

Comparative Analysis of the Gendered Effects of Newly-Emergent Outbreaks on Women: Case Study of the 1918-20 Spanish Influenza, 2014/15 Ebola Pandemic, and 2019/20 COVID-19

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RESEARCH

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ABSTRACT

Objective: This paper examines the effects of newly-emergent disease outbreaks on female populations around the world, examining the sociological ramifications that lower their quality of life. This article specifically identifies gender ramifications of historically large-scale emerging viral diseases.

Method: By comparing the top-cited literature in online search engines on the pandemics of 1918 Spanish Influenza, 2014/15 Ebola, and 2019-20 COVID-19, this analysis attempts to identify common risk factors and experiences that primarily affect women. A literature review is performed on the most prominent research applying a gender lens on the direct effects these emerging diseases have on women and girls, particularly during outbreak and spread, and into recovery phases. The article assesses for physical and mental health effects, as well as socio-economic effects, and other factors affecting quality of life, commonly in the literature.

Background: Much scholarship on the impacts of diseases indicates that women and girls are often have unique risks of being infected, as well as undergoing greater hardships in their daily lives, leading to psychosocial, physical, and socio-economic harm. While there is some literature on gendered risk factors of disease, there is a limited understanding of how large-scale pandemics involving emergent viral diseases can lower the quality of life for women.

Results: Emergent diseases often can lead to large breakdowns in public health systems, the direct and indirect results often cascade to marginalized or vulnerable sub-populations including women. While women have lower infection and death rates than men, they often face physical risks like pregnancy that can increase their risk of death or prolonged physical issues if infected, although data on female physical effects is limited. Secondly, women often are the first primary caregivers of infected people, and thus have specific risks of exposure affecting their financial and psychosocial wellbeing, often as they hold care roles with less health training and adequate medical protective gear. Critical factors affecting women's risk to disease exposure in emerging outbreaks is knowledge and access to information about the disease and infection control practices. In disease-affected homes and communities, women tend to survive diseases at higher rates, but as survivors, they suffer greater psychosocial trauma, isolation, and economic instability during and after an outbreak.

Conclusion: The comparative literature review implies common gendered variables that are historical trends in emerging pandemics. Outbreaks of new diseases can have direct and secondary effects on individual women's physical, psychosocial, and economic safety as well as her social network involving family and community. Societal gender



norms fuel risk factors targeting female populations in disease-affected households and communities. These roles often implicate women as the primary caregiver to those affected, frequently in vulnerable care positions like nursing in healthcare facilities or at home, with limited training and proper protective equipment. They are also the first to give up employment for home duties when disease strikes. Severe gender-biases in medical research including lack of data on how diseases affect female populations further hinder adequately documenting gendered effects. At a time when disease outbreaks are growing around the world, understanding the effects that pandemics can have on vulnerable populations can help better inform policy and programming that can alleviate and even mitigate these negative consequences, and help support female populations to have a better fighting chance against disease.

Key Words: emerging disease, pandemic, gendered effects, women, 1918 Spanish Influenza, Ebola, COVID-19, policy, comparative analysis.

INTRODUCTION

In the last thirty years, global disease outbreaks have been on the rise worldwide. Both old and new strains of communicable viruses, like various strains of influenza, Ebola, SARS, HIV/AIDS, and Zika, are surfacing more frequently, often linked to global warming, conflict, disasters, and overpopulation. Many new diseases and mutated strains of known viral illnesses transition from animals, like bats and pigs, to humans. These diseases then go on to burn through the most vulnerable populations with devastating results as infection numbers spike. Global transportation and the global market help fuel outbreaks to spread easier transnationally, making the concern of an outbreak in one region to eventually become a larger scale global issue [34, 44, 46, 47, 61]. Outbreaks frequently have the most devastating consequences on minority groups and vulnerable populations. In recent decades, there is a growing recognition in the medical, economic, and human development communities that disease outbreaks often can

have specific gender-related impacts than previously noted. With the increase in deadly disease epidemics and pandemics in recent decades, research implies a lack of understanding and consideration of the inclusion of gender perspective in public policy and programming targeting outbreaks at the global level and to adequately question gender assumptions around disease, all of which have extensive impacts on national and local populations, predominantly on women including those who represent minority groups and/or low socio-economic households [16, 58]. There are clear gender inequities that result of the effects of global pandemics like H1N1, Ebola, and COVID-19, with women facing high risk situations that can lower their quality of life, especially in resource-constrained environments [12].

This paper specifically examines the gendered effects of historically large-scale emerging viral diseases. Emergent diseases often can lead to large breakdowns in public health systems, the direct and indirect results can cascade to the general population but can be doubly challenging to marginalized or vulnerable sub-populations including women. According to Chattu & Yaya (2020), emerging infectious diseases are characterized by the World Health Organization (WHO) as those first outbreaking for the first time in a new geographic region, or may have existed previously yet suddenly begins to swell in the number of infected in the region, and thus are not well-contained as a result. The issue of emergent outbreaks can increase in health systems that are generally weak to begin with, such as in a variety of low-income nations. These healthcare systems and public services do not have adequate funding and infrastructure to respond to large outbreaks in which there is little known treatment or practices to mitigate spread. Chattu & Yaya posit that this issue on low-income public health systems is endemic among most emerging diseases like Ebola, COVID-19, and SARS9 (pp.2-4). This paper however offers that their finding may not necessarily be universal to all emergent disease outbreaks. Low-income nations that have experienced emerging disease outbreaks previously may demonstrate the ability to improve capacity and learn to better and more



quickly respond to newer diseases later. For instance, Liberia and Sierra Leone have managed to contain the spread of COVID-19 among the general population better than sister African nations and even middle-income and high-income nations like the United States [38].

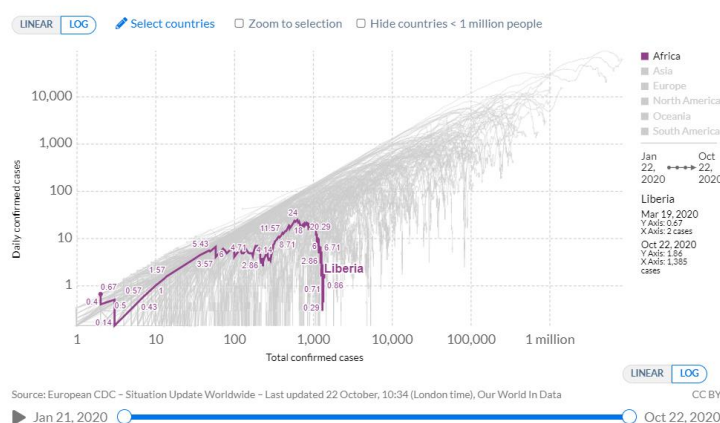
It is important to acknowledge that low-resourced healthcare systems and low-income national governments can learn from past emergent disease outbreaks, better responding the future to mitigating spread of new outbreaks like COVID-19. There are still large challenges to the Liberian healthcare and governmental systems including limited funding. However, due to Ebola, there is improved trust in public messaging around disease prevention. Additionally, there are better established local systems and knowledge about tracing spread and quarantining, represented by county health teams (CHTs), as well as quicker policy response by the government and key stakeholders to gain control of the spread of COVID-19 [19]. In late October 2020, there are a reported 82 deaths from COVID-19 among its 4.9 million citizens with two large spikes in the summer, but then a significant decline in spread marked after strict social distancing mandates were enforced by the government. Comparatively, in the USA, 224,308 people died from the disease by mid-October, making up nearly 20 percent of the global number of recorded deaths to date. Furthermore, this high-income nation [HIC] continues to experience an incline in cases with repeated spikes. Estimates of death rates may be slightly inaccurate as they depend on testing and establishing confirmed cases, and COVID-19 tests can be inaccurate at times [13], still, Liberia appears to have a notable advantage on containment than the USA, including bending the curve [see Chart 1]. This comparative case demonstrates that institutional learning after an initial emergent disease outbreak can occur nationally, improving response time and quality to future outbreaks, even in low-income countries [LICs]. The simile can be how training can improve a person's fast-twitch muscle response. These improvements may further translate to gender-responsive policies and system improvements to support vulnerable female populations. First, we must examine archetypal cases of

pandemics to identify common gendered factors. In both settings, women make up a lower proportion of disease victims and have higher survivor rates than men [9], however this fact does not discount the negative impacts of large-scale pandemics have on female quality of life.

Chart 1: Liberia Bends the Curve with COVID-19

Daily vs. Total confirmed COVID-19 cases

Shown is the 7-day rolling average of confirmed COVID-19 cases. The number of confirmed cases is lower than the number of total cases. The main reason for this is limited testing.



[Source:

<https://ourworldindata.org/coronavirus/country/liberia?country=~LBR>]

The consequences of being affected by the disease do not always equate to higher morbidity or mortality rates; however, the negative experiences of women during and after pandemics often are tipped in scale compared to their male counterparts. Women nonetheless experience the effects of the disease, in unique ways that men often do not face. In large emergent disease outbreaks, like the 1918 Influenza pandemic, the 2014/15 Ebola outbreak, and COVID-19 global pandemic, women in disease-affected households and hot zone communities can be heavily affected physically, psychosocially, and economically [30]. This paper will compare the various commonalities and differences between these three pandemics that repeated target female populations, often as a result of gender norms and disparities. These experiences can be categorized into physical, socio-economic, and psychosocial impacts.

Physically, women face specific challenges to diseases than men, like pregnancy [29]. Women who are pregnant often face higher rates of infection and death. Secondly, pandemics can have direct and secondary effects

on individual women's economic safety as well as her social network involving family and community. Women tend to earn less than men in most professions, often hold less prestigious or higher-ranked positions including in healthcare, and in many households may depend on a male adult figure like her father or spouse as the breadwinner. In an outbreak, socio-economic factors like these can threaten their economic stability if disease enters the household. For instance, women may be left more financially burdened when the disease strikes their home, taking away the primary/only breadwinner in the home, such as her husband or father. Moreover, disease-affected homes often can be discriminated against and stigmatized, lowering a woman's social status and support. Female survivors of disease or those living with a disease often face different risk factors than men, often in direct relationship with their sex and societal limitations placed on minority populations in patriarchal populations. Due to predominant gender norms, when disease affects a household, it is the societal expectation that the female member[s] tend to the sick, work as nurses and volunteer caregivers in health facilities, and/or stay home to care for children and tend to the home during quarantine or government-issued lockdowns. All the aforementioned factors can have immense consequences on her mental and emotional wellbeing, including risk of experiencing increased levels of psychosocial trauma including anxiety and post-traumatic stress disorder (PTSD) [32].

METHOD

This research is a qualitative comparative analysis based on a thorough literature review. Taking on a gender lens, this analysis compares the top-cited literature in the online search engine of Google Scholar on the pandemics of 1918 Spanish Influenza, 2014/15 Ebola, and 2019-20 COVID-19, using specific search criteria including emerging disease, pandemic, women, and gender effects. It also attempts to identify common risk factors and experiences that primarily affect women. The results later articulated emerge in literature review applying a gender lens on the direct effects these emerging diseases have on women and girls,

particularly during outbreak and spread, and into recovery phases. The article assesses for physical and mental health effects, as well as socio-economic effects, and other factors affecting quality of life, commonly in the literature. This paper will explore the gendered risk factors affecting women in large scale viral pandemics, based on the three categories of physical, socio-economic, and psychosocial experience lowering their quality of life.

RESULTS

Physical Disparities

Comparative physical disparities that women and girls face often directly relate to their biology and gendered societal roles. Overall, research indicates that women tend to have a higher resistance to disease than men, with lower death rates among most viral outbreaks, yet this cannot discount the many ways that they suffer when disease strikes their home or work place. Since the 1918 Spanish flu, the influenza virus demonstrates the easy ability to mutate into highly virulent strains spreading through larger human populations [43]. Factors of social-economic class, age, gender often were important variables in death rates [42, 43]. Yet, examining the sex differential between 1917 to the end of 1918, male death rates remained higher per 100,000 populations than female throughout, including years after the end of the influenza outbreak [50].

Recent research indicates that influenza like many communicable viral outbreaks often affect men differently than women. Since 1918, studies show that men are infected at a higher rate than women, and as shown often die at higher rates depending on factors like age and health [50]. These trends remain similar in the three cases of large-scale emergent disease pandemics, but with distinct gendered risk factors. There is an apparent lack of data tracking the physical manifestations of diseases in men and women, with severe 'sex data blind spots.' This lack of understanding of how diseases like COVID-19, SARS, and Ebola affect women differently than men is in part because science has historically negated studying the female body, but instead focusing on male anatomy. This fact represents the clear biases in data in a patriarchal global system, in



which knowledge on gendered effects of diseases physically and socially on women are skewed. Additionally, there is a lack of information informing us how discriminant systems in the daily routines of women including the workplace, transportation, and public services negatively affect female experiences with disease [22,52]. Women are often exposed to disease in unique ways than men particularly in their occupational and domestic roles, including as caregivers.

Before the 2014 Ebola outbreak, over 1,500 people reportedly died from different Ebola outbreaks since its emergence in 1976. The 2014/15 outbreak leads to over 11,310 deaths that are known of but with estimates much higher due to the difficulty in tracking the spread [10,49].

"Women's increased exposure can be attributed to time spent at home and their responsibility for caring for the sick, while men's increased vulnerability to the virus can be attributed to their responsibility for caring for livestock and to time spent away from home...There is currently no evidence related to biological differences in female or male sex that increases Ebola virus transmission and vulnerability; rather, there are differences in the level of exposure between men and women. Gender is therefore an important risk factor to consider in the design of health programs" [49, p.4].

This key finding is supported by medical evidence that Ebola tends to infect men at comparable rates as women with no significant differences [13, 28, 37, 64, 67]. On average, male patients are also more likely to die than female patients, with case fatality rate of 67.1 percent versus 63.0 percent (odds ratio, 0.83, 95 percent confidence interval, 0.77 to 0.91) [64]. Likewise, initial research implies that women are both infected by and die at lower rates from COVID-19 than men [57]. Recent research further indicates that as noted with 1918 Influenza and SARS, men with COVID-19 are more likely to experience more severe symptoms and death, independent of factors like age [36]. As the literature implies, women may have some advantages in surviving contagious viruses and haemorrhagic diseases. Scholarship suggests that it is likely not physical, but there is contrasting literature that states that there is a black hole of data from which we can draw

such conclusions between sexes. Moreover, there is a wealth of medical research that shows that girls and women can be highly susceptible to outbreaks when in psychologically changing, such during pregnancy or post-partum.

Influenza pandemics like H1N1 and the 1918 Spanish flu, often place pregnant women at intense risk of more severe complications like including pulmonary complications as a result of their altered immunity and physical changes related to pregnancy. While there are vaccinations now against most influenza strains, more novel strains present a challenge with insuring safe vaccination that will not affect mother and baby. Medical research is challenged to create vaccines that can respond to the physiological adaptations that are specific and changing from conception to the third trimester. Regulatory authorities and drug agencies strive to determine when newer vaccines are safe before being distributed to the general population [35, 51]. In rare cases, international health and safety agencies, national governments and state authorities can face challenges of mandating regulations and treatments, often having learned through trial by error. Naturally, research indicates it is usually safer to take a novel vaccine that has passed a clinical drug trial than to do without especially if the risks to mother and fetus are higher without the vaccination. Vaccinations developed against more known-viral outbreaks like the common flu show very little risk to pregnancy, yet there are physiological considerations that are still documented [8, 48, 72]. This fact further implies that physically male versus female anatomy may respond to diseases, especially emerging outbreaks, in ways that still are not fully known. There are ethical concerns that frequently exclude pregnant women in clinical trials of novel vaccines, including in the cases of vaccine development against 2015-2019 Ebola [55] and 2020 COVID-19 [23].

The worry and even anxiety that expecting mothers face in emerging diseases outbreak can be overwhelming. The researcher of this paper can empathize firsthand, having delivered her baby in late March 2020 as hospitals began banning family from attending the birth, and later being readmitted with a high fever during post-partum due

to a uterine infection, yet still all the while being monitored for COVID-19. During the Spanish flu, women and girls of child-bearing status, as well as pregnant women notably endure many horrid effects caused by the pandemic. Of this population, nearly one third become infected from 1917-1919 [3, 25]. 13 independent studies of pregnant female patients during this period indicate the mortality rate to be from 23 percent to 71 percent, depending socio-economic and health demographics. 26 percent of influenza female survivors who were pregnant at the time tragically experience a miscarriage or stillbirth. Those children who survive until birth often reportedly suffer increased incidences of fetal stress [4, 25]. The higher death rate among expecting mothers compared to their non-pregnant peers comes as a shock to many medical researchers during and after the 1918 outbreak.

Emerging diseases can frequently confound the medical community to treat the general population but are often even more problematic for pregnant women and their babies. This danger appears to increase with haemorrhagic contagions. Ebola virus disease (EVD) outbreaks historically have devastating mortality rates among expecting mothers and more so for their children. Maternal mortality can reach over 90 percent, and perinatal mortality is 100 percent [6, 55, 60]. Seeing beyond the percentages into the eyes of those affected focuses our understanding of the impact disease survival can have on women. In a 2015 Liberian Ministry of Health analysis of over 100 randomly selected Ebola survivors' surveys, female survivors repeatedly document having miscarriages both during hospitalization or discharge from the Ebola Treatment Unit (ETU). An anonymous survivor reports having a late term miscarriage on the side of a road on her way home from recovery [33]. As she goes into premature labor, she is unable to find help from anyone, as people going by are too afraid that she might still have the virus. She, like many of her female survivor peers, later face years afterwards of the inexplicable inability to become pregnant or to hold a pregnancy far beyond the first trimester. After Ebola strikes their home, many survivors are left widowed, or later abandoned by their male partners. Medical research in 2015

uncovers that Ebola can remain active in the body of a survivor, spreading like a STI through sex as long as 3-12 months after discharge from the clinic and the patient tests negative post-recovery. There also is only one reported case during the Liberian outbreak of a baby with Ebola recovering after infection, but his mother, only weeks after giving birth, perishes in the ETU, orphaning the child [32, 33]. About two years after Ebola ends in Liberia, one of the first survivors to become pregnant during the recovery phase bleeds to death while giving birth, as clinical workers refuse to treat her due to her Ebola status. She was recognized by Times as a hero during the crisis, as a nurse having become infected, surviving but suffering a miscarriage, she immediately returned to working in the ETU upon her discharge. Infertility, severe nerve damage, chronic headaches, sleep disorders, stigmatization, and depression are noted as common health issues related to surviving the disease in West Africa [65, 66]. There is clear evidence of both latent consequences and difficulties that women face after surviving an emerging pandemic, which can be taken from case studies like 1918 Influenza and Ebola in Africa to foreshadow impacts during future pandemics. But not every emerging outbreak will necessarily have the same impacts as previous diseases. Take for example the case of COVID-19 with pregnant women.

At the start of the COVID-19 pandemic, many medical researchers are highly concerned about the unknown effects that infection will have on pregnant and post-partum women. However, COVID-19 does not appear to be as deadly for mother and child as other major pathogens like Ebola. Initial studies indicate that more than half of hospitalized pregnant women with COVID-19 are asymptomatic and only 2 percent of pregnancy losses occur. But, expecting mothers experience severe illness if they are symptomatic, such as nearly one in five needing intensive care and one in ten placed on mechanical ventilation. There are continuing issues in testing pregnant women who may be either symptomatic or asymptomatic. If more attention is placed on identifying positive cases during hospital births, this measure can help prevent complications and protect



the mothers, newborns, immediate family, other patients, and hospital staff [11, 23].

Socio-economic Impacts

The review of top-cited literature on the 1918 pandemic, Ebola, and COVID-19 reveals a tendency of most research to mainly examine overall infection rates and morbidity on women from a psychological perspective. It is also necessary to understand the sociological factors that also play a role in female infection. Due to common gender norms often placed on the female sex, more women and girls are often at higher exposure rates of the disease, facing the effects of influenza face-to-face. They take on the roles of caregivers for sick family members and neighbors. They regularly also served more frequently as community volunteers and nurses in clinics, hospitals, quarantine centers, and make-shift facilities treating infected people. Most high-level medical positions like doctors are held by men, indicating a career window ceiling for many women. For instance, over 90 percent of nurses in European nations and United States are women who on average earn less than their male colleagues [40, 62]. Moreover, female nurses make up the majority of lower-level HCWs in many African nations with medical systems further compounded by shortages of adequate staffing and financial resourcing [39].

Nurses and health volunteers often are exposed more directly to the virus by providing more daily hands-on care of patients, including being responsible for the majority of their washing, feeding, and changing of their bedding and clothing. Pointedly, there are certain cases where women's gender roles led to more significant exposure and death rates, which may indicate an important phenomenon that can lead to key preventative and protection measures. The author feels it is important to explore these outliers.

In the most recent Nigerian outbreak of Ebola, women make up more of the Ebola cases and contacts traced. Half the fatalities are female patients. Most female victims are healthcare professionals. Likewise, many of the first to fall ill are female caregivers [24]. Relatedly, there are case studies of Ebola outbreaks wiping out entire female

populations in hot zones. In Liberia, in 2014, several villages in the interior experience a massive devastation of all the women and most girls, victims of the outbreak [7, 20]. These instances in which women experience much higher infection and death rates than normal seem to happen in the initial appearance or spike in Ebola outbreak in a location.

Additionally, research repeatedly finds that female populations are exposed to emerging disease like Ebola through their domestic and occupational caregiving roles, often expected in their matriarchal positions to nurse the infirm. As women often make lower on the dollar in their positions as male colleagues worldwide, there is a noted trend in literature that women are usually the first to have to make the decision to leave their employment than a male partner. This same body of literature states that women need access to information, proper safety gear, health kits, and services to better protect them against infection [28, 31, 49, 64, 67]. Yet, most of these studies fail to note that women's vulnerability to infection and death appear greatly compounded at the initial outbreak phase, when knowledge about the emerging disease is very limited. Female Ebola survivors often state that they became infected while providing care to a sick person, mistaking the illness that the person had as not-Ebola, since the symptoms were very similar to other common diseases like malaria. For instance, Decontee, the first Liberian Ebola survivor to donate her blood to be used to treat newly infected patients, shares that she was treating an elderly member of her family, assuming she had a common illness. Within days, Decontee reportedly experiences the same symptoms of fever, headache, and body pain, but also the unusual vomiting of black bile. She eventually loses most of her family to the disease, including her husband who died calling out her name in his final hours [33]. Likewise, many COVID-19 patients in late 2019/early 2020 report having contracted the disease from a family member or acquaintance who they thought had a cold or flu [63].

This study posits that one of the critical factors affecting women's risk to disease exposure in emerging outbreaks is knowledge and access to information about the

disease and infection control practices. Nurses in West Africa often have only a few years or less of medical training, and as shown previously, often are female [33, 69, 70]. In health facilities, they were more directly involved in the care or encountered persons who had been in contact with persons with Ebola. In the homes, they were at the forefront of nursing the sick, as well as washing the dead in preparation for religious/ethnic burial practices [45, 51]. As caregivers, women may have limited access to proper protection gear like PPE, medicines, and gloves [21]. As a result, records indicate that Ebola often ravaged female populations in certain circumstances compared to men, and this included among the first months of the outbreak in hospitals where female nurses often were the first to fall sick to the disease. Yet it is difficult to state for certain that female caregivers are always more likely to be exposed to emergent diseases compared to male counterparts.

This study finds that another crucial factor affecting women in emergent disease systems includes gender-biases in medical research. The data blind-spot on gendered effects of disease noted by Perez (2019) may likely extend further to understanding how emerging pandemics affect women in healthcare roles [52, para. 4-10]. Research in West Africa indicated that the first to be most impacted by the disease involve female nurses and female health volunteers, as was the case with female matriarchies in infected households. They often are unrecognized for the critical role they played, and are victims of stigmatization, depression, and economic hardship [32, 33, 68]. They often are recorded on the frontlines treating patients with more frequent contact and exposure to bodily fluids and soiled materials. Yet, it is difficult to draw comparisons on whether female healthcare workers' infection and death rates are higher or lower than male colleagues, a deficiency that relates back to the lack of historical, recorded data on women in pandemics. The 1918 Influenza outbreak is poorly documented, and what we know today is often pieced together from old archival and qualitative news sources by researchers.

Comparatively, during the fall and winter months of 1918, mortality rates among physicians and nurses

presumed to have influenza are 0.64% and 0.53%, respectively. But this data is from sources that include news reports on the deaths of doctors [mostly men] [1]. There appears to be limited data records on the death or infections of nurses, who again are mainly women. Moreover, healthcare workers [HCWs] during the 1918 Spanish flu have little to no infection control practices utilized today [1]. Investigations in the number of infection and death cases among military medical workers tend to be better recorded from 1917-1919. This military data shows that female American nurses face the highest health impacts of influenza than male American officers/doctors, as well as both female and male British healthcare workers. As the strain is novel at the time, all healthcare workers and officers likely share the same risk factors to contracting the disease. Yet, there are distinct variables that may lessen the risks of a HCW being infected. 1918 nurses in England during WWI tend to have more extensive training and experience in providing medical care compared to the majority of female American nurses, who are often newly recruited by the US Army. These American nurses are experientially trained in medical centers, compared to male doctors who receive seven years of training before becoming an officer. Similar cases are also identified among Australian female nurses during the 1918 pandemic. Thus, we might postulate that newly-minted HCWs tend to have less knowledge and experience in medicine and nursing, likely increasing their risk to falling victim to diseases like influenza [15, 56]. As with Ebola, female HCWs in some instances of the 1918 Spanish outbreak are inadequately prepared to take on caring for the infected.

The quality of healthcare training and access to infection control practices that women receive prior to a massive outbreak can determine her risk of exposure. As Perez (2019) reflects, there are gender biases not only in tracking data on women but also inequities in the quality of professional development and supportive environment opportunities afford female workers. There is the need to ensure women, both professional healthcare workers and health volunteers, as well as mothers, have access to disease preventative information, services and personal



protective equipment to enable them protect themselves from infection as they give care to the sick. Education and engagement of women is also necessary to protect women from infection and to ensure prompt outbreak containment [53].

Beyond the exposure risks that women face in their roles of caregivers during pandemics, they also face severe socio-economic hardships at home. When disease creeps into a household, often it is the female members who suffer the most in the long-term, a global phenomenon. Firstly, the financial implications can be catastrophic for female family members and their children. As we are experiencing worldwide with the Corona virus, emerging disease pandemics can lead to economic stagnation, which can lower family income, and place more strain on household expenditures. The Spanish flu mainly impacts the economy by the closures of small and mid-sized businesses, less market spending, and impacts of mortality and morbidity on the working population and human capacity [14, 26, 27, 37]. Arguably, there may be challenges to comparing disease impacts on economies at different points in time, such as the case in comparing the 1918 flu pandemic to the current COVID-19 situation in the US. Most Americans in 1918 are rural workers, whereas today the majority work in urban regions, which makes drawing parallel effects more difficult [14]. However, it is logical to assume that in settings where more men are dying, in work environments where men tend to have higher income than women, there can be some theoretical similarities established. The 1918 Spanish Influenza outbreak targets mostly men ages 18-40, which in turn has severe economic impacts for families that lose their principal breadwinner [27]. The extent to which women in 1918 and afterward are affected is difficult to assess, as again, there is very limited data from this time period on the financial burden on females. An analysis of the top-cited sources on the economic effects of the 1918 Spanish flu on academic search engine of Google Scholar reveals just a few detailed analyses on the economic hardship women faced, even by contemporary researchers. The literature mainly focuses on the economic impacts on the male worker population.

This analysis will now combine examining both the economic and psycho-social impacts that large scale pandemics have on female populations. In the end, they are so interconnected in the gender narrative that one cannot easily examine one without stumbling on the other. In gender analysis, it can be arguably insular to examine the effects of any disaster on any affected peoples through a siloed sectoral or disciplinary approach. The experiences of women and girls transcends disciplines.

In the case of the Spanish flu, when women lose their husband or an older male child, the burden is often two-fold. Firstly, she loses a key source of income, and often may need to resort to depending on extended family for support or explore informal work options which were limited for women. The average women in low-income and middle-income countries had little education and often live in an agricultural region. Property and wealth are usually controlled by male heads of household. Thus, the loss of this head of household can cause numerous complications and threaten her financial security. Secondly, women like those in disease-affected households in Canada, likely experience extensive emotional and psychosocial hardship, including depression, survivor's guilt, and stress [37].

Research today seems less biased in its attention to the economic hardships on gender in pandemics than a century ago. There have been more extensive economic analyses and case studies of the impacts that pandemics today can have on female populations, particularly in communities that are at one-point hot zones, but there needs to be more studies. During Ebola, most families where a male relative died, women reportedly experience severe economic stress, including the inability to pay rent or feed their families. Middle class women overnight lose everything and are sometimes driven to destitution. Many female Ebola survivors have little option but to move back in with surviving relatives [if they are willing to take them in], or return to ETUs and quarantine centers for employment as they are often driven out of their communities due to stigma and fear of their disease status. The hardships of Ebola significantly lower the quality of life for women and girls in Liberia and other parts of West

Africa. Women often suffer from severe anxiety, depression, nightmares, flashbacks, and stigma, with little mental health access or communal support other than religious institutions and non-profit programs [32, 33, 41]. Likewise, COVID-19 is severely affecting women.

As the 2020 job market closes, blue-collar and white-collar jobs are lessening as the pandemic continues. Today, women on average make nearly a quarter less than their male co-workers, which reflects an uneven playing field from the start. This economic inequality is extended with the surge in COVID cases. In disease-infected homes, where more often than not men are the first to get sick, matriarchs are placed in the precarious situation to either divide their time between work and caring for family. Additionally, some of the hardest hit sectors include industries like restaurants and small businesses in which high percentages of women work [2, 5, 18, 30, 59]. In low-income nations including in sub-Saharan Africa, economic hardship in 2020 is larger for females than males. The informal job sector has been significantly reduced, and 90 percent of African women make up this informal work force [63].

As with the case of Ebola, during the COVID-19 outbreak, worldwide women often tend to be the first in the household to reduce their work hours or to leave a job in order to care for family members in quarantine and related to school closures. This responsibility may limit the ability to work even in informal job sectors. Even if a woman in a middle-income household has to decide to temporarily leave work to care for her children in a pandemic, she is affected financially beyond income. She pays the opportunity cost of income invested in a personal savings or retirement that accrues over time, the loss of any dipping into her personal savings during pandemic, dependency on male income sharing, and time lost in her industry which can result in promotion or salary raise. These financial limitation and burdens can be also emotionally taxing affecting self-esteem and mental health. While depression in the COVID-19 pandemic is well-researched, there is clear evidence that women suffer higher rates of depression, lower self-esteem, emotional and physical abuse, and

apathy than before the outbreak. Research during COVID-19 and Ebola identify the issue of increased sexual violence including sexual assault by male partners as key burden affecting females, particularly among low-income and marginalized populations. These stressors are similar to those noted in other pandemics including Ebola and SARS [2, 41, 59, 63]. A 2016 study in Liberia assessing the quality of life of women in Ebola-affected homes finds that these incidences can lead to long term psychosocial trauma. PTSD and other anxiety disorders can result, which can spiral into long term dysfunctional relationships, self-abusing or risky behaviors, and issues with employment [32]. Women worldwide are demonstrating these same common psychosocial issues today during Corona. Furthermore, isolation from friends and family while quarantining or social distancing can further complicate mental health. As with many pandemics like Ebola and COVID, women additionally experience limited access to vital healthcare and mental health services [17, 54, 59, 62, 63].

In spite of these obstacles, women are not passive actors in a pandemic. Women often are key players in helping mitigate disease spread, building community and family support networks for those affected either directly or indirect by the outbreak, and often take on creative means to respond to economic and household challenges. Women are often valuable stakeholders in the response and recovery phases of Ebola. Female health workers including nurses in Ebola ETUs and COVID-19 community services provide important feedback to decision makers about how to best respond to the pandemic. Much of their input helps inform knowledge management systems that can be activated in future outbreaks, as is the case for COVID-19 Liberia and Sierra Leone response after Ebola five years previously [62, 63].

CONCLUSION

Large-scale emerging disease pandemics are increasing in frequency with each decade that passes. These pandemics can lead to massive national and global hardships. Never previously experienced, new diseases can disrupt and even crash healthcare systems and economic



markets, the effects of which hit the most vulnerable populations the hardest. This analysis of top-cited literature on the three case studies of the 1918 pandemic, 2014-15 Ebola outbreak, and COVID-19 indicates that there is large gap in both research data on the impacts of diseases specifically on women, often with a biased focus on working male populations. Thus, it is difficult to clearly discern the similarities and differences in the physical, financial and psychosocial wellbeing of women over time. However, there is a growing focus by the research community in a number of fields like economics, sociology, and psychology that better inform the lack of understanding and consideration of the inclusion of gender perspective in public policy and programming. There are clear gender inequities that result of the effects of global pandemics like H1N1, Ebola, and COVID-19, with women facing high risk situations that can lower their quality of life, especially in low-income and/or misogynistic settings.

As a result of stereotypical gender boxes that society can place on women and men, the burden of disease can fall heavily on female populations. Research implies that male morbidity and mortality are higher compared to that of women and girls. There needs to be more research performed specifically identifying the physiological differences in how novel diseases affect men and women. We know that pandemics often are more dangerous for women who are experiencing bodily changes, including pregnancy. Ebola has the largest negative health impacts on pregnant women, 1918 influenza taking second, and COVID-19 have the least of the three. Yet, women who survive a disease infection or are indirectly affected when disease enters the home or office face gendered variables more frequently than men.

These factors often are informed by the gender roles and expectations placed on females. Women tend to take on caregiving roles more than men during pandemics, including as primary child caregivers, caregivers to infected family, and serving vital HCW roles like nursing. While women tend to be less risk adverse during pandemics like Ebola, they still face threat of infection often due to their role as a professional or informal caregiver. Yet, there is not

enough data especially on the Spanish flu to draw clean parallels of women's experiences between the three cases. Just as there was little recorded information on the mortality rates of female during 1918, there also a discriminate focus on the economic hardships faced by working men than women. Even in cases where the woman is educated and employed, pandemics can economically diminish female quality of life. Often, her experiences transcend multiple fields and disciplines. Women often face compounded psychosocial hardships in relation to her economic and psychological obstacles. However, women still have an active voice in informing policy and programming solutions around mitigating and recovering from emerging pandemics. It is crucial to ensure that in settings where there are gender inequities in the workforce and economy, that women are afforded support services and safe employment opportunities to better counteract gendered risks. Likewise, policymakers and implementers should provide ample space for women's voices in pandemic response, recovery, and prevention. As one of the main pillars in the community, women can provide key insight and perspectives to combat the outbreak.

LIMITATIONS

This study compares three of the major emerging disease pandemics that affect large scale populations. This is a qualitative analysis of the most cited literature based on Google Scholar. The author would like to acknowledge that this research is meant to only begin to articulate the commonalities affecting women. Thus, this study only begins to uncover some of the similarities and differences that affect women who are victimized or affected by one of these three diseases. This research can be further extended to include additional case studies such as Zika and SARS in more detail. Furthermore, the timeline only covers the cases studies in the last century, thus leaving room to expand the analysis to consider additional large scale emerging pandemics like those bubonic plague in the medieval times, the sweating sickness in Europe in the late 1400s to 1500s, as well as the effects of small pox and polio when it spread to new continents after the discovery of the



Americas. However, any analysis of this topic is limited by the large biases and lack of data historically collected specifically on the effects of past disease outbreaks on women and girls. This limitation is frequently referred to throughout the paper by the author, being well-noted in literature particularly gender health studies. There are also the limits of understanding how disease like Ebola and COVID-19 affect women's physiology, including survivors of the disease and those who tragically pass away. There are ethical constraints put into place to protect invasive medical research on infected patients, and due to the highly infectious nature and chaos of emergency response medicine, there is an incredible challenge to study these physical effects in detail including over time. Just as with the Spanish Flu, we may not know the long-term implications of physiology until generations after these new pandemics run their course. Lastly, this paper would be further validated through a more robust study, including a meta-analysis, as well as a potential quantitative analysis of factors identified in this report to test for significance of factors that are identified.

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CONFLICT OF INTEREST

The author would like to declare that they do not have any financial interests or any conflicts of interest.

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PEER REVIEW

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