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ORIGINAL RESEARCH

Medicine Science International Medical Journal

Medicine Science 2020;9(1):54-9

The knowledge and approaches of parents to tick bite and tick-borne disease

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Received 31 August October 2019; Accepted 29 October 2019
Available online 24.02.2020 with doi:10.5455/medscience.2019.08.9134

Abstract

The present study aims to evaluate the knowledge and approaches of parents to a possible tick bite and tick-borne diseases that may develop in their children.
Methods: The descriptive study enrolled 504 voluntary parents living in Bolu, having children under the age of 18 and applying any reason to the outpatient clinic of family medicine between September 2018 and December 2018. A 33-question questionnaire was applied to all participants. The mean age of participants was 39,8±13,9 (18-68). Considering the measures taken by parents in their children, 240 (47.6%) of them were careful to wear light-colored and closed clothing and 379 (75.2%) of them were careful to tuck their pant legs into their socks. 169 (33.5%) of them were roughly checking the presence of tick on their children's body, when they were in risky areas for ticks, while 78 (15.5%) of them were fully checking their children body, including the back of the underarm, the nape, the hair bottoms, the groin for presence of tick. When the participants with being engaged in farming compared with the patients without being engaged in farming, we observed the statistically significant differences concerning type of clothing styles, previous educational history and being familiar with a tick (p= 0.006, 0.014 and <0.001, respectively). The present study shows that people who are engaged in farming and live in risky areas for tick-bite are well-informed about the tick-borne disease. Furthermore, the people who are not engaged in farming must be trained on tick-bite and tick-borne disease.

Keywords: Tick bite, tick-borne disease, tick control

Introduction

Parasitic diseases, emitted by endoparasites or ectoparasites such as tick, are important health problems [1]. Parasites could carry and spread many different pathogens such as bacteria, spirochetes, rickettsia, protozoa, viruses, nematodes, and toxins [2]. To date, no combat method has been successful in tick eradication, so tick eradication is impossible. It was understood that ticks could cause medical and economic damages after realizing that ticks could infect humans and animals [3].

The fact that tick-borne diseases cause death in humans and animals is very important and notable for public health [4]. Tick-borne disease is more common in regions where ticks are endemic [5]. Therefore, when in the risky areas in terms of a tick, you need to beware of a tick bite [6]. In the last decades, the incidence of some rare tick-borne diseases, including Crimean-Congo Hemorrhagic Fever (CCHF), Lyme disease, tularemia, babesiosis, erliosis and the epidemic relapsing fever has increased and has become more popular due to climate changes in the world [7].

Previous studies have shown that only one tick could carry more than one infectious pathogen. They have also shown that 23% of patients with Lyme disease were accompanied by babesiosis, and 10-30% of them were accompanied by erliosis [8]. It should be kept in mind that combined pathogens will cause a worse clinical course.

Lyme disease, which can cause serious problems due to cardiac, joint, and nervous system involvement, is the most common disease in the USA and the world. Since Lyme disease can cause serious sequelae, early diagnosis and treatment of this disease are essential. [9-11].

CCHF, a zoonotic disease increasing in recent years in Turkey, with a mortality of 3-30%, with symptoms such as fever, widespread muscle pain, headache, redness of the face and eyes, nausea, vomiting, diarrhea and widespread hemorrhage [12,13].

As in all infectious diseases, protection in tick-borne disease is very important. Therefore, it is necessary to increase the familiarity

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and knowledge of tick-borne diseases of people who live in risky areas. There are a limited number of studies evaluating the behaviors and knowledge of people about tick-borne diseases in literature. [14,15].

Especially to protect children from tick-borne disease, their parents' knowledge and consciousness should be evaluated and measures should be taken, where they appreciate. Previous studies have shown that tick-borne disease is less common in children of parents whose knowledge and awareness about tick-borne disease have increased [16].

We aimed to evaluate the knowledge and approaches of parents to a possible tick bite and tick-borne diseases that may develop in their children.

Material and Methods

The descriptive study enrolled 504 voluntary parents applying any reason to polyclinic of family medicine, between September 2018 and December 2018. The inclusion criteria were as follows: 1) being over 18, 2) having any psychiatric disease, 3) being volunteer 4) having children under the age of 18. Written informed consent was obtained from all patients in the study. The study was approved by the Abant İzzet Baysal University Ethical Committee and Review Board.

A 33-question questionnaire was applied to all participants. The questions in the questionnaire were prepared based on the information given in the brochures of the Public Health Directorate [17].

The socio-demographic characteristics in the first part, the information about the tick and tick-related diseases in the second part, and the information related to the measure and intervention for tick-borne disease in the third part of the questionnaire were questioned. The questionnaire, which was prepared with the use of posters, asked the participants what they were doing to prevent tick bite and what they would do in case of a tick bite. They were asked how they were dressed at the picnic, in the garden or in the field and the precautions they had taken in contact with the animals. They were asked whether they fully checked their child's body, including the back of the underarm, the nape, the hair bottoms, the groin for the presence of a tick, when they are risky areas. Checking at least three risky areas mentioned above of the body was accepted as "fully checking." Multiple-choice questions were asked to determine what they would do following the possible tick bite

As defined by the Public Health Agency of Turkey, those who are engaged in agriculture and animal husbandry, camping and picnics, and those who are exposed to unprotected green areas (garden, vineyard, field, forest, and forest edge agricultural land etc.) were defined as the risk group.

Data analysis was performed by using IBM SPSS Statistics version 23.0 software (IBM Corporation, Armonk, NY, USA). Continuous variables were shown as mean ± SD (min-max). A number of cases and percentages were used for categorical variables. Chi-Square Test compared the mean differences of socio-demographic characteristics and answers between groups. A p-value of less than 0.05 was considered statistically significant.

Results

The mean age of participants was 39.8±13.9 (18-68). 254 (50.4%) of participants were male, and 250(49.6%) of them were female. 199 (39.5%) of participants graduated from high schools. 223 (44.2%) of them were actively working. 313 (62.1%) of them thought their income and expenses were equal. 273 (54.2%) of them engaged were agriculture, while 30 (6%) of them were engaged in animal husbandry (Table 1). 338 (67.1%) of the parents were in the risk group in terms of tick contact. While 81 (16.1%) of them lived in the district, 51 (10.1%) of them lived in the village. 420 (83.3%) of them informed about the tick.

Table 1. Demographic characteristics of parents

		n	%
Age	<25	53	10.5
	26-35	154	30.6
	36-45	134	26.6
	>45	162	32.1
Gender	male	254	50.4
	female	250	49.6
Occupation	actively working	223	44.2
	retired	75	14.9
	not actively working	206	40.9
Education level	literate	15	3.0
	primary education	167	33.1
	high school	199	39.5
	college	123	24.4
Living place	center	363	72.0
	district	90	17.9
	village	51	10.1
In terms of tick contact	risky	338	67.1
	risky free	166	32.9

84 (16,7%) of them had previously received training on ticks and tick-borne diseases. Of those who did not receive education, 332 (79%) of them were willing to be educated on this subject. 434 (86.1%) of them (90.2% of men and 82% of women, p:0.080) knew that some diseases could pass by tick bite (Table 2).

397 (78.8%) of them stated that tick diseases in the spring and summer (April-September) were more frequent. 394 (78.1%) of them stated that the time of tick bite on the human body is important for disease transmission. 213 (42.3%) of them answered as " I have no idea" to the question as "How long the disease begins after the tick bite?

Considering the measures taken by parents in their children, 240 (47.6%) of them were careful to wear light-colored and closed clothing and 379 (75.2%) of them were careful to tuck their pant legs into their socks. 39.6% of the parents stated that they would not touch the tick on the animals and the blood and urine of the animals with the bare hands.

169 (33.5%) of them were roughly checking the presence of tick on their children's body, when they were in risky areas for ticks, while 78 (15.5%) of them were fully checking their children body, including the back of the underarm, the nape, the hair bottoms, the groin for presence of tick.

The percentage of those who said that they would remove the tick bite on the body without touching the bare hands, with gloves, cloth or pouches, was 89.7%. The percentage of those who said that they would apply cologne or alcohol on bite tick was 8.1%, who said that they would wait for it to fall spontaneously was 3.8%, who said that they would crush it with their hands was 11.1% (Table 3). 468 (92.8%) of the participants said that they would go to the nearest health center to remove the tick.

Table 2. Information about the tick and tick contact of parents

			n	%
Informed about tick		**no**	52	10.4
		yes	452	89.6
Previously received training on ticks and tick-borne diseases		**no**	420	83.3
		yes	84	16.9
Have you ever seen a tick?		**no**	339	67.3
		yes	165	32.7
Have you ever been bitten by a tick?		**no**	485	96.2
		yes	19	3.8
Have you ever taken a tick?		**no**	470	93.3
		yes	34	6.7
After tick bite	**I removed myself**	**no**	452	89.7
		yes	52	10.3
	I remove with tweezers	**no**	442	87.7
		yes	62	12.3
	I would apply cologne or alcohol	**no**	448	88.9
		yes	56	11.1
	I would wait it to fall spontaneously	**no**	486	96.4
		yes	18	3.6
	I would go to the nearest health center for remove the tick.	**no**	36	7.1
		yes	468	92.8

Table 3. Approaches of parents to prevent tick clinging and tick related diseases in children

			n	%
In areas where tick bitting is risky	**Careful to wear light-colored and closed clothing**	**I don't**	264	52.4
		I do	240	47.6
	Careful to tuck their pant legs into their socks	**I don't**	125	24.8
		I do	379	75.2
	Bare hands touching the tick on animals. blood and urine of animals	**I don't**	304	60.4
		I do	200	39.6
	Check for ticks including the back of the underarm. the nape. the hair bottoms. the groin for presence of tick. when they are risky areas. (Checking least 3 areas)	**I wouldn't check**	335	66.5
		I would check	169	33.5
	Fully checked their child's body	**I wouldn't check**	426	84.5
		I would check	78	15.5

Although the participants living in the village had significantly lower educational level compared to those living in the district of the city (p:0.030), the percentage of the those children who were living in the village was covered with light-colored and closed clothing rate of 31.4% as similar to those living in the district of the city (p:0.160).

The percentage (51%) of "roughly checking for a tick" in their children was significantly higher than the others (p:0.020). However, the percentages of "fully checking for a tick" were similar among the groups (p:0.284).

The participants at risk in terms of tick contact showed a higher incidence of tick encounter, tick bite and informing about tick than others (p:0.001, p:0.090 and p:0.013, respectively). The participants, informed about the tick, stated that they benefited most from the education they received from health workers (62.1%).

Considering the measures taken by parents in their children, 162 (47.9%) of them, who were living in risky areas, we're careful to wear light-colored and closed clothing. 243 (71.9%) of them, who were living in risky areas, we're careful to tuck their pant legs into their socks as similar to others (p:0.082).

While 338 (%62.6) of participants were being engaged in farming, 166 (%37.4) of participants were without being engaged in farming. Compared to those who engaged with and without farming in terms of variations with tick, there was a statistical difference in terms of dress type (p:0.006), previously received training on ticks and tick-borne disease (p:0.014), whether the ticks sees (p<0.001), whether the tics bite (p:0.006) (Table 4).

Table 4. Comparison of tick-related variables of with or without being engaged farming

N(%)	Being Engaged Farming (n:338)	Without Engaged Farming (n:166)	p
Dress Type			
Light-colour	162 (47.9)	56 (33.7)	
Dark colour	69 (20.4)	50 (30.1)	0.006
No answer	107 (31.7)	60 (36.1)	
Previously received training on ticks and tick-borne diseases			
Yes	66 (19.5)	18 (10.8)	0.014
No	272 (80.5)	148 (89.2)	
Have you ever seen a tick?			
Yes	138 (40.8)	27 (16.3)	<0.001
No	200 (59.2)	139 (83.7)	
Have you ever been bitten by a tick?			
Yes	18 (5.3)	165 (99.4)	0.006
No	320 (94.7)	1 (0.6)	
Have you ever taken a tick?			
Yes	33 (9.8)	165 (99.4)	<0.001
No	305 (90.2)	1 (0.6)	

Discussion

Ticks have a great potential to carry many pathogenic factors that can cause disease in humans and animals since they are compulsory blood-sucking arthropods. Ticks can live in every region of the world; more than 850 species have been identified in Turkey. The provinces where tick-borne diseases are seen intensively were Erzurum, Erzincan, Gümüşhane, Bayburt, Tokat, Yozgat, Sivas, Amasya, Çorum, Çankırı, Bolu, Kastamonu, Karabük, Giresun and Samsun in Turkey [18]. In other regions of Turkey, although rare, it has been reported cases of different tick-borne diseases [19]. Bolu, where the present study was conducted, is one of the regions where both tick bites and tick-borne diseases are frequently reported in Turkey [20].

In patients bitten by ticks, other diseases such as CCHF and Lyme disease should be kept in mind, the differential diagnosis should be made by using clinical and laboratory findings and early treatment should be initiated for prevention of serious complications that may develop [21].

Dzul-Rosado et al. have found that 98.5% of the people living in endemic regions recognized the tick [22], as like the current study [89.6%). Since the vital activity of ticks increase in hot air and more people going to picnic in summer, tick-borne diseases show a seasonal tendency and most cases of them are observed between June and September [23,24]. Another study showed that school-age children had more risk of tick attachment because they spent more time outside [25]. Because the time of tick bite is one of the most important factors determining the transmission of tick-borne disease, it is necessary to remove the biting tick from the body as soon as possible [24]. Most of the participants in the present study knew that tick-borne diseases were most frequently seen in the summer months, tick-borne diseases could be transmitted, and the risk of disease transmission increased as tick- bite time increased. 83.3% of the participants in our study were educated on these mentioned subjects. The participants, living in the village, were educated more than others. These results are important in terms of demonstrating how much training is required within the scope of primary health care.

The emergence of deaths related to tick-borne diseases led to the development of awareness and knowledge about ticks in society [26]. Butler et al. have reported that the cases of the tick-borne disease have been seen more in the uneducated areas about tick [27]. Another study showed that uneducated people about tick are mostly oblivious to the tick bite on their body; however, when they come to tick-borne disease in the people around them, they admitted to the health center due to tick bite [28]. People living in the areas with low socio-cultural levels try to treat the tick-holding area or to prevent the tick bite with fat, salt or other substances. However, studies are reporting that these approaches are successful [29,30]. The participants in previous studies, like our study, have stated that the tick should be removed in the professional health center without using the bare hands [26,31]. Previously given education emphasized that at the health center. However, recently given education have emphasized that tick should be removed as soon as possible with the appropriate method

Physical examination of patients admitted to the health center due to tick bite should be performed carefully, and the tick should be removed with the right technique. After removal of the tick, the patient and his / her family should be informed that they should re-apply to the health center if possible, disease symptoms such as sudden fever in ten days, head and muscle pain or weakness are observed.

People in areas where the ticks are endemic take measures to prevent tick infestation even in the houses; where they live. Unlike vectors such as mosquitoes or bedbugs, ticks are very difficult to destroy. Protective measures and changing individual behaviors are considered as the most important factors in protection against tick-borne diseases [26,25]. Another study has demonstrated that people did not take any measures about ticks in the habitats they were accustomed to, but they considered to take more measures about tick in environments where they were not familiar [32]. Previous studies have reported that people who live in low socio-cultural level in which the tick is endemic remain insensitive to possible tick-borne diseases [26,33].

It is known that changing individual behavior takes time and requires a professional training process. Aenishaenslin et al. have emphasized that health education should be given individually rather than high participation meetings and should be compatible with the educational level of the community [34].

Beaujean et al. found that only 18% of the parents fully checked their children for tick, similar to our study (15.5%) [35]. The tick is easier to detect on visible parts of the body, while it may be more difficult to detect the tick on unseen parts of the body. Therefore, all patients should be examined carefully in a patient who is admitted with a tick bite. Duman et al. have revealed that the most common bite area of the tick was head and neck (31.2%), lower extremity (18.3%), genital area (13.4%) [36]. Oğuz et al. have also reported that the most common bite area of the tick was head and neck head and neck (50%), body (28.3%) and arm and leg (21.7%) [37]. Kömüroğlu et al. have shown that tick bites were more common in the lower extremity in adults, while they were more common in the head and neck region in children [24]. The high rate of the tick bite in the head and neck region indicates that the standard measures (wearing boots and thick socks on the feet) to protect children from tick attachment are not sufficient.

Therefore, the possibility of a tick bite in rural areas should always be considered. Beaujean et al. have underlined that the training given in rural areas should be of interest to children [35].

Limitations

The limitations of the current study include that the majority of the participants live in urban areas and inadequate information about the disinfestation. Further multi-center prospective studies should be designed to investigate the level of education related to the prevention of tick-borne disease.

Competing interests
The authors declare that they have no competing interest.

Financial Disclosure
The authors received no financial support for this study.

Ethical approval
The study was approved by the Abant İzzet Baysal University Ethical Committee and Review Board.

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