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Research Article

The health risks of *Columba livia* Infestation: A public Health Concern of Thane District, Maharashtra

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Abstract— *Columba livia*, commonly known as the domestic pigeon, is a ubiquitous bird species found throughout the country. With a long history of association with humans, pigeons have been domesticated for various purposes, including food, sports, research, and as ornamental birds. However, the close association between pigeons and humans has a darker side. As pigeons come into contact with human populations, they pose a significant risk to public health. These birds can carry a variety of pathogens, including bacteria, viruses, and fungi, which can cause diseases in humans. The proximity of pigeons to human settlements, coupled with their ability to thrive in urban environments, makes them a potential reservoir for zoonotic diseases. The present study deals with the health issues when get exposed to pigeon.

Keywords-- *Columba livia*, Zoonotic disease, Respiratory disorder, Hypersensitivity pneumonitis, Human population

1. Introduction

For thousands of years, pigeons have been closely associated with human beings. These birds have been utilized for various purposes, Pigeons have been used as messengers throughout history, particularly during times of war, racing and breeding have been popular hobbies for centuries and many people keep pigeons as pets. However, studies have revealed a darker side to this relationship. Pigeons carry pathogens that can be harmful to humans, and their feathers can exacerbate respiratory issues, leading to Breathlessness, Allergies, Hypersensitivity pneumonitis [1]. It is essential to acknowledge both the benefits and risks associated with human-pigeon interactions to ensure a safe and healthy coexistence.

Pigeons are known to carry various pathogens, including bacteria, viruses, and fungi. These pathogens get transmitted to humans through direct contact with pigeon excreta, secretions, or feather dust [2]. The most commonly reported pathogens associated with feral rock-doves are Chlamydophila psittaci and Cryptococcus neoformans [3,1].

Hypersensitivity pneumonitis (HP) is a kind of allergy that cause inflammation in the small air sacs of lung, this is basically lung disease caused by the regular exposure to a variety of organic antigens, including bacteria, fungi, and proteins [5]. It is considered one of the most common causes of HP is exposure to avian antigens, particularly those from feral pigeons [6]. Feral pigeons, with their ability to thrive in urban environments, have become a ubiquitous feature of megacities worldwide, including Mumbai and Thane, India.

The rapid urbanization and lack of effective waste management in Mumbai and Thane have created an ideal environment for feral pigeon infestation. These birds, with their droppings and feathers, can contaminate buildings, homes, and public spaces, Rock-doves cause significant damage to buildings and infrastructure, particularly through their droppings and nesting activities. Their tenacious behavior can lead to the destruction of original architectural and structural designs, resulting in costly repairs and maintenance [7,8].

Despite the potential health risks, there is a paucity of data on the burden of HP due to feral pigeon infestation in this region HP is a significant public health concern, as it can lead to chronic respiratory disease, lung fibrosis, and even death [9]. The disease is often misdiagnosed or underdiagnosed, particularly in regions with limited access to healthcare

services [10]. In India, where the healthcare system is often overwhelmed by infectious diseases such as tuberculosis and pneumonia, HP may be overlooked or neglected.

The urban environment of Mumbai and Thane presents unique challenges for the control and prevention of HP. The cities' high population density, poor air quality, and inadequate waste management practices create an environment conducive to the growth of microorganisms that can trigger HP [11]. Furthermore, the inadequacy of effective public health and limited awareness about HP among healthcare providers and the general public intensify the problem [12].

Several studies have investigated the relationship between feral pigeons and HP in urban environments. In North India found that feral pigeons were a significant source of avian antigens, which were associated with an increased risk of HP [6]. Another study found that pigeons carry pathogens such as *Salmonella* and *Escherichia coli*, which can exacerbate HP [12].

Despite these findings, there is a need for further research on the burden and risk of hypersensitivity pneumonitis due to feral pigeon infestation in megacities like Mumbai and Thane. This study aims to investigate the incidence and risk of hypersensitivity pneumonitis due to feral pigeon infestation in Thane, India. By understanding the burden of hypersensitivity pneumonitis in this context, we can inform public health policy and develop targeted interventions to reduce the incidence of this disease.

2. Material and Methods

The study was carried out in Thane District, Maharashtra in 2024-25 for the period of 9 months to determine the details of growing population of feral pigeon on the human health. Random sampling was carried out by involving 200 residents who were willing to participate. Informed consent was obtained from all the participants and a pretested questionnaire was used to collect information regarding,
I) exposure to pigeons
II) Development of Respiratory symptoms like cough, fever, breathlessness, weakness and weight loss
III) Relationship of symptoms with exposure to pigeons
IV) Absence of other lung diseases

Inclusion Criteria - Sample from residents living in close proximity to the pigeon feeding grounds were taken and who were willing to participate in the study.

Exclusion Criteria -
1) Residents who were not willing to participate.
2) Participants who had other known respiratory diseases.

Statistical Analysis:

1. Participants who come in contact with pigeons regularly are considered to have history of exposure to pigeons.
2. Participants that come in contact with pigeons rarely or never are considered to be unexposed
3. The participants that had history of exposure to pigeons and also had presence of any one of the respiratory symptoms [I) cough II) breathlessness III) fever, weakness, weight loss] were identified. They were further enquired if the symptoms were recurrent and whether they occurred after 4-8 hours of exposure to pigeons
4. Lastly these participants were enquired about history of any lung disease or history of smoking which may contribute to the respiratory symptoms. Those that had it were excluded from the study.
5. Participants (who were healthy without any Respiratory disease) who had a history of exposure along with presence of respiratory symptoms that are recurrent and occur after exposure to pigeons were considered as Hypersensitivity pneumonitis on clinical basis.[13]

3. Results

Out of the total 200 participants surveyed 124 reported exposure to pigeons, among them 27 reported recurrent respiratory symptoms on exposure as per the response. Among the 76 unexposed participants, 3 reported respiratory symptoms.

Table 1. Comparison of symptoms between pigeons exposed and unexposed Individuals

Symptoms	Symptoms present	Symptoms absent
Exposed to pigeons	27	97
Unexposed to pigeons	3	73

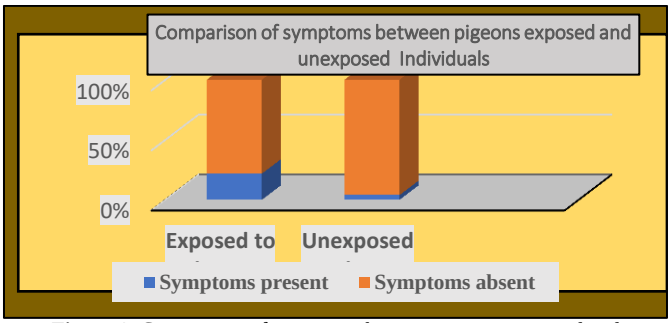

Figure 1. Comparison of symptoms between pigeons exposed and unexposed Individuals

The incidence of respiratory symptoms in participants exposed to pigeons is 0.218(21.8%) and the incidence of respiratory symptoms in participants unexposed to pigeons is 0.04(4%). The total incidence of respiratory symptoms in the study population is 0.15(15%) Table 1.

The Relative risk of development of Respiratory symptoms on exposure to pigeons is 5.45 which indicates positive association between exposure to pigeons and development of respiratory symptoms as Relative risk is >1. The attributable risk is 81.65% and the population attributable risk is 73.33% Figure 1.

4. Discussion

The present study was conducted among residents of Thane region residing near the pigeon feeding ground. The objectives of the study determine the incidence of symptoms of respiratory disorder among residents of Thane and to determine whether there is increased risk of symptoms of hypersensitivity pneumonitis in people that were exposed to pigeons regularly. Thane region was selected as the site as pigeon population here is quite large [14,15]. Focuses only on the clinical symptoms of respiratory disorder, hypersensitivity pneumonitis and not the lab diagnosis or imaging studies. [13]

The data was collected using a pretested questionnaire. The participants who were having presence of recurrent attacks of respiratory symptoms 4-8 hours after exposure to pigeons were considered to be hypersensitivity pneumonitis on clinical basis. The symptoms, duration of exposure and recurrence were [13].

There are very few researches conducted in Thane region to know the incidence of hypersensitivity pneumonitis and other health issue related with pigeon. So this research may provide insight into it. Among the total participants around 59% were men and 41% were women. The majority of the participants were in the age group of 20-45.

The total incidence of respiratory related problem in the present population was found to be 15%. In this study it is found that incidence of respiratory symptoms in participants exposed to pigeons higher (21.8%) than the incidence of respiratory symptoms in participants unexposed to pigeons (4%).

The Relative risk of development of Respiratory symptoms on exposure to pigeons is 5.45 which indicates positive association between exposure to pigeons and development of respiratory symptoms as Relative risk is >1.

These findings indicate a positive relationship between exposure to pigeons and development of symptoms of hypersensitivity pneumonitis. Similar results were found in a Denmark study [16]. It is well identified that pigeons transmit diseases and cause pulmonary disorders in pigeon keepers/breeders, very little is available in the scientific/medical literature regarding the impact of this 'addiction' on the psychological and mental health of the individuals and family life/relations. [17]. The current study provides a useful insight of incidence of health issues related to respiratory symptoms in Thane as well as increased incidence with exposure to pigeons. These findings can help to develop public health policies

5. Conclusions

Our study found that there is increased incidence of symptoms of respiratory disorder in people exposed to pigeons. pigeon pose a significant threat to human health and ecosystems. The health issues arising due to pigeon highlights the need for effective management strategies to control their populations and also mitigate disease transmission. Further research is necessary to understand the complex relationships between pigeon, humans, and the environment, and to develop evidence-based solutions to address this emerging public health concern.

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