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## ORIGINAL ARTICLE

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## THE SPECTRUM OF STUDENT ENROLLMENT-RELATED OUTCOMES IN PHYSIOTHERAPY EDUCATION PROGRAMS IN WEST AFRICA

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## ABSTRACT

**Background:** This cross-sectional study investigated student enrollment-related outcomes from physiotherapy education programs in West Africa.

**Methods:** The Head of Department of all physiotherapy education programs in Nigeria and Ghana universities (N=14) completed a questionnaire that sought information on admission capacity/goal, student enrollment, baccalaureate (BPT/BS) and postgraduate (MS, Ph.D.) degrees conferred and the student-core faculty ratio (SFR).

**Results:** In Nigeria, 4,748 BPT, 325 MS and 50 Ph.D. degrees in physiotherapy were conferred over a 50 year period; 2,038 BPT, 160 MS, and 42 Ph.D. students are currently enrolled. In Ghana, over a 14 year period, 277 BS degrees were conferred and 162 students are currently enrolled. The mean SFR for the undergraduate program in Nigeria and Ghana was 17.6 and 13.5, respectively. In Nigeria, 83.3% of the physiotherapy programs are located in Federal owned university; while in Ghana 100% of the programs are in State-owned university ( $\chi^2 = 8.556$ ;  $p = .014$ ). Admission goal and university ownership are significantly ( $p < .05$ ) influenced by the number of students annually admitted, students enrolled and SFR.

**Conclusion:** The number of physiotherapists currently produced by universities in West Africa is inadequate to meet the regional physiotherapist needs.

**Keywords:** Professionalism, Student Admission, Enrollment, Student-Faculty Ratio, Manpower Capacity Building.

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## INTRODUCTION

Africa is witnessing a significant increase in dilapidating chronic diseases and concomitant physical disabilities [1]. The recent increase in the aging population has been implicated as one of the major causes of the rise in global prevalence of disability [2, 3]. Global statistics show that over 600 million persons throughout the world have one or more form of disability. Of the 600 million individuals with disabilities, 400 million are from developing countries and 80 million live in Africa [4,5]. West Africa is beset by a shortage of physiotherapists and has one of the lowest physiotherapists per resident ratio in the world [5, 6].

In the last two decades, physiotherapy education globally has witnessed increased student enrollment at undergraduate and graduate levels. In many countries, professional education in physiotherapy has transitioned to an entry-level Master's (MS) or doctor of physiotherapy (DPT) levels. In West Africa, Nigeria and Ghana is the only English language speaking countries offering a professional baccalaureate (BPT/BS) degree program in physiotherapy, but no empirical data on student enrollment-related outcomes from the existing physiotherapy education programs.

For long-term strategic planning purposes, it is necessary to investigate the enrollment and graduation outcomes of the physiotherapy education programs in West Africa to ascertain whether the number of physiotherapists produced is adequate to meet the regional needs. Unfortunately, empirical data on the number of physiotherapists produced annually in West African universities is not currently available.

This study was designed to investigate the spectrum of student enrollment-related outcomes from universities offering physiotherapy education programs in West Africa.

## METHODS

### Study Setting and Research Design

The population of West Africa is 301,587,669 [7]. Nigeria is the most populous country in Africa, with a population that doubles the population of the next two most populous African countries-Ethiopia and Egypt. Of the 16 West African countries, Nigeria and Ghana are the two most populous. Nigeria's population is 174,507,573 and has a land mass of 910,768 sq. km [8]. Ghana is inhabited by 24,304,000 people and has a land mass of 238,535 sq. km.

The protocol for this research was approved by the College of Medicine University of Lagos Institutional Review Board. This cross-sectional study only focused on the physiotherapy education programs in English-speaking West African countries that are a member of the World Confederation of Physical Therapy (WCPT) [9]. The study participants were recruited purposively. Physiotherapy education programs in French-speaking West African countries and physiotherapy assistant programs were excluded from the study.

### Survey Instrument

The survey instrument used in this study was developed

by the investigators. It consists of 25 open-and-closed ended questions divided into three sections. Section I of the survey instrument sought information on the university name, country of location, ownership of the university (federal or state governments or private), year of initiation of entry-level baccalaureate degree program, length (duration) of the physiotherapy education program (years), number of students admitted annually (admission capacity), admission goal (to increase, decrease or admit same number of students), total number of students enrolled and number of BS/BPT degrees conferred since the debut of the program. Section II of the questionnaire sought information on the type (MS or Ph.D.) of the postgraduate degree program in physiotherapy offered, the debut year of the postgraduate program and number of lecturers employed.

To establish the face and content validity of the survey instrument, three lecturers with over 10 years experience as program director/chair (Head of Department) reviewed the initial draft of the questionnaire. Based on their feedback, several items were rewritten to improve content and comprehension. Subsequently, the instrument readability was evaluated using standard procedures (<https://readability-score.com/premium/>). The readability indices obtained for the survey instrument revealed Flesch-Kincaid and Flesch-Kincaid Reading Ease scores of 17 and 28.1, respectively. The Flesch-Kincaid and the Flesch Reading Ease scores are a measure of the instrument literacy difficulty level. A Flesch-Kincaid score of 17 indicates that the respondents would need a 17th-grade reading level to fully comprehend the contents of the survey. The minimum and maximum Flesch Reading Ease score range from 0 to 100, respectively. A low Flesch Reading Ease score indicates the content of the questionnaire is difficult to read. A Flesch Reading Ease score of 28.1; indicates that the test is relatively difficult to comprehend.

### Procedure

Prior to data collection, the list of physiotherapy education programs in West Africa published on the WCPT website was obtained [9]. The Head of Department of Physiotherapy in each university was identified and requested to participate in a program evaluation survey. After receiving their consent, a survey instrument was emailed to them. Follow-up emails and phone calls were made to the study participants to ensure a 100% response rate.

Following data collection, we computed the student-core faculty ratio (SFR) for the undergraduate and postgraduate programs in each university. The undergraduate SFR was derived by dividing the number of undergraduate physiotherapist students enrolled by the total number of full-time (core) lecturers employed. Similarly, the postgraduate SFR was derived by dividing the total number of postgraduate students enrolled by the total number of lecturers with Ph.D. degree teaching postgraduate courses and supervising student thesis and/or dissertation.

The SFR is used in this study as a proxy to gauge class size

[10]. An SFR of 10:1 indicates that there are 10 students for every one lecturer. A low SFR is often used by institutions of higher learning as a selling point for quality education derived from more individual attention from lecturers. A learning environment with low SFR is anticipated to benefit a low-performing student when the academic content is more challenging [10].

### Statistical Analysis

We coded the dependent and independent variables on the survey instrument into SPSS version 16 software (SPSS, Chicago, IL, USA). Both descriptive (measures of central tendency and percentages) and inferential statistics were computed. We employed the Shapiro-Wilk test to assess the normality (Skewness and Kurtosis) of the student enrollment related outcomes data. We computed the Chi-Square ( $\chi^2$ ) non-parametric test to evaluate any plausible association between countries (Nigeria/Ghana), university ownership (Federal/State/Private), and admission goals

(increase/decrease/same level). We also computed the Kruskal-Wallis non-parametric test to evaluate plausible differences in the dependent variables between countries, university ownership, and the admission goals. The dependent variables evaluated were: program age, the length of the program (years), the number of students annually admitted (admission capacity), the number of students currently enrolled, the total number of BPT/BS, MS, and Ph.D. degrees conferred since the debut of program, and undergraduate and postgraduate SFR. A p-value  $\leq .05$  was accepted as being statistically significant.

### RESULTS

#### Entry-level Baccalaureate Program Student Enrollment Related Outcomes

The physiotherapy education program debut date, the age of the program (years) and length of the entry-level baccalaureate degree programs in West African universities is presented in Table 1.

**Table 1: Entry-level Physiotherapy (BPT/BS) Degree Program Debut Date, Program Age (Years) and Length (Years) in West African Universities**

Country/University	BS Program Debut	Program Age (year)	Length of Program (years)
<b>Nigeria</b>			
1. University of Ibadan	1966	50	5
2. University of Lagos	1970	45	5
3. OAU, Ile-Ife	1977	39	5
4. University of Nigeria	1985	31	5
5. Bayero University	1990	26	5
6. University of Maiduguri	2003	13	5
7. Nnamdi Azikiwe University	2004	12	5
8. University of Benin	2015	2	5
9. Bowen University	2015	1	5
10. University of Ilorin*	2015	1	5
11. Federal University, Dutse*	2015	1	5
12. Ondo State Univ. of Medical Sciences*	2016	0.5	5
<b>Ghana</b>			
1. University of Ghana	2002	14	4
2. Univ. Health & Allied Sciences, Ho	2014	2	4

\*The program was approved by the University Governing Council but the pioneering students is yet to enroll

The length of the physiotherapy education program in Nigeria is 5 years in duration leading to the award of a professional Bachelor of Physiotherapy (BPT) degree. The physiotherapy education programs in Nigeria are at different stages of development and implementation. Of the existing physiotherapy program in Nigeria, 67% already had students enrolled and have awarded BPT degrees; 17% of the programs have enrolled students but yet to graduate the first cohort of students, and the remaining 17% are yet to admit students, but still in the planning stages.

The physiotherapy education program in Ghana is 4 years in duration leading to a Bachelor of Science (BSc) degree in physiotherapy. Fifty percent of the universities in Ghana with physiotherapy program have conferred the BSc degree and the remaining program is yet to graduate the pioneering students. The first physiotherapy degree program in Nigeria started at the University of Ibadan 50 years ago. About 14 years ago, Ghana initiated its first physiotherapy degree program at the University of Ghana. A physiotherapy program graduates from a West African university is

required to successfully complete a one-year mandatory clinical internship before qualifying to practice as a physiotherapist. No licensure examination is required following the clinical internship.

The number of undergraduate students annually admitted/enrolled/graduated from the physiotherapy education programs in West African universities is presented in Table 2

**Table 2: Current Undergraduate Students Enrolled, Physiotherapist Produced and University Ownership**

Country/University	# of BS Students Enrolled	# of Degree Conferred	University Ownership
<b>Nigeria</b>			
1. University of Ibadan	74	900	Federal
2. University of Lagos	210	1350	Federal
3. OAU, Ile-Ife	412	602	Federal
4. University of Nigeria	530	1200	Federal
5. Bayero University	344	316	Federal
6. University of Maiduguri	172	214	Federal
7. Nnamdi Azikiwe University	243	166	Federal
8. University of Benin	33	0	Federal
9. Bowen University	20	0	Private
10. University of Ilorin*	0	0	Federal
11. Federal University, Dutse*	0	0	Federal
12. Ondo State Univ. of Medical Sciences*	0	0	State
<b>Total</b>	<b>2,038</b>	<b>4,748</b>	
<b>Ghana</b>			
1. University of Ghana	132	277	Public^
2. Univ. Health & Allied Sciences, Ho	30	0	Public^
<b>Total</b>	<b>162</b>	<b>277</b>	

\*The program was approved by the University Governing Council but the pioneering students is yet to enroll ^Ghana runs parliamentary type of government which is different from Federal system where we have State and Federal governments. Government establishments are referred to as public or state. None of the two universities is owned by private organization

Since the debut of the first physiotherapy program in Nigeria, in 1966, 4,748 BPT degrees have been conferred and a total of 2,038 students are enrolled in all the universities. In Nigeria, 83.3% of the physiotherapy programs are located

in the universities owned by the Federal Government, 8.3% is in a church affiliated private university and another 8.3% is located in a newly established State funded university. In Ghana, there are no federal universities. The existing physiotherapy education programs are public universities owned by the State government. Only 277 BS degrees in physiotherapy have been awarded and a total of 162 students are currently enrolled.

0020The admission capacity and the admission goal in each of the physiotherapy education program in West African universities are presented in Table 3.

**Table 3: Entry-level Physiotherapy (BPT/BS) Degree Program Current Admission Capacity and Department Admission Goal in West African Universities**

Country/University	Current Admission Capacity		Admission Goal	
	# of Students	Increase	Decrease	Same
<b>Nigeria</b>				
1. University of Ibadan	34	Y		
2. University of Lagos	60		Y	
3. OAU, Ile-Ife	90		Y	
4. University of Nigeria	140		Y	
5. Bayero University	110		Y	
6. University of Maiduguri	49			Y
7. Nnamdi Azikiwe University	180		Y	
8. University of Benin	33	Y		
9. Bowen University	20	Y		
10. University of Ilorin*	0			
11. Federal University, Dutse*	0			
12. Ondo State Univ. Medical Sciences*	0			
<b>Total</b>		<b>3 (33.3%)</b>	<b>5 (55.6%)</b>	<b>1 (11.1%)</b>
<b>Ghana</b>				
1. University of Ghana	35		Y	
2. Univ. Health & Allied Sciences, Ho	11	Y		
<b>Total</b>		<b>1(50%)</b>	<b>1(50%)</b>	

The number of students admitted into the physiotherapy program each year varied widely among the Nigerian universities; 20 students at the newly established private (Bowen) university and 180 students at the Federal Government owned Nnamdi Azikiwe University, which was established in 2004.

**Postgraduate Program Enrollment-Related Outcomes**

Table 4 presents the debut (initiation) date and age of the postgraduate (MS and Ph.D.) degree programs in West African universities.

**Table 4: Postgraduate Physiotherapy Program Debut Date and Program Age (Years) in West African Universities**

Country/University	Program Debut Date		Program Age (Year)	
	MS	Ph.D.	MS	Ph.D.
<b>Nigeria</b>				
1. University of Ibadan	1997	1997	19	19
2. University of Lagos	2008	2008	8	8
3. OAU, Ile-Ife	1985	2003	31	13
4. University of Nigeria	1995	2007	21	9
5. Bayero University	2015	2015	1	1
6. University of Maiduguri	2016	--	0	--
7. Nnamdi Azikiwe University	2010	2016	6	0
<b>Ghana</b>				
1. University of Ghana	2017	--	--	--

Fifty percent of the universities in Nigeria with physiotherapy program presently offer postgraduate (MS and/or Ph.D.) degrees. In addition, the University of Maiduguri plans to admit the first cohort of students into their newly approved MS degree program by August 2016. In Nigeria, the MS degree program in physiotherapy debut at Obafemi Awolowo University in 1985; 31 years ago. And the first

Ph.D. degree program in physiotherapy was launched at the University of Ibadan in 1997; 19 years ago. The University of Ghana will in 2017 offer the first postgraduate (MS) degree program in physiotherapy in Ghana.

The enrollment in the postgraduate (MS and Ph.D.) program and degrees conferred by West African universities is presented in Table 5.

**Table 5: Postgraduate Physiotherapist Students Enrolled and Postgraduate Degrees Awarded by West African Universities**

Country/University	# of Students Enrolled		# of Degrees Awarded	
	MS	Ph.D.	MS	Ph.D.
<b>Nigeria</b>				
1. University of Ibadan	20	5	134	33
2. University of Lagos	18	6	136	6
3. OAU, Ile-Ife	15	4	40	2
4. University of Nigeria	42	11	14	9
5. Bayero University	53	16	0	0
6. University of Maiduguri	0	-	0	-
7. Nnamdi Azikiwe University	12	0	1	0
<b>Total</b>	<b>160</b>	<b>42</b>	<b>325</b>	<b>50</b>
<b>Ghana</b>				
1. University of Ghana	0	-	0	-

In Nigeria, 160 practicing physiotherapists are currently enrolled in the MS degree program and 42 are enrolled in the Ph.D. degree program in physiotherapy. To date, Nigerian universities have awarded a total of 325 MS and 50

Ph.D. degrees in physiotherapy. No postgraduate degree has been awarded in Ghana.

Tables 6 present the undergraduate physiotherapy program data for SFR in West African universities.

**Tables 6: Undergraduate Program Student-Core Faculty Ratio in West African Universities**

Country/University	# of Core Lecturers	# of BS Students Enrolled	Student-Faculty Ratio (SFR)*
<b>Nigeria</b>			
1. University of Ibadan	15	74	4.9
2. University of Lagos	13	210	16.2
3. OAU, Ile-Ife	9	412	45.8
4. University of Nigeria	8	530	66.3
5. Bayero University	23	344	15.0
6. University of Maiduguri	19	172	9.1
7. Nnamdi Azikiwe University	8	243	30.4
8. University of Benin	5	33	6.6
9. Bowen University	8	20	2.5
10. University of Ilorin	6	0	0
11. Federal University, Dutse	2	0	0
12. Ondo State Univ. of Medical Sciences	0	0	0
<b>Total</b>	<b>116</b>	<b>2038</b>	<b>17.6</b>
<b>Ghana</b>			
1. University of Ghana	9	132	14.7
2. Univ. Health & Allied Sciences, Ho	3	30	10.0
<b>Total</b>	<b>12</b>	<b>162</b>	<b>13.5</b>

\*Mean SFR in the entry-level DPT program in the USA for 2014/2015 academic year = 11.6

\*\*Mean SFR in the BS physiotherapy program in the UK for 2014/2015 academic year = 15.16

\*\*Mean SFR in the MS physiotherapy program in the UK for 2014/2015 academic year = 14.72

There are 116 full-time (core) lecturers in Nigeria teaching the 2,038 students currently enrolled in the entry-level BPT degree programme. The SFR data varied widely among the universities; it ranges from 2.5 at Bowen University to 66.3 at the University of Nigeria, Nsukka. The mean SFR data for the undergraduate program in Nigerian universities is 17.6. In Ghana, there are only 12 full-time (core) lecturers

employed to teach the 162 students enrolled in the 4-years entry-level BS degree programme. The mean SFR for the undergraduate physiotherapy programs in Ghana universities is 13.5.

The SFR data for the postgraduate physiotherapy program in West African universities is presented in Table 7.

**Tables 7: Postgraduate Physiotherapy Program Student-Faculty Ratio in West African Universities**

Country/University	# of Core Lecturers With Ph.D	# of Postgraduate Student Enrolled	Student-Faculty Ratio
<b>Nigeria</b>			
1. University of Ibadan	11	25	2.8
2. University of Lagos	10	24	2.4
3. OAU, Ile-Ife	8	19	2.4
4. University of Nigeria	5	53	10.6
5. Bayero University	7	69	9.9
6. University of Maiduguri	7	0	0
7. Nnamdi Azikiwe University	5	12	2.4
<b>Total</b>	<b>53</b>	<b>202</b>	<b>3.8</b>
<b>Ghana</b>			
1. University of Ghana	1	0	0

In Nigeria, 53 full-time (core) lecturers with a Ph.D. degree are employed to teach the 202 postgraduate students enrolled. The SFR data for the postgraduate program also varied widely among the universities. It ranges from 2.4, in three of the six universities, to 10.6 at the University of Nigeria, Nsukka. Ghana is yet to enroll postgraduate

students; therefore, no SFR was computed.

Given the small sample size in this study, it was deemed necessary to test the normality of the student enrollment-related outcomes data from the West African universities (Table 8).

**Table 8: Evaluation of the Normality of the Student Enrollment-Related Outcomes Data by the Shapiro-Wilk Test**

Dependent Variable	Descriptive Statistic				Shapiro-Wilk Test Measures		
	Min	Max	Mean	SD	Statistic	DF	Sig.
1. BPT/BS Program Age	1	50	17.1	17.8	.974	5	.901
2. MS/Ph.D. Program Age	1	31	14.3	11.2	.917	5	.512
3. Physiotherapist Produced	0	1350	588.6	508.9	.907	5	.448
4. BPT/BS Student-Fac. Ratio	2.5	66.3	20.1	19.8	.909	5	.463
5. MS/Ph.D Student-Fac. Ratio	2.2	13.3	5.4	4.6	.824	5	.125
6. # of BPT/BS Students Enrolled	20	530	200.0	169.4	.955	5	.770
7. # of MS Students Enrolled	12	53	26.3	16.9	.847	5	.186
8. # of Ph.D. Students Enrolled	0	16	7.40	6.2	.979	5	.927
9. BPT/BS Admission Capacity	11	180	69.3	54.2	.990	5	.978
10. MS/Ph.D Graduation Year	0	21	10.3	8.9	.931	5	.601
11. # of MS Degree Awarded	0	136	54.2	64.3	.766	5	.042*
12. # of Ph.D. Degree Awarded	0	33	8.3	12.6	.873	5	.281

\*p<.05

The result of the Shapiro-Wilk test revealed that all the student enrollment-related outcomes data, except for the number of MS degree awarded, is normally distributed; they are neither skewed nor kurtotic (Table 8). Based on the finding from the Shapiro-Wilk test, we proceeded to use inferential statistics to explore association between the dependent and independent variables.

The result of the Chi-Square test revealed that admission goal is not associated (p>.05) with the country of location of the university (Table 9). The proportion of universities in Nigeria that planned to decrease their annual student intake into the physiotherapy program was 55.6% and 50% in Ghana. In Nigeria, 33.3% of the physiotherapy education

programs planned to increase their annual student intake and 50% of the universities in Ghana with physiotherapy program would like to decrease student intake (Table 3). The difference in proportions is not statistically significant ( $\chi^2 = .356, N=11, DF 2; p = .837$ ).

The result of the Chi-Square test also revealed that admission goal was not associated (p>.05) with university ownership. In the coming year, the proportion of Federal and State owned universities with a strategic plan to decrease their annual student intake was 50% each; 40% of the Federal owned universities in Nigeria plan to increase their intake and 50% of State-owned public universities in Ghana would like to do same. The only private university in the



study- the newly established Bowen University - has a plan to increase student intake next year. The difference in proportions is not statistically significant ( $\chi^2 = 1.517$ ,  $N = 13$ ,  $DF 4$ ;  $p = .824$ ).

There was a statistically significant ( $p < .05$ ) correlation between country of program location and university ownership (Table 9).

**Table 9: Chi-Square Test to Explore Association between Countries' Admission Goals and University Ownership**

Independent Variable	Admission Goal		same	Chi-Square Statistic	
	Increase Percentage (%)	Decrease		$\chi^2$	p
<b>Country</b>					
Nigeria	33.3	55.6	11.1	.356	.837
Ghana	50	50	0		
<b>University Ownership</b>					
Federal	40	50	10	1.517	.824
State	50	50	0		
Private	100	0	0		
Independent Variable	University Ownership			Chi-Square Statistic	
	Federal Percentage	State (%)	Private	$\chi^2$	p
<b>Country</b>					
Nigeria	83.3	8.3	8.3	8.556	.014*
Ghana	0	100	0		

The overwhelming majority (83.3%) of the existing physiotherapy education program in Nigeria is owned by the Federal Government, 8.3% each are State and Private funded (Table 2). On the other hand, in Ghana, all the physiotherapy education programs are owned by the State (public) government. The difference in proportions between the

country of program location and university ownership is statistically significant ( $\chi^2 = 8.556$ ,  $N = 14$ ,  $DF 2$ ;  $p = .014$ ). For the student enrollment-related outcomes data, only four of the Kruskal-Wallis inferential statistic tests were statistically ( $p < .05$ ) significant (Table 10).

**Table 10: Kruskal-Wallis Test to Evaluate Significant Difference within the Independent Variable Categories**

Null Hypothesis Tested	Kruskal-Wallis Statistic
1. The distribution of the number of undergraduate students admitted per year is the same across categories of Admission Goal	.024*
2. The distribution of the number of undergraduate students enrolled is the same across categories of Admission Goal	.024*
3. The distribution of the undergraduate Student-Faculty Ratio is the same across categories of Admission Goal	.022*
4. The distribution of the length of program (year) is the same across categories of the University ownership	.019*

\*  $p < .05$

In this cohort of physiotherapist students from West Africa, the admission goal of the participating universities has a significant influence on the number of students admitted/enrolled and the class size (SFR). Similarly, the duration of

the physiotherapy program was impacted by the university ownership. The length of the physiotherapy education program was significantly ( $p < .05$ ) longer in the Federal universities compared to the State-owned universities.

## DISCUSSION

This exploratory study set out to investigate the spectrum of student enrollment-related outcomes in physiotherapy education programs in West Africa. As of 2015, Nigeria has a total of 141 universities - 40 are Federal Government owned, 40 are State Government owned and 61 privately funded. Of the 141 universities in Nigeria, only 8.5% universities offer physiotherapy program. In Ghana, 22% of the existing nine State owned public universities offer physiotherapy program. All the established and developing entry-level BPT/BS programs in West Africa participated in this study. In Nigeria, 75% of the participating universities have produced physiotherapists. The remaining 25% of the universities have hired Heads of Department and lecturers but are yet to admit students. In Ghana, all the universities with physiotherapy program have enrolled students, and 50% have conferred BS degree in physiotherapy. Over a 14 year period, only 277 physiotherapists were produced from the universities in Ghana.

In our study, we observed that student enrollment in some of the universities increased dramatically without a corresponding increase in the number of lecturers. Similarly, the class size varied widely among the universities. The mean SFR for the undergraduate program in the Nigerian universities is 17.6 and 13.5 in Ghana universities. These values are clearly higher than the norms reported by physiotherapy programs in the USA and UK. For example, during the 2014/15 academic year, the mean SFR reported for the DPT programs in the USA was 11.6 [11]. In the UK, during the 2014/15 academic year, the mean SFR for the BS and MS degree programs was 15.16 and 14.72, respectively [12]. The high SFR obtained in this study is disconcerting because it has a profound negative implication on the quality of education offered in several of the universities. Physiotherapy is a “hands-on” profession which emphasizes clinical competence through close supervision of the students in the clinical setting by lecturers. Concerted effort should be made to employ more lecturers in the universities with high SFR values.

The findings in this study have practical implication for physiotherapy education and practice in Nigeria. It is estimated that Nigeria with a population of over 170 million people will need 42,000 physiotherapists to manage its national health care system [6]. Given that only 4,748 physiotherapists were produced from all the universities in the last 50 years, it is unrealistic to expect that the shortage of physiotherapist will be abated anytime soon. An existential threat to the future of physiotherapy profession in Nigeria is the continuing shortage of physiotherapists and the apparent lack of will on the part of the Nigeria Society of Physiotherapy (NSP), Medical Rehabilitation Therapist Board (MRTB) and the Federal government to realistically address the conundrum.

Physiotherapy is now perceived in certain quarters in Nigeria to be an “elitist” profession because of the inflexible position of the NSP to produce only physiotherapists with university education. Unfortunately, based on our findings

in this study, the number of physiotherapists annually produced in the local universities cannot meet the national demand. There are currently a growing number of calls from respected elites and technocrats coming from outside the physiotherapy profession, loudly drawing the attention of the NSP and MRTB to the need for more Nigerians to gain access to physiotherapy services. In his Chairman’s opening remark at the 50th anniversary marking the establishment of the physiotherapy education program at the University of Ibadan on March 29, 2016, Professor Eytayo Lambo, former Federal Minister for Health in President Olusegun Obasanjo’s administration, is of the opinion that the NSP and MRTB’s advocated position and focus on training only highly educated practitioners (with DPT, Ph.D., and clinical specialists credentials) “may be very constraining to achieving some national and global health policy goals in Nigeria.” He, therefore, challenged the NSP and MRTB to proffer innovative strategies that will make physiotherapy accessible to all Nigerians.

The MRTB and NSP current position against the creation of a technical workforce within the physiotherapy profession was informed by the unfortunate experience of the pharmacy profession in Nigeria. For economic and cost saving reasons, most private hospitals and clinics prefer to hire pharmacy technicians instead of licensed pharmacists. Unfortunately, there are no laws that define the scope of practice for the pharmacy technicians. Consequently, several employers take advantage of this vacuum and require pharmacy technicians to carry out advanced clinical tasks that they are competent to perform after years of work experience. The unfortunate lesson from the pharmacy profession is what the NSP is careful not to repeat. To prevent a repeat of the disastrous pharmacy experience, the Federal government must legislatively empower the MRTB to regulate the curriculum of the physiotherapy assistants and enforce standards. And most importantly, the physiotherapy assistants should be legislatively required to work under the direct supervision and authority of the physiotherapists.

Recently, several private organizations have established tertiary institutions to train physiotherapy aides. It is high time that the NSP and MRTB collaborated with the private organizations by creating a physiotherapy assistant career ladder pathway within the profession to make physiotherapy services readily for rural dwellers. In the interim, to address the acute shortage of physiotherapists, universities offering physiotherapy program must be incentivized by the Federal government, through the National University Commission, to increase student enrollment by providing additional resources - funding to hire more lecturers and to purchase instructional and research equipment.

Improving the quality of education in Nigerian universities has been a subject of national interest for some years now. Since 2004, the universities in Africa are regularly ranked to provide guidance to students and parents on the quality of education offered [7, 8]. Unfortunately, the *Webometrics* method used for ranking the universities is based on the

“web presence and impact”; a method that does not measure student learning. As the cost of university education increases, it is anticipated that parents and prospective students will become more discerning in their selection of universities, and ultimately professional programs. Furthermore, it is anticipated that the NUC in the near future, as part of the accreditation process, will closely monitor universities class size and demand professional programs to demonstrate performance outcome on student learning. In anticipation of this seismic change in accreditation process, physiotherapist educators must begin to track the following performance measures that is reflective of student learning and institutional capacity: (1) enrollment pattern and retention rate; (2) graduation rate; (3) faculty/student ratio; (4) satisfaction of program graduates; (5) annual budget; (6) physical resources; (7) research and instructional instrumentation; (8) faculty research (citation index) productivity; (9) faculty teaching workload; (10) educational profile of faculty members; (11) available human and physical resources for clinical education; (12) grantsmanship productivity; (13) cost of education; (14) curriculum innovations; (15) job placement of graduates; (16) student scholarship awards; (17) number and types of faculty awards; (18) level of community collaboration; (19) program endowment fund generated; and (20) number of Master’s and doctoral graduates produced.

## CONCLUSION

The number of physiotherapists currently produced by universities in West Africa is inadequate to meet the regional physiotherapist shortage. Consequently, there is an urgent need to create a physiotherapy assistant career ladder pathway within the profession to make physiotherapy services readily available for rural dwellers. The findings from this study will be useful to individuals and government agencies involved in physiotherapy manpower capacity building and development in West Africa.

## Disclosure of Interest

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