VECTORIAL POTENTIAL OF *BLATTELLA GERMANICA* AS CARRIERS OF HUMAN INTESTINAL PARASITES IN VAN, TURKEY

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Abstract

Cockroaches are claimed to be mechanical transmitters of disease causing microorganisms such as intestinal parasites, bacteria, fungi, and viruses. A study was conducted to determine the role of cockroaches as potential carriers of parasites of medical importance in Van, Turkey. One hundred and thirty-eight cockroaches were collected from different parts of apartments and houses around the town from March to April 2014. All of the collected cockroaches were identified to species as *Blatella germanica*. They were examinated for isolation and identification of human intestinal parasites from external surface of cockroaches. The results show that 66 (48%) of the cockroaches harbored parasitic organisms. Of these, 96.6% were protozoa and the remaining 3.4% were helminthes. Of the isolated helminthes, the species included *Toxocara* sp. (3%), *Ascaris lumbricoides* (3%), *Trichostrongylus* sp. (1.5%), *Trichuris trichiura* (1.5%), unidentified nematode egg samples (3%). The protozoa types that were identified included *Endolimax nana* (7.6%), *Blastocystis hominis* (41%), *Entamoeba histolytica/E. dispar* (16.7%), *Eimeria* spp. (7.6%), *Chilomastix mesnilli* (4.5%), Entamoeba coli (35%), *Giardia* sp. (13.6%), *Iodamoeba butschlii* (7.6%). In conclusion, *Blattella germenica* was found to harbor intestinal parasites of public health importance. Hence, awareness on the potential role of cockroaches in the mechanical transmission of human intestinal parasites needs to be created. Therefore, control of cockroaches will substantially minimize the spread of infectious diseases in our environment.

Objectives

The cockroach poses are one of the greatest health hazards of all households' pests. Millions of them live in our homes, hotels, restaurant kitchens, shops, supermarkets and bars, spreading diseases which can prove fatal to humans. Many cases of food poisoning are known to be as a result of cockroach contamination. Thirty species of cockroaches are associated with human habitations, but only a few of these species inhabit human dwellings. The most common of these are the American cockroach (*Periplaneta americana*) and the German cockroach (*Blattella germanica*) [1,2]. The majority of these species live in tropical and subtropical area but are not pests [3], so they found in abundance near areas where there is frequently standing water or areas where continued moist is usually available such as toilets, kitchen and drainages water frequently serve as a migration routes from place to place [4]. Cockroaches frequently feed on human feces, garbage and sewage, therefore they have copious opportunity to disseminate pathogenic agents [5]. They are known as one of the most important agents in transmission and distribution of many different bacteria, viruses, protozoa and fungi to human life, and they are intermediate host for some pathogenic intestinal worms . In addition to the presence of some bacteria, parasites and fungi in external surfaces of cockroaches they have been found in internal parts of their body, therefore these insects are considered as important diseases vectors transmitted by both mechanical and biological routes [6].

Despite the abundance of cockroaches in residential areas in Van, Turkey and the high prevalence of intestinal parasites in this province [7], to our knowledge, there is no documented data on the role of cockroaches as carriers of intestinal parasites in Van, Turkey. Because of lack of information on the role of cockroaches in carrying these human parasites the present study was conducted to isolate and identify parasites from external surface of the cockroaches *Blattella germanica* which were collected from some houses and apartments in Van.

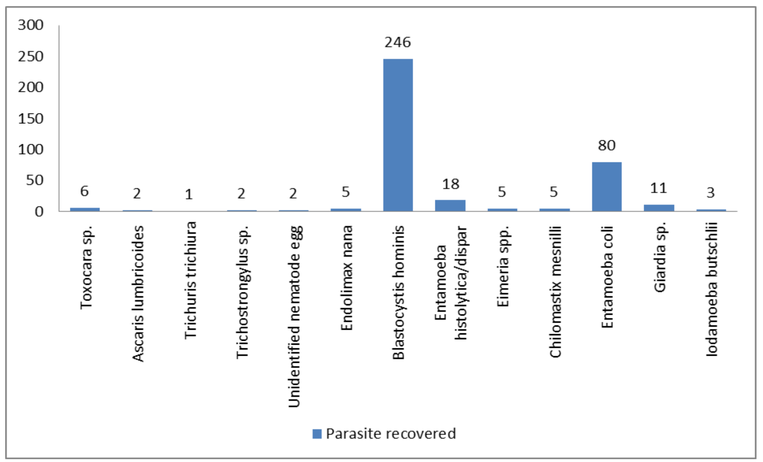
Methods

One hundred and thirty-eight adult cockroaches were collected between March and April 2014 for parasitological studies. Seventy-five cockroaches were trapped from different parts of apartments and sixty-three from some houses. Samples were transported alive to the laboratory where they were immobilized by freezing at 0 °C for 10 min. The cockroaches were identified using morphology as well as standard taxonomic keys. Only adult cockroaches that were caught alive and without missing any body parts were used in this study.

Isolation and Identification of Parasites

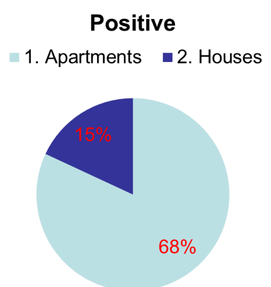
After identification, each cockroach was placed in a test tube containing 2 ml of normal saline. The test tube was shaken strongly for two minutes to detach any parasite or their stages from the external body of the cockroach. Ever after, the fluid was transferred to a centrifuge tube and centrifuged at 3000rpm for 5 minutes. After decanting the excess top fluid, the residual deposit was placed on a clean glass slide, covered with a cover slip and stained with Lugol's iodine and viewed under the x40 microscope objective lens. The parasites and/or their stages encountered were identified and counted using keys of Cheesbrough [8].

Study Areas	No. Examined	No. Positive
Apartments	75	51 (68 %)
Houses	63	15 (24 %)
Total	**138**	**66 (48 %)**



Results

A total of 138 cockroaches were studied, all were identified as Blattella germanica (138). In this study, 48 % of the 138 cockroaches that were entoiled from four houses and two apartments in Van had helminthes and protozoa on their external surfaces, indicating that they are carriers that are capable of mechanically transmitting these parasitic organisms.



Conclusions

The results from this study revealed that cockroaches were contaminated with many intestinal parasites. This may be caused by sewage overflow on the ground floor due to disturbances in the sewage system in the apartments and houses. After resting and contaminating the environment with infective matter carried on the body surface, they can transmit the infection to the community. The finding of this study sheds light on the potential role of cockroaches in the mechanical transmission of human intestinal parasites; so, the control of cockroaches could considerably minimize the spread of infectious diseases.

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