
Epidemiological Study of the Medically Attended Cases of Pneumonia and Influenza in Taiwan in 2002

Abstract

Influenza virus types A and B are two major viruses that cause influenza in men. Type A influenza virus, in particular, induces large-scale epidemics. The monitoring of influenza in Taiwan is based on the trends shown by the weekly average number of cases reported by the sentinel physicians established by the Center for Disease Control of the Department of Health. An analysis of the National Health Insurance data should help understand the basic information on pneumonia and influenza in Taiwan, and should also serve as an important basis for the clinical medical care systems to plan and set up necessary volume of work at time of epidemics. The National Health Insurance data are bulky, and human errors are likely to occur in the process of data inputting to cause deviations which will have serious impact on the entire statistical analysis. The National Health Insurance data were therefore separately checked against sex, age, and major and secondary complaints. To really understand the actual number of patients medically attended, they should be tabulated by households. By the 2002 medical payments of the National Health Insurance, the number of pneumonia patients was 763,394; and the number of influenza patients was 1,713,846; totaling 2,477,240, and accounting for 11.0% of the mid-year population of that year. There were more female patients than males. By age,

infants and children under six years of age had the highest medical-care rate. By month, more patients of both pneumonia and influenza were medically attended in January. The central region of Taiwan had the highest medical-care rate of pneumonia; and the Kao-Ping region had the highest medical-care rate of influenza. By medical costs in terms of points, in-patient care was 40 times as high as out-patient care. Medical costs of outpatient care for pneumonia were 4.8 times higher than those of influenza. Medical costs were the highest for the elderly above 65 years, either for the inpatient or outpatient care of pneumonia and influenza.

Key Words: influenza, pneumonia, medical-care rate, medical costs

Introduction

Influenza virus types A and B are two major viruses that cause influenza in men. In particular, type A induces large-scale epidemics. By the two surface antigen proteins, hemagglutinin (HA) and neuraminidase (NA), type A viruses can be further grouped into different subtypes. The H proteins range from H1 to H15; and the N proteins, from N1 to N9⁽¹⁾. The large-scale epidemics recorded in the last hundred years are⁽²⁾ namely, the 1918 outbreaks in Spain ended in 20 to 40 million deaths worldwide; the Asian flu in 1957 killed more than one million; and the Hong Kong flu in 1968 cost 700,000 lives. There have been fewer large-scale epidemics of high casualties since the 1977 outbreaks in the USSR. H1, H3, and type B influenza viruses, however, still continue to live with humans. This is one of the major reasons that immunization against influenza should be carried out each year.

In 1997, a high pathogenic avian flu of H5N1 broke out in Hong Kong to infect 18 and kill 6, giving a fatality as high as 30%⁽³⁾. Thus far, there have been

several outbreaks of H5, H7, and H9 avian flu around the world; in particular, in Vietnam and Thailand, the H5N1 avian flu has infected 39 and killed 28, giving a high fatality of 70%. Lately, it was reported that H5N1 had been detected in pigs in China. These and other facts have cautioned the world community against disastrous large-scale epidemics in human beings as a result of the likely mutation of the avian flu viruses⁽⁴⁾.

This report analyzes and reviews information of the medically attended cases of pneumonia and influenza in Taiwan to understand the basic information of patients, and to serve as a reference basis for the clinical medical care systems in formulating and designing plans to face any possible large-scale influenza epidemics in the future.

Materials and Method

The data files of the inpatient and outpatient care of patients under the National Health Insurance were used as the sources of information. To understand the medical care statuses of the nationals, the medical care data were initially checked against the identification numbers to remove cases of foreign and unknown nationalities. The National Health Insurance data are bulky. To avoid any human errors in the process of data inputting and thus to cause deviations and also serious impact on the process of statistical analysis, the data were checked against sex, age, and main and secondary diagnoses. If the main and secondary diagnoses were two-digit codes (except A-code: V0), the data were considered erroneous and removed⁽⁵⁾.

To understand the actual number of cases medically attended (not the number of repeated care), the number of patients by households should be calculated, including major and secondary diagnoses (three diagnosis codes for outpatient, and five for inpatient care). Patients were calculated by households by their identification numbers and diseases (the same person with the same

disease would be counted one no matter how many visits to the clinics he/she had made).

For convenience, medical-care rate was calculated per 100,000 population by: number of patients by households/2002 mid-year population x 100,000.

Results

The medical payment data of the National Health Insurance for 2002 showed that there were 763,394 patients of pneumonia (ICD-9: 480-486; A-code: A320-321), and 1,713,846 patients of influenza (ICD-9: 487; A-code: A322), totaling 2,477,240 patients, accounting for around 11.0% of the mid-year population of that year. Of them, 1,211,985 were males, and 1,265,255 were females.

1.Outpatient and Inpatient Care (Figure 1)

Further analysis shows that the number of patients cared inpatient for pneumonia and influenza was 212,391, accounting for about 9.0% of the total number of patients mentioned above. The number of patients cared outpatient was 2,264,849, accounting for 91.0% of the total number of patients. That is, of every ten outpatient cases, one was admitted for inpatient care.

The number of patients cared inpatient for influenza was 1,539, accounting for about 0.7% of all inpatients; and that for pneumonia was 210,852, accounting for 99.3% of all inpatients. More patients were cared inpatient for pneumonia. The number of patients cared outpatient for influenza was 1,712,307, accounting for 75.6% of all outpatients; and that for pneumonia was 552,542, accounting for 24.4% of all. More patients were cared outpatient for influenza.

2.Age Distribution (Figures 2 and 3)

Distribution of patients by age, sex, and inpatient-outpatient care shows that infants and children under six had the highest medical-care rate; and male

children had slightly higher rate than the female children. If sex was disregarded, children of 1-2 years of age had the highest medical-care rate of 34,909.6 per 100,000 population. The elderly above 65 had a medical-care rate of 17,390.9 per 100,000 population. Women of 15-64 years of age had a medical-care rate between 9,133.1 and 11,641.5 per 100,000 population, which was slightly higher than that of the males.

3.Monthly Distribution (Figures 4 and 5)

From the number of flu-like cases reported each week by the sentinel physicians and the medical-care rate of the National Health Insurance, it could be noted that their annual trends of growth corresponded to each other. A high peak was noted in the first week through the 7th week of 2002, and then another small peak in the 37th through 43rd weeks.

By month, January had the most number of pneumonia and influenza patients, 433,526 for outpatient care, and 23,188 for inpatient care. The number declined thereafter to 111,547 for outpatient care and 13,413 for inpatient care in September. It went up again month by month in October.

4.Regional Distribution (Figure 6)

For pneumonia, the central region of Taiwan had the highest medical-care rate of 3,854.5 per 100,000 population; that for the northern region was 3,270.9 per 100,000; and for the southern region, it was 3,078.6 per 100,000.

For influenza, the Kao-Ping region had the highest medical-care rate of 9,076.7 per 100,000 population; that for the central region was 8,504.3 per 100,000; and for the eastern region, it was 5,982.6 per 100,000.

5.Distribution by Medical Costs (Figure 7)

By medical costs of inpatient and outpatient care in terms of the points approved by the National Health Insurance, costs for outpatient care were on average 747.4 points per patient; and costs for inpatient care were on average

29,461.3 points per patient. Costs in terms of points for inpatient care were 40 times higher than the costs for inpatient care.

Costs for outpatient care for influenza were 677.3 points; they were higher for pneumonia, at 964.0 points. For costs of inpatient care, they were 6,136.7 points for influenza and 29,631 points for pneumonia. Inpatient care for pneumonia was 4.8 times more costly than influenza.

By age, the elderly above 65 had the highest costs of 6,608.0 points for the care of influenza; the 6-14 age groups, the next, at 4,244.7 points. They were 1,454.6 points for the 0-year group; 876.8 points for the 1-2 age group; and 562.7 points for the 15-19 age group. For the medical care of pneumonia, the elderly above 65 had the highest costs of 284,157.3 points; the 40-64 age groups, the next, at 43,665.5 points. They were 11,038.4 points for the 0-year age group; and 3,484.1 points for the 1-2 age group. In other words, the elderly above 65 had the highest medical costs for both inpatient and outpatient care.

Discussion and Recommendations

Reports are that for the general population, the influenza infection rate at ordinary times is 10-20%. The National Health Insurance estimate of the influenza infection rate of 11% for 2002 corresponded with the reported range.

When facing a large-scale epidemic of influenza in the future, will the manpower and bed capacities of the medical care systems in Taiwan be sufficient to meet the crisis? Organizations concerned should be prepared well in advance following the instructions of the "Plan to Prepare for Large-Scale Influenza Epidemics"⁽⁶⁾. Generally speaking, early preparation through projection and planning to face epidemics should not be too difficult if the epidemics follow the specific natures that are already understood. In reality, this would not be the case. There still are many unknown natures of the avian flu. Why the fatality of H5N1 doubled in 2004, for instance. What would the situations be when flu

induces a large-scale epidemic in humans? Both clinicians and public health workers should be more alert at any time to various relevant information, should strengthen monitoring for infections of men and animals as well for the early detection of any intervening factors for more effective containment and even eradication. Supplies that should be prepared in advance, pharmaceuticals against viruses, protective facilities, for instance, should be well kept in store. Disease control measures should be standardized and documented, and through communication and drills, team work should be enhanced for better coordination and timeliness to meet the urgent needs of the future.

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Figure 1. Number of Patients Medically Attended for Pneumonia and Influenza in Taiwan 2002

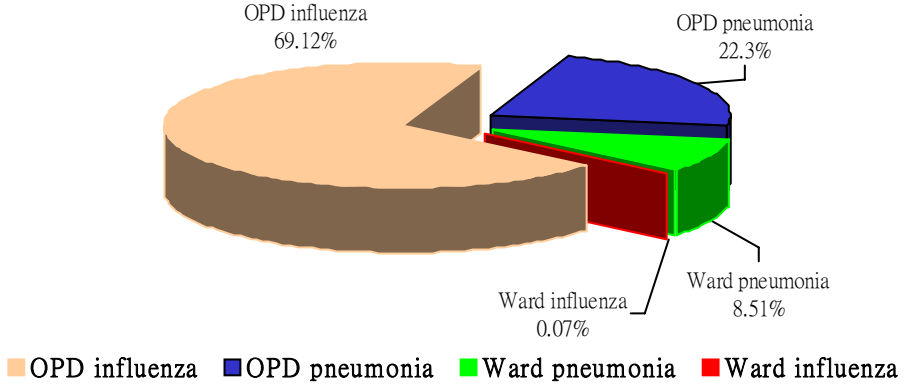


Figure 2. Age Distribution of Patients Medically Attended for Pneumonia and Influenza in Taiwan, 2002

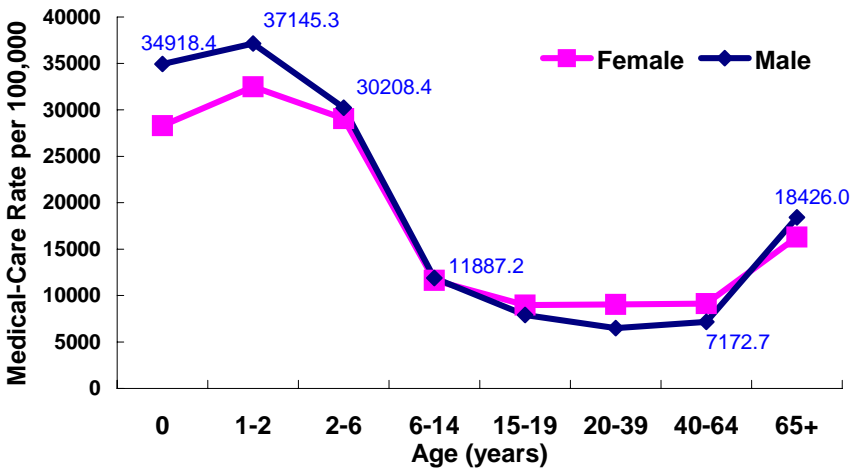


Figure 3. Age Distribution of Patients Cared Inpatient and Outpatient for Pneumonia and Influenza in Taiwan, 2002

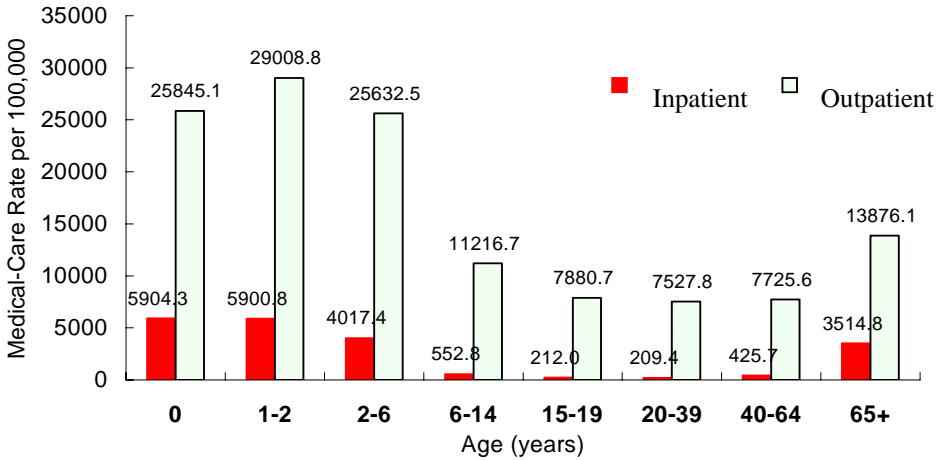


Figure 4. Average Number of Cases Reported by Sentinel Physicians for Pneumonia and Influenza in Taiwan, 2002

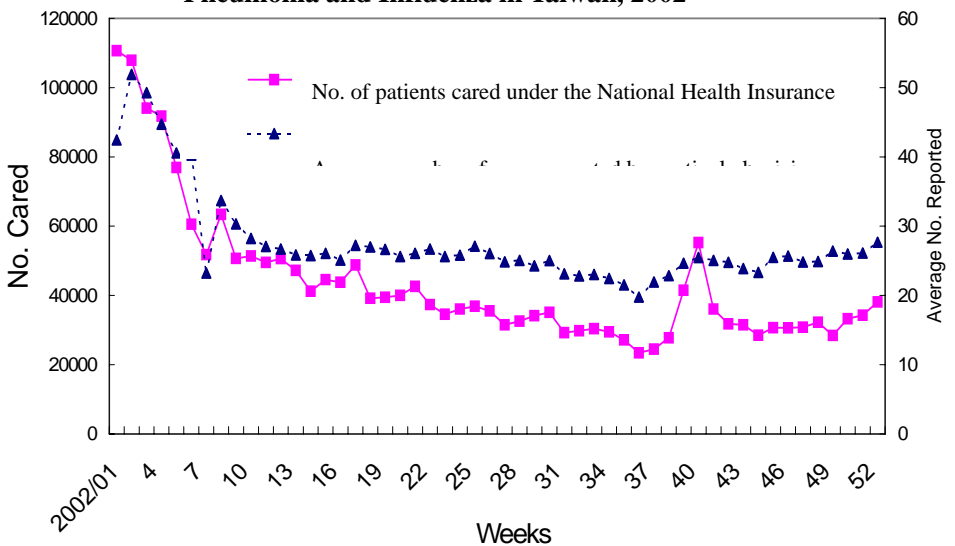


Figure 5. Monthly Distribution of Cases of Pneumonia and Influenza, Taiwan, 2002

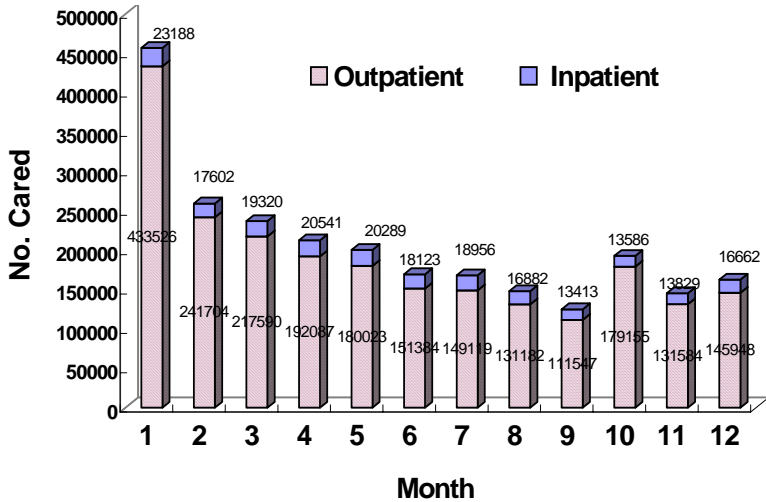


Figure 6. Regional Distribution of Cases of Pneumonia and Influenza, Taiwan, 2002

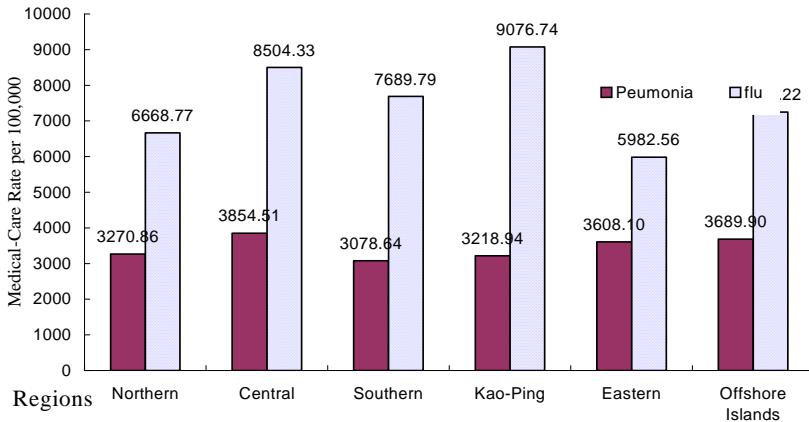


Figure 7. Medical Costs (Points) by Age for Pneumonia and Influenza, Taiwan, 2002

