



Educational attainment and life expectancy: A perspective from the NIH Office of Behavioral and Social Sciences Research



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ABSTRACT

The NIH Office of Behavioral and Social Sciences Research (OBSSR) furthers the mission of the NIH by stimulating behavioral and social sciences research throughout NIH and integrating these areas of research more fully into the NIH health research enterprise, thereby improving our understanding, treatment, and prevention of disease. OBSSR accomplishes this mission through several strategic priorities: (1) supporting the next generation of basic behavioral and social sciences research, (2) facilitating interdisciplinary research, (3) promoting a multi-level systems perspective of health and behavior, and (4) encouraging a problem-focused perspective on population health.

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1. OBSSR interest

OBSSR is pleased to partner with the guest editors, the Harvard Center for Population and Development Studies, and *the Journal of Social Science and Medicine* in supporting this special issue. OBSSR has become increasingly interested in the relationship between educational attainment and life expectancy because of our commitment to addressing differences in survival and health related quality of life in population subgroups. Health disparities are well documented (Diez Roux, 2012), but to reduce these disparities it is imperative that we better identify malleable mechanisms that contribute to these disparities. Education is one example of a potential leverage point. As the papers in this issue suggest, there is a strong relationship between education and life expectancy.

The association between educational attainment and life expectancy is apparent for both sexes and for a variety of ethnic groups (Montez et al., 2012). In all groups, having less than a high school degree is associated with the shortest life expectancy and the relationship persists through college graduation and beyond (Montez et al., 2011). Among white males, for example, the difference in life expectancy between those with less than a high school education and those with a college degree is about 12 years (Olshansky et al., 2012). In addition to life expectancy, those with

less education report strong differences in health related disability in comparison to those with more education (Zajacova et al., 2012).

The number of people with little education and those who are well educated varies by race and ethnicity. For both men and women, Hispanic persons are less likely to have a high school education while White respondents are most likely to have a college degree. African-Americans fall between Hispanic and White respondents (Olshansky et al., 2012).

Several studies have shown that the systematic graded relationship between educational attainment and life expectancy remains persistent through the highest levels of education attainment. For example, the benefit of education in terms of hazard of death continues throughout higher levels of education (Rogers et al., 2010). Those with master's degrees live longer than those with bachelor's degrees, and those with doctoral degrees live even longer than those with master's degrees (Montez et al., 2009; Rogers et al., 2010).

2. The strength of the education effect

What is perhaps most compelling about the potential of educational interventions is the strength of the effect. In preventive medicine, there have been significant debates regarding relatively modest advantages of some interventions. For instance, the number of quality adjusted life years gained by performing Pap smears every year as opposed to every third year is quite modest—only about the equivalent of one day of life (Hagen et al., 2001). The advantage of yearly mammography screening versus not screening

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is only about 1 month of life expectancy (Gotsche and Jorgensen, 2013). The difference in life expectancy between those with elevated LDL cholesterol versus normal cholesterol is about 6 months (Clarke et al., 2009). In contrast, the difference in life expectancy between those with less than a high school education and those with an advanced degree is 10–12 years (Montez and Hayward, 2014).

If we could eliminate homicide, there would be approximately 12,000 fewer deaths each year in the United States. Eliminating deaths from automobile crashes would result in 30,000 fewer deaths per year, while eliminating diabetes would reduce the number of deaths by about 80,000. However, if the life expectancies of those with less than a high school education could be made equal to those with more than a high school education, there would be an estimated 240,000 fewer deaths per year (Galea et al., 2011). This is not to suggest that 240,000 fewer deaths would occur if we were able to insure that everyone received a high school education. The strength of this relationship is not evidence of causality, and many contributing factors related to education and mortality need to be considered, but the magnitude of the relationship and the consistency across studies and databases of this finding between education and health make this relationship a critical focus of research efforts to ultimately eliminate health disparities.

3. Contributions of papers

Each paper in this special issue contributes a different approach to the question, offering different methodological tools, novel datasets, and operationalizations of health. What makes this collection of research papers particularly significant, however, is that the findings provide invaluable new insights toward a better understanding on the complex processes underlying the widely known, but poorly understood, association between educational attainment and health. The insights are a function of at least two factors: (1) the treatment of health is multi-dimensional and (2) the treatment of education is not limited to a simple operationalization.

The biomedical research literature often narrowly defines health in terms of patho-physiological or biological attributes. As a result, remedies for health problems are often focused only on biology (Galea et al., 2011). This is not the case in this peer-reviewed issue, where a variety of indicators or risk factors are used to represent “health”. The papers consider obesity, mental health, dementia, health behaviors, smoking, mortality, diabetes, prolonged illness, life expectancy/longevity, coronary heart disease, and deaths due to preventable causes versus deaths due to non-preventable causes. This broader attention allows the reader to appreciate, with greater nuance, how the education-health link is far from a simple statistical association.

The special issue also explores how education or schooling is operationalized. Often education is reduced to discrete categories that are based on the U.S. school system and/or its meaning in terms of the labor market, such as less than High School, High School Completed, and Greater than High School (any college). The numerical representation of educational attainment has consequences for study results. For example, we do not know whether the relationship between education and health outcome results from a credential, like a high school diploma or college degree that opens employment opportunities, or if it is the consequence of greater personal skill development. This issue includes a variety of different treatments, including a focus on international data and examining proxies for education where there is a lack of a formal schooling structure, such as measures of literacy.

Studies of educational attainment should be of considerable interest to the social and behavioral sciences. Despite a long history of studies documenting the relationship between education and

health, we are just beginning to develop the science of social determinants of health as a transdisciplinary science that integrates methods and approaches.

Some research areas view education as an important factor to consider when assessing health outcomes. In these studies, education is treated as an important ‘stratifying’ variable, or a significant variable to partition population differences to detect vulnerabilities. Indeed, gradients or group/population differences in health outcomes are of interest to scholars, practitioners, and policy makers. In other research areas, education is employed as a statistical ‘control’ – to get a cleaner sense of the ‘true’ underlying effect once the ‘bias’ that might be introduced by not including education are mitigated. In a separate but connected line of reasoning, education is treated as a robust indicator of social standing or status, in light of the fact that many other measured characteristics are plagued by problems of endogeneity or reverse causality (e.g., income).

However, all of the above rationales, either to detect vulnerabilities or as a way to get a ‘cleaner estimates of an effect’, may miss the central point that education might be THE important individual AND societal level factor that has both direct and indirect effects on health, yielding insights into a potentially powerful ‘social vaccine’ relevant to a variety of disease processes (Baker et al., 2009). In this light, education should not be viewed as a statistical control to other more important factors, but rather as a logical leverage point for intervention. Perhaps the key to better improving health in our country might be to invest more in non-health related institutions such as education.

4. Unanswered questions

The timing of this special issue represents one part to a shared interest in both the public and private sectors on the policy impact and importance of education. In June 2014, OBSSR convened a meeting of leaders in the field to define the new opportunities and scientific directions for a new research agenda on explaining the linkage between education and health. A summary of the meeting is available at:

http://obssr.od.nih.gov/pdf/OBSSR_Education_and_Health_REV_8-22-2014_FINAL_RLA.pdf

Scientifically linked to the many of the conclusions in this special issue, the OBSSR meeting identified a series of questions worthy of future investigation. These included:

- (1) How do the effects of education on health differ by period, cohort, and age distributions of a population?
- (2) How does the relationship of education and health vary over time within the same education and health care system (i.e., was the relationship of education and health different when substantially fewer people obtained high school or college degrees than now) or vary across different educational or health care systems (e.g., in countries with limited or different educational systems or in countries with universal healthcare)?
- (3) How is education linked to other social factors, such as marriage, occupational employment (or spells of employment), or where one lives (geography)? Do these factors affect health outcomes independently or are they interactive?
- (4) With improved genotyping, how much does biology influence, accelerate, or act as a moderator between education and health outcomes?
- (5) What education data can be brought to bear to understand the linkage between educational attainment and health outcomes?

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