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BIRD FLU VIRUSES AVIAN INFLUENZA DURING 20002019: A TIME SEQUENCE ANALYSIS ON CAB DATABASES

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ABSTRACT

Gaining knowledge of attempts to analyse the performance of researchers working in the discipline of worldwide Avian Influenza Bird Flu Viruses and nationwide distribution over the twenty-year expert interval from 2000–2019. For this study, a total of 936 publications have been taken from CAB Direct Databases. With common publications of 46.8 % per annum, all sorts of property are low to excessive within the one year 2010. The time sequence evaluation used to be carried out in the best, most productive nation (Africa) and India is an 11th rank (1.28 %) out of the 49 worldwide areas.

KEYWORDS: *Avian Influenza, Bird Flu, CAB Direct, Diseases, Countries, Time Series Analysis*

INTRODUCTION

Avian influenza refers to type A viruses infected by birds. These viruses occur naturally among worldwide wild aquatic birds, and may infect domestic poultry and other species of birds and animals. Wild aquatic birds may be infected with avian influenza a viruses in their bowels and respiratory tract, but they do not usually get sick. Avian influenza a viruses, however, are highly contagious among birds and some of these viruses can sicken and even kill certain species of domesticated birds including chickens, ducks and turkeys. Infected birds may shed A virus on avian Influenza in their saliva, nasal secretions, and faeces. Susceptible birds get infected when they come into contact with the virus, as infected when they come into contact with the virus, as infected birds shed it. They may also get infected from infected from infected birds through contact with surfaces contaminated with virus.

Low pathogenic avian influenza (LPAI) A viruses, and Highly Pathogenic Avail Influenza (HPAI) A viruses are classified into the following two categories. The categories relate to the molecular characteristics of A virus and the ability of the virus to cause disease and mortality in chickens in a Cdc-pdf laboratory setting [2.5 MB, 64 pages] external. Poultry infection with LPAI viruses can cause no disease or mild illness (such as ruffled feathers and a drop in the production of eggs) and may not be detected. HPAI – virus infection of poultry can cause severe illness with high mortality. Both the HPAI and LPAI viruses can quickly spread through flocks of poultry. Some ducks can, however, get infected without any signs of disease.

Bird flu, or avian flu, is a type of infectious influenza which spreads among birds. It can affect humans in very rare cases. There are many different strains of bird flu virus, most of which don't infect humans. Viruses of avian influenza A are isolated from more than 100 different wild bird species. Most of those viruses were viruses with LPAI. Most of the

wild birds from which these viruses were recovered represent gulls, terns, and shorebirds, or waterfowl like ducks, geese, and swans. These wild birds are frequently considered reservoirs (hosts) for avian influenza A viruses.

REVIEW OF LITERATURE

Sciento metric research on the exclusive individual journal publications and literature on particular areas of difficulty has been conducted earlier through one of a kind author. The following studies linked to this study's objectives have been reviewed.

Motamed N. et al., (2020) studied for Avian Influenza (AI) virus (H9N2 and H5 subtypes) infections in birds because major concerns around the world. The majority of the avian species, such as domestic, pet, and wild birds, are natural and experimental hosts of avian influenza viruses. There are global concerns about members of the Columbidae family, namely pigeons or doves, for their role as the potential interspecies bridge in influenza A viruses ecology. The acquired scientific data in this regard is still not clear since there are doubts about whether or not they transmit viruses between susceptible populations, and spread viruses among farms during outbreaks. To monitor H5 and H9 influenza virus infection status in the rural, backyard, and domestic birds, an annual active surveillance program was performed from September to October 2016. In December 2016, an outbreak of highly pathogenic avian influenza (HPAI) virus subtype H5N8 was detected in a layer farm in Tehran province, Iran. The present research was conducted to study H9N2 or H5 infections in pigeons within HPAI H5N8 2016 outbreaks and annual national AI surveillance in Iran. For this purpose, cloacal swabs and tissue samples (trachea, lung, brain, liver, heart, pancreas, and cecal tonsil) were collected and examined by real-time reverse transcription polymerase chain reaction (RT-PCR) method and virus isolation. Results of the tests performed on the swab and tissue samples were negative for neither H5 nor H9N2 viruses. The samples in real-time RT-PCR that after three passages still showed negative results in HA and molecular tests were considered negative. Moreover, the Newcastle disease virus was isolated in most of the samples taken from dead pigeons, after inoculation in embrocated chicken eggs.

Belewu K.Y. (2019) was taken the dissemination and maintenance of AIV in wild birds is important for understanding the factors that contribute to transmission of AIV from wild birds to poultry. This study examined the impact of avian flu on the consumption of chicken and egg among university of Ilorin staff, in Ilorin, Kwara state, Nigeria. A survey was conducted by interviewing 110 University of Ilorin staff. Information was collected on the same economic characteristics of the respondents, income and consumption of chicken and eggs. The data were analysed using descriptive statistics. The results revealed that avian flu outbreaks and spread in Nigeria have caused serious threat to the poultry industry, the food security and livelihoods of urban communities. It was also noted that there was a decline in consumers' confidence in poultry product (e.g. chicken and egg) as indicated by the respondents. Perception of people about avian flu pandemic indicates 90% of respondents perceived it as deadly, incurable and easily transmissible disease and that was why 77.27% of the sampled households were found to have stopped or drastically reduced the consumption of poultry products for the fear of being infected by the disease. The research conclude that since most of people perceived avian influenza as deadly disease, government enact measures to prevent the virus from spreading and to reduce the risk of infection and ban on transporting poultry in the area where bird flu has occurred.

Asmaa A Hussien (2017) had said the circulation of Avian Influenza A (H5N1) and Swine Influenza A (H1N1) infection in Egypt increased the burden of a reasserting virus which may increase the human infection rate because it is unknown to the human immune system. This study was done from 2010 through 2016 to detect influenza viruses in Assist Governorate among respiratory patients admitted to the Assist University hospital using Real time PCR (rRT-PCR), as

well as exhibit the factors associated with infection. Four (5.8 %) and 19 (27.5 %) out of 69 patients were infected with H5N1 and H1N1 subtypes respectively. Influenza virus activity was increased in cold weather resulted in increased influenza infection rate in both poultry and humans. Also, the clinical outcome toward patient recovery was increased with early detection and treatment of virus infection. In addition, people in contact with poultry, patients with chronic diseases, and those in contact with infected patients are highly significant for A (H5N1) and A (H1N1) infection. Strict implementation of control measures to eliminate the infection in both poultry and human is essential for reducing the risk of zoonotic transmission and human infection with influenza diseases.

Vladimir Savić (2015) studied the three types of influenza viruses: A, B, and C; and the latter two are primarily of a human health importance. In contrast, influenza A viruses have been isolated from a variety of birds and mammals, nevertheless the natural hosts of the virus are wild waterfowls, gulls and related birds. Other species that are infected with influenza a viruses, particularly chickens, turkeys, swine, horses, and humans, are considered aberrant hosts. Majority of influenza a viruses are fully adapted to the natural hosts in which they multiply mainly in intestines and the infection causes no symptoms. Influenza A viruses in their natural hosts are in evolutionary stasis. On the other hand, the infection in aberrant hosts usually results in rapid evolution due to selection pressure driven by the virus adaptation to a new host. Such rapid evolution can result in high virulence for the new host, and sometimes even for other species. Emergence of highly virulent influenza A viruses is of a particular concern for the poultry industry because such viruses cause up to 100% mortality in chickens and turkeys. Few influenza viruses are well adapted and established in mammalian hosts, causing primarily respiratory disease like swine influenza, equine influenza and human influenza. Swine, as an aberrant host, plays an important role in ecology and epidemiology of influenza A viruses because this species is prone to infection with viruses originating from wild birds, domestic poultry and mammalian hosts. Such a universal host can serve as a vessel for mixing of the genetic material of different viruses which can result in new influenza A viruses with unpredictable features.

Irfan Irshad (2020) have analysed Virulent strains of AAvV-1s and low-pathogenic H9N2 avian influenza viruses are presently endemic in Pakistan and repeated outbreaks are continuously being reported with high mortality in poultry and non-poultry avian species. In this study, five AAvV-1s have been patho typed and genetically characterized from vaccinated birds collected between 201314. A phylogenetic analysis revealed that all the isolates belonged to sub-genotype VIIi with high similarity of 97.9 to 99.8 % with similar viruses in this clade. Analysis of the hemagglutin in (HA) gene sequences of the two AIV was performed and phylogenetic analysis reveals genetically closely-related to H9N2 viruses classified into Mideast group-B and sub lineage B2. The two strains classified as LPAIV in poultry based on amino acid sequence at the proteolytic cleavage-site of the HA gene with PAKSSR/G. Our findings highlight the potential risk of ND and AI in poultry and continued active surveillance is needed to monitor the transmission of these viruses.

METHODOLOGY

The Study is based on the publication data collected from the CAB Direct Online Database for 20 years (2000-2019) in the field of the analysis of disease of Avian Influenza Bird flu viruses. The selection process used in the key word was “Avian Influenza” in the title of the article as follows, and published during 2000-2019.

OBJECTIVES

The main objective of this study is to research, the results of the analysis in Avian Influenza Bird flu Viruses diseases as

reflected in the CAB Direct Online database in its publication output throughout 20002019. The study focuses, in exacting on the following objectives:

- To examine for the period 2000-2019 the overall research output of Avian Influenza Bird flu in the year wise.
- Examine the top ten Avian Influenza Bird Viruses ranking Countries.
- Avian Influenza Bird flu Viruses supported CAB Direct Online database for the period 2000-2019 to examine the overall research output in year wise.
- To study the time series analysis of the yearly Wise distribution of Avian Influenza Bird flu Viruses.
- To identify the most productive authors for the analysis of Avian Influenza Bird flu Viruses.

  Identifying the language distribution of an analysis of Avian Influenza Bird flu Viruses.

DATA ANALYSIS

Growth of Publications

Data collected through the CAB Direct Online database were analysed and presented on the Avian Influenza Bird flu Viruses. Different types of statistical tools such as tables and diagrams are used for presenting the data.

Year of Publication on Avian Influenza Bird Flu Literature

The study showed that Avian Influenza Bird flu analysis has revealed a complete of 936 publications during the period 20002019. In 2009 the highest number of publications was 104 papers. It is very interesting to note that in 2000 the lowest published was 1. In Table 1 the year-wise publication in provided.

Table 1: Overall Research Output in Year Wise

Year	No. of Article	Percentage	Cumulative	Percentage
2000	1	0.10	1	0.10
2001	2	0.21	3	0.32
2002	3	0.32	5	0.53
2003	3	0.32	6	0.64
2004	14	1.49	17	1.81
2005	12	1.28	26	2.77
2006	18	1.92	30	3.20
2007	55	5.87	73	7.79
2008	36	3.84	91	9.72
2009	104	11.1	140	14.9
2010	79	8.44	183	19.5
2011	93	9.93	172	18.3
2012	55	5.87	148	15.8
2013	58	6.19	113	12.0
2014	64	6.83	122	13.0
2015	81	8.65	145	15.4
2016	68	7.26	149	15.9
2017	74	7.90	142	15.1
2018	64	6.83	138	14.7
2019	52	5.55	116	12.3
Total	**936**			

Output in Year Wise Distribution of Avian Influenza Bird Flu in Ranking Forty Nine Countries

Ranking Country in Avian Influenza Bird Flu

The study showed that the Avian Influenza Bird flu analysis has revealed a complete of 936 publications during the period 2000 2019. Table 2 shows that Africa is the top country in Avian Influenza Bird flu research with 69 papers contributing almost (6.94 %) of the global research output of Avian Influenza Bird flu research followed by Iran by (5.44 %). China ranks third (5.23 %) of the 10 countries, while India rank 11th (1.28 %).

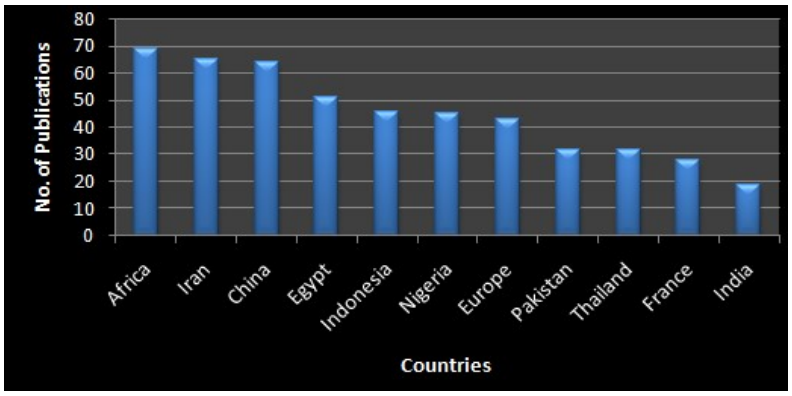

Figure 1: Ranking Country In Avian Influenza Bird Flu.

Overall Research Output in Year Wise Distribution of Avian Influenza Bird Flu in the 49 Countries Ranking

Table 2 shows yearly Wise sharing of Avian Influenza Bird Flu publications included in CAB Database. The table provides a comprehensive depiction of the research output. From the table one could clearly see that a total of 936 publications were published at global level during the study period 2000 to 2019, with an average of 46.8 % publications per year. Avian Influenza Bird Flu output increased to 14 papers in 2004, from 1 in the year 2000. The highest publication is 104 in 2009 followed in 2011 by 93 papers followed in 2015 by 81 papers. The growth ration calculated as shown in the yearly wise distribution of Avian Influenza Bird Flu overall research output in the ranking forty nine countries.

Table 2: Overall Research Output in Year Wise Distribution of Avian Influenza Bird Flu in the 49 Countries Ranking

S. No.	Countries	Year										Percentage
		2019	2018	2017	2016	2015	2014	2013	2012	2011	2010	
1.	Australia	1	-	-	-	-	-	-	-	-	-	0.1
2.	Brazil	-	1	-	-	-	-	-	-	-	-	0.1
3.	Irish Republic	-	1	-	-	-	-	-	-	-	-	0.1
4.	Bosnia	-	-	-	1	-	-	-	-	-	-	0.1
5.	Trinidad	-	-	-	-	-	1	-	-	-	-	0.1
6.	Andaman	-	-	-	-	-	1	-	-	-	-	0.1
7.	Amazonas	-	-	-	-	-	-	1	-	-	-	0.1
8.	Taiwan	2	-	-	-	-	-	-	-	-	-	0.21
9.	Canada	1	-	-	-	-	-	-	-	1	-	0.21
10.	Bulgaria	-	2	-	-	-	-	-	-	-	-	0.21
11.	England	-	-	2	-	-	-	-	-	-	-	0.21
12.	Jiangsu	-	-	2	-	-	-	-	-	-	-	0.21
13.	Turkey	-	-	-	2	-	-	-	-	-	-	0.21
14.	Belize	-	-	-	2	-	-	-	-	-	-	0.21
15.	Croatia	-	-	-	-	2	-	-	-	-	-	0.21
16.	Java	-	-	-	-	2	-	-	-	-	-	0.21

Table 2 (Contd.,)												
17.	Middle East	-	-	-	-	-	2	-	-	-	-	0.21
18.	Myanmar	-	-	-	-	-	2	-	-	-	-	0.21
19.	Peru	-	-	-	-	-	-	2	-	-	-	0.21
20.	Germany	-	-	-	-	-	-	-	2	-	-	0.21
21.	Sulawesi	-	-	-	-	-	-	-	2	-	-	0.21
22.	Ethiopia	-	-	-	-	-	-	-	-	-	2	0.21
23.	Iraq	3	-	-	-	-	-	-	-	-	-	0.32
24.	Korea	3	-	-	-	-	-	-	-	-	-	0.32
25.	Italy	-	-	-	-	-	-	3	-	-	-	0.32
26.	Denmark	-	-	-	-	-	-	-	-	3	-	0.32
27.	Japan	-	-	-	-	-	-	-	-	3	-	0.32
28.	Romania	-	-	-	-	-	-	-	-	3	-	0.32
29.	Turkey	-	-	-	-	-	-	-	-	3	-	0.32
30.	Bali	-	3	-	-	-	-	-	-	1	-	0.42
31.	Korea	-	-	4	-	-	-	-	-	-	-	0.42
32.	Nordic	-	-	-	-	-	-	-	-	4	-	0.42
33.	Malaysia	-	3	-	-	-	2	-	-	-	-	0.53
34.	Vietnam	2	-	-	-	2	-	2	-	-	-	0.64
35.	USA	2	-	-	2	-	-	3	-	-	3	1.06
36.	UK	-	-	8	-	-	-	-	2	-	-	1.06
37.	Asia	-	-	-	4	-	3	-	-	-	3	1.06
38.	France	-	7	-	4	-	-	-	-	4	3	1.17
39.	India	2	1	4	-	-	-	-	-	5	4	1.28
40.	Bangladesh	-	-	-	2	3	2	5	3	-	-	1.6
41.	Pakistan	2	3	5	4	-	2	3	-	-	-	2.02
42.	Thailand	-	-	-	6	-	3	-	2	4	6	2.24
43.	Europe	-	1	6	2	3	2	2	2	5	9	3.41
44.	Nigeria	3	3	6	4	-	3	2	6	4	3	3.63
45.	Indonesia	4	4	3	4	5	3	8	8	3	-	4.48
46.	Egypt	7	6	5	6	6	4	2	-	4	6	4.91
47.	China	5	6	2	5	5	2	5	5	5	9	5.23
48.	Iran	3	3	7	5	3	8	4	4	9	5	5.44
49.	Africa	1	1	9	6	2	5	11	14	-	16	6.94

Analysis of Avian Influenza Bird Flu in the Time Series

The study showed that the Avian Influenza Bird flu analysis has revealed a complete of 936 publications during the period 2000 – 2019. Table-3 shows that the Avian Influenza Bird flu time series analysis has a predicted literature output value of 470.3 for 2020, and the predicted literature output for 2025 is 62.03. By applying the formula, analysing the time series and subsequently from the results obtained for the year 2020 and 2025, it is found that the future growth trend of research articles in Avian Influenza Bird flu research may take on an increasing trend in the years to come. The inferences from the calculations have shown a positive growth in the value of Avian Influenza Bird flu research literature output.

Table 3: Times Series Analysis of Year Wise Distribution of Avian Influenza Birds

Year	Article (Y)	Cumulative Article	X	X^2	X * Y	Trend Value
2000	1	936	78	6084	78	28.86
2001	2	935	77	5929	154	29.09
2002	3	933	76	5776	228	29.32
2003	3	930	76	5776	228	29.32
2004	14	927	65	4225	910	31.85
2005	12	913	67	4489	804	31.39
2006	18	901	61	3721	1098	32.77

Table 3 (Contd.,)						
2007	55	883	24	576	1320	41.28
2008	36	828	43	1849	1548	36.91
2009	104	792	-25	-625	-2600	-41.05
2010	79	688	0	0	0	46.8
2011	93	609	-14	-196	-1302	-43.58
2012	55	516	24	576	1320	-41.28
2013	58	461	21	441	1218	-41.97
2014	64	403	15	225	960	-43.35
2015	81	339	-2	-4	-162	-46.34
2016	68	258	11	121	748	-44.27
2017	74	190	5	25	370	-45.65
2018	64	116	15	225	960	-43.35
2019	52	52	27	729	1404	-40.59
			32			-39.44
			37			-38.29
	936			**39942**	**9284**	

$Y_C = a+bX$

$$a = \sum y/N = \frac{936}{20} = 46.8$$

$$b = \sum xy/\sum x^2 = \frac{9284}{39942} = 0.23$$

Estimated Literature in 2020 is when X = 2020 – 2010 = 10

=46.8+0.23x10=470.3

Estimated Literature in 2025 is when X = 2025-2010=15

=46.8+0.23x15=62.03

Most Productive Authors

The study reveals that Roger, F is that the most ranked authors of the Avian Influenza Bird flu analysis who revealed 30 papers (3.20 %) followed by Benko, M with 23 papers (2.45 %). It is observed that out of the top five authors that contributed a lot of papers in Avian Influenza Bird flu analysis, there are world ranking author contributed a paper level of 14-30 viz., Harrach, B23 papers (2.45 %), Renard, J.F, 22 papers (2.35 %) Table 4 lists the top 10 ranking authors in the Avian Influenza Bird flu analysis field.

Table 4: Most Productive Authors in Bird Flu Analysis

Sl. No	Name of Author	No. Of Papers	Percentage
1.	Roger, F	30	3.20
2.	Benko, M	23	2.45
3.	Harrach, B	23	2.45
4.	Renard, J.F	22	2.35
5.	Cunus, E	20	2.13
6.	Cardinale, E	20	2.13
7.	Dalibard, C	20	2.13
8.	Marinez, D	20	2.13
9.	Roberts, V	15	1.60
10.	Omar, A.R	14	1.60

Language Distribution

It is observed that English is the most prevalent language used by the researchers in the Avian Influenza Bird flu analysis with 739 papers (78.95 %) followed by Chinese with 42 (4.48) and French with 32 (3.41 %). In table-5 the top 10 predominant languages are furnished.

Table 5: Language Avian Influenza Bird Flu Analysis

Sl. No	Language	No. of Papers	Percentage
1.	English	739	78.95
2.	Chinese	42	4.48
3.	French	32	3.41
4.	Indonesian	30	3.20
5.	Persian	23	2.45
6.	Polish	20	2.13
7.	Spanish	19	2.02
8.	Italian	16	1.70
9.	Thai	16	1.70
10.	Bengali	5	0.53

CONCLUSIONS

The study of Avian Influenza Bird flu analysis based on the CAB Direct Online database reveals that Africa is the leading producer of scientific research output, which is about (6.94 %) of the overall research output of the 49 countries of Avian Influenza Bird flu disease research. The other interesting fact is that the most prolific / ranking authors in this field are the most ranked authors of Avian Influenza Bird flu analysis who revealed 30 papers (3.20 %) followed by Benko, M with 23 papers (2.45 %). It is observed that a paper level of14-30viz., Harrach, B23papers (2.45 %), Renard, J.F, 22 papers (2.35 %) contributed from the top ten authors who contributed a lot of papers in Avian Influenza Bird Flu analysis, there are world ranking author. Within the discipline of the Avian Influenza Bird flu assessment, world contribution in terms of publications is significantly extended for a period of twenty years. Evaluation of the time series also suggests a trend towards confident development someday. Time series evaluation also suggests that the confident development trend someday. Africa is the top country in Avian Influenza Bird flu research with 69 papers contributing almost (6.94 %) of the global research output of Avian Influenza Bird flu research followed by the Iran (5.44 %),China ranks third (5.23 %) of the 10 countries, while India ranks 11th (1.28 %).

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