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Human Anatomy Education: Knowledge, Attitude, Perception and Challenges Encountered by Medical and Nursing Students in Two Gambian Universities

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ABSTRACT

Human Anatomy (HA) is one of the basic science courses in every medical school, and an excellent knowledge and understanding of HA is essential for medical and nursing students. Aim of this research was to evaluate the knowledge, attitude, perception, and challenges in learning Human Anatomy amongst Medical and Nursing students in two Gambian universities. This study was conducted amongst Medical and Nursing students of American International University West Africa (AIUWA) and University of The Gambia (UTG). Both universities are located in The Gambia. 290 randomly selected students consented to this study. Data was obtained by administering a structured questionnaire on students' knowledge, attitude, perception, and challenges in learning Human Anatomy. Data analysis and comparisons were done with independent samples T-test using IBM, SPSS version 23.0. Level of significance was set at $p < 0.05$, and at a 95% confidence interval. Mean age of the respondents was 20.7 ± 7.4 years, 74.1% were females, and 75.9% of them had a Senior Secondary School Certificate (Ordinary Level) as their highest educational qualification. Only 64.1% of the respondents rated their knowledge of HA as average or above average for their respective professions. Students' knowledge of HA was 72%, their attitude towards learning HA was 69.8%, their perception of studying HA was 64.4%, and their challenges in learning HA was 57.3%. Comparisons showed that medical students had an insignificantly higher ($p > 0.05$) knowledge of HA than nursing students, and AIUWA students had better knowledge of HA than UTG students ($p > 0.05$). Nursing students had a better attitude toward learning HA than medical students ($p > 0.05$), same as AIUWA students over UTG students ($p > 0.05$). UTG nursing students had the best perception towards learning HA, which was significantly high compared to AIUWA nursing students ($p = 0.0029$). The medical and nursing students in both universities faced similar challenges with UTG medical students mostly affected. Knowledge of Human Anatomy is essential in all medical fields and adequate measures must be put in place to make the learning of this course less tedious for students.

INTRODUCTION

Human Anatomy is a basic science course. Teaching and learning of basic science courses such as Hematology, Immunology, Medical Genetics, etc should be simplified for everyone, especially for students in the health sciences (Medicine, Dentistry, Pharmacy, Medical Laboratory Science, Physiotherapy, Nursing, etc) (Ikwuka, 2023a; Ikwuka, 2023b; Ikwuka, 2023c).

The study and acceptance of Human Anatomy as a science have been dated back to the era of ancient Greece, where several Greek philosophers tremendously impacted the future of scientific thinking (van De Graff, 2011). The Dark Age orchestrated by the Roman Empire came in afterward leading to a diversion into practical rather than theoretical study (van De Graff, 2011). Till date, the study of Human Anatomy has been one of the basic science courses in every medical school (Papa, 2013). Excellent knowledge and understanding of basic anatomic terms are essential for medical and nursing students (Snells, 2012), and every medical student must pass Anatomy

before progressing to the clinical phase of their training (Ali, 2022; GS Medical College and Hospital, 2023).

The word "Anatomy" is derived from a Greek word, "Anatome", meaning "to cut up", and by definition, it is the study of the structure and function of the body (Snells, 2012). The course appears fascinating to the public, but it is often a "nightmare" to undergraduates because of the different aspects of the course, cumbersome curriculum and vocabulary which make students devote very little time to other courses (Farrohkhi, 2017; Gupta, 2014). Nevertheless, undergraduates admit to insufficient anatomical knowledge (Bergman, 2011).

For past decades, numerous studies have emphasized the declining rate of knowledge of Anatomy among undergraduates and junior health personnel (Ali, 2022; Bhangu, 2010; Mitchell, 2009). This deterioration tends to be more severe in allied medical departments like the technicians, where the knowledge of Anatomy is allegedly believed to be less relevant. It has been suggested that this lack of anatomical knowledge is why the number

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of medico-legal claims in healthcare is rising (Goodwin, 2000). A broad knowledge of Human Anatomy is needed for excellent productivity in examination, diagnosis, surgery, nursing, radiography, physiotherapy, and pathology to name just a few. With the established decline, it should be worrisome that mediocrity will infest the health sector in the long run.

In addition to the ambiguity of learning Anatomy, the teaching methodologies may greatly affect students' learning ability, understanding and retention (Egwu, 2023). Controversies have emerged relating to teaching methods, lecture hours designated to the sub-courses, and their contents (Peeler, 2018; Philippe, 2020). A study has highlighted that some tutors emphasized a stop to the traditional teaching that is cadaveric-based, large group format, and teacher-centered approach, and towards adopting modern methodologies that involve information technology, plastination, 3-dimensional models, edutainment, student-centered learning, and inquiry-based (Akeel, 2021). Concise literature proving the effectiveness of these modern methods on students' knowledge of Anatomy is scanty. Rather, much depends on perception, learning experience, and student course feedback (Akeel, 2021; Ali, 2022).

As the smallest country in continental Africa, The Gambia has few universities supported predominantly by foreign instructors and professors. Medicine, nursing, and other medical courses are offered in these universities, and as a West African country, similar challenging scenarios of education in other African countries are readily found. Moreover, due to the absence of a recent study on the knowledge, attitude, perception, and challenges of learning Human Anatomy among medical and nursing students in Gambian universities, it will be quite interesting to evaluate the knowledge, attitude, perception, and challenges in learning Human Anatomy amongst medical and nursing students to help widen literature on medical education and propose remedies where necessary.

MATERIALS AND METHODS

Study Area

This study was conducted in Banjul and Kanifing, both cities are located in The Gambia, from August 2023 to October 2023. Banjul, the capital city of The Gambia, is the location of the School of Medicine and Applied Health Sciences (SMAHS) of University of the Gambia (UTG). Kanifing, a city about thirty minutes drive from Banjul, is the location of the medical and nursing campuses of the American International University West Africa (AIUWA). Both UTG and AIUWA offer courses including Medicine, Nursing, Medical Laboratory Science, Pharmacy Technician, and Medical Laboratory Technician. Pharmacy (PharmD) is currently only available in AIUWA.

Study Population

This involved an estimated 1,000 medical and nursing students who are learning or have learnt Human

Anatomy as one of their basic science courses in both universities and have written at least an examination in Human Anatomy.

Sample Size

With an estimated study population size below 10,000 students, the Cochran equation for cross-sectional, descriptive studies with a study population size <10,000 was used to determine the sample size (Cochran, 1962).

$$n = n_0 / (1 + (n_0 - 1) / N)$$

Where N = study population size = 1,000

n_0 = sample size for a large population >10,000 = $(Z^2 PQ) / d^2$

Z = standard normal deviate usually set at 1.96 which corresponds to 95% confidence level.

P = proportion of the medical students with adequate knowledge of Human Anatomy from a previous study. P is set at 47.9% (0.479) from a study at Maastricht University, The Netherlands (Triepeles, 2018).

Q = complementary proportion equivalent to 1-P; that is, $1 - 0.479 = 0.521$

d = degree of accuracy desired (absolute precision), which is 5.0% (0.05).

Therefore:

$$n_0 = (1.96^2 \times 0.479 \times 0.521) / 0.05^2 = 384$$

$$n = 384 / (1 + (384 - 1) / 1000)$$

$$= 384 / (1 + 0.383)$$

$$= 277.657$$

The sample size (n) is ~278 students. Adding a 10% non-response rate, 306 was obtained. Selection was by a simple random sampling technique, and the eligibility criteria were that a student must have completed a trimester or semester, and must have written at least an examination in Human Anatomy.

Sampling Interval = N/n

N = study population size (1,000); n = sample size (306)

SI = $1,000/306$

SI = $3.27 = \sim 3$

Study Procedure

This study used the cross-sectional, descriptive survey method. The research instrument was a structured pre-tested questionnaire with five sections as follows: Demographic parameters, Knowledge of Human Anatomy, Attitude towards learning Human Anatomy, Perception towards learning Human Anatomy, and Challenges of learning Human Anatomy amongst Medical and Nursing students in AIUWA and UTG. A simple random sampling technique was used to select the participants and only those who consented were included in the study.

Data Analysis

Collected data were cleaned, entered, hardcoded and analyzed using IBM Statistical Package for Social Sciences (SPSS) version 23.0. Summary statistics was presented using tables. Descriptive statistics were computed for relevant variables. Independent samples T-test was used for comparisons between the programs of study and

universities. A 95% confidence interval was set and p-value <0.05 was considered to be significant.

Ethical Considerations

Adequate professional work ethics and confidentiality of all participants' data were ensured. The participants were fully aware of the purpose of the study and they were assured of the confidentiality of the information they provide. Informed, voluntary consent from every participant was obtained. This research was also carried out with due observance of the ethical principles of the Declaration of Helsinki (DoH) in 2013 concerning human research.

RESULTS AND DISCUSSIONS

RESULTS

Of the 306 students expected to participate, only 290

(94.7%) willingly partook in this study. All data were extracted from the structured questionnaires and expressed in tables. Table 1 shows the demographic information of the students. The mean age of the students was 20.7 ± 7.4 years. Most (48.3%) of the students were between ages 21-25 years, 29% of them were 20 years or younger, and only 0.7% were 36 years or more. 74.1% of the students were females while males accounted for 28.9%. 220 (75.9%) students had a Senior Secondary School Certificate (Ordinary Level) as their highest educational qualification. 8.6% of the students have already graduated from a Nursing School with a Registered Nurse (RN) qualification. 15.2% already had a Bachelor's degree, and 0.3% already had a Master's degree. The Nursing department and Medicine department ratio was 4:1 as nursing students accounted for 80.3% of all study participants.

Table 1: Demographic Characteristics of Medical and Nursing students at AIUWA and UTG

Demographic Characteristics	Options	AIUWA		UTG		Total n (%)
		Total n (%)	Nursing (n)	Medicine (n)	Nursing (n)	
Age	<21	4	41	3	36	84 (29)
	21-25	17	39	24	60	140 (48.3)
	26-30	3	32	6	7	48 (16.5)
	31-35	0	14	0	2	16 (5.5)
	≥36	0	2	0	0	2 (0.7)
	Total	24	128	33	105	290 (100)
	Mean age	20.7±7.4				
Gender	Male	6	27	9	33	75 (25.9)
	Female	18	101	24	72	215 (74.1)
	Total	24	128	33	105	290 (100)
Highest Educational Qualification	SSCE	17	101	27	75	220 (75.9)
	RN	1	24	0	0	25 (8.6)
	BSc	5	3	6	30	44 (15.2)
	MSc	1	0	0	0	1 (0.3)
	Total	24	128	33	105	290 (100)

Source: Fieldwork, 2023

Table 2 shows the level of Knowledge of Human Anatomy among the students. Knowledge was categorized as follows: below average (0.0-33.3%), average (33.4-66.6%), and above average (66.7-100.0%). The scores for the departments were ranked as medical students at AIUWA (79.2%), medical students at UTG (75.5%), nursing students at AIUWA (74.4%), and nursing students at UTG (66.3%). A few students (6.6%) could not get the definition of Human Anatomy while 98.6% of the students agreed that Human Anatomy is essential to all medical fields. When asked about their general knowledge of Human Anatomy, 90.9% of medical students at UTG and 83.3% of medical students at AIUWA agreed that their knowledge of anatomy is average for the medical profession, while only 31.4% of nursing students at UTG and 80.5% of nursing students at AIUWA believed that

their knowledge of Human Anatomy is average for the nursing profession. Overall, the students' knowledge of Human Anatomy stood at 72% (above average).

Table 3 illustrates the Attitude of the students towards learning Human Anatomy. Attitude was categorized as follows: negative (0.0-49.9%) and positive (50.0-100.0%). The scores from the universities show that 71.3% of AIUWA medical students, 69.4% of AIUWA nursing students, 63.6% of UTG medical students, and 68.4% of UTG nursing students had a positive attitude towards learning Human Anatomy. Nursing students at AIUWA were the most punctual group of students with 94.5% of them agreeing to be seated at Human Anatomy classes before lectures commence. The attitude towards learning Human Anatomy amongst all students studied was positive (69.8%).

Table 2: Knowledge of Human Anatomy amongst Medical and Nursing students at AIUWA and UTG

S/No.	Respondents	AIUWA		UTG		Total (n=290)
		Medicine (n=24)	Nursing (n=128)	Medicine (n=33)	Nursing (n=105)	
	Statements	Agree (%)	Disagree (%)	Agree (%)	Disagree (%)	Agree (%)
1	Human Anatomy is a branch of biology that studies the body structure in size, shape, composition, and color.	87.5	94.5	90.9	94.3	93.4
		12.5	5.5	9.1	5.7	6.6
2	The study of Human Anatomy is essential to all medical fields	91.7	98.4	100	100	98.6
		8.3	1.6	0	0	1.4
3	Aside from being an introductory course in medical departments, Human Anatomy is also studied as a degree.	95.8	89.1	81.8	82.9	86.6
		4.2	10.9	18.2	17.1	13.4
4	Human Anatomy encompasses subdivisions like gross anatomy, histology, medical genetics, neuroanatomy, comparative anatomy, and embryology.	87.5	97.7	90.9	97.1	95.9
		12.5	2.3	9.1	2.9	4.1
5	Human Anatomy can be studied based on a systemic or regional approach.	91.7	81.3	100	80.0	83.8
		8.3	18.8	0	20.0	16.2
6	I am aware of the history of Human Anatomy.	62.5	64.1	36.4	62.9	60.3
		37.5	35.9	63.6	37.1	39.7
7	Excellent dissection skills are essential to be outstanding in Human Anatomy.	79.2	71.1	63.6	71.4	71.0
		20.8	28.9	36.4	28.6	29.0
8	I understand the precautionary measures in handling cadavers in the Human Anatomy laboratory.	70.8	41.4	54.5	25.7	39.7
		29.2	58.6	45.5	74.3	60.3
9	I am familiar with histological techniques and tissue staining routines.	41.7	25.8	45.5	17.1	26.2
		58.3	74.2	54.5	82.9	73.8
10	My knowledge of Human Anatomy is sufficient for the medical/nursing profession.	83.3	80.5	90.9	31.4	64.1
		16.7	19.5	9.1	68.6	35.9

Source: Fieldwork, 2023

Table 3: Attitude towards learning Human Anatomy of Medical and Nursing students at AIUWA and UTG

S/No.	Respondents	AIUWA		UTG		Total (n=290)
		Medicine (n=24)	Nursing (n=128)	Medicine (n=33)	Nursing (n=105)	
	Statements	Agree (%)	Disagree (%)	Agree (%)	Disagree (%)	Agree (%)
1	I am punctual to Human Anatomy classes (arrive before the lectures commence).	79.2	94.5	90.9	88.6	90.7
		20.8	5.5	9.1	11.4	9.3
2	I do not miss Human Anatomy classes.	87.5	89.1	81.8	85.7	86.9
		12.5	10.9	18.2	14.3	13.1
3	I always have a positive energy at every Human Anatomy class.	75.0	79.7	72.7	77.1	77.6
		25.0	20.3	27.3	22.9	22.4
4	I make notes during lectures.	70.8	84.4	54.5	82.9	79.3
		29.2	15.6	45.5	17.1	20.7
5	I am an enthusiastic studying Human Anatomy.	87.5	75.0	63.6	77.1	75.5
		12.5	25.0	36.4	22.9	24.5

6	I spend extra hours studying Human Anatomy courses after class and on weekends.	70.8	69.5	45.5	62.9	64.5
		29.2	30.5	54.5	37.1	35.5
7	I go online to get extra study materials e.g. textbooks and videos.	91.7	70.3	90.9	66.7	73.1
		8.3	29.7	9.1	33.3	26.9
8	I read my Human Anatomy study materials only when there is a quiz or an examination.	50.0	34.4	45.5	31.4	35.9
		50.0	65.6	54.5	68.6	64.1
9	I like dissection sessions (for medical students).	75.0	-	90.9	-	84.2
		25.0	-	9.1	-	15.8
10	I would love to study Human Anatomy at postgraduate level.	25.0	28.1	0	42.9	30
		75.0	71.9	100	57.1	70

Source: Fieldwork, 2023

Perception of the students towards learning Human Anatomy is illustrated in Table 4. Perception was categorized as follows: bad (0.0-49.9%) and good (50.0-100.0%). More UTG students (90.9% of medical students and 91.4% of nursing students) believed that the duration of the semesters is not enough to complete the content of the curriculum, while UTG nursing students were the highest group to believe that 8:30 AM lecture time does not favor punctuality of students to classes. Almost half

(49.7%) of the respondents believed anatomical terms are strange and difficult to pronounce, while 62.8% thought the words are difficult to spell. Interestingly, 82.5% of the medical students believed the dissection time was insufficient. More UTG students agreed that the training method was less efficient and productive, while more AIUWA students thought otherwise. Overall, perception of all the studied students towards learning Human Anatomy was good (64.4%).

Table 4: Perception towards learning Human Anatomy of Medical and Nursing students at AIUWA and UTG

S/No.	Respondents	AIUWA		UTG		Total (n=290)
		Medicine (n=24)	Nursing (n=128)	Medicine (n=33)	Nursing (n=105)	
	Statements	Agree (%)	Disagree (%)	Agree (%)	Disagree (%)	Agree (%)
1	The duration of a trimester/semester is insufficient to complete the content of the curriculum.	75	64.1	90.9	91.4	77.9
		25	35.9	9.1	8.6	22.1
2	The 8:30 AM lecture time does not favor punctuality of students to classes.	37.5	50	45.5	77.1	58.3
		62.5	50	54.5	22.9	41.7
3	The terminologies used are strange and difficult to pronounce.	25	58.6	27.3	51.4	49.7
		75	41.4	72.7	48.6	50.3
4	Anatomical words are difficult to spell correctly.	50	57.8	45.5	77.1	62.8
		50	42.2	54.5	22.9	37.2
5	Cadaveric study time is insufficient (for medical students).	70.8	-	90.9	-	82.5
		29.2	-	9.1	-	17.5
6	Frequent intra-semester public holidays distort the learning process.	87.5	45.3	9.1	85.7	59.3
		12.5	54.7	90.9	14.3	40.7
7	The training method is less efficient and productive.	33.3	39.1	100	80	60.3
		66.7	60.9	0	20	39.7

Source: Fieldwork, 2023

The challenges in learning Human Anatomy amongst the students are illustrated in Table 5. Challenges were categorized as follows: less (0.0-49.9%) and more (50.0-100.0%). Possession of course curriculum was lowest among UTG medical students as 72.7% of them do not have a copy of the school curriculum. The supply

of cadavers was insufficient as 71.9% of all the medical students agreed to this. 64.8% of the students agreed that the universities do not have sufficient recent Human Anatomy textbooks in the library. Less AIUWA students (33.3% of medical students and 35.9% of nursing students) agreed that their Human Anatomy lecturers

were difficult to access, while more UTG students (72.7% medical and 65.7% nursing) agreed that their Human Anatomy lecturers were difficult to access. More (73.4%) of all studied students agreed that the training

facilities were poorly equipped. Overall, the challenges of all studied students in learning Human Anatomy were more as 57.3% of them agreed to be facing the challenges listed.

Table 5: Challenges in learning Human Anatomy amongst Medical and Nursing students at AIUWA and UTG

S/No.	Respondents	AIUWA		UTG		Total (n=290)
		Medicine (n=24)	Nursing (n=128)	Medicine (n=33)	Nursing (n=105)	
	Statements	Agree (%)	Disagree (%)	Agree (%)	Disagree (%)	Agree (%)
1	I do not have a copy of the course curriculum.	20.8	45.3	72.7	28.6	40.3
		79.2	54.7	27.3	71.4	59.7
2	There is inadequate supply of cadavers (for medical students).	70.8	-	72.7	-	71.9
		29.2	-	27.3	-	28.1
3	Visualization as a teaching aid is inadequate.	50	43	36.4	42.9	42.8
		50	57	63.6	57.1	57.2
4	Recent Human Anatomy textbooks are insufficient in the university's library.	91.7	50	90.9	68.6	64.8
		8.3	50	9.1	31.4	35.2
5	Accessibility to Human Anatomy lecturers after lectures is limited.	33.3	35.9	72.7	65.7	50.7
		66.7	64.1	27.3	34.3	49.3
6	Training facilities such as Histology and Anatomy laboratories and museum are poorly equipped.	54.2	67.2	100	77.1	73.4
		45.8	32.8	0	22.9	26.6

Source: Fieldwork, 2023

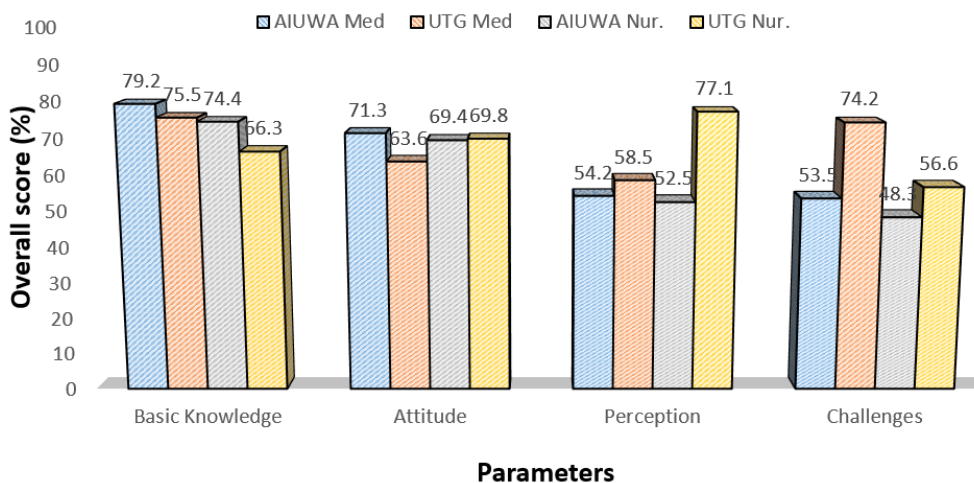


Figure 1: Summary of Knowledge, Attitude, Perception and Challenges of learning Human Anatomy amongst Medical and Nursing students at AIUWA and UTG

Table 6 illustrates the comparison of the four parameters under study between the four departments in both universities. With the mean values of the response from the departments, the medical students at AIUWA had insignificantly higher ($p=0.3441$) knowledge of Human Anatomy compared to their counterparts at UTG, same as between nursing students at AIUWA and UTG ($p=0.2624$). Separately comparing the two departments from the same university, the medical students showed

better knowledge. However, the difference was not significantly different ($p>0.05$). Medical students at AIUWA showed the best attitude towards learning Human Anatomy, but on comparison with the medical students at UTG there was no significant difference ($p=0.2508$). There was also no significant difference ($p>0.05$) when nursing students from both universities were compared, as well as when the departments from the same university were compared separately.

Nursing students at UTG had the best perception of learning Human Anatomy (77.1%). Using the four comparison parameters, all showed no significant difference ($p > 0.05$) except the comparison between the nursing students from both universities where UTG nursing students had significantly higher perception ($p = 0.0029$).

The students with the lowest challenges in learning Human Anatomy were the AIUWA nursing students (48.3%), while medical students at UTG faced the most challenges in learning Human Anatomy (74.2%). The intra-university and inter-university comparisons showed no significant difference ($p > 0.05$).

Table 6: Comparison of Knowledge, Attitude, Perception, and Challenges in learning Human Anatomy amongst Medical and Nursing students at AIUWA and UTG

Parameters	Universities	Departments	Mean (%)±SD	Comparison		p-value
				A	B	
Knowledge of Human Anatomy amongst medical and nursing students at AIUWA and UTG	American International University West Africa	Medicine	79.2±16.67	Medicine AIUWA	Medicine UTG	0.3441
		Nursing	74.4±24.48	Nursing AIUWA	Nursing UTG	0.2624
	University of The Gambia	Medicine	75.5±23.49	Medicine AIUWA	Nursing AIUWA	0.3084
		Nursing	66.3±31.00	Medicine UTG	Nursing UTG	0.2332
Attitude towards learning Human Anatomy of medical and nursing students at AIUWA and UTG	American International University West Africa	Medicine	71.3±20.08	Medicine AIUWA	Medicine UTG	0.2508
		Nursing	69.4±23.22	Nursing AIUWA	Nursing UTG	0.4584
	University of The Gambia	Medicine	63.6±28.74	Medicine AIUWA	Nursing AIUWA	0.4296
		Nursing	69.8±19.75	Medicine UTG	Nursing UTG	0.3393
Perception towards learning Human Anatomy of medical and nursing students at AIUWA and UTG	American International University West Africa	Medicine	54.2±23.82	Medicine AIUWA	Medicine UTG	0.3977
		Nursing	52.5±9.35	Nursing AIUWA	Nursing UTG	0.0029*
	University of The Gambia	Medicine	58.5±35.53	Medicine AIUWA	Nursing AIUWA	0.4341
		Nursing	77.1±13.76	Medicine UTG	Nursing UTG	0.1179
Challenges in learning Human Anatomy amongst medical and nursing students at AIUWA and UTG	American International University West Africa	Medicine	53.5±25.48	Medicine AIUWA	Medicine UTG	0.0806
		Nursing	48.3±11.73	Nursing AIUWA	Nursing UTG	0.2269
	University of The Gambia	Medicine	74.2±21.82	Medicine AIUWA	Nursing AIUWA	0.3346
		Nursing	56.6±20.11	Medicine UTG	Nursing UTG	0.0986

Source: Fieldwork, 2023. * indicates statistical significance set at $p < 0.05$

DISCUSSION

A solid grasp of Human Anatomy is indispensable across all medical disciplines, and how this knowledge is imparted to students/learners, is pivotal in raising proficient medical professionals. From the inception of medicine, the approach to learning Human Anatomy has evolved, same as the attitude that students show towards learning the course, their perception of Human Anatomy, and the

challenges they face in learning the course. This evolution over the years is the determining factor in the quality of health workers we get in our society today. The teaching and learning of Human Anatomy have improved from mere classroom teaching and dissection to the use of e-learning materials such as simulating three-dimensional images and videos, e-books, and virtual reality, accessible on numerous webpages in this era of high speed internet.

The download of these learning materials online has made Human Anatomy more appreciated among students and teachers. These have made the course more popular among individuals from other fields as well as the unlearned.

The best way to study Human Anatomy as well as the best teaching method has been a topic of long-term debate (Estai, 2016; Peeler, 2018; Philippe, 2020). This argument has been that recent advanced technologies like e-learning, and the internet-based simulating images and videos are more productive when compared to the conventional method (the use of textbooks, classroom teaching and laboratory sessions). However, others believe otherwise (Davis, 2014). Some believe it is best when the recent e-learning method is incorporated into classroom teaching and dissection (Estai, 2016). Noting the popularity of this course and its evolution, it is essential to evaluate knowledge, attitude, perception, and the challenges students face in learning Human Anatomy. This study shows that the mean age of the students was 20.7 ± 7.4 years. This implies that most of the students were young adults. However, the high standard deviation means the age bracket within the students was vast as it was recorded in this study that 22.7% of the students were 26 years or more while 29% were 20 years or less. A simple explanation for 22.7% that were 26 years or more is simply that 24.1% of the students already had an RN, BSc, or MSc degree before being admitted for a degree in medicine or nursing. This mean age is close to the 19.09 years reported in another study (Owolabi, 2020). Female students were far more than male students with a ratio of 3:1. This could be attributed to nursing students accounting for 80.3% of the respondents, and noting that nursing is mostly studied by females. This higher percentage of female students was also found in the study of (Owolabi, 2020) where 55% of the respondents were females, but not in the study of (Auwal, 2023) where females accounted for only 26.4% of the medical students.

The definition of Anatomy was surprisingly not correctly answered by 6.6% of the students. This percentage could be among students of much higher classes who might have forgotten the correct definition of Anatomy. Almost all the respondents (98.6%) agreed that Human Anatomy is essential to all medical fields, unlike the finding of (Triepels, 2018) that highlighted that only about half (50.8%) of the medical students in the Bachelor's and Master's phase of Medicine considered Human Anatomy to be very important, and the report of (Auwal, 2023) where 57.1% agreed that adequate knowledge of Human Anatomy is crucial to becoming a good doctor. Another study also highlighted how medical students confirmed the importance of the knowledge of Human Anatomy to medical practice, as 61.9% of Human Anatomy students agreed that Human Anatomy is a requirement to advance in their pursuit of a medical degree (Moxham, 2007). Approximately 95.9% of the students in this study agreed with the subdivisions of Human Anatomy. However, a

good number (39.7%) of the students were not aware of the History of Anatomy.

Human Anatomy could be learnt without dissection, but a proper dissection skill gives students an edge over those who have no physical visualization of the body. This study highlighted that 71% of the medical students agreed that excellent dissection skill was essential to be outstanding in Human Anatomy. This means that dissection is important in learning Human Anatomy, and this statement agrees with the report of (Sbayeh, 2016) that lectures and cadaveric dissections are the main preferred methods for teaching and learning Human Anatomy, and also agrees with another study that reported that 91.4% of medical students agreed that dissection sessions are important avenues of teaching Human Anatomy (Auwal, 2023).

On self-evaluation of their knowledge of Human Anatomy, 64.1% of the respondents in this study agreed that their knowledge is sufficient for their profession. This value (64.1%) is higher than the 47.9% reported by (Triepels, 2018). Knowledge of Human Anatomy is vital in the medical professions as some doctors may eventually become surgeons (Ellis, 2002). A below average knowledge of Human Anatomy poses a threat.

The students expressed an encouraging positive attitude towards learning Human Anatomy as their overall attitude score was 69.8%. Almost all the students (90.7%) were always punctual to Human Anatomy classes. The reasons behind this could be that 10% out of the 100% assessment score is assigned to class attendance, and also, the attention the lecturers pay to punctuality. These reasons also highlighted the 86.9% score for students that do not miss classes. Approximately three-quarter of the students agreed to have positive energy and to be enthusiastic towards learning Human Anatomy. This enthusiasm could also be linked with the high rate of punctuality among the students. These findings were close to the 83.4% reported in another study where students were asked if they enjoyed Human Anatomy courses (Auwal, 2023). The enthusiasm did not show in the rate at which the students did self-study as 35.5% of them disagreed with spending extra hours reading after classes and on weekends. This figure is almost the same as the 35.9% that agreed to read only when there is a quiz or examination. This poor self-study among students agrees with the finding of another study where 48.4% of medical students spent less than 10 hours privately studying Human Anatomy during an 8-week block period (Triepels, 2018).

A high number (84.2%) of the respondents liked dissection sessions, a finding in line with the result of a different study where 62.3% of medical students favored cadaveric dissection the most when compared to other modes of learning Human Anatomy (Ali, 2022). 70% of the respondents disagreed with studying Human Anatomy at postgraduate level. An explanation for this could be because most of the respondents were nurses, or that they believed that Human Anatomy as a career is not lucrative. Another study reported that 60.1% of medical

students were not going to consider Human Anatomy as a career option (Auwal, 2023) while another different study reported that 73% of BSc Human Anatomy students were interested in pursuing a postgraduate course in Human Anatomy (Owolabi, 2020).

On students' perception, 77.9% of them agreed that the duration of a semester or trimester was not enough to cover the content of the curriculum. This number is quite larger than the 48.5% reported by (Auwal, 2023). Of the 90.7% who were always punctual to classes, a good number of them (58.3% of the total respondents) believed that the 8:30 AM lecture time did not favor their punctuality to classes. Almost half (49.7%) of the respondents mentioned that anatomical words were strange, while 62.8% of the respondents believed that anatomical terms are difficult to spell correctly. This is a typical scenario among fresh students. However, as they advance in their studies, they get acquainted with the words.

In a review, it was reported that a continuous decrease in the time allocated to dissection and the absence of a core anatomy curriculum were the main causes of a decline in the knowledge of anatomy (Bergman, 2011). This finding is supported by this present study where 82.5% of medical students agreed that cadaveric study time was insufficient. 59.3% of the students believed that public holidays interrupt their learning. It would have been advised that supplementary or make-up classes be fixed afterwards, but because the semester or trimester is usually loaded with activities, free periods are rarely available even on Saturdays. 38.2% of AIUWA students and 84.8% of UTG students described their training method to be less effective. This could be linked to the teaching method and facilities available at the universities. Challenges faced by the students were similar, although a few varied between the two universities. A well-structured curriculum is essential to any learning irrespective of the course (Bergman, 2011), and the curriculum should also be made available to students. A total of 40.3% of the respondents do not have a copy of the curriculum, as such they have no clue if they have learnt all that was expected to be learnt. It has been established that the dissection of cadavers is a teaching method most students like, cadaver is therefore an important learning tool. Cadaver scarcity remains a pressing challenge in medical schools (Chia, 2019; McLaglan, 2004). Both AIUWA and UTG faced this challenge almost equally. Visualization as a teaching aid has been described to boost students' understanding. 42.8% of the students agreed that visualization is inadequate. On students' personal use of the internet which is the main source for visual materials, a study reported that only 39.3% of students agreed to using the internet to study (Auwal, 2023).

The libraries in both universities were reported to have insufficient recent books in Human Anatomy by 64.8% of the students. However, medical students reported this much more than the nursing students. This could be interpreted as medical students visiting the library more

often and paying more attention to the year of publication of a book. Accessibility to Human Anatomy lecturers after lectures was more at AIUWA when compared with UTG. The reason for this could be that AIUWA is a private university whereas UTG is a public university. Private institutions are known to always check the availability of its employees to duties. These checks are less strict in public institutions as they usually have a lot of human resources at their disposal. This present study agreed with the findings of (Chia, 2019) who reported poor teaching facilities in a review focused on the teaching of Human Anatomy in Nigeria. 73.4% of students in this present study agreed that the training facilities such as Histology laboratory, Anatomy laboratory, and Anatomy museum were poorly equipped.

The general comparison between the departments and universities showed that medical students had a slightly better knowledge of Human Anatomy irrespective of the university. Both departments share similar attitudes towards learning Human Anatomy. Nursing department at UTG had a significantly outstanding perception when compared to nursing students at AIUWA, and the departments are faced with similar challenges.

The challenges in both universities have been stated. A quick response by the governing councils of both universities in providing sufficient copies of the school curriculum, facilitating a sufficient supply of cadavers for Human Anatomy practicals, providing recent textbooks in the libraries, and upgrading the training facilities with the required materials such as models, simulators, and audiovisual devices, is therefore paramount. On the other hand, lecturers should improve on the audiovisual aids they use in teaching Human Anatomy and make themselves readily available to students after lectures.

CONCLUSION

With regards to Human Anatomy education, medical and nursing students in AIUWA and UTG, as well as medical students in UTG, have an above average knowledge of Human Anatomy. UTG nursing students have average knowledge. Medical and nursing students in AIUWA and UTG have a positive attitude, and a good perception towards learning Human Anatomy. Nevertheless, UTG medical students faced the most challenges in learning Human Anatomy while AIUWA nursing students faced the least challenges.

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