

Analysis of the Relationship between Education and Health

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Abstract. The unequal COVID19 vaccination rates amongst US citizens highlights the issue of health inequality in America. One key socioeconomic factor that drives this inequality is education. We posit that understanding the mechanisms in this association and exploring ways technology can assist the education process is key to reducing health disparities. In this paper, we first provide a general overview of current research on the relationship between health and education in the United States. Then, we go on to analyze how education underlies two major determinants of health—health care and health behavior—and suggest possible ways in which technology may play a role in mitigating the issue. We end by acknowledging that beyond individual level, there are ways in which contexts makes one's education important and more research can also be done regarding the structural factors that create and maintain disparities.

Keywords: COVID19, education, health.

1. Background and Introduction: Need to new directions in education-health research

The disparate impacts of COVID-19 have brought health disparities into light among the media and public. The CDC defines health equity achievement as when no person is “disadvantaged from achieving this potential because of social position or other socially determined circumstances.” [1] Research shows that health outcomes are shaped by multiple factors, including genetics, environmental factors, and access to health care. In particular, studies suggest that social determinants of health, which refers to health behaviors and social and economic factors, are the main drivers of health outcomes. [2] Healthy People have determined five primary social determinants: economic stability, neighborhood environment, social context, health care, and education. [3] In this paper, we focus specifically on the relationship between health and education.

Vaccines are critical to forging a way out of the COVID-19 pandemic. However, health inequalities and poor health of low education adults in the United States have created disparities in vaccination rates among various vulnerable populations. Research on the vaccination data from April 2021, when almost half of the US adult population was at least partially vaccinated, found a positive association between COVID-19 vaccination and educational attainment of individuals [4]

Understanding how education affects health is thus crucial to reducing health disparities and elevating the well-being of citizens. During the past several decades, education in the US has been a major path to financial and social success for individuals. [5] But the country's youth have been subjugated to increasingly unequal educational environments due to varying neighborhoods, schools, skin color, and financial background. This can be attributed to structural changes taking place at the time: the rise of globalization, decline in manufacturing as well, and the decay of policies protecting vulnerable groups together triggered a sharp increase in economic and social inequalities. [6]

Health disparities grew hand in hand with these socio-economic inequalities. Over the past decades, the most education groups experienced increase in average health while the less educated face declining health and longevity [7] as inequalities in health [8] and mortality [9] gradually intensified. With the growing recognition of the significance of education for health as well as the pandemic's worrisome unequal distribution of vaccination rates, research on the health consequences of education is at a critical point. A deeper understanding of the issue is needed in order to identify and develop effective points of intervention.

The paper is organized in two parts. First, we broadly summarize the current main theoretical and empirical research (over the past 10–15 years in the US) on the association between education and health as well as studies on the causal relationship between education and health. In the second section,

we seek to highlight gaps in extant research and propose new research directions and their implications for policy.

2. Relationship Between Education and Health

2.1 Conceptual understandings

To conceptualize the relationship between health and education, researchers have generally referenced three broad theoretical perspectives. The first one is the Fundamental Cause Theory (FCT), which hypothesizes that social factors such as education determine one's access to non-material and material resources such as income, employment, and living environment, all of which affects health outcomes; Thus, these social factors are the fundamental drivers of health.[10] Borrowed from econometrics, The Human Capital Theory (HCT) describes education as an investment that returns productivity: education is able to help individuals gain and improve a wide range of skills that can be used to produce health, including knowledge, skills, reasoning, effectiveness.[11] The third approach, the Signaling or Credentialing perspective, views education credentials as a significant sign of one's abilities and skills and is thus able to yield large economic and social returns. Many researchers have used this theory to explain the apparent gap in health at 12 or 16 years of schooling—which respectively corresponds to the receipt of high school and college degrees. [12]

All three perspectives hypothesize numerous mechanisms through which education has a causal effect on health. FCT emphasizes the unequal access to resources, the HCT identified important skills and abilities, and credentialism analyzes the social responses to educational attainment.

2.2 Empirical Associations Between Education and Health

Empirically, numerous studies have observed how education is tied to a longer life and better health. Less educated adults tend to report worse general health and more chronic conditions and disability. [13] In 1973, Kitagawa and Hauser's book revealed the stunningly wide differences in mortality by education in the US. [14] Since then, hundreds of studies have corroborated its findings.

Although this trend is observed in men and women and across all ethnic groups, there are significant group differences. For example, education is observed to impact the health of women more strongly than men [15] and also for non-Hispanic whites more strongly than minority adults. [16] Some studies hypothesize that these variations may be due to systematic social differences in education quality and content as well as different benefits in the labor market from educational attainment for different population groups. [17]

2.3 Causal Relationship Between Education and Health

Numerous studies using twin design have tried to test how and if there is a causal relationship between education and health. Twin design studies have been conducted that compare the health of twins who received different levels of education in order to isolate the effect of schooling by controlling for the influence of genetic variation and family resources. Overall, this literature provides a wide range of conclusions: there are evidence for a strong, modest, to no causal relationship of education on adult health and mortality across numerous contexts and outcomes. [18-19]

These findings are important because educational programs, policies, and interventions hoping to improve population health stem from the existence of a causal relationship between the two. However, the studies should only be viewed as a starting point to further research as they display large variability. Some of these variabilities could be due to the sharp differences in contexts across the studies, such as countries with different political systems and population groups.

3. Mechanisms responsible for education-health association

While current research has shown that education is clearly linked to various health outcomes, the mechanisms responsible for the association are not well understood. In studies by Marcia Angell,

Senior Lecturer in the Department of Global Health and Social Medicine at Harvard Medical School, socioeconomic factors such as education, income, and occupation appear to be powerful yet mysterious determinants of health; instead of having direct impacts, they are likelier to expose people to other conditions with more immediate effects on health.[20] McGinnis and Foege's study identified three of such determinants, which taken together show correlation with about 80 percent of premature mortality: behavior and lifestyle accounts for about 50 percent, environmental exposure for about 20 percent, and health care for 10 percent.[21] Below we will consider how education influence two of these pathways: behavior and lifestyle and health care.

3.1 Health care

Education attainment affects one's access to, quality of, and use of health care. For example, while 40 percent of adults who have not graduated from high school are uninsured, that statistic decreases to 10 percent of college graduates. [22] This puts these lower education individuals at various health risks as people who lack insurance receive less and poorer-quality medical care compared to those who do not. [23]

However, even when universal coverage is provided in some countries, persons with less income and education are unable to effectively utilize and maximize the benefits of health services as wealthier, better-educated groups do. A recent Canadian study showed that men with less education experienced higher mortality for a variety of death causes that were all amenable to medical treatment. [24] Thus, while universal coverage could make major progress, this policy strategy will not effectively address health inequalities. Instead, one desirable and necessary area of research in addressing this issue is the role of technology.

It is universally accepted that technology can bring structural changes to various field that leads to significant improvements in productivity. In particular regarding healthcare, technology can help create easily accessible and free curriculums and tutorials informing people how they can best use available health care resources. The low-cost nature of these materials also allows it to be tailored depending on individual's background and current circumstance. This would be able to efficiently help raise awareness of what health insurance is and how one can maximize its benefits.

3.2 Behavior and lifestyle.

Behavioral factors vary by education and account for about half of premature mortality, with one of the greatest risks being tobacco use. [25] Studies have found that while education is not associated with smoking on the onset, more educated individuals are more likely to quit. [26]

However, without definitively identifying the independent contributions of education to these behavioral patterns, the Acheson Commission recommended policies that pushed for nutritional information campaigns, exercise, and an emphasis on smoking cessation. As a result, following the U.S. surgeon general's report on smoking, smoking rates decreased more rapidly among groups who have received higher levels of education. Anti-smoking media campaigns have been fairly successful, but need to be more directed towards high-risk groups that are targeted by tobacco companies for advertisement. [27] All of this goes to show how such policies need to be tailored to the life circumstances of people who received less education in order to be effective in reducing disparities. Technology could be one tool that can be considered in addressing this concern. For example, current advancements in machine learning and big data can assist in the process of identifying high risk groups and creating campaigns geared specifically to them. Moreover, technology can also assist in the education of smoking and health in schools. By linking teachers to their students and also to professional content, resources, and systems, technology assist in personalizing learning and improving instruction. [28] Moreover, these open educational resources can also help increase educational productivity reducing material costs and accelerating the rate of learning. By doing so, people's health awareness and the frequency of healthy behaviors can be improved.

3.3 Implications for Policy

Traditionally, policy considerations tend to focus on economic efficiency or social justice. What is often ignored is the health-supporting and potentially cost-effective outlooks of policies that equalize resources and improve education. In an information age, perhaps researchers can turn to technology for innovative solutions regarding these, and many other concerns regarding education and health.

4. Understanding Macro Level Contexts

When analyzing the extant theoretical and empirical research on education and health, there is a stark contrast between the voluminous literature on individual-level education and health and the “startling lack of attention to the social/political/economic context” in which the relationships are embedded in. [29]

One potent example is how U.S. states shape the effect of education on health as institutional actors. In a study by Jennifer Montez and Mark Hayward, they found that educational inequality in the health for adults aged 45 to 89 years differs across different states due to variation in the health of adults who received lower levels of education. The researchers used state excise taxes on cigarettes as an example of how states affect the educational disparities in health. [30]

These findings highlight how the education-health association is not simply a reflection of higher educated adults gaining certain beneficial characteristics but also of how contexts could support or hinder one’s education from gathering particular resources and avoiding risks. Therefore, more future research should focus on the contextual factors that drive education and health disparities so that explanations can expand from individual-level mechanisms to encompass structural factors as well. Doing so in turn increases the range of possible strategies for reducing these disparities.

5. Conclusion

Education underlies two major determinants of health: health care and health behavior, and in both sectors, technology may play a role in mitigating the issue. Beyond the individual level, more research can also be done regarding the structural factors that create and maintain disparities.

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