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Original article

Non-Communicable Diseases (NCDs) and Epidemic Diseases Vulnerabilities in Ghana: A Reflection on the Influenza Epidemic of 1918-1920

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Abstract
NCDs conditions such as hypertension and diabetes have featured in the top ten causes of mortalities and hospital admissions in Ghana for the past three decades. Since the outbreak of COVID-19 in the country, emerging evidence indicate that persons living with NCDs conditions, especially hypertension and diabetes suffered from severe COVID-19 complications and death. In the context of COVID-19 health outcomes and their association with NCDs underlining conditions, we ask: How has NCDs exacerbated health conditions of individuals during the outbreak of epidemic diseases? This research attempts to draw a linkage between NCDs and epidemic diseases vulnerabilities in Ghana, reflecting on the influenza epidemic also known as "Spanish Flu" of 1918 to 1920 of the Gold Coast (now Ghana). We argue among other things that traces of NCDs were observed in the Gold Coast but there is little evidence of an exacerbation of mortalities during the influenza epidemic, a reminiscent of COVID-19.

Keywords: Non-Communicable Diseases (NCDs), COVID-19, Influenza, Epidemics, Pandemics, Ghana

Introduction

After several years of individuals suffering from communicable diseases, Ghana now faces a double burden of diseases in the face of non-communicable diseases (NCDs) with the latter recording a persistent increase. Non-communicable diseases also known as 'chronic diseases or lifestyle diseases' have been identified to mean, "diseases or conditions that occur in, or are known to affect individuals over an extensive period of time and for which there are no known causative agents that are transmitted from one affected individual to another" (MoH, 2012). In terms of premature mortality, the emphasis has always been on Cardiovascular Diseases (CVDs), cancers, diabetes and Chronic Respiratory Diseases (CRDs) (Atun et al., 2013).

According to Atun et al. (2013), NCDs consist of a vast group of conditions but in terms of premature mortality, emphasis have been placed on cardiovascular diseases (CVDs), cancers, diabetes and chronic respiratory diseases (CRDs). Cardiovascular diseases consist of conditions such as stroke while chronic respiratory diseases include conditions such as asthma and hypertension. In Ghana, the major NCDs are grouped into five as cardiovascular diseases (CVDs), cancers, diabetes, chronic respiratory diseases (asthma and hypertension) and sickle cell diseases (MoH, 2012). Several studies suggest that most of these diseases are preventable given their risk factors, which are noted to be modifiable. Obesity, high blood pressure, high cholesterol, alcohol and tobacco have been identified by experts as the major risk factors that cause most common NCDs (de-Graft Aikins, 2007). The major common risk factors have been identified to include; tobacco, harmful use of alcohol, unhealthy diet and physical inactivity (MoH, 2012). In addition to these risk factors are the contemporary agricultural practices, which encompassed the inappropriate use of chemicals that are said to have produced toxic foods that have placed the public at risk of illness such as cancer (de-Graft Aikins, 2007; WHO, 2014).

Whereas it is admittable that the country has suffered unprecedentedly from infectious diseases in all of its health history, NCDs have co-existed with infectious diseases to cause mortality and

disability for the past twenty years (de-Graft Aikins, 2007). Although little evidence exist to proof NCDs co-morbidities with infectious diseases, the clinical outcomes of the novel coronavirus (COVID-19) pandemic present an insight into how NCDs exacerbate complications from epidemic diseases. The COVID-19 pandemic, apart from endangering lives and causing discomfort, has admittedly threatened the gains made in health. Also, in the earlier stages of the pandemic, disparities in the infection and mortality rates became eminent (Gyasi, 2020). Since the outbreak of COVID-19 in Africa, there have been publications on the implications of COVID-19 on NCDs control and prevention in sub-Saharan Africa (Kraef et al., 2020; Geffen, Kelly, Steyn, Kalula, 2020; Owopetu, Fasehun, Abakporo, 2021; Kamano et al., 2021).

Influenza and COVID-19 have been described as the most lethal epidemics in the twentieth and twenty-first centuries respectively. COVID-19 is comparable to influenza in terms of its clinical features and its disproportionate disruptions among human populations and economies across the globe. COVID-19 is caused by a virus and spreads primarily through droplets of saliva or discharge by droplets through the respiratory route (WHO, n.d). Like COVID-19, influenza was also a viral disease transmitted from person to person through the respiratory route (Patterson, 1995). Emerging evidence from COVID-19 studies has been revealing on how persons living with underlining health conditions such as hypertension and diabetes experience severe complications as well as death after being infected (Yawson et al., 2020; Adjei et al., 2020; Ayisi-Boateng et al., 2020; Atoh et al., 2020; Lamptey et al., 2020).

In the context of COVID-19 health outcomes and their association with NCDs underlining conditions, we ask: How has NCDs exacerbated health conditions of individuals during the outbreak of epidemic diseases? This preliminary paper attempts to forge a linkage between NCDs and epidemic diseases vulnerabilities in Ghana using the influenza epidemic also known as "Spanish Flu" of 1918 to 1920 of the Gold Coast (now Ghana) as a case study. We deem this paper as a preliminary study to historically establish a linkage between NCDs and

epidemic diseases vulnerabilities. A study of this nature would help to provide a clear picture of this subject and to understand the place of underlining health conditions in events of epidemics and pandemics. It first charts a trend in NCDs morbidity and mortality from 2001 to 2016. We focus on morbidity and mortality since NCDs outcomes are measured with those indicators (Adeyi, Smith, Robles, 2007). The paper then looks at a historical interpretation of NCDs and their linkage in COVID-19 and influenza epidemics. In this study, we refer to both influenza and COVID-19 as epidemics because of the scope of the study. However, we use pandemic when references are made at the global level.

Method

The study is exclusively qualitative. We made use of annual reports of the Ghana Health Service (GHS) and Ministry of Health (MoH), hospital-based studies on the clinical outcomes of COVID-19 in Ghana provided information for this research. Useful data was also gleaned from reports of the World Health Organisation (WHO). These agencies provided not only qualitative but also some statistical data on the scope of NCDs in Ghana and COVID-19. In this paper, the archival materials used consist of annual reports of the Gold Coast Medical Department from 1893 to 1924. The archival documents provided information on the influenza epidemic of 1918. We interpret the archival data based on the evidence presented in the reports together with existing accounts. The secondary data was retrieved from books and journal articles on the subject under study.

Trends in Major Non-Communicable Diseases Morbidity and Mortality in Ghana, 1990-2016

There has been a documented increase in the prevalence rate of NCDs such as cardiovascular diseases, hypertension and diabetes in Ghana. The trend in NCDs prevalence, morbidity and mortality has followed a rising but irregular pattern since their official recognition in policy documents in the early 1990s. Through community surveys and health

facility records, NCDs morbidity and mortality has been documented to monitor the pattern of diseases. The introduction of the Health Information Management System (HIMS) under the auspices of the Ghana Health Service (GHS) into the healthcare system has made it much easier to record and track the pattern of diseases notwithstanding its challenges.

From the 1950s, major causes of death shifted from predominantly communicable diseases (CDs) to a combination of both communicable and non-communicable diseases (de-Graft Aikins, 2007). By inference, NCDs have existed side by side with CDs from the 1950s to cause greater morbidity and mortality in Ghana. Against this background, public health reforms and initiatives in the colonial and the first decade after independence were focused on CDs prevention and control (de-Graft Aikins, Koram, 2017). Table 1 gives a summary of the number of outpatient morbidity for hypertension, anaemia, diabetes and asthma from 2001 to 2016 as those diseases were among the top twenty causes of outpatient morbidity. It is worthy of note that any omission of morbidity cases in the table meant that we did not obtain data for those years.

Several reasons have been cited as the cause of the persistent increase in NCDs conditions among the Ghanaian population. The theory of epidemiological transition has featured most in discourses of the prevalence of NCDs (Agyei-Mensah, de-Graft Aikins, 2010). The fundamental concept of the theory relates to the change in the pattern of diseases that comes about as societies transform or progress within the historical space in time. It is imperative to hint that the societal progress and transformation are associated with changes in social and economic behaviours (lifestyles) that are to some extent harmful to the health and wellbeing of individuals. This is to echo that as man progresses in life and as societies go through transitions or what contemporary studies may term as globalization, certain lifestyles that are not compatible with good health evolve with time with its associated diseases such as NCDs. As a result of this, experts suggest that an understanding of these lifestyle changes is relevant when it comes to health policy formulation and interventions (Ezzati et al.,

2005). Similarly, taking into consideration the legislative, socio-economic and cultural factors as indicators in effective and sustainable policy implementation is core to stemming the tide of lifestyle diseases.

Essentially, knowledge about indigenous food systems and cultures presents deeper understanding of the transformation in health and well-being among a population. Contemporary and evidence-based studies on global health have established the nexus between the social determinants of health and the emergence of diet-related diseases such as NCDs as a trail of globalization (WHA 2004; WHO, 2006; 2009; 2014; NDH, 2013; Legetic et al., 2016). This has transformed indigenous food and culinary practices as well as lifestyle modification with its attendant degenerative diseases. To this end, we may ascribe to the position of Kuhnlein, V. Harriet, Bill Erasmus and Dina Spigelski that, "Globalization and homogenization have replaced local food cultures; high-yield crops and monoculture agriculture have taken the place of biodiversity; industrial and high-input farming methods have degraded ecosystems and harmed agro-ecological zones; and modern food industries have led to diet-related chronic diseases and other forms of malnutrition" (Kuhnlein, Erasmus, Spigelski, (Eds.), 2009).

Table 1. Number and percentage of outpatient morbidity cases for hypertension, anaemia, diabetes and asthma from 2001 to 2016.

YEAR	DISEASE			
	HYPERTENSION	ANEMIA	DIABETES	ASTHMA
2001	137,801	111,915	-	-
2002	195,655	141,059	-	-
2003	212,354	128,009	-	-
2004	206,925	129,315	-	-
2005	249,342	144,606	-	23,288
2006	283,591	143,171	-	24,877
2007	505,180	185,293	-	43,402
2008	321,994	139,593	_	30,212
2009	497,845	211,318	120,000	58,317
2010	644,134	321,792	143,713	68,482
2011	860,745	555,159	204,812	68,032
2012	964,724	759,151	232,535	-
2013	936,958	955,001	220,098	-
2014	829,655	993,135	213,837	-
2015	715,247	1,007,335	185,945	-
2016	606,721	1,069,138	154,790	-

Source: Authors' construct from GHS, CHIM/PPMED, Facts and Figures 2008, 2011, 2012, 2013, 2014, 2016 and 2017; MoH, 2012 and GHS, Annual Report 2011.

A Historical Analysis of NCDs and Epidemic Diseases Vulnerabilities in Ghana

This section draws the linkage between NCDs and their role in exacerbating the health complications of victims of epidemics. In the first section, we present evidence from studies that discuss how NCDs, specifically hypertension and diabetes escalated the conditions of persons infected with COVID-19. The individuals are noted to be living with one or two of the conditions of NCDs. The second looks at a historical examination of the influenza epidemic of 1918 to 1920 within the context of NCDs.

COVID-19 Vulnerabilities and NCDs

Prior to the first reported cases of COVID-19 in Ghana, experts shared sentiments over its implications for NCDs care and management (de-Graft Aikins et al., 2020). The worst aspect of the epidemic in Ghana was the fear for older adults and young individuals living with NCDs conditions such as hypertension and diabetes. The fear emanated from the fact that such individuals were to face the brunt of the epidemic in terms of their vulnerability to infection, continued care in health facilities, and experience severe complications when infected with the disease (Gyasi, 2020; de-Graft Aikins et al., 2020; Cowling, Leung, 2020; Arthur-Holmes, Gyasi, 2021; Kamano et al., 2021). This category of persons among the population were prone to experiencing severe complications upon contracting COVID-19. By the end of December 2020, Africa experienced a mild progression of COVID-19 where severe cases remained low as compared to the rest of the world (Yawson et al. 2020). Ghana's case fatality rate of COVID-19 ranged between <0.01% and 5%.

In their study conducted among two hundred and seventy-five (275) patients at two COVID-19 national treatment centers in Accra, the Ga East Municipal Hospital and the University of Ghana Medical Centre from March to May 2020, Yawson et al. (2020) found that patients who presented moderate to severe COVID-19 illness also suffered from NCDs. According to them, the prevalence of chronic health conditions served as a catalyst to "severity of symptoms and fatalities." Thus, the aged and individuals with underlining health conditions mostly hypertension and diabetes shown worse prognosis. The prevalence of NCDs co-morbid conditions among COVID-19 patients were as follows: hypertension-32.1%; Diabetes-9.9%; Asthma-5.2%; Heart disease – 4.1%, Chronic Kidney Disease -1.1% (Yawson et al. 2020). Overall, approximately 38.9% had underlining health conditions mainly from NCDs.

A similar study carried out at the COVID-19 treatment centre at the Korle-Bu Teaching Hospital outlined the common co-morbidities of COVID-19 to include hypertension and diabetes mellitus (Adjei et al.,

2020). Older adults aged fifty years and above faced severed complications from COVID-19 and subsequent death, confirming earlier projections of COVID-19 vulnerable groups and fatalities (Gyasi, 2020; de-Graft Aikins et al., 2020; Cowling, Leung, 2020; Arthur-Holmes, Gyasi, 2021; Kamano et al., 2021). Other hospital-based studies on the clinical outcomes of COVID-19 patients in major isolation and treatment centres in the country affirmed the prevalence of NCDs, especially hypertension and diabetes miletus as major drivers of COVID-19 critical conditions and death (Ayisi-Boateng et al., 2020; Atoh et al., 2020; Lamptey et al., 2020; Ashinyo et al., 2020). These studies established that, individuals without NCDs suffered less from severe COVID-19 complications and were less likely to succumb to the disease.

The Influenza Epidemic of 1918 to 1920 and NCDs

The COVID-19 pandemic revived memories of past pandemics of similar nature across the globe. In Ghana, memories of the influenza epidemic of 1918 also known as the "Spanish Flu," a reminiscent of COVID-19 were awakened. The historian, K.D Patterson has described the influenza pandemic as the most lethal of the twentieth century despite its short-term occurrence from 1918 to 1920 (Patterson, 1995). Like the influenza epidemic, COVID-19 pandemic could also be described as the most lethal epidemic of the twenty-first century. The COVID-19 pandemic is comparable to the influenza pandemic in terms of its clinical features and its disproportionate disruptions among human populations and economies across the globe. The COVID-19 pandemic is caused by a virus and spreads primarily through droplets of saliva or discharge by droplets through the respiratory route (WHO, n.d). Like COVID-19, available evidence indicates that the influenza pandemic was caused by a virus and transmitted from person to person through the respiratory route (Patterson, 1995). There is also a consensus that pneumonia facilitated the increasing trend of mortalities and complications from influenza, as it was the leading cause of death across the globe (Barry, 2004). Thus, influenza mostly killed through pneumonia. Barry (2004) postulated that a section of the population

who succumbed to influenza would have died in the absence of an epidemic.

A unique feature of the 1918 influenza pandemic was its inconsiderate mode of attack and cause of death. Pioneering studies on the influenza pandemic have established that the influenza killed both the young and the elderly, with high mortality rates among the young adult population aged between twenty and forty (Patterson, 1995; Johnson, Mueller 2002; Barry 2004). The Gold Coast witnessed similar occurrence when a majority of the infected population in the Saltpond Township, were noted to be children and the young adult up to 30 years of age (Government of the Gold Coast, 1919). The statistics of mortalities recorded during the influenza pandemic has been contested and remain uncertain among scholars. It is argued that the available data on mortalities and infections were understated because of lack of registration of cases during the outbreak, missing records, misdiagnosis, nonmedical certification and inconsistent coverage of the population of certain locations as would be discussed in the case of the Gold Coast (Johnson, Mueller, 2002). Johnson and Mueller (2002) purged that the global mortalities from the pandemic was between fifty (50) to hundred (100) million.

Corresponding to the above, scholars have noted the difficulty in determining the exact number of people who were infected by the influenza (Patterson, 1995; Johnson, Mueller, 2002). At the time of completing the first draft of this paper in July 2021, the global confirmed cases of COVID-19 stood at 195,886,929 with 4,189,148 deaths (WHO 2021a). The cumulative recorded cases in Africa was 4,868,312 with 115,177 deaths. Ghana's COVID-19 total case count during the same period was 103,019 with 823 deaths (WHO 2021b). In June 2021, Dr Matshidiso Moeti, the World Health Organization (WHO) Regional Director for Africa announced the possible outbreak of a third wave of COVID-19 in Africa. Democratic Republic of the Congo was noted to have reached a third wave of the pandemic (Burke, 2021). Although the COVID-19 pandemic lingers, its mortalities fall below the estimated number of deaths from the influenza pandemic,

hence less lethal than the latter. In an age of advanced technologies, which have aided improved health management information systems, we argue that the problems that were encountered concerning the recording of the infection and mortality rates of the influenza pandemic is a thing of the past. However, we do acknowledge the health system challenges with data management, especially in developing countries like Ghana. Therefore, data computed for the COVID-19 pandemic are nearest to accuracy and precision than the influenza pandemic.

The influenza pandemic of 1918 occurred in three distinct waves: the first occurred in March to July 1918 and was relatively mild; the second was very lethal and took place from August to December 1918; the third happened in 1919 and was severe but relatively modest (Phillips, 1914). The Americas, Europe and Asia experienced the first wave of the pandemic. The index cases of influenza on the African continent were mostly the second wave, which was very lethal. According to Phillips (1914), the pandemic claimed nearly two percent of the continent's population within six months and Africa, especially sub-Saharan Africa faced the highest brunt of the pandemic. The influenza pandemic entered sub-Saharan Africa between mid-August and late September 1918 through seaports in Freetown, Cape Town and Mombasa. It then spread to other parts of the sub-Saharan African region by sea.

The Gold Coast registered first cases of the 1918 influenza epidemic at Sekondi, a coastal town of the colony where members of the crew of an infected ship landed for treatment (Gold Coast Medical Department, 1919). Prior to the 1918 deadly influenza epidemic, cases of influenza were recorded in the Gold Coast. The history of previous outbreak of the epidemic dates to late 1891 (Gold Coast Medical Department, 1919). The colony recorded few cases with some deaths in 1891and subsequent years until 1918. As stated earlier, until September 1918, the disease was not regarded as epidemic in the Gold Coast. The notion was that the symptoms of influenza mimicked those of malarial infection, and thus not readily 111merge111zan until it attained a definite degree of development (Government of the Gold Coast Medical Department, 1919). In 1915, influenza cases in hospital records

were 3 (Gold Coast Medical Department, 1917). In 1916, the cases had more than tripled to 27. The cases jumped from 27 in 1916 to 280 in 1917. Yet, influenza was not recognized as part of the causes of death among the population as chicken pox and measles dominated the epidemic diseases chart (Gold Coast Medical Department, 1918). The return of influenza disease treated in hospitals in 1918 stood at 7,756 (Gold Coast Medical Department, 1919). As reported earlier, the influenza killed both young and the elderly, with high mortality rates among the young adult population aged between twenty and forty (Patterson, 1995; Johnson, Mueller 2002; Barry 2004). To emphasise the earlier point, in the Gold Coast, majority of the infected population in Saltpond, a coastal town, were children and those who were up to 30 years of age (Gold Coast Medical Department, 1919). In Kumase, the population that faced the brunt of the influenza were adult males aged between 20 and 35.

With regards to statistics of infections and mortalities from the influenza epidemic in the Gold Coast, Patterson (1995) has established its imprecision. Patterson was of the view that the colonial medical officers were partial in reporting cases among the European and African population. Medical attention was more geared towards the European population and African officials in the colonial service. According to Patterson (1995), the official statistics of morbidity and mortality for the African population "were conservative, as many patients went untreated and, no doubt, some deaths were not reported to the authorities." Undoubtedly, the statistics computed for the Gold Coast as presented in the medical and sanitary report for 1918 show the grave oversight in reporting cases of infections and mortality (Gold Coast Medical Department, 1919). The estimated total number of deaths for the Gold Coast was far below the reported deaths from the colonies, Asante and the Northern territories, cumulatively. For example, in Asante, 9,000 deaths were recorded out of an estimated population of 450,000. In the North-Eastern province of the Northern territories, 80% of the population were infected with about 4000 deaths. In the North-Western province, 80% were infected with 8,172 deaths.

Medical officers in the Gold Coast during the period of the epidemic admitted the difficulty in obtaining accurate figures for mortalities and infections, and often relied on assumptions or estimates. The Principal Medical Officer of the Gold Coast projected the influenza mortalities in the colony at 60,135 considering a population of 1,503,386. A statement of the medical officer reads: "If we assume that the general mortality rate amounted to 4% of the population, the total number of deaths caused by the epidemic, based on the population at the last census, 1,503,386 amounted to 60,135" (Gold Coast Medical Department, 1919).

Patterson (1995) contested the above projection and argued that even if the mortality rate of 4% is accepted given an estimated total population of the Gold Coast in 1918 as 2,213,000, the total deaths would have been about 88,500 or almost 30,000 more than the official estimate of 60,135. For him, the epidemic caused at least 80 to 100,000 deaths or higher. The years after 1918 registered cases of influenza. However, it was at a decreasing rate. By the end of 1918, the number of influenza patients that remained in hospitals were 8 (Gold Coast Medical Department, 1919). In 1919, the number of patients treated in hospitals was 135. During the year under review, the number of influenza patients in hospitals was 1. In 1920, influenza cases treated in hospitals were 885 with 3 deaths and the number remaining in the hospital at the end of the year was zero (Gold Coast Medical Department, 1921). Between 1921 and 1924, the number of patients that remained in hospitals were zero with no recorded deaths although cases were registered (Gold Coast Medical Department 1923; 1924). This signifies that the deadly epidemic period had passed.

The linkage between NCDs and their role of placing individuals at higher risk of epidemic diseases fatalities can be established from the standpoint of such diseases being endemic, and the extent of their prevalence among the population. In the absence of epidemics, a dearth of literature on NCDs in sub-Saharan Africa, particularly Ghana affirm NCDs as major contributors to co-morbidity and death (Ezzati et al., 2005; de-Graft Aikins, 2007; Agyei-Mensah, de-Graft Aikins, 2010; Bosu, 2012; de-Graft Aikins et al., 2012; Atun et al., 2013; de-Graft Aikins et al., 2014; Gouda et al., 2017; Asiko, Wairegi, Waswa, 2018).

This notwithstanding, tracing NCDs as major contributors to mortalities during major epidemics in Ghana is barely known. We suggest that approaching such a discourse would demand among others, the examination of autopsy reports and case files of victims of the major epidemics that occurred in Ghana, which is beyond the remit of this paper. Emerging evidence from studies on the COVID-19 epidemic has been revealing on how persons living with underlining health conditions such as hypertension and diabetes experience severe complications after being infected with the virus while mortality rate among them was higher (Yawson et al., 2020; Adjei et al., 2020; Ayisi-Boateng et al., 2020; Atoh et al., 2020; Lamptey et al., 2020). These conditions are noted to be prevalent among older adults aged fifty years and above. Drawing from these studies, we can appreciate the extent to which NCDs exacerbated the conditions of COVID-19 infected patients. In our analysis, we have noticed variations in the nature of the two epidemics; the influenza of 1918 and COVID-19 in terms of their attack and their associated mortalities although they possesses similar mode of transmission.

In 1918, tuberculosis was regarded as an endemic disease in the Gold Coast. Recounting its relation to the influenza epidemic, it was recorded that although cases of tuberculosis death had declined with increase in cases during this period, "the influenza most certainly accounted for the deaths of number of tubercular subjects who would have died from tuberculosis had not influenza supervened" (Gold Coast Medical Department, 1918). Tuberculosis was classified as infectious diseases under the Infectious Diseases Ordinance in 1917. Most cases of tuberculosis went undetected in the colony until after 1917. Tuberculosis was not "compulsorily" noticeable although it was 114merge114zan as an infectious disease under the Ordinance. While the medical department was crippled Ie of insufficient laboratories and shortage in staff, the influenza added to the burden as it impeded the routine examinations of blood specimens. During the influenza outbreak, "medical officers across the colony were kept busy and were unable to forward specimens for examinations" (Gold Coast Medical

Department, 1918). It is recorded that blood specimens examined at the only existing laboratory in Accra was 344 in 1918, falling below half of the specimens examined in 1916 and 1917. There were 750 specimens in 1916 and 686 in 1917. The records do not state any NCDs related condition as causing an escalation in influenza mortalities. Medical officers noted an increase in deaths in the Gold Coast in 1918 and attributed the same to pulmonary diseases, specifically of the chest but in 115merge115zance of the fact that the influenza was responsible. Medically, there is a linkage between pulmonary diseases and cardiovascular diseases despite their seeming difference; they all constitute NCDs. There is a higher probability that the disfunction of any pulmonary organ directly cause a medical defect to the cardiovascular system.

The pneumonia-like nature of the influenza epidemic made it difficult to admit that pulmonary diseases exacerbated the conditions of those infected with influenza. In 1918, among 52 post-mortem examinations on two European bodies and fifty African bodies in the Gold Coast, the large proportion of death was related to pulmonary diseases with more than half of the diseases arising from chest diseases. A statement from the Principal Medical Officer reads: "For this increase in deaths due to pulmonary diseases the epidemic of influenza was undoubtedly responsible" (Gold Coast Medical Department, 1918). The results of eighteen autopsies performed between September and December 1918 showed that the lungs and heart were the organs mainly affected due to complications of influenza. In Axim for instance, enlarged lymphatic glands were frequently found in victims of influenza (Gold Coast Medical Department, 1919). Postmortem examinations made between the time of the outbreak of the influenza epidemic in 1918 and the end of the year revealed abnormality of the liver of patients; they exhibited "pale-yellow" colour (Macfie, 1922; Ingram, 1922). This state of the liver was usually found in pneumonic conditions of the lungs. Writing about the influenza epidemic and its associated vulnerabilities, John M. Barry predicted as below:

> If a new pandemic struck, people suffering from Acute Respiratory Distress Syndrome (ARDS) would quickly overwhelm intensive care units; those with ARDS who did not get true intensive care would have a mortality rate approaching that in 1918. A new virus would also feast on a population that did not exist in 1918— those with compromised immune systems, including people undergoing radiation or chemotherapy for cancer and transplant recipients, not to mention anyone with HIV (Barry, 2004).

The results from worldwide studies of the clinical conditions of COVID-19 patients partly confirm the arguments of Barry. The evidence presented in this paper, though limited shows that influenza epidemic took advantage of existing health conditions; tuberculosis and pneumonia to cause greater mortalities. Inspite of most victims of the epidemic being young adults, traces of deaths point to the existing conditions, specifically those of the pulmonary and cardiovascular systems.

Conclusion

The COVID-19 pandemic undoubtedly revived memories of past epidemics of similar nature across the globe. In Ghana, memories of the influenza epidemic of 1918 also known as the "Spanish Flu," a reminiscent of COVID-19 were awakened. Available evidence of past events and not the past itself offer significant insight into understanding discourses of this nature. After independence, the major causes of death and hospital admissions shifted from only communicable diseases to a combination of non-communicable diseases with the latter recording a persistent increase over the years. Traces of NCDs were observed in the Gold Coast but there is little evidence of them exacerbating mortalities from the influenza epidemic, a reminiscent of COVID-19. The evidence presented in this paper shows that influenza took advantage of existing health conditions, specifically those related to the pulmonary and cardiovascular systems; tuberculosis and pneumonia to cause greater mortalities. Approaching such a discourse would demand among others, the examination of

autopsy reports and case files of victims of the major epidemics that occurred in Ghana.

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