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Research Article

Knowledge, Attitudes, and Perceptions on Bequeathing of Bodies for Medical Education and Research among Health Science Students of the University of Health and Allied Sciences

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Introduction. Cadaveric dissection is an established effective teaching method in anatomical science education. Cadaver acquisition for dissection is, however, based on voluntary body bequeathment. As a result of the increasing numbers of medical schools and student intake, the challenges of inadequate bodies for education became obvious in most parts of the world as the main cadaver source remains anonymous corpses in the custody of the state. Cultural and religious beliefs or commercial purposes are among the several factors that influence the decision about body bequeathal. This study investigates the knowledge, attitude, and perceptions of body bequeathing among health science students who benefitted or are potential beneficiaries of cadaveric studies and identified factors influencing the bequest of bodies in Ghana for educational purposes among students in the University of Health and Allied Sciences. *Method*. This was a cross-sectional descriptive study. The study recruited 513 students in the bachelor programs in medicine, physician assistantship, nursing, midwifery, pharmacy, and allied health sciences at various levels. Both closed- and open-ended questions contained in the designed questionnaire were administered. *Result*. About 74.1% of the respondents had heard of body bequeathal. Majority (98.3%) agreed body bequeathal was important. However, only 39.6% knew the requirements and processes of body bequeathal. Most (>90%) had a negative attitude toward body bequeathal. *Conclusion*. The study concluded that there was a high awareness of the importance of body bequeathal for medical education and research but very low procedural knowledge on bequeathing, amongst health science students. Moreover, most were unwillingness to donate their bodies or even encourage others to donate their bodies. It is, therefore, recommended that medical schools should setup accessible body bequeathal programs that provide opportunities for interested individuals to be readily assisted through the process of body bequeathal.

1. Introduction

Anatomical science is studied in almost all health professional training programs, including medicine, dentistry, nursing, and pharmacy [1]. A better understanding of the subject is relevant in eliciting clinical signs, providing clinical reasoning for diagnosis, and effective invasive procedures or intervention in surgical pathology [2]. Firm knowledge on structural forms is required in the design of the surgical instruments and acquisition of tactile sense. Cadaveric dissection is an integral component of medical education [3, 4] for the acquisition of firm knowledge in anatomy. Even though the advent of modern technology has allowed the availability and access to simple, clean, and hazard-free representations of the human body such as 3D prints and virtual simulations like anatomage, these are sophisticated

and expensive especially in developing countries, and do not provide the dissection skill or tactile sense development. Cadaveric dissection remains an effective teaching and learning method for undergraduate and postgraduate anatomy programs. Thus, most academicians, students, and clinicians have attested that gross anatomy is better understood through body dissection, which must be sustained through whole-body bequeathal [3–5] to medical schools. Medical students in the University of Health and Allied Sciences (UHAS), Ghana, perceived the use of cadavers as an effective method of teaching and learning anatomy [3], thereby necessitating the conduction of this research as there is scarcity of cadavers. Body bequeathal programs are usually governed by an act, and in Ghana, the Anatomy Act 280, 1965 regulates its process [6].

The problem of body acquisition for cadaveric dissection remains a challenge to many medical schools, especially in Ghana which has increasing number of medical schools and student intake. The traditional cadaveric source, which has been largely unclaimed bodies, is no longer reliable and does not satisfy the increasing need for it [7–10]. Several factors might influence the decision to be a body donor. These factors may include awareness of the program, cultural, religious beliefs, love for humanity, medical research, and education [11]. The cultural and religious beliefs of potential donors particularly play a major part in influencing Ghanaians on the donating of bodies for medical education. Culturally, in Ghana, the extended family system is very strong and the decision following the death of a family member rests on the family head and most at times without consultation with the nuclear family of the deceased. There are also firmly held cultural and religious burial traditions that might influence the bequests of body. This is similar in other African countries such as South Africa and Zimbabwe, where the donations are mostly from the white community, and medical school in the Islamic country of Libya is importing cadavers from India [7]. The aim of this study is to investigate the knowledge, attitude, and perceptions of body bequeathing for medical science education among Ghanaian students at the UHAS. The study specifically assessed students' knowledge on the bequest of bodies, explored students' perception of body donation, and their attitude toward the bequeathing of bodies and identified factors influencing the bequeathal of bodies in Ghana for basic medical science education and research. Furthermore, this study was conducted to understand the students' perspective on the factors influencing the body bequeathal that might informed the need for larger scale study among the Ghanaian populace. Based on the findings, educational programs can be fashioned out to improve on the willingness for the body bequeathal among the general populace of Ghana.

2. Materials and Methods

2.1. Study Design and Participants' Recruitment Criteria. This was a cross-sectional descriptive study. It involved participants whose academic curriculum required practical anatomy lessons with cadavers either in the form of dissection or the use of prosected bodies for demonstration. Thus, the schools include medicine, nursing and midwifery, and allied health sciences and pharmacy of the UHAS, Ho in the Volta region of Ghana. They were studying the bachelor programs, preclinical or clinical levels. Students who desired not to participate were excluded from the study.

2.2. Sample Size Determination. The total number of students in the four schools at the time of data collection was 2,187. The sample size was determined using Yamane's (1998) formulae for sample size determination. With a confidence of 95% and a margin of error of 5%, a minimum sample size of 351 participants was required. Ten percent nonrespondents were added making a total of 385 required participants. However, a total of 513 responded to a structured questionnaire that was used for the analysis.

2.3. Data Collection Instrument. The data were collected using a questionnaire that was self-developed based on findings from previous studies. The questionnaire was made of five sections covering the demographic data (Section 1), knowledge regarding body bequeathing (Section 2), the attitude toward body bequeathal (Section 3), and perception was assessed in Sections 4 and 5 focused on factors that influence respondents to bequeath their bodies. The questionnaire contained items made up of both close- and open-ended statements. The open-ended questions were asked to assess most important factors that might influence own body bequeathal among respondents.

2.4. Data Collection Procedures. The students were selected by convenience method where the contacts of email addresses were obtained. A questionnaire with an online Google form link was sent through the university email addresses to the study participants for responses at their convenience between June and August 2021.

2.5. Statistical Analysis. Data were downloaded and organized in Microsoft Excel® spreadsheets and an analysis software Stata 16.0 was used for the analysis. Data were analyzed using descriptive and inferential statistics and results presented in tabular form. Knowledge of students regarding processes involved in body bequeathing was ascertained. Three main questions with options that allowed multiple answers to be picked were asked: whether respondents had heard about body bequeathal, requirements of the process of body bequeathal, and what bequeathed bodies were used for. A correct answer was assigned a score of 1 and 0 for an incorrect answer. An average and percentage were calculated for the options chosen. Classification system for the knowledge level was adapted and modified from previous studies [12, 13] to be: 80% and above were rated as high, 60%–79% as average, 40%–59% as low, and below 40% as very low. p-value of <0.05 was considered to have statistical significance for parametric or nonparametric data.

2.6. Ethical Issues. The proposal for the study was submitted to the UHAS Research Ethical Committee for ethical clearance and it was approved with the assigned number UHAS-REC A.12[95]20-21. The consent of the Head of the Anatomy Department was sought. The anonymity of

Table 1: Demographic characteristics of respondents ($n = 513$).

Variable	Frequency (No.)	Percent (%)
Age* of the respondent (years)		
17–25	406	79.1
26–35	90	17.5
36–43	17	3.3
Sex		
Female	273	53.2
Male	240	46.8
School		
Medicine	236	46.0
Nursing and midwifery	144	28.0
Allied health science	109	21.2
Pharmacy	24	4.7
Year of study		
100 (1st)	115	22.4
200 (2nd)	74	14.4
300 (3rd)	111	21.6
400 (4th)	132	25.7
500 (5th)	44	8.6
600 (6th)	37	7.2
The religion of the respondent		
Christian	488	95.1
Muslim	19	3.7
Traditionalist	6	1.2

*Mean age = 24 years; range 17–43 years with a standard deviation = 4.8.

participants was ensured by using codes for individual answered questionnaires received. Participation in the study was voluntary and respondents could withdraw at any stage of the data collection process.

3. Results

3.1. Demographic Characteristics. Table 1 shows that majority of the respondents 406 (79.1%) were between the ages of 17–25 years (24.0 ± 4.8 years). Females constituted 273 (53.2%) and 236 (46%) of the respondents were from the School of Medicine. Fourth and final year medical students were, respectively, 132 (25.7%) and 37 (7.2%). Majority (95.1%) of the respondents believe in the Christian faith.

3.2. Knowledge of Students on Bequeathing of Bodies for Medical Science Education. Table 2 presents the data where majority 380 (74.1%) have heard of body bequeathal, which correlates with an average knowledge level of 74.1% of the concept of body bequeathal. With regards to the requirements involved in body bequeathal, participants stated completion of legal documentation (47.9%) and making one's family aware (45.6%) as requirements. However, 214 (41.7%) did not know what was required in the process of body bequeathal and five responses representing 1% reported that nothing was required. The knowledge level of participants pertaining to the requirements was, therefore, 39.6%, which was very low. On the use of bequeathed bodies, a majority (89.3%) identified teaching and learning of anatomy and 78.8% indicated that medical research was a possible use. The level of knowledge of the use of bequeathed bodies amongst participants was 76.4, which is average knowledge based on the classification stated earlier.

3.3. Respondents' Attitude toward Body Bequeathal. Table 3 summarizes the attitude of the respondents toward body bequeathal. Just a few (9.8%) of the respondents expressed their willingness to bequeath their bodies for anatomical education and research, while 43.9% were undecided about bequeathing their bodies. On donation of organs, 24.8% are willing to donate their organs to others for medical purposes to save their lives. Medical education and research had response rates of 83.2% and 86.2%, respectively. Body bequeathal is also helpful in making one contribute to society (30.4%).

On whom respondents will encourage to bequest the body, 45.0% of the responses showed that respondents were indecisive on who they were willing to encourage to bequest, while 29.4% said they will encourage anyone to bequest. On how their cultural background were related to body bequeathal, most 381 (74.3%) of the respondents reported that their culture supported body bequeathal. Meanwhile, 370 (72.2%) of the respondents did not, however, know what their religion had to say about body bequeathal.

3.4. Perception of Students on Body Bequeathing in Medical Science, Education, and Research. Table 4 shows the perception of respondents on body bequeathal where 35.7% of respondents were indecisive about what they feared when they thought about body bequeathal, while fear of misuse of the body had a response rate of 24.8%. Notably, a majority 217 (42.3%) of the respondents would prefer to be quest their bodies to their families. Majority 46.0% viewed the bequest as a family decision, meanwhile 242 (47.2%) were indecisive.

3.5. Factors that Influence the Willingness for Body Bequeathal. Further analysis was done using cross-tabulation between the background characteristics and the willingness to bequeath body, and chi-square tests were performed for the significant of their association (p-value < 0.05). Table 5 presents the result, and it shows that only religion has a significant (p-value –0.033) influence on the willingness to bequeath the body. The other background characteristics, including school, sex, age, level of study, and whether respondent has ever heard of body bequeathal, have no influence on the willingness to bequest to a body after death.

3.6. Other Factors that Influence Willingness to Bequeath a Body. Asides the background characteristics in Table 5, respondents reported multiple factors that will inspire them to bequest their bodies. To further obtain more information on the factors that influence body bequest, respondents were asked open-ended questions to state the most important factors that will influence their decision to bequest their bodies. Upon analysis, three main themes emerged from the responses as follows:

(1) Approval from family, culture, and religion
(2) Mishandling of bequeathed body
(3) The desire to be useful after death

Table 2: Knowledge of body bequeathal.

Variables	Frequency (No.)	Percent (%)	Knowledge level (%)
Heard of body bequeathal in Ghana			
Yes	380	74.1	74.1
No	133	25.9	
Requirement in body bequeathal			39.6
Nothing is required	5	0.9	
Copy of a death certificate	165	32.2	
Making one's family aware	234	45.6	
Body disposal permit by government	114	22.2	
Body not too thin/not too fat	110	21.4	
Body without disease	10	1.9	
Body not under police investigation	144	28.1	
Filling legal forms	246	47.9	
I do not know what is required	214	41.7	
Use of bequeathed bodies			
Medical research	404	78.8	
Medical testing	233	45.4	76.4
Anatomy teaching and learning	458	89.3	
I do not know	40	7.8	

3.7. Theme 1: Approval by Family, Culture, and Religion. One of the key themes that emerged from the respondents was that their decision to partake in a body bequeathal will depend on whether or not their family, culture, or religion approved it. Many of the responses were stated revealed that respondents think that what their families had to say concerning the body bequeathal will determine if they will bequest their bodies. Some of the respondents' statements are quoted as follows:

> *"I will consider my family's opinion on the matter; when my nuclear family decides or disagrees; refusal from spouse/children/family; my family is uncomfortable, family consent; if there is a strong resistance from my family."*

Some also stated that they will consider what their religion or faith and culture say concerning the body bequeathal and will consider bequeathing if only these are in approval and are stated as follows:

> *"My customs and traditions; when my religion stands against it; the fact that my parents or religion will disagree; religious disapproval; my faith."*

Importantly, it was noted that most respondents will also be prevented from bequeathal by disapproval from both their culture and religion as in the following statements:

> *"If it is against my cultural or religious beliefs; disrespect to my body; culture and religion."*

3.8. Theme 2: Mishandling of the Bequeathing Body by the Students and Staff. There was concern amongst the respondents about how their bequeathed bodies will be handled. Respondents reported that they were concerned about their privacy and whether their bequeathed bodies will be treated with respect while being used. Some reported that they feared their bequeathed bodies would be sold for other purposes. Hence, most of them will consider whether their bequeathed bodies will be used for the purpose for which they agree to the bequest. The following were reported:

> *"My dignity and respect; privacy during usage; disrespect and derogatory remarks; my sentiments about misuse and disrespect for body parts; selling my body parts; mistrust of doctors, hospitals, and the organ allocation system; and a belief in a black market for rituals; What if my body is not kept well; I have seen how bodies are handled in my school's anatomy lab some get infected with fungi."*

3.9. Theme 3: The Desire to be Useful after Death. Another factor that stood out was the desire to be useful after death. Some of the respondents stated their willingness to bequest their bodies to aid in the advancement of medical science and research. Notably, some will consider the option of organ donation, if not whole-body bequeathal, to save the lives of others who might need these organs for transplant. They recounted that if the bequeathal of their bodies will aid in medical research, science, and education of medics, it will mean they are being useful even after death. Some also reported that it will be benefitting society and the health of

Table 3: Respondents' attitude toward the bequeathing of bodies.

Variables	Frequency (No.)	Percent (%)
Willingness to bequeath body		
Yes	50	9.8
No	238	46.4
Undecided	225	43.9
Willing to donate any organs		
Yes	127	24.8
No	170	33.1
Undecided	216	42.1
Usefulness of body bequeathal		
Medical research	427	83.2
Medical education	442	86.2
Making one contribute to the good of society	156	30.4
Making one popular	7	1.4
I do not know	37	7.2
Person one will encourage to bequeath their bodies		
Family	51	9.9
Friends	54	10.8
Anyone	147	29.4
Myself	51	9.9
No one	100	20.0
Undecided	225	45.0
Culture's relation to organ/body bequeathal		
My culture supports it	381	74.3
My culture is against it	86	16.2
It is not part of my culture	32	6.2
I do not know what my culture says about it	17	3.3.
Religion's relation to organ/body bequeathal		
My religion supports it	44	8.6
My religion is against it	23	4.5
It is not part of my religion	76	14.8
I do not know what my religion says about it	370	72.2

Table 4: Perception of students on body bequeathing for medical science education and research.

Variables	Frequency (No.)	Percent (%)
What are your fears about body bequeathal		
I am not afraid	152	29.6
Disrespect	79	15.4
Sale of my body part	87	16.9
Misuse of my body	127	24..8
Undecided	183	35.7
Others	9	1.8
Persons who will not support the decision to bequest one's body		
Family	236	46.0
Friends	72	14.0
My religion	48	9.4
My culture	63	12.3
Undecided	242	47.2
Other	9	1.8
Who one prefers to bequest organ/body to		
Family	217	42.3
Friends	89	17.4
Any medical/research institution	126	24.6
No one	76	14.8
Undecided	151	29.4
Other	2	0.4

those to whom their organs will keep alive. They are as follows: "usefulness of medicine; the benefits it will serve to the society through learning, anatomy, and research; saving lives; the health and well-being of the one receiving my organs; no waste of resources on the dead body, which can be useful in helping others; and the benefit it will be to the society" were the factors that will inspire them to donate their bodies.

4. Discussion

4.1. Knowledge of Students on Bequeathing of Bodies for Medical Science Education. The present study reveals that most respondents had heard about body donation and almost all of them knew the importance of bequeathed bodies for the teaching and learning of anatomy in medical education. This might be due to the respondents being students in health training universities. Furthermore, most of the students, particularly the medical and physiotherapy students, had cadaveric dissections for the teaching and learning of anatomy and might have been informed by their instructors. Similarly, a previous study by Ciliberti et al. [14] among Italian medical students also reported high awareness of body bequeathal as cadaver dissection was an important part of their education. Contrary to this finding among students, previous studies [11, 15–17] amongst the general population reported poor knowledge of body bequeathal. This is likely because of a lack of prior exposure to the use of bequeathed bodies in anatomical education and research in the general population.

In a previous study amongst Italian medical students by Ciliberti et al. [14], students were not aware of the processes involved in body bequest. This was attributed to a general lack of awareness of the programs amongst these students from that study. This current study also corroborated this finding with a low level of knowledge of the requirement of body bequeathal.

Despite the knowledge on the importance of bequeathed bodies for the teaching and learning of anatomy in medical education, respondents in this study had very low knowledge (39.6%) on the requirements for body bequeathal. Respondents in this study mentioned the requirement for body bequeathal to include filling legal forms, a copy of a death certificate, making one's family aware, and bodies not under police investigation. This result is likely due to students not being actively involved in the process of acquisition of the bodies that they use for their anatomy education.

Table 5: Cross-tabulation between background characteristics of respondent and their willingness to bequeath body.

Variables	Willingness to bequeath body			Chi-square tests	
	No. (f)	Undecided (f)	Yes (f)	Pearson chi-square	p-value
School of respondent					
School of Allied Health Science	48	51	10		
School of Medicine	114	96	26		
School of Nursing and Midwifery	66	65	13	3.950	0.684
School of Pharmacy	9	14	1		
Total	237	226	50		
Sex of Respondent					
Female	115	131	27	4.156	0.125
Male	122	95	23		
Total	237	226	50		
Age group (years)					
Less than 20	41	30	8		
20–25	134	142	31		
26–30	29	16	7	8.783	0.361
31–35	24	26	2		
Above 35	9	12	2		
Total	237	226	50		
Religion					
Christians	222	219	47		
Muslim	14	4	1	10.521	0.033
Traditionalist	1	3	2		
Total	237	226	50		
Level of study					
100	55	51	9		
200	36	32	6		
300	47	53	11	6.645	0.758
400	59	54	19		
500	20	21	3		
600	20	15	2		
Total	237	226	5		
Ever heard of body bequest					
No	64	55	14		
Yes	173	171	36	0.553	0.0.758
Total	237	226	50		

f = frequency.

4.2. The Attitude of Students toward Bequeathing of Bodies for Medical Science Education. The current study reveals that the willingness to bequest their bodies for anatomical education and research was very low. This finding confirms a study by Abbasi et al. [15] among Iranian students. In the present study, although respondents recognized how beneficial the bodies bequeathed were to medical education, they exhibited a poor attitude toward it. This poor attitude was further exhibited, as only 32.6% were willing to encourage other people to participate in body bequeathal, which is similar to findings by Alexander et al. [18]. This study reveals that 24.8% of respondents were willing to bequest parts of their bodies such as organs as opposed to 9.8% willingness for whole-body bequeathal. This indicates that respondents have a higher likelihood of donating their organs than the whole body. Previous studies [19, 20] reported similar findings. A possible explanation for this finding might be the desire of respondents to be useful in saving lives through organ bequest for medical transplants.

In the present study, even though most of the respondents were not certain on the dictates of their religion or their culture, they admitted that they will only be willing to partake in body bequeathal if it was permitted by their religion and culture. Rokade and Bahetee [19] also observed in their study that most people were unaware of the views of their various religions on body bequest. Thus, the attitude of respondents toward the body bequeathal, whether positive or negative, was, hence, determined by personal thoughts and intuitions regarding their religious and cultural beliefs.

Other previous studies corroborate the present study where they reported that people who were willing to bequest their bodies did so for altruistic reasons [21]. Thus, most of

the bodies are bequeathed by people who were willing to bequest due to their belief in unselfish regard or devotion to the human race; hence, altruism [21]. As was demonstrated in the current study, very few, 1.4% reported that body bequeathal will serve the personal purpose of making themselves popular.

4.3. Perception of Students on Bequeathing of Bodies for Medical Science Education. Some of the respondents in this study reported that they feared their bodies will be misused or that their body parts will be sold. These thoughts could prevent the body bequeathal. These findings were in line with similar studies where respondents stated that they were unwilling to bequest their bodies due to similar fears of misuse and sale of body parts [19, 22, 23].

The current study showed families of participants will not support their decision to bequest their bodies just as Mwachaka et al. [24] reported in a study where respondents said their decision will be deterred by their families. Some considered that there will be a loss of family ties after their death if they bequest their bodies. The present study offers a clearer understanding of why respondents were unwilling to bequest their bodies if their families did not approve of their decision to bequest. In this study, respondents also showed concern of unacceptability of body bequeathal by their families and this was a similar finding to a previous study by Sehirli et al. [25].

Furthermore, the respondents in this study portrayed a general sense of uneasiness about how their bodies might be handled, especially during anatomy dissection. As was seen, even amongst groups of people who are willing to or have joined bequeathal programs, there is still the mindset that there will be a lack of respect or due dignity to their bodies in the laboratory [11]. This, therefore, could be an important factor that will prevent bequeathal even though the importance of bequeathed bodies in medical education and research is well known amongst the respondents.

In this study, very few of the respondents will consider organ donation and this was still a higher number in comparison to those who were willing to participate in whole-body bequeathal. This was reported in studies by Rokade and Bahetee [19] and Arráez-Aybar et al. [20].

4.4. Factors that Influence the Body Bequeathal. Previous studies indicated that a common reason for making a body bequest is to aid medical science education and research [22–27]. This was evident in this study, as the respondents reported that contributing to advancement in medical research and anatomy are factors that will inspire them to bequest their bodies. The current study reveals that 23.8% of the respondents were of the conviction that being useful after death was more inspiring to participate in body bequeathal programs. For one-third of the respondents, they will bequest to contribute to the good of society. These findings are in line with observations from a previous study by Ajita and Singh [21].

The respondents in this study reported that the love of family and friends is a factor that will inspire them to participate in body bequeathal. The anxiety of disrespectful behavior to cadavers as seen by Sehirli et al. [25] was also reported by respondents in this study as a factor that will prevent them from body bequeathal. As was reported via answers to open-ended questions in this study, most of the respondents reported that they feared that their bequeathed bodies will be treated with disrespect. Background characteristics of respondents such as religion have a significant influence on the willingness to bequest a body. This finding corroborates a previous study by Gangata et al. [7] where religious beliefs negatively impact medical school in the Islamic countries including Libya to the extent that cadavers were being imported from India.

In this current study, themes from open-ended questions also revealed that approval of others; family, culture, and religion; fear of mishandling of bequeathed bodies; and the desire to be useful after death were important factors that will influence the decision to either bequeath or not. This was not different observations from various studies that had been conducted [19, 22, 23]. Unlike in previous studies [28, 29], this current study did not show any significant influence of sex or age on body bequeathal. The context of this study should, however, be taken into consideration as the age group of the respondents (17–43 years) in this current study is not as varied as in previous studies.

5. Conclusion

This study concludes that there is a high awareness of the importance of body bequeathal for basic medical science education and research. There was, however, very low knowledge with regards to the processes required for a person to bequest their body. The study reveals a negative attitude of respondents toward the willingness to donate their body or even recommending others to donate their body. Notable factors that might influence body bequeathal were disapproval of family, religion, or culture, protection of privacy, and fear of mishandling and misuse of their bequeathed bodies. The background characteristics such as age, sex, program, level of study, and awareness of existence of the concept of body bequeathal have no influence on the decision to bequest among respondents. It is, therefore, recommended that medical schools should setup accessible body bequeathal programs to improve on education for body bequeathal to the populace. Bodies donated should also be handled with dignity by anatomy instructors and students.

Data Availability

The datasets used during the current study are available from the first and corresponding authors on reasonable request.

Disclosure

This manuscript has been presented to Research Square and a preprint has been published [30].

Conflicts of Interest

The authors declare that they have no conflicts of interest.

Authors' Contributions

Henrietta Enam Quarshie and Raymond Saa-Eru Maalman made contributions to the conception and design of the study. Mahamudu Ayamba Aliaayamba, Yaw Otchere Donkor, and Kingsley Ampongkampong made a substantial contribution to the study design and management of the research activities. Henrietta Enam Quarshie and Raymond Saa-Eru Maalman analyzed the data and drafted the manuscript. All authors were involved in critical revision for important intellectual content and approved the final manuscript.

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