**INCIDENCE OF DOG BITE INJURIES AND ITS ASSOCIATED FACTORS IN PUNJAB PROVINCE OF PAKISTAN**

**By**

**Tahir Abbasi**

**20-CUVAS-0682**

**A THESIS SUBMITTED IN THE PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE DEGREE OF**

**DOCTOR OF PHILOSOPHY**

**IN**

**EPIDEMIOLOGY & PUBLIC HEALTH**

****

**DEPARTMENT OF EPIDEMIOLOGY & PUBLIC HEALTH**

**CHOLISTAN UNIVERSITY OF VETERINARY AND ANIMAL SCIENCES BAHAWALPUR**

**PAKISTAN**

**2022**

**DECLARATION**

I hereby declare that the contents of the thesis, “***Incidence of dog bite injuries and its associated factors in Punjab province of Pakistan***” are product of my own research and no part has been copied from any published source (except the references, standard mathematical or genetic models/ equations/ formulate/protocols etc.). I further declare that this work has not been submitted for award of any other diploma/degree. The University may take action if the information provided is found incorrect at any stage.

**TAHIR ABBASI**

**20-CUVAS-0682**

**The Controller of Examinations,**

**Cholistan University of Veterinary and Animal Sciences**

**Bahawalpur**

We, the Supervisory Committee, certify that the contents and form of thesis submitted by, Tahir Abbasi with registration no. 20-CUVAS-0682, have been found satisfactory and recommend that it be processed for evaluation by the External Examiner(s) for the award of degree.

**Supervisory committee:**

1. **Supervisor**

(Dr Tariq Abbas)

1. **Co-Supervisor (if applicable)**

(Name with salutation)

1. **Member**

(Dr Muhammad Nisar)

1. **Member**

(Dr Qudratullah)

**DEDICATION**

To my parents for their unwavering love and support throughout my life. Their encouragement and belief in me has been a constant source of strength and motivation.

**ACKNOWLEDGEMENTS**

I would like to express my deepest appreciation to my thesis advisor, **Dr Tariq Abbas**, for his invaluable guidance, patience, and support throughout the research and writing process. His expertise and constructive feedback greatly contributed to the success of this thesis.

I would also like to extend my gratitude to the members of my thesis committee, Dr **Muhammad Nisar**, and **Dr Qudratullah** for their valuable insights and suggestions.

Finally, I would like to acknowledge the financial support provided by [Name of Funding Agency] for this research

**TAHIR ABBASI**

**CONTENTS**

|  |  |  |
| --- | --- | --- |
| CHAPTER | TITLE | PAGE NO. |
| **1** | **INTRODUCTION** |  |
| **2** | **REVIEW OF LITERATURE** |  |
| **3** | **MATERIALS AND METHODS** |  |
| **4** | **RESULTS** |  |
| **5** | **DISCUSSION** |  |
|  | **LITERATURE CITED** |  |

**LIST OF TABLES**

|  |  |  |
| --- | --- | --- |
| TABLE NO. | CAPTION | PAGE NO. |
| 3.1 | Output of simple linear (univariate) regression analysis | 34 |
| 3.2 | Output of multiple linear regression models | 36 |

**LIST OF FIGURES**

|  |  |  |
| --- | --- | --- |
| FIGURE No. | CAPTION | Page No. |
| 3.1 | Annual incidence of dog bites per 100000 of population at risk in Punjab, Pakistan (2016-2019) | 37 |
| 3.2 | Pair-wise spearman’s correlation coefficient (r) and coefficient determination (r2) between study variables | 38 |

**LIST OF APPENDICES**

|  |  |  |
| --- | --- | --- |
| Sr. No. | Title | Page No. |
|  |  |  |

**ABSTRACT**

Dog bites are a major cause for transmission of rabies virus to humans. Pakistan ranks fifth among most rabies affected countries in the world. There are a few regional (ecological) studies that investigate factors that explain geographic disparities in incidence of dog bite injuries. The main objective of this research was to document findings of spatial exploratory data analysis of incidence of reported cases of dog bite in Punjab province of Pakistan (2016-2019). In addition, we have quantified the association between incidence of dog bites and a set of selected socio-economic and demographic variables. District-wise data about reported cases of dog bite from 2016 to 2019 were used to map annual crude incidence per 100000 of population. There was an obvious spatial variation in incidence of dog bites but there was no evidence of spatial autocorrelation. The risk of dog bite attacks was relatively higher in districts with low human population density (per sq. km), poor literacy rate, more rural population (% of total population), and lower median nighttime lights. We conclude that incidence of dog bites is relatively higher in most districts of the Punjab because observed incidence was greater than expected incidence in seventeen out of thirty six districts considered. The problem of dog bites is endemic across the province as no hotspot was detected keeping the district as a unit for spatial analysis. However, it may be interesting to do either spatial or spatiotemporal analysis with sub-district level data (sub-districts locally called “tehsils”). The predictor variables considered in this study were found to have weak but still significant association. The fitness of the model should be improved by strengthening case reporting and exploring additional covariates.