

Harnessing Evidence of Effects of Covid-19 and Recommendations for Mitigating the Impacts of Pandemic on Chronic Patients: A Systematic Integrative Review

¹KOLOG STEPHEN DOKROUG, ²LINDA HYDE-QUARTEY,
³AHOTVI THOMAS AHOTO

¹School of Mathematical Sciences, Jiangsu University, Zhenjiang 212013, Jiangsu Province, China

^{2,3}School of management, Jiangsu University, Zhenjiang 212013, Jiangsu Province, China

DOI: <https://doi.org/10.5281/zenodo.8252896>

Published Date: 16-August-2023

Abstract: Aim: Building a Global Perspective on the Vulnerability of Chronic Patients to the Covid-19 Pandemic.

Method: This systematic integrative review harmonized findings from both developed and developing countries concerning the vulnerability of chronic patients during the Covid-19 pandemic. Searches were conducted using the Web of Science, Scopus, and Social Science Citation, focusing on articles published from late 2019 to early 2023. The search yielded 333 articles, of which 24 were selected after rigorous application of the selection criteria. The review adhered to the 17-item PRISMA-P checklist and utilized the Critical Appraisal Skills Programmed (CASP) to measure the methodological quality, ensuring a rigorous methodological standard.

Findings and Discussion: The effects of Covid-19 on chronic patients were synthesized into five themes and accompanying sub-themes: **Health System Weaknesses:** Chronic patients faced increased risks in developing countries due to pre-existing health system vulnerabilities. **Patient Behavior:** The behaviors of chronic patients also contributed to their increased susceptibility to Covid-19. **Diagnostic Challenges:** Possible incorrect diagnostics occurred, with laboratories being overwhelmed or malfunctioning during the pandemic. **Treatment Delays:** Chronic patients faced treatment delays as ICU equipment in developing countries became overbooked, and ICU beds were scarce. **Policy Implications:** The over-concentration of resources on controlling the pandemic had adverse consequences for chronic patients and other vulnerable groups.

Recommendations: The Covid-19 pandemic has had a profound impact on health delivery, disproportionately affecting chronic patients. Evidence has shown that these patients were neglected during the outbreak, revealing the inadequacy of the existing response to chronic health issues in a crisis. While policy directives focused on controlling the pandemic, these often-had detrimental implications for chronic patients and other vulnerable populations.

Several recommendations have been made on the treatment of chronic patients during outbreaks, emphasizing the need for a more comprehensive and empathetic approach. Furthermore, there is a need for studies examining post-pandemic health delivery patterns for chronic patients, ensuring that the lessons learned from this crisis inform future health policies and practices.

This review sheds light on the complex interplay between the Covid-19 pandemic and the care of chronic patients. A multifaceted approach that recognizes the unique needs of these patients is vital for enhancing resilience and preparedness in future health crises. Policymakers and healthcare providers must consider these insights carefully to design more effective, compassionate, and inclusive strategies for managing chronic patients during pandemics.

Keywords: Covid-19; Chronic Patients; Systematic Integrative Review; Vulnerability to Covid-19 Pandemic; Covid-19 Restrictions.

1. INTRODUCTION

All aspects of global activities have been affected by the covid-19 pandemic since late 2019, and most sectors of the global economy are yet to recover from the negative impacts of the covid-19 pandemic [1],[28]. Nonetheless, most sectors scrambled; the health sector was at the frontline of covid-19 fight and actively worked in collaboration with other sectors to reduce mortality and morbidity associated with the pandemic [2]. The covid-19 pandemic increased vulnerabilities among the population and made those who are already vulnerable more vulnerable [3], [28].

One group of vulnerable people most impacted by the pandemic are persons with chronic health conditions, this was established from the early stages of the outbreak and supported by current global studies [3]. Unfortunately, though, higher mortality and morbidity were recorded among persons with underlying chronic health issues, much has not been done to protect them from the harsh impacts of covid-19 pandemic, as some of the preventive measures implemented further increased their vulnerability [5],[4].

The vulnerability of chronic patients to disease outbreaks and other emergencies has been exposed during the peak of the covid-19 pandemic [28],[8]. Both covid-19 pandemic and some measures taken to control the pandemic worsen the health conditions of chronic patients [1]. In contrast, channeling a more significant portion of health resources to covid-19 related issues deprived chronic patients of resources for routine and emergency treatment [1],[29]. Social support for chronic patients was unavailable when it was most needed, putting the chronic patient in double jeopardy [9],[5].

In most studies, issues such as chronic patients' difficulties in accessing healthcare services, routine treatment, and overconcentration of health resources on covid-19 issues at the expense of other health issues were well documented [6]. Other studies mentioned how health facilities were ill-equipped in developing countries with poorly maintained intensive care facilities, and in some cases, intensive care beds were not available [7]. In addition, fear driven by the spread of misinformation or unethical dissemination of information was well recorded as adding up to the suffering of chronic patients [9],[42]. While chronic diseases increased the vulnerability of chronic patients to covid-19 pandemic, weak health systems, restrictions, and other policies to control the pandemic put chronic patients and other vulnerable groups at a disadvantage [8].

Several studies have been published establishing the impacts of the covid-19 pandemic on chronic patients in diverse ways and in different geographical areas [9],[11],[36]. There is a need to harness the findings of these studies to ease policy-makers' comprehension and decision-making by using a systematic integrative research approach. Findings on the impacts and effects of the covid-19 pandemic on chronic patients were synchronized into themes, sub-theme developed from various studies from developed, and developing countries. Various recommendations offered by researchers were also synthesized as using studies from different countries enabled the researchers to look at the impacts of covid-19 on chronic patients from a global perspective and projects cases from both developed and developing countries' standpoints.

2. MATERIALS AND METHOD

A systematic integrative review was conducted to synchronize the findings of studies that focused on the predicaments of persons with chronic health conditions during the pandemic and recommended actions to mitigate such impacts. The systematic integrative review aims to project evidence that was demonstrated in other studies and summarized to enhance policymakers' comprehensive understanding [9]. The systematic integrative review was performed in line with the principle of transparency and rigor established by [10] to ensure that the studies' findings were well synthesized and attention was paid to methodical adherence [11].

3. STUDY SELECTION CRITERIA.

To make sure that data meticulousness observed four inclusion criteria, two inclusion criteria were set in selecting articles. Studies included must focused on the effects of the covid-19 pandemic on either person with specific chronic health conditions or the number of chronic health conditions.

The following are the inclusion criteria a study met before being included in the study (I) a peer-reviewed article published in journals that applied a double-blind peer review process to articles before publication. (II) Though articles published using all methodologies were accepted, preference was given to qualitative articles above others since they gave in-depth details about the predicaments of chronic patients concerning covid-19 pandemic. (III) Articles published from December 2019, when covid-19 occurred, to January 2023, were included. (IV) Articles published in journals indexed in the Journal

Citation Reports (JCR), Web of Science, Social Science Citation Indexed, or Scopus. Preference was given to articles in Scimago Journal, and Country Rank quartiles and impact factors were included.

The following are exclusion criteria (I) articles published before December 2019 as they predate the covid-19 pandemic, and other articles such as articles in the press, conference proceedings, and others that were not peer-reviewed were excluded. (II) Studies that focused on issues of chronic health patients during the pandemic but did not connect covid-19 to chronic health issues were also excluded. Similar criteria were used in previous studies in public health and other fields [14], [12],[13].

3.1. Article Search Strategies and Articles Sources

Systematic searches were conducted for articles published in English; the research was done in the following databases: Web of Science, sciencedirect.com, Scopus, and google scholar. The bases for the data search were the year 2019. Four keywords used to describe chronic health issues were used in association with covid-19 pandemic. These are "treatment of chronic disease during covid-19," "effects of covid-19 on chronic patients," "predicaments of persons with chronic health conditions during covid-19," and "vulnerability of chronic patients to covid-19 pandemic."

Secondly, keywords focused on caregiver narrations were also used for the search; hence, these keywords were used "caregivers experience in caring for chronic patients during covid-19 pandemic" and "difficulties in handling chronic patients during covid-19 pandemic."

3.2 Data Extraction and Synthesis

Articles were selected from the mentioned database using search words in the table above. Inclusion and exclusion criteria were used to examine the relevance of the articles to the study. The year of publication, journal in which the article is published, the objective of the article, methodology, and the terms chronic disease, chronic patients, and covid-19 pandemic were given attention. The findings and recommendations were also given attention.

After the selection of articles, narrative source synthesis was carried out using [14] inductive content analysis to synthesize studies' findings and transform them into themes and sub-themes. Similar ideas and findings from studies constituting specific themes and sub-themes. The study results or findings were developed by categorizing the findings and ideas of existing published articles into themes according to Willemse et al., [12] . The reason for building themes and sub-themes from the current study is to harmonize findings from individual articles to more composed structures where a single study provides detailed information for researchers and policy-makers [10].

Coding findings, results, and other information from the articles were done following Bekhet's 2012 coding principles, leading to the development of five themes and seventeen sub-themes. In addition, misunderstandings surrounding themes and their associated sub-themes development were resolved through continuous discussions between the researchers throughout the process [17].

3.3 Quality evaluation of the studies

According to Moick et al. [18] and Willmott et al. [18] high-quality journals mostly publish relevant articles to meet scientific research procedures. Hence conducting an integrative systematic review using articles published in journals indexed in globally recognized databases influence the quality of the article. Based on this assumption, articles used for the review were selected from journals with JCR ratings using quantiles and impact factors. Web of Science, Scopus, and Social Science Citation indexes were reliable databases.

The inclusion and exclusion criteria set were adhered to limit biases in article selection, as all articles selected were only valid when they met the inclusion criteria. To meet methodological and other standards for conducting and publishing systematic review articles, the PRISMA-P statement of 17 items checklist for conducting a systematic review was adhered to achieve robustness [19].

The next step to ensure the study's quality is using the Critical Appraisal Skills Programmed (CASP) to measure the methodological quality (MQ) of the qualitative and review studies. Using CASP led to the scoring of each article used in the study, the articles were rated into categories of low quality, which were signed (0-3 points), medium quality (4-7points), and high quality (8-10 points). Rating of the articles was done by three public health professors by considering but not limited to methodological strength, findings, and recommendations of each article. The above procedure helped to remove biases and other study limitations to achieve the robustness of the study [20],[11].

4. RESULTS AND DISCUSSIONS

4.1 Description of Data

A total of 333 documents were identified concerning literature on the impacts, effects, or influence of covid-19 on chronic patients. Duplicates accounted for 150 articles that were eliminated. The remaining 183 articles were screened using title and abstract; this left total of 124 articles that were subjected to the inclusion and exclusion criteria, and 69 articles passed the inclusion criteria. The 69 articles were submitted to three public health professors for rating and selection, out of which 26 articles were eliminated due to lack of methodology robustness. Fifteen articles were removed because they do not give sundry accounts on chronic health issues in line with covid-19 pandemic. Three articles were eliminated because their recommendations provide little solution to chronic health issues; therefore, 24 articles were included in the study. This is contained in figure 1.

4.2 Description of the Included Studies

The following are methodological categorizations of articles used in study 11 of the articles were designed using the quantitative method, while the remaining 13 articles were designed using qualitative or other methods. The study's setting indicated that eight were conducted in North America (United States of America, Canada, and Mexico), six were conducted in Asia, five were conducted in Africa, and five were conducted in Europe. Finally, ten articles focused on specific chronic health conditions, while the remaining 14 articles focused on general chronic disease. Two categories of respondents appeared in all the articles selected that are respondents being chronic patients or healthcare professionals.

Figure 1: PRISMA Flow Chart Detailing Article Selection Processes

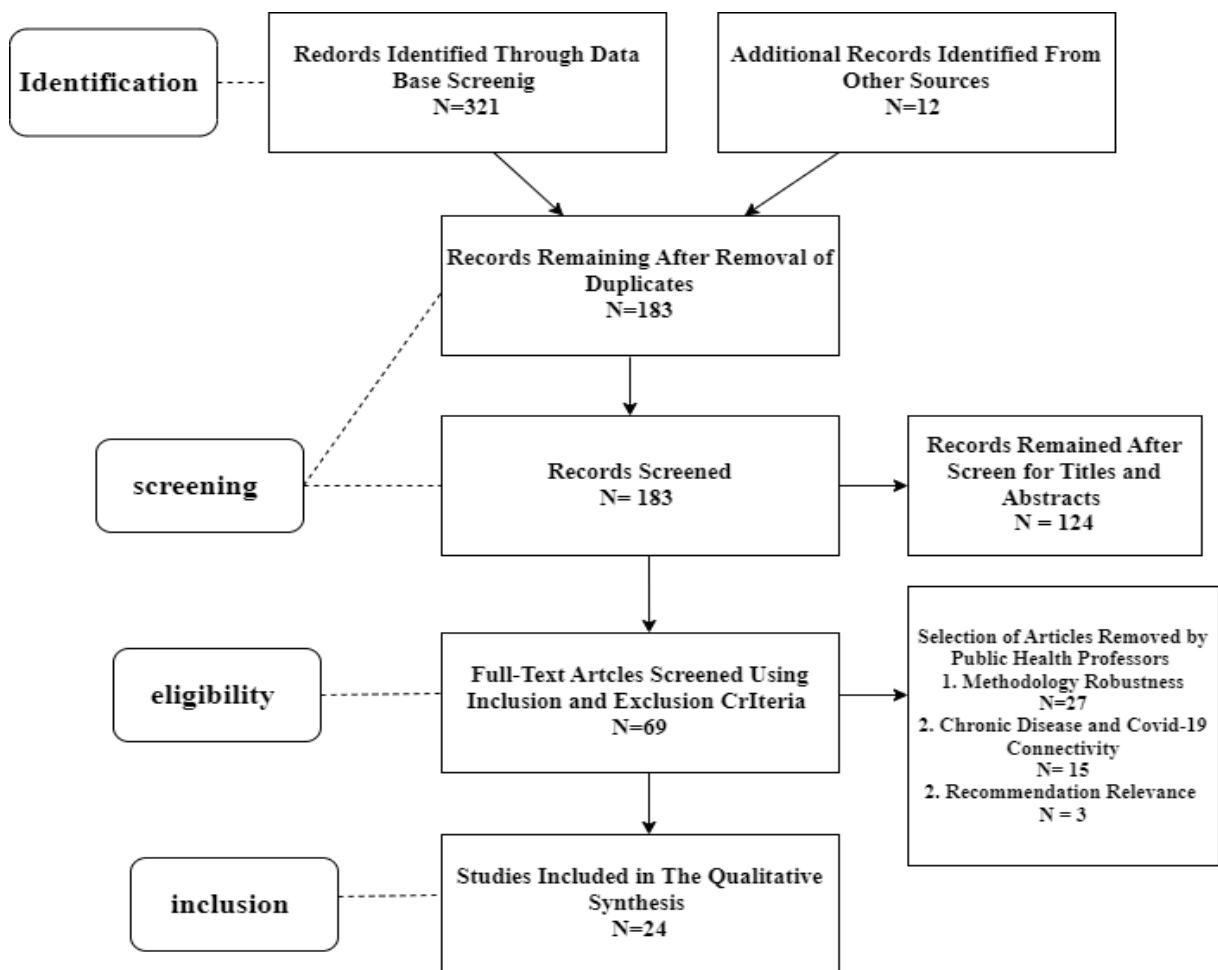


Figure 1: PRISMA flow chart Adopted From (Moher, Liberati, Tetzlaff, & Altman, 2009) [19]

Table: List of Articles Used and Their Characteristics

Authors (year)	Title	Design	Country	Sample size	Condition investigated	Journal
1 John M. Clements (2022)	Access to care by Medicare beneficiaries in the U.S. with diabetes and multiple chronic conditions during the COVID-19 pandemic	Quantitative study	United State of America	11,114 chronic patients	diabetes and multiple chronic conditions	Journal of Diabetes and Its Complications
2 Radhika et al (2022)	The effects of India's COVID-19 lockdown on critical non-COVID health care and outcomes: Evidence from dialysis patients	Quantitative study	India	2110 chronic patients	dialysis patients	Social Science & Medicine
3 Lilanthi Balasuriya et al (2022)	Impacts of the COVID-19 Pandemic on Nationwide Chronic Disease Prevention and Health Promotion Activities	Qualitative study	United State of America	Team leaders	Chronic patients	American journal of preventive medicine
4 Britta L. Jewell et al. (2020)	Potential effects of disruption to HIV programmes in sub-Saharan Africa caused by COVID-19: results from multiple mathematical models	Quantitative study	Sub-Sahara Africa	Cohort groups	HIV/AIDS	www.thelancet.com/hiv
5 Sungwon et al (2022)	Spillover Effects of COVID-19 on Essential Chronic Care and Ways Health System Resilience to Support Vulnerable Non-COVID Patients: A Multistakeholder Study	Qualitative study	Singapore	51 health experts	Chronic patients	JAMDA
6 Francisco et al.(2022)	Fraction of COVID-19 hospitalizations and deaths attributable to chronic diseases	Quantitative study	Mexico	1,121,541 chronic patients	Chronic diseases	Preventive Medicine
7 Leila et al (2022)	Cough in an adolescent with cystic fibrosis, from a nightmare to COVID-19 stigma: A qualitative thematic analysis	Qualitative study	Iran	21 adolescents	Cough in an adolescent with cystic fibrosis	Journal of Pediatric Nursing
8 Samantha et al, (2022)	Even if I'm undetectable, I just feel like I would die": a qualitative study to understand the psychological and socioeconomic impacts of the COVID-19 pandemic on women Living with HIV (WLWH) in Chicago, IL	Qualitative study	United States of America	19 women living with HIV (WLWH)	women living with HIV (WLWH)	BMC Women's Health
9 Amanda et al. (2021)	Experiences of cancer care during COVID-19: Phase 1 results of a longitudinal qualitative study	qualitative study	Ireland	16 participants	Cancer	International Journal of Nursing Studies Advances
10 Xiaoyu et al (2021)	Risk perception trajectory of elderly chronic disease patients in the community under COVID-19: A qualitative research	qualitative study	China	21 older adult patients with chronic disease	elderly chronic disease patients	Geriatric Nursing
11 David et al. (2021)	Findings from an online survey on the mental health effects of COVID-19 on Canadians with disabilities and chronic health conditions.	Quantitative study	Canada	1027 online respondents	Mental health	Disability and Health Journal
12 Gienus et al. (2021)	Impact of the COVID-19 pandemic on chronic diseases: care follow-up and current perspectives in low resource settings: a narrative review	narrative review	Lower-or middle-income countries.	Expert opinions	Chronic diseases	Int J Physiol Pathophysiol Pharmacol
13 Thomas et al (2021)	Navigating the COVID-19 infodemic in those living with kidney disease: access and trust in health information sources and the association with anxiety and depression	Quantitative	England, UK	236 participants	kidney disease	Current Medical Research and Opinion, Taylor & Francis
14 Xinyu et al (2022)	Management of COVID-19 patients with chronic liver diseases and liver transplants	Concise reviews	China		liver diseases and liver transplants	Annals of Hepatology
15 Bente et al (2021)	Post COVID-19 hospitalizations in patients with chronic inflammatory diseases – A nationwide cohort study	Population based cohort study	Danish	417 patients	chronic inflammatory diseases	Journal of Autoimmunity
16 Jienchi (2021)	The impact of the COVID-19 lockdown on HIV care in 65 South African primary care clinics: an interrupted time series analysis	interrupted time series analysis	South Africa	65 South African primary care clinics	HIV/AIDS	Lancet HIV
17 Josephine et al (2021)	I wouldn't survive it, as simple as that": Syndemic vulnerability among people living with the chronic non-communicable disease during the COVID-19 pandemic	Qualitative study	England	29 participants	chronic non-communicable disease	SSM - Qualitative Research in Health
18 Dejan et al (2022)	Impact of resilience, social support, and personality traits in patients with Neuron inflammatory diseases: during the COVID-19 pandemic	Quantitative study	United State of America	1079 chronic patients from cohorts	neuroinflammatory diseases	Multiple Sclerosis and Related Disorders
19 Finlay et al (2023)	Health Care Implications of the COVID-19 Pandemic for the Cardiovascular Practitioner	Review article	Canada		Cardiovascular diseases	Canadian Journal of Cardiology
20 Kavita et al (2022)	Impact of the COVID-19 Pandemic on Chronic Disease Care in India, China, Hong Kong, Korea, and Vietnam	Quantitative study	India, China, Hong Kong, Korea, and Vietnam	5672 participants with chronic conditions	Chronic Disease	Asia Pac J Public Health.
21 Ahotovi et al (2022)	Effects of COVID-19 Outbreak on Persons with Chronic Health Conditions in Anglophone West Africa: A Qualitative Study Involving Key Stakeholders	Qualitative study	West Africa	19 participants, including chronic patients, healthcare professionals and social workers	Chronic diseases	INQUIRY: The Journal of Health Care Organization, Provision, and Financing
22 Huda et al (2021)	The impact of the COVID-19 pandemic on medical conditions and medication adherence in people with chronic diseases	Brief Report	United States of America	1103 chronic patients	people with chronic diseases	Journal of the American Pharmacists Association
23 Yogini et al (2020)	Impact of COVID-19 on routine care for chronic diseases: A global survey of views from healthcare professionals	Quantitative study	UK	202 healthcare professionals from 47 countries	Chronic diseases	Diabetes & Metabolic Syndrome: Clinical Research & Reviews
24 Sisay (2020)	The Psychological impact of COVID-19 pandemic on chronic disease patients in Dessie town government and private hospitals, Northeast Ethiopia	Quantitative study	Ethiopia	413 chronic disease patients	Chronic diseases	Diabetes & Metabolic Syndrome: Clinical Research & Reviews

4.3. Table1. Observations Stemming from the Review and Development of Themes and Sub-Themes from the Articles.

Themes	Sub-Themes
Factors driving covid-19 mortality and morbidity among chronic patients.	<ul style="list-style-type: none"> Behavioral a driving factor of covid-19 morbidity and mortality among chronic health patients. Weak health system a driving factor of covid-19 morbidity and mortality among chronic health patients.
Pre- Hospital services and hospital services delivered to chronic patients	<ul style="list-style-type: none"> Difficulties in getting to hospitals and needing clarification-as to which hospitals to attend. Difficulties in getting access to a specialist on time and slow responses to chronic patients' need. Long booking before getting access to specialized diagnostics equipment. Fear of the wrong diagnostic due to less availability or overwhelmed laboratories. Decrease interest in attending hospitals due to fear of infections and changes in treatment schedules.

Increase in the prevalence of chronic diseases and worsening health outcomes.	•	<ul style="list-style-type: none"> • Limited public health services include health education, health promotion, and testing for chronic diseases. • Poor physical activities during the pandemic led to the sedentary life • Limited access to preventive medicine and other materials.
Economic and social effects	•	<ul style="list-style-type: none"> • Increase stigma • Increase burden on families • Reduction in social support
Recommendations	•	<ul style="list-style-type: none"> • Consideration of minority populations during pandemics • Increase community and social support to disadvantaged people before, during, and after outbreaks. • Strengthening primary healthcare systems to enable communities to care for chronic disease patients within their communities • Increase digitalization of health delivery. • Awareness about people’s chronic disease status should be enhanced through medical examinations since many people with chronic health conditions may not be aware of their status. • Increase in the provision of healthcare resources. • Empower chronic patients’ self-efficacy in chronic patients in routine care.

Key issues that appeared in the articles were structured into themes and sub-themes. Through rigorous processes, eight themes were formed and later consolidated into five themes.

Theme 2: Exploring Factors Driving Covid-19 Mortality and Morbidly Among Chronic Patients.

The severity of covid-19 on persons with chronic health conditions has been established in several studies, as morbidity of covid-19 pandemic was higher among persons with chronic health conditions [20]. Hypertension, diabetes, asthma, chronic obstructive pulmonary disease (COPD), cancer and are recognized as drivers of covid-19 mortality among the population[22],[23],[5]. At the beginning of the covid-19 pandemic, these and other chronic health conditions increased the individual's vulnerability to covid-19, nonetheless less is known about specialized policies that were not designed to ease the effects of the pandemic on these people [23],[5].

The important revelation from studies in North America shows that covid-19 mortality among chronic patients is highly influenced by individuals' lifestyles or behavior[22] [21]. Though fatality in covid-19 pandemic was attributed to multimorbidity, unhealthy behaviors such as being overweight and physical inactivity, smoking, and poor nutrition accounted for a high fraction of covid-19 morbidity and mortality among people in Mexico, the United States of America, and the United Kingdom [22],[23],[5].

In Latin America, most covid-19 mortality was attributed to chronic disease, with 50% of covid-19 fatality recorded among young adults with chronic health conditions compared to covid-19 fatality among adults over 60 years, which stands at 18.7% [25], [26]. A few African studies show that covid-19 death among youths with chronic health was higher than covid-19 death among adults with chronic health conditions [22].

The above disparities of covid-19 mortality among chronic patients of different ages provide insight that chronic disease alone was not enough driver of covid-19 death among the population [23]. Still, the lifestyle of chronic patients during the pandemic was a key determinant of their health and safety [24]. The probability of adults adhering to the World Health Organization’s covid-19 control measures was higher than youth and young adults with chronic health conditions [25].

Hence, though many studies perceived adults as more vulnerable to the covid-19 pandemic, the behavioral dynamics of youths and young adults with chronic health conditions made them more vulnerable to the pandemic [26]. Studies conducted in five Asian countries established increased intake of alcohol during the pandemic by chronic patients, which were established to have negatively affected patients with chronic liver problems [22],[44]. The impacts of covid-19 on chronic

patients were established, but the chronic patients' behavioral aspects that increased their vulnerability to the pandemic need to be given more attention [27].

Evaluation of the effects of access to healthcare on the well-being of chronic patients during covid-19 pandemic in developed countries seems to be difficult as most studies from developed countries gave less account of changes in their healthcare structures during the pandemic [31],[46]. However, studies conducted in Africa asserted that chronic patients' access to regular care and medications was hampered by rearrangements made in the health sectors to meet covid-19 pandemic issues [1]. In Africa, where face-to-face consultation was a major form of treatment, studies have shown that face-to-face consultation has ceased due to restrictions coupled with the less clear directive as to actions chronic patients need to take to seek health at the mist of the pandemic [32],[21]. Other studies articulated difficulties patients faced in the ICU of hospitals, which were not limited to chronic health patients [10],[33].

Theme 2; Pre-Hospital and Hospital Service Delivery to Chronic Patients.

Pre-hospital and hospital treatment delivered to chronic patients have been issues of research interest due to numerous changes brought to health systems that focused mostly on handling covid-19 pandemic issues as fewer rooms were created for existing health issues such as maternal health, mental health, and other chronic health issues [25]. Most studies in developing and developed countries estimated that outpatient and inpatient hospital attendance was reduced by half due to the covid-19 pandemic [8]. In most African countries, there has been a reduction utilization of medical services such as treatment of HIV cases and tuberculosis, case management of chronic diseases were either truncated or put on a hold [34],[21].

While in developed countries, the reduction in hospital attendance was traced to the increase in the utilization of telemedicine and other remote treatment systems, the same cannot be said about developing countries in Africa where telemedicine is underutilization [28],[35],[11].

There was fear of poor diagnosis in developing countries as studies have established that most medical laboratories were not functioning in several hospitals. In contrast, most technological laboratories were designated to test covid-19 cases [36],[41]. Besides these, most developing countries have few technological diagnostic equipment such as CT scans, which made patients book treatment with this equipment for months before having access [29]. As a result, most chronic patients needing this equipment for their treatment suffer from delayed treatment, leading to worsening health outcomes or death before the due treatment date [37],[30].

Some studies in developed countries also alluded to the worsening health conditions of chronic patients due to poor access to healthcare services during the pandemic[1],[31]. A study conducted in the North America established that over 51% of chronic patients reported a medicated related-health problem due to difficulties in adherence to scheduled medication procedures, and these were recorded among young women with a chronic health condition [22],[26]. Other Centers for Disease Control statistics revealed that 41% of adults avoid attending scheduled treatment for fear of the pandemic. In comparison, 31% of chronic patients avoided routine medical care, with 12% of emergency cases not handled on time [38],[32].

The difficulties in accessing hospitals and medical services were mostly documented in developing African countries. Less covid-19 cases were recorded with restrictions such as lockdowns hardly implemented or implemented for shorter periods [36],[33]. It is estimated that the weaker health system in these countries may have increased the predicament of chronic patients during the pandemic [34]. Evidence from studies conducted in most African countries show that most countries have limited ICU bed capacities, with available ICU equipment being inadequate and most of them malfunctioning. These challenges existed before the covid-19 outbreak but were further exposed during the outbreak [40], [10]. Though earlier studies in China, India, Japan, and Italy expressed similar difficulties in their healthcare systems due to an increase in inpatients cases, temporal healthcare facilities were erected to augment the existing facilities to ease the challenges [41],[35].

Theme 3; Increase in Prevalence in Chronic Diseases and Worsening Health Outcomes.

The year 2020 to 2022 have recorded a huge jump in the prevalence of HIV/AIDS, tuberculosis, and other chronic health conditions among global populations [8]. Though most studies provided empirical evidence on how covid-19 pandemic influenced the worsening health outcome of chronic patients, the astronomical increase in the prevalence of chronic disease infections and other behavioral-driven chronic diseases needs more studies to establish strong connectivity to the covid-19 pandemic [34],[43].

The worsening health outcome of chronic patients was driven by restrictions on movement which led to a reduction in flow to hospitals, over consideration of covid-19 issues and decrease in attentions on chronic health issues, and less availability of essential drugs in developing and testing kits in countries due to restriction on global logistic movements [36],[34]. In addition, though face-to-face consultation remains the main medium for treatment in developing countries, this was impeded by restrictions, and telemedicine, which could have been replaced. This was less operational in some cities in Africa as compared to developed countries [29].

In as the case increase in the prevalence of tuberculosis, evidence pointed to a reduction in attendance at TB clinics, poor presumptive TB identification services, and less attention paid to TB cases detection and treatment; all these affected early detection and prevention of the spread of TB among the population, in most developing countries as the services mentioned above were reduced by over 48% [42], [43].

The prevalence of HIV among the population has increased due to a lack of public health services, health education, and promotion were poorly funded in developing countries. At the same time, the social and traditional media communicate mostly on covid-19 pandemic [34],[43]. Scheduled antiretroviral treatments were poorly attended with testing and for HIV reduced, increased stigma reduced patients' zeal to seek treatment and attend peer counselling during the outbreak [36]. Studies are needed to investigate if unprotected sex, a major mode of HIV transmission, has increased during the pandemic. However, access to condoms and other HIV prevention materials may have been affected by the pandemic [37]. Apart from the increase in HIV and tuberculosis prevalence, an increase in a sedentary life also influences—the jump in hypertension, diabetes, obesity, and others in both developing and developed countries, with some studies predicting chronic health conditions as the next pandemic [45],[38],[36].

Theme 4; Economic and Social Effects of Covid-19 on Chronic Patients.

Studies that considered the effects of the covid-19 pandemic on chronic patients have pointed out that the covid-19 influenced economic impact on chronic patients were more severe than those without chronic health conditions [6],[5]. These studies established three main facts regarding how chronic patients were socially and economically deprived during the pandemic [29],[42]. First, socially, studies established increased stigmatizations, unethical information disseminations psychologically increased fear of death among chronic patients while social distancing, and restrictions made the chronic patients more isolated [31],[38].

In economic effects, withdrawal or reduction in support from governments, none government organization and relatives made it difficult for some chronic patients to feed themselves and purchase medications [46],[21]. In addition, some chronic patients have their employment contracts terminated or their salaries reduced [1]. In developing countries in Africa, increase inflation led to increased prices of drugs and shortages in medication influenced the cost of drugs upward. These were started as the economic effects of covid-19 on chronic patients [29].

Theme 5; Consolidation of Recommendations.

Consolidation of experts' recommendations on how to mitigate effects of pandemics on persons with chronic health conditions, the first is consideration of minority population when making emergency decisions. It was clear that most decisions made during the pandemic mostly focused on the entire global or national population while groups of people with specific characteristics or needs were not given the much-needed attention [25]. The general good was to control covid-19, but the health needs of chronic patients and other minorities were not handled effectively [6],[31].

Secondly, building the capacity of community healthcare to enable chronic patients to get the needed treatment within their community health system [23],[5]. This capacity could have mitigated the struggle of chronic patients in accessing healthcare since basic facilities could have provided them with the needed treatment [36]. It must be noted that the principle of the community healthcare system does not include specialized services, but this need to be re-examined [34].

Thirdly, implementing consistent community social support for chronic patients and disadvantaged people [39]. Studies have established that support from the government and none governmental organizations failed during the pandemic, and that was when chronic patients needed this support most [40]. The covid-19 pandemic has thrown light on the need to strengthen social support systems that cushion the vulnerable in society even at critical times [41].

Fourthly, digitalization in health delivery has been usual during the outbreak of covid-19 pandemic, and it mitigated the challenges chronic patients faced during the pandemic, especially in developing countries where they were used to telemedicine and other remote treatment models [45],[9]. Developing countries, especially in Africa, must implement

telemedicine and other technologies brought by the pandemic to the health system to improve health delivery even after the pandemic [42].

There is a need to increase awareness of chronic health conditions by testing and screening the population regularly for chronic diseases [42]. However, the large population in developing countries may not know their status in line with chronic diseases; hence they might not have taken the needed covid-19 preventive measures seriously, and these can account for higher mortality [43].

Again, health financing in developing countries should be critically examined. Studies have pointed that most hospitals in developing countries need ICU beds, while few pieces of equipment available were malfunctioning. Nonetheless, covid-19 led to increased hospitalizations, the weak healthcare systems of developing countries were already problematic before the outbreak [43]. There is a need for study in the areas of judicious use of health resources and reduction of corruption in the health systems of developing countries [46],[22].

5. STUDY LIMITATIONS

Nonetheless, the researchers went through rigorous processes to select the articles used for the study. The study result should not be overly generalized, as articles were not selected according to geographical zones, and most articles focused on developed countries compared to African countries. This problem is because few articles published African perspectives on the subject. Furthermore, the articles focused on chronic patients' predicaments at the mist of the pandemic; hence, other effects of covid-19 pandemic on the healthcare system may be overlooked. Users of the articles must remember that though important findings were provided, they were mostly limited to chronic disease experiences.

6. CONCLUSION

The covid-19 pandemic has influenced all aspects of health delivery, but chronic patients were more vulnerable to the pandemic than others were. There is much evidence that persons with chronic health conditions and other vulnerable populations were not given the needed attention during the outbreak, and the weakness in handling chronic health issues during outbreaks was exposed. The policy directives that aimed at controlling the pandemic and over-concentrating health resources during the pandemic have negative implications for chronic patients and others. Many recommendations have been made on how chronic patients should be treated during outbreaks. There is a need for studies to examine post-covid-19 health delivery patterns to chronic patients.

STATEMENT OF DECLARATIONS

Data Availability Statement

No supporting data to declare

Conflict of Interest

All authors have declared having no conflict of interests relevant to this manuscript's content.

Funding Information

The authors did not receive any funds, grants, or other forms of support from any organization for the work submitted.

Ethical Conduct

All authors read and agreed to the submitted paper and have all made significant contributions to the content of this paper.

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