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Short Communication

A CLINICAL SURVEY OF VIRAL RESPIRATORY DISEASES OF COMMERCIAL POULTRY IN PAKISTAN

M. Usman[1], F. Sarwar[2], S. Umar[3], S. Subhan[4], M. L. Sohail[5,6], M. Younus[7] and M. A. Shah[8]

[1,2]Poultry Research Institute (PRI) Rawalpindi, Pakistan; [3,8]Department of Pathobiology, Faculty of Veterinary Sciences PMAS Arid Agriculture University Rawalpindi, Pakistan; [4]Department of Microbiology, [5]Department of Clinical Medicine and Surgery, University of Veterinary and Animal science Lahore Pakistan; [6]University College of Veterinary and Animal Sciences, The Islamia University of Bahawalpur, Pakistan; [7]Department of Pathology, College of Veterinary and Animal Sciences Jhang, Pakistan
Corresponding Author E-mail: vet.luqman@gmail.com

ABSTRACT

Viral diseases are a huge concern for poultry farmers in Pakistan since 1963. Multiple common viral respiratory diseases (CVRDs) such as, infectious bronchitis (IB), newcastle disease (ND), swollen head syndrome (SHS) and low pathogenic avian influenza (LPAI) cause huge economic losses in poultry industry. Incidence rates of CVRDs are not reported in various developing countries including Pakistan. A survey of CVRDs based on clinical diagnosis was carried out in Pakistan. Diagnostic laboratories provided the data of viral diseases affecting respiratory system in different types of chicken flocks, during different seasons in different regions. This survey suggested that ND is the most prevalent disease followed by IB, LPAI and the least prevalent was SHS. The information presented here are of great value in the research, prevention, and control of poultry diseases.

Keywords: viral respiratory diseases, chicken, survey, Pakistan.

INTRODUCTION

Commercial poultry in Pakistan was established in early 1960's representing one of the largest agro based segment of Pakistan economy with 1.3% contribution in GDP (Hussain *et al*. 2015). There are 25000 commercial poultry farms of layer, broiler and breeder birds in country, housing 722.39 million broilers, 39.46 million layers and 10.19 million breeders (Ahmad *et al*. 2014).

In past, small scale regional studies on surveillance of poultry diseases were conducted in relation to seasons and regions, indicating the huge economic impact of viral diseases (Ahmad *et al*. 2012; Rehman *et al*. 2013). Consistent outbreaks of viral diseases in the commercial poultry causing high morbidity and mortality had been reported (Alam *et al*. 2012). Pakistan poultry industry is experiencing consistent rapid growth, welcoming spread of multiple CVRDs (Rehman *et al*. 2013). Outbreaks of some of CVRDs such as IB and SHS were not reported to Ministry of Livestock and Poultry Production, Pakistan. Consequently, the distribution pattern of viral avian diseases is still ambiguous in country. Moreover, some CVRDs, such as LPAI (H9N2) infections are of great public health significance, and ignoring them can fuel the fire of their spread to human population (Chaudhry *et al*. 2015). Therefore, it is important to investigate the distribution pattern of CVRDs in different seasons, regions, and types of avian flocks to develop scientific and risk based prevention measures of poultry diseases. However, to date no systematic surveys have been reported on the distribution pattern of CVRDs in Pakistan. Since poultry diseases impose severe economic and production losses, it is important to remain updated about prevailing health issues of poultry in the areas of concern. It is assumed to be the first clinical survey about the incidence rates of CVRDs in Pakistan at national level.

MATERIALS AND METHODS

To conduct this survey, 10 poultry diseases diagnostic laboratories located in Peshawar, Rawalpindi, Lahore, Multan and Karachi were selected as the information source. Selection was made on the reliability of record keeping system and diagnostic facilities for poultry diseases (Figure 1). Complete disease history and diagnosis of CVRDs were gathered from all the selected laboratories from January 1, 2013, to December 30, 2014. CVRDs were clinically diagnosed through case history; clinical signs and necropsy were later confirmed by laboratory tests (haemagglutination inhibition test, enzyme linked immunosorbent assay, rapid plate agglutination test).

RESULTS AND DISCUSSION

In total, 14244 flocks were clinically diagnosed by 10 poultry disease diagnostic laboratories. Among these flocks, 5327 flocks were diagnosed to have

bacterial diseases, 633 flocks had parasitic diseases, 887 flocks had mycotoxin poisoning, 157 flocks had metabolic diseases, and 1035 flocks had clinically not diagnosable diseases, while 6205 flocks were diagnosed to be affected by CVRDs. (Fig. 2). Some flocks were diagnosed with more than one disease. Among 6205 CVRDs effected flocks, 3933 (63.38%) had ND, 1244 (20.04%) had IB, 946 (15.24%) had LPAI H9N2, and 82 (13.21%) had SHS**.** Moreover, among the 6205 CVRDs affected flocks, 951 (15.32%) had more than one CVRDs. Moreover, among 6205 CVRDs affected flocks, 3208 were broiler; 2276 were layer and 721 were breeder flocks. The incidence rates of CVRDs in different types of poultry are shown in Figure 3. ND outbreaks remained a menace throughout the study period (2013-2014) in commercial layer and broiler flocks. ND and IB occurred more frequently in the third (July, August, September) and fourth quarters (October, November, December) representing significant higher ($P<0.05$) incidence rates in fourth quarter than in first (January, February, March) and second quarters (April, May, June) (Fig 4). SHS incidence was recorded more frequently in the first quarter and least frequently in other quarters. On the other hand, incidence rates of LPAI H9N2 varied insignificantly ($P>0.05$) among quarters and sporadic cases of LPAI H9N2 were reported in all seasons with no significant difference ($P>0.05$). Number of IB and SHS affected flocks were higher in north region of Pakistan, while incidence rates of LPAI H9N2 were higher in southern region as compared to other regions of Pakistan. Moreover, ND occurrence varied among different regions of Pakistan. In total, 3273 and 2932 flocks were diagnosed in 2013 and 2014, respectively. The pattern of the CVRDs occurrence changed insignificantly ($P>0.05$) between the study years (2013 and 2014), suggesting that this survey is repeatable and incidence of many CVRDs may change in coming years. This survey demonstrated that the incidence of some CVRDs changed significantly ($P<0.05$) according to type of poultry flocks, seasons, and regions. These findings are consistent with the incidence of some CVRDs being affected by host-pathogen interactions, seasons, and regions (Ahmad *et al*. 2008; Rehman *et al*. 2013; Zhuang *et al*. 2014). The statistical analysis revealed no significant difference ($P>0.05$) among mean number of diseased flocks observed during the four quarters of the year except for ND and IB. Relatively higher incidence of ND and IB were observed during July to December (3rd and 4th quarters) than other quarters of the year possibly due to more humidity in air during this time of the year as reported previously (Rehman *et al*. 2013). However, total number of diseased flocks for ND in broilers was more than layers and breeders possibly due to poor litter management and high growth rate for broilers than layer birds which show improved immunity with advancing age. Occurrence of LPAI H9N2 was more in layer than broiler and breeder birds. Number of diseased flocks for LPAI H9N2 changed insignificantly ($P>0.05$) among different quarters, suggesting that LPAI H9N2 may be seen during any time of the year (Rehman *et al*. 2013). Breeder flocks showed lower incidence of CVRDs than other types of poultry, possibly due to better biosecurity and management practices at breeder farms than at commercial layer and broiler farms (Siddique *et al*. 2012).

The incidence rates of some CVRDs among different types of poultry flocks, seasons, and regions are of great value in the research, prevention, and control of poultry diseases. As per this survey, more attention should be given to the prevention of ND in the last quarter of the year because of higher occurrence. Similarly, the survey suggested that SHS problem arose in layer and breeders in first quarter. Continued nation-wide surveillance, farm biosecurity and vaccination throughout the year are warranted to prevent outbreaks of CVRDs in Pakistan.

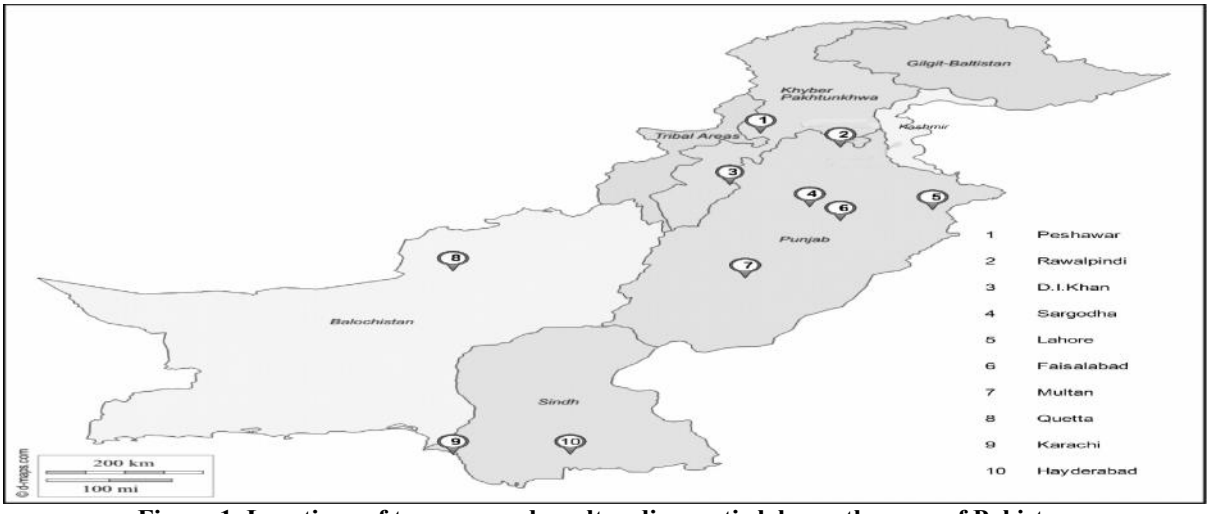

Figure 1. Locations of ten surveyed poultry diagnostic labs on the map of Pakistan

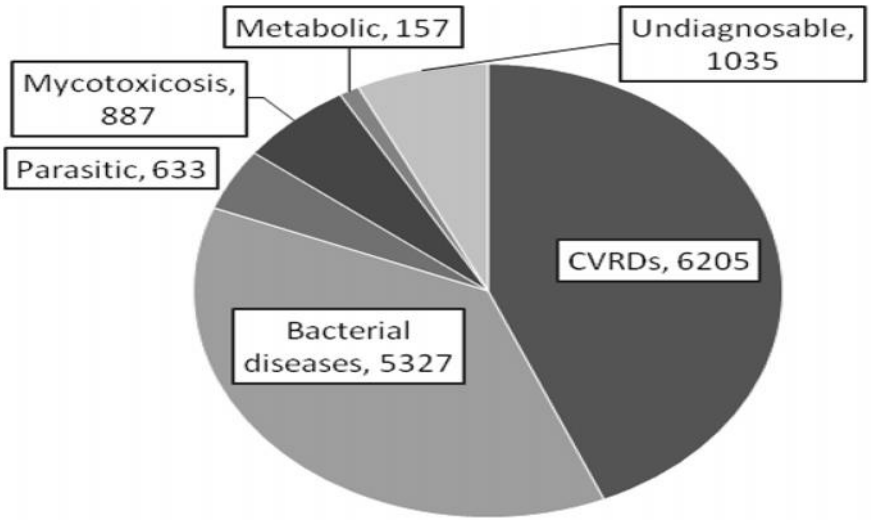

Figure 2: Numbers of flocks affected by different types of diseases through clinical diagnoses of ten poultry disease diagnostic labs

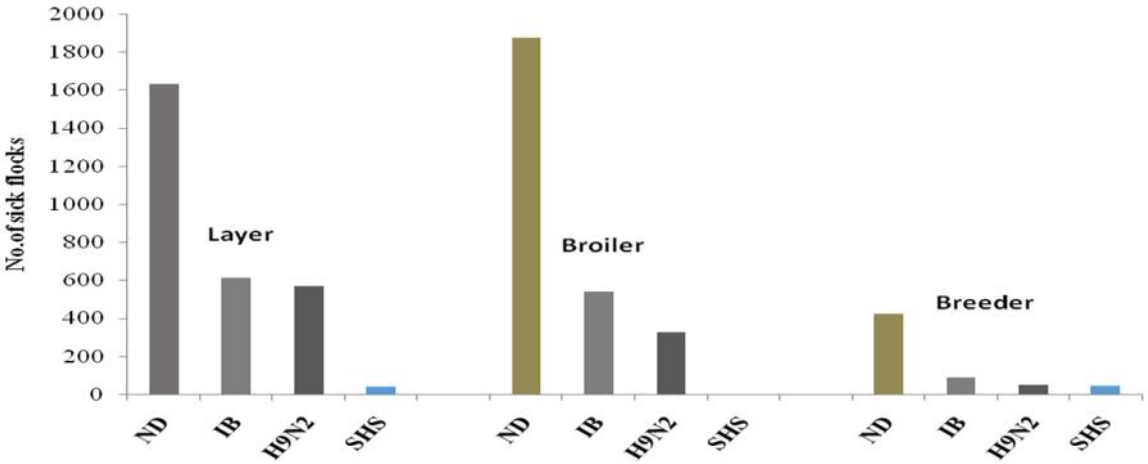

Figure 3: Incidences of CVRDs in different types of chicken

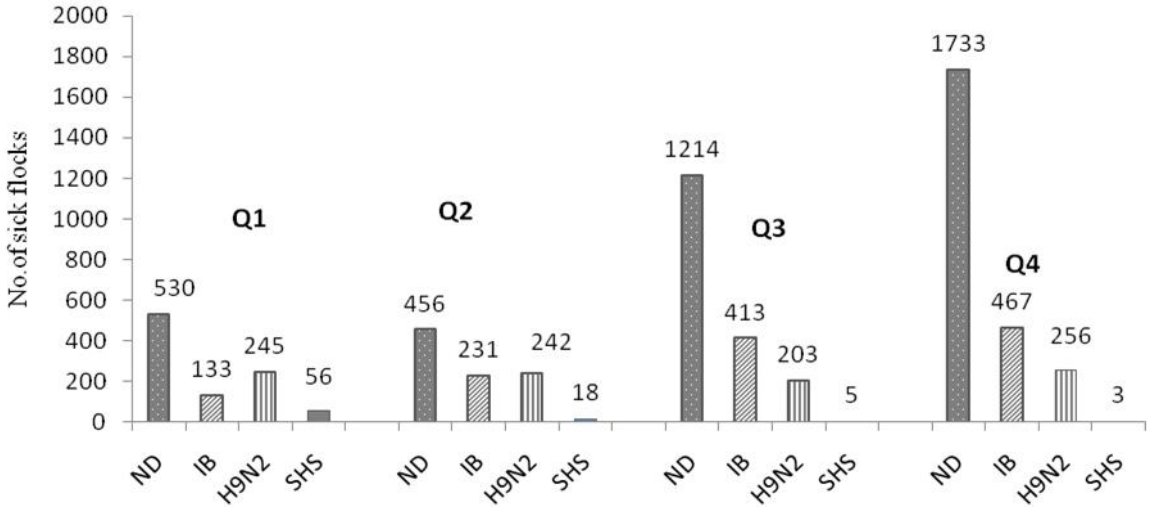

Figure 4: CVRDs cases in different seasons of a year. Q1 (First quarter: January, February, March), Q2 (second quarter: April, May, June), Q3 (third quarter: July, August, September), Q4 (Fourth quarter: October, November, December)

Conflict of interest statement: None of the authors of this paper has financial or personal relationship with other people or organisations that could inappropriately influence or bias the content of the paper.

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