

The Effect of Education Inequality Upon Cardiovascular Disease Risk
Ankan Pal
Jamison, Pennsylvania

ABSTRACT:

Background

Cardiovascular disease is the leading cause of mortality, accounting for 15.6 million deaths in 2010 and 17.8 million deaths in 2017. CVD is often affected by non-medical factors known as social determinants of health.

Methods

Google Scholar and PubMed were used to find four original studies. Our exclusion criteria consisted of other literature reviews and any studies that compared groups with each other such as men to women.

Results

Among the studies reviewed, higher education is associated with a statistically significant decrease in CVD risk. One study showed that 1-ll of education leads to a 9% decrease in their participant's risk of developing CVD. Another study showed a 20%-40% decrease in CVD risk from the least to most educated men and women.

Discussion

Overall, education attainment and inequality were inversely associated with CVD risk. This indicates that countries and large organizations should use their influence and power to encourage, introduce, and improve education in developing countries.

INTRODUCTION:

Cardiovascular disease (CVD) has increased the mortality rates in the United States since 2010[1]. Most commonly, nonmedical factors such as social determinants of health greatly impact CVD risk in all ages [2]. In 2010 alone, CVD caused an estimated 15.6 million deaths globally [3], and this number increased to 17.8 million in 2017 [1]. Additionally, CVD brings a catastrophic burden on health care and productivity. In 2010, CVD was the leading source of an estimated US \$863 billion in healthcare and productivity costs; these numbers are only bound to worsen with a projected estimate of \$30 trillion by 2030 [4].

Some of the major risk factors of CVD are cardiometabolic, behavioral, environmental, and social risk factors [5]. Among them, education leads to more informed decisions among individuals, more secure employment, and higher income to afford adequate healthcare and

insurance [6]. Nevertheless, it is difficult for lower-income families to afford higher-level education, which becomes detrimental to their health since occupation is one of the strongest predictors of any disease [7]. Additionally, many adolescents are unaware of the risk they put on themselves with their education since those years are pivotal in their development [8]. Globally, 17% of children (258 million) are either not in school or don't have access to any education [10]. These statistics are worse in developing countries, as 31% in sub-Saharan Africa and 21% in Central Asia are not in school compared to 3% in Europe and America [10].

This study aims to summarize the literature around education's impact on an individual's risk for developing CVD or experiencing a cardiovascular event in their life.

METHOD:

This scoping review used Google Scholar and PubMed to find relevant studies using the key search terms: education, school, educational attainment, cardiovascular disease, and cardiovascular health. Among the studies with titles that fit the key terms, we excluded other literature reviews and any studies that compared groups with each other such as men to women because this study involves analyzing the effect of different levels of education and not race or gender.

RESULTS:

In a 26-year study, 13,948 participants (56% female and 27% African) were followed up with their physicians and recorded 4512 CVD events and 2401 non-CVD-related deaths [11]. Amongst men, grade school level had a 59% risk of CVD; 52.5% for high school education (without graduation); 50.9% for high school (with graduation); 47.2% for vocational school, 46.4% for college (with or without graduation); and 42.2% for graduate/professional school [11].

In a second study, the Tromsø Study, 12,000 participants enrolled in a self-reported questionnaire [6]. It was documented that for every 1-level increase in education, the participant's risk of CVD or experiencing a cardiac-related event decreased by 9% [6]. However, after adjusting for covariates, the association was weaker [6].

A third study showed that the least educated men had a 21% higher risk of developing CVD than the most educated and a 41% higher risk for the least educated women [12].

All three studies above are consistent in the inverse correlation between education risk and CVD risk, however, one study displayed no correlation between CVD risk and education. In a randomized clinical trial, a program tested three groups—long-term intervention (LTI), short-term intervention (STI), and a control) for whom all the participants started with a baseline CVH score (10.3 for LTI, 10.3 for STI, and 10.5 for the control) and were analyzed at the end of the short-term intervention (STI), and the end of the long-term intervention (LTI) [8]. By the first analysis, the LTI group had a difference of 0.44 points in the CVH score change between the

controls, and the STI group had a difference of 0.18. But, at the end of the 4 years, the differences between CVH score changes of the STI and the LTI against the control were 0.13 and 0.12 points [8]. The program did not provide any benefit nor was it disadvantageous to any participants, and there were no adverse events reported [8].

DISCUSSION:

Cardiovascular disease has been the leading cause of mortality and morbidity across the globe. CVD has also been mediated by multiple factors, some of which are nonmedical factors like social determinants of health. This study analyzed the effect of education and how it affects individuals' risk of developing CVD.

From the reviewed studies, education was found to have a significant impact on CVD risk. Differences in education led to statistically distinct CVD risk among patients. In some cases, a single-level increase in education was associated with a 9% decrease in the risk of CVD in the participant's life [6] while the difference was strikingly even greater in a second study : the least educated men had a 21% higher risk of CVD and women had a 41% higher risk than the most educated men and women, respectively [12]. It's likely that education may have an impact on CVD risk, as higher education leads to more knowledge around risk factors and behaviors associated with CVD, which then allows for healthier informed decisions regarding lifestyle choices. Despite the associations seen in 3 studies, there was one study that displayed no significance on how different levels of education impacted CVD risk or experiencing any cardiac-related issue in their lifetime [8]. This may have been due to a younger age in which the effects were indistinguishable or absent. Since most of the participants were teens, the effects may have not been as prominent compared to an elderly person.

One of the limitations of the searched studies is self-reported data risked recall bias. Additionally, the era in history in which people were born may have also affected educational attainment, as the oldest participants were in grade school during the Depression, and the youngest were born during WWII, a time of racially segregated schools [11]. Minorities may have had a decreased education from segregation and the war may have reduced education from enlistments so fewer young adults had a chance to extend their education and instead were fighting for their country.

Education is important, not only for a stable income but for the maintenance of health. Large organizations and other developed countries should look into foreign relations of developing countries to improve or even introduce education. Additionally, it's imperative to improve the quality of education in low-income neighborhoods even in developed nations, including to implement programs to help retain students in school.

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