SES and Death Rate: Mechanisms and Empirical Evidence

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Abstract. This article focuses on one specific health-related outcome—mortality, describing the detailed patterns of health disparities by socioeconomic factors such as income and education. The authors also comment on the mechanisms underlying the observed mortality disparities. Later they examine the strengths and weaknesses of the empirical literature associated with each proposed mechanism, pointing directions for future research related to understanding the mortality disparities.

Introduction

Mortality has long been a concern throughout human history. With the advancement of medicine and technology, most developed countries have gone through the second demographic trend—that is low fertility and mortality with longer life expectancy. Death rate for adults has been declined in recent decades around the world, however, this improvements has not been equally distributed across all socioeconomic status (SES) groups. It has been well documented in the U.S. that there is an inverse link between SES and health, and large gaps in mortality exists among different race/ethnicity groups. Health disparities by socioeconomic status and race/ethnicity have been and will be the policy focus for 21st century. To understand the mechanisms linking them and track the changing patterns and trends overtime would be of extreme necessity and importance for policy making in terms of housing, health care reform, neighborhood environment building, etc. Here we will examine the patterns and the mechanism between SES and mortality.

Health disparity could be measured by different indicators, among which frequently employed are morbidity, mortality, life expectancy/life span, self-rated health, and specific disease rates like obesity, diabetes, etc. The health patterns differ depending on which health indicators employed, so here we will settle on the mortality rate as the key health indicator to explore health patterns and mechanisms. Mortality could be measured as age-standardized, age-specific, or cause-specific mortality rates across population subgroups and geographic areas. The following two indicators are frequently seen as mortality indices in previous empirical research. 1) Age-standardized all-cause death rate could compare mortality rates across populations by taking into account different age structures. 2) Life expectancy/life span is the maximum number of years an average person could live. It is also a key measurement used in mortality analysis, calculated from a life table constructed on the mortality rates for specific population or subgroups [1].

Measures of Socioeconomic Status (SES)

SES is a proxy for social class, and it is more of a Weberian notion of stratification. It becomes a remarkably robust determinant of variations in health status. SES has various dimensions, typically constituting income, level of education, and occupational status. Others included are community standing, power, and wealth [2], and sometimes even minority/racial status [3]. These variables are designed to capture different aspects of the SES, and better track its link to various health outcomes. Income reflects spending power, housing, diet, and medical care; occupation measures social identity, responsibility, physical activity, and psychological control of stress and other health-related risks
associated with work; education indicates a person’s ability to acquire positive social and economic resources [4].

**General Patterns Linking SES and Mortality Rate**

Earlier documents have recorded that those with high SES lived longer than those with lower SES [5]. Williams argues that the statement holds true even in the historical trend that lives are less threatened by infectious diseases, and common access to basic living infrastructure like clear water, housing, improvements in hygiene conditions, sufficient food and health care etc. [6]

Education has one of the strongest net influences on health, and its effect is argued to be the root feature of SES and determinant of health. And empirical findings show that education could mitigate the negative link between low income and economic hardship, and depression [7].

Those with a stable and better-paid jobs show better health outcomes than those without. Death rates of women in the labor force are substantially lower than those of housewives [8]. Part-time female workers have worse health than full-time workers, although their health is better than the non-employed [9]. Even for a similar income level, those who occupy the higher end of working hierarchy demonstrate lower risks of mortality, which is suggested by the Whitehall study among British male civil servants.

Some empirical research reveals that there are enlarging disparities across the SES indicators among different SES groups. Using the national Health Interview Survey in 1960 and 1986, Pappas found that the inverse link between SES and age-standardized mortality persisted, and mortality gap had enlarged from 1960 to 1986 [10], and those poor educated persons died at a higher rate than those with better income and higher education. It reflects the increasing health disparities due to income and education across different SES groups, despite the fact that average educational level has been increased for all in 1986. Their conclusion has been confirmed by another empirical research on the SES inequality on death rates, using data from the National Vital Statistics System to calculate mortality rates from 1993 to 2001. The contributing factor is the increasing SES inequality due to the continued progress for those well-educated, and the stable or even worsening trends among those less educated [11,12].

However, it is recognized that SES has a gradient effect on health. Beyond some level of SES, additional increase in SES has little or a greatly diminished effect in reducing mortality rate. The desirable benefit of additional income on health occurs at the lower bottom of income scale, which means that over the 20th percentile, income produces insignificant effect on health [13], and some report mean income as the cutting line. However, whether the percentile still holds true or how would it change in the current trend of enlarging SES disparity is still unknown and need to be further examined.

**Mechanisms Explaining These Persistent Links**

SES is one of the strongest and consistent predictors of death rates, as it reduces mortality risks through a number of mechanisms, in different situations, and for numerous causes of death [14].

**Social Selection/Social Causation**

The selection/drift hypothesis argues that those who have illness or diseases have prevented them from achieving higher level of SES. So the SES is the outcome of ill health not the cause for it. Healthy people have been “selected” into higher SES. However, earlier empirical studies provided support for it has been argued contaminated by methodological problems [15]. Recent cohort studies show that though health driven downward social mobility did occur, it made only a minor contribution to SES differences in health. And the major causal trend is from SES to health outcomes. Dohrenwend’s quasi-experiments, based on a large-scale epidemiological study in Israel, have concluded that social causation was stronger than social selection in producing the inverse association of SES to health outcomes [16]. The causation theory has been confirmed in later research with similar strategy [17].
SES Inequality as the Fundamental Cause

The fundamental cause model argues that all health disparity have the roots in the SES inequality, compared to the other relative proximal and distal causes of disease such as diet, cholesterol level, exercise and healthy behaviors [18].

Dimensions of SES convey information of the structural position a person or a subpopulation occupy in a society [19]. Though modern people are largely free from those infectious diseases thanks to the technological improvement, they are exposed to more subtle health threats and perils. SES conditions and limits the possible coping resources that people could utilize when needed, and shapes the exposure to risks and stressors [20]. For example, higher SES people decrease their mortality risks through better access to health care and other health related information and resources, as those resources enable them to be more alert and cautious of perceived health risks and quickly adjust their behaviors to correct or avoid the risks. In a word, though the risk patterns linking SES and health outcomes might change under different social circumstances, SES inequality remains the predictor of health disparity.

Psycho-social Process

This theory views health outcomes as people’s patterned response to daily life constraints and realities of the external environments. Those psychological factors, also called the lifestyle characteristics, include health practices such as smoking, drinking alcohol, eating nutritious food, social integration and support, sense of mastery and control, and other stress from family, occupational, or residential areas [21]. Empirical research finds that higher SES individuals often exercise more, smoke less, eat better diets, and refrain from illicit drug use, which lower the risks of mortality from accidents, cancers and other causes of death [22].

Life Course Perspective

It hypothesizes that early life conditions or SES could be critical for healthy development in later adulthood or even older ages, increasing the risks for certain diseases [23]. Some studies show a link between SES and height, while height is positively associated with less mortality rates. There is also a positive link between infant birth weight and infant mortality. As birth weight is a proxy of nutritional deprivation, it is highly positively related to adult heart disease in adulthood [25].

Future Research Direction

Education is the most stable and widely used indicator in SES. Other dimensions have been troubled with either data quality problem such as they may vary in time. How to better tune the measures to better represent both the short term changes and long term standing should be the future effort. New indicators have been suggested to better capture the economic situation of individuals or families/households, such as credit records, health insurance, home ownership, etc.

References

[1] Richard G. Rogers, Robert A. Hummer, Patrick Krueger, Adult mortality [C]// Dudley Poston, Michael Micklin (Eds.), Handbook of Population. New York City: Springer Publishing, 2005: 283-309.

[2] N. Moss, N. Krieger, Report on the conference of the National Institutes of Health [J]. Public Health Reports, 1995, 110(3): 302-305.

[3] D. R. Williams, Socioeconomic differentials in health: A review and redirection [J]. Social Psychology Quarterly, 1990, 53:81-99.

[4] William C. Cockerham, Medical Sociology [M]. Person Education, Inc., 2007.
[5] A. Antonovsky, Social class life expectancy and overall mortality [J]. Milbank Memorial Fund Quarterly, 1967, 45: 31-73.

[6] D. R. Williams, Socioeconomic differentials in health: A review and redirection [J]. Social Psychology Quarterly, 1990, 53:81-99.

[7] J. Mirowsky, P. Hu, Physical impairment and the diminishing effects of income [J]. Social Forces, 1996, 74:1073-1096.

[8] M. R. Passannante, C. A. Nathanson, Female labor force participation and female mortality in Wisconsin 1974-1978 [J]. Social Science and Medicine, 1985, 21: 655-665.

[9] J. Herold, I. Waldron, Part-time employment and women's health [J]. Journal of Occupational Medicine, 1985, 27: 405-412.

[10] Gregory Pappas, Susan Queen, Wilber Hadden, Gail Fisher, The increasing disparity in mortality between socioeconomic groups in the United States, 1960 and 1986 [J]. New England Journal of Medicine, 1993, 329(2):103-109.

[11] A. Jemal, E. Ward, R. N. Anderson, T. Murray, M. J. Thun, Widening of socioeconomic inequalities in U.S. death rates, 1993–2001 [J]. PLoS One, 2008, 3(5): e2181.

[12] Eileen M. Crimmins, Yasuhiko Saito, Trends in healthy life expectancy in the United States, 1970-1990: Gender, racial and educational difference [J]. Social Science and Medicine, 2001, 52: 1629-1641.

[13] Ross Mirowsky, J. Reynolds, Links between social status and health status [C]//Chloe Bird, Peter Conrad, Fremont (Eds.), Handbook of Medical Sociology. New Jersey: Prentice Hall. 2000: 202-218.

[14] E. M. Kitagawa, P. M. Hauser, Differential Mortality in the United States: A Study in Socioeconomic Epidemiology [M]. Cambridge, MA: Harvard University Press, 1973.

[15] D. R. Williams, Socioeconomic differentials in health: A review and redirection [J]. Social Psychology Quarterly, 1990, 53:81-99.

[16] B. Dohrenwend, Socioeconomic status (SES) and psychiatric disorders [J]. Soc. Psychol. Psychiatr. Epidemiol., 1990, 25:41-47.

[17] B.G. Link, J. Phelan, Social conditions as fundamental causes of disease [J]. Journal of Health and Social Behavior, 1995, Extra Issue: 80-95.

[18] B.G. Link, J. Phelan, Social conditions as fundamental causes of disease [J]. Journal of Health and Social Behavior, 1995, Extra Issue: 80-95.

[19] Leonard Perlin, The sociological study of stress [J]. Journal of Health and Social Behavior, 1989, 30: 241-56.

[20] J. Phelan, B. G. Link, P. Tehranifar, Social conditions as fundamental causes of health inequalities: Theory, evidence, and policy implications [J]. Journal of Health and Social Behavior, 2010, 51: S28-S40.

[21] D. R. Williams, Socioeconomic differentials in health: A review and redirection [J]. Social Psychology Quarterly, 1990, 53:81-99.

[22] S. H. Preston, P. Taubman, Socioeconomic differences in adult mortality and health status[C]// L.G. Martin, S. H. Preston (Eds.), Demography of Aging. Washington, D.C: National Academy Press, 1994:279-318.
[23] I.T. Elo, S. H. Preston, Effects of early-life conditions on adult mortality: A review [J]. Population Index, 1992, 58: 186-212.

[24] D. R. Williams, C. Collins, Racial residential segregation: A fundamental cause of racial disparities in health [J]. Public Health Reports, 2001, 116(5): 404-416.

[25] D. J. P. Barker, C. Osmond, P. D. Winter, B. Margetts, S. J. Simmonds, Weight in infancy and death from ischaemic heart disease [J]. Lancet, 1989, 9: 578-580.