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Attitudes and Knowledge about Zoonotic Diseases among Livestock Farmers in Rural Tamale, Ghana

Shamsu-Deen Ziblim[1], Sufyan Bakuri Suara[1*], Adam Jemilatu[2]

1Department of Community Health and Family Medicine, School of Medicine and Health Science, University for Development Studies, Tamale, Ghana

2Sagnarigu Municipal Health Directorate, Ghana Health Service, Tamale Ghana

**Corresponding e-mail: bsuara@uds.edu.gh*

ABSTRACT

Cattle farming remains one of the lucrative agricultural ventures among rural settlers in the Northern parts of Ghana and is kept for both commercial and subsistence purposes. However, the emergences of cattle-associated infections remain a threat to cattle production and the human population. This study aimed at assessing the knowledge, attitudes, and practices towards zoonotic diseases among cattle farmers in the Tamale Metropolis. The study was a descriptive cross-sectional study, involving a mixed method. The quantitative approach involved the use of a semi-structured questionnaire and the qualitative approach involved the use of focused group discussions using a focus group guide. A total of 100 cattle farmers were selected using a purposive sampling method, from March to July 2020. A chi-square test analysis was performed to identify the factors that are associated with the knowledge, attitudes, and practices towards cattle-related zoonotic diseases. A 95% confidence level and statistical significance of $p<0.05$ were used. The qualitative data were analyzed using thematic content analysis. Males were the most represented (98%). The overall knowledge, attitude, and practices towards cattle-related zoonotic diseases good scores were 52%, 67%, and 16%, respectively. Age ($p=0.022$), ethnicity ($p=0.039$), and educational background ($p=0.042$) of the study participants showed a significant association with the knowledge, attitudes, and practices towards cattle-related zoonotic diseases. In conclusion, their practices towards zoonotic diseases were largely poor. The study, therefore, recommends that the Ministry of Agriculture, the Tamale Metropolis, and other stakeholders ought to organize periodic training for cattle farmers on zoonotic diseases.

Keywords: Zoonotic diseases, Knowledge, Attitude, Practices, Symptoms, Cattle

INTRODUCTION

Livestock farming plays a significant role in sustaining rural livelihoods by providing a source of income, food, manure, and draught power [1]. It remains one of the livelihood strategies among the rural folk in Northern Ghana and is kept for both commercial and subsistence purposes [2]. However, the emergences of livestock-associated infections remain a threat to livestock production and the human population. Common infectious diseases that are naturally transmissible from vertebrate animals like cattle to humans and vice-versa are classified as Zoonotic Diseases (ZD) [3]. These diseases are a major public health concern and are known to account for approximately 61%-75% of emerging infections that affect the human population especially in Sub-Sharan Africa [4-6]. Further, contemporary studies have revealed that nearly 20% of all human morbidity and mortality especially in developing countries are strongly associated with endemic zoonosis [7-9].

Socio-demographic variables such as educational status and lack of awareness on zoonotic diseases may partly explain inadequate knowledge and poor attitudes towards the prevention of zoonotic diseases among livestock farmers [4,10,11]. Also, the risk of these diseases is heightened by close contact with animals, poor hand hygiene, poor sanitation, and unvaccinated, free-ranging animals have been linked with zoonotic transmissions [12,13].

In Bangladesh, awareness regarding the management of zoonotic disease was found to be less than 30% among the study participants [6]. Also, in India, only 18% of the respondents were aware of zoonotic diseases that could be

transmitted from cattle to humans [11]. In Africa, a study in Ethiopia revealed that among cattle farmers, about 61.3% of the respondents could not mention a name of a milk-borne zoonotic disease that is transmissible through unpasteurized cow milk [10]. Furthermore, in Southern Ghana, among poultry farmers, Ayim-Akonor, et al. reported that 22% of them could not name any zoonotic disease. Knowledge and attitude of livestock farmers on zoonotic disease transmission and their prevention and other related control measures should be of concern to all. However, this type of data among livestock farmers in rural Tamale is scarce. Therefore, the study aims to assess the knowledge and attitudes towards zoonotic diseases among livestock farmers in rural Tamale Metropolis.

MATERIALS AND METHODS

A descriptive cross-sectional study was being conducted from May 2019 to June 2020. A mixed-method (quantitative and qualitative) approach was employed for the study. This provided a more holistic approach to the study, whereby the weaknesses of one method were compensated for by the strengths of the other instruments and vice-versa. This approach also provides a multi-perspectival dimension to the study. A focus group guide was adopted in conducting the Focused Group Discussions (FGDs) guide to ascertain information regarding knowledge and attitudes on zoonotic diseases amongst the study participants. In conducting the study, five focus group discussions were organized, one in each of the selected communities. A survey questionnaire was also used to gather the quantitative data. In all, 100 questionnaires were administered to one hundred livestock farmers in the study communities who were purposively selected.

The knowledge assessment questions on cattle-related zoonotic diseases comprised of 7 questions (Table 1). The knowledge was categorized into poor or good based on the knowledge score of participants. A correct knowledge response attracted one (1) mark. A total score of 50% and above was considered good knowledge and a total mark of less than 50% were considered poor knowledge.

The attitudes on cattle-related zoonotic questions consisted of five (5) main questions (Table 2). Participants were categorized into having poor or good attitudes depending on the score of the participant. A correct practice attracted one mark. A total mark of 50% and above was considered a good attitude and a total score of less than 50% were considered poor attitude.

Regarding the practices, a "yes or no response" was elicited from the respondents based on 5 questions as outlined below:

Do you wash your hands before attending to any of the cattle

Do you wash your hands after attending to any of the cattle

Do you always apply soap when washing hands

Do you think washing hands is important in handling the cattle

Do you use any protective clothing before attending to the cattle

A correct practice attracted one mark. A total mark of 50% and above was considered good practices and a total mark of less than 50% were considered poor practices.

Data Analysis and Presentation

Data obtained for the quantitative part of the study was entered on Microsoft Excel 2010, validated, and later exported to SPSS for further data management and analysis. The results of the study were presented in frequency, percentage, charts, and tables for clarity. A test of association between the explanatory and outcome variables was performed using the chi-square test at a significance of $p<0.05$. The qualitative data were transcribed and analyzed using content analysis.

RESULTS

Overall, 72 (72%) study participants were able to list or name at least one cattle-related zoonotic disease (not shown in Table). Table 1 describes participants' knowledge of zoonotic diseases. Out of the 100 study participants, 52 (52%) of the participants exhibited good knowledge, whereas 48 (48%) equally exhibited poor knowledge scores. Also, 73 (73%) of the participants indicated that they are aware that animals are capable of transmitting diseases to humans with 27 (27%) indicating that they are not aware that animals are capable of transmitting diseases to humans. More-

over, the majority of the study participants 85 (85%) held the belief that residing close to the cattle can increase one's risk of contracting zoonosis diseases. Additionally, 45 (45%) of the study participants indicated knowledge on how cattle-related diseases could be transferred with only 43 (43%) being able to list or name how the cattle-related diseases can be transferred from the cattle to humans. Further, 89 (89%) of the study participants indicated they know the signs and symptoms of zoonotic diseases with about 38 (38%) of the participants being able to list/name at least one cattle-related signs and symptoms of zoonosis diseases.

Table 1 Knowledge on cattle-related zoonotic diseases

(n=100)		
Variables	**Frequency**	**Percentage**
Aware that animals are capable of transmitting diseases to humans		
Yes	73	73
No	27	27
Aware that leaving close to the cattle can increase risk of contracting certain diseases		
Yes	85	85
No	15	15
Know how the diseases are transferred from the cattle to humans		
Yes	45	45
No	55	55
Could list/name any disease that can be transferred from animals to humans		
Yes	43	43
No	57	57
Know any signs or symptoms that cattle show when they are sick		
Yes	89	89
No	11	11
Could list or name any of the signs and symptoms of cattle-related diseases		
1 sign and symptom	38	38
2 signs and symptoms	30	30
More than 3 signs and symptoms	21	21
Not all	11	11
Able to name/list common disease(s) among the cattle		
1 disease	37	37
2 diseases	22	22
3 or more diseases	13	13
Not all	28	28
Total	100	100
Source: Field Data, 2020		

At the Bilpella a participant reported as follows:

"Zoonosis diseases are real, but we are not getting enough education on them, unlike crop farming where every time all radio stations are talking and educating farmers on when to cultivate and the type of seeds to use hmmm!! That type of education is not given to we the animal farmers perhaps they think we are in the minority and not important…."

Figure 1 presents the results on responses given by study participants on how cattle-related zoonotic diseases can be transferred to humans. A total of 80 modes of transmission of cattle-related zoonotic disease responses were given

by participants. Out of the 80 modes of transmission; 32 (40%) indicated that cattle-related zoonotic diseases can be transmitted through contaminated meat/food, followed by contaminated water 19 (23.8%) and open skin/wound 12 (15%) as the topmost three (3) ways of transmission of cattle-related diseases.

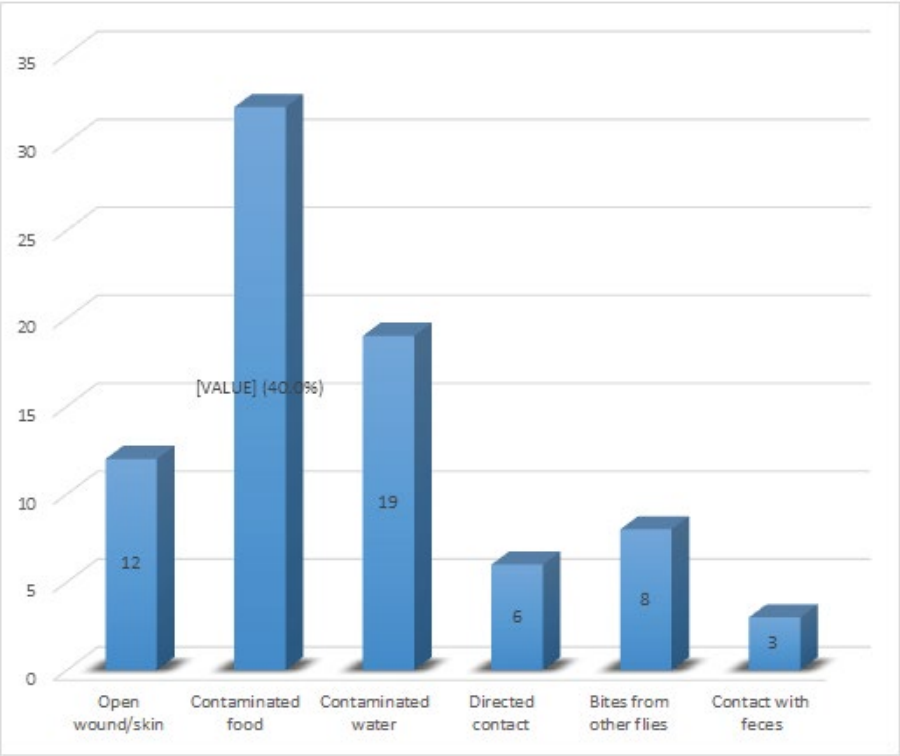

Figure 1 Knowledge on how the livestock-related zoonotic diseases can be transferred to humans

Table 2 presents results on the attitudes towards cattle-related diseases. On the question of drinking raw milk from cattle increases the risk of getting cattle-related zoonotic disease, the vast majority of the participants disagreed 74 (74%). Also, 60 (60%) of the participants slightly agreed that having direct contact with animals increases the risk of getting the cattle-related zoonotic disease.

Table 2 Attitudes towards cattle related diseases

Variable	Responses (%)				
	Disagree	**Slightly Disagree**	**Slightly Agree**	**Agree**	**Total**
Drinking raw milk from cattle increases the risk of getting cattle related zoonotic disease	74 (74.0)	5 (5.0)	7 (7.0)	14 (14.0)	100 (100.0)
Having direct contact with animals increases the risk of getting cattle related zoonotic disease	10 (10.0)	24 (24.0)	60 (60.0)	6 (6.0)	100 (100.0)
Walking bare footed in the “animal house” does not put me at risk of contracting cattle related zoonotic disease	30 (30.0)	27 (27.0)	23 (23.0)	20 (20.0)	100 (100.0)
Cattle droppings/manure does not contain any infectious disease agent	22 (22.0)	26 (26.0)	20 (20.0)	32 (32.0)	100 (100.0)
Deworming of the cattle protect them totally from any infection	17 (17.0)	4 (4.0)	55 (55.0)	24 (24.0)	100(100.0)
Source: Field Data, 2020					

However, only 20 (20%) agreed that walking barefooted in the "animal house," does not put them at an increased risk of contracting the cattle-related zoonotic disease. Also, enquiring whether cattle droppings/manure do not contain any infectious disease agent, 22 (22%) disagreed. Lastly, on whether deworming of the cattle protects them totally from any infection, 24 (24%) of the participants agreed.

The social demographic characteristics were considered as independent variables and were analyzed with the outcome variables (knowledge on cattle-related zoonotic diseases, attitudes, and practices of good animal husbandry) by chi-square test (Table 3). The result revealed a significance in the age (p=0.022) of participants and their attitude. Regarding the direction of this observation, participants within the age range of 41-50 years old appear to have a good attitude toward animal husbandry compared with their colleagues who were outside this age bracket.

Table 3 Relationship between sociodemographic characteristics, level of knowledge, attitude, and practices as analyzed by Chi-square test

Variable	Knowledge			Attitude			Practices		
	Good (%)	Poor (%)	p-value (x^2, df)	Good (%)	Poor (%)	p-value (x^2, df)	Good	Poor	p-value (x^2, df)
Sex									
Female	0 (0.0)	2 (4.2)	0.137 (2.211, 1)	2 (3.0)	0 (0.0)	0.316 (1.005, 1)	0 (0.0)	2 (2.4)	0.533 (0.389, 1)
Male	52 (100.0)	46 (95.8)		65 (97.0)	33 (100.0)		16 (100.0)	82 (97.6)	
Total	52 (100.0)	48 (100.0)		67 (100)	33 (100.0)		16 (100.0)	84 (100.0)	
Age									
21-30	3 (5.8)	7 (14.6)	058 (9.116, 4)	3 (4.5)	7 (21.2)	0.022(11.495, 4)*	0 (0.0)	10 (12.0)	0.317 (4.719,4)
31-40	7 (13.5)	14 (29.2)		12 (18.0)	9 (27.3)		3 (18.8)	18 (21.4)	
41-50	20 (38.5)	17 (35.4)		27 (40.3)	10 (30.3)		7 (43.8)	30 (35.7)	
51-60	12 (23.1)	7 (14.6)		13 (19.4)	6 (18.2)		2 (12.5)	17 (20.2)	
61-70	10 (19.2)	3 (6.3)		12 (18.0)	1 (3.0)		4 (25.0)	9 (10.7)	
Total	52 (100.0)	48 (100.0)		67 (100.0)	33 (100.0)		16 (100.0)	84 (100.0)	
Marital status									
Married	49 (94.2)	46 (95.3)	0.713 (0.135, 1)	65 (97.0)	30 (91.0)	0.188 (1.735, 1)	16 (100.0)	79 (94.0)	0.317 (1.003,1)
Single	3 (5.8)	2 (4.2)		2 (3.0)	3 (9.0)		0 (100.0)	5 (6.0)	
Divorced	-	-		-	-		-	-	
Total	52 (100.0)	48 (100.0)		67 (100.0)	33 (100.0)		16 (100.0)	84 (100.0)	
Ethnicity									
Dagomba	19 (36.5)	17	0.039 (10.093, 4)*	23 (34.3)	13	0.113 (7.470, 4)	6 (37.5)	30	0.042 (9.919, 4) *
Fulani	16 (30.8)	13 (27.1)		21 (31.3)	8 (24.2)		9 (56.3)	20 (23.8)	
Huasa	9 (17.3)	1 (2.1)		7 (10.4)	3 (9.1)		1 (6.3)	9 (10.7)	
Konkomba	5 (9.6)	9 (18.8)		12 (17.9)	2 (6.1)		0 (0.0)	14 (16.7)	
Others	3 (5.8)	8 (16.7)		4 (6.0)	7 (21.2)		0 (0.0)	11 (13.1)	
Total	52 (52.0)	48 (100.0)		67 (100.0)	33 (100.0)		16 (100.0)	84 (100.0)	
Educational Background									

No education	20 (38.5)	20 (41.7)	0.511 (1.344, 2)	21 (31.3)	19 (57.8)	0.042 (6.341, 2) *	4 (25.0)	36 (42.9)	0.285 (2.513, 2)
Formal education	16 (30.8)	18 (37.5)		26 (38.8)	8 (24.2)		8 (50.0)	26 (31.0)	
Non-formal education	16 (30.8)	10 (20.8)		20 (30.0)	6 (18.2)		4 (25.0)	22 (26.2)	
Source: field data, 2020 (*: significant; df: Degree of Freedom, x^2=chi-square)									

The relationship between the ethnicity of participants and their knowledge was statistically significant (p=0.039), which suggests that compared with Dagomba, Huasa, and Konkomba, the Fulani had good knowledge of animal husbandry. Also, there was a significance in the ethnicity of participants and practices of good cattle farming methods (p=0.042). Thus, the Fulani showed good practices of animal husbandry than the other ethnic groups. The results also showed significance in the attitudes of participants and their educational background (p=0.042). Thus, a good attitude of animal husbandry was more likely to happen among the study subjects with formal education compared with their counterparts without formal education.

The livestock-related characteristics were equally considered as independent variables and analyzed with the outcome variables (knowledge on livestock-related zoonotic diseases, attitudes, and practices of good animal husbandry) by chi-square test (Table 4). In the present study, higher proportions of participants leaving closed to cattle house showed good knowledge (p=0.023) and good attitudes (p=0.025) of animal husbandry compared with their colleagues leaving farther from cattle house, respectively. Compared with farmers who practice the intensive system and the semi-intensive system, good knowledge of animal husbandry was higher among those who practice the extensive system (p=0.021). Also, study participants who owned cattle were more likely to demonstrate a good knowledge of animal husbandry compared with those who did not own cattle (p=0.033).

Table 4 Relationship between cattle-related characteristics, level of knowledge, attitude, and practices analyzed by Chi-square test

Variable	Knowledge			Attitude			Practices		
	Good	Poor	p-value (x^2, df)	Good	Poor	p-value (x^2, df)	Good	Poor	p-value (x^2, df)
Years of experience									
less than 5 years	23 (44.2)	24 (50.0)	0.564 (0.334, 1)	31 (46.3)	16 (23.9)	0.835 (0.044, 1)	9 (56.3)	38 (45.2)	0.419 (0.654, 1)
more than 5 years	29 (55.7)	24 (50.0)		36 (53.7)	17 (25.4)		7 (43.8)	46 (54.8)	
Total	52 (100.0)	48 (100.0)		67 (100.0)	33 (100.0)		16 (100.0)	84 (100.0)	
Leaving close to cattle house									
Yes	47 (90.4)	35 (72.9)	0.023 (5.160, 1)*	59 (88.0)	23 (70.0)	0.025 (5.051, 1)*	14 (87.5)	68 (81.0)	0.532 (0.390,1)
No	5 (9.6)	13 (27.1)		8 (12.0)	10 (30.0)		2 (12.5)	16 (19.0)	
Total	52 (100.0)	48 (100.0)		67 (100.0)	33 (100.0)		16 (100.0)	84 (84.0)	
Farming system									
Extensive system	46 (88.5)	34 (70.8)	0.021 (9.688, 3)*	53 (79.0)	23 (70.0)	0.778 (1.095, 3)	13 (81.3)	63 (75.0)	0.783 (1.077,3)
Intensive system	3 (5.8)	11 (23.0)		8 (12.0)	6 (18.0)		1 (6.3)	13 (15.5)	
Semi-intensive system	7 (13.5)	3 (6.3)		6 (9.0)	4 (12.0)		2 (12.5)	8 (9.5)	
Total	52 (100.0)	48 (100.0)		67 (100.0)	33 (100.0)		16 (100.0)	84 (100.0)	
Cattle ownership									

Yes	50 (96.2)	40 (83.3)	0.033 (4.558, 1)*	60 (89.6)	30 (91.0)	0.832 (0.045, 1)	15	75 (89.3)	0.585 (0.298, 1)
No	2	8 (16.7)		7 (10.4)	3 (9.0)		1	9 (10.7)	
Total	52	48 (100.0)		67 (100.0)	33 (100.0)		16	84 (100.0)	
Source: field data, 2020 (*: significant; df: Degree of Freedom, x^2=chi-square)									

DISCUSSION

The overall knowledge score was 52%, indicating that majority of the participants had an appreciable level of awareness about cattle-related zoonotic diseases. Conversely, Ayim-Akonor, et al. observed a higher (87%) level of knowledge of zoonotic diseases among both poultry and livestock farmers in a previous study in Southern Ghana [14]. However, Tebug observed a low level of knowledge on zoonotic diseases in a study in Malawi among cattle farmers [15]. The observed differences in the level of knowledge may be partially be attributed to differences in the characteristics of the study participants. The impact of zoonotic diseases on agriculture may include low consumption of animal and their products and a drop in exports of animal products [16]. As asserted by Amissah-Reynolds on the impact of the Government of Ghana's rearing for foods and job program, it is an initiative that has the potential of increasing the livestock population as well as the human contacts with most livestock; this would, in turn, have consequences for the spread of zoonotic diseases in the country [12].

In the present study, the majority of the cattle farmers (73%) showed that they were aware that cattle are capable of spreading diseases to humans. Likewise, less than half of the farmers (43%) were able to list or name how cattle-related diseases can be transferred from cattle to humans. Another important observation was that a greater number of the participants (89%) indicated they know the signs and symptoms of zoonotic diseases, however less than half of these farmers (38%) were able to list or name at least one cattle-related signs and symptoms of zoonotic diseases. Similarly, Ayim-Akonor, et al. reported that about 86.8% of the farmers were able to tell when a bird is sick with common clinical signs and symptoms, however, (22%) of them were not able to name the actual disease [14].

Regarding the attitudes of cattle farmers, most of them recognized that drinking raw milk from cattle increases the risk of getting cattle-related zoonotic disease coupled with direct contact with animals or their droppings. Though the farmers portrayed good attitudes towards cattle-related diseases, nonetheless the question to ask is whether good attitudes translate into good practices? From the results of the current study, it appears that good attitudes do not necessarily translate into good animal husbandry practices. As in this study, poor animal husbandry practices were acknowledged among some of the farmers (84%).

In this study, it was observed that the majority of the cattle farmers (96%) keep their cattle in the open with less than half of them (29%) of the participants engaged in cleaning of places where the cattle are kept and only 33% of the participants equally indicated sanitizing feeding troughs/water cans. These findings are in line with the results of a previous study, and further, corroborate earlier studies that livestock including cattle are mainly raised through backyard farms [12,17-19]. This form of raising livestock is preferred because it less capital intensive [20].

The practices of hand hygiene among the participants were generally poor in this study because very few of the cattle farmers (8%) admitted applying soap when washing their hands. The use of protective clothing before attending to the cattle was generally low among the farmers. In line with the present findings, Caknur, et al. observed that only 35.8% and 6.6% of the farmers interviewed indicated they use hand gloves and face masks, respectively [21].

The handling of cattle-related zoonosis was also generally poor among the cattle farmers. As most of the common practices of handling cattle-related zoonotic diseases included self-medication. Interestingly, most of the participants indicated they sell the cattle if the disease or sickness of the cattle does not resolve after treatment. This was in sharp contrast with the assentation made by Caknur, et al. as 80.1% of the farmers recognized that sick animal corpses needed to be buried deep, however only 22.5% of the farmers indicated destroying the sick animal corpse by burying deep [21]. Further, the sociodemographic characteristics such as leaving close to the cattle are associated significantly with knowledge and attitudes. Also, the age and educational status of participants related significantly to their attitude towards zoonotic diseases. These findings are similar to previous reports in India, Ethiopia, and Southern Ghana [10-12].

CONCLUSION

The study revealed an appreciable knowledge of cattle-related zoonotic diseases among the farmers. Additionally, the study portrayed that the majority of the study participants had good attitudes. In contrast, their practices of good animal husbandry were extremely poor. This creates a worrying situation as at the time the Government of Ghana is promoting the rearing of animals for food and jobs. Therefore, the Ministry of Agriculture and authorities of the Tamale Metropolis ought to design public health education programs to help increase the knowledge, attitudes, and practices of the cattle farmers towards zoonotic-related diseases in the Northern Region.

LIMITATIONS

The study was cross-sectional in design. Therefore, the findings do not represent causal effects. Moreover, the sample size was small. The use of prospective study designs on the subject may be more useful in validating the present results.

DECLARATIONS

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Ethics Approval and Consent to Participate

The study was approved by the ethics review committee of the University for Development Studies, Ghana.

Conflict of Interest

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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