



Assessment of Knowledge, Attitude, Perception and Practices on Rabies Disease in the GA East Municipality, Ghana

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Authors' contributions

This work was carried out in collaboration among all authors. Author OV was involved in the study design, data collection, analysis and manuscript writing. Author EG participated in samples collection and analysis. Author EYST was involved in study design, editing of the manuscript and validation and correcting medical terms involved in this study. All authors read and approved the final manuscript to be published.

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ABSTRACT

Background: Rabies is one of the neglected tropical zoonotic diseases caused by a virus. It belongs to the Rhabdoviridae [1]. It is a disease that is commonly found in animals but can easily affect human [2]. Where there are animal reservoirs, rabies is commonly spread. The general objective of this study to evaluate differences in knowledge, attitude and perception about rabies, among the residence in Ga East.

Methods: A cross-sectional study was used in this study using purposive sampling technique. Data was collected by interviewing study participants using OKD Collection and also STATA version 14.2 was used for data analysis

Results: A total of 475 respondents were involved in the study with 354 (74.53%) males and 121(25.47%) as females. Of this, majority of the participants (93.47%) own a dog against 6.53%

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who did not own a dog. Dog is own in the community basically for security purposes (77.25%). Few own dog for leisure. The study document less than 50% of the respondents [186 (39.16%)] resort to local drug stores drug store for first aid following a dog bit. Seeking veterinary attention (12.84%) and properly clearing of wound (8.84%) was not a common practice. Participants were of the opinion that tetanus vaccination should be done first (29.05%). Most of the participants have heard about rabies (96.42%) and showed various degree of knowledge on source of rabies, common animals associated with rabies, symptoms of rabies. Among some other practices, any identified rabid dog is killed as indicated by majority of the participants (52.63%). Most participants (71.58%) knew that rabies vaccination serves as preventive measures against rabies and further perceived all dogs must be vaccinated (38.32%). Of the total respondents, most (63.74%) never sent their dog for routine medical check-up nor vaccinated their dogs (70.95%).

Conclusion: The study revered that dog owners do not provide adequate care for their dogs. In addition to low coverage of dog vaccination and human anti rabies vaccination in the community which poses a greater threat to the lives community, the potential for increased spread of the diseases is high due to inadequate level of knowledge, poor perceptions, and attitudes towards rabies.

Keywords: Rabies; knowledge; reservoir; zoonotic; varus; saliva; animal; neglected.

1. INTRODUCTION

Rabies is one of the neglected tropical zoonotic diseases caused by a virus. It belongs to the *Rhabdoviridae* [1]. It is a disease that is commonly found in animals but can quickly affect humans [2,3]. Where there are animal reservoirs, rabies is widely spread. The virus is spread through infective saliva in bites and scratches, and, in some cases, the transmission is through lick from an infected animal in open wounds and the mucosal membrane [4,5,6].

The development of rabies starts when the virus enters into the tissue of the human or animal. It is estimated that 99% transmission of the virus to human is through dog bite [7], where this serves as inoculation of the virus to the tissue by escaping the outer layer of the skin which act as a protective barrier [8]. After injection, the virus replicates in the skin and muscle tissue [9]. Then the virus binds to the nicotine acetylcholine receptor at the neuromuscular cells, also known as the junction, and transported via retrograde axonal by the peripheral nerve to the spinal cord [3]. The virus then continues its replication in the motor neuron of the spinal cord and the dorsal ganglia root and ascending to the brain; up to this time, there is no clinical sign and symptoms shown by the patient stage [10,11]. In the brain, the virus continues to replicate in the brain stem, which will cause neuronal dysfunction, leading to clinical symptoms [10,11]. In carnivore's mammals, both wild and domesticated, especially the dog, the virus will be found in the oral cavity in the saliva because rabies virus will be transferred to the salivary gland since it is

innervated from the parasympathetic nervous system via submandibular ganglion and glossopharyngeal nerve by sympathetic innervations via superior cervical ganglion by afferent innervations [3].

1.1 Statement of the Problem

In Ghana, between the years 2000 to 2004, 123 clinically confirmed human cases were reported by the Public Health Unit of the Ghana Health Service [12]. Ga East has been a rural Municipality in the Greater Accra Region, recorded 888 (Exaction from DHIMS2) cases of dog bites between 2014 and 2018 with 5 deaths. Most of the cases were from rural settings. It was also observed that most community members who report with dogs' bites do not know the action to take at home before registering at the health facility. It's also noted that community members seek medical help at a drug store for wound management after exposure to dog bites. This practice has not helped since most of these individuals later report at the facility with severe rabies forms.

Even though there are two agencies involved in Rabies elimination such as Ghana Health Service (GHS), Neglected Tropical Diseases (NTDs), and the Ministry of Food and Agriculture (MOFA), Veterinary Services Division (VSD), their efforts had not yielded the expected result. Based on the above, the researcher aims to determine the public's perception of their knowledge in dog bite and rabies control measures at community levels. Therefore, this study's general objective is to evaluate

differences in background, attitude, and perception about rabies among the residence in Ga East.

2. METHODOLOGY

2.1 Study Design

Cross-sectional study design was used in this study.

2.2 Study Population

The study was conducted in the Ga East Municipality of Greater Accra Region. The study covered owners and non-owners of dogs who resided in the Ga East municipality over the past five years.

2.3 Sample Size Estimation

Sample size estimation was done using the Cochran equation.

$$N = \frac{z^2 p (1 - p)}{E^2}$$

Where,

N = the minimum required sample size.

Z = standard average deviate corresponding to 95% confidence interval, which equals to 1.96.

P= proportion of pregnant women who were bitten by a dog was 12% (Annual report Ga East, 2018)

E = Is the Margin of Error on P estimated to be at 5%

Therefore,

$$n = \frac{1.962 \times 32 (100 - 12)}{52}$$

n = 432

A total number of 432 Respondents were used as the sample size to give a fair representation of the population's views. The calculation of this figure was the Cochran equation; (1963). To cater to non-response, 10% of 432 were added to the study sample. Thus $432/100 \times 100 = 43$. Therefore 43 respondents were being added, making the total sample size to be 475.

2.4 Sampling Technique

Purposive sampling (a non-probability) method was used to interview 75% of the respondents who own dogs in each community. In contrast, Convenient selection was used for those who do not own dogs. The language that was used were; English, Ga, Ewe, and Twi.

2.5 Data Collection Tools/Methods

Data was collected by interviewing study participants with a questionnaire. The interviews were conducted by trained interviewers to obtain information on knowledge, attitude, perception, beliefs, and practices regarding rabies disease among the residents in the Ga East Municipality. The questionnaire consisted of lists of questions that address the objectives of the study.

2.6 Data Handling and analysis

The questionnaire was designed using KOBO Data Collection Tools and linked using URL to ODK collection for field data collection. The responses were recorded on an Excel worksheet, which enabled me to run my frequency tables. Excel was again used to run the frequency tables. Data was presented in tables, and all variables were in narratives.

3. RESULTS

3.1 Demographic Characteristics of Respondents

The Table 1 describes the Demographic responses of the respondents. Out of 475 respondents, 354, representing 74.53%, were males while 25.47 were females. Most respondents either fell in the 40-49 (32.63%) age categories or 30-39 (24.84%) categories, while the least were aged 15-19 (3.79%). Regarding educational level, with the majority of (44.21%) reporting having tertiary education, while 9.68% represents primary level education as the least on the table. However, Christians were of the majority, 342 (72.0%) and Traditional/Spiritualist constitute the least religious group of 28(5.89%). Other variables, such as Sales and Services and Unskilled Manual, include the highest (36.21%, 27.79%) of the respondents' occupation. Meanwhile, clerical respondents 12 (2.53%) were the least among specialization/occupation categories.

Table 1. Distribution of Respondents by Age, Sex, Education, Occupation and Religion

Variables	Frequency (N=475)	Percentage (%)
Sex		
Male	354	74.53
Female	121	25.47
Age (Years)		
15-19	18	3.79
20-29	52	10.95
30-39	118	24.84
40-49	155	32.63
50-59	99	20.84
60+	33	6.95
Education		
Primary	46	9.68
Secondary	155	32.63
Tertiary	210	44.21
No Education	64	13.47
Religion		
Christian	342	72
Muslim	53	10.95
Traditional/Spiritualist	28	5.89
No Religion	58	11.16
Occupation		
Professional/Technical/Managerial	45	9.47
Clerical	12	2.53
Sales and Services	172	36.21
Skilled Manual	73	15.37
Unskilled Manual	132	27.79
Agriculture	41	8.63

3.2 The Knowledge of the Community Concerning Rabies

A total of 475 (100%) respondents responded to this section. However, from Table 2, it was observed that 96.42% of the respondent were of the view of hearing about rabies disease while a handful of respondents said they have not heard of rabies disease before. Sources of information of those who said they have heard of rabies shows; School, friends, and neighbors of 149 (32.53%), as the most occurring sources of information, media score of 20.74%, while vaccination campaign been other source was the least among the responses of sources of information. 37.7% of the respondents who have heard of rabies disease believed that rabies is a viral disease. Others, 21.62%, have a different opinion that rabies is an air-borne disease. Even though 458 respondents have heard of rabies disease, 49 respondents representing 10.70%, have no idea of rabies transmissions. Another variable was to explore the most common source of rabies transmission. It was noticed that playing with an infected animal without bites (37.77%) poses a significant danger of rabies

disease transmission, according to respondents. Meanwhile, dogs are the most mentioned common animal's sources of rabies transmission mentioned which was followed by a cat, and the least was the goat on the frequency table respectively (73.74%, 19.3%, and 0.56%)

On the area of primary symptoms of rabies, fever constitutes 187, representing 40.65%. Others also view that stiff muscles (16.96%) are the first cardinal sign of any rabies disease. In the area of the relationship of personal dogs, the majority believe that their dogs can bite them (90.32%), and therefore rabies is dangerous, and it can also kill human beings (91.89%). However, in the area of dogs licking open wounds as to whether one can get rabies, most of the respondents (51.13%) believed that dogs licking open wounds would lead to getting rabies while 48.87% were of the view that this cannot be possible. Exploring the opinion of dog vaccination, 278 (62.47%) were of the view that dogs should be vaccinated every year. Meanwhile, others (27.42%) were also of the opinion that dogs' vaccination should be done on quarterly bases.

Table 2. Knowledge of Rabies Disease

Questions	Frequency (N=475)	Percentage (%)
Have you heard of Rabies Disease		
Yes	458	96.42
No	17	3.58
Source of information about Rabies		
School, friends and neighbours	149	32.53
Media	95	20.74
Veterinary Service	135	29.48
Healthcare Centre	66	14.41
Vaccination Campaign	13	2.84
Others	0	0
Rabies is;		
Rabies is a viral infection that affects the nervous system of mammals	176	37.77
Rabies is Bacteria infection that affects the nervous system of mammals	76	16.59
Rabies is a worm infection that affects the nervous system of mammals	59	12.88
Rabies is an air-born infection that affects the nervous system of mammals	99	21.62
No Idea	49	10.70
Other	3	0.44
Most common source of Rabies		
Bites from infected animal	97	21.18
Playing with infected animal without bites	173	37.77
Scratch from infected animal	75	16.38
Consuming meat from infected animals	93	20.31
Others	5	1.09
No Idea	15	3.28
Most common animal source of Rabies		
Dog	264	73.74
Cat	71	19.83
Fowls	13	3.63
Bat	5	1.40
Sheep	3	0.84
Goat	2	0.56
Primary symptoms of rabies in people		
Fever	187	40.65
Sore throat	78	16.96
Stiff Muscles	127	27.61
Nausea	29	5.65
Fear of Water	16	4.57
Paralysis	21	4.89
Your dog can bite you		
Yes	401	90.32
No	43	9.68
Is rabies dangerous		
Yes	408	91.89
No	36	8.11
Rabies can kill		
Yes	322	72.52
No	122	27.48
Rabid dog licking open wound you can lead to rabies		
Yes	227	51.13

Questions	Frequency (N=475)	Percentage (%)
No	217	48.87
Duration of dog vaccination		
Yearly	278	62.47
Quarterly	122	27.42
Monthly	43	9.66
Weekly	1	0.22
Others	1	0.22

3.3 Common Practice among Community Members during Dog Bits (Exposure)

Assessing the community's practice after dog exposure, most of the respondents 186 (39.16%) believed that buying medicine from the drug store is the first remedy to take after dog bits' exposure. Others (29.05%) also thought that tetanus vaccination should be done first. Meanwhile, calling the doctor (12.84%) and thoroughly washing the wound with soap under running water (8.84%) seen optimum responses. Regarding the suspected rabid animal (Dog), 52.63% of the respondents said the animal should be killed. Others (17.68%) believed that the animal should be sent to the Veterinary for

assessment. However, 18.11% said the animal should be chased away from home immediately after suspecting it. To Confine and observe, the alleged animal had seen a response rate of 9.68% as well as 1.05% for five respondents who have no idea what to do the rabid animal. About 34.53% were also aware that Taking tetanus injection before a bite will serve as a preventive and protective measure against while 2.74% believe that the dead animal (rabid animal) should not be touched. In protective measures, the vast majority of the respondents, 340 (71.58%), believe the best way to be protected against rabies was to have rabies vaccination done before a bite. The Table 3 below outlined each response.

Table 3. Common Practice among Community members during Dog Bits (exposure)

Questions	Frequency (N=475)	Percentage (%)
What would you do (First) if you are bitten by an animal or exposed to the saliva of a possibly rabid animal		
Call the Doctor	61	12.84
Thoroughly wash the wound with soap and running water	42	8.84
Buy medicine from the Drug store	186	39.16
Put black stone on the wound	46	9.68
Take Tetanus Injection	138	29.05
Other	1	0.21
No Idea	1	0.21
What do you do to the animal you suspect of rabies or bite you		
Kill it	250	52.63
Send to the veterinary	84	17.68
Chase away from home	86	18.11
Confine and Observe	46	9.68
Other	4	0.84
No Idea	5	1.05
What is the best way to protect myself/ family and others from rabies		
Vaccinate your domestic dog, cat, or ferret	168	35.37
Keep wild animals out of homes, workplaces and other dwellings	128	26.95
Take tetanus injection before a bite	164	34.53
Do not touch dead animals	13	2.74
Other	2	0.42
Can a person get rabies vaccination as preventive measures		
Yes	340	71.58
No	135	28.42

3.4 Perception

About 38.32% of the respondents believed that freely roaming dogs should be vaccinated, whereas others (28.63%) their populations should be reduced through scientific methods. Meanwhile, 20.63% hold their opinion that those stray dogs should be killed without any consideration. In controlling stay dogs' population, 311 respondents representing 65.47%, believe this should be done with the collaboration between Governments, residents in the community, and NGOs into animal welfare. Again, 62.58% perceived stray dogs attack people, while 26% found stray dogs creating a nuisance in the environment (3.6%).

Nearby dwellings and road as well as others 107 (24.10%) partially fenced their homes.

3.5 Attitude of Individuals towards Dogs Keeping

The majority of the respondent 349 (78.60%) who own dogs do not feed their dogs at all. However, (8.78%, who fed their dogs does so ones a while and some one's daily (60.0%), others (5.86%) could not remember when they have fed their dogs. Seeking for medical attention; about 63.74% don't send their dogs for medical check-up at all. In addition, 130 representing 29.28% seek for medical help only whenever the dogs are sick. 84.23% of the respondents beat their dogs whenever they have misbehaved untowardly. Likewise, 70.95% who own dogs do not vaccinate their dogs. Reasons

for not vaccinating dogs seem "vaccination been too expensive" 136 (43.17%) and vaccination centre been too far of (33.33%). Some respondents (23.49%) are not even aware they have to vaccinate their dogs.11.71% as fully fenced their houses to prevent dogs from been on the street or going to the nearby houses. A higher number of respondents (60.32%) who own dogs freely allow their dogs moving to nearby houses and street as well as others 107 (24.10%) partially fenced their homes.

4. DISCUSSION

4.1 Demographic Characteristics

The demographic characteristics of respondents as presented in demographic table seem to have more Males responding to the questionnaire than Female because, the married women were of the view that their husbands should be in the position in responding to the survey not them.

In the area of religion, some Muslims who have dogs believed that dogs play a very important role in securing homes when well trained and that they have dogs because of insecurity of the current state in the country.

Even though the educational level of the respondents was good (tertiary) most are into sales and service such as selling of mobile phones, fast foods and others engaged in the sale of home used clothing as sources of income.

Table 4. Perception on stray dogs in the environment

Questions	Frequency (N=475)	Percentage (%)
Opinion about free roaming dogs/ stray dogs?		
They should be killed	98	20.63
They should all be vaccinated	182	38.32
Their population should be reduced using some method not killing them	136	28.63
Chase from home	26	5.47
Observed	33	6.95
I don't care about them	0	0.00
Who in your opinion is responsible for the controlling stray dog population		
Government only	138	29.05
Government plus people in the community/NGO	311	65.47
Don't know	26	5.47
What problems do stray Dogs contribute to?		
They bark a lot and create nuisance	123	26.00
Attack and bite people who pass their way	296	62.58

Table 5. Attitude of individuals on dogs

Questions	Frequency (N=475)	Percentage (%)
Feeding you dog		
One's a while	39	8.78
One's a day	27	6.08
Twice a day	2	0.45
Trice a day	1	0.23
No feeding at all	349	78.60
I can't remember	26	5.86
Others	0	0
Do often do you take your dog for medical check-up		
Every months	2	0.45
Every quarter	9	2.03
Very Year	11	2.48
Whenever the dog is sick	130	29.28
Not at all	283	63.74
Others	9	2.03
Do you beat your dog when it misbehaves		
Yes	374	84.23
No	70	15.77
Have you vaccinated your dog		
Yes	129	29.05
No	315	70.95
Reason for not vaccinating your		
Not aware of dog vaccination	74	23.49
Vaccination too expensive	136	43.17
Vaccination centre too far	105	33.33
Level of dog confinements		
Caged	7	2.22
Rope	9	2.86
Freely moving within the house	109	34.60
Free moving to nearby houses and street	190	60.32
Level of Home Fencing		
Not fenced	285	64.19
Partially fenced	107	24.10
Fully fenced	52	11.71

4.2 The Knowledge of the Community Concerning Rabies

Data from the analysis shows that most of the community members have heard of rabies disease before, yet variables such as "common sources of information was attributed to hearing from Schools, friends and close neighbours had seen more responses. Schools, friends and close neighbours had been seen to play an important role in the disseminations of information on Rabies as compared to the media, health facilities (personnel) and the veterinary. This supports a study done in Abidjan, most of the people interview knew of rabies disease and schools were the most occurring sources of information [13]. This makes schools an important target of public awareness creation or

education on rabies than any other sources. This is a call for the veterinary Department on the Ministry of Agriculture to embark public education on rabies disuses.

Less than 50% knew that rabies is a viral disease. This is also seen when the respondents said rabies is an air-born infection that affects the nervous system of mammals 21.62%. Relating this to student in South Sudan [14], it revealed that most of the respondent does not know how rabies is transmitted to human. Another study conducted in Southern Ethiopia among Koma's, [15]. Their findings were not different from the Sudan study. From this study, it was obverted that playing with animals without a bite can constitute rabies transmission, while exposing ones opened wound to dogs to lick dose not lead

to rabies transmission. The respondents were of the view that, this will rather facilitate wound healing than normal wound dressing. According to them, this practice is less expensive and the result within two weeks is positive. While in a study conducted Nigeria [16], the result shows that most respondent believe this practices is dangerous and can leads to rabies. The practice of dogs licking open wounds for faster healing e needs to be discourages because rabies is a viral disease and it migrate to the salivary gland of the affected dogs. Such practices rather will expose the individuals to rabies infection if only the dogs is an infected dogs. There should be a very strong collaboration between the Veterinary departments and the Health service to reach out to the entire population on rabies disease.

From the earlier discussion it can be seen that among the rabies control measures, education is very important. The type of information given to the general public about rabies must be clear and relevant. Community participation or involvement is also very important, but before the community will participate they need to be educated on why they should participate and what they are expected to do or the economic important of rabies. With adequate information, dog owners would make an informed decision that will health them take appropriate actions toward their dogs. This (knowledge) would encourage participation and cooperation from dog owners and it can lead to more effective control programmes.

In assessing the knowledge of the population, Majority knew that rabies is a very dangerous disease and can kill them. Most of respondents also know that they are at risk of being bitten by their own dogs. When asked about the symptoms of rabies, less than half of the respondents could mention fever as the common symptom.

Elieza SV [9], in his study revealed majority of Africans are exposed to rabies infection because mothers do not know how rabies is transmitted and also have lesser knowledge on rabies prevention. This study was conducted to ascertain Current and Future Trends in the Epidemiology, Prevention, Treatment, Control and Possible Elimination of Rabies. Views on this study, it is an indication that information at the community level is woefully is incomplete, and may not lead to required actions.

4.3 Communities Practice after Exposure to Dog Bite

From the analysis it was noticed that buying of medicines from the drug stores and taken of Tetanus injection were the common practices of the respondents. Exploring their reasons for seeking treatment from above sources, some were of opinion that; there will not be a queue at the chemical shops and services over there are very fast. Others were also of the opinion that the tetanus injection works the same as another medicine (anti-rabies).

A similar survey conducted in Tamale [17], shows that majority of the respondents buy medicines and call for tetanus injection from the chemical sellers whenever they are being bitten by dogs. In another study conducted [18], most of the respondents resort to medical help when every bitten by dogs (South Africa, Angola, Egypt) yet in Sub-Saharan Africa countries, the practice of buying medication from drugs stores and peddlers are common whenever bitten by dogs.

However, this is an indication of insufficient information (knowledge) at the community levels. The most important actions were all left out. The thorough washing the wound with soap under running water and seeking Medical help were all not considered as intervention measures mentioned by the respondents.

Under the Animal Disease (Act of 1961), the Veterinary Services Department is to be notified of cases of animal diseases and also the Act empowers the Department to isolate infected animals. The Department is vested with the power to inspect any animal at a reasonable time. Dog owners are to housed (caged) their animals and prevent them from straying. Owners are to present their animals to the Veterinary staff for inspection and for any veterinary intervention such as treatment and vaccination to be carried out. People bitten by dogs are to report to the Ministry of Health for Post Exposure Treatment (Hospital or clinics) and also report to the Veterinary Services Department as specified in the Disease of Animals Act 1961 with the dog for veterinary examination and quarantine. Dogs with clinical signs and those bitten by suspected rabid animals are killed and sent to the veterinary laboratory for examination. As to whether dog owners in the Ga East Municipality knew and adhere to these regulations is also another issue to be considered.

4.4 Community Perception Regarding Rabies

Majority of dogs owned by members in the community are not caged (housed) and not fed. In a study conducted by Cleaveland S et al. [19], it also revealed that most Rural Africa dog owners do not house their dogs. The same study also stated that the dogs are mostly on free range and they look for their own food.

4.5 Community's Attitude toward Caring for their Dogs

The majority of the respondents do not send their dogs for medical check-up at all. Even those who send their dogs do so when the dogs are sick. Some of the respondents beat their dogs whenever they have misbehaved untowardly. In a study [20], it was revealed that most dogs' owners in Nigeria, do not send their dogs for medical check-ups. Again in a study by Ogun AA et al. [21], findings are not different from [20]. Majority of the respondents left their dogs to seek for their own health out sending them for medical check-ups or even when the dogs are sick, they do not care for their health.

5. CONCLUSIONS

Study revealed that the residents of Ga East Know about Rabies disease and that they are of the view rabies is transmitted mostly by dogs. However, most of the respondent believe rabies is a bacterial disease. The common practice of the community members after dog exposure is buying and taken tetanus injection at chemical shops only few seek for medical help at the health facility.

Most of the community members perceived that rabies can kill them and all stray dogs have to be killed with consideration. However, most of them don't believe that when dogs lick their open wound they can get infected with rabies.

In conclusion, the resident's in Ga East Municipality are of the view that all dogs should be vaccinated against rabies and the vaccines should be made accessible and affordable.

CONSENT AND ETHICAL APPROVAL

Ethical clearance for the study was sought from the Committee on Human Research, Publications, and Ethics - Kwame Nkrumah University of Science and Technology.

Informed consent was also sought from respondents before including them in the study. All information obtained from the participants was kept confidentially, and they were informed that they have the right not to participate in the study. The respondents' names were not to be associated with responses that were provided to ensure their anonymity. Again, participants were informed about their freedom to skip some of the questions and exit from the study at their discretions. They were told that answering the questionnaire will take five (10) minutes. There was no risk associated with the study, and there were no material or financial benefit to respondents.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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