

Major poultry diseases and their temporal pattern detected through rapid tests at the Veterinary Laboratory, Pokhara, Nepal

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ABSTRACT

Poultry industry in Kaski and surrounding districts are affected by various diseases. Veterinary Laboratory, Pokhara is one of the major diagnostic center for animal diseases in the region. A retrospective investigation was carried out for one year of duration (April 2018-March 2019) for the cases recorded at the Veterinary Laboratory (VL), Pokhara, Gandaki province. The method of rapid test used were plate agglutination test (PAT) for bacterial diseases (Salmonellosis & Mycoplasmosis), rapid diagnostic test (RDT) for viral diseases (Infectious Bursal Disease; IBD, Newcastle Disease; ND & Avian Influenza; AI), and microscopic examination for parasitic disease (Coccidiosis). Antibodies against Salmonella (47.15%) and Mycoplasma (58.63%) were found sero-positive from the sample of morbid chickens. Similarly, ND (42.11%), IBD (62.45%) and AI (9.97%) were detected on the RDT from the suspected chicken carcass. Out of 2053 caecal scrapings taken from the chickens older than two weeks of age, 28.30% were found positive for caecal Coccidiosis on microscopic examination. Rapid tests were found very easy, quick, less laborious, and non-expensive for the detection and differentiation of various diseases. Salmonellosis, Mycoplasmosis, IBD, ND and caecal Coccidiosis were found endemic diseases in the poultry sector of this region. The incidences of AI, the highly pathogenic strain with a potential to cause pandemic should be taken seriously. Our preliminary investigation indicated that the majority of diseases are correlated with poor management and biosecurity measures in farms. Therefore, farmers need to be made aware about seasonal occurrence of diseases, their timely vaccination, good farm management and overall biosecurity measures.

Keywords: Occurrence, Poultry diseases, Rapid test, Temporal

INTRODUCTION

Poultry sub-sector is one of the major components of the livestock sector which contributes 3-4% in total gross domestic product (GDP) and 8 % in agricultural gross domestic product (FAO, 2014; Kattel, 2016). It is developing as a resilient industry with huge capital investment which is directly employing and engaging large number of people across the country. Likewise, it has created multiplier effect to other industries (Winrock International, 2008; FAO, 2014). There is an estimated investment of NRs 80 billion in this sector which has provided direct employment of 1.5 lakh people (Singh, 2018). The growth rate of commercial sector is around 17-18% annually and its contribution to overall GDP is also encouraging and increasing (FAO, 2014).

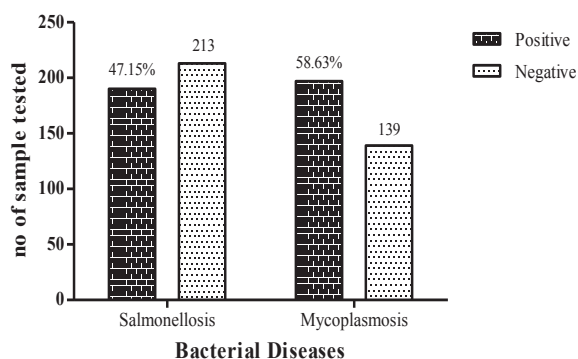
Farmers from different districts (Kaski, Tanahun, Syangja, Parbat, Baglung, Myagdi, Palpa, Gorkha, Lamjung, Nawalpur) of western Nepal bring dead or morbid chicken for disease diagnosis in this laboratory (Regmi *et al.*, 2020). Most of the cases presented here are of broilers (80%), layers (12%) and remaining 8% local, giriraj, fighter chicken and turkey. Different diseases are increasing and causing huge economic losses with the advancement of poultry sector, some of which are of high zoonotic potential e.g. Avian Influenza. Diseases are major constraints in the development of poultry sector causing a huge economic losses to farmers. Many diseases have seasonal occurrence (Regmi *et al.*, 2017; Regmi *et al.*, 2020). Therefore, this study was aimed to find out the clinical prevalence of major poultry diseases and their temporal occurrence.

MATERIALS AND METHODS

All cases brought to the Veterinary Laboratory (VL), Pokhara from April 2018-March 2019, suspected during post-mortem examination (PME) were diagnosed using rapid test (microscopic examination, PAT, RDT for antigen detection) for the parasitic, bacterial and viral diseases respectively. Coccidian parasites were confirmed through caecal scrapings and their microscopic examination by viewing the oocytes. Clinical sero-prevalence of some bacterial diseases like Salmonellosis and Mycoplasmosis were performed for the morbid chicken by rapid plate agglutination test (PAT) using commercial *Salmonella* and *Mycoplasma gallisepticum* (MG) antigens to determine the presence of *Salmonella* and MG specific antibodies. Some viral diseases like Newcastle Disease (ND), Infectious Bursal Disease (IBD) and Avian Influenza (AI) were diagnosed on the basis of RDT. Then, the various pattern of diseases were analyzed using Microsoft Excel-2013 and the results are expressed in the chart forms.

RESULTS AND DISCUSSION

A



B

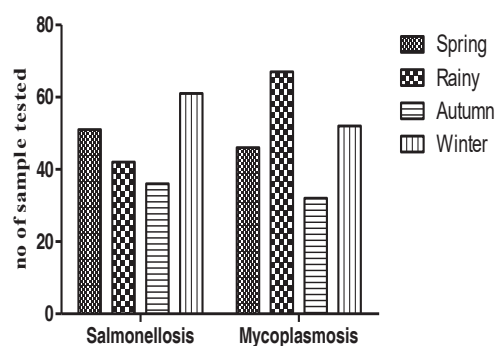


Figure 1 Graph showing cases of two important bacterial diseases, A: Sero-prevalence of Salmonellosis & Mycoplasmosis based on rapid PAT; showing the prevalence of *Salmonella* and *Mycoplasma* infection 47.15% and 58.63% respectively, B: Seasonal occurrence of Salmonellosis & Mycoplasmosis; showing the prevalence of *Salmonella* infection highest in the winter season 61 (32.10%) and *Mycoplasma* in rainy season 67 (34.01%).

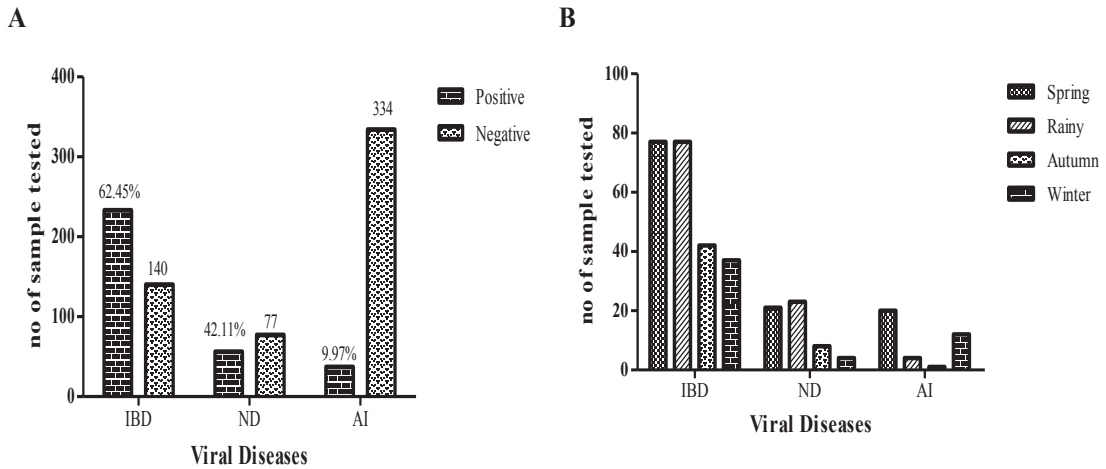


Figure 2 Graph showing, A: Different viral diseases positive on RDT. The prevalence of IBD, ND and AI was found 62.97%, 42.02% and 9.5% respectively on the RDT, B: Seasonal variation of IBD, ND and AIV diseases showing the clear higher cases of IBD and ND in spring and rainy season

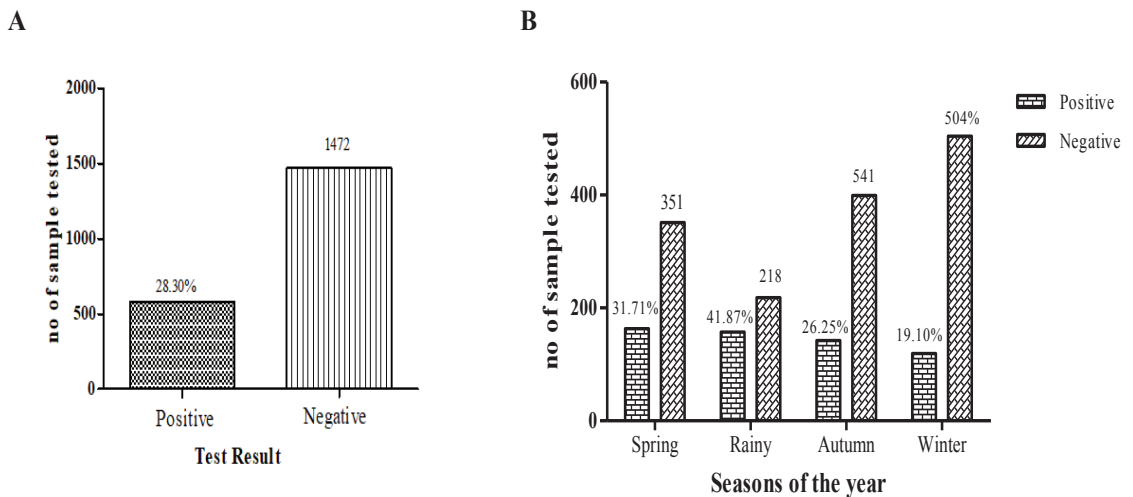


Figure 3 Graph showing cases of caecal Coccidiosis, A: Out of the 2053 caecal scrapings taken from the chicken of more than two weeks of age and tasted for caecal coccidian oocyst, 583 (28.8%) were found positive for caecal Coccidiosis, B: Seasonal variation of caecal Coccidiosis on microscopic examination. The prevalence of Coccidiosis was found more in humid spring season (28.3%), followed by rainy (26.9%), autumn (24.4%) and winter (20.4%)

The clinical sero-prevalence of *Salmonella* and *Mycoplasma* infection (47.15% and 58.63% respectively) on PAT as shown in Figure 1A, is higher than the findings of Sikder *et al.* (2005), who had recorded Salmonellosis (23.46%) and Mycoplasmosis (46.88%). This higher value indicates the poor management and biosecurity measures of farming system. The Salmonellosis

was found more prevalent in the winter season 61 (32.10%) whereas Mycoplasmosis in the rainy season 67 (34.01%) as shown in Figure 1B.

The prevalence of IBD (62.45%) on RDT as shown in Figure 2A, is similar to the finding of Lawal *et al.* (2014) who have reported the prevalence of 63.5%. This high prevalence may be due to the sample taken from only suspected chickens found on PME. Similarly, the prevalence of 48.02% was found for ND on RDT form the suspected chicken carcass which is higher than the findings of Rahman *et al.* (2012), who reported about one third sample positive. A high prevalence of IBD and ND was obtained during the rainy season as compared with in the dry winter season (figure 2B). This is in consistent with the report by Lawal *et al.* (2014), who also reported high prevalence of IBD 84.4% (rainy season) and 40.3% (dry season). The prevalence of AI was found 9.46%, in which high prevalence was in spring (43.33%) and winter season (40%) which may be due to the high susceptibility of virus in cool and moist climatic conditions.

The overall prevalence of caecal Coccidiosis (28.30%) is lower than 39.58% (figure 3A) as reported by Ebrahimi-Nik *et al.* (2018) and 31.8% reported by Lawal *et al.* (2016). The main parasitic disease, Coccidiosis is due to poor management practices in the deep litter system encouraging *Eimeria* oocysts to build-up. Coccidiosis was found more prevalent in hot and humid seasons (figure 3B).

CONCLUSION

Rapid tests are very easy, quick, less laborious, and non-expensive for the detection and differentiation of various poultry diseases. Salmonellosis, Mycoplasmosis, IBD, ND and caecal Coccidiosis were found endemic diseases in the poultry sector of this region. The incidences of AI is also increasing. These diseases are likely to be correlated with the poor management and biosecurity measures of farm which needs further investigation. We suggest farmers to be conscious about seasonal occurrence of common poultry diseases, their timely vaccination, good farm management and overall biosecurity measures.

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