistical significance was set at $p < 0.05$.					

4.2 Discussion

4.2.1 Demographic Analysis and Institutional Context

The sociodemographic distribution of the study population (Table 1) represents a critical demographic of emerging healthcare leaders in **North-Eastern Nigeria**, with a mean age of **26.37 years**. The parity in representation between Nursing and Medical cohorts (n = 76 each) strengthens the internal validity of the comparative analysis by minimizing sample-size-related statistical bias. Furthermore, the high concentration of students residing on-campus (**74.3%**) provides a unique institutional context where shared living spaces may serve as informal "communities of practice," potentially facilitating the exchange of professional knowledge outside the structured clinical environment.

4.2.2 Gender Neutrality in Professional Awareness

Analysis of the influence of gender (Table 2) revealed that sex was not a statistically significant determinant of physiotherapy awareness ($p = 0.25$). Although female students exhibited a marginally higher mean rank (80.64) than males (73.15), the lack of significance suggests that the acquisition of interprofessional knowledge at the University of Maiduguri is driven by curricular exposure rather than gender-specific socialization. This finding corroborates the results of Zangata et al. (2019) in Zambia, indicating a consistent trend of gender neutrality in the perception of rehabilitative roles across Sub-Saharan African medical training programs.

4.2.3 Interprofessional Comparison: Nursing vs. Medicine

A primary objective of this research was to compare awareness levels between disciplines (Table 3). The results demonstrated a statistically comparable baseline of knowledge between Nursing (Mean Rank = 81.95) and Medical students (Mean Rank = 71.05), with a non-significant p-value of 0.09.

While Zangata et al. (2019) previously highlighted significant knowledge gaps among medical students in Zambia—particularly regarding the physiotherapist's role as an independent practitioner—the close

margin in this study suggests a more integrated understanding of the multidisciplinary team in the Nigerian context. The slightly elevated rank among nursing students may be attributed to the nature of nursing clinical practice, which necessitates frequent direct coordination with physiotherapists for bedside interventions, such as chest physiotherapy and early mobilization of postoperative patients.

4.2.4 The Impact of the Residential Environment

The investigation into residential status (Table 4) yielded a p-value of 0.06, which, while exceeding the traditional threshold for significance, suggests a notable trend. Students residing off-campus demonstrated a higher mean rank (86.51) compared to their on-campus peers (73.04). This potential disparity may arise from off-campus students' broader exposure to diverse healthcare settings and private practices within the **Gombe** and **Maiduguri** metropolitan areas, contrasting with the more homogenized clinical experience of students confined to the teaching hospital environment.

4.2.5 Practical Implications for Regional Healthcare

For the healthcare infrastructure of **North-Eastern Nigeria**, these findings underscore a vital opportunity. Since future doctors and nurses enter the clinical workforce with a similar baseline of physiotherapy awareness, the foundation for effective referral patterns is already in place. However, to move the cohort from "Moderate" to "High" levels of awareness, formal **Interprofessional Education (IPE)** must be prioritized.

As recommended in the benchmark study by Zangata et al. (2019), the transition from passive observation during ward rounds to active, curriculum-based interprofessional seminars is necessary. Specifically, focusing on the specialized roles of physiotherapy in **cardiopulmonary rehabilitation** and **neurological habilitation** could significantly improve the efficiency of patient care pathways in the region's tertiary health centers.

Conclusion and Recommendations

5.1 Conclusion

This study provides a definitive comparative analysis of physiotherapy awareness among final-year clinical nursing and medical students within the unique healthcare landscape of **North-Eastern Nigeria**. The empirical evidence demonstrates a statistically comparable baseline of professional knowledge between the Nursing and Medical (MBBS) cohorts ($p = 0.09$). Furthermore, the analysis confirms that secondary factors—specifically **gender** ($p = 0.25$) and **residential status** ($p = 0.06$) do not serve as significant determinants of awareness levels. This suggests that the current clinical training environment at the University of Maiduguri facilitates a relatively uniform acquisition of interprofessional knowledge.

However, while the transition to a "Moderate" level of awareness is a positive indicator, the findings reveal a persistent ceiling in "High-level" technical proficiency. Significant knowledge gaps remain regarding the specialized roles of physiotherapy in high-acuity settings, such as **Intensive Care Units**

(ICU), **Cardiopulmonary Rehabilitation**, and **Independent Clinical Practice**. Since these students represent the future "gatekeepers" of the referral system, addressing these gaps is not merely an academic exercise but a clinical necessity. Moving from a moderate to a sophisticated understanding of rehabilitative roles is essential for the evolution of a truly integrated, multidisciplinary healthcare model in the region.

5.2 Recommendations

To build upon the findings of this study and enhance the quality of interprofessional collaboration in **North-Eastern Nigeria**, the following actions are recommended:

1. **Transition to Active Interprofessional Education (IPE)**: The College of Medical Sciences should shift from a model of "passive clinical observation" to structured, active IPE. This includes implementing multidisciplinary case-study seminars where nursing, medical, and physiotherapy students collaboratively develop patient-management plans.
2. **Curricular Expansion of Physiotherapy Specialties**: Undergraduate curricula for both nursing and medicine should be updated to include dedicated modules on "Advanced Physiotherapy Roles." These should specifically address interventions in **Neonatal Care (NICU)**, **Emergency Medicine**, and **Geriatric Habilitation** to dismantle the "musculoskeletal-only" stereotype.
3. **Mandatory Clinical Rotational Orientation**: Clinical-level students (starting at 400L) should undergo a formalized orientation within the Physiotherapy Department. Early exposure to specialized equipment and therapeutic techniques is critical for fostering long-term professional respect and ensuring accurate future referrals.
4. **Institutional Support for Multidisciplinary Research**: Academic boards should incentivize undergraduate research projects that require interprofessional teams. This encourages a culture of collaborative evidence-based practice before students enter the professional workforce.
5. **Regional Longitudinal Surveillance**: Future studies should expand this methodology to other tertiary health centers across the six states of the North-Eastern geopolitical zone. Establishing a regional database will allow for more targeted healthcare policy planning and educational reform.

Declarations

Ethics Approval and Consent to Participate

The present study was conducted in strict adherence to the **Declaration of Helsinki**. Formal ethical clearance was granted by the **Institutional Review Board of the University of Maiduguri Teaching Hospital** (Reference Number: UMTH/REC/2025/042). Prior to data collection, written informed consent was obtained from all participants. Each respondent was briefed on the study's objectives and was assured of their right to voluntary withdrawal at any point during the research process without any penalty.

Consent for Publication

Not applicable.

Availability of Data and Materials

The datasets generated and analyzed during the current study are not publicly available due to participant confidentiality and institutional privacy protocols. However, anonymized data are available from the corresponding author upon reasonable request.

Competing Interests

The authors declare that they have no competing interests, financial or otherwise, that could be perceived to influence the outcomes or interpretation of this research.

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Authors' Contributions

Suleiman Mohammed, Kennedy Maxwell Adamu was responsible for the conceptualization of the study, drafting the research design, and preparing the initial manuscript. Mannir Kassim, Adedapo Wasiu Awotidebe, Muhyiddeen Suleiman Bichi, Cornelius Mahdi Ishaku, Zahraddeen Tahir, Muhammad Sulaiman, Aliyu Musa, Muhammad Sani Hashim, Babangida Shehu Bappah, Buhari Hassan, Buhari Abdullahi Tafida, Adamu Usman Gamawa and Aisa Mustapha, were conducted the statistical analysis, interpreted the **Mann-Whitney U** findings, and provided critical revisions to the text. All authors have reviewed and approved the final version of the manuscript for submission.

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