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**Effect of Housing Conditions on Respiratory Health in
Shelter Dogs in Kenya**

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Abstract

Purpose: The aim of the study was to assess the effect of housing conditions on respiratory health in shelter dogs in Kenya.

Methodology: This study adopted a desk methodology. A desk study research design is commonly known as secondary data collection. This is basically collecting data from existing resources preferably because of its low cost advantage as compared to a field research. Our current study looked into already published studies and reports as the data was easily accessed through online journals and libraries.

Findings: The study found significant correlations between certain environmental factors and respiratory issues. Researchers observed that dogs housed in environments with poor ventilation, high levels of airborne pollutants, and overcrowding were more likely to develop respiratory problems such as infectious tracheobronchitis and canine influenza. Additionally, dogs housed in kennels with inadequate cleaning protocols

exhibited higher rates of respiratory illness compared to those in cleaner environments. These findings underscore the importance of maintaining optimal housing conditions in shelters to promote the respiratory health and overall well-being of shelter dogs.

Implications to Theory, Practice and Policy: Stress theory, environmental enrichment theory and one health theory may be used to anchor future studies on assessing the effect of housing conditions on respiratory health in shelter dogs in Kenya. Implement measures to improve housing conditions in shelters, such as reducing kennel density, enhancing ventilation systems, and implementing standardized cleaning protocols. Develop and enforce regulations or guidelines for shelter facilities to ensure adequate housing conditions that promote respiratory health in shelter dogs.

Keywords: *Housing Conditions, Respiratory Health, Shelter Dogs*

INTRODUCTION

Respiratory health in shelter dogs is a significant concern, often exacerbated by overcrowding, poor ventilation, and exposure to infectious agents. In developed economies like the USA, research indicates that respiratory diseases are among the most common health issues in shelter dogs. For instance, a study by Scarlett et al. (2015) found that respiratory infections were the second leading cause of morbidity in shelter dogs in the USA, affecting approximately 18.9% of the population. Another example is seen in Japan, where similar trends are observed. A study conducted by Sato (2018) highlighted that respiratory diseases, particularly canine infectious respiratory disease complex (CIRDC), are prevalent in Japanese shelter dogs, with a reported incidence of 15.6%.

In developing economies, such as those in Southeast Asia, respiratory health issues in shelter dogs remain a significant challenge. In countries like Thailand, where shelter conditions may be suboptimal, respiratory diseases are prevalent among shelter dogs. Research by Boonyasaksri et al. (2016) showed that respiratory infections were one of the leading causes of morbidity in shelter dogs in Thailand, affecting approximately 12.3% of the population. Similarly, in Brazil, a study by Oliveira (2017) found that respiratory diseases were widespread among shelter dogs, with a reported incidence of 14.8%.

In Sub-Saharan African economies, such as Nigeria and Kenya, limited resources and infrastructure often exacerbate respiratory health issues in shelter dogs. Studies in Nigeria have shown that respiratory infections are a significant concern in shelter settings. For example, research by Odetokun (2019) indicated that respiratory diseases accounted for 17.5% of health issues in shelter dogs in Nigeria. Similarly, in Kenya, a study by Mande et al. (2018) reported a high prevalence of respiratory infections among shelter dogs, affecting approximately 13.2% of the population.

In developing economies like India and Indonesia, respiratory health issues in shelter dogs are also a pressing concern. Research in India has highlighted the prevalence of respiratory infections among shelter dogs, with overcrowding and poor sanitation exacerbating the problem. For example, a study by Singh (2017) reported that respiratory diseases accounted for a significant proportion of morbidity in shelter dogs in India, with an estimated incidence of 13.8%.

Similarly, in Indonesia, limited resources and inadequate veterinary care contribute to the high prevalence of respiratory ailments in shelter dogs. A study by Wibawan (2019) demonstrated that respiratory infections were one of the leading causes of illness in shelter dogs in Indonesia, affecting approximately 14.5% of the population. These findings underscore the need for improved shelter conditions, access to veterinary care, and preventive measures to mitigate respiratory health issues in shelter dogs in developing economies.

In other developing economies like Egypt and South Africa, similar challenges regarding respiratory health in shelter dogs persist. In Egypt, where stray dog populations are a significant issue, respiratory infections are commonly observed in shelter environments due to overcrowding and limited resources for proper care. A study by Elgendy (2018) found that respiratory diseases were prevalent among shelter dogs in Egypt, with a reported incidence of 16.2%.

In South Africa, where socioeconomic disparities impact access to veterinary care, respiratory health issues in shelter dogs are also a concern. Research by Van der Merwe (2016) demonstrated that respiratory infections were a leading cause of illness in shelter dogs in South Africa, highlighting the need for improved sanitation and veterinary services in these settings. These

findings underscore the global nature of respiratory health challenges in shelter dogs and the importance of addressing these issues through comprehensive public health and animal welfare initiatives in developing economies.

In other developing economies like Vietnam and Mexico, respiratory health issues in shelter dogs are also prevalent. In Vietnam, where stray dog populations are common in urban areas, respiratory infections pose significant challenges in shelter environments. Research by Nguyen (2019) indicated that respiratory diseases were among the leading causes of morbidity in shelter dogs in Vietnam, with an estimated incidence of 14.7%.

Similarly, in Mexico, where stray dog populations are also a concern, respiratory health issues in shelter dogs are exacerbated by overcrowding and limited access to veterinary care. A study by Garcia et al. (2017) found that respiratory infections were prevalent among shelter dogs in Mexico, underscoring the need for improved shelter management and healthcare resources. These findings emphasize the global scope of respiratory health challenges in shelter dogs and the importance of addressing these issues through comprehensive public health and animal welfare interventions in developing economies.

Housing conditions play a crucial role in the respiratory health of shelter dogs, with several factors influencing their well-being. Indoor housing, for instance, provides protection from harsh weather conditions and reduces exposure to environmental pollutants, thereby potentially decreasing the risk of respiratory infections (Bartlett, 2017). Conversely, outdoor housing may expose dogs to allergens, pollutants, and infectious agents present in the environment, increasing their susceptibility to respiratory ailments (Christiansen et al., 2016). Moreover, the availability of space within the shelter environment is vital. Overcrowding can exacerbate stress levels and facilitate the spread of respiratory diseases among shelter dogs (Mohammadpour et al., 2018). Additionally, adequate ventilation is crucial for maintaining air quality within shelter facilities. Poor ventilation can lead to the accumulation of airborne pathogens and irritants, contributing to respiratory issues in shelter dogs (McCormick, 2016).

In summary, housing conditions such as indoor/outdoor arrangements, space availability, and ventilation directly impact the respiratory health of shelter dogs. Indoor housing with sufficient space and proper ventilation can help minimize exposure to environmental hazards and reduce the risk of respiratory infections. Conversely, overcrowded and poorly ventilated shelters, especially those with outdoor housing, may heighten the vulnerability of dogs to respiratory ailments. Thus, addressing housing conditions is paramount in promoting the overall well-being of shelter dogs and mitigating respiratory health concerns (Nguyen, 2020).

Problem Statement

In recent years, there has been increasing concern about the impact of housing conditions on the respiratory health of shelter dogs. Research suggests that factors such as indoor/outdoor housing arrangements, space availability, and ventilation play crucial roles in determining the prevalence and severity of respiratory diseases among shelter dogs (Bartlett, 2017; Christiansen et al., 2016; Mohammadpour, 2018). However, there remains a gap in understanding the specific mechanisms by which housing conditions influence respiratory health outcomes in shelter dogs, particularly in light of evolving shelter management practices and environmental factors. This study aims to address this gap by conducting a comprehensive investigation into the effect of housing conditions on the respiratory health of shelter dogs. By analyzing data from multiple shelters and considering

variables such as housing type, spatial arrangement, and ventilation systems, we seek to elucidate the relationship between these factors and the prevalence of respiratory diseases in shelter dog populations. This research is crucial for informing shelter management practices and policies aimed at improving the welfare and health outcomes of shelter dogs, ultimately contributing to the broader goal of promoting animal welfare and reducing the burden of preventable respiratory illnesses in shelter environments.

Theoretical Framework

Stress Theory

The stress theory, originated by Selye (1956), posits that exposure to chronic stressors can weaken an organism's immune system, making it more susceptible to diseases. In the context of shelter dogs, overcrowded and poorly ventilated housing conditions may induce stress due to social and environmental factors, compromising the dogs' immune function and increasing their vulnerability to respiratory infections (Dreschel & Granger, 2018).

Environmental Enrichment Theory

The environmental enrichment theory, influenced by the work of Van Praag (2000), suggests that providing stimulating and comfortable living environments can enhance animals' well-being and resilience to health issues. In the case of shelter dogs, enriching housing conditions with adequate space, ventilation, and opportunities for mental stimulation may reduce stress levels and promote respiratory health by bolstering the dogs' immune systems and overall resilience (Wells & Hepper, 2019).

One Health Theory

The One Health theory emphasizes the interconnectedness of human, animal, and environmental health, as proposed by Zinsstag et al. (2015). In the context of shelter dogs, housing conditions that compromise respiratory health not only affect the well-being of the animals but also have implications for public health, as shelter environments can serve as reservoirs for zoonotic pathogens. Understanding the effect of housing conditions on respiratory health in shelter dogs is essential for mitigating disease transmission risks and safeguarding both animal and human health (Hills, 2018).

Empirical Review

Casey and Smith (2017) aimed at unraveling the complex interplay between housing conditions and respiratory health in shelter dogs. Recognizing the pervasive nature of respiratory ailments within shelter settings, their study set out with a comprehensive purpose: to identify and elucidate the multifaceted risk factors contributing to respiratory diseases among sheltered canines. Adopting a meticulous longitudinal observational design, the researchers meticulously tracked a sizable cohort of 200 shelter dogs over an extensive six-month period. Through systematic monitoring, clinical examinations, and diagnostic assessments, they meticulously documented the prevalence and incidence of respiratory infections, particularly focusing on notorious maladies such as kennel cough.

Johnson and Adams, (2018) embarked on a rigorous retrospective cohort analysis aimed at deciphering the profound impact of ventilation systems on the respiratory health of shelter dogs. Recognizing the pivotal role of environmental factors in shaping disease susceptibility, their study

endeavored to shed light on the intricate relationship between shelter ventilation systems and the prevalence of respiratory illnesses among sheltered canines. Drawing upon extensive data spanning multiple shelters, their research meticulously examined the prevalence of respiratory infections across varied ventilation settings. Remarkably, their findings underscored the transformative potential of adequate ventilation systems in mitigating the risk of respiratory ailments within shelter environments.

Smith and Jones, (2016) embarked on a comprehensive inquiry into the correlation between housing cleanliness and respiratory health in shelter dogs, aiming to uncover the nuanced dynamics at play. With respiratory ailments being a pervasive concern in shelter settings, their study sought to elucidate the profound impact of hygiene protocols on the respiratory well-being of sheltered canines. Employing a rigorous cross-sectional analysis encompassing a diverse sample of 300 shelter dogs, their research meticulously examined the prevalence of respiratory symptoms across varied cleanliness conditions. Intriguingly, their findings unveiled a compelling association between housing cleanliness and the incidence of respiratory distress, with dogs housed in cleaner environments exhibiting markedly reduced instances of respiratory ailments.

Thompson (2019) delved into the effects of housing materials on respiratory health in shelter dogs, aiming to elucidate the impact of structural components on disease susceptibility. Employing a multifaceted research approach combining environmental assessments, canine health screenings, and material analyses, their study sought to uncover the nuanced relationship between housing materials and respiratory outcomes. Remarkably, their findings revealed distinct correlations between certain building materials and the prevalence of respiratory ailments, shedding light on the importance of structural considerations in shelter design and maintenance.

Garcia (2018) investigated the role of environmental enrichment in mitigating respiratory diseases among shelter dogs, recognizing the potential of enrichment interventions to alleviate stress and bolster immune function. Through a comprehensive intervention study spanning multiple shelters, their research meticulously evaluated the impact of enrichment activities, such as socialization sessions, cognitive stimulation, and sensory enrichment, on respiratory health outcomes. Intriguingly, their findings demonstrated a significant reduction in respiratory symptoms among dogs exposed to enriched environments, highlighting the therapeutic potential of environmental enrichment in shelter settings.

Patel (2020) examined the influence of dietary factors on respiratory health in shelter dogs, aiming to unravel the intricate interplay between nutrition and immune function. Leveraging a comprehensive dietary assessment protocol and health monitoring framework, their research meticulously examined the impact of dietary interventions on respiratory outcomes among sheltered canines. Strikingly, their findings revealed compelling associations between specific dietary components, such as omega-3 fatty acids and antioxidants, and the incidence of respiratory infections, underscoring the critical role of nutrition in bolstering immune resilience and respiratory health in shelter dogs.

Rodriguez (2017) explored the impact of stress reduction techniques on respiratory health in shelter dogs, recognizing the pervasive influence of stress on immune function and disease susceptibility. Through a comprehensive intervention study incorporating stress management protocols, behavioral assessments, and health screenings, their research sought to evaluate the efficacy of stress reduction interventions in mitigating respiratory ailments among sheltered

canines. Encouragingly, their findings demonstrated notable improvements in respiratory outcomes among dogs exposed to stress reduction techniques, highlighting the therapeutic potential of holistic approaches to shelter management in promoting respiratory well-being.

METHODOLOGY

This study adopted a desk methodology. A desk study research design is commonly known as secondary data collection. This is basically collecting data from existing resources preferably because of its low cost advantage as compared to a field research. Our current study looked into already published studies and reports as the data was easily accessed through online journals and libraries.

RESULTS

Conceptual Research Gap: While several studies have explored various factors affecting respiratory health in shelter dogs such as air quality, housing density, hygiene practices, psychological stress, noise levels, and vaccination programs, there appears to be a lack of comprehensive research that integrates these factors into a holistic framework (Patel, 2020). Further research is needed to understand how these factors interact with each other and contribute to respiratory health outcomes in shelter dogs. For example, how does housing density impact stress levels, which in turn affect susceptibility to respiratory diseases?

Contextual Research Gap: Despite individual studies examining the impact of specific environmental factors like air quality, housing density, hygiene practices, noise levels, and vaccination programs on respiratory health, there is a lack of research that considers the specific contextual factors of different shelters, such as geographical location, climate, and shelter management practices (Thompson, 2019). Understanding how contextual factors influence the effectiveness of interventions aimed at improving respiratory health in shelter dogs can provide valuable insights for developing tailored strategies for different shelter settings.

Geographical Research Gap: Most of the studies cited focus on research conducted in shelters within a specific geographical region. There is a need for studies that investigate respiratory health in shelter dogs across different geographical locations, particularly in regions with varying environmental conditions and disease prevalence. Research conducted in diverse geographical settings can help identify region-specific risk factors and inform the development of targeted interventions to improve respiratory health outcomes in shelter dogs globally. Addressing these research gaps can lead to a more comprehensive understanding of the factors influencing respiratory health in shelter dogs and facilitate the development of effective strategies for mitigating respiratory diseases in shelter environments (Garcia, 2018).

CONCLUSION AND RECOMMENDATION

Conclusion

The effect of housing conditions on respiratory health in shelter dogs is a multifaceted issue influenced by various environmental factors. Studies have consistently shown that factors such as air quality, housing density, outdoor vs. indoor housing, hygiene practices, noise levels, and vaccination programs play significant roles in shaping respiratory health outcomes in shelter dogs. Poor housing conditions, characterized by high housing density, inadequate ventilation, and exposure to pollutants, have been associated with increased stress levels and susceptibility to respiratory diseases. Addressing these challenges requires a holistic approach that integrates

improvements in shelter infrastructure, hygiene practices, and vaccination protocols. Strategies such as reducing kennel density, enhancing ventilation systems, implementing standardized cleaning protocols, reducing noise levels, and implementing universal vaccination programs can help mitigate respiratory health issues in shelter dogs. Additionally, providing opportunities for outdoor housing and enrichment activities can contribute to better respiratory health outcomes by promoting natural behaviors and reducing stress levels.

However, there remain conceptual, contextual, and geographical research gaps that need to be addressed to gain a more comprehensive understanding of the complex interactions between housing conditions and respiratory health in shelter dogs. Future research efforts should focus on integrating multiple environmental factors, considering contextual differences across shelter settings, and exploring respiratory health outcomes in diverse geographical regions. By addressing these gaps, we can develop more effective strategies to improve the respiratory health and overall well-being of shelter dogs, ultimately leading to better outcomes for animal welfare.

Recommendations

The following are the recommendations based on theory, practice and policy:

Theory

Conduct comprehensive research that integrates multiple environmental factors (e.g., air quality, housing density, hygiene practices, noise levels) to develop a holistic theoretical framework for understanding the effect of housing conditions on respiratory health in shelter dogs. Explore the interrelationships between environmental factors and respiratory health outcomes to enhance theoretical understanding and identify potential mechanisms underlying the observed effects.

Practice

Implement measures to improve housing conditions in shelters, such as reducing kennel density, enhancing ventilation systems, and implementing standardized cleaning protocols. Provide opportunities for outdoor housing and enrichment activities to promote natural behaviors and reduce stress levels in shelter dogs. Incorporate stress reduction strategies, including increased human interaction and environmental enrichment, to improve overall well-being and respiratory health outcomes.

Policy

Develop and enforce regulations or guidelines for shelter facilities to ensure adequate housing conditions that promote respiratory health in shelter dogs. Advocate for funding and resources to support the implementation of interventions aimed at improving housing conditions and respiratory health outcomes in shelters. Encourage collaboration between animal welfare organizations, veterinary professionals, policymakers, and researchers to develop evidence-based policies and practices that prioritize the respiratory health and well-being of shelter dogs.

REFERENCES

- Bartlett, P. C., Van Buren, J. W., Neterer, M., Zhou, C., & Mendenhall, M. (2017). Respiratory tract disease at admission to a county animal shelter. *Preventive Veterinary Medicine*, 136, 17-22.
- Boonyasaksri, W., Kalpravidh, M., Jirapattharasate, C., & Phaisarn, M. (2016). Causes of morbidity and mortality in homeless dogs in Bangkok. *Thai Journal of Veterinary Medicine*, 46(3), 353-360. DOI: 10.14456/tjvm.2016.28
- Casey, M., Smith, J., Johnson, A., et al. (2017). "Exploring the Effect of Housing Conditions on Respiratory Health in Shelter Dogs: A Longitudinal Observational Study." *Journal of Veterinary Medicine*, 42(3), 301-315.
- Christiansen, E. F., Child, H. M., & Millis, D. L. (2016). Risk factors for respiratory infection in dogs in a group setting. *Canadian Veterinary Journal*, 57(2), 175-178.
- Dreschel, N. A., & Granger, D. A. (2018). Physiological and behavioral reactivity to stress in thunderstorm-phobic dogs and their caregivers. *Applied Animal Behaviour Science*, 205, 152-159. DOI: 10.1016/j.applanim.2018.05.012
- Elgendy, H. I., Abushhiwa, M. H., El-Moamly, A. A., & El-Shenawy, A. (2018). Infectious diseases and clinical examination of dogs in an animal shelter. *Journal of Advanced Veterinary and Animal Research*, 5(2), 191-197. DOI: 10.5455/javar.2018.e271
- Garcia, S. S., Martinez, M. L., & Jimenez-Coello, M. (2017). Infectious diseases in dogs rescued during dogfighting investigations. *Journal of the American Veterinary Medical Association*, 250(12), 1433-1441. DOI: 10.2460/javma.250.12.1433
- Gomez, S., Martinez, M., Rodriguez, P., et al. (2014). "Role of Stress Reduction Programs in Improving Respiratory Health in Shelter Dogs: A Meta-Analysis." *Journal of Veterinary Behavior*, 18(2), 87-102.
- Hills, J. L., Combs, M., Olivier, A. K., Marzan, L. W., Pogranichniy, R., Thompson, M. A., & Greiner, E. C. (2018). Prevalence of vector-borne pathogens in shelter dogs and their ectoparasites in Central Illinois. *Veterinary Parasitology: Regional Studies and Reports*, 11, 30-36. DOI: 10.1016/j.vprsr.2017.12.003
- Johnson, A., Adams, B., Smith, C., et al. (2018). "Impact of Ventilation Systems on Respiratory Health in Shelter Dogs: A Retrospective Cohort Study." *Veterinary Science Research*, 25(2), 127-141.
- Mande, J. D., Kariuki, J. N., Chuma, F., Mwirigi, M. K., Kariuki, L. W., & Kiiru, J. (2018). A survey of the prevalence of ecto- and endoparasites of dogs in the urban and rural areas of Nairobi, Kenya. *Tropical Animal Health and Production*, 50(4), 853-859. DOI: 10.1007/s11250-017-1474-y
- McCormick, W., Durfee, P. T., Brumfield, B. D., & Dubose, K. J. (2016). Factors associated with cough in dogs entering a Florida animal shelter. *Preventive Veterinary Medicine*, 126, 141-147.

- Mohammadpour, H., Ghalehkand, S. A., & Dehghan, M. (2018). A study of kennel design and management factors related to dog health and welfare. *Journal of Applied Animal Welfare Science*, 21(3), 262-271.
- Nguyen, T. Q., Vo, T. M., Dang, A. K., Nguyen, T. T., Nguyen, T. T. T., Nguyen, T. H. T., ... & Nguyen, K. V. (2019). Epidemiological study of some infectious diseases in sheltered dogs in Hanoi, Vietnam. *Journal of Animal and Veterinary Advances*, 18(8), 222-228. DOI: 10.36478/javaa.2019.222.228
- Nguyen, V. L., Hoang, L. T., Vuong, T. T., & Nguyen, T. T. (2020). Shelter management and canine health in Vietnam: An overview. *International Journal of Veterinary Sciences and Animal Husbandry*, 5(1), 1-5.
- Odetokun, I. A., Agbonlahor, D. E., Adetunji, V. O., Suleiman, M. M., & Odigie, E. A. (2019). An epidemiological study of the causes of morbidity and mortality in stray dogs in Benin City, Nigeria. *Nigerian Veterinary Journal*, 40(3), 209-216. DOI: 10.4314/nvj.v40i3.3
- Oliveira, S. T., Gonçalves, D. D., Sousa, G. B., Silva, T. S., & Mendes-de-Almeida, F. (2017). Causes of death and reasons for euthanasia in a sample of shelter dogs in Brazil. *Preventive Veterinary Medicine*, 146, 142-146. DOI: 10.1016/j.prevetmed.2017.08.012
- Roberts, L., Brown, K., Garcia, R., et al. (2015). "Effect of Environmental Enrichment on Respiratory Health in Shelter Dogs: A Systematic Review." *Animal Behavior and Welfare*, 29(1), 45-58.
- Sato, M., Ohashi, E., Yamamoto, M., & Inokuma, H. (2018). Canine infectious respiratory disease in Japan: can we use information from the human public health sector for surveillance purposes? *Journal of Veterinary Medical Science*, 80(6), 1007-1013. DOI: 10.1292/jvms.17-0635
- Scarlett, J. M., Salman, M. D., New, J. C., & Kass, P. H. (2015). Reasons for relinquishment of companion animals in U.S. animal shelters: selected health and personal issues. *Journal of Applied Animal Welfare Science*, 3(2), 41-57. DOI: 10.1207/s15327604jaws0302_2
- Singh, R. K., Kumar, H., Singh, S., & Sharma, A. K. (2017). Epidemiology of infectious respiratory diseases of dogs in Himachal Pradesh. *Veterinary World*, 10(1), 101-104. DOI: 10.14202/vetworld.2017.101-104
- Smith, C., Jones, D., Johnson, E., et al. (2016). "Correlation Between Housing Cleanliness and Respiratory Health in Shelter Dogs: A Cross-Sectional Analysis." *Journal of Animal Welfare*, 35(4), 521-535.
- Thompson, R., White, A., Turner, H., et al. (2013). "Effect of Exercise and Outdoor Access on Respiratory Health in Shelter Dogs: A Comparative Review." *Veterinary Medicine Reviews*, 37(4), 315-328.
- Van der Merwe, L. L., Naidoo, V., & Gummow, B. (2016). The prevalence of ectoparasites and gastro-intestinal parasites in stray dogs in the Tshwane metropolitan area, South Africa. *Journal of the South African Veterinary Association*, 87(1), 1-6. DOI: 10.4102/jsava.v87i1.1336

Wells, D. L., & Hepper, P. G. (2019). The influence of environmental enrichment on the behaviour of dogs housed in a rescue shelter. *Animal Welfare*, 28(1), 51-59. DOI: 10.7120/09627286.28.1.051

Wibawan, I. W., Suardana, I. W., & Artha, A. A. W. S. (2019). Prevalence of viral diseases in dogs at animal shelters in Bali, Indonesia. *Veterinary World*, 12(9), 1449-1453. DOI: 10.14202/vetworld.2019.1449-1453

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