



A Multidisciplinary Exploration of Diseases, Treatments, and Impact, From Cancer-Related Anemia to Pandemics and Therapeutics

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Abstract:

This paper presents multidisciplinary research on diseases, treatments, and social impacts ranging from the complex relationship between cancer and anemia to the effects of epidemiological change. Focusing on cancer-related anemia, prevalence rates, diagnostic methods, and treatment spectrum are reviewed. The historical context of the pandemic, including the recent COVID-19 outbreak has been explored, highlighting the societal vulnerabilities and positive changes. Furthermore, this paper addresses mental health challenges during the pandemic and provides insight into treatment interventions, emphasizing the critical scope of antibiotic therapy, especially for various infections. This multidisciplinary approach illustrates the need for collaboration in navigating the complex challenges of healthcare and their broader societal implications.

Keywords: Cancer-Related Anemia, Anemia, Diseases, Pandemics Therapeutics.

استكشاف متعدد التخصصات للأمراض والعلاجات والتأثيرات، من فقر الدم المرتبط بالسرطان إلى الأوبئة والعلاجات

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المخلص

تقدم هذه الورقة بحثاً متعدد التخصصات حول الأمراض والعلاجات والتأثيرات الاجتماعية التي تتراوح من العلاقة المعقدة بين السرطان وفقر الدم إلى تأثيرات التغيير الوبائي. يتم التركيز على فقر الدم المرتبط بالسرطان، ومعدلات الانتشار، وطرق التشخيص، وطيف العلاج. وقد تم استكشاف السياق التاريخي للوباء، بما في ذلك تفشي فيروس كورونا (COVID-19) مؤخرًا، مع تسليط الضوء على نقاط الضعف المجتمعية والتغيرات الإيجابية. علاوة على ذلك، تتناول هذه الورقة تحديات الصحة العقلية أثناء الوباء وتقدم نظرة ثاقبة للتدخلات العلاجية، مع التركيز على النطاق الحرج للعلاج بالمضادات الحيوية، خاصة بالنسبة للعدوى المختلفة. يوضح هذا النهج متعدد التخصصات الحاجة إلى التعاون في التغلب على التحديات المعقدة للرعاية الصحية وأثارها المجتمعية الأوسع.

الكلمات المفتاحية: فقر الدم المرتبط بالسرطان، فقر دم، الأمراض، الأوبئة، العلاجات

Introduction

Due to fast changing in healthcare environment on daily basis today we (Patients and Healthcare professionals) face a lot of challenges that are increasingly complex and interconnected. As disease become more intricate and diverse, we need to addressing them effectively which necessitates a multidisciplinary approach that integrates knowledge and also expertise from various fields. Integrated approach acknowledges the no any single discipline holds the key to solve the intricate problems in modern healthcare. Instead, it's promoting the teamwork and collaborate with professional doctors, researchers, and scientists from diverse fields come together to approach health issues from different angles and point of views.

We can see the importance of multidisciplinary healthcare research when we consider the intricate web of factors affecting health outcomes. Some conditions like as cancer-related anemia and the impact of pandemics (like covid) on mental health and the development of innovative therapeutic are more multifaceted problems. It's essential to include knowledge from oncology, psychology, pharmacology, public health and several other disciplines for properly understand these problems and provide appropriate solutions of these problems.

The purpose of this research is to explore the diverse nature of healthcare difficulties and the corresponding multidisciplinary solutions that have been developed. The aim of this investigation is to highlight the synergistic power of multidisciplinary research by digging into the interconnected realms of cancer-related anemia, pandemics, therapeutic interventions, health policies, patient-centered approaches and future healthcare trends. Through this comprehensive analysis, we aim to uncover innovative strategies, improve patient outcomes, and enhance the overall efficiency of healthcare systems.

This report essentially emphasizes the fundamental relevance of collaboration and multidisciplinary research in determining the future of healthcare. We may provide the groundwork for a more comprehensive, effective, and patient-centered healthcare strategy by comprehending the intricacies of diseases, the socio-economic issues influencing healthcare legislation, and the variety of therapeutic approaches accessible. Through this multidisciplinary investigation, we hope to add to the ongoing conversation in healthcare by fostering a holistic knowledge that cuts across disciplinary barriers and encourages cooperation between researchers and healthcare providers.

Now, in this paper we explore multidisciplinary diseases such as Cancer-Related Anemia, Pandemics like Covid and Therapeutics are following:

1. Cancer-related anemia

Cancer and Anemia have multifaceted and complex relationship which both are leading to serious health challenges for people. Anemia is a medical condition that causes when the body's production of red blood cells (RBCs) is insufficient, as evidenced by a reduction of hemoglobin (Hb) or a decline in the packed cell volume (PCV) of RBCs when measured within specified range [1,2]. Anemia also is defined as Hb 11 g/dl or less than 2 g/below normal, according to the National Comprehensive Cancer Network (NCCN) guidelines. Furthermore, the World Health Organization describes anemia as a situation related to low level of hemoglobin (Hb) of 12 g per dL in females and 13 g per dL in male population. [3] Cancer also describes the uncontrolled growth and spread of abnormal cell in the body. Anemia is cancer is characterized as a mild, hypochromic normocytic anemia with hemoglobin concentration range of 0 to 10 g/dL and significantly reduced circulatory serum ferritin accumulation and transferrin saturation (e.g., serum ferritin >100 ng/mL) despite normal iron stores. [1].

What is the Prevalence of Anemia in cancer?

The severity of the risk of prevalence of anemia varies depending on the type of cancer [32]. Barrett-Lee P et al, (2005) conducted prior research in the European Union and found that 30.4 % and 49.1 % of participants admitted to hospital with breast and gynecological tumor were anemic at the time of admission, respectively [33]. A number of factors, including the sort of management, the sort of malignancy, and the tumor stage, influence the presence and incidence of anemia in cancer patients. Melanoma type, anemia concept (9 g/dL vs. 11 g/dL), and chemotherapy medication are all variables that impact epidemiology of anemia. As shown in an analysis of relevant literature published in 2004, the overall prevalence of CRA tend to range from 30 to 90%. [32]. Furthermore, as shown in a new

analysis, 41% of women with breast cancer in Malaysia have been anemic after undergoing neoadjuvant chemotherapy [33,1].

There are some several factors which contribute the relationship between cancer and anemia:

- **Bone Marrow Suppression:** The certain type of cancer like leukemia and lymphoma can infiltrate the bone marrow, where blood cells are produced. This infiltration disrupts the normal production of blood cells especially red blood cells are leading to anemia.
- **Chronic Inflammation:** Cancer are the cause of chronic inflammation in body which can interfere with the body ability to utilize the iron and any other nutrition necessary for the production of red blood cells in body. Inflammatory proteins can hinder the production of erythropoietin hormone which stimulates the bone marrow to produce red blood cells in body.
- **Cancer Treatment:** Some treatments for cancer like chemotherapy and radiation therapy can damage the bone marrow and reduce the production of red blood cells. The both treatments may cause gastrointestinal bleeding or affect the nutrients, which are leading to anemia.
- **Blood loss:** Certain cancers can cause internal bleeding such as Gastrointestinal tumor. Chronic blood loss can deplete the body iron stores which are leading to iron-deficiency anemia.
- **Underlying Health conditions:** Cancer often occurs in peoples who are already dealing with other chronic health issues like kidney disease, which are common among cancer patients. This can affect the generation of erythropoietin which lead to anemia.

Anemia in cancer patients must need to manage carefully since it can have negative impact on their quality of life and their ability to tolerate cancer treatments. In treatment some strategies are follow which may include blood transfusions, erythropoiesis-stimulating agents to increase red blood cell production, iron supplementation and addressing the underlying cause of anemia such as treat with bleeding tumors or managing chronic inflammation. Cancer and anemia relationship underscores the importance of comprehensive care for addressing both diseases cancer itself and the complications associated with cancer to improve patient outcomes and their general wellbeing.

1.1. Diagnostic Methods:

- **Blood Test:** CBC (Complete Blood Count) is a standard blood test that measures various components of the blood including red blood cells count, hemoglobin levels, hematocrit and MCV (Mean Corpuscular Volume). An abnormal CBC can indicate the presence of anemia.
- **Peripheral Blood Smear:** A blood smear allows to get a detailed examination of the shape and characteristics of red blood cells under a microscope, providing valuable information about the type of anemia.
- **Iron Studies:** Blood tests measure the irons in serum, TIBC (Total Iron Binding Capacity) and ferritin levels help assess iron-deficiency anemia which were the common type of anemia in cancer patients.
- **Bone Marrow Aspiration and Biopsy:** These procedures involve extracting a sample of bone marrow to examine the production and characteristics of blood cells. They can reveal abnormalities in the bone marrow and help to diagnose various underlying conditions which cause anemia and including cancers like leukemia or myeloma.
- **Endoscopy and Imaging:** Endoscopy and imaging procedures such as colonoscopy or esophagogastroduodenoscopy are employed to identify sources of bleeding in the gastrointestinal tumors which is a common cause of anemia in cancer patients. Imaging techniques like CT scans can help locate tumors or bleeding sites.

1.2. Treatments and therapeutic advancements:

- **Blood Transfusions:** In cases of severe anemia blood transfusions are used to boost the number of red blood cells quickly and also improve the capacity of carrying oxygen in the body.
- **Erythropoiesis-Stimulating Agents (ESAs):** ESAs like erythropoietin stimulate the bone marrow to produce more red blood cells. They are basically used to reduce the need for blood transfusions especially in cancer patients undergoing chemotherapy.

- **Iron Supplementation:** To restore the iron levels in body doctors are recommended to take oral iron supplements or intravenous iron infusions, especially in cases of iron-deficit anemia caused by cancer or cancer therapy.
- **Targeted Cancer Therapies:** Advancements in cancer treatment such as targeted therapies and immunotherapy can directly effect on cancer cells and help to shrink tumor and reduced blood loss which may improve anemia.
- **Nutritional Support:** Proper nutrition including supplements like vitamin B12 and folic acid is crucial for managing anemia. Nutritional counseling such as supplements and proper diets may help to maintain nutrition levels in cancer patients.
- **Clinical Trials:** Enrolling in clinical trials gives patients access to cutting-edge medications and treatments that could particularly target the root causes of cancer-related anemia and providing the innovative alternatives beyond conventional therapies to patients.
- **Supportive Care:** Palliative care services focus on improving the quality of life for cancer patients which include managing anemia symptoms and providing emotional and psychological support to patients.

2. History of Pandemics and their impacts on society

Throughout human history pandemics have been significant events that have shaped society and leaving profound impacts on many different aspects of life. These global infectious disease outbreaks have led to widespread illness, death, and social disturbance. One of the most devastating pandemics in history was the 14th-century Black Death, caused by the bubonic plague which wiped out millions of people in Europe, Asia and Africa. The 1918 Spanish flu, caused by the H1N1 influenza virus infected about a third of the world's population and make reason to the deaths of 10 million peoples. Another pandemic Corona was firstly diagnosed in Wuhan China [25]. Multiple respiratory tract infection incidents with unknown causes were confirmed in Wuhan, China at the end of 2019. The virus in question is now known as a new coronavirus (nCoV), also known as severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) [10]. The virus quickly spread globally leading to an unprotected global health crisis. The impact of COVID-19 on healthcare systems, economies, and societies has been profound and reshaping the way the world approaches public health and crisis management. Pandemics have historically exposed the weaknesses of society and revealing weaknesses in the health system, social structure and economic stability. Before the pandemic, fear and panic often gripped communities, leading to social unrest and sometimes violence. Additionally, the pandemic has exposed social disparities, disproportionately affecting marginalized communities with limited access to health care and resources.

Economically, the pandemic has caused significant disruption. Businesses closed, trade declined and the economy contracted due to falling productivity and rising health care costs. The loss of the workforce and skilled professionals has further reduced economic growth and leading to long-term consequences. Due to coronavirus many industries disrupt and face economic issues Such as the Poultry Industry. One country's advantage and output satisfaction level have been found to have a significant impact on reports of COVID-19 pandemic consequences on global poultry production. Worker's shortages, rising medical insurance premiums, and lockdown periods disrupted the supply chain of raw materials, feed additives, and veterinary supplies in the supplying countries. Due to shifts in market supply and demand, these countries were able to provide adequate food security for humans during the pandemic period. As a result of these and other problems caused by a broken supply chain, impoverished and third-world countries in demand faced even more severe manufacturing input limits [25, 26]. Infectious Bronchitis is a major disease in poultry It is a viral disease it spreads from bird to bird and it is a disease of the upper respiratory tract [29]. It is like the Human Coronavirus but Human Corona Virus was observed later in 2019 China while avian coronavirus was observed many years ago. Infectious bronchitis is caused by Corona Virus which belongs to Corona Viridinae. Corona viridinae is very large group of viruses causing disease in human [28] as well as in birds [27].

On the positive side, the pandemic also spurred scientific advances and medical innovation. The search for treatments and vaccines during the pandemic has spurred medical research and lead to advances that have not only alleviated the immediate crisis but also improved health care practices. Castle. Societies have adapted and evolved in response to the pandemic. Public health measures such as quarantine,

social distancing and vaccination, have been developed over centuries to minimize the spread of infectious diseases. These measures, combined with advances in medical science and improved medical infrastructure, have played a key role in reducing the impact of the pandemic on society.

2.1. Analyze the effects of COVID-19 on healthcare systems

Case Study I Italy:

Italy faced one of the earliest and most severe outbreaks of COVID-19 in Europe. The healthcare system, particularly in regions like Lombardy, experienced tremendous strain due to the high influx of patients. Hospitals struggled with shortages of intensive care unit (ICU) beds, ventilators, and personal protective equipment (PPE). The rapid surge in cases forced healthcare professionals to make difficult decisions regarding patient prioritization and resource allocation. Lessons learned from Italy emphasized the critical need for sufficient ICU capacity, robust supply chains for medical equipment, and clear protocols for managing patient surges.

Case Study II United States:

The United States had a varied experience with COVID-19 due to its decentralized healthcare system. Certain states faced overwhelming surges in cases and struggled with shortages of medical supplies, ICU beds, and healthcare personnel. Disparities in access to healthcare services were amplified, impacting vulnerable communities disproportionately. The experience in the U.S. emphasized the importance of a coordinated national response, equitable distribution of resources, and addressing systemic healthcare disparities to effectively manage a pandemic.

Case Study III India:

Due to large population of India and diverse healthcare landscape, Indian peoples faced some unique challenges. The country implemented various measures including nationwide lockdowns and increasing healthcare infrastructure capacity. However, there were significant challenges in managing densely populated urban areas and providing suitable healthcare in remote rural regions. India's response highlighted the need for flexible and adaptive strategies, focusing on both urban and rural healthcare needs, and strengthening healthcare infrastructure in underserved areas.

Case Study IV Libya:

In Libya the impact of the COVID-19 pandemic exposed the vulnerabilities of an already fragile healthcare system, intensifying existing challenges and adding new layers of complexity. The nation's healthcare infrastructure strained by years of political instability and conflict; peoples faced immense pressure as COVID-19 cases surged. Hospitals faced with shortages of critical medical supplies, ICU bed including ventilators and personal protective equipment, hindering the ability to provide adequate care. The limited healthcare workforce, already stretched thin, struggled to cope with the increased demand, impacting the quality of care for COVID-19 patients. In lockdown due to travel restrictions access to hospitals or healthcare services became a concern and cause the delayed from seeking essential medical care and treatments. The economical strain makes worse by the pandemic further hampered the government's ability to invest in healthcare infrastructure and provide necessary support. However, The Libyan health authority should improve the public health capacities and conduct strict hygienic measures in the society and vaccinate as many people against Covid-19 to minimize both the case fatality ratio and socio-economic impacts of the pandemic in Libya [12].

2.2. Mental health challenges during pandemic

The mental health challenges arising during pandemic require a multi-disciplinary and interdependent approach. Just like Psychology provides insight into the psychological impact and addressing issues such as anxiety, depression and post-traumatic stress disorder which offering therapeutic interventions and coping strategies. According to study results, cancer patients have elevated incidence of anxiety, nervousness, and distress than the general public, and the longer the treatment plan, the greater the depression [4]. Social work plays a central role in connecting affected individuals to vital community resources and support systems. Sociology looks at social aspects, examining disparities in access to mental health services and the social stigma attached to mental health problems. Public health focuses on mental health at the population level, focusing on prevention strategies, mental health promotion,

and integration of mental health services into the primary health care system. Antipsychotic medications are widely used in the treatment of mental disorders, mainly for the treatment of schizophrenia patients. Some antipsychotics' anti-inflammatory characteristics may defend against extreme COVID-19 by inhibiting the cytokine waves involved in its disease development, according to growing evidence [4]. Antipsychotic combinations can serve to minimize and regulate many psychotic symptoms, such as false beliefs, mental confusion, fear, and extreme irritability. Furthermore, it can help to keep such signs from recurring. [9] Economics analyze the economic burden of mental health problems, advocating increased funding and resource allocation for mental health services. Telemedicine and digital health technology provides mental health services remotely, ensuring continuity of care and reaching people in quarantined or remote areas. Together, this multidisciplinary approach facilitates a comprehensive understanding of mental health challenges during the pandemic and guiding the development of appropriate interventions, support systems and policies to protect the mental health of individuals and communities.

The good mental health for people is not only a vital outcome in itself, it is also a means to other important outcome such as learning. If mental health suffers, that means the learning usually suffers. When students attend schools in person, teachers and other education staff can observe students who may be struggling, provide real time assistance, and guide the students to appropriate professional learn and support. This is more difficult to do in an e-learning environment. During times of online learning, school will be aware of some students with whom they should maintain closer contact, including students with additional educational needs, such as those with dyslexia, and attention-deficit/hyperactivity disorder, etc. But it is very important that all students are informed clearly of who to contact outside or inside schools if they are struggling [13].

In the age of COVID-19 it is likely students will be anxious and some may also lose loved ones or have family and friends who are seriously sick. As soon as a school is aware of this, it is important they immediately reach out to the student, probably via the school's counselling support unit, or other approach and provide an appropriate support and professional referrals needed [13].

3. Therapeutic Interventions

3.1. Antibiotic therapy for various infections

Choosing antibiotic therapy is a crucial decision that will impact the direction of medical treatments in the complex field of infection control. Our attention focuses on these decisions by conducting a thorough comparison study to understand the subtleties and intricacies of various antibiotic treatments used for various diseases.

Imagine being at the intersection of many antibiotic alternatives, each intended to treat a different type of infection. In order to determine the best course of action for various illnesses, this comparative study explores the efficacy, side effects, and overall impact of these medications. It is similar to looking through a large list of medications and carefully weighing their benefits to determine which one provides the best mix of effectiveness and safety. Every antibiotic interacts with infections differently due to its own structure and mechanism of action. Knowing how these drugs specifically target germs and inhibit their development is like solving a complicated jigsaw. By studying these pathways in detail, we may better understand the complex warfare that takes place inside the human body, in which antibiotics serve as the front-line combatants.

Side effects and patient tolerance are crucial dimensions of our analysis. Antibiotics, while powerful in their ability to combat infections, can also trigger adverse reactions in some individuals. We meticulously examine these side effects and focus on understanding how they impact the overall well-being of patients. By considering these factors we aim to guide healthcare practitioners toward antibiotic therapies that not only eradicate infections but also promote patient safety and comfort.

Initial Therapy

“As in the case of any viral pneumonia, antibiotics are not benefit to treatment Coronavirus Disease 2019. However, patients showing respiratory symptoms and pulmonary infiltrates on imaging may match the diagnostic criteria for pneumonia. Super infection with pathogenic bacteria is expected, in accordance with the standard therapy of Community-acquired pneumonia (CAP), antibiotics are suggested. An example of a standard treatment of hospitalized patients with CAP is ceftriaxone 1-2g IV per day with intravenous azithromycin 500mg for three days or oral azithromycin 500mg for a single

day followed by 250mg for four days. While cases of COVID-19 who may have contact with travelers or may have a history of travel, rising the spectrum of antibacterial is not necessary unless the patients have significant risk factors for antibiotic-resistant bacteria” [34].

Immunotherapy is a major trigger for COVID-19 infection. Previous research suggests that 2 percent of COVID-19 patients have malignancy [5], and 3.7 percent of COVID-19 patients have weakened immune systems [6]. Clinical observations indicated that cancer related anemia, and cancer related fatigue is initial predictive factors of COVID-19 patients. Hematological and pathological assessments, as well as bone marrow evaluations, may be valuable screening instruments for people with cancer suffering from anemia and fatigue [1]. People with acute illness had considerably higher white blood cell (WBC) numbers and lower lymphoid cells and hematocrit levels. These people also had increased levels of stress hormones, cardiovascular, hepatic, renal function, and clotting indicators [7]. In COVID-19 patients, infections can cause an alteration in metal hematopoiesis and decreased digestive intake, leading in less iron available for hematopoiesis and red blood cells creation (Bellmann-Weiler et al., 2020). Further, anemia in patients with chronic kidney disease (CKD) is frequently caused by a reduction in erythropoietin supply by [8] and makes CKD patients more susceptible to COVID-19 illness. [4] Think about the wide range of illnesses, which include urinary tract infections and respiratory tract infections each with their own special difficulties. Antibiotics are chemical substances that are biologically produced and have the ability to limit the spread of infectious diseases which caused by the pathogenic bacteria of the host[11]. We acknowledge the significance of customizing antibiotic treatments to individual illnesses by taking into account these diverse situations in our research. This customized strategy guarantees that the selected antibiotic not only successfully eliminates the illness but also reduces the risk of resistance and adverse reactions.

3.2. Innovative Drug Delivery Methods for Improved Patient Outcomes

In the ever-evolving system of healthcare innovative drug delivery methods have emerged as the cornerstone of transformative patient care. In this exploration we investigate the realm of pioneering techniques and also aiming to revolutionize how medications are administered and consequently also enhance patient outcomes and quality of life. Imagine a future where medications are delivered with unprecedented precision ensuring optimal therapeutic effects while reducing side effects. This vision pushes us and necessitate us for inquiry of innovative drug delivery methods. These methods transcend traditional boundaries and harnessing cutting-edge technologies to improve the efficacy, safety, and convenience of drug administration.

One side of this exploration involves nanotechnology where minuscule particles enable targeted drug delivery to specific cells or organs. Nanoparticles designed with meticulous precision to navigate the intricate pathways of the human body and delivering medications directly to the site of action. It's akin to a personalized courier service ensuring that medications reach their intended destinations with unparalleled accuracy.

Let, consider a small implant that is meticulously constructed to deliver medication gradually over time maintaining a continuous therapeutic impact. These implants provide patients with a convenient substitute for often taking medications, revolutionizing the management of chronic diseases. It allows patients to concentrate on their lives instead of the complexities of prescription regimens; it's similar to a dependable, round-the-clock support system. Furthermore, the use of smart technology into medication delivery strategies represents a paradigm change. Real-time data on medication adherence and physiological reactions may be obtained through smart tablets that are fitted with sensors and transmitters. The ability to adjust therapies dynamically in response to patients' changing demands is made possible by this priceless feedback loop. It promotes a mutually beneficial interaction between patients and their treatment regimens, much like a customized healthcare companion. Consider the possibilities of 3D printing in the pharmaceutical industry. This cutting-edge technology makes it possible to precisely manufacture pharmaceuticals, customizing their shapes and compositions to meet the needs of each patient. Patients are guaranteed to receive drugs that are tailored to their specific physiological features thanks to customized doses and formulations. In the realm of medicines, it's comparable to custom tailoring and guaranteeing a precise fit for each patient.

Effects in treating the emerging coronavirus

Coronavirus is brought about by (SARS-Cov-2) " serious intense respiratory disorder related COVID species 2." it's an "encompassed positive-sense", "single abandoned RNA infection" lead to mellow respiratory illness in human [14]. In beginning stage, patients show introductory viral reaction with mellow manifestations, at that point they may create pneumonic and hyper provocative stage (cytokine storm) having raised incendiary markers, windedness and hypoxia [15]. This is might be because of enormous arrival of fiery arbiters, including interleukin-1B, interleukin-2, interleukin-8, Tumor defilement factor-alpha (TNF-alpha), ligand 10 subject C-X-C (CXCL10), and ligand 2 topic CC (CCL2) [16]. "Pathophysiology of lung during COVID-19 is of two stages, mellow stage described by an irritation, epithelial harm, and safe reaction that are created by cytokine and chemokine discharge, Extreme cycle, generally because of delayed arrival of cytokine inclining to ARDS, kidney harm, other organ disappointment and optional contamination." [17].

4. Health Policies and Strategies

4.1 Government Responses During Pandemics: Successes and Challenges

In the face of unprecedented global health crises, the role of governments becomes paramount, shaping the course of public health, societal stability, and individual well-being. This exploration delves into the intricate tapestry of government responses during pandemics, examining both their successes and the challenges they encounter, painting a comprehensive picture of crisis management in the modern age.

Successes:

Governments, at their best, exhibit remarkable resilience and adaptability in the face of pandemics. Successful responses often involve swift and decisive actions, such as implementing widespread testing and contact tracing initiatives. Imagine a coordinated effort, where testing centers emerge like sentinels, rapidly identifying and isolating cases, thus curbing the virus's spread.

Additionally, successful governments engage in transparent and consistent communication. Picture leaders standing before their nations, providing clear, evidence-based information, and instilling a sense of unity and purpose. This communication not only educates the public but also fosters a collective resolve, guiding citizens through the storm with a shared sense of purpose.

Furthermore, effective resource allocation stands as a hallmark of success. Governments channel resources to bolster healthcare infrastructures, ensuring hospitals are well-equipped, healthcare workers are supported, and essential supplies are readily available. Picture a well-coordinated supply chain, where masks, ventilators, and medications reach the frontlines, fortifying the healthcare system against the onslaught of the pandemic.

Challenges:

Yet, the path to success is riddled with challenges. One of the primary hurdles lies in balancing public health measures with economic stability. Governments face the daunting task of imposing restrictions to curb the virus while mitigating the economic fallout. It's akin to walking a tightrope, where every decision impacts both lives and livelihoods, necessitating a delicate equilibrium.

Another challenge emerges in ensuring compliance and combating misinformation. Picture a labyrinth of information, where accurate guidance is essential to navigate the complexities of the pandemic. Governments grapple with disseminating correct information, countering misinformation, and encouraging adherence to safety protocols. This challenge underscores the importance of robust public education campaigns and community engagement.

Moreover, global coordination presents a formidable obstacle. Imagine a world where nations, diverse in policies and resources, must align their efforts to combat a common enemy. Collaborative initiatives, information sharing, and resource pooling become imperative, demanding diplomacy, negotiation, and a shared commitment to global well-being.

4.2 Healthcare Policy Implications: Lessons Learned from Pandemics

Pandemics serve as poignant teachers, imparting invaluable lessons that reverberate throughout healthcare policies. As we dissect the aftermath of global health crises, the significance of robust, adaptive healthcare policies becomes evident. Lessons learned from pandemics underscore the critical need for flexible policies that can swiftly respond to evolving challenges. Prioritizing investments in healthcare infrastructure, bolstering disease surveillance systems, and ensuring equitable access to

medical resources are paramount. Furthermore, these lessons emphasize the importance of international collaboration, urging nations to foster partnerships, share knowledge, and collectively strengthen global healthcare policies. A resilient healthcare policy framework, fortified by the wisdom gained from pandemics, stands as our shield against future uncertainties, guiding nations toward proactive preparedness and ensuring the well-being of their citizens.

4.3 Importance of Interdisciplinary Collaboration in Public Health Initiatives

In the intricate tapestry of public health, interdisciplinary collaboration emerges as the linchpin, weaving together diverse expertise to address complex challenges. The importance of this collaboration manifests profoundly in public health initiatives. Picture epidemiologists working hand-in-hand with social scientists, healthcare professionals collaborating with data analysts, and policymakers consulting with environmental experts. This multidisciplinary synergy breathes life into comprehensive public health strategies. Through interdisciplinary collaboration, nuanced solutions are crafted, accounting for social, economic, psychological, and environmental factors. It's akin to assembling a mosaic, where each piece contributes to the holistic picture of public health. This collaborative spirit not only enhances the effectiveness of interventions but also fosters innovation, ensuring that public health initiatives resonate with the intricacies of human societies and the environments they inhabit. As we navigate the challenges of the modern world, interdisciplinary collaboration stands as our guiding principle, illuminating the path toward healthier, more resilient communities.

5. Patient approaches and Quality of life

Enhancing Patient Experience in Cancer-Related Anemia Treatments

In the realm of cancer-related anemia treatments our focus is not solely on medical efficacy but also on the holistic well-being of the patient. Enhancing the patient experience becomes a cornerstone, recognizing the profound impact of emotional and psychological support during the challenging journey of battling cancer-related anemia.

Imagine a healthcare environment where empathy and understanding are woven into the fabric of care. Patient-centered approaches are paramount, acknowledging the fears, uncertainties, and physical discomfort experienced by individuals undergoing anemia treatments. Healthcare providers, equipped with compassion, take the time to listen, educate, and involve patients in their treatment decisions. This open dialogue fosters a sense of empowerment, transforming the treatment journey into a collaborative effort between healthcare professionals and patients. Additionally, patient education emerges as a powerful tool. Picture informative sessions where patients and their families are equipped with knowledge about anemia, its treatments, and potential side effects. Informed patients are empowered patients, able to actively participate in their care, make informed decisions, and effectively communicate their concerns and preferences. This knowledge not only demystifies the treatment process but also cultivates a sense of control, diminishing anxiety and building confidence in the chosen treatments.

Moreover, supportive care services stand as pillars of the patient experience. Envision a comprehensive support network, offering services such as counseling, nutritional guidance, and pain management. These services cater not only to the physical aspects of anemia but also to the emotional and social dimensions, addressing the multifaceted needs of patients. Support groups, where individuals share their experiences and offer mutual encouragement, create a sense of community, diminishing the sense of isolation that can often accompany chronic illnesses.

Cancer-related fatigue (CRF) is a medical issue that influences cancer patients before and after treatment [18]. It differs from normal fatigue in that cancer patients rarely get relief from their fatigue by resting and/or sleeping [19]. The underlying cause of increased fatigue in cancer may be related to tumor type, location, stage of treatment, and various types of anti-neoplastic therapies. For instance, lung cancer patients who received radiotherapy experienced more fatigue compared to individuals suffering from other cancer types and gynecologic patients who prescribed with chemotherapy experienced side effects e.g. nausea vomiting and fatigue which affect their QOL [21]. Studies found that CRF could be due to tumor-related cytokine production, factors related to neuroendocrine, pain and management [20]. Moreover, fatigue is also one of the well-known symptoms of radiotherapy or antineoplastic in cancer patients as about 65% to 100% and 82% to 96% of patients receiving radiotherapy and chemotherapy, respectively developed severe fatigue [20]. Cancer patients undergoing

chemotherapy experienced a significantly high level of severe fatigue which may last several months and even years. Until recently, CRF has gained the attention of both patients and healthcare providers with more focus on how it affects patients' quality of life (QOL). In medical field, quality of life is described as an evaluation of how a disease can affect various parts of a life of the individual. Regular assessment of QOL may lead to the maintenance of appropriate drugs selections, minimize side effects and delay or prevent diseases progression [21] [22].

Several tools are available for the evaluation of quality of life among individuals diagnosed with cancer, such as EORTC- QOL, functional assessment of cancer therapy–general (FACT-G) and 36-Item Short-Form Survey (SF-36). Some of these tools, such as the SF-36 and FACT-G, are used to measure QOL in general, whereas others, such as the EORTC QLQ-BR23 (for breast cancer patients), the Functional Assessment of Cancer Therapy of Anemia (FACT-An) (used to assess QOL among anemic cancer patients), and the Functional Assessment of Chronic Illness of Fatigue (FACIT-F) (used to assess QOL in fatigue cancer patients), are used for specific condition or disease. Similarly, numerous tools are also available to assess severity of fatigue among patients with cancer, which includes the Cancer fatigue scale (CFS), Functional Assessment of Chronic Illness Therapy-Fatigue (FACIT-F), Fatigue Assessment Questionnaire (FAQ), Multifunctional Fatigue Scale (MFS), Piper Fatigue Scale-Revised (PFS-R) and Brief Fatigue Inventory (BFI) [21].

CRF has an immense negative effect on QOL of cancer patients and daily life activities. Aside from causing physical problems, severe and intense fatigue has a negative effect on QOL, social status, ability to work, and, may consequently affect mental health. The main goal of this comprehensive analysis is to ascertain the prevalence of CRF and its effect on QOL in cancer patients undergoing chemotherapy [21].

Table 1A Detail Description of Selected Studies in the Systematic Review [21].

Number of patients/study design /Setting /Age mean	Cancer type	Trial length and data collection method	Quality of life variable	Tools to measure fatigue	Tools to measure QOL	Prevalence of fatigue % (n)	Outcomes	References/ country
N =172 Observational prospective Setting = Malaysia Age mean = 52.6	Breast cancer	8 months /self-administered	PWB,SWB,EWB,FWB	BFI	FACIT-F	100% (172/172)	Fatigue strongly decrease QOL	Muthanna et al., 2021
N = 180 RCTs Age mean = 53.31	Cancer	Written	PWB,SWB,EWB,FWB	BFI	FACIT-G	67.07% (121/180)	Fatigue affected QOL negatively	Poort et al., 2020
N = 318 Cross-sectional Setting = France Age mean = 53.6	Epithelial & ovarian cancer	1.5 years/self-administered	Physical, Social, Emotional, Functional domains	FACIT-F	FACIT-G	26% (82/318)	Prevalence of fatigue was double in cancer survivor's compar	Joly et al., 2019

							ison to control . Also, fatigue disturbed the QOL	
N = 235	Prostate cancer	self-administered	PWB, EWB,SWB,FWB	BFI	FACT-G/FACT-P	74% (174/235)	Fatigue reduced QOL negatively	Rodríguez Antolín et al.,2019
Cross-sectional/multicenter								
Setting = Spain								
Age mean = 77.3								
N = 440	Breast cancer	3 years/self-administered	Physical, cognitive, social function	BSI	EORTC QLQ-C 30	4.20% (19/440)	Fatigue had an adverse effect on QOL and functionality	Calderon et al., 2019
Prospective/multicenter/								
cross-sectional								
Setting = Spain								
Age mean = 53.2								
N = 236	Breast, lung, & gastrointestinal	14 months /self-administered	PWB, EWB,SWB,FWB	FACT-F	FACT-G	23.25% (55/236)	Self-care and self-efficacy improved the QOL and lowered fatigue in cancer patients	Akin & Kas Guner, 2019
Descriptive cross-sectional								
Setting = Turkey								
Age mean = 57.37								
N = 148	Prostate cancer	3.5 years/self-administered, face-to-face	Physical, affective, cognitive	CFS	EORTC QLQ-C 30, EORTC QLQ-PR25	66.90% (99/148)	Fatigue negatively affect the QOL of prostate cancer patients	Charalambous & Kouta, 2016
Cross-sectional								
Setting = Finland								
Age mean = 37								
N = 402	Cancer							

Prospective cohort								
Setting = India								
Age mean = 52		6 months / telephone or face to face	Physical, cognitive, social function	ESA S	EOR TC-QOL PAL 15	80.80 % (325/402)	A significant correlation was reported between fatigue and QOL.	Ghoshal et al., 2016
Number of patients/study design /Setting /Age mean								

- **Prevalence of CRF**

The prevalence of fatigue severity was recorded in all cancer patients undergoing chemotherapy, which ranged from 4.2% (Calderon et al., 2019) to 100% (Muthanna et al., 2021). The prevalence of fatigue varied depending on the patient's age and types of cancer. In this review, cancer patients belonging to the age category of 35 to 60 years old [23], Karthikeyan et al., 2012) had the highest prevalence of fatigue, whereas the lowest prevalence was recorded in the age group of 61 to 70 years old [21] (Table 1)

- **Treatment**

Through the mechanism of medication, we can conclude that hydroxychloroquine can be used to treat diseases caused by the covid-19 by hydroxychloroquine sticking to the virus after the incubation period of the virus inside the lungs and preventing the covid-19 virus from splitting within the Alveoli. Studies by doctors show that the covid-19 virus causes many symptoms of it, the most important of which is respiratory difficulty, and that hydroxychloroquine is safe and can be used to treat many diseases through a drug-working mechanism, it is safe to use in treating the covid-19 virus [24]. To treat other symptoms caused by the COVID-19 virus, we recommend you test Dexamethasone with hydroxychloroquine to treat other symptoms caused by the COVID-19 virus that are difficult to breathe, by giving hydroxychloroquine to prevent the spread of COVID-19 and with Dexamethasone to help the patient breathe by preventing pneumonia inside the lungs [24].

HRQOL and Cancer diseases [30]

According to research, cancer patients' quality of life suffers a large and unfavorable influence as soon as they are given their diagnosis, or as soon as they receive the word "cancer". The quality of life (QOL) of people with cancer is impacted by a variety of elements, including physiological (pain, loss of hair, fatigue, vomiting, and diarrhea) as well as psychological (anxiety, stress, tension) and social (emotional adverse reactions) (e.g., social isolation, and function loss). The QOL of people with cancer can be enhanced by a number of elements, such as family support, financial stability, and belief in healing. Recent research concluded that HRQOL is affected by anemia, fatigue. In addition, recent research indicated that covid-19 diminished HRQOL negatively. The survival rate of kidney transplants continued to increase in tandem with enhanced care for patients and novel immunosuppressive protocols. Long-term QOL has received more consideration as a result of these accomplishments. Nevertheless, HRQL has only been assessed as a personal health outcome in a small number of studies to date. However, it is widely acknowledged that individuals with a functional renal transplant have a better HRQL compared to those receiving dialysis [30].

Quality of life in Chronic Disease

Over the past few decades, there has been an increasing prevalence of chronic diseases, live with a large number of people chronic diseases that may adversely affect them quality of life [30]. To investigate quality of life, particularly health-related quality of life (HRQoL) in patients with chronic diseases is a multidimensional structure. It consists of at least three large domains – physical, mental and social functioning –affected by disease and/or treat. HRQoL usually starts with chronically ill and often

impaired most [30]. Chronic diseases are slow, long-lasting and require medication. Most chronic diseases have the potential to worsen a patient's overall health by limiting their ability to live well, limiting functional status, productivity, and HRQoL, and are major contributors to healthcare costs. These diseases include cancer, heart disease, stroke, diabetes, HIV, bowel disease, kidney disease and central nervous system disease [30]. Additionally, HRQL is becoming more widely acknowledged as a crucial indicator of success after major organ transplants. In addition to notable statistical advancements in individual and allograft survival, HRQL has been recognized as another reliable outcome indicator. HRQL research examines subjectively medical problems broadly and views wellness as a conundrum of distinct well-being dimensions. Along with physical and mental health, the psychological and interpersonal facets of well-being are the parts in this picture. Some of these works are judged objectively, while others are appraised subjectively [31].

Quality of life assessments in the context of chronic diseases play a pivotal role in understanding the intricate and often multifaceted impact of long-term health conditions on individuals. These assessments delve into various dimensions of patients' lives, including their physical, mental, emotional, and social well-being. By evaluating the physical aspects such as pain levels, fatigue, and mobility, healthcare providers gain insights into the patient's ability to carry out daily activities and manage symptoms. Furthermore, these assessments explore the emotional toll of chronic diseases, shedding light on feelings of anxiety, depression, and overall mental health, allowing for tailored interventions, such as counseling or therapy, to address these aspects effectively.

Social functioning is another critical dimension assessed, focusing on a patient's relationships, social support, and participation in social activities. Chronic illnesses often impact social interactions, potentially leading to social isolation, making it crucial to identify and address these challenges. Cognitive functioning, encompassing memory and concentration, is also evaluated, especially in conditions that affect neurological health. Understanding cognitive changes aids in adapting routines and providing necessary support. Moreover, quality of life assessments considers the burden of treatments and their impact on daily life. This includes medication adherence, therapy sessions, and lifestyle modifications, ensuring that the treatment plan aligns with the patient's lifestyle and preferences. Additionally, these assessments delve into spiritual and existential well-being, recognizing the profound impact chronic diseases can have on an individual's beliefs, coping mechanisms, and sense of purpose.

QOL in Pandemics

Quality of life assessments during pandemics serve as crucial tools for understanding the multifaceted impact of these crises on individuals and communities. Pandemics, such as the COVID-19 outbreak, bring not only physical health risks but also substantial social, psychological, and economic challenges. Quality of life assessments in this context encompass a broad spectrum of factors.

These assessments evaluate the physical aspects of well-being, considering not only the direct effects of the disease but also the impact of preventive measures like lockdowns and social distancing. Physical health parameters such as symptoms, ability to access healthcare services, and adherence to safety guidelines are assessed to gauge the overall health status of individuals.

Mental and emotional well-being is a central focus, considering the stress, anxiety, and fear induced by the pandemic. The assessments delve into factors like psychological distress, sleep disturbances, and coping mechanisms, offering insights into the emotional resilience of individuals during these trying times.

Social functioning, encompassing social interactions, support networks, and feelings of isolation, is evaluated. Social distancing measures can lead to a sense of loneliness and reduced social support, which significantly impact the quality of life. Understanding these aspects helps in designing interventions to address social isolation and foster connectedness within communities.

Economic factors are also considered in quality-of-life assessments during pandemics. Job losses, financial strain, and uncertainties about the future create significant stressors. Assessments may include questions about job security, financial stability, and access to essential resources, providing valuable information for policymakers to design economic support measures.

Furthermore, these assessments consider the impact on vulnerable populations, such as the elderly, individuals with pre-existing conditions, and low-income communities. Disparities in healthcare access

and socio-economic resources are highlighted, guiding efforts to ensure equity in healthcare delivery and support services.

Integrating Patient Feedback into Healthcare Strategies:

In the evolving landscape of healthcare, patient feedback stands as a potent catalyst for transformative change. This invaluable resource, born from the firsthand experiences and perceptions of individuals within the healthcare system, holds the key to shaping patient-centered approaches, improving services, and enhancing overall healthcare strategies.

Patient feedback serves as a mirror reflecting the strengths and shortcomings of healthcare services. By actively listening to patients' voices, healthcare providers gain deep insights into the quality of care, communication effectiveness, and the emotional support received during their medical journeys. These insights become the foundation upon which robust healthcare strategies are built.

Imagine a scenario where patient feedback is systematically collected and analyzed. Patients become active partners in their care, sharing their perspectives on various aspects of healthcare, including accessibility, wait times, the clarity of medical information, and the responsiveness of healthcare professionals. Through surveys, focus groups, or digital platforms, patients articulate their needs, preferences, and concerns, painting a detailed portrait of their healthcare experiences.

Integrating this feedback into healthcare strategies fosters patient engagement and trust. When patients see their feedback leading to tangible improvements, they feel valued and heard. This sense of partnership enhances patient-provider relationships, ensuring open communication and mutual respect. Moreover, patient feedback acts as a compass guiding the allocation of resources. Hospitals and healthcare institutions can prioritize areas identified as problematic by patients, directing efforts toward enhancing services in those specific domains.

Additionally, patient feedback fuels innovation. Picture a culture where healthcare providers, inspired by patient insights, develop innovative solutions to address identified challenges. Whether it's streamlining appointment scheduling, improving information dissemination, or enhancing post-treatment support, patient feedback sparks creativity, leading to patient-centered innovations that redefine the healthcare experience.

Furthermore, in the realm of policy-making, patient feedback advocates for patient rights and needs. Informed by real-life experiences, policymakers can draft legislation and regulations that prioritize patient welfare. Patient narratives become compelling tools, driving policy changes that promote accessibility, affordability, and quality in healthcare services.

6. Future Perspectives and Challenges

Emerging Trends in Healthcare Research

The landscape of healthcare is rapidly evolving, propelled by groundbreaking research and innovative technologies. As we peer into the future, several transformative trends are poised to redefine the healthcare paradigm, bringing both unprecedented opportunities and intricate challenges.

Genomic Medicine: Genomic medicine, a pioneering field that explores the influence of genes on health, is set to revolutionize diagnosis, treatment, and prevention. With advancements in genomic sequencing technologies, personalized medicine tailored to an individual's genetic makeup is becoming a reality. This promises targeted therapies, precise disease risk assessments, and the potential to eradicate hereditary diseases at their roots.

Telemedicine and Remote Healthcare: The widespread adoption of telemedicine is reshaping healthcare delivery. Virtual consultations, remote monitoring devices, and digital health platforms enable patients to access medical expertise from the comfort of their homes. This not only enhances healthcare accessibility, especially for those in remote areas, but also offers efficient, cost-effective, and timely interventions. However, ensuring the security of patient data and maintaining the human touch in virtual interactions pose challenges in this digital frontier.

Artificial Intelligence and Machine Learning: AI and machine learning algorithms are poised to augment clinical decision-making, streamline administrative tasks, and enhance medical research. These technologies can analyze vast datasets, predict disease patterns, and assist in drug discovery, significantly accelerating the pace of research and innovation. Nevertheless, ethical considerations, data privacy, and the need for interpretability in AI-driven healthcare solutions demand careful navigation.

Blockchain in Healthcare: Blockchain technology is revolutionizing healthcare data management. Its decentralized and secure nature ensures the integrity and confidentiality of medical records, facilitating seamless information exchange among healthcare providers. Implementing blockchain can mitigate data breaches and enhance interoperability. However, integrating this technology into existing healthcare systems requires overcoming technical complexities and fostering industry-wide collaboration.

Patient Empowerment and Advocacy: Empowering patients to actively participate in their healthcare decisions is an emerging trend that emphasizes patient education, engagement, and advocacy. Informed patients not only make better decisions about their health but also contribute valuable insights to the healthcare system. Engaging patients as partners, however, necessitates a shift in traditional healthcare dynamics, embracing shared decision-making and fostering a culture of respect and collaboration.

Challenges Ahead: Alongside these transformative trends, healthcare faces complex challenges. Ethical dilemmas surrounding genetic editing and data privacy demand thoughtful consideration. Ensuring equitable access to advanced healthcare technologies, especially for marginalized communities, remains a pressing concern. Regulatory frameworks must evolve to keep pace with technological advancements, ensuring patient safety without stifling innovation. Additionally, addressing the healthcare workforce's digital literacy and adaptability is crucial to harness the full potential of emerging technologies.

In this dynamic landscape, the synergy between innovative research, ethical considerations, and patient-centric approaches will shape the future of healthcare. While challenges are inherent, navigating them with foresight, collaboration, and a commitment to holistic patient care will pave the way for a healthcare future that is not only advanced but also profoundly humane.

Conclusion

We have explored a wide range of healthcare issues in this thorough interdisciplinary investigation, from pandemics and anemia linked to cancer to new developments in healthcare research and ethical issues. The research we performed revealed important new information and clarified the complicated interactions between different disciplines when dealing with difficult healthcare issues.

Summary of Key Findings and Insights:

Through our exploration, we uncovered the nuanced relationship between cancer and anemia, understanding the diagnostic methods, available treatments, and the impact of COVID-19 on healthcare systems, among other crucial topics. We recognized the significance of patient feedback in shaping healthcare strategies, the ethical dilemmas in multidisciplinary research, and the promising future trends like genomic medicine and telemedicine. Each topic illuminated diverse facets of the healthcare landscape, highlighting the need for interdisciplinary collaboration to foster holistic solutions.

Implications for Future Healthcare Practices and Research:

The implications drawn from our exploration are profound. It is evident that the future of healthcare lies in the synergy between various disciplines. Personalized medicine, facilitated by genomic research, offers tailored solutions, while telemedicine ensures healthcare accessibility, especially in remote areas. Ethical considerations underscore the moral compass guiding our research endeavors, emphasizing the importance of respecting patients' autonomy and privacy.

Moreover, the integration of patient feedback into healthcare strategies enhances patient-provider relationships, ensuring a patient-centered approach. Multidisciplinary research not only fuels innovation but also addresses healthcare challenges comprehensively, paving the way for holistic healthcare practices. Quality of life assessments, both in chronic diseases and pandemics, emerge as pivotal tools, ensuring that healthcare interventions are not just medically effective but also consider the patient's overall well-being.

Call for Continued Interdisciplinary Research and Collaboration:

As we conclude this exploration, it is imperative to emphasize the call for continued interdisciplinary research and collaboration. The challenges and opportunities presented by the intersection of diverse fields necessitate ongoing dialogue, mutual understanding, and collaborative efforts. Researchers, healthcare practitioners, policymakers, and communities must unite to foster an environment where knowledge seamlessly transcends disciplinary boundaries.

By nurturing a culture of interdisciplinary collaboration, we can address healthcare challenges with a comprehensive, patient-centered approach. As we move forward, let us embrace the wealth of insights garnered from this multidisciplinary exploration, integrating them into our practices and research

endeavors. Together, we can shape a healthcare landscape that is not only advanced and innovative but also compassionate and inclusive, ensuring the well-being of individuals and communities around the globe.

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