

ARTICLE

Evaluating the impact of the 1918–1920 influenza pandemic in Pre-War Imperial Japan

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ABSTRACT

This paper shows the health impact of the Spanish influenza pandemic on Imperial Japan, which includes Korea and Taiwan from 1918 to 1920, using excess mortality data from the series “*Vital Statistics of Imperial Japan*”, “*Korean Governor-General Annual Statistical Reports*” and “*Taiwan Vital Statistics*”.

The total number of excess deaths from 1918 to 1920, the years of the Spanish flu pandemic that reached Imperial Japan was almost 670,000, with deaths amounting to almost 470,00 in Japan’s main islands. The standardized mortality ratio (SMR) during the period was calculated with the Japanese in Japan as standard populations. Excess mortality for infants and children for both Japanese and the Koreans in Korea, however, seemed to be underestimated, especially after the 1919 March First Sam-il Movement, one of the first Korean public displays of resistance against Japanese rule.

Standardized Mortality Ratio for the 5 to 49 year old population in Japan, excluding infants, children, and those in the older age brackets have been provided. The SMR for the 5 to 49 year old Japanese in Korea was almost similar to those of the Japanese in Japan, while among the Koreans in Korea the SMR was 60 per cent higher for the same demographic profile. The levels of excess mortality among the Japanese in Japan and the Japanese in Taiwan were the same, in contrast with those of the Taiwanese in Taiwan, which was higher by at least 60 per cent. The relationship between excess mortality and gross domestic expenditure (GDE) per head in 1920, was also assessed. After adjusting the effect of the 1919 March First Sam-il Movement, Japan had the highest SMR and GDE per head and Korea had the lowest.

Based on these figures, it is argued that the Koreans in Korea and the Taiwanese in Taiwan were more vulnerable to the Spanish flu compared with the Japanese in Korea, Taiwan, and Japan. It could also be surmised that there was a proportional relationship between states of health and poverty in Japan, Korea, and Taiwan during this period.

KEYWORDS

influenza, Spanish flu, Imperial Japan, Korea, Taiwan

Introduction

Japan has a continuing historical record of disease and medicine since the ancient period in the sixth century when the earliest epidemics have been recorded. Based on these records there are now several important and available works in English on the subject (Goble 2011; Bay 2012). Historians have also been able to study infectious diseases in the late nineteenth and early twentieth century, and more especially so when the Japanese government began to create a statistical database and statistics became part of Japanese historical data. Cholera epidemics from the early- and mid-nineteenth century Japan became the focus of most scholarly works, which examined the cultural aspects of epidemics and popular culture (Gramlich-Oka 2009). Japan experienced several cholera outbreaks, particularly in the 1880s, with mortalities amounting to 100,000, despite Japan's adoption of Western public health measures, which Japanese social and cultural historians understand to be a result of Japanese interactions with the West (Kuo and Fukui 2007). Japanese efforts to deal with cholera were undertaken through a mixture of Western public health ideas and the Japanese family and community system (Johnston 2018). It was this particular public health model—this mix of Western and Japanese systems of public health—implemented in the cities, towns, and villages, along with Japanese domestic hygiene, that enabled Japan to avoid large outbreaks of cholera epidemics in the twentieth century.

There are two web-based databases from which this study derives its data and these databases have provided new research agendas and possibilities on studies on disease and medicine in Japan. Based on these databases, it is argued that the cause of deaths in the Japanese prefectural regions from 1900 to 1959, are very specific (Tomobe and Suzuki 2006a). The number of patients who died from legally identifiable diseases from 1876 to 1959 is also identifiable (2006b). Beginning in the 1900s, infectious diseases have ceased to become epidemics and instead, have become chronic in Japanese society. This shift in the nature of diseases provides new insights on the subject of diseases and medicine in Japan and could help formulate questions on the nature of infectious diseases, especially those that coincided with the entry of Western influence in Japan and its subsequent effects on Japanese traditional society. According to economic historian Takeshi Nagashima, typhoid fever in Tokyo in the 1920s presents an interesting example of high morbidity in the wealthier parts of Tokyo and low morbidity in the city's poorer areas. The latter is attributed to the availability of a clean water system in the low-lying and poorer areas of Tokyo (Nagashima 2004). Historian Akihito Suzuki, who has undertaken a study of measles in the prefectures and large cities of Japan, emphasizes the role of space in the rise of infectious diseases and has identified primary schools in late nineteenth century

Japan as the “pivotal spaces” or sites from which to derive strong morbidity statistics based on attendance records in primary schools, a method which is based on the Western style social system (Suzuki 2009). While both works by Nagashima and Suzuki that highlight the combination of Western public health ideas and practices and the development of local medical knowledge in Japan provide valuable insights to understand modern diseases such as typhoid and measles their views are limited. These two scholars only examined the changes in the local understanding of indigenous or domestic infectious diseases, particularly typhoid and measles, vis-à-vis the environmental changes in large cities as well as the interactions between Japan and the West and East Asia; they did not examine the effects of Western influences on traditional Japanese society (Nagashima et al. 2017).

The study of influenza is a recent research subject in Japan. Towards the end of the First World War in 1918, the influenza pandemic more popularly known as the Spanish flu pandemic, hit Japan. By examining the records on influenza in Japan, historical demographer Akira Hayami was not only able to pose questions on its effects; his work also paved new ways of undertaking a regional comparison of its impact on the western part of Japan, Taiwan, and Korea, and almost the entire Japanese Empire (Hayami 2006). While it seems that influenza had been a forgotten “plague” in Japan in the wake of the Great Earthquake which completely destroyed Tokyo and Yokohama in 1923, its impact has long since remained and its effects unexamined.

This study on the profound effects of the almost forgotten impact of the Spanish flu in Japan takes its impetus from Hayami’s work and his attempts to identify the methods of modern public health work. This study will be also undertaken within the context of the influenza outbreaks in Japan and other parts of the world. Specifically, this paper will assess public health interventions and social responses to those interventions by examining the effects of the pandemic of Spanish flu in Japan and its impact from 1918 to 1920, through a quantitative analysis of government statistics methods. We place Hayami’s arguments within Japanese history, the particular geographical location in which influenza was most virulent, and the context of the Japanese economy. Influenza pandemics in the early modern period up to the end of the twentieth century in Japan’s empire are taken into consideration, particularly its two major colonies, Korea and Taiwan, along with their economies during this period. In this regard the study also hopes to be able to examine the Spanish flu beyond the context of the First World War.

Methodology

This study examines the long-term historical structure of disease and medicine in Japan in the context of the pandemic of influenza in the early modern period (1500–1850) and the Russian-flu in 1889–1891. Qualitative and visual materials are analyzed and quantitative analysis is provided when applicable. The study is also grounded on the work of medical historian Yu Fujikawa, a leading authority on the history of disease and medicine in Japan, particularly his 1922 work, *Japanese history of sickness*, which is based on primary historical records of several diseases including influenza. The reference to Russian-flu to supplement the analysis of excess mortality based on available data also forms part of the grounding of this work.

This study begins with an analysis of the impact of the Spanish flu from 1918 to 1920, based partly on Hayami's study of Spanish flu attacks on Japan and his introduction of new methods of interpreting historical and statistical data (2006). This will be undertaken through an examination of the pandemics and non-pandemic episodes of influenza from 1918 to 1920, based on the examination of documents from Japan's 1922 government sanitary bureau, which includes data on influenza and the Japanese medical and public health interventions that were undertaken to deal with the epidemic. An analysis of its current impact and significance, focusing on the estimation and analysis of excess mortality, will also be provided. In addition, excess mortality in Korea and Taiwan are also examined, as well as the economic factors that were at play during this period and its interactions with the ethnicity of the subjects concerned. While partly for this part of the paper is derived from Hayami's index the paper differs from the latter's work in terms of the use of excess mortality to examine and explain the long-term influence of the Spanish flu in the beginning of the twentieth century.

The quantitative method that forms the empirical grounding of this study involves the estimation of the impact of influenza on health. The influenza epidemic's impact on mortality includes not only deaths that have been directly caused by influenza but also excess mortality, or the increase in mortality brought about by other causes associated with influenza. Specifically, excess mortality refers to the excess of actual mortality that occurred during the epidemic compared to the estimated death rate in its absence.

The estimate of excess mortality was done by two methods. The first is based on seasonal changes in mortality between 1900 and 1938, and is estimated as follows. Months with influenza outbreaks were identified on the basis of influenza mortality rates (converted to yearly rates) for each year and month. The assessment criterion used was monthly mortality for influenza as the direct

cause of death. As in a previous study months with influenza outbreaks are defined as periods where influenza mortality rate exceeded 40 per 100,000 population (Ohmi and Marui 2011). The second method is based on the average number of deaths per calendar year or month before and after the influenza pandemic covering the years 1918 to 1920 (Murray et al. 2006).

Data

Data for this study is derived from the mortality statistics of the *Vital Statistics of Imperial Japan* for the years 1899–1943 (Cabinet Statistical Office 1902–1945) for mainland Japan; the *Korean Governor-General Annual Statistical Reports* for the years for the years 1910–1937 (Korean Governor-General 1912–1944) for Korea; and, the *Vital Statistics of Taiwan* for the years 1906–1938 (Taiwan Governor-General Planning Department 1907–1943) for Taiwan. Population data was taken from the civil registration and gender records in Korea and Taiwan and was obtained from Mizoguchi Toshiyuki and Mataji Umemura's *Basic economic statistics of former Japanese colonies* report (1988).

Data classified according to age groups of the Japanese living in Japan were obtained from the 1920 *National Census* (Cabinet Statistical Office 1928). Since the national census in 1920 was abandoned due to political reasons that could primarily be attributed to the Battle of Qingshanli on October 1920, between the Imperial Japanese Army and Korean armed groups, there is no population data available for this period for the Japanese in Korea. Thus, population figures that famous economic demographers of Toshiyuki Mizoguchi and Mataji Umemura, who used the estimations of the 1920 population and the data of age-specific population of Korea taken from the national census of 1925, was used. Data on Koreans living in Korea were obtained from the estimates reported by Yoshikuni Ishi (1972) while data on the Japanese and Taiwanese in Taiwan were sourced from the *1920 Taiwan national census*.

Influenza epidemics and interventions: Premodern Japanese society (1000-1850)

According to Yu Fujikawa, prior to the epidemics of influenza, the Japanese had an almost similar word for it (1912). *Shihabuki'yami* is a word for a disease that causes cough and is cited in *Genji Monogatari* or *Tale of Genji*, a classic work of Japanese literature written around 1000 A.D., as well as in the *Masu'kagami* or *Historical stories* based on 1183–1333 records. The medical monograph *Ishin'ho*, written during the same period, also records the use of the term *seki* or cough (See Figure 1).

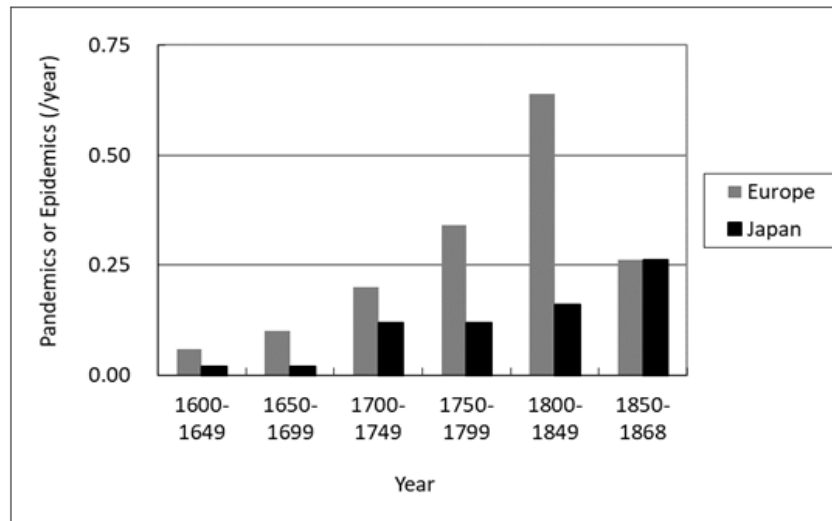


Figure 1. Frequency of influenza pandemics or epidemics, 1600–1868.

From 1600 to 1868, Europe and Japan had already experienced pandemics and epidemics (Fujikawa 1912). Fujikawa notes the available records for the three episodes of influenza epidemics in Europe during the 50-year period, from 1600 to 1649, especially noting the increase in influenza episodes to 32 for the 50-year period, specifically from 1800 to 1849, for a total of 0.64 episodes annually. During the 19-year period dating from 1850 to 1868, coinciding with the first year of the Meiji era in Japan, there were five episodes of influenza epidemics in Europe with an annual incidence of 0.26 episodes, which is equivalent to less than half of the previous incidence in Japan from 1600 to 1649. In this same period, there was only one recorded epidemic, probably influenza, in Japan. The number of influenza episodes in Japan increased only slightly thereafter, with only eight recorded episodes for the 50-year period in the nineteenth century, specifically the years from 1800 to 1849. This period corresponds to an annual incidence of only 0.16 episodes. During the 19-year period, from 1850 to 1868, when Japan opened its door to foreign powers, coinciding with the beginning of the Meiji era, influenza epidemics had increased to five, corresponding to an annual incidence of 0.26 episodes, a record that contrasts with the downward trend of influenza epidemics in Europe. These statistics are based on published reports of events that appear to be related to the influenza epidemics, although the reports vary in terms of the volume and quality of the epidemics recorded. It is unlikely, however, that the volume or quality of published reports decreased in Europe in the latter half of the nineteenth century. It seems possible to consider that, as with cholera, influenza epidemics peaked during the first half of the

nineteenth century, and such peaks are illustrated in the drawings of Honoré Daumier, the famous French artist whose works offer political and social commentaries on life in Paris during the nineteenth century.

The period of the nineteenth century also coincides with the Edo period in Japan, which is characterized as a period of high literacy, as seen in the extant diaries and written records from that period. Therefore, it seems unlikely that the recorded number of influenza episodes in Japan, based on available written records after 1700, is an underestimation of the actual number of influenza episodes in the country. As such, it could be the case that recorded influenza epidemics coincided with the period of the Meiji Restoration, when Japan opened itself to foreign powers.

The Japanese term *ryukosei kanbo*, or influenza, was also coined at the time of the pandemic, from 1889 to 1891. Prior to the pandemic, influenza was only referred to as *kaze*, or “cold”. Thus, it was only after the occurrence of a major influenza episode that a specific name, such as *kaze*, also the name of a popular theater play, fashion, hairstyle, Sumo wrestler, or God/Buddha considered responsible for the episode or the district from which the episode seemed to have originated, was assigned to it (1912). For example, based on Fujikawa’s work, influenza was referred to as the following (See also Table 1):

Table 1. History of major influenza outbreaks worldwide and in Japan

| Worldwide | | | Japan | |
|-----------|-------------|--|---------|---------------------------------------|
| Year | Epidemicity | Affected countries | Year | Name |
| 1729–33 | +++ | Europe, N. & S. America | 1730–33 | |
| 1761–62 | + | Europe, N. America | 1769 | Inaba-kaze |
| | | | 1775–76 | Okoma-kaze |
| 1781–82 | +++ | Europe, China, India, N. America, Russia | 1781 | |
| | | | 1784 | Tani-kaze |
| 1788–90 | + | Europe, N. America | 1795 | Oikari-kaze |
| 1799–1802 | ++ | Europe, China, Brazil, Russia | 1802–03 | Anpon-kaze, Oshichi-kaze, Nenkorokaze |
| | | | 1808 | Nenkoro-kaze |
| | | | 1821 | Danbo-kaze |
| | | | 1827 | Tsugaru-kaze |
| 1830–33 | +++ | Europe, N. America, Russia, India, China | 1831–32 | Ryukyu-kaze |
| 1847–48 | ++ | Europe, Russia, N. America | 1854 | America-kaze |
| 1857–58 | + | Europe, N. & S. America | | |
| 1889–91 | +++ | All countries affected | | Osome-kaze |
| 1900 | +++ | Europe, N. & S. America, Australia | | |
| 1918–20 | +++ | All countries affected | | (Spanish flu) |
| 1946–48 | + | All countries affected | | (Italian flu) |
| 1957–58 | +++ | All countries affected | | (Asian flu) |
| 1968–69 | +++ | All countries affected | | (Hong Kong flu) |
| 1977–78 | +++ | All countries affected | | (Russian flu) |
| 2009–10 | +++ | All countries affected | | (2009H1N1) |

+ Epidemic; ++probably pandemic; +++ pandemic
References: Ohmi 2009, Potter 1998, and Fujikawa 1912.

1775–1776 - Okoma-kaze: heroine of a *yoruri* or a ballad doll drama

1784- Tani-kaze: a Sumo wrestler; very strong; boastful to other wrestlers and believed to have said: “You cannot throw me down and have me lay down on the wrestling area. If you want to see me lying down, you will have to visit me when I am sick in bed.” According to historical records, Tani-kaze, after making this declaration, caught a cold during an epidemic.

1795- oikari-kaze: “Wild boars hunting.” According to folklore, boar hair was found on the clothing of influenza victims.

1802–1803- ampon-kaze or foreigner, specifically Thai, who drifted ashore to Japan. Oshichi-kaze: popular ko-utai, a traditional song in Japan

1807–1808- nenkoro-kaze, from the name of a nursery song, with the phrase *nennen korori*, which conjures images of sick people in bed.

1821- danbo-kaze, popular ko-utai, a traditional song in Japan

1827- Tsugaru-kaze, or feudal lord of the Tsugaru district at the northern tip of Japan, who was castigated and blamed by the central Tokugawa government during the Edo period, presumably for being inauspicious because he traveled on a palanquin suggesting a funeral service during a state ceremony.

1831–1832- Ryukyu-kaze, envoy from Ryukyu who visited Japan during the year

1854- America-kaze, ship carrying an envoy from the United States who reached Yokohama in during this year.

The 1831 to 1832 epidemic was referred to as *Ryukyu-kaze* and in 1854, *America-kaze*. These references to influenza somehow suggest that the Japanese in the nineteenth century in some ways had thought that influenza was associated with the arrival of foreigners to Okinawa, which had contact with China, and had coincided with the beginning of diplomacy and trade with Western countries.

The Russian-flu (1889–1891)

The influenza epidemic from 1889 to 1891, in Russia entered Japan in the spring of 1890. Its virulence had terrified the Japanese so that it was eventually referred to as *Osome-kaze* (Table 1). Osome was the heroine's name in a popular kabuki play on ethically unacceptable love. Since Hisamatsu, Osome's beloved partner was only a merchant's servant, he was associated with stigma and from then on the Japanese associated evil with Hisamatsu. The Japanese since then had a charm to ward off evil by uttering "Hisamatsu is not home" at the entrance of every house to avoid transmission of a disease, which later on was referred to as Osome, Hisamatsu's lover. A colored woodblock print with "Be careful of Hayarikaze" (influenza) was eventually made to ward off "evil" (Figure 2). As absurd as this "method" was in preventing influenza, which could have been avoided through moderate drinking and eating, sufficient clothing, taking alcohol only when cold, and consulting a doctor when suffering from sore throat or taking a mixture of Chinese medicine whenever one is having a dull headache, the Japanese seemed to have believed the "method" worked at that time.



Figure 2. 1890 colored woodblock print: "Be careful of Hayarikaze" (influenza). (Source: Naito Museum of Pharmaceutical Science and Industry 2001)

During the 1890 epidemic, the Japanese government issued a statement that recommended the early treatment of influenza. It also undertook an information dissemination campaign by making known the influenza cases that had occurred, as well as educational campaigns to the public by distributing printed leaflets with information on the symptoms and characteristics of influenza.

Excess mortality in the 1889–1891 Russian-flu

Excess mortality in Tokyo and Kanagawa Prefectures were derived from the monthly mortality data from 1889 to 1891. Figure 3 shows that in 1891, excess mortality due to influenza was 1.70 per 1,000 population in Tokyo and 2.20 in Kanagawa.



Figure 3. A poster cited in "Influenza" by Central Sanitary Bureau (1).
(Source: Central Sanitary Bureau 1922)

Until 1899, monthly mortality data had not been collected from all the prefectures in Japan, nor had these been recorded in the *Vital Statistics* record of Japan. Thus, data on nationwide excess mortality due to influenza before 1899 is unavailable. Analysis of data available in the records of Tokyo and Kanagawa, however, suggest that the health damage in terms of excess mortality due to the

1889–1891 pandemic were comparable to the damage associated with the Spanish flu, particularly in the Kanto district, which includes Tokyo and Kanagawa. The data also indicates that there were almost no health damages from influenza in Tokyo and Kanagawa by the end of the 1889–1891 pandemic and the Spanish flu pandemic from 1918 to 1920.

The 1918-20 “Spanish flu” pandemic in Japan: Before and after

The so-called “Spanish flu” epidemic broke out twice in Japan: first, in 1918, until the spring of 1919; and, in 1919, until the spring of 1920. The means to prevent influenza, according to Japan’s 1922 government sanitary bureau, included the use of vaccine, masks, and gargling. These preventive measures were listed on the pamphlets that were being distributed that featured vaccination, along with a tiny description for gargling, among others. Detailed descriptions were mostly about the masks, including information on its usage, materials used, and the distance travelled by liquid droplets to the mouth. Educational posters, which became the main medium for the educational campaigns also emphasized the use of masks, gargling, and the isolation of sick patients in a designated room. According to Fukumi et al., the “Spanish flu” provided the initial stimulus for the daily Japanese habit of “wearing a mask” (1960). During the period of the pandemic, 66.5 per cent of all households in the Fukui Prefecture in Honshu Island stocked masks; 36.7 per cent of the entire population in Fukui had them. The number of vaccinated individuals exceeded 4.64 million (Central Sanitary Bureau 1922).

Figure 4 to Figure 6 show the posters being distributed with the following recommendations against influenza: avoid getting close to people when they are coughing; cover the nose and mouth; be vaccinated; and, gargle in the morning and evening. Various colored posters that were distributed also recommended visits to medical facilities at the onset of any symptom, use of masks, covering of the mouth when coughing and gargling, vaccination, isolation of patients using a partition, and exposure of beddings to sunlight for disinfection.

According to Fukumi et al., the use of masks during the influenza epidemic in the Taisho era was not effective in protecting the local population from the disease, even as the Japanese government encouraged the use of masks as a social custom, similar to the ceremonial practice of gargling by school children (1960). Thus, during the outbreak of the “Osome-kaze” influenza in 1890, folkloric rituals depicted in pictorial rituals were the norm among the local population, especially since the government only issued a very basic health advisory. In 1920, however, the local population started using masks and was vaccinated during the epidemic. It is important to consider, however, that the government issued health advisory did not differ from the contemporary public health advisory on influenza (Markel et al. 2007).



Figure 4. A poster cited in "Influenza" by Central Sanitary Bureau (2). (Source: Central Sanitary Bureau 1922)

防 豫 感 流
 (局 生 衛 省 務 内)

| | | | |
|------------------------|-------------------------|-------------------------|------------------------|
| 四、 含嗽 せよ——朝な夕なに | 三、 豫防注射 を——轉ばぬ先に | 二、 鼻口 を覆へ——身の爲にも | 一、 近寄 るな——咳する人に |
|------------------------|-------------------------|-------------------------|------------------------|

Figure 5. A poster cited in "Influenza" by Central Sanitary Bureau (3). (Source: Central Sanitary Bureau 1922)



Figure 6. Colored woodblock print illustrating the 1858 cholera epidemic.
(Source: Naito Museum of Pharmaceutical Science and Industry 2001)

The changes in the awareness and responses of the local population to influenza and the Japanese government's efforts to control and prevent the disease bear resemblance to both the local population's and the Japanese government's reactions and responses to the cholera epidemics. Figure 7 shows the colored woodblock print illustrating the 1858 cholera epidemic. It shows people dying of cholera and a huge pile of coffins of dead people awaiting cremation because of the absence of any countermeasures against it. Figure 8 shows another colored woodblock print published in 1880, which depicts a monster symbolizing cholera that the local population chased away with carbolic acid.

Excess mortality before and after the 1918–1920 Spanish-flu pandemic

Since 1899, the nationwide *Vital Statistics* of Japan contains collected data on deaths, including the monthly number of deaths directly caused by influenza, which makes possible the estimation of excess mortality due to influenza. Based on the 1922 report of Japan's sanitary bureau, the 1918 Spanish-flu pandemic had reached Japan, affected 23,804,673 individuals, causing 388,727 deaths. The reports of the Ministry of Interior that were generated to survey the damage that influenza had brought to Japan also show that the number of those affected by the Spanish-flu had been underestimated (1922). Based on this report, an estimation of excess mortality due to Spanish-flu is necessary.



Figure 7. Colored woodblock print illustrating the 1880 cholera epidemic. (Source: Naito Museum of Pharmaceutical Science and Industry 2001)

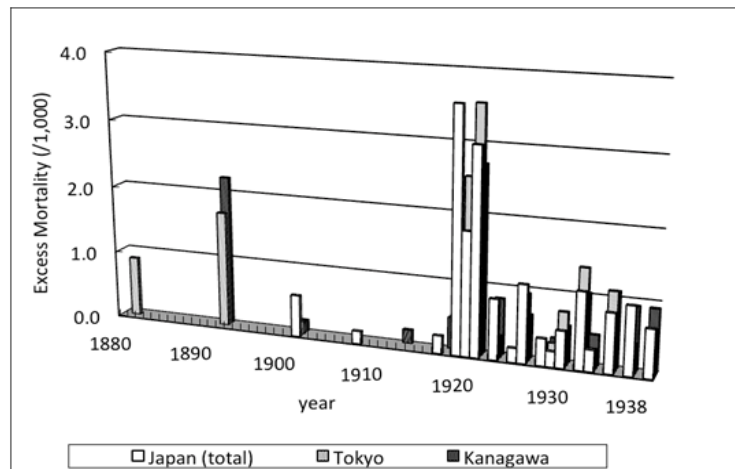


Figure 8. Excess mortality due to influenza in Tokyo and Kanagawa.

Table 2 shows that Hayami (2006) estimated excess mortality due to Spanish-flu at 453,152, while the paper by Stephanie Richard et al. estimated it at 481,500 (2009). According to our estimation, excess mortality due to Spanish-flu was actually 465,670. This figure is consistent with estimates calculated by these two groups. Thus, it could be said that, based on available data and a comparison of these works, excess mortality due to Spanish-flu was slightly lower than 500,000. Both works by Hayami (2006) and Richard et al. (2009), which estimated excess mortality due to Spanish-flu, did not consider the circumstances surrounding the pandemic before and after its occurrence. In contrast, this study's estimation of excess mortality covers a longer period from the turn of the twentieth century until the 1930s, or prior to the Second World War, specifically the years 1900 to 1938. Table 3 shows that the total excess mortality during the survey period was 993,266. Analysis of annual averages of excess mortality also reveals that excess mortality after the Spanish-flu pandemic was about 10 times greater than any other cases of influenza in Japan so that the total excess mortality during the post-Spanish flu period, from 1921 to 1938, was comparable to that of the Spanish-flu pandemic.

Table 2. Excess deaths due to Spanish flu

| | This study | Hayami | Richard et al. |
|--------------------|------------|---------|----------------|
| Oct. 1918–May 1919 | 284,809 | 260,647 | 299,700 |
| Dec. 1919–May 1920 | 180,861 | 186,673 | 181,800 |
| Total | 465,670 | 453,152 | 481,500 |

References: Hayami 2006, and Richard et al. 2009.

Table 3. Excess deaths in 1899–1938, Japan

| | Deaths | /year |
|-----------|---------|---------|
| 1899–1917 | 50,768 | 2,672 |
| 1918–20 | 465,670 | 155,223 |
| 1921–38 | 476,828 | 26,490 |
| Total | 993,266 | 24,832 |

References: This study, and Ohmi 2009.

Comparison of excess mortality between Japan and the US

Comparing excess mortality per 1,000 population during the Spanish-flu pandemic between Japan and the US, Table 4 shows that during the first pandemic wave from October 1918 to May 1919, excess mortality for both was almost the same, with 5.24 for the US and 5.13 for Japan per 1,000. During the second pandemic wave from December 1919 to May 1920, there was a reported excess mortality of 1.39 in the US and 3.20 in Japan, with the latter having 2.3 more in excess

mortality. Both pandemic periods from October 1918 to May 1920, show a total of 6.63 excess mortality for the US and 8.33 for Japan. The data on excess mortality in Japan collected in this study is similar to the data in Richard et al. (2009).

Table 4. Excess mortality due to Spanish flu in Japan and U.S.A.

| (/1,000) | This study | | Richard et al. |
|--------------------|------------|-------|----------------|
| | U.S.A. | Japan | Japan |
| Oct. 1918–May 1919 | 5.24 | 5.13 | 5.4 |
| Dec. 1919–May 1920 | 1.39 | 3.20 | 3.3 |
| Total | 6.63 | 8.33 | 8.7 |

Reference: Richard et al. 2009.

Excess mortality in Korea and Taiwan during the Japanese occupation

Crude mortality from 1900 to 1938

Figure 9 shows the total death rate per 1,000 population, or crude mortality among Japanese and Koreans living in Korea from 1900 to 1938. The same also shows that the Japanese living in both Japan and Korea had a crude mortality of around 20 in the 1900s, with a gradual decrease over the years. Crude mortality of Koreans living in Korea, however, had a significant increase from 6.9 in 1910 to 20.4 in 1915. This increase in crude mortality is taken to be inaccurate because of the incomplete death registration records during the first half of the 1900s.

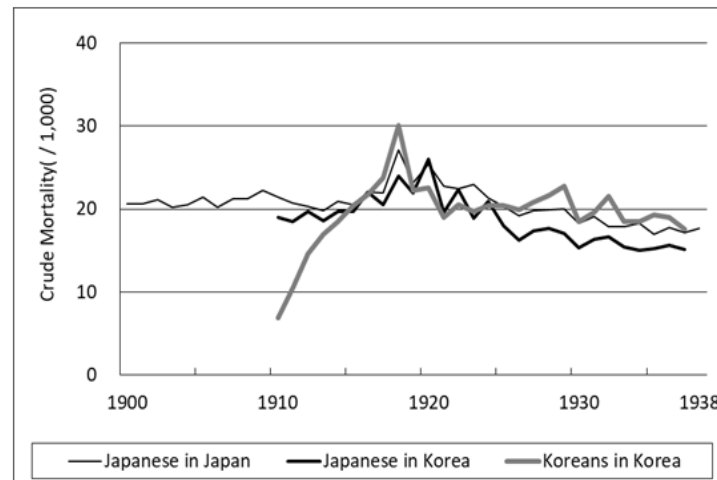


Figure 9. Korea crude mortality, 1900–1937.

Figure 10 shows the crude mortality per 1,000 for the Japanese and Taiwanese living in Taiwan from 1900 to 1938. In 1906, crude mortality was 20.2 for the Japanese living in Taiwan; the same figures are shown for the Japanese living in Japan. These figures would eventually decrease over the years for the Japanese, with only 13.9 crude mortality in 1921, and 9.5 in 1938. This decrease in the crude mortality of the Japanese living in Taiwan, however, is inaccurate because of the compromised nature of recording population statistics due to the Japanese Empire's colonial public health policies, which compelled some of Taiwanese to indicate their ethnicity as "Japanese" in the national census.

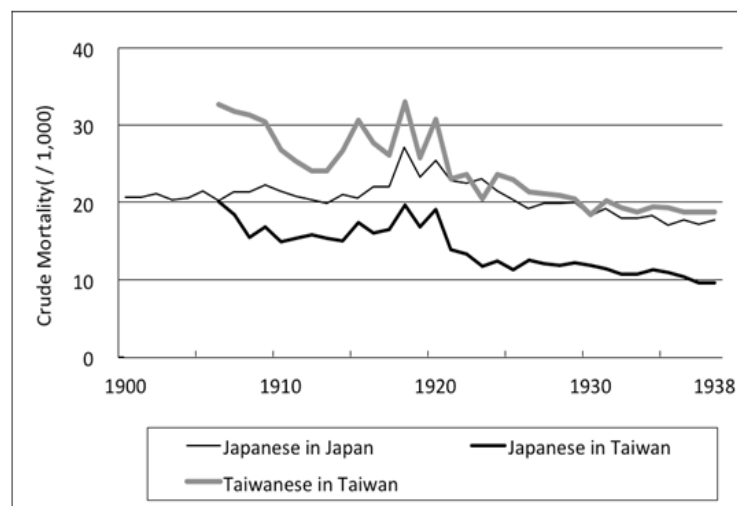


Figure 10. Taiwan crude mortality, 1900-1938.

Crude mortality before, during, and after Spanish flu

This section discusses the monthly mortality per 1,000 from 1917 to 1921, the years corresponding to the period prior to, during, and after the Spanish-flu in pre-war imperial Japan. Figure 11 shows that in November 1918, crude mortality rapidly increased in all of pre-war imperial Japan: 54.9 for the Japanese living in Japan; 45.4 for the Japanese living in Korea; and, 86.7 for the Koreans in Korea, a figure twice that of the Japanese in Korea. Figure 12 also shows that in the same period crude mortality was 48 for the Japanese living in Taiwan and 74.8 for the Taiwanese in Taiwan. This data suggests that in both Korea and Taiwan, Japanese mortality slowly increased only to decrease rapidly during the first and

second periods of the Spanish-flu pandemic. The increase in mortality was reported to be greater for the Koreans living in Korea and for the Taiwanese living in Taiwan when compared to the Japanese living in these areas. It is also noteworthy that the increase in mortality was particularly greater for Koreans living in Korea during the first pandemic and for the Taiwanese living in Taiwan during the first and second pandemic waves.

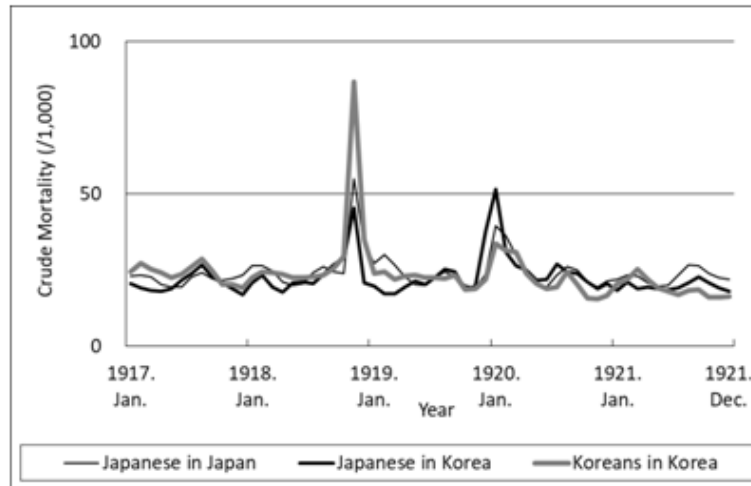


Figure 11. Korea crude monthly mortality, 1917–1921.

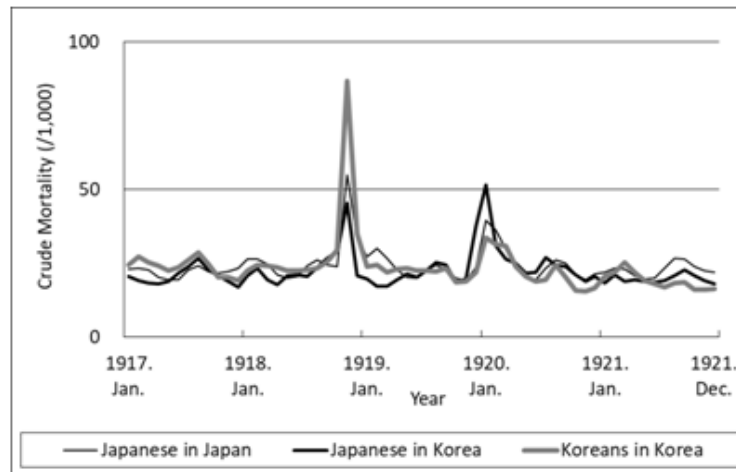


Figure 12. Taiwan crude monthly mortality, 1917–1921.

Excess mortality in Japan, Korea, and Taiwan

Excess mortality during the 1918-1920 Spanish flu pandemic was reported to be 466,865 for the Japanese living in Japan; 2,451 for the Japanese living in Korea; 146,634 for the Koreans living in Korea; 1,256 for the Japanese living in Taiwan; and, 56,089 for the Taiwanese living in Taiwan. The total excess mortality in the Japanese Empire, including Japanese, Koreans, and Taiwanese was 673,295 (Ohmi 2009).

Monthly mortality according to the civil registration category in Korea and Taiwan during the 1918–1920 Spanish flu pandemic

This section compares the excess mortality from the civil registration records per 1,000 during the different episodes of the Spanish-flu pandemic in Japan from 1918 to 1920. Table 5 shows that during the first pandemic episode from October 1918 to May 1919, the excess mortality was reported to be 5.3 for the Japanese living in Japan, a figure higher in comparison with the Japanese living in Korea, which was 3.2. Excess mortality of the Koreans in Korea, however, was 9.7, about twice that of the Japanese living in Japan. In the second pandemic episode from December 1919 to May 1920, mortality was reported to be 3.8 for the Japanese living in Japan, but was only 7.0 for the Japanese living in Korea, or approximately twice the mortality of the Japanese living in Japan. The mortality of Koreans in Korea, however, was reported to be lower than the Japanese living in Japan at 3.4. Thus, excess mortality of the total pandemic period from 1918 to 1920, was reported to be 9.1 for the Japanese living in Japan; 10.1 for the Japanese living in Korea; and, 13.1 for the Koreans in Korea.

Table 5. Excess mortality due to Spanish flu in Korea

| | Japanese in Japan | Japanese in Korea | Koreans in Korea |
|--------------------|-------------------|-------------------|------------------|
| Oct. 1918–May 1919 | 5.3 | 3.2 | 9.7 |
| Dec. 1919–May 1920 | 3.8 | 7.0 | 3.4 |
| Total | 9.1 | 10.1 | 13.1 |

Reference: This study.

Table 6 shows that during the first pandemic from October 1918 to May 1919, excess mortality for the Japanese living in Taiwan was 4.3, a figure that was somewhat lower than the Japanese living in Japan, which were only 5.3. Excess mortality for the Taiwanese in Taiwan, however, was 7.9, or higher by about 30 percent for the Japanese living in Japan. During the second pandemic from December 1919 to May 1920, mortality was reported to be 3.8 for the Japanese living in Japan but those Japanese living in Taiwan was 5.9, approximately 1.6 times higher than the Japanese living in Japan. The excess mortality for the Taiwanese in Taiwan, however, was 7.9, which was higher than the Japanese

living in Japan. In other words, excess mortality for the entire period of the Spanish-influenza pandemic from 1918 to 1920, was reported as 9.1 for the Japanese living in Japan; 10.2 for the Japanese living in Taiwan; and, 15.7 for the Taiwanese in Taiwan.

Table 6. Excess mortality due to Spanish flu in Taiwan

| | Japanese in Japan | Japanese in Taiwan | Koreans in Taiwan |
|--------------------|-------------------|--------------------|-------------------|
| Oct. 1918–May 1919 | 5.3 | 4.3 | 7.9 |
| Dec. 1919–May 1920 | 3.8 | 5.9 | 7.9 |
| Total | 9.1 | 10.2 | 15.7 |

Reference: This study.

Mortality by gender, category of civil registration, age, and the SMR in Korea and Taiwan during the 1918–1920 “Spanish-flu” pandemic

In Figure 13, excess mortality by age group per 1,000 was analyzed among the Japanese living in Japan during the Spanish flu pandemic without incorporating the annual conversion rate. Mortality at age 0–4 was reported to be 11.0 among males and 12.8 among females. Based on the work of Shigeki Nishida, an analysis of mortality by age showed that mortality was higher among the younger generation aged between 20 and 39 years (1996). Mortality was reported to be highest in the range of 30–34 years for males with a mean rate of 13.5. For the 25–29 age range for females the mean rate was 14.7. Analysis of mortality within the range of 0–28 years of age showed that excess mortality was slightly higher for females. This figure corresponds with Nishida’s findings that in pre-World War II Japan, the overall death rates for infants, children, and young adults were

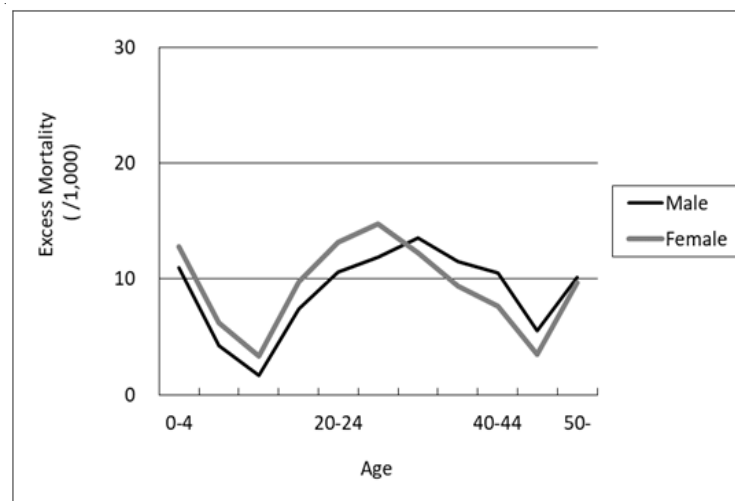


Figure 13. Japanese in Japan excess mortality by age due to influenza.

higher among females than among males. Based on his findings, the difference in the average life span between males and females through the analysis of the respective cause of mortality shows that death from tuberculosis, pregnancy, and parturition were the factors affecting the difference in average life spans for both females and males (1996).

In Figures 14 and 15, excess mortality by age among the Japanese and Koreans in Korea during the same period shows that at ages 0–4, excess mortality was estimated to be slight or even negative, suggesting a probable underestimation of the figures. This underestimation, especially in comparison with the excess mortality for the Taiwanese in Taiwan in Figures 16 and 17, is understood to be brought about by the 1919 March First Sam-il Movement in Korea and the political and nationalist upheavals it caused, which disrupted the recording of demographic data for the Koreans.

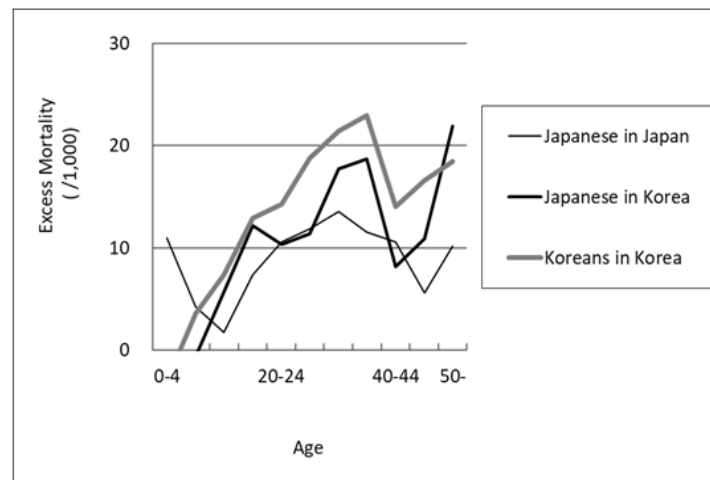


Figure 14. Korean males excess mortality by age due to influenza.

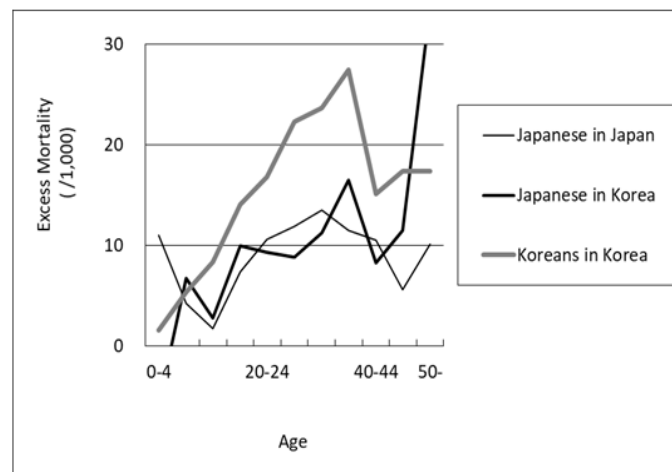


Figure 15. Korean females excess mortality by age due to influenza.

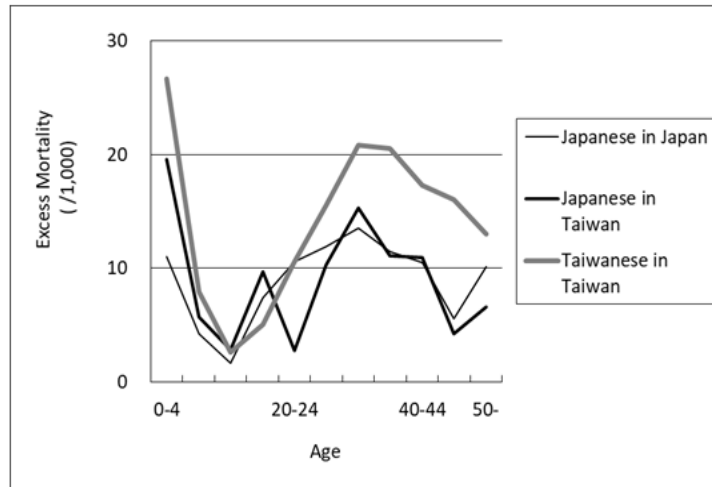


Figure 16. Taiwanese males excess mortality by age due to influenza.

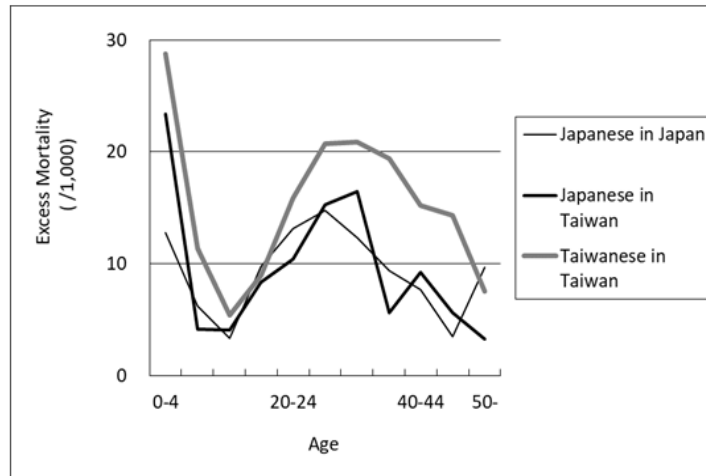


Figure 17. Taiwanese females excess mortality by age due to influenza.

The SMR was calculated with Japanese males and females living in Japan as standard populations. The calculated SMR allows for a comparison of differences in death rate by eliminating the influences that the changes in the population structure had brought about. SMR therefore, was only calculated for the population ages 5–49, without including infants, children, and those 50 years of age and above. Figure 18 shows that the SMR for the Japanese ages 5–49 living in Korea was 1.18 for males and 0.98 for females, indicating that excess mortality between the Japanese in Japan and those in Korea was almost the same. The SMR among Koreans in Korea, however, was reported to be 1.67 for males and 1.72 for females, indicating that the level of death for Koreans in Korea was higher by more than 60 per cent, compared to the Japanese in Japan.

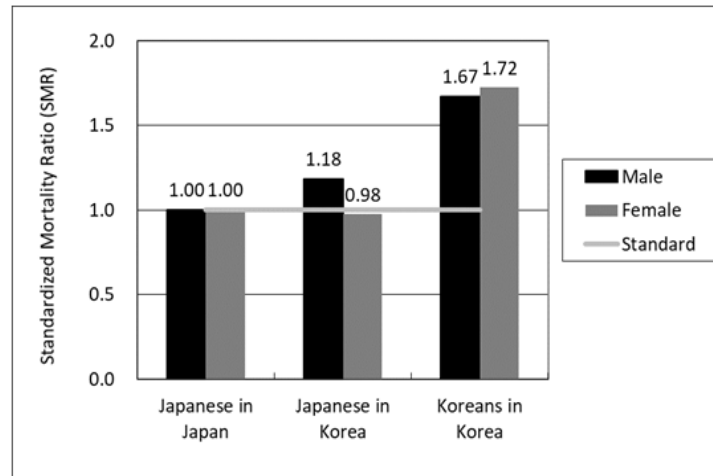


Figure 18. Korea SMR and excess mortality for 5–49 years old due to influenza.

Figure 19 shows that the SMR among the Japanese living in Taiwan was 1.01 for males and 1.10 for females. This means that the difference in the level of excess mortality due to the Spanish-flu between the Japanese living in Japan and those living in Taiwan is not great once age distribution is eliminated. On the other hand, the SMR among the Taiwanese living in Taiwan was reported as 1.61 for males and 1.62 for females, indicating that the level of death for the Taiwanese living in Taiwan was higher by at least 60 per cent compared to the Japanese living in Japan, even when age distribution was eliminated. In other words, the level of excess mortality due to the Spanish-flu between the Japanese in Japan and those in Taiwan was similar, in contrast with the Taiwanese in Taiwan, which was higher by at least 60 per cent than the Japanese in Japan.

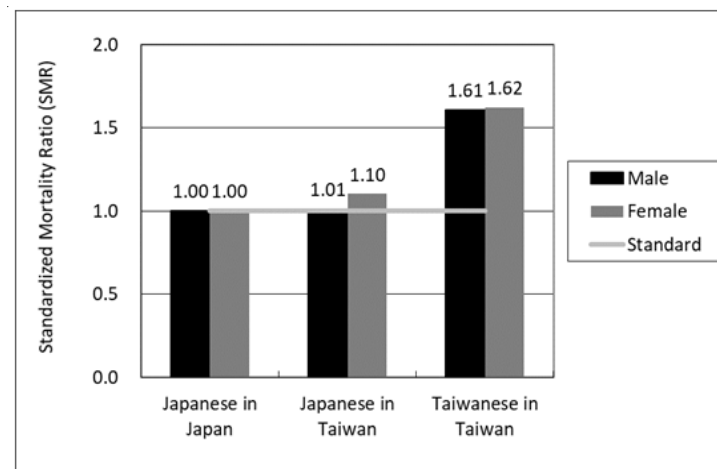


Figure 19. Taiwan SMR and excess mortality due to influenza.

Excess mortality and gross domestic expenditure (GDE) per head in 1920

Figure 20 shows the relationship between excess mortality due to the Spanish-flu and the economic factors during this period, specifically, the relationship between excess mortality and GDE per head in 1920. It shows that GDE per head was highest in Japan by 286 yen (Mizoguchi 1988). The excess mortality calculated as 9 was the lowest, according to the index of Christopher Murray, who is one of the leading researchers in global and public health, compared to those of Taiwan and Korea (2006). Taiwan had the second highest GDE by 188 yen, and GDE was lowest in Korea by 100 yen. Excess mortality in Korean was 12.2, which was lower than that in Taiwan.

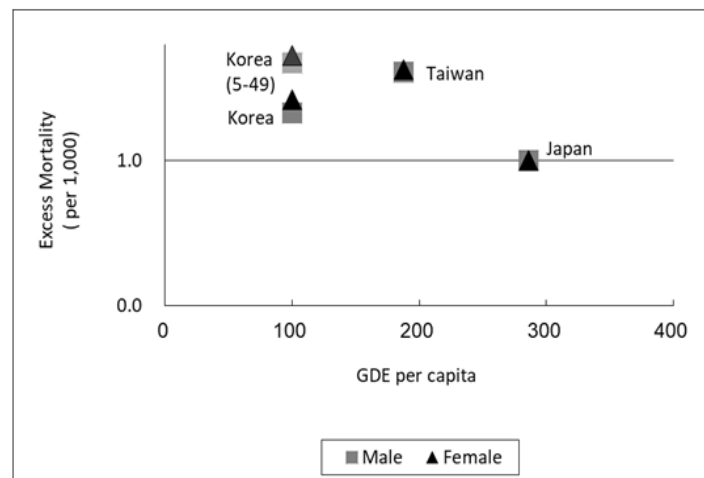


Figure 20. SMR and excess mortality due to influenza per capita GDE. (Source: Mizoguchi 1988)

Conclusion

Influenza epidemics is now being seen to have occurred most frequently during the first half of the nineteenth century in Europe and the earlier half of the Edo Period, when Japan was relatively isolated due to its lack of international contact with many countries because of its own foreign policy. Japanese historians of medicine, therefore, correlate the occurrence and frequency of epidemics in Japan when the country opened itself to Western powers, especially in the nineteenth century. For these historians, the Japanese had also experienced continued disease frequency during this period, increasing especially after the Meiji restoration. It was only in the earlier half of the nineteenth century, through the examples of Ryuku-kaze in 1831–1832, and Amerika-kaze in 1854, that the Japanese were beginning to understand the infectious nature of certain diseases, including influenza.

During the Russian-flu from 1889 to 1891, Japan did not show any excess mortality, except in 1891, showing a good contrast with European countries' experience in 1889 (Valleron et al. 2010). From 1918 to 1920, Japan's contact with foreign countries and its international connections intensified. This intensification coincides with excess mortality during the Spanish-flu epidemic, which was more than 8 per 1,000, much higher than the Russian-flu, which was only about 2 per 1,000. This larger excess mortality of the latter outbreak of influenza in 1920, suggests the possible vulnerability of Japan after its long-term isolation for about 200 hundred years, from the seventeenth to the nineteenth centuries. In Korea and Taiwan, the damages caused by the second episode of the Spanish-flu were greater for the Japanese than the Koreans and Taiwanese. This difference may be associated with factors such as the social isolation of the Japanese living in Korea and Taiwan and their higher susceptibility to influenza, although the exact causes for that susceptibility remains unclear.

Modern public health understanding of diseases and their transmission, along with preventive measures, such as the use of masks, vaccination, and gargling, became widespread after the 1918–1920 Spanish-flu pandemic. In Japan, the 1918–1920 Spanish-flu caused excess mortality amounting to about 470,000 deaths. Although it has not been previously pointed out, excess mortality continued even during the non-pandemic period following the pandemic. During the 18-year period, from 1921 to 1938, excess mortality amounted to 480,000 deaths, exceeding the number of deaths during the pandemic. Again, this could still be due to Japanese vulnerability after two centuries of isolation.

Health damages for Koreans living in Korea and Taiwanese living in Taiwan in the same period were greater than those of the Japanese who were living in these countries. Economic factors may be the reason for this difference, although these factors should not be taken as the sole reason for the disparity, especially when excess mortality was reported to be higher for the economically rich Taiwanese than for the Koreans; rather, this should be taken into consideration along with a reexamination of other health damages from the Spanish-flu in the lower altitude districts locally and globally that Murray has already identified (2006).

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