

COMMENT

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Health inequities: a persistent global challenge from past to future

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Abstract

Health inequities remain one of the most pressing global challenges, deeply rooted in socio-economic, environmental, and technological factors. These disparities, historically influenced by colonial legacies and socio-economic inequality, persist into the present, with new challenges such as the COVID-19 pandemic and climate change further widening them. Looking ahead, the rise of digital health technologies and worsening climate impacts present additional risks. This comment explores the historical, present, and future dimensions of health inequalities and offers evidence-based solutions, including strengthening health systems, addressing social determinants, building climate-resilient healthcare, and bridging the digital divide. Achieving health equity requires bold, systemic changes to ensure universal access to quality healthcare.

Introduction

Health inequities, defined as avoidable and unfair differences in health outcomes across population groups [1], remain a global issue, impacting millions. These disparities are driven by various factors, including socio-economic status, environmental conditions, and access to healthcare and technology. While efforts to mitigate these inequalities have been ongoing, new challenges, such as climate change and the digital divide, threaten to widen the gaps. The COVID-19 pandemic has further highlighted the stark health disparities that exist both within and between countries. This commentary will explore the historical, present, and future dimensions of health inequalities and propose actionable solutions to address them. Rather than offering a purely descriptive overview, this commentary centers on how historical colonial structures continue to shape contemporary

health disparities and how addressing these foundational issues is critical to achieving long-term health equity.

Historical roots of health inequalities

Colonial legacies and socioeconomic inequalities

Health inequalities are historically rooted in colonialism, which established exploitative systems that deprived colonised regions of healthcare infrastructure, education, and economic opportunities. Colonial administrations deliberately structured local economies to focus on the extraction of resources and cheap labour, creating economic dependencies that persist today. Health systems under colonial rule were primarily established to protect colonial officials and maintain workforce productivity, rather than to address the health needs of indigenous populations. Additionally, colonial powers often marginalized or actively suppressed indigenous medical knowledge and health practices, eroding community-based health solutions. Upon gaining independence, many countries inherited fragile health infrastructures and economic systems ill-equipped to support equitable development. These historical injustices have led to persistent socio-economic disparities, underfunded health services,

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and limited access to quality care, particularly in regions that were heavily colonized [2, 3].

These colonial legacies left many countries, particularly in sub-Saharan Africa and South Asia [3], with fragile healthcare systems that continue to face high rates of infectious diseases and poor access to care. Indigenous populations also face disproportionately poor health outcomes due to long-standing systemic discrimination and marginalisation [4]. Even within high-income countries, socio-economic disparities influence health outcomes, with low-income populations and racial minorities facing higher mortality and morbidity rates. These groups often live in areas with limited access to healthcare services, nutritious food, and safe housing [5, 6].

The epidemiological transition and uneven progress

The mid-20th century saw many countries experience an epidemiological transition, where the burden of disease shifted from infectious diseases to non-communicable diseases (NCDs) like heart disease and cancer [2, 3, 7]. High-income countries benefited from advancements in healthcare infrastructure, vaccines, and sanitation, leading to significant improvements in life expectancy. However, this progress was uneven, with low- and middle-income countries (LMICs) continuing to face high rates of infectious diseases while also contending with rising rates of NCDs. This uneven progress entrenched health inequalities, particularly among marginalised populations with limited access to healthcare services.

Present-day challenges in health inequalities

COVID-19 pandemic: exposing health disparities

The COVID-19 pandemic has revealed the deep-rooted health inequalities that exist within and between nations. Marginalised populations, including racial minorities, low-income groups, and individuals with pre-existing health conditions, have been disproportionately affected by the virus [8]. In high-income countries, these disparities were driven by factors such as overcrowded living conditions, limited access to healthcare, and a higher prevalence of chronic conditions [9].

In LMICs, fragile healthcare systems were overwhelmed by the pandemic, leading to a rise in preventable deaths from other causes like maternal complications and childhood diseases. Additionally, the economic fallout of the pandemic, including job losses and food insecurity, has disproportionately impacted vulnerable populations, further exacerbating health inequalities [10].

Social determinants of health

Health inequalities are largely driven by social determinants of health, the conditions in which people are born, grow, live, work, and age [11]. These determinants include access to education, employment, housing, healthcare,

and environmental factors. In low-income communities, limited access to nutritious food, clean water, and healthcare services leads to higher rates of chronic diseases. Systemic discrimination, including racism and gender-based, worsens these disparities. For example, Black and American Indian and Alaska Native in the United States face higher rates of maternal and infant mortality [12] due to factors like poverty, limited access to healthcare, and exposure to environmental hazards.

It is essential to understand that these social determinants are not isolated factors but interconnected outcomes of systemic historical injustices. For instance, the entrenchment of poverty and under-resourced health systems in post-colonial nations directly stems from economic and governance models imposed during colonial rule, which prioritized extraction over development. Addressing these determinants requires not only improving material conditions but also dismantling these embedded structural inequalities.

Climate change: a growing driver of health inequalities

Climate change is a significant driver of health inequalities, disproportionately affecting vulnerable populations [13, 14]. Low-income communities, particularly those in climate-sensitive regions such as sub-Saharan Africa and small island developing states, face greater exposure to extreme weather events, food insecurity, and water-borne diseases [14, 15]. Prolonged droughts, floods, and heatwaves are increasingly impacting agricultural communities, leading to malnutrition and heightened susceptibility to infectious diseases. In urban areas, low-income populations are more vulnerable to heat stress and respiratory diseases due to poor housing conditions, inadequate access to healthcare, and high levels of pollution [14, 15]. As climate change intensifies, these health disparities are expected to worsen.

Future challenges in health inequalities

The digital divide and healthcare access

The digital revolution in healthcare presents both opportunities and risks for health equity. Telemedicine, mobile health (mHealth) applications, and artificial intelligence-driven diagnostics have the potential to improve healthcare access, particularly in underserved areas. However, the digital divide, the gap between those with access to digital technologies and those without [16], threatens to widen health disparities. Many low-income populations, rural communities, and elderly individuals lack access to the internet, digital devices, and the digital literacy needed to benefit from telemedicine services. During the COVID-19 pandemic, these groups were unable to access telemedicine, leading to delays in care and worsening health outcomes. Addressing the digital divide will be

crucial to ensuring equitable access to healthcare in the future.

Emerging technologies: opportunities and risks

Emerging technologies, such as genomics, personalised medicine, and artificial intelligence, hold great promise for improving healthcare outcomes. However, these advancements also pose a risk of deepening health inequalities if they remain accessible only to wealthier populations. Genomic research is often concentrated in high-income countries, leaving out much of the world's population [17]. This lack of diversity in research could lead to treatments that are less effective for marginalised groups. Without equitable access to these emerging technologies, the gap between rich and poor in health outcomes could widen further. Global cooperation will be essential to ensure that the benefits of these innovations are shared across populations, regardless of income or geography.

Climate change and the triple burden of disease

Looking ahead, low-income countries will increasingly face a triple burden of disease, characterized by the simultaneous impact of communicable diseases, non-communicable diseases, and injuries. Climate change will further intensify these health challenges [18] by disrupting food systems, increasing water scarcity, and amplifying extreme weather events. Vulnerable populations are particularly at risk, as they contend with malnutrition, respiratory diseases, and the spread of vector-borne diseases like malaria and dengue fever. In this context, the combined effects of communicable diseases, chronic non-communicable conditions, and injuries from climate-induced disasters will exacerbate health inequities [18].

Solutions: a systemic approach to addressing health inequalities

To reduce health inequalities, governments must prioritise universal health coverage to ensure that everyone, regardless of income or location, has access to essential healthcare services without facing financial hardship [19]. This requires increased investment in healthcare infrastructure, workforce training, and equitable distribution of healthcare resources. High-income countries must also address gaps in access for minority and rural populations to achieve more equitable healthcare outcomes. For example, Thailand's Universal Coverage Scheme (UCS), implemented in 2002, successfully expanded healthcare access to over 99% of its population, significantly reducing out-of-pocket expenditures and improving health outcomes among low-income groups [20]. Similarly, Rwanda's community health worker program has effectively delivered essential healthcare services to rural

populations, contributing to improved maternal and child health outcomes [21].

Policymakers must address the broader social determinants of health by implementing strategies to reduce poverty, improve access to education, and ensure safe housing and working conditions. For example, urban planning initiatives that create green spaces and infrastructure improvements to reduce air pollution can help mitigate health risks in low-income and marginalised communities. A notable real-world example is the Healthy Streets for London initiative, which integrates urban design improvements, expanded green spaces, and active transportation infrastructure to promote healthier environments and reduce air pollution, particularly benefiting marginalized communities [22].

Importantly, these policy interventions must be framed as efforts to dismantle the entrenched structural inequities established through colonial rule. Colonial administrations deliberately created economic models centered on resource extraction and cheap labour, leaving colonized nations with fragile economies and underdeveloped social systems after independence. Poverty reduction and educational advancement play a critical role in reversing the socioeconomic disadvantages imposed on colonized populations, whose economies and governance structures were historically shaped to serve external interests. Addressing these inequities requires not only financial investment but also a decolonization of global health governance, ensuring that formerly colonized nations have a greater voice in setting health agendas and priorities. Investments in healthcare should prioritize not only improved access but also the empowerment of local leadership and community-based health solutions, fostering autonomy and resilience. For example, the success of Rwanda's community health worker programs illustrates how locally led healthcare initiatives can effectively address health disparities and promote long-term systemic change [21]. Similarly, initiatives such as Ghana's Community-based Health Planning and Services (CHPS) program have demonstrated how empowering communities can lead to substantial improvements in maternal and child health outcomes [23]. By addressing the social determinants of health through this historical lens, policymakers can actively redress long-standing injustices and promote sustainable, locally driven health equity solutions.

In the face of climate change, building climate-resilient healthcare systems is essential [24]. Governments must invest in early warning systems for extreme weather events, improve water and sanitation infrastructure, and ensure that healthcare facilities are equipped to handle the health impacts of climate-related disasters. Additionally, climate adaptation strategies must prioritise the health needs of vulnerable populations.

To prevent the digital revolution from worsening health disparities, governments must invest in expanding digital infrastructure, including broadband access, particularly in rural and low-income areas. Providing digital literacy programs and ensuring that digital health platforms are accessible to all will help bridge the gap between those who benefit from digital health innovations and those who are left behind.

Conclusion

Health inequalities are a complex global challenge that requires bold and systemic action. By addressing the root causes, socioeconomic disparities, climate vulnerability, and digital exclusion, governments and global health organisations can reduce health inequities and ensure that all individuals have access to quality healthcare. A critical step toward achieving this vision involves confronting and dismantling the historical and structural roots of inequality, rather than addressing only their modern manifestations. Through targeted investments in healthcare systems, social determinants, climate resilience, and digital infrastructure, we can create a future where health equity is a reality for all.

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