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The perspectives of clinical level medical students on animal-assisted therapy: a study in Ghana

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Abstract

Background The role of animal-assisted therapy (AAT) in complementary and alternative medicine is well acknowledged. AAT is widely patronized, in developed countries such as USA, Canada, and many European countries, but less so in developing countries in Africa including Ghana. For persons in developing African countries and elsewhere to benefit from AAT, healthcare professionals must be acquainted with it recommend it to their patients when necessary. This study therefore assessed the perspectives of clinical-level medical students on AAT.

Method A semi-structured questionnaire was used to collect data in a cross-sectional study from 206 randomly selected clinical-level medical students of the University for Development Studies, Tamale, Ghana. The data was analyzed using Microsoft Excel and SPSS (Version 26) and the results were presented in Tables and charts. The association between demographic variables and the knowledge and attitude of the students were determined using ANOVA, while bivariate Pearson's correlation was used to measure the relationships between continuous variables. Associations were considered significant when p -value < 0.05 .

Results The knowledge about AAT among the medical students was very poor (0.971 ± 2.407 over 10; 9.7%); almost all of them ($\approx 99.0\%$) had very little or no exposure to AAT in school or at home. The attitude of the students was however averagely positive (3.845 ± 0.748 over 7; 54.9%), with a perceived health benefit of ATT score of 4.768 ± 1.002 (68.1%). The motivation of the students to acquire more knowledge and skills about AAT mostly through lectures and practical sessions (70.9%) was good (4.809 ± 1.221 ; 68.7%). Female students were significantly more knowledgeable about AAT than their male counterparts (1.5 versus 0.6; p -value = 0.006). No other sociodemographic characteristics had any significant association with knowledge, attitude, and perception of benefit variables. However, a significant positive relationship was found to exist between the students' knowledge, attitude and perception of animal-assisted therapy ($r \geq 0.236$; p -value ≤ 0.001).

Conclusion We conclude that the knowledge about AAT among medical students is inadequate and this is worrying given the beneficial complementary role of AAT in achieving SDG 3. Medical schools and their regulators in Ghana should incorporate complementary and alternative medicine (CAM) lessons in their training curricula. For practising medical doctors, topics on CAM should be discussed during their Continuous Professional Development sessions. With better knowledge, physicians would possibly be more willing and confident in recommending this useful

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complementary and alternative medicine to patients who may seek other forms of therapy besides conventional medicine or which will augment the orthodox medication the patients may have been using to treat their conditions.

Keywords Animal-assisted therapy, Medical student, Knowledge, Attitude, Motivation, Ghana

Introduction

Conventional medicine has become the preferred choice for the treatment of ailments globally, particularly in urban settings, due to advancements in science and technology [1, 2]. However, there is also the growing use of complementary and alternative medicines (CAM) in both developed and developing countries for various reasons including the (i) increased availability of information on the internet, (ii) increasing interactions with persons from cultures that use CAM, (iii) the perception that CAM is safer and less expensive, (iv) dissatisfaction with conventional medicines because of adverse effects, cost, lack of efficacy, (v) erosion of doctor-patient relationships, and (vi) an impersonal health care system [3, 4]. Although plants have played a leading role in CAM, dead or live animals and their products have also been beneficial in the restoration of ill health in humans [5–7].

The use of animal body parts or by-products such as excreta, bones, and feathers for traditional medicine and related cultural purposes is referred to as zootherapy [8, 9]. Other healing methods that involve bringing the live animals in close contact with the human host are known as biotherapies [10]. One of these biotherapies that have found use in many developed countries as an alternative therapy is Animal Assisted Therapy (AAT) or Animal Assisted Interventions (AAI). AAT, also referred to as animal-facilitated therapy, was defined by Stefanini et al., (2015) as a goal-directed intervention in which an animal that meets specific criteria is an integral part of the treatment process [11]. The International Association of Human-Animal Interaction Organizations (IAHAIO) also defined AAI as “a goal-oriented and structured intervention that intentionally includes or incorporates animals in health, education, and human services for therapeutic gains in humans and involves people with knowledge of the people and animals involved” [12]. AAT has produced positive outcomes in managing cardiovascular, psychological, and cognitive disorders in humans [13]. Even in psychiatric disorders such as schizophrenia, personality disorders, depression, acute stress reactions, and bipolar affective disorders, several studies have provided evidence showing how useful AAT has been in their management [14, 15]. In a study in Norway among ninety adults with psychiatric disorders, a significant increase in self-efficacy was observed among those who were enrolled in AAT (60 patients) compared to the control group (30 patients) after a treatment period of six months with animals including cattle, sheep, horses, and small animals like rabbits, poultry, pigs, cats or dogs [14].

Although the interaction between humans and animals existed since time immemorial, it was only in the year 1700 that a healing facility known as York Retreat in England, founded by the Society of Friends, used animals to treat mentally ill patients [16]. This practice of AAT using dogs was applied in a New York Hospital in the United States in the 1940s [17]. After World War II through to the 1950s, research experiments investigating animal-facilitated therapy by psychologist Boris Levinson led to greater interest and trust in AAT [17]. In America and other developed countries, the use of AAT has increased in hospitals, schools, and nursing homes [16]. The increasing use of AAT in Australia and European countries such as France, Italy, and the UK has also been reported [18–22]. In Africa, there have been reports of the use of AAT in South Africa [23–25].

Various groups of health professionals such as therapists, psychologists, psychiatrists, nurses, and social workers are known to apply AAT in their practice [26]. Medical practitioners sometimes recommend complementary and alternative therapies to their clients, when need be. In Italy, 36.4% of doctors who know about AAI have recommended pet therapy to their patients [20]. This means that with an increased knowledge about AAT, there is a greater tendency for medical practitioners to encourage their patients to use this alternative medicine option. To the best of our knowledge, there is currently no study assessing medical students' perspective of AAT in Ghana, necessitating the need for such a study to provide an appreciation of the future of AAT in Ghana. These medical students will soon become medical practitioners, and would only be well-placed to recommend this useful alternative medicine to their clients if they are well-educated about this therapy. This study therefore assessed their perspective on animal-assisted therapy by measuring their knowledge, attitude, and perception of AAT; what would motivate them to seek more knowledge about AAT, and if some of their sociodemographic characteristics are associated with their perspectives about AAT.

Methods

Study design

This quantitative research was conducted between July and August 2020 using a cross-sectional study design.

Study setting

The study was conducted at the Tamale Teaching Hospital, where clinical-level medical students of the School

of Medicine of the University for Development Studies undertake their clinical rotations. The University for Development Studies (UDS), which is the first university in northern Ghana, was established in 1992. The School of Medicine and Health Sciences from which the School of Medicine was carved, began training medical students in 1996. Tamale, the only city in northern Ghana is geographically situated between latitude 9° 16 and 9° 34 North and longitude 0° 36 and 0° 57 West [27]. During the 2010 national population census, Tamale was reported to have a population of 233,252 [27].

Study population

The study population included all 4th year (level 400), 5th year (level 500), and 6th year (level 600) clinical-level medical students undertaking their junior and senior clerkships at the Tamale Teaching Hospital. The total number of students in each level was; 215(4th year), 137(5th year), and 135(6th year).

Sample size

The sample size was calculated using the Cochran formula, $n_0 = \frac{t^2(p)(q)}{d^2}$, where $t=1.96$, the value for a selected alpha level of 0.025 in each tail; $d=0.05$ considered as an acceptable margin of error for proportion; p , is the estimated proportion of an attribute that is present in the population, which is considered as 0.5 or 50% since there is a paucity of data on perspective of undergraduate students on AAT in Ghana, hence $q=0.5$ ($q=1-p$).

$$n_0 = \frac{1.96^2 (0.5) (0.5)}{0.05^2}$$

$$n_0 = 384$$

With $n_0 = 384$, exceeding 5% of the eligible study population of 487 ($487 \times 0.05 = 24.4$) and excluding the 28 students who took part in the piloting of the study tool, an adjusted sample size n_1 was calculated using the Cochran correction formula.

$$n_1 = \frac{n_0}{1 + \frac{n_0}{\text{Study population}}}$$

$$n_1 = \frac{384}{1 + \frac{384}{459}}$$

$$n_1 = 209$$

However, a total response of 206 was recorded at the end of the data collection resulting in an overall response rate of 98.6% ($206/209 \times 100$).

Sampling procedure

The sampling of the respondents involved the use of both simple random and proportionate sampling techniques. Simple randomisation was performed on the class lists using the Microsoft Rand function, and the required proportion from each class was calculated. The total population of the medical students in this study was 487 and the proportion drawn from each class was 4th year ($95/215 \times 100 = 44.0\%$), 5th year ($52/137 \times 100 = 38.0\%$) and 6th year ($59/135 \times 100 = 44.0\%$).

Study tool

The study tool, which was a semi-structured questionnaire was designed after reviewing literature on this subject as well as with input from study tools used in two previous studies by Hightower (2010) and Lutzky-Cohen (2016) [28, 29]. After the initial piloting of the semi-structured questionnaire from 29th April to 6th May 2020, ambiguous questions were deleted, and some questions were reorganised to ensure respondents would have a better understanding of the questions. In addition, the researchers analysed all the questions to ensure their face validity. The twenty-eight students who participated in the piloting were excluded from the data collection. A Google form was developed based on the questionnaire and a Google link was generated.

Data collection

With the researchers provided with the WhatsApp numbers of all the students by their class leaders, the randomly selected respondents were sent the Google form link (<https://forms.gle/NZFE1rgHnRk44bKi8>) between 6th July and 7th August 2020 for their responses. Should a selected respondent fail to complete the questionnaire after several reminders or be unavailable, the next available respondent beyond the selected list is invited. Respondents were encouraged to indicate to the researchers a successful submission of the completed form.

Data measurement

In this study, the independent variables include sex, age, religious affiliation, where the respondent grew up, fathers' and mothers' educational status, level or class of study, and whether the respondent currently has a pet at home. The dependent variables were the knowledge, attitude, perceived benefit, and motivation assessment scores.

Knowledge of respondents about AAT was based on four questions; (i) definition of AAT (Intentionally includes or incorporates animals in health, education, and human services for therapeutic gains –1 point), (ii) three animals used in AAT (A point each for any three of animals such dogs, cats, horses, farm animals, birds,

hamsters, fish, and dolphins), (iii) three conditions requiring the use of AAT (A point each for any three of the following diseases or disorders such as cardiovascular diseases, dementia, Alzheimer's disease, child cerebral paralysis, rheumatoid arthritis, Acquired immunodeficiency syndrome, depression, multiple sclerosis, Post-traumatic stress disorder, stroke, spinal cord injury, and schizophrenia), (iv) three health facilities that apply AAT in their practice (A point each for any three of these facilities; hospitals, prisons, nursing homes, rehabilitation centres, among others). The maximum knowledge score was 10 points.

A seven Likert scale from strongly agree, moderately agree, slightly agree, neutral, slightly disagree, moderately disagree and strongly disagree was used to assess respondents' attitudes towards AAT, perceived benefits of AAT and motivation to acquire future knowledge and

skills in AAT. Scores allocated to the non-reverse scored responses were; strongly disagree (1), moderately disagree (2), slightly disagree (3), neutral (4), slightly agree (5), moderately agree (6), and strongly agree (7). The scores for the reverse-scored responses were opposite to the non-reverse scored items with the strongly disagree scoring seven and strongly agreeing allotted one. Attitude, perceived benefit, and motivation assessments were evaluated using eight, five, and three questions respectively. Overall knowledge and individual question scores converted to nearest whole numbers from 0 to 4 ($\leq 40\%$) were considered as poor, 5 to 6 (50 to 60%) as average, and 7 to 8 (70 to 80%) as good, while 9 and above ($\geq 90\%$) were adjudged as excellent. For each attitude, perceived benefit, and motivation question or overall score of each of these variables, the mean score of 0.0 to below 3.5 ($\approx 40\%$) was poor, 3.5 to 4.5 ($\approx 50.0\text{--}60.0\%$) was considered average, 5.0 to less than 6.0 (70.0% to $<85.0\%$) was good, and above 6 or 85.0% was excellent.

Table 1 Sociodemographic characteristics of respondents

Variable	Subgroup	Frequency	Percentage
Sex	Female	70	34.0
	Male	136	66.0
Age (Nearest whole number)/ years	21–24	92	44.7
	25–29	97	47.1
	> 29	17	8.3
Religious affiliation	Christianity	153	74.3
	Islam	50	24.3
	Others	3	1.5
Where respondent grew up	Village	16	7.8
	District capital	30	14.6
	Town	34	16.5
	Regional capital	24	11.7
Level of study	City	102	49.5
	Level 400 (4th year)	95	46.1
	Level 500 (5th year)	52	25.2
Father's educational status	Level 600 (6th year)	59	28.6
	None	20	9.7
	Primary	7	3.4
	JHS/Middle School	15	7.3
Mother's educational status	SHS	24	11.7
	Tertiary	140	68.0
	None	42	20.4
	Primary	7	3.4
Home accommodation type	JHS/Middle School	36	17.5
	SHS	43	20.9
	Tertiary	78	37.9
	None	42	20.4
Do you currently have a pet at home?	Single room	11	5.3
	Chamber and a Hall	17	8.3
	Two to three-bedroom apartment	77	37.4
	Four or more-bedroom apartment	101	49.0
Do you currently have a pet at home?	No	109	52.9
	Yes	97	47.1

Statistical analysis

Data collected in Microsoft Excel was cleaned and then analyzed using IBM Statistical Package for Social Sciences (SPSS) version 26.0. The results were presented as tables and charts. The association between the sociodemographic characteristics and dependent variables such as knowledge, attitude, perceived benefit and motivation scores was determined using the One-Way Analysis of Variance (ANOVA). Pearson's correlation was used to test for the linear relationship between some of the continuous variables (Age, knowledge, attitude, motivation and perceived benefit scores). The association between variables was considered statistically significant only if the p-value < 0.05 at a confidence interval of 95%.

Results

Sociodemographic characteristics of respondents

Of the 206 respondents, males (136; 66.0%), persons of the Christian faith (153; 74.3%), those currently not keeping a pet (109; 52.9%) and students whose fathers had tertiary level education (140; 68%) were in the majority. Most of the respondents were between the ages of 25 and 29 (97; 47.1%), currently, resident in the cities (102; 49.5%), fourth-year medical students (95; 46.1%), had mothers who had tertiary level education (78; 37.9%), had families of high income and occupying more than a four-bedroom apartment (101; 49.0%). Table 1 shows the sociodemographic characteristics of the respondents in this study.

Level of exposure of respondents to lessons on AAT at school and home

Majority of the medical students in this study (203; 98.5%) had never been exposed to any materials or

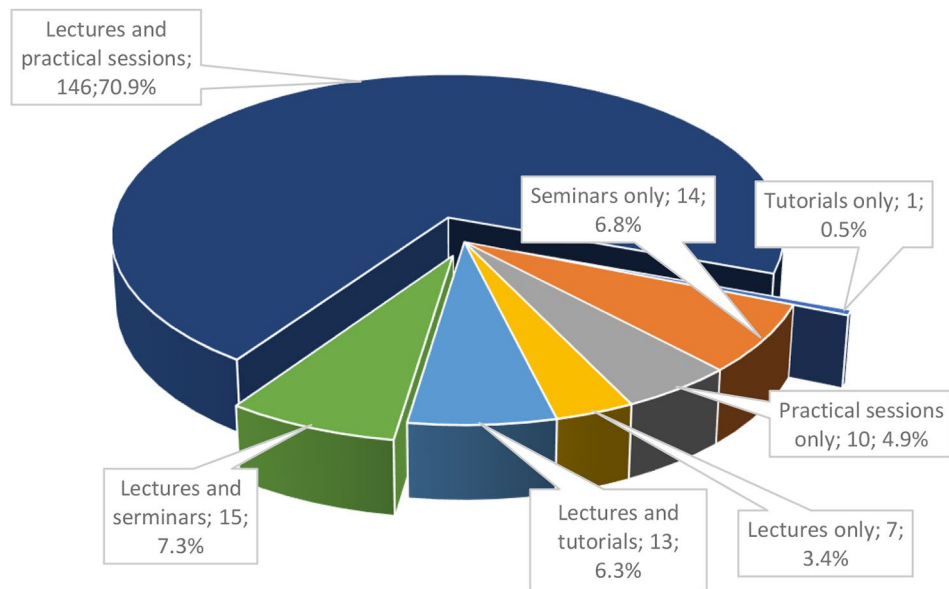


Fig. 1 Preferred modalities for the provision of knowledge on AAT

Table 2 Assessing medical students' knowledge of AAT

Knowledge statements	Subgroup	Frequency	Percentage	Mean	Percentage level of correctness
Definition of AAT	Incorrect	180	87.4	0.126±0.333	12.6
	Correct	26	12.6		
List three categories of sick persons or health disorders who can benefit from AAT	0/3	179	86.9	0.32±0.875	10.7
	1/3	5	2.4		
	2/3	5	2.4		
	3/3	17	8.3		
List three animals that are used in AAT	0/3	174	84.5	0.408±0.982	13.6
	1/3	2	1.0		
	2/3	8	3.9		
	3/3	22	10.7		
List three facilities that use AAT	0/3	193	93.7	0.117±0.490	3.9
	1/3	5	2.4		
	2/3	5	2.4		
	3/3	3	1.5		
Overall score				0.971±2.407	9.7

lessons on AAT before and during their university education and had not seen any book on AAT in their libraries. Only two (99.0) were aware of a facility or health worker that uses an animal as part of their treatment protocol.

Respondent's most preferred method of acquisition of knowledge in AAT if offered the opportunity

Figure 1 shows how medical students desired to acquire knowledge on AAT. The most preferred method suggested by the majority of respondents was a combination of lectures and practical lessons (146; 70.9%), followed by a blend of lectures and seminars (15; 7.3%), with the least preferred method being the use of only tutorials (1; 0.5%).

Assessment of medical students' knowledge of AAT

The overall knowledge score of the respondents was paltry (0.971±2.407 over 10; 9.7%). For the four questions used to assess respondents' knowledge of AAT (Table 2), respondents who scored zero or gave incorrect answers were between 84.5% and 93.7%. The top three worst scores were related to questions asking the respondents to list three facilities that use AAT (0.117±0.490 over 3; 3.9%), stating three categories of persons who apply AAT in their practice (0.32±0.875 over 3; 10.9%) and asking for the definition of AAT (0.126±0.333 over 1; 12.6%). On the other hand, the best-answered question was about the listing of three animals that are used in AAT (0.408±0.982 over 3; 13.6%).

Table 3 Medical students' attitudes towards AAT

Attitude statement	Attitude score (Mean ± Standard deviation)	Attitude score (Percentage)
Animals should NEVER be used in treating any human disease or disorder. **	5.679 ± 1.566	81.1
Using animals for treating diseases or disorders will increase the money a patient or client will spend on healthcare. **	4.286 ± 1.725	61.2
More studies need to be done to demonstrate how effective animal-assisted therapy is to health care**	1.971 ± 1.586	28.1
Should animals be used to treat human diseases, it can lead to the spread of zoonotic (animal to human transmitted) diseases**	3.000 ± 1.504	42.9
Many people who seek therapy will enjoy having animals as part of their treatment	4.335 ± 1.462	61.9
Animals brought to health facilities can mostly lead to allergies in many patients**	2.529 ± 1.444	36.1
Introducing animals into treatment can cause them to bite patients or clients if they are near them**	3.805 ± 1.479	54.4
Animals belong in the wild or zoos, but not in hospitals**	5.155 ± 1.669	73.6
Overall attitude score	3.845 ± 0.748	54.9

Note ** = Items that are reverse scored

Medical students' attitude towards AAT

The bottom three lowly-scored attitudes statements responded to by the respondents were; requesting more studies to demonstrate the effectiveness of AAT in health care (1.971 ± 1.586 or 28.1%), the assumption that animals used in AAT in hospitals can cause allergies (2.529 ± 1.444 or 36.1%) and that animals used in AAT are likely to spread zoonotic diseases (3.000 ± 1.504 or 42.9%). The top three highly scored attitudes questions were; respondents' disagreement that animals should never be used in treating human disease or disorder (5.679 ± 1.566 or 81.1%), that animals belong to zoos not hospitals (5.155 ± 1.669 or 73.6%), and agreement that many people that seek therapy will enjoy having animals as part of their treatment protocol (4.335 ± 1.462 or 61.9%). Table 3 shows the assessment of the attitude of the respondents to AAT with an overall attitude score of 3.845 ± 0.748 (54.9%).

Perceived benefits of AAT in healthcare

The results of the assessment of the respondents about what they perceive as the benefits of AAT are presented in Table 4. The overall perceived benefit score of the respondents was 4.768 ± 1.002 (68.1%). The top three perceived benefits of AAT by the respondents were that (i)

Table 4 Medical students' perceived benefit of AAT to healthcare

Perceived benefit statement	Attitude score (Mean ± Standard deviation)	Attitude score (Percentage)
The use of animals in therapy can facilitate patient and health worker interaction"	4.364 ± 1.586	62.3
If animals are used in health facilities, they will not only improve the patient's emotional health but also his/her physical health"	5.121 ± 1.586	73.2
Using animals in health facilities can help reduce stress among patients"	5.626 ± 1.383	80.4
All families should keep pets in their houses to ensure mental well-being"	4.393 ± 1.522	62.8
Health professionals should recommend the use of animals for the sick"	4.334 ± 1.390	61.9
Overall perceived benefit score	4.768 ± 1.002	68.1

Table 5 Medical students' motivation to acquire knowledge and training in AAT

Motivation assessment statement	Motivation score (Mean ± Standard deviation)	Motivation score (Percentage)
As a health worker, I will enjoy working with animals	4.242 ± 1.783	60.6
I will be happy if Animal Assisted Therapy is introduced as a course that I can register for and study at this university	4.888 ± 1.534	69.8
Joining any training programme that will equip me to help use animals to treat the sick will be great	5.296 ± 1.377	75.7
Average score	4.809 ± 1.221	68.7

animals can reduce stress among patients (5.626 ± 1.383 or 80.4%), (ii) animals improve both the emotional and physical health of patients (5.121 ± 1.586 or 73.2%) and (iii) all families should keep pets for their mental well-being (4.393 ± 1.522 or 62.8%).

Assessment of respondents' motivation to acquire more knowledge in AAT

Results assessing the medical students' motivation to acquire more knowledge and training in AAT are shown in Table 5. Whereas the overall motivation score was 4.809 ± 1.221 or 68.7%, the highest motivation was their desire to join any training programme that will enable them to practice AAT (5.296 ± 1.377 or 75.7%), followed by their wish to see AAT introduced as a course of study in their university (4.888 ± 1.534 or 69.8%). Their lowest motivation score was to the question if they will enjoy working with animals when they become health workers (4.242 ± 1.783 or 60.6%).

Relationship between sociodemographic characteristics of respondents and their perspectives on AAT

Table 6 shows the relationship between the respondents' sociodemographic characteristics (independent variables) and their knowledge of, attitude towards, perceived benefits and motivation to be trained in AAT in the future (dependent variables). Female students were more knowledgeable, had a better attitude, had greater perceived benefits and were more motivated to study AAT than the males, but it was only in the measure of knowledge that the females were significantly better (1.5 versus 0.6; p -value=0.006). There were no significant differences in the scores of the dependent variable among the different age groups (p -value>0.05), although students between the ages of 21 and 24 performed better across all the dependent variables considered. In terms of religious affiliation, students ascribing to other religions besides Islam and Christianity scored better, but the differences were not statistically significant. Except for the attitude scores, in which the 6th-year medical students obtained the highest scores, for all the dependent variables, the junior most class in the clinical year (4th-year students), performed better but the differences were not significant. Interestingly, students who do not have pets at home were more knowledgeable about AAT than those who own pets, but the difference was not significant (1.1 versus 0.82; p -value=0.683). However, those with pets had better attitudes towards AAT, and perceptions about its benefits and were more motivated to study more about AAT, even though again the differences were not statistically significant (p -value>0.05).

Assessment of the relationships between various continuous variables in this study (age, knowledge scores, attitude scores, perceived benefit scores, and motivation scores)

Pearson correlation coefficient (r) of age (years) against knowledge, attitude, motivation, and perceived benefit scores were all negative values. Except for knowledge (r =-0.025; p -value=0.722), a significant relationship existed between age and attitude (r = -0.167; p -value=0.017), motivation (r = -0.197; p -value=0.004) and perceived benefit (r =-0.207; p -value=0.003). Positive correlation was found between knowledge and attitude (r =0.236; p -value=0.001), motivation (r =0.288; p -value<0.001) and perceived benefit (r =0.263; p -value<0.001). Also, between attitude and motivation (r =0.428; p -value<0.001) and perceived benefit (r =0.477; p -value<0.001) exist a positive correlation. Again, a positive correlation relationship was found between motivation and perceived benefit (r =0.600; p -value<0.001). Table 7 shows the relationship between continuous variables age, knowledge, attitude, motivation and perceived benefits scores of respondents.

Discussion

This study found medical students in their clinical years at the University for Development Studies, Tamale, Ghana, to have inadequate knowledge (9.7%) about AAT. Their overall score on the definition of AAT was less than 15% and knowledge about the animals and categories of persons who can benefit from AAT were also abysmal. A study by Hightower (2010) recorded a knowledge score of almost 84% among occupational therapists in Ohio in the United States of America [30]. It is understandable why a comparatively lower score was recorded in this study. Hightower's (2010) study was among occupational therapists some of whom had Master's degrees so they might have possibly come across AAT in their practice or study, unlike these medical students who are still in school [30]. Again, the practice of AAT is high in the USA and some European countries [30, 31] which is not the case in many developing countries including Ghana. Despite the practice of AAT being higher in developed countries, there is still a deficit in knowledge about this therapy even in these countries. For instance, a study across Canada among graduate clinical psychology and counselling students recorded up to 97% of these students knowing little or nothing about AAT [32]. There is a limitation of data on the practice of AAT in Ghana since 93.7% of the students could not name one facility where AAT can be practised. The assertion about the low AAT practice in Ghana is corroborated by other results recorded in this study which found that up to 98.5% of the students had not come across any information on AAT in their pre-tertiary educational institutions and the university. Again, a similar proportion had not seen any book in the University library on AAT.

Although the knowledge of the medical students about AAT was poor (9.7%), their attitude towards this therapy can be considered average (54.9%). Quite a good proportion of the respondents disagreed with the suggestion that animals are meant to be in the wild or zoos (73.6%) and should never be used in treating human diseases or disorders (81.1%). This average attitude could be due to limitations or risks that the student may know to be associated with human-to-animal interactions. There is always the apprehension about the possibility of these animals transmitting zoonotic diseases especially the very young or old and persons who are immunocompromised and the tendency of the animals being sources of allergies or the occurrence of animal-related accidents such as scratches or bites from these animals [33].

According to Schrader and Lawless, (2004), the relationship between knowledge, attitude, and behaviour is dynamic and can be reciprocal [34]. Therefore, what an individual knows may inform his or her attitude about that topic, and how he or she feels about that topic may influence behaviour. Schrader and Lawless, (2004) further

Table 6 Assessment of the relationship between sociodemographic characteristics and continuous variables knowledge, attitude, perceived benefits and motivation

Independent variables	Subgroup	Dependent variables				p-value	Attitude towards AAT/7	p-value	Motivation to use AAT in the future/7	p-value
		Frequency	Knowledge about AAT/10	Perceived benefits of AAT/7	p-value					
Sex	Female	70	1.56±2.785	4.883±1.014	0.16	3.877±0.859	0.891	4.876±1.347	0.324	
	Male	136	0.67±2.136	4.709±0.994	0.16	3.829±0.686	0.891	4.775±1.156	0.324	
Age (years)	21–24	92	0.99±2.246	4.976±0.909	0.489	3.942±0.831	0.171	5.072±1.142	0.086	
	25–29	97	0.81±2.333	4.631±1.044	0.489	3.805±0.652	0.171	4.629±1.262	0.086	
	> 29	17	1.76±3.474	4.424±1.063	0.489	3.551±0.732	0.171	4.412±1.182	0.086	
Religious affiliation	Christianity	153	0.92±2.387	4.812±1.015	0.95	3.909±0.762	0.733	4.863±1.224	0.372	
	Islam	50	0.9±2.188	4.584±0.956	0.95	3.648±0.695	0.733	4.593±1.209	0.372	
	Others	3	5±4.359	5.6±0.04	0.95	3.917±0.315	0.733	5.667±0.882	0.372	
Where one grew up	Village	16	0±0	4.663±0.869	0.304	3.688±0.592	0.832	5.125±0.949	0.945	
	District capital	30	0.8±2.235	4.68±1.021	0.304	3.713±0.703	0.832	4.567±1.465	0.945	
	Town	34	1.65±3.18	4.524±1.019	0.304	3.809±0.748	0.832	4.696±1.006	0.945	
Level of study	Level 400	24	0.17±0.816	4.667±0.965	0.963	3.714±0.841	0.639	4.833±1.362	0.107	
	Level 500	102	1.14±2.525	4.916±1.013	0.963	3.952±0.757	0.639	4.863±1.219	0.107	
	Level 600	95	1.09±2.415	4.874±1.000	0.963	3.869±0.853	0.639	5.0561±1.132	0.107	
Type of family accommodation	Single room	52	0.98±2.675	4.658±0.938	0.285	3.75±0.638	0.485	4.744±1.243	0.785	
	Chamber and a Hall	59	0.76±2.16	4.695±1.058	0.285	3.889±0.655	0.485	4.469±1.273	0.785	
	Two to three-bedroom apartment	11	1.45±3.236	4.455±1.265	0.285	3.602±0.561	0.485	4.758±1.274	0.785	
Currently, having a pet at home?	Four or more-bedroom apartment	17	0.59±2.425	4.776±1.027	0.553	3.904±0.931	0.801	4.509±1.415	0.239	
	No	77	1.32±2.692	4.691±1.015	0.553	3.852±0.745	0.801	4.839±1.131	0.239	
	Yes	101	0.71±2.041	4.859±0.961	0.553	3.856±0.740	0.801	4.8412±1.260	0.239	
		109	1.1±2.656	4.637±1.003	0.553	3.791±0.722	0.801	4.679±1.208	0.239	
		97	0.82±2.097	4.915±0.985	0.553	3.906±0.775	0.801	4.955±1.227	0.239	

*Statistically significant

Table 7 Correlation between age, knowledge, attitude, motivation and perceived benefits scores of respondents

Variables	Variables									
	Age		Knowledge scores		Attitude scores		Motivation scores		Perceived benefit scores	
	r	p-value	r	p-value	r	p-value	r	p-value	R	p-value
Age (years)	-	-	-0.025	0.722	-0.167	0.017	-0.197	0.004	-0.207	0.003
Knowledge	-	-	-	-	0.236	0.001	0.288	<0.001	0.263	<0.001
Attitude	-	-	-	-	-	-	0.428	<0.001	0.477	<0.001
Motivation	-	-	-	-	-	-	-	-	0.600	<0.001
Perceived benefits	-	-	-	-	-	-	-	-	-	-

explained that behaviour can also inform attitude and attitudes do impact what an individual perceives which ultimately influences the motivation a person would have to gain greater knowledge on a certain topic [34]. Just as established in this study, several other studies have found respondents with lower knowledge exhibiting positive attitudes towards an issue [35–37], although generally, higher knowledge aligns with a positive attitude [38].

This study found a positive correlation and significant relationship between knowledge and attitude ($r=0.236$; $p\text{-value}=0.001$), motivation ($r=0.288$; $p\text{-value}<0.001$), and perceived benefit ($r=0.263$; $p\text{-value}<0.001$) with the motivation to gain more knowledge about AAT and the perceived benefits gauging the students' behaviour towards AAT. This study corroborates the findings of Schrader and Lawless (2004) who observed a relationship between knowledge, attitude, and behaviour [34]. Although this study recorded a poor knowledge score, the average attitude towards AAT, a good motivation score of 68.7%, and a good perceived benefit score of 69.1%, make the researchers speculate that the practice of AAT in Ghana looks good if health training institutions can include AAT in their curriculum or postgraduate programme on AAT is mounted in any university for interested practising medical doctors. In a study among members of the Norwegian Medical Association, 67.8% were motivated to learn more about AAT which is close to the 68.7% recorded in this study [39]. A similar study in Romania among Social work and Sociology students found an increased interest in acquiring knowledge in AAT although the vast majority (95.7%) never had any academic training [40].

A search on the practice of AAT in Africa brought up only a few case studies in South Africa suggesting the limited use of this alternative medicine in Africa [23, 24, 41]. However, the potential application of AAT in Ghana is exemplified by these medical students' willingness to register for a course on AAT (69.8%) and their desire to join a training programme on AAT (75.7%). With this high level of motivation, it is not surprising that 70.9% of the students would want a training modality with practical sessions and a didactic pedagogy since they desire to possess actual skills rather than mere knowledge about AAT.

Of all the sociodemographic characteristics of the respondents, only sex recorded a significant association with the knowledge scores. Female students were significantly more knowledgeable about AAT than their male counterparts (1.56 ± 2.785 versus 0.67 ± 2.136 ; $p\text{-value}=0.006$). Although the female students recorded better attitude scores, were more motivated to acquire more knowledge, and had a better perception of the benefits of AAT than their male classmates, the differences were not significant ($p\text{-value}>0.05$). The performance of the females in this study corroborates some previous studies which revealed that females by their nature have greater concern for animal welfare and rights than males and also are more likely to keep pets, hence possessing a higher awareness level on the use of animals for therapy [42, 43]. In this study, no association was found between the various categories of age groups and their knowledge, attitude, perceived benefit, and motivation to learn more about AAT. However, except for knowledge ($r=-0.025$; $p\text{-value}=0.722$), a significant relationship exists between age and attitude ($r = -0.167$; $p\text{-value}=0.017$), motivation ($r = -0.197$; $p\text{-value}=0.004$) and perceived benefit ($r=-0.207$; $p\text{-value}=0.003$). The negative correlation coefficient scores suggest that younger students are more willing to learn more about AAT than their elderly colleagues. One cannot be sure what factors accounted for this observation since students older than 27 years obtained higher but not significant knowledge scores than their younger mates (1.76 versus $0.81-0.99$; $p\text{-value}=0.147$).

This study although possibly the first among medical students in Africa cannot be extrapolated as the actual situation among all medical students in Ghana and Africa since this study was conducted in just one university and only among clinical-level students. Nonetheless, it serves as a starting point for similar studies among other health profession students and even among qualified healthcare practitioners. Using a simple random sampling technique in this study ensured the removal of biases which makes the results of this study representative of the study population.

Conclusion

This study evaluated the potential use of AAT in Ghana by assessing the knowledge of, attitude towards, perceived benefit of and level of motivation to acquire knowledge and skills about AAT among medical students. Although the knowledge of the students about AAT was highly inadequate, they have an average positive attitude about this complementary and alternative medicine. The students acknowledged that AAT has some benefits in human health with the majority willing to acquire theoretical and practical skills which will equip them enough to recommend or practice AAT when they qualify as medical practitioners. Medical schools in Africa and Ghana would need to include this alternative medicine in their curriculum. We also recommend that government agencies that regulate the practice of medicine include such alternative medicine lessons in their continuous professional development sessions to enable practitioners to be knowledgeable about this useful alternative medicine.

Abbreviations

AAT	Animal-assisted therapy
AAI	Animal-assisted intervention
CAM	Complementary and Alternative Medicine
SPSS	Statistical Programme for Social Sciences
ANOVA	Analysis of Variance
SDG	Sustainable Development Goals

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Author contributions

EPKA and BYO conceived the idea and designed the questionnaire. EPKA collected the data and analyzed the data. EPKA, LAOA and BYO did the drafting of the manuscript. All authors reviewed the manuscript.

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Data availability

All data generated or analysed during this study are included in this published article.

Declarations

Ethics approval and consent to participate

The Ethics Committee of the School of Medicine and Health Sciences of the University for Development Studies provided prior approval for this study. The certificate number SMSAHS/JIRC/0005. Data were collected from participants only after they gave their informed consent to take part in the study.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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References

1. Van Andel T, Carvalheiro LG. Why urban citizens in developing countries use traditional medicines: the case of Suriname. Volume 2013. Evidence-Based Complementary and Alternative Medicine; 2013.
2. Ameade EP, Ibrahim M, Ibrahim HS, Habib RH, Gbedema SY. Concurrent use of herbal and orthodox medicines among residents of Tamale, Northern Ghana, who patronize hospitals and herbal clinics. Evidence-Based Complementary and Alternative Medicine. 2018;2018.
3. Fjær EL, Landet ER, McNamara CL, Eikemo TA. The use of complementary and alternative medicine (CAM) in Europe. BMC Complement Med Ther. 2020;20(1):1–9.
4. Tangkiatkumjai M, Boardman H, Walker DM. Potential factors that influence usage of complementary and alternative medicine worldwide: a systematic review. BMC Complement Med Ther. 2020;20(1):1–5.
5. Quave CL, Lohani U, Verde A, Fajardo J, Rivera D, Obón C, Valdes A, Pieroni A. A comparative assessment of zootherapeutic remedies from selected areas in Albania, Italy, Spain and Nepal. J Ethnobiol. 2010;30(1):92–125.
6. Alves RR. Relationships between fauna and people and the role of ethnozoology in animal conservation. Ethnobiol Conserv. 2012;1.
7. Whiting MJ, Williams VL, Hibbitts TJ. Animals traded for traditional medicine at the Faraday market in South Africa: species diversity and conservation implications. Animals in traditional folk medicine: implications for conservation. 2013;421–73.
8. Costa-Neto EM. Healing with animals in Feira De Santana city, Bahia, Brazil. J Ethnopharmacol. 1999;65(3):225–30.
9. Friant S, Bonwitt J, Ayambem WA, Ifebueme NM, Alobi AO, Otukpa OM, Bennett AJ, Shea C, Rothman JM, Goldberg TL, Jacka JK. Zootherapy as a potential pathway for zoonotic spillover: a mixed-methods study of the use of animal products in medicinal and cultural practices in Nigeria. One Health Outlook. 2022;4(1):1–21.
10. Grassberger M, Sherman RA, Gileva OS, Kim CM, Mumcuoglu KY. Biotherapy—history, principles and practice. Volume 37. Dordrecht Heidelberg New York London: Springer; 2013. pp. 38–9.
11. Stefanini MC, Martino A, Allori P, Galeotti F, Tani F. The use of animal-assisted therapy in adolescents with acute mental disorders: a randomized controlled study. Complement Ther Clin Pract. 2015;21(1):42–6.
12. IAHAIO. The IAHAIO definitions for animal assisted intervention and guidelines for wellness of animals involved in AAI. In Handbook on Animal-Assisted Therapy. 2019. (pp. 499–504). Elsevier. <https://doi.org/10.1016/B978-0-12-813333-3.00010-1>.
13. Ernst L. Animal-assisted therapy: an exploration of its history, healing benefits, and how skilled nursing facilities can set up programs. Annals long-term care. 2014;22(10).
14. Berget B, Ekeberg Ø, Braastad BO. Animal-assisted therapy with farm animals for persons with psychiatric disorders: effects on self-efficacy, coping ability and quality of life, a randomized controlled trial. Clin Pract Epidemiol Mental Health. 2008;4:1–7.
15. Sempik J, Hine R, Wilcox D, editors. Green care: A conceptual framework. A Report of the Working Group on the Health Benefits of Green Care, COST Action 866. *Green Care in Agriculture, Loughborough. Centre for Child and Family Research, Loughborough University, Loughborough* 2010.
16. Pichot T, Coulter M. Animal-assisted brief therapy: a solution-focused approach. Binghamton, NY: Haworth; 2007.
17. Netting FE, Wilson CC, New JC. The human-animal bond: implications for practice. Soc Work. 1987;32(1):60–4.
18. Black AF, Chur-hansen A, Winefield HR. Australian psychologists' knowledge of and attitudes towards animal-assisted therapy. Clin Psychol. 2011;15(2):69–77.
19. Kerulo G, Kargas N, Mills DS, Law G, VanFleet R, Faa-Thompson T, Winkle MY. Animal-assisted interventions: relationship between standards and qualifications. People Animals: Int J Res Pract. 2020;3(1):4.
20. Istituto Zooprofilattico Sperimentale delle Venezie. Doctors and Animal Assisted interventions: first results of the nationwide survey. 2016. <https://www.wizsvenezie.com/doctors-animal-assisted-interventions-first-results-nationwide-survey/> Accessed 14 December 2013.
21. Mignot A, Leboucher G, Servais V, de Luca K. The state of animal-assisted interventions in France: is the IAHAIO Model relevant? People Animals: Int J Res Pract. 2021;4(1):7.

22. Shoosmith E, Gibsons S, Ratschen E. The impact of Covid-19 on animal-assisted interventions: perceptions of UK Animal-assisted intervention providers. *J Public Health*. 2023;45(2):e303–8.
23. Lubbe C, Scholtz S. The application of animal-assisted therapy in the South African context: a case study. *South Afr J Psychol*. 2013;43(1):116–29.
24. Thompson JA. Exploring best practices in animal-assisted therapy with children in the Western Cape (Doctoral dissertation, North-West University). 2013.
25. Coetzee N, Beukes JT, Lynch I. Substance abuse inpatients' experience of animal-assisted therapy. *J Psychol Afr*. 2013;23(3):477–80.
26. Abate SV. Nurse Leaders' Perspectives on Animal-Assisted Interventions (Doctoral dissertation, Walden University).
27. Ghana Statistical Service 2010 Population and Housing Census. Regional Analytic report – Northern Region. 2013 https://www2.statsghana.gov.gh/docfiles/2010phc/2010_PHC_Regional_Analytical_Reports_Northern_Region.pdf. Accessed 14 December 2013.
28. Owen DK, Bryden H, Lewth G, Stephens CR. Can doctors respond to patients' increasing interest in complementary and alternative medicine? Commentary: special study modules and complementary and alternative medicine—the Glasgow experience. *BMJ*. 2001;322(7279):154–8.
29. Doust J, Del Mar C. Why do doctors use treatments that do not work? *BMJ*. 2004;328(7438):474–5.
30. Hightower RM. Assessment of occupational therapists' attitudes and knowledge of animal-assisted therapy. 2010. Doctoral dissertation, University of Toledo.
31. De Santis M, Contalbrigo L, Simonato M, Ruzza M, Toson M, Farina L. Animal assisted interventions in practice: Mapping Italian providers. *Veterinaria Italiana*. 2018;54(4):323.
32. Lutzky-Cohen N. Motivation to use animal assisted therapy among psychotherapy and counselling graduate students. University of Toronto (Canada); 2016.
33. Bert F, Gualano MR, Camussi E, Pieve G, Voglino G, Siliquini R. Animal assisted intervention: a systematic review of benefits and risks. *Eur J Integr Med*. 2016;8(5):695–706.
34. Schrader PG, Lawless KA. The knowledge, attitudes, & behaviors approach how to evaluate performance and learning in complex environments. *Perform Improv*. 2004;43(9):8–15.
35. Yildirim Y, Parlar S, Eyigor S, Sertoş OO, Eyigor C, Fadiloglu C, Uyar M. An analysis of nursing and medical students' attitudes towards and knowledge of complementary and alternative medicine (CAM). *J Clin Nurs*. 2010;19(7–8):1157–66.
36. Alzahrani SH, Bashawri J, Salawati EM, Bakarman MA. Knowledge and attitudes towards complementary and alternative medicine among senior medical students in King Abdulaziz University, Saudi Arabia. *Evidence-Based Complementary and Alternative Medicine*. 2016;2016.
37. Ameade EP, Amalba A, Helegbe GK, Mohammed BS. Medical students' knowledge and attitude towards complementary and alternative medicine—A survey in Ghana. *J Traditional Complement Med*. 2016;6(3):230–6.
38. Rajbanshi M, Bhusal S, Paudel K, Poudel B, Gaire A, Khatri E, Kalauni BR, Aryal B, Sharma G, Karki N. Knowledge, attitude, and practice of Nepalese residents in the prevention and control of COVID-19: a cross-sectional web-based survey. *Annals Med Surg*. 2022;84:104861.
39. Berget B, Grepperud S, Aasland OG, Braastad BO. Animal-assisted interventions and psychiatric disorders: knowledge and attitudes among general practitioners, psychiatrists, and psychologists. *Soc Anim*. 2013;21(3):284–93.
40. López-Cepero J, Perea-Mediavilla MA, Netedu A. Influence of attitudes, formative and biographical background on intention of use of animal-assisted interventions developed with dogs. Some conclusions on a sample of Romanian students. *J Psychol Educational Res*. 2016;24(2).
41. Le Roux MC, Swartz L, Swart E. The effect of an animal-assisted reading program on the reading rate, accuracy and comprehension of grade 3 students: a randomized control study. In *Child & Youth Care Forum* 2014 Dec (Vol. 43, pp. 655–73). Springer US.
42. Herzog HA. Gender differences in human–animal interactions: a review. *Anthrozoös*. 2007;20(1):7–21.
43. Phillips C, Izmirli S, Aldavood J, Alonso M, Choe BI, Hanlon A, Handziska A, Illmann G, Keeling L, Kennedy M, Lee G. An international comparison of female and male students' attitudes to the use of animals. *Animals*. 2010;1(1):7–26.

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