



Knowledge Levels of Individuals Living in Rural Areas about Anthrax

Kırsal Kesimde Yaşayan Bireylerin Şarbon Bilgi Düzeyi

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ABSTRACT

Aim: Anthrax, which is encountered sporadically throughout the world, is a zoonotic infectious disease especially seen in the eastern regions of our country. The spore structure maintains its vitality for a long time in the environment. This can cause epidemics among humans. In this study, we aimed to determine the knowledge levels of individuals living in rural areas and at risk of disease transmission.

Material and Method: The population of the research, which was planned in descriptive type, consisted of individuals aged 12 and over living in the A village in B. It was planned to reach the entire universe. The survey prepared by the researchers was collected by face-to-face interviews with people who agreed to participate. The data were analyzed in the SPSS package program.

Results: The median age of 201 people participating in the study was 47 (13-80). 55.7% (112 people) of them were women. Among the education levels of the participants, primary school graduates made up the largest portion with 39.3%. All participants in the study had heard of anthrax before. However, it was seen that the effect of anthrax disease on humans and animals was not known enough.

Conclusion: The fact that province B is one of the provinces where anthrax disease is most common was considered to be the reason why the participants had heard of anthrax before. However, it was understood that the effect of anthrax disease on humans and animals is not known enough. It was seen that educational activities were needed to increase society's awareness about disease protection.

Keywords: Anthrax, knowledge level, countryside, farming, contagious disease

ÖZ

Amaç: Dünya genelinde sporadik olarak karşılaşılan şarbon, özellikle ülkemizin doğu bölgelerinde görülen zoonotik bir enfeksiyon hastalığıdır. Spor yapısı ortamda uzun süre canlılığını korur. Bu da insanlar arasında salgınlara neden olabilir. Bu çalışmada kırsal kesimde yaşayan ve hastalık bulaşma riski taşıyan bireylerin bilgi düzeylerinin belirlenmesi amaçlandı.

Gereç ve Yöntem: Tanımlayıcı tipte planlanan araştırmanın evrenini B ili A köyünde yaşayan 12 yaş ve üzeri bireyler oluşturdu. Evrenin tamamına ulaşılması planlandı. Araştırmacılar tarafından hazırlanan anket, katılmayı kabul eden kişilerle yüz yüze görüşerek toplandı. Veriler SPSS paket programında analiz edildi.

Bulgular: Çalışmaya katılan 201 kişinin yaş ortancası 47 (13-80)'dir. Bu kişilerin %55,7'si (112 kişi) kadındı. Katılımcıların eğitim düzeyleri arasında en büyük payı %39,3 ile ilköğretim mezunları oluşturdu. Araştırmaya katılanların tamamı daha önce şarbonu duymuştu. Ancak şarbon hastalığının insan ve hayvanlar üzerindeki etkisinin yeterince bilinmediği görüldü.

Sonuç: B ilinin şarbon hastalığının en sık görüldüğü illerden biri olması, katılımcıların şarbonu daha önce duymasının nedeni olarak değerlendirildi. Ancak şarbon hastalığının insan ve hayvanlar üzerindeki etkisinin yeterince bilinmediği anlaşıldı. Toplumun şarbon hastalığından korunma konusunda farkındalığını artırmak için eğitim faaliyetlerine ihtiyaç olduğu görüldü.

Anahtar Kelimeler: Şarbon, bilgi düzeyi, kırsal kesim, hayvancılık, bulaşıcı hastalık

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INTRODUCTION

Anthrax is a zoonotic infectious disease caused by *Bacillus anthracis*. The causative agent is a gram-positive bacterium that forms spores in the presence of oxygen. The spore form is highly resistant to external environments, dryness, cold, ultraviolet rays, high and low pH levels and chemical disinfectants (1). It is transmitted to animals orally through infected food and water (2,3). It can be transmitted to humans through direct contact with an infected animal as a result of injury during slaughter, consumption of infected animal meat without adequate cooking, inhalation of spores, and use of contaminated injectors in drug addicts (2,3). In general, human cases are associated with animal products. However, it is important because of its use for bioterrorism. There are national programs against anthrax, which is among the notifiable diseases (2, 4). Turkey Zoonotic Diseases Action Plan (2019-2023) includes policies to combat anthrax in Turkey (5).

In order to prevent anthrax cases, it is important to control both animal and human transmission. In this context, it is a priority to provide training to risk groups (livestock, butchers, veterinarians, etc.). In education, the main subjects are slaughtering, swimming, eating meat of infected animals, burial of carcasses, vaccination, decontamination and disinfection. In our study, it was aimed to evaluate the knowledge about anthrax disease of people living in A Village of B province.

MATERIAL AND METHOD

The study was carried out with the permission of Kafkas University Medical Faculty Ethics Committee (Date: 30.12.2022, Decision No: 13). All procedures were carried out in accordance with the ethical rules and the principles of the Declaration of Helsinki.

The population of the research, which was planned as a descriptive type, consisted of people aged 12 and over (387 people) living in A village, city B. It was planned to reach the entire universe, without making a choice for the sample of the study. The limitation of our study was the high workload of some of the villagers due to their work both in the city center and in the village. This led to the reluctance of the villagers to participate in the survey. For this reason, 201 (%51,9) people in the research universe agreed to participate in the research, while the rest did not. The data were collected through face-to-face interviews with the data collection form prepared by the researchers. The data collection form includes the sociodemographic characteristics of the individual, the transmission routes of anthrax disease, the symptoms and prevention methods.

The data were analyzed in SPSS package program. In the analyses, the descriptive criteria frequency, percentage, and median from the central concentration criteria were used.

RESULTS

The median age of 201 people participating in the study is 47 (minimum 13-maximum 80). 55.7% of these people (112 people) were women. 8.0% of the participants had not received any formal education. Considering the education levels, primary school graduates made up the largest portion with 39.3% (**Table 1**). 75.6% of the participants (152 people) were engaged in animal husbandry. 30.9% (47 people) of those who are engaged in animal husbandry and 22.4% (11 people) of those who are not engaged in animal husbandry had previously received training on anthrax. 71.1% of all participants had not received any training. To the question 'where did you get the most information about anthrax', 26.4% of the participants answered from television, radio and newspaper, 24.9% from the Ministry of Agriculture personnel, 24.9% from my neighbor, 16.9% from the internet (**Table 1**). It was known with 59.7% accuracy that unburied animal carcasses were an important source of contagion between animals. 53.8% of the participants misunderstood or did not know how the animals infected with anthrax died. 42.3% of the participants knew that it is wrong to keep the meat in the refrigerator at -40 degrees in order to prevent anthrax contamination from the meat of animals infected with anthrax (**Table 2**). 90.0% correctly stated that vaccination is necessary to protect animals from anthrax, 92.5% correctly stated that anthrax is a notifiable disease, and 85.1% correctly knew how to dispose of animals caught with anthrax (**Table 2**).

DISCUSSION

Anthrax has been brought under control in developed countries, and it is still prevalent in developing countries where agriculture is intense. It is an endemic disease in our country and it is seen that the cases originate from agriculture. The cases are mostly concentrated in Eastern Anatolia and Central Anatolia regions. Case report at most; It was built from Kars, Sivas, Ankara, Muş, Erzurum and Hakkari (1, 3).

Anthrax can be transmitted to humans by slaughtering infected animals, consuming contaminated animal products, and not burying animals properly. In order to control the disease, people need to know the methods of prevention and follow the methods (6).

In a study conducted in Eskişehir, it was found that 56.5% of 200 participants knew what anthrax

Table 1: Sociodemographic characteristics

Sociodemographic characteristics	Number	Percentage
Sex		
Woman	112	55,7
Man	89	44,3
Age		
13-22	28	13,9
23-32	23	11,4
33-42	28	13,9
43-52	54	26,9
53-62	45	22,4
63-72	18	9,0
73-80	5	2,5
Education status		
Illiterate	16	8,0
Primary school graduate	79	39,3
Secondary school graduate	52	25,9
High school graduate	38	18,9
Graduated from a University	16	8,0
Animal husbandry situation		
Doing animal husbandry	152	75,6
Does not farm	49	24,4
Status of receiving education about anthrax		
Educated	58	28,9
Not educated	143	71,1
Where to get the most information about anthrax		
Internet	34	16,9
TV, radio, newspaper	53	26,4
Book, magazine, article	6	3,0
Relative, neighbor, friend	50	24,9
Ministry of Agriculture and Forestry personnel	50	24,9
Ministry of Health personnel	8	4,0

TV:television

was, and in a study conducted at Erciyes University Hospital, 82.2% of 420 participants had heard of anthrax before(7, 8). In this study, all of the participants had heard of anthrax before. The fact that animal husbandry is carried out intensively in B province and that this is one of the provinces where anthrax is most common was thought to be the reason for the people involved in this study to have heard of anthrax before.

Sheep and goats infected with anthrax die in a very short time, while cattle die within a week. Bloody oozing occurs in the mouth, nose and anus of dead animals (9). Anthrax can infect the skin, intestines, or lungs in humans(4). 53.8% of the participants did not know that animals infected with anthrax could die in a very short time. Again, 34.8% of the people in this study did not correctly answer the organs that anthrax disease causes disease in humans(**Table 2**). In our study, it was understood that the effect of anthrax disease on humans and animals is not known enough.

Unburied animal carcasses are important in inter-animal contagion, as carcasses are consumed by carnivorous animals and contaminate the environment with their excrement and waste. Slaughtering of sick animals, consumption or use of products such as meat, leather and wool lead to the transmission of the disease to humans (2, 6). In the study, 59.7% of the participants knew that anthrax could be transmitted from unburied animal carcasses. It was understood that 35.3% of the participants did not know that their skin and wool could not be used after the infected animal was killed, and 57.7% did not know that they should not keep their meat in the refrigerator (**Table 2**). This situation shows the lack of information about the necessity of disposal of infected animal products.

Table 2: Distribution of people according to their answers to questions about anthrax

Questions asked	The answers given		
	True	Wrong	I don't know
	Number (%)	Number (%)	Number (%)
The most important source for the transmission of anthrax to animals is the unburied animal carcasses in the pasture.	120 (59.7)	8 (4.0)	73 (36.3)
Meat should be kept in the refrigerator at -40 degrees to prevent contamination of meat with anthrax.	54 (26.9)	85 (42.3)	62 (30.8)
Animals infected with anthrax bleed to death in less than a week.	93 (46.3)	10 (5.0)	98 (48.8)
Anthrax infects the skin, intestines and lungs in humans.	131 (65.2)	4 (2)	66 (32.8)
The most important way to protect animals from anthrax is to vaccinate all animals.	181 (90.0)	0 (0)	20 (10)
Animals caught with anthrax are killed and destroyed, their meat is not eaten, but their skin and wool can be taken to prevent loss.	42 (20.9)	130 (64.7)	29 (14.4)
Animals that have died from anthrax are buried in pits dug two meters deep by pouring quicklime on them.	171 (85.1)	6 (3)	24 (11.9)
The pastures and water sources where anthrax disease is detected are cordoned off and no animals are allowed into the pasture for 15 days.	155 (77.1)	16 (8)	155 (77.1)
It is sufficient to vaccinate the animals in the pastures with anthrax disease for one year.	103 (51.2)	32 (15.9)	66 (32.8)
Reporting of anthrax disease in both animals and humans is mandatory.	186 (92.5)	2 (1)	13 (6.5)



Animals that die from anthrax should be buried in pits at least two meters deep, with quicklime poured over them. Places where anthrax disease is seen should be cordoned off and the entry and exit of animals there should be prohibited. Anthrax is a disease that must be notified if it occurs in humans or animals (9). 85.1% of the participants knew how to bury animals that died from anthrax, 77.1% knew that pastures with anthrax should be cordoned off, and 92.5% knew that anthrax is a notifiable disease. It was seen that they knew what to do except disposal of animal products .

All animals susceptible to the disease in areas associated with communal areas such as pastures where anthrax has been observed should be vaccinated continuously for five years (9). Of the people in the study, 90% knew that vaccination is important in protecting animals against anthrax. 51.2% of the participants stated that if anthrax disease is seen in the pastures, it is sufficient to vaccinate for one year. Although most of the participants knew that vaccination is necessary to protect animals from anthrax, it was seen that they did not have enough information about the duration of vaccination.

CONCLUSION

Anthrax is a disease that continues its effects in rural areas where animal husbandry is intense. The number of studies conducted to determine the knowledge status of people living in rural areas about anthrax is limited. In the fight against this disease, it is very important to know the information status of the people in the risk group and to carry out awareness-raising activities if necessary. It has been observed that the knowledge about anthrax is not sufficient in A village of B province, whose primary livelihood is animal husbandry. Lack of information on vaccination and disposal of anthrax-infected animal products was noted. Studies should be carried out to increase public awareness about anthrax disease. Before incentive programs in the field of animal husbandry, it is necessary to attend training on zoonotic diseases..

ETHICAL DECLARATIONS

Ethics Committee Approval: The study was carried out with the permission of Kafkas University Medical Faculty Ethics Committee (Date: 30.12.2022, Decision No: 13).

Informed Consent: During the face-to-face interview with the participants, verbal consent was obtained and the forms were filled out.

Referee Evaluation Process: Externally peer-reviewed.

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REFERENCES

1. Kadanalı A, Topluoğlu S, Aktaş D, et al. Current Situation Report of Anthrax in Turkey. *Türk Hij Den Biyol Derg.* 2020; 77(2): 1-20.
2. Özcan BA. Anthrax Disease and its Importance: Sağlık ve Toplum Derg. 2019; 29(1):P 27-31
3. Kaya A, Tasyaran MA, Erol S, Ozkurt Z, Ozkan B. Anthrax in adults and children: a review of 132 cases in Turkey. *Eur J Clin Microbiol Infect Dis.* 2002 ;21(4):258-61.
4. Goel AK. Anthrax: A disease of biowarfare and public health importance. *World J Clin Cases.* 2015;3(1):20-33.
5. Ministry of Health of the Republic of Türkiye: Türkiye zoonotic diseases action plan(2019-2023): Accessed: 2023. <https://ekutuphane.saglik.gov.tr/Yayin/564>
6. Kadanalı A, Özel AS. Anthrax: Unforgettable disease in the modern era. *Klimik Derg.* 2019; 32(3): 222-8.
7. Çetinkaya D, Yelken B, Aykanat YD, Dere G. Attention May Anthrax! Anthrax Awareness Survey in Eskisehir. *T.Tıp Öğr. Arş. D* 2020; 2(1): 5-8.
8. Günay O., Şengün E., Gündoğdu İ, Borlu A. Erciyes Üniversitesi Hastanelerine Başvuran Yetişkin Bireylerin Şarbon Hastalığı ile İlgili Bilgi ve Tutumları; 3.International 21.National Public Health Congress:2019
9. Ministry of agriculture and forestry of the Republic of Türkiye: Anthrax Disease Field Fight Instruction : Accessed: 2023. https://www.tarimorman.gov.tr/Konu/2115/sarbon_mucadele_talimat
10. Ngetich W. Review of anthrax: a disease of animals and humans. *Int J Agric Environ Biores* 2019; 4:123–34.
11. Doganay M, Dinc G, Kutmanova A, Baillie L. Human Anthrax: Update of the Diagnosis and Treatment. *Diagnostics (Basel).* 2023;13(6):1056.