DISTRIBUTION OF NEWCASTLE DISEASE (ND) DIAGNOSED IN THE NORTHERN REGION OF MALAYSIA FROM YEAR 2014 TO 2018

THENAMUTHA, M.*, RAFIDAH, A. J. AND SAIRA BANU, M. R.
Northern Zone Veterinary Laboratory instead of makmal Veterinar kawasan Bukit Tengah, Peti Surat 63, 14007 Bukit Mertajam, Pulau Pinang
**Corresponding author*: thenamutha@dvs.gov.my

ABSTRACT. Data over five years were analyzed for Newcastle Disease (ND) virus isolated from poultry samples submitted to the Regional Veterinary Laboratory at Bukit Tengah, Malaysia (RVLBT) for diagnosis. ND is an infectious disease of the poultry that is caused by virulent strains of Avian Paramyxovirus-1. A total of 236 suspected ND cases were tested by the Virology Section, RVLBT between the years of 2014 to 2018. ND virus has been isolated and tested by using Haemagglutination Inhibition (HI) Test. About 55 cases (15.28 %) from a total of 360 suspected cases in poultry samples were positive for the presence of ND. Among the bird species, chickens are more likely infected with ND and from there, both broiler chickens and local chickens are highly susceptible to this disease. Therefore, awareness of the existing ND cases indicates the importance of strict management procedures, proper management programmes, vaccination, and immunization for chickens in Northern Region of Malaysia.

Keywords: Newcastle Disease (ND), birds, chicken, poultry, biosecurity

INTRODUCTION

Newcastle Disease (ND) is a known as a highly contagious viral disease which affects all species of domestic as well as wild birds (Abdu, 2005). ND is caused by Newcastle Disease Virus (NDV) that belongs to the genus *Avulavirus* in the family *Paramyxoviridae*. The disease creates high economic losses among the poultry industry as it causes high mortality, decreased egg production, morbidity, stress, and hatchability (Alexander, 2000). It usually presents as respiratory disease, but depression, nervous manifestations, or diarrhea could also be the predominant clinical form (OIE, 2013). Findings in Malaysia by Siti (2021) indicated the occurrence of subgenotype VII.2 (VIIi) as the fifth panzootic of ND in Malaysia and the importance of the epidemiology of ND in poultry. Among the various diagnostic procedures, virus isolation is known as one of the diagnostic techniques that is commonly tested in Malaysia. This paper presents the distribution of ND among poultry samples from the Northern Region of Malaysia. The age and type of the birds including chicken have an important impact on the occurrence of diseases over the five years. The understanding of the ND distribution is fundamental to comprehend the appropriate diagnosis and to develop the controlling strategies in preventing the disease (Henning *et al*., 2009). By understanding the distribution of ND, the risk factors associated with the ND virus in poultry can be estimated.

MATERIALS AND METHODS

Virus isolation was carried out as outlined by the World Organization of Animal Health (OIE) (2013). The diagnostic samples from dead birds from both commercial and small farmers in Northern Region of Malaysia were collected from lung, kidney, spleen, brain, liver, heart, and intestines tissue. About 360 of pooled organ samples from postmortem cases were homogenized in Tryptose Phosphate Broth (Oxoid, UK) with

antibiotics containing Penicillin (Amresco, USA), Streptomycin (Amresco, USA), and Kanamycin (Amresco, USA). Homogenized tissues should be prepared as 10 – 20 % (w/v) suspensions in the antibiotic solution. Suspensions should be processed as soon as possible after incubation for 1 – 2 hours at room temperature. The suspension was clarified by centrifugation at 3000 rpm for 10 min. The allantoic cavity of the 9 to 11-day-old Specific Pathogen Flock (SPF) or Minimal Disease Flock (MDF) embryonated chicken eggs was inoculated with 0.2 mL of the supernatant and incubated at 37 °C for 3 - 5 days (Alexander, 2009). Candling of the eggs was done daily. The dead embryos and all eggs remaining at the end of the incubation period were chilled overnight at 4 °C for a minimum of 1 - 2 hours or overnight. The allantoic fluid collected from the live and dead embryos was tested for haemagglutination (HA) activity. Haemagglutination Inhibition (HI) shall proceed if HA test shows haemagglutination. Detection of the virus was conducted by the slide HI test using chicken red blood cells (1 %).

RESULTS AND DISCUSSION

The five years records from 2014 to 2018 received by the Virology Section, RVLBT was subjected to retrospective analysis by using the data from SIMMAK (*Sistem Maklumat Makmal*). A total of 360 poultry cases were documented with 55 cases (15 %) disease diagnosed positive for ND. The highest incidence of ND was recorded in 2016 with 22 %, whilst the lowest incidence rate of ND was recorded in 2015 with 1 %. In this research, although data from 2016 showed the highest positive case, the positive cases gradually declined throughout 2017 and 2018 with 17 % of the year-specific rate for both years. The highest incidence of ND in Northern Region of Malaysia in the year 2016 was probably due to the large number of cases received upon suspected signs and symptoms.

Table 1. Yearly distribution of Newcastle Disease (ND) cases received by Regional Veterinary Laboratory at Bukit Tengah, Malaysia (2014-2018)

Years	Suspected cases	ND cases	Non-ND cases	Year specific rate (%)
2014	82	13	69	15.85
2015	68	1	67	1.47
2016	116	25	91	21.55
2017	47	8	39	17.02
2018	47	8	39	17.02
Total	**360**	**55**	**305**	15.28

The percentage of ND cases reported in RVLBT among the type of birds is shown in Table 2. Chickens were found to have the highest ND incidence rate which was recorded at 21 % followed by turkeys' cases at 6 %. Meanwhile, all other bird's types showed negative ND cases throughout the five years. Based on the report by World Organization for Animal Health (OIE), among the poultry species, chicken is the most susceptible to ND compared to other poultry species as it is the least compatible. According to Alexander in the year 2003, chicken is most

susceptible to ND and usually become severely ill if they are infected compared to other birds which are relatively resistant. Turkeys develop less severe signs than chickens, and the susceptibility of other gallinaceous birds is variable. This infection is usually inapparent in ducks and geese as ducks rarely present signs of clinical disease, while geese show slightly higher susceptibility depending on the strain of NDV (Kinde, 2004).

Table 2. Distribution of Newcastle Disease (ND) cases received by Regional Veterinary Laboratory at Bukit Tengah, Malaysia (2014-2018) based on the type of birds

Type of Birds	Suspected cases	ND cases	Non-ND cases	Bird specific rate (%)
Chicken	258	53	210	20.54
Duck	22	0	22	0
Turkey	31	2	30	6.06
Goose	2	0	2	0
Peacock	10	0	10	0
Dove	6	0	6	0
Ostrich	3	0	3	0
Parrot	6	0	6	0
Unknown	22	0	22	0
Total	360	55	305	15.28

In chickens' cases, broilers were found to record the highest incidence of ND at 22 % followed by local chickens at 18 %. However, there was no ND cases recorded in layers or breeders. Generally, both layers and breeders are kept longer in a very confined and well biosecurity area as compared to broilers. Hence, broiler chickens are at a higher risk to get infected compared to other chickens. The study in Malaysia by Aini and Ibrahim (1990) demonstrated that a single food pellet vaccination is not sufficient to confer immunity in the vaccinated local chickens as a high percentage of local chickens died from the challenge with the exception of the group vaccinated at 6 weeks of age. Other than that, storage, and transport of ND viruses at high temperatures is an apparent problem in tropical countries which is caused by vaccination failures. This could be attributed to the reason that broilers are more prone to ND (Sadaqat, 2018). ND is also common among chickens that are kept in confinement such as commercially raised chickens as most of them are overcrowded. Apart from that, the lack of sufficient biosecurity measures might also cause contact between healthy and infected chickens which agrees with the findings of Hafez (2003).

Table 3. Distribution of Newcastle Disease (ND) cases received by Regional Veterinary Laboratory at Bukit Tengah, Malaysia (2014-2018) based on the type of chicken

Type of chicken	Suspected cases	ND cases	Non-ND cases	Chicken specific rate (%)
Broilers	153	33	122	21.56
Layers	6	0	6	0
Local Chickens	62	11	51	17.74
Breeders	5	0	5	0
Unknown	32	9	23	28.13
Total	258	53	205	20.54

CONCLUSION

This study provided background information on the current distribution status of Newcastle Disease (ND) in the Northern Region of Malaysia. The results indicated that the ND virus has the highest rate in the year 2016. Among the bird species, chickens are more likely to be infected with ND, whereas both broiler chickens and local chickens are highly susceptible to this disease.

Thus, it is recommended that there should be routine vaccination program in the study site. Consequently, farmers should be appropriately educated in order to improve the biosecurity with the usage of disinfectants and farming systems. This is also to ensure appropriate ways of handling vaccines among the chickens besides the usual vaccination schedules and types to minimize transmission of ND disease in Northern Region of Malaysia.

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