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KNOWLEDGE, ATTITUDE AND PRACTICES REGARDING TUNGIASIS IN POPULATION OF LAHORE, PUNJAB, PAKISTAN

Zunaira Wasif*[1] Muhammad Saqlain[2], Arooj Fatima[3], Atija Waris[4], Sadaf Sattar[5], Nimra Shahzad[6], Rana M. Kamran Shabbir[7], Sikandar Hayat[8], Imran Tipu[9]

*[1]*Department of Zoology, Lahore College for Women University, Lahore, Pakistan*
[2,4,5,6,8]*Institute of Molecular Biology and Biotechnology, The University of Lahore, Pakistan*
[3,9]*Department of Life Sciences, School of Science, University of Management and Technology, Lahore, Pakistan*
[7]*Department of Zoology, Division of Science and Technology, University of Education, Lahore, Pakistan*

*[1]zunairawasif444@gmail.com

ABSTRACT

Tungiasis is a zoonotic disease caused by female sandflea (Tunga penetrans). The fleas typically inhabit sandy environments, tropical and sub-tropical habitat of world. Main goal of the study was to find out the knowledge, attitude and practices of tungiasis among the population of Lahore. The prevalence of tungiasis and sociodemographic variables were analyzed descriptively. In this study, total 800 people have been questioned about tungiasis from 18 towns. The knowledge about tungiasis were 62.1%. The prevalence of tungiasis were most in animals as compared to human. Mostly the animals affected by tungiasis were cow and buffalo. Attitude of respondents for protection of animals from tungiasis were 59.3%. Several treatments coconut oil, ethanol and glycerine were applied by respondents to cure their animals from tungiasis. Further questionnaire responses indicates that respondent make efforts to the clean place of animals, keep good hygiene, wear shoes, washing hands after dealing with animals for the prevention of tungiasis. There should be awareness campaigns regarding the mode of transmission of tungiasis and its preventative strategies.

Keywords: *Lahore, Tunga penetrans, tungiasis, zoonotic disease, KAP*

INTRODUCTION

The term "zoonotic diseases" or "zoonosis" refers to illnesses that can sometimes be contracted from animals and then transferred to humans (Suzuki *et al*., 2023). Hematophagy is thus shared by both sexes. Only female fleas, however, may enter the skin of the host and feed on blood and exudates to mature their eggs. Female fleas grow, fill with eggs, go through a five-stage developmental process, and cause pathological skin changes known as tungiasis once they have entered the top layer of skin (Ariza *et al*., 2010). Some victims of insidious assaults must have their toes and digits amputated due to consequences such as tissue necrosis, fissures, and gangrene. Jigger flea, also known as *Tunga penetrans* in the scientific community, is an ecto-parasite typically found in soiled and dusty environments. It is the cause of the skin condition tungiasis (Obebe and Aluko, 2020).

The flea can only jump a short distance therefore; an infestation usually effects on feet. Penetration mainly takes place in the periungual region, though it can occur anywhere else on the body (Okoth 2015). After 24 hours, the penetration site is swollen and unpleasant. The host scratches the lesion because of the unavoidable pruritus, which helps the egg ejection procedure. Without adequate treatment, secondary

infections are consistently detected. Tungiasis lesions have generated strains of *C. tetani, S. pyogenes*, pathogenic *S. aureus, K. aerogenes, E. agglomerans, E. coli,* and several *Enterobacteriaceae*. The point of the lesion was connected to a 10% admission risk for tetanus in a study conducted in the Brazilian state of Sao Paulo (Nyangacha *et al*., 2017). *T. penetrans* infection can affect a wide variety of mammals, whether they are domestic, wild, or peri-domesticated. The research that is now accessible suggests that *T. penetrans* infections have a considerable influence on growth rate, leg abnormalities, and bacterial infection, even if the economic effects of these infections on animal output have not been adequately studied (Feldmeier et al., 2013).

The research reveals a considerable incidence of animal tungiasis as well as a clear link between the disease prevalence and parasite burdens in humans and animals. Pigs were discovered to be the most important domestic animal hosts for *T. penetrans*. The effects it has on domesticated animals and people, however, are not well understood (Harvey et al., 2019) The acute phase is characterized by persistent erythema, edema, desquamation, discomfort, and itching. Scratching the lesion results in itching, encouraging bacterial superinfection. Surgery is the main treatment for burrowing sand fleas in endemic regions, and patients or caregivers often perform the procedure. Buried parasites are removed with tools like sticks, hairpins, sewing needles, or scissors when sterile conditions are not present (Tardin *et al*., 2021). Biological procedure of treating jiggers comprises manually applying leaf extract like neem and aloe Vera. tungiasis has been successfully treated with zanzarin, a substance derived from jojoba oil, aloe vera extracts, and coconut oil, in Brazil. These oral medications help prevent jigger-related acute illnesses while also being environmentally friendly and effective prophylactic measures. Neem mixture is used to interior flooring as well as exterior animal sitting regions to destroy jigger flea. It is harmless to the environment and non-toxic (Elson *et al*., 2019).

Jiggers are treated, controlled, and prevented from harming people via chemicals. Pesticides, that decapitate or deter jiggers, are the best and fastest way to control an infestation. Propoxur, an insecticide dust or spray, is another effective substance applied as in treatment (Heukelbach et al., 2021). DDT was widely utilized kill insects, which led to a decline in Tungiasis by the 1950s. Due to this parasitic treatment, *Tunga penetrans* was eliminated in many regions. Using covered shoes may operate like a protective border towards jigger prevention despite the fact that it is sanitation precaution (Joseph *et al*., 2006). Prepared shaker bottles are also physical equipment being used to enhance chemical treatment on animals as well as surfaces. Cleaning should be properly managing and get rid of jiggers as well as their carrier (Obebe and Aluko, 2020).

Material and Methods

Study area

Lahore was the primary study area. Lahore is the most populous city in western Punjab, Pakistan. The population is made up of 52.35% men, 47.64% women, and 0.01% transgender people. The 82% of Lahore's population assorted as urban and 18% categorized as being ruler (Shirazi and Kazmi 2014).

Study design

The study was conducted in Lahore. The study got under way in September 2021. There were four categories in the data that was gathered. A simple questionnaire was created with questions that respondents from both urban and rural locations could easily answer. There are 15 questions in total, divided into four major categories.

Data collection

Starting at Shahdara town in Lahore, the first survey was conducted in November 2021. Different types of responses were observed during our study. The same researchers continued to conduct study. Information was gathered from 15 different places in Lahore. From Lahore, we finished our studies in January 2022.

Data Analysis

Both dependent and independent variables were used in this study. Gender, age, occupation, were the independent factors. While the dependent variables were knowledge, attitudes, and practices which are tungiasis-related. After entering the data into an excel database, it was cleaned up and then moved to SPSS version 25.0 to perform data analysis. Descriptive statistics were used throughout data analysis (Frequencies distributions).

Results

Sociodemographic characteristics are presented in table 1. The respondents in our study were male 53.1% and female 46.9% with age ranges from up to 20 and more than 40. The occupation described by our respondents were agriculture 33.7%, business 38.7%, employed 11.5% and student 16.0%.

Table 1. Sociodemographic characteristics of 800 questionnaire respondents.

Socio-Demographic Characteristics	Number	(%)
Gender		
Male	475	53.1
Female	375	46.9
Age		
Upto 20	123	15.3
21 to 30	207	25.8
31 to 40	159	19.8
More than 40	311	38.8
Occupation		
Agriculture	270	33.7
Business	310	38.7
Employed	92	11.5
Student	128	16.0

Total, 800 people were questioned about tungiasis from Chiniot. In this study, the knowledge about tungiasis in the respondents were 62.1%. When asked that tungiasis is seasonal disease respondents (n=519/800; 64.8%) said ‘’yes’’. When respondents asked about female sandflea cause tungiasis (n=419/800; 52.3%) said ‘’yes’’. Animals affected by tungiasis were (n=458/800; 57.3%). Only 3.6% of individual in studied population were affected by tungiasis. Mostly the animals affected by tungiasis were cow and buffalo (n=657/800; 82.1%). Attitude practices followed by respondents (n=475/800; 59.3%) like to spray at the place of their animals to protect them from tungiasis. The traditional treatments used for treatment were (coconut oil n=304/800; 38.0%), (ethanol n=267/800; 33.3%), (glycerin n=229/800; 28.6%). And 79.0% of respondents think that using unsterile instruments can cause hepatises, HIV. Practices followed by respondent (n=437/800; 54.6%) wear shoes, (n=363/800; 45.3%) keep good hygiene when the walk at the place of animals, (n=710/800; 88.7%) wash hands after dealing with animals, and (n=641/800; 80.1%) cleans regularly the place of their animals to prevent them from tungiasis and other contagious diseases.

Table 2. Knowledge, Attitude and Practices frequencies regarding tungiasis.

Knowledge based questions	Response	Number of responses	(%)
Do you know about Tungiasis?	No	303	37.9
	Yes	497	62.1
Do you think tungiasis is a seasonal disease?	No	281	35.1
	Yes	519	64.8

Do you know about female sand fleas caused tungiasis	No	381	47.6
	Yes	419	52.3
Have your animal ever get infected by tungiasis?	No	342	42.8
	Yes	458	57.3
Have you or your family member ever infected by tungiasis?	No	771	96.3
	Yes	29	3.6
Which animals affected most by tungiasis?	Buffalo, Cow	657	82.1
	Buffalo, Cow, Sheep, Goat	44	5.5
	Buffalo, Cow, Sheep, Goat, Horse, Donkey, Camel	35	3.0
	Dog, Cat, Sheep, Cow, Goat, Buffalo, Donkey, Horse, Camel	64	5.4
Attitude based questions			
Would you like to spray, to protect yourself and your animal from tungiasis?	No	325	40.6
	Yes	475	59.3
What traditional treatments would you prefer for your animals?	Coconut oil	304	38.0
	Ethanol	267	33.3
	Glycerin	229	28.6
Do you think using for extraction unsterile instruments in tungiasis leads to other diseases like AIDs, Hepatitis etc.	No	168	21.0
	Yes	632	79.0
Practice based questions			
What are preventive measures you take to protect yourself from tungiasis?	Keep good hygiene	363	45.3
	Wear shoes	437	54.6
Do you wash hands after dealing with your animals?	No	90	11.2
	Yes	710	88.7
Do you daily clean the place of your animals?	No	159	19.8
	Yes	641	80.1

Discussions

Overall, 1100 respondents 82.8% were aware that sand fleas cause tungiasis. Many persons had a profound understanding regarding the parasite life cycle including the biological traits of sand fleas, according to open-text responses. Some individuals went into great detail regarding the growth of imbedded sand fleas, known of blood sucking, and were familiar with the development as well as discharge of eggs and many were aware about the zoonotic mode of transmission and infected animals are major risk for tungiasis 41.6% (Thielecke *et al*., 2023). According to the findings of this study, the knowledge about tungiasis in respondents were 62.1%. The majority of household heads (75.7%) knew only a little about tungiasis. About 19.2% of people knew very little about the illness, compared to 5.1% who knew a great deal (Gitau et al., 2021). In this study, the knowledge of tungiasis were 62.1%.

80% of pigs, 24% of dogs, 16% of goats, 8% of cats, as well as 5% of sheep had tungiasis. Animals investigated in the community kraal level had a tungiasis rate of 19.5%, which was similar to the 11.9% rate seen in animals discovered inside of homes (Mutebi *et al*., 2023). In this study, the animals affected by

tungiasis were buffalo, cow 82.1%, buffalo, cow, sheep, goat 5.5%, cat, dog 4.4%, dog, cat, sheep, cow, goat, buffalo, donkey, horse, camel 8.0% were infected by tungiasis (Table 01).

Similarly, to various parasitic diseases, these inconsistencies may appear if attack rates fluctuate throughout a period of time or if rates of prevalence are calculated for several times of the year. In fact, locals in northeastern Brazil assert that tungiasis become a catastrophe each year throughout the dry season's (Anyaele and Enwemiwe, 2021). Patterns of rainfall as well as prevalence intersect, which shows that assault rates peaked in September when there was no precipitation and began to rise quickly as soon as it ceased to rain (in July). Presumably declining instances of attack were promptly followed by a sharp decline in prevalence in January when it stopped raining in December (Velev, 2022). In the present study, 64.8% of the respondents thinks that prevalence of tungiasis varies with seasonal variation as climate changes it become more prevalent.

Nearly all participants in a prior study on the eradication of *T. penetrans* fleas favored employing thorns, razors, pins, and needles; this result is consistent with research done in Tanzania, Uganda, Kenya, and Nigeria. However, because of these risky behaviors, blood-borne diseases including the hepatitis B and C virus and perhaps HIV could be transmitted (Nsanzimana *et al*., 2019). The findings of current study show, 79.0% of respondents thinks that sing unsterile instruments like needles, pins etc. can causes HIV, hepatitis and several other contagious diseases.

The owners of animals (n = 657) who responded to the practice component of the KAP survey gave a variety of replies regarding how frequently they cleaned their animals' quarters. 35.2% of respondents said they cleaned the premises at least once every two days, compared to 45.4% of respondents (n = 298) who said they cleaned their homes infrequently 28.2%, rarely 17.2%, or never at all. The two most often mentioned preventive approaches were keeping animal abodes clean 54.5%and uses insecticides spray at the place of animals 67% (Tardin *et al*., 2021). 80.1% clean the place of animals regularly and 59.4% liked to spray at place of animals (Table 01).

Tungiasis is also treated with topical medications including potassium permanganate and the plant-based repellant zanzarin, both of which are derived from coconut oil. They get rid of free-living fleas, suffocate neosomic ones, and eventually permanently fix the pathology caused by tungiasis. Kerosene, and pesticides, are utilized in Brazil and Madagascar (Abrha *et al*., 2021). Various treatments for tungiasis were employed, including insecticidal compounds known as grease, petroleum jelly, disinfectants like Dettol, and medicinal herbs. An agricultural insecticide for growing tomatoes is administered in rural Uganda (Adriko, 2022). Several traditional treatments were observed 38.0% coconut oil, 33.3% ethanol, 28.6% glycerin by the respondents to cure the animals affected by tungiasis.

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