REVISTA DE ENFERMAGEM REFERÊNCIA
homepage: https://rr.esenfc.pt/rr/
ISSNe: 2182.2883

HISTORICAL RESEARCH ARTICLE

The Spanish flu pandemic of 1918 *versus* SARS-CoV-2: A comparison through history

Gripe española de 1918 versus SARS-CoV-2: Comparativa a través de la historia
A gripe espanhola de 1918 versus SARS-CoV-2: Uma comparação ao longo da história

Laura Romera-Álvarez [1]
https://orcid.org/0000-0003-4160-0945

Sagrario Gómez-Cantarino [1]
https://orcid.org/0000-0002-9640-0409

Abel Checa-Peñalver [2]
https://orcid.org/0000-0003-4989-1628

Mercedes Dios-Aguado [3]
https://orcid.org/0000-0002-0991-7558

Paulo Joaquim Pina Queirós [4]
https://orcid.org/0000-0003-1817-612X

[1] University of Castilla-La Mancha (UCLM), Faculty of Physiotherapy and Nursing, Department of Nursing, Physiotherapy and Occupational Therapy, Toledo, Spain

[2] Castilla-La Mancha Health Service (SESCAM), National Hospital for Paraplegics (HNP), Rehabilitation Unit, Toledo, Spain

[3] Castilla-La Mancha Health Services (SESCAM), Yepes Health Center, Primary Health Care, Area No. 1, Toledo, Spain

[4] Health Sciences Research Unit: Nursing (UICISA: E), Nursing School of Coimbra (ESEnfC), Coimbra, Portugal

Corresponding author
Paulo Joaquim Pina Queirós
E-mail: pauloqueiros@esenfc.pt

Received: 13.08.20
Accepted: 06.01.21

Abstract
Background: Humanity has so far faced multiple pandemics, with swift propagation and high morbimortality rates.
Objective: To compare the social and health impact of the Spanish flu of 1918 and SARS-CoV-2.
Methodology: Historical-descriptive study on the 1918 flu and SARS-CoV-2. Data were collected on health protocols through the analysis of international organizations, books, and scientific articles. An interpretative analysis was performed based on the dates and events of the period under study.
Results: The Spanish flu occurred in 3 stages, the first in March 1918 and the last in 1919. SARS-CoV-2 started in Wuhan, China, in December 2019 but spread worldwide in March 2020 and a new wave is expected. As of now, July 2020, the Spanish flu has had the highest number of victims, although both pandemics have had worldwide repercussions, accounting for many deaths.
Conclusion: The lack of knowledge about these diseases, the absence of treatment and vaccines, as well as the scarcity of resources for the high rate of patients' needs have been a global challenge.

Keywords: epidemics; pandemics; coronavirus; history of nursing; influenza A virus; public health

Resumen
Marco contextual: La humanidad ha tenido que enfrentarse a múltiples pandemias, estas se extendieron rápidamente produciendo altas tasas de morbimortalidad.
Objetivo: Comparar el impacto sociosanitario de la gripe española de 1918 y el SARS-CoV-2.
Metodología: Investigación histórico-descriptiva, relacionada con la gripe de 1918 y el SARS-CoV-2. Recopilación de información: protocolos sanitarios; análisis (organismos internacionales, libros y artículos científicos). Se realizó un análisis interpretativo por fechas y acontecimientos del periodo de estudio.
Resultados: La gripe española ocurrió durante tres etapas, la primera en marzo de 1918 y la última en 1919. El SARS-CoV-2 comenzó en Wuhan (China) en diciembre de 2019; no obstante, tuvo su mayor propagación en marzo de 2020 y se prevé un nuevo rebrote. Hasta julio de 2020 la gripe española ha tenido mayor número de víctimas, ambas pandemias han tenido repercusión a nivel mundial y han causado la muerte a multitud de personas.
Conclusión: El desconocimiento de estas patologías, la ausencia de tratamiento y vacuna y la escasez de recursos para la alta demanda de pacientes han sido un desafío global.

Palabras clave: epidemias; pandemias; coronavirus; historia de enfermería; virus de la gripe A; salud pública

Resumo
Enquadramento: A humanidade teve de enfrentar múltiplas pandemias, que se espalharam rapidamente e produziram altas taxas de morbilidade e mortalidade.
Objetivo: Comparar o impacto socio-sanitário da gripe espanhola de 1918 e SARS-CoV-2.
Metodologia: Investigação histórico-descritiva, relacionada com a gripe de 1918 e SARS-CoV-2. Recolha de informação: protocolos de saúde; análise: organizações internacionais, livros e artigos científicos. Foi realizada uma análise interpretativa por datas e eventos do período de estudo.
Resultados: A gripe espanhola ocorreu durante três fases, a primeira em março de 1918 e a última em 1919. SARS-CoV-2 começou em Wuhan (China) em dezembro de 2019; teve a sua maior propagação em março de 2020 e espera-se um novo surto. Até julho 2020, a gripe espanhola tem tido o maior número de vítimas, embora ambas as pandemias tenham tido repercussões mundiais, com muitas pessoas a morrer.
Conclusão: A falta de conhecimento sobre estas patologias, a ausência de tratamento e vacina, bem como a escassez de recursos para a grande procura de doentes, têm sido um desafio global.

Palavras-chave: epidemias; pandemias; coronavírus; história da enfermagem; vírus da influenza A; saúde pública

How to cite this article: Romera-Álvarez, L., Gómez-Cantarino, S., Checa-Peñalver, A., Dios-Aguado, M., & Queirós, P. J. (2021). The Spanish flu pandemic of 1918 *versus* SARS-CoV-2: A comparison through history. *Revista de Enfermagem Referência, 5*(Supl. 8), e20141. https://doi.org/10.12707/RV20141

Introduction

An epidemic refers to a sudden widespread of a disease in a defined geographical region or population group. On the other hand, a pandemic is a disease outbreak occurring worldwide. The most tragic pandemic until 2020 was the Spanish flu of 1918, accounting for an estimated 25-50 million deaths worldwide (Almudéver Campo & Camaño Puig, 2018). However, the total number of deaths is unknown due to government censorship during the First World War. An analogy can be made with the current SARS-CoV-2 pandemic, first occurring in Wuhan, China, which until July 2020 affected 10.2 million people. An estimated 506,000 people have died so far. Therefore, the exact number of deaths is unknown (World Health Organization [WHO], 2020).

The 1918 Spanish flu presented similar symptoms and evolved similarly to the outbreaks in previous years and other respiratory tract diseases (Grabowski et al., 2017). However, the increase in the number of deaths due to this disease was closely linked to the poor hygiene and sanitary conditions of that time, which were exacerbated by the First World War (Simonsen et al., 2018).

The rapid spread of the Spanish flu across Europe was caused by increased immigration to other countries and people escaping war to other places to protect themselves or help in military camps (Shanks et al., 2016). Similarly, in the case of the current pandemic, the delay of social isolation in China, as well as in southern European countries (Italy and Spain), quickly spread the disease globally (Maguiña, Gastelo, & Tequén, 2020).

The trajectory of the 1918 Spanish flu pandemic occurred in three phases: 1) spring 1918; 2) autumn 1918; and 3) early 1919 (Porras-Gallo, 2008). The COVID-19 pandemic started in February 2020 with a huge outbreak up until this moment (July 2020). However, it can evolve in a similar way to the 1918 influenza. Therefore, this study aims to analyze how both pandemics have evolved. To this end, the research questions are as follows: What are the similarities between these two pandemics? Which political, health, and social measures were taken, especially in Spain, during the 1918 flu? Which resources were available to health professionals at the time? How did the population deal with the different health measures? Has society learned from that pandemic, or is history actually repeating itself? This study was carried out within the context of the structuring project "History and Epistemology of Health and Nursing", specifically within an objective of the associated study "History, Health, Gender: Spain and Portugal (HISAG-EP)", of the Health Sciences Research Unit: Nursing (UICISA: E).

Methodology

An historical-descriptive, exploratory study was carried out to respond to the proposed objectives, using the knowledge about the history of epidemics.

This study followed three steps: 1) a literature search in the following online databases: SciELO, Dialnet, Cuide, MEDLINE/PubMed, Cumulated Index of Nursing & Allied Health Literature (CINAHL), Science Direct, as well as Google Academics, using the MeSH/DeCS descriptors: epidemic, pandemic, coronavirus, influenza A virus, public health, history of nursing; 2) due to the historical nature of the study, existing documentation at the Library of the University of Castilla-La Mancha (Toledo Campus) and at the Public Library of Castilla-La Mancha was reviewed, including archives available in digital format; 3) analysis of databases of international organizations such as the Spanish Ministry of Health, Consumer Affairs and Social Welfare, and the World Health Organization; 4) review of both textbooks and newspaper headlines containing relevant information on the coronavirus pandemic. Inclusion criteria were: 1) Documentation following the objective of the research; 2) Scanned archives; 3) Texts in Spanish, Portuguese and English related to the topic under study. Exclusion criteria were: 1) Documentation that did not fit the topic and 2) Duplicate scanned files.

It should be noted that the topicality of this theme is high, so publications up to June 2020 have been analyzed. Twenty documents were analyzed in this study, of which four were books, two were official websites, and 14 were scientific journal articles.

Collected data was subject to a descriptive historical analysis, cross-checked, and underwent an analytical and descriptive synthesis.

Results and discussion

The Spanish flu occurred in three stages. The first cases appeared in March 1918 in Kansas (United States of America) and Mexico, and it quickly spread worldwide, giving rise to the second stage, with new cases appearing in Latin America. This stage corresponded to a greater outbreak than the first stage, with mortality rising to 64% (Simonsen et al., 2018). It should be noted that SARS-CoV-2 had its highest number of cases and biggest outbreak in March 2020 and rapidly spread to Latin America, where very high numbers of deaths are reported. The most affected population is Brazil with 20,984 cases and 1,141 deaths (Maguiña et al., 2020).

The 1918 flu soon spread throughout South American countries during the second stage, causing a social upheaval. In fact, in the United States, discrimination against the countries suffering from the disease emerged, especially towards the Mexican population (Simonsen et al., 2018). China is blamed for the origin of the coronavirus, as it feeds on Pangolin (Maguiña et al., 2020). Even in Spain, people from urban areas were discriminated when they were allowed to move within the country. Notably, Madrid citizens have been subject to reprisals in both urban and rural areas. Approximately 72,269 infection cases and 8,439 deaths have been reported in Madrid as of June 2020 (Ministerio de Sanidad, Gobierno de España, 2020).

The third and final stage of the influenza occurred in January 1919 and was less aggressive than the second. This wave caused a global mortality rate of 26%. This

pandemic ended in the mid-1920s, although there are doubts about whether it coexisted with any other strain of the influenza virus (Almudéver Campo & Camaño Puig, 2018).

Argentina attributed the cause of the 1918 Spanish flu to the country's lack of food resources. For this reason, little importance was given to the disease because they thought that their diet, based on the country's own natural resources, would give them immunity to the flu (Carbonetti, 2010). Therefore, the concern at the time focused on other diseases that threatened the Argentinian population, such as smallpox, tuberculosis, black death, syphilis, among others.

Eventually, the disease spread within the country, probably caused by the wave of infected European immigrants fleeing misery and the First World War (Almudéver Campo & Camaño Puig, 2018). This wrongful explanation of the cause of the disease reminds what happened in Spain with SARS-CoV-2, where it was initially assigned a low risk level, comparing it to the seasonal flu, which would only affect at-risk groups (people older than 65 or with chronic diseases).

Spain was the first country in Western Europe in which the Spanish flu pandemic spread to all the population. In June and July, the pandemic spread to Portugal, where 135,257 deaths were recorded in a population of 6 million during the three waves (Bandeira, 2009).

In general, governments all over the world censored information about the number of flu-related deaths and gave minimal data to the enemy about loss of workers and soldiers in an attempt to maintain the level of performance of their troops. This attitude contrasted with that of Spain, which, due to its neutrality in the war, did not censor any information concerning the flu (Almudéver Campo & Camaño Puig, 2018).

Thus, Spain became a source of information for the rest of Europe by creating flue reports. The Spanish press even played a major role in transmitting knowledge to other parts of the world and recruiting voluntary health workers to make up for the personnel shortage. Spain's attitude was so relevant that, in the summer of 1918, this disease was named the Spanish flu, which has been used to this day (Echeverri-Dávilla, 1993). In Portugal, this flu is also known as pneumonic flu because of its similarity to the bacterial lung infections of previous years. It is a double misunderstanding because it is neither pneumonic because it is a virus nor Spanish because it originated in Kansas and not in Spain (Figure 1).

Figure 1

Main sources of the spread of the 1918 influenza

Note. Adapted from "A year of terror and a century of reflection: Perspectives on the great influenza pandemic of 1918–1919" by M. E. Nickol and J. Kindrachuk, 2019, *BMC Infectious Diseases*, *19*, 117. (https://doi.org/10.1186/s12879-019-3750-8). In public domain.

In total, the 1918 flu affected an estimated 500 million people and killed between 50 and 100 million of all infected people (even more than the number of deaths during the First World War). Mortality was mainly concentrated between September and December 1918, coinciding with the first and second phases. It is estimated that between 10% and 20% of those infected died in 1918. The high mortality led to a negative net growth in Spain in that year, and it only happened again in 1936 due to the Spanish Civil War (Echeverri-Dávilla, 1993). A similar situation is currently occurring in Spain, among other countries, with SARS-CoV-2 outbreaks in different parts of the country after the end of lockdown. Of particular note are the cases in Lugo, some provinces of Guipúzcoa and Lérida, where the population has again been confined due to increased cases (Ministerio de Sanidad, Gobierno de España, 2020). It is expected that SARS-CoV-2 will follow a similar trajectory to the 1918 influenza, with a second wave at the end of

the summer of 2020, as high temperatures are considered to prevent infection by this virus.

Characteristics of 1918 influenza virus vs. SARS-CoV-2

The influenza (H1N1) virus possessed particular antigenic characteristics, intense virulence, a long development, and a persistent legacy.

Deaths associated with the seasonal flu in 1916, 1917, and 1921 accounted for 19.7%, 12.5%, and 21.0% of all deaths, respectively. Due to the Spanish flu, in 1918, the rate of flu-related deaths among people aged between 15 and 44 years reached 68.2% in Paris and 66.3% in Madrid (Erkoreka, 2010).

One of the most striking features of the Spanish flu compared to other respiratory tract diseases was the age distribution of the dead. Some studies revealed that, between 1916 and 1921, the Spanish flu mainly affected men and women aged between 15 and 44 years (Erkoreka, 2010; Shanks et al., 2016).

The current SARS-CoV-2 is a significant contrast because the most severely affected age group in the first phase are those older than 65 years of age, both men and women. However, younger people are not free from infection as deaths have been reported in younger age groups (15-44 years), mostly associated with previous pathologies, including chronic diseases such as diabetes, high blood pressure, obstructive sleep apnea, obesity, chronic obstructive pulmonary disease (COPD), and asthma. Recent studies even point to a higher incidence in people with blood type A+/A than those with blood type 0+/0- (WHO, 2020). In outbreaks after deconfinement, infection cases correspond to younger people, possibly infected at crowded social gatherings. However, 70% of infection cases are asymptomatic, and the symptoms are less severe than in the first phase (Ministerio de Sanidad, Gobierno de España, 2020).

The symptoms of the 1918 flu were common to the disease, such as vomiting, nausea, and high fever. However, deaths related to this virus were caused by secondary bacterial pneumonia, coupled with the lack of health resources and real treatments to cure the disease (Spinney, 2020). In the case of SARS-CoV-2, the symptoms are similar, except for vomiting and nausea. Notable complaints include dry cough, dyspnea (shortness of breath), as well as fever (Maguiña et al., 2020).

Compared to the 1918 flu, nausea, vomiting, and diarrhea, among other symptoms, only occur in some cases. However, bilateral pneumonia is common in both pandemics. The lack of healthcare resources due to high patient needs and the lack of knowledge of the disease trajectory are common to both pathologies, as a vaccine has not yet been developed.

In the beginning of the 20th century, Pfeiffer's bacillus (erroneously considered to be the causative germ of the 1918 flu) was already officially known. However, it was impossible to develop an effective vaccine to prevent the disease due to difficulties in isolating it. The H1N1 virus, a subtype of the influenza A virus, was only isolated in the 1930s. The virus was new and distinguishable from Pfeiffer's bacillus, but in May 1918, when the first cases were reported in Madrid, there was no medical consensus, which contributed to its spread.

In addition, diphtheria antitoxin was tested for a time as a non-specific therapeutic measure for the flu. However, after numerous failed experiments, it eventually proved to be ineffective against the influenza virus (Porras Gallo, 2008). This also happened with SARS-CoV-2, specifically in the United States, where hydroxychloroquine was recommended as a potential drug for the treatment of SARS-CoV-2, despite its unproven efficacy. The United States has even stocked out supplies of Remdesivir (antiviral medication), which is the first drug effective against SARS-CoV-2.

Nursing performance during the Spanish flu

In the beginning of the 20th century, nursing underwent profound changes and was in search of its own identity. The nursing degree was only officially created in 1915 by the Servants of Mary, Ministers to the Sick. Up to that moment, the profession was not formally recognized, and care was provided by the practitioners of that time (Gómez-Cantarino et al., 2019; Mas Espejo et al., 2015). Nursing played a prominent role in the care of flu patients, providing help, health care, and hygiene care to meet the specific basic needs of each patient (Porras Gallo, 1997).

Nurses have been socially recognized during the current SARS-CoV-2 pandemic. The community, not only in Spain but also in various parts of the world, has paid tribute to health professionals with applause every day of the lockdown, and even at the same time throughout Spain (8 pm). The Kingdom of Spain has awarded the health sector the 2020 Princess of Asturias Award. In Portugal, in the 1918 pandemic, female nurses, led by Ana Guedes da Costa, were of relevance. She also established a hospital in her family home in Amarante. (Silva, 2020).

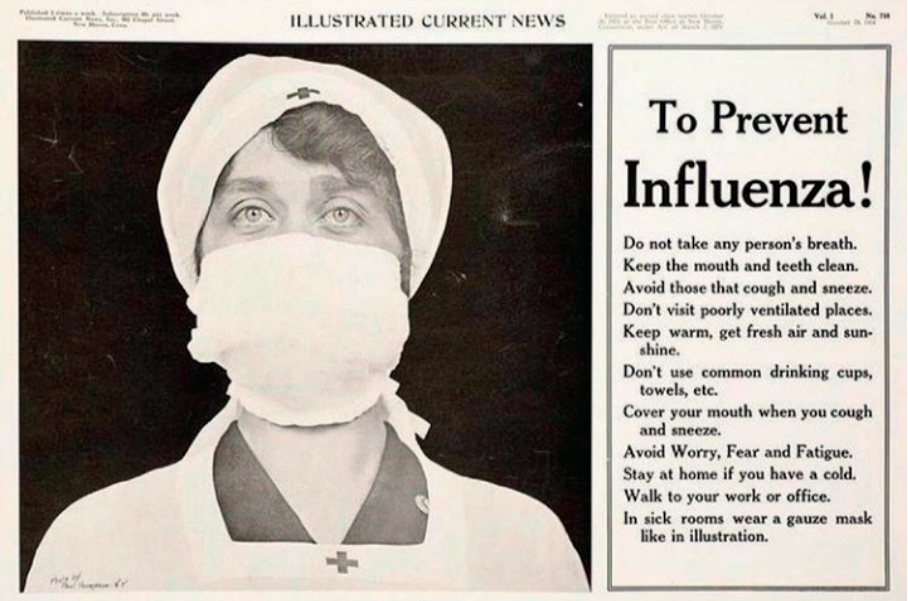
During the 1918 flu pandemic, nursing was responsible for providing basic and home care to treat those infected by the virus. As there was no cure, the nurses' work consisted of implementing hygiene measures to prevent the spread of the disease and caring for bedridden patients to prevent the fluid in their lungs from suffocating them, thus allowing them to survive longer (Almudéver Campo & Camaño Puig, 2018).

In the current pandemic, the measures adopted have been more complex, including hand hygiene measures (handwashing with plenty of soap and the use of hydroalcoholic solutions) and prevention measures (mandatory facemasks), and also the disinfection of surfaces with sodium hypochlorite and the use of personal protective equipment (PPE). These measures have included mechanical ventilation to overcome respiratory difficulties in these patients (Ministerio de Sanidad, Gobierno de España, 2020).

However, these preventive measures were not available to healthcare workers during the 1918 Spanish flu. During that pandemic, the use of a facemask was recommended for health workers and volunteers (Figure 2).

Figure 2

Female nurse in 1918-19



Note. Adapted from "To Prevent Influenza", by the US National Library of Medicine, 18 October 1918, Illustrated Current News, (https://circulatingnow.nlm.nih.gov/2015/01/15/influenza-precautions-then-and-now). In public domain.

In addition to patients' compliance with isolation, sanitary recommendations also included frequent hand washing, disinfection of rooms with creolin, and fumigations with lime or eucalyptus. Disinfection of the upper respiratory tract was carried out with saline solutions, including seawater, chicken broths, sugary water, orange juice, and lemon infusions, leading to the shortage of lemons in Madrid (Andrade & Felismino, 2018).

Many professionals died from the flu because they were not immune to it. For this reason, the was a significant decrease in nurses and other healthcare workers in the various Spanish hospitals of that time, whose work was of vital importance in containing the disease (Almudéver Campo & Camaño Puig, 2018; Carbonetti, 2010). Compared to the current pandemic, 198 health professionals have died in Spain to this date, and society has acclaimed them. On 16 July 2020, the country paid tribute to all those who died of SARS-CoV-2, including health professionals who lost their lives fighting against this pandemic. The voice of nursing was heard, with the supervisor of the Vall d'Hebron Hospital representing the healthcare community.

Conclusion

Social factors and the lack of health resources contributed to the spread of the 1918 flu virus in the most disadvantaged social classes. However, both the Spanish flu and SARS-CoV-2 have affected a large part of the world population, regardless of its purchasing power and resources. The large number of rapidly infected people did, however, make the health care system collapse in both pandemics, increasing the number of deaths, which could have been avoided with greater healthcare resources. The number of hospital beds with mechanical ventilation and the number of healthcare staff did not meet the high needs of SARS-CoV-2 patients. In an attempt to address this issue, field hospitals were set up, such as IFEMA in Madrid, a venue for trade fairs, exhibitions, and other events. Stands were also set up at the entrances of hospitals to prevent access by those who might be infected and provide out-of-hospital care.

During the 1918 flu, research was directed towards understanding the trajectory, transmission, and possible treatment of the disease. For the first time, nursing faced a health challenge as a recognized profession. Nursing care was socially recognized, as could be seen in the press at that time. A similar situation has occurred with SARS-CoV-2, where research efforts focus on understanding how the virus works and finding a possible vaccine. Even nurses, as well as health workers as a whole, have been acclaimed worldwide for their contribution as front-line workers. The nurses have not only worked in hospitals providing direct care but also given emotional support and clarifying doubts to citizens through the 24-hour call service set up for this purpose.

The similarities between the two pandemics are therefore obvious. A second and a third waves of the new SARS-CoV-2 may occur, like the Spanish flu. However, thanks to the work of health professionals, as well as the knowledge acquired after the first phase and more resources, the

response to this pandemic will use better supported with social and sanitary resources and measures. Knowing the past is important to better understand the present and act more effectively and efficiently. Nurses need to know that there were similar pandemic periods and which problems, challenges, and solutions there were at that time.
The limitations of this study include, first, a reference list limited to 20 articles (journal rules) and, second, the fact that this study was an analysis of an ongoing pandemic process.

Author contributions

Conceptualization: Romera-Álvarez, L., Checa-Peñalver, A.
Data curation: Queirós, P., Dios-Aguado, M., Gómez--Cantarino, S.
Methodology: Romera-Álvarez, L., Checa-Peñalver, A.,
Writing – original draft: Checa-Peñalver, A., Romera-Álvarez, L., de Dios-Aguado, M.
Writing – review & editing: Queirós, P., Gómez-Cantarino, S.

References

Almudéver Campo, L., & Camaño Puig, R. (2018). Enfermeras y practicantes durante la epidemia de gripe de 1918: Análisis a través de la prensa española. *Cultura de los cuidados,* 0(52), 109–118. https://doi.org/10.14198/cuid.2018.52.10

Andrade, H., & Felismino, D. (2018). A pandemia de gripe de 1918-1919: Um desafio à ciência médica no princípio do século XX. *Ler História*, *73*, 67-92. https://doi.org/10.4000/lerhistoria.4070

Bandeira, M. L. (2009). A sobremortalidade em Portugal: Análise demográfica. In J. M. Sobral, M. L. Lima, P. Castro, & P. Sousa (orgs.) *A pandemia esquecida: Olhares comparados sobre a pneumónica 1918-1919*. ICS.

Bristow, N. K. (2003). You can't do anything for influenza. Doctors, nurses and the power of gender during the influenza pandemic in the United States. In H. Phillips, & D. Killingray (Eds.), *The Spanish Influenza pandemic of 1918-1919. New perspectives*, (pp. 58-69). Routledge.

Carbonetti, A. (2010). Historia de una epidemia olvidada: La pandemia de gripe española en la argentina, 1918-1919. *Desacatos,* 2, 159-174. http://www.scielo.org.mx/pdf/desacatos/n32/n32a12.pdf

Echeverri-Dávila, B. (1993). *La Gripe Española: La pandemia de 1918-1919.* Siglo XXI.

Erkoreka, A. (2010). The Spanish influenza pandemic in occidental Europe (1918-1920) and victim age. *Influenza and Other Respiratory Viruses, 4*(2), 81-89. https://doi.org/10.1111/j.1750-2659.2009.00125.x

Gómez Cantarino, S., Gutierres de la Cruz, S., Espina Jerez, B., Dias-Aguado, M., Queirós, P. J., & Rodrigues, M. A. (2019). Desarrollo formativo de la enfermería española y sus especialidades: Desde los albores del s. XX hasta la actualidad. *Cultura de los cuidados*, 0(52), 58–67. https://doi.org/10.14198/cuid.2018.52.05

Grabowski, M. L., Kosińska, B., Knap, J. P., & Brydak, L. B. (2017). The lethal spanish influenza pandemic in Poland. *Medical Science Monitor, 23*, 4880-4884. https://doi.org/10.12659/msm.906280

Mas Espejo, M., Siles González, J., & Pulido Mendoza, R. (2015). ¿Qué sabemos de las Damas Enfermeras de la Cruz Roja Española? *Metas de Enfermería, 18*(8),12-19.

Ministerio de Sanidad, Gobierno de España. (2020). Información científica-técnica: Enfermedad por coronavirus, COVID-19. https://www.mscbs.gob.es/en/profesionales/saludPublica/ccayes/alertasActual/nCov-China/documentos/20200417_ITCoronavirus.pdf

Nickol, M. E., & Kindrachuk, J., (2019). A year of terror and a century of reflection: Perspectives on the great influenza pandemic of 1918–1919. *BMC Infectious Diseases, 19(117)*. https://doi.org/10.1186/s12879-019-3750-8

Porras Gallo, M. I. (1997). *Un reto para la sociedad madrileña: La epidemia de gripe de 1918-19.* Editorial Complutense.

Porras Gallo, M. I. (2008). Sueros y vacunas en la lucha contra la pandemia de gripe de 1918-1919 en España. *Asclepio*, *60*(2), 261-288. https://doi.org/10.3989/asclepio.2008.v60.i2.266

Shanks, G. D., Burroughs, S., Sohn, J. D., Waters, N. C., Smith, V. F., Waller, M., & Brundage, J. F. (2016). Variable mortality from the 1918–1919 influenza pandemic during military training. *Military Medicine, 181*(8), 878-882. https://doi.org/10.7205/MILMED-D-15-00124

Silva, H. (2020). Os esforços da Cruz Vermelha Portuguesa. *Visão História*, *58*, 18-19.

Simonsen, L., Chowell, G., Andreasen, V., Gaffey, R., Barry, J., Olson, D., & Viboud, C. (2018). A review of the 1918 herald pandemic wave: Importance for contemporary pandemic response strategies. *Annals of Epidemiology, 28*(5), 281-288. https://doi.org/10.1016/j.annepidem.2018.02.013

Spinney, L (2020). *El jinete pálido*. Critica.

US National Library of Medicine. (2015). *Influenza precautions, then and now***.** https://circulatingnow.nlm.nih.gov/2015/01/15/influenza-precautions-then-and-now/

World Health Organization. (2020). *Infection prevention and control during health care when novel coronavirus (nCov). Infection is suspected. Interim Guidance.* https://www.who.int/publications/i/item/10665-331495