



Proposing the Incorporation of Basic Medical Sciences into the Curriculum for Basic Education Training

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Authors' contributions

This work was carried out in collaboration among all authors. Author USA designed the study and wrote the first draft of the manuscript. Authors OFO and FSO managed the analysis. Authors MOO and SJA performed statistical analysis. Authors CEE, BNO and DIO managed the literature search. All authors approved the final manuscript.

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ABSTRACT

Health is everyone's business. Teachers are essential channels for transmitting societal values to the younger generation. To achieve this, attention must be paid to proper curriculum in teachers' training. This study was designed to ascertain empirically the level of knowledge of teachers on the basics of medical sciences and to propose the introduction of Basic Medical Sciences in the curriculum for teachers training in Nigeria. The research design is a descriptive non-experimental survey. The research population was students of post-graduate diploma in Education (PGDE) and the sampling method was the random sampling method. The total study population is 1031 and the sample size is 165 determined by the method of Krejcie and Morgan. The control group was drawn from 80 students in 2nd semester 200 level of Anatomy, Physiology and Medicine & Surgery departments. The research instrument is a questionnaire. A total of 250 questionnaires were distributed, 234 returned but 12 were disqualified due to improper filling. Therefore 222 (88.8%) was used for the study. Our results showed that male respondents scored an average of 47.66% as against 88.91% from the control group. Female respondents scored an average of 43.70%

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as against 74.91% by the female control group. Respondents on the average scored 43.28% in Anatomy related questions and 49.49% in physiology related questions. It was concluded that knowledge of basic medical sciences among teacher-trainees in Nigeria is deficient. On this basis we propose the incorporation of Basic Medical Science in teachers' training curriculum in Nigeria.

Keywords: Curriculum; PGDE; basic medical science; anatomy; physiology.

1. INTRODUCTION

Health is everyone's business, educational, social, economic or cultural background notwithstanding. Education prepares individuals to live healthier lives and make their environment safe for living [1,2]. Basic Medical science deals with the structural composition of the human body (Anatomy) and by extension their functions (physiology) [3,4].

Unfortunately, our school system in Nigeria has not done much in impacting this knowledge to students of non-medical faculties. This research is designed to provide an empirical data on the extent of deficiency in the knowledge of basic medical sciences among graduate teacher-trainees, most of who are already teaching in both government and private schools across the state and the nation as a whole. The outcome of our findings will therefore provide empirical data to support the proposal for the introduction of Basic medical science into the curriculum of the post-graduate diploma in Education (PGDE) program in Nigeria.

Internationally, schools are important stake holders in health promotion with teachers having integral roles as promoters of health [5,6]. In the UK for instance, teachers are a key part of the wider public health workforce as they are in a unique position to promote the health and well-being of children and young people, through teaching personal health and hygiene, and the promotion of whole school approaches to healthy lifestyles [7,8]. There is therefore a need to deliberately train teacher-trainees in the basics of medical sciences.

2. MATERIALS AND METHODS

2.1 Research Design

This was a descriptive survey non-experimental research. It was aimed at providing empirical data on the extent of knowledge of basic facts of human anatomy and physiology among teacher trainees in the PGDE program of the NTI who

are all graduates of our tertiary institutions across the country.

2.2 Population of Study

The population for this research was students of the PGDE program of the NTI (2016 set) and the respondents were the PGDE students of the NTI at the Rumuapara study center in Port Harcourt, Rivers state, Nigeria.

2.3 Sample and Sampling Technique

This study was carried out using the random sampling method. Respondents were students of the PGDE programme of the NTI at the Rumuapara study center in Port Harcourt, Rivers State, Nigeria. The test/questionnaires was administered to students during one of the Saturday classes and retrieved within the shortest possible time on the same day. Only questionnaires returned on the same day were used for the study to exclude bias and results produced after consultations. The total number of students running the PGDE programme of the NTI in Rivers State for the 2016 academic session was 1031. At Rumuapara center (center three) there are a total of 288 students. Sample size was calculated using the sample size estimation table for a finite population, according to Krejcie and Morgan [9]. From the table, the required sample size is 165.

2.4 Instrument of Data Collection

The questions were presented in two parts; basic anatomy and basic physiology. Content validity method was used to ensure that the questions in the test adequately represent the research questions and the responses to them will supply the needed data. The same question was administered to year two students of Anatomy, Physiology and Medicine & Surgery at Madonna University to check for its reliability as an instrument of data collection.

2.5 Administration of Instrument

Questions were administered to the NTIPGDE students during one of the Supervisor's lecture periods. Before administration, the students were

briefed by the researcher as to measures taken to ensure the confidentiality of the results and also assure the respondents that the scripts cannot be traced back to them. They were encouraged to give honest answers of what they know and not communicate with their colleagues. The scripts were retrieved during the break period on the same day. Out of 250 questionnaires sent out, 234 were retrieved. Out of this, 12 were not properly responded to and so were excluded. We were left with 222 responses (88.8%) which were still well above the required sample size. For the control group, 80 students of Anatomy, Physiology and Medicine & Surgery at Madonna University Nigeria, Elele campus were drawn.

2.6 Method of Analysis

The scripts were marked and the marks for each question collated for all respondents and members of the control group and reported in simple percentages.

3. RESULTS AND DISCUSSION

3.1 Results

This test was carried out on post-graduate diploma in education (PGDE) students of the National Teachers' Institute (NTI) at the Rumuapara center of Rivers State. The control group students are 2nd semester 200 level students of Anatomy, Physiology and Medicine & Surgery from Madonna University Nigeria, Elele campus.

From Table 1, we see that on the average male students performed higher than their female counterparts both in the control group and among the respondents. The male respondents scored an average of 47.66% as against 88.91% by the control group. The female respondents on the other hand scored an average of 43.70% as against 74.91% from the female control group.

The result in Table 2 shows the performance of PGDE students in the test conducted to evaluate their knowledge of basic medical science. The

number on the table represents the number of correct responses while the percentage is their proportion to the total sample. The control group students passed by 81.91% on the average, while the respondents scored 45.68% on the average.

The result presented in Table 3 above on the performance of PGDE students in questions on the structure of the human body reveals that female respondents performed better in Anatomy questions than their male counterparts with average scores of 49.50% and 37.06% respectively for the respondents. The male control however performed better than their female counterparts with average scores of 93% and 61.43% respectively. On the average, the respondents scored an average of 43.28% for anatomy related questions against 77.22% by the control group.

Table 4 above reveals that the male respondents on the average passed physiology questions by 50.58% compared to 76% from the control group. Female respondents scored an average of 48.40% compared to 80% from their counterparts in the control group. Therefore, while male respondents performed better in physiology related questions, female controls performed better than their male counterparts. On the average, the respondents scored 49.49% in physiology questions compared to 78% by the control.

3.2 Discussion

Health is everyone's business. The health of a nation to a great extent lies in the hands of her teachers. As such, teacher-trainee programs should be consciously designed to include foundational level knowledge on the structure and function of the human body and how this knowledge translates into healthy living. That is the basis for Anatomy and physiology.

The result of our studies shows that teacher trainees undergoing the PGDE program of the NTI in the Rumuapara center of Port Harcourt, Rivers state have below average knowledge of

Table 1. Summary of the performances of male and female respondents in test

Respondents	Score (in Percentage)
Male Respondents	45.4%
Male Control	92%
Female Respondents	41.8
Female Control	78%

Table 2. General performance of PGDE students of the NTI in the test evaluating their knowledge of the basics of human structure (Anatomy) and function (Physiology)

S/N	Question	Control		Respondent	
		Number	Percentage (%)	Number	Percentage (%)
1.	Anatomy is Morphology	11	64.70	28	16.67
2.	Longest bone in the body is femur	16	94.12	98	58.33
3.	A system is a collection of organs	17	100	112	66.67
4.	Components of a cell are called organelles	13	76.47	44	26.19
5.	The diaphragm separates the thorax	17	100	112	66.67
6.	The orbital cavity contains the eye	17	100	44	59.52
7.	Top of the head is superior	11	64.70	112	54.17
8.	The navel is located ventral	11	64.70	100	50.59
9.	A cervical lesion can be in the female genitalia or on the neck	10	58.82	91	32.74
10.	A headache is an example of cephalic pain	13	76.47	88	52.38
11.	Physiology is about body function	13	76.47	52	30.95
12.	Breakdown of large food particles in digestion	15	88.23	104	61.90
13.	Exchange of gases is respiration	14	82.35	152	90.48
14.	A nurse takes vital signs	3	17.65	88	52.38
15.	Maintaining stable internal environment is homeostasis	15	88.23	64	38.09
16.	Shivering when cold is a homeostatic response	12	70.59	48	28.57
17.	The membrane that covers the lungs is called pleura	17	100	40	23.81
18.	Integration and coordination are functions of the nervous system	15	88.23	84	50
19.	Hormones are chemical substances of the endocrine system	17	100	96	57.14
20.	The kidneys remove soluble waste from	11	64.70	100	59.52
	Average		80.59		48.84

the basics of the structure and function of the human body. In the test conducted, the students scored an average of 45.68%. This score is low, especially in the light of the basic nature of the questions and when compared with the results obtained (81.91%) from year two students who have only completed one full semester in the medical school. Male respondents scored an average of 47.66% while females had an average of 43.70% overall performance. In comparison, on the average, the control males passed by 88.91% while the females passed by 74.91%.

Comparing these results, we see that the deficiency in the knowledge of the basics of medical sciences is very high (to the tune of about 55%). Teacher's represents a country's

major channel for transmission of knowledge [10]. It is through them that the policies and philosophies of a nation are inculcated to the younger generation, beginning from the basic education levels. Therefore, a country that desires to build a healthy society must equip its teachers with that requisite knowledge for onward transmission. Good habits and lifestyles are best taught at tender ages when it can easily sink and become a culture to the young minds. The world currently has faced tremendous health problems many of which are transmissible [11]. Therefore every nation has to increase their orientation of personal and public hygiene. This has to be taught actively in schools at all levels. To achieve this, teachers must be rightly trained to carry out this national orientation.

Table 3. Performance of PGDE students of the NTI in the test on the structure of the human body (Anatomy) compared to the control group

S/N	Question	Control		Respondents	
		Male	Female	Male	Female
1.	Anatomy is Morphology	90	28.57	5.88	24
2.	Longest bone in the body is femur	100	85.70	52.94	64
3.	A system is a collection of organs	100	100	52.94	76
4.	Components of a cell are called organelles	90	57.14	5.88	40
5.	The diaphragm separates the thorax	100	100	52.94	76
6.	The orbital cavity contains the eye	100	100	58.82	60
7.	Top of the head is superior	90	28.57	29.41	28
8.	The navel is located ventral	90	28.57	41.17	32
9.	A cervical lesion can be in the female genitalia or on the neck	90	14.28	17.64	43
10.	A headache is an example of cephalic pain	80	71.42	52.94	52

Table 4. Performance of PGDE students of the NTI in the test on the function of the human body (physiology) compared to the control group

S/N	Question	Control		Respondents	
		Male	Female	Male	Female
11.	Physiology is about body function	70	85.71	35.29	28
12.	Breakdown of large food particles in digestion	90	85.71	64.70	60
13.	Exchange of gases is respiration	80	85.71	88.23	92
14.	A nurse takes vital signs	10	28.57	52.94	52
15.	Maintaining stable internal environment is homeostasis	80	100	58.82	24
16.	Shivering when cold is a homeostatic response	60	85.71	11.76	40
17.	The membrane that covers the lungs is called pleura	100	100	11.76	32
18.	Integration and coordination are functions of the nervous system	80	100	52.94	48
19.	Hormones are chemical substances of the endocrine system	100	100	58.82	56
20.	The kidneys remove soluble waste from the body	90	28.57	70.59	52
Average		84.50	70.71	43.82	52.35

Nigeria as a developing nation with a population of over 180 million persons is reported by the United Nations educational scientific and cultural organization (UNESCO) to have literacy level of about 65%. Of this percentage, only a smaller proportion can boast of a first degree [12]. This means that holders of first degrees are among Nigeria's most educated citizenry. All students undergoing the PGDE program of the NTI are among this elite group as one must possess a B.Sc. from the University or an HND from a polytechnic to qualify to apply for this program. Therefore, if our elites are wallowing in this depth of ignorance concerning the basics of their own body structure and function, it therefore means that the entire society is grossly deficient in this knowledge. It is therefore not surprising that life expectancy in Nigeria according to World Health

Organization (WHO) 2016 report is low (54.5 years) at a time when global life expectancy is on the increase due to improved living standards and better health care systems. Nigeria now ranks among the seven countries with the lowest life expectancies alongside Lesotho (53.7years), Cote D'Ivoire (53.3years), Chad (53.1years), Central African Republic (52.5years), Angola (52.4years) and Sierra Leone (50.1years). The COVID-19 pandemic also revealed the level of unpreparedness in the country in terms of health knowledge as well as facilities to mitigate the impact of large scale medical emergencies.

It is also worthy to note that although medical literature is filled with jargons, graduates of tertiary institutions should be enlightened enough

on these basic medical terminologies so as to be able to read and comprehend a piece of medical writing. This informed our decision to test the knowledge of these graduates on information relating to location and function. In this regard many didn't know the head is placed superiorly on the body (question 7) or that cervical also refers to structures in the neck region (question 9). Many are used to referring to the thorax as chest and abdomen as stomach. So they got confused when they encountered questions on thorax and abdomen (Question 5). Many didn't know that the orbit or orbital region referred to the eye socket as it is popularly called. This exposition will help you realize the extent of communication achieved when write ups are circulated on medically related issues. The common practice is for the illiterate to approach a teacher or learned person around for explanation. Our results therefore show that on 55% of occasions, they will give a wrong interpretation. This alone can lead to loss of lives and endanger the health of society. On function related questions, about half of the respondents didn't know the function of kidneys. Worse still is the fact that many don't understand what hormones are or the concept of homeostasis. This is a surprising observation. But I do not blame the respondents entirely but the curriculum that produced them as graduates of tertiary institutions across the country. Education is designed to expand an individual's horizon on basic things of life and society [13]. The concept of health, society, religion, politics, and technology must be part of every tertiary education training irrespective of the discipline of the student.

4. CONCLUSION

Teacher trainees undergoing the PGDE program have below average knowledge on the basics of medical sciences. This represents the educated class of the Nigerian society. Having considered all these points, I hereby propose the introduction of a course on Basic medical science in the curriculum of Post Graduate Diploma in Education (PGDE) program as presented in the appendix. This can be extended to all non-medical related disciplines in the country and beyond.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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