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Purpose in life and reduced incidence of stroke in older adults: 'The Health and Retirement Study'

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ABSTRACT

Objective: To determine whether purpose in life is associated with reduced stroke incidence among older adults after adjusting for relevant sociodemographic, behavioral, biological, and psychosocial factors.
Methods: We used prospective data from the Health and Retirement Study, a nationally representative panel study of American adults over the age of 50. 6739 adults who were stroke-free at baseline were examined. A multiple imputation technique was used to account for missing data. Purpose in life was measured using a validated adaptation of Ryff and Keyes' Scales of Psychological Well-Being. After controlling for a comprehensive list of covariates, we assessed the odds of stroke incidence over a four-year period. We used psychological and covariate data collected in 2006, along with occurrences of stroke reported in 2008, 2010, and during exit interviews. Covariates included sociodemographic factors (age, gender, race/ethnicity, marital status, education level, total wealth, functional status), health behaviors (smoking, exercise, alcohol use), biological factors (hypertension, diabetes, systolic blood pressure, diastolic blood pressure, BMI, heart disease), negative psychological factors (depression, anxiety, cynical hostility, negative affect), and positive psychological factors (optimism, positive affect, and social participation).
Results: Greater baseline purpose in life was associated with a reduced likelihood of stroke during the four-year follow-up. In a model that adjusted for age, gender, race/ethnicity, marital status, education level, total wealth, and functional status, each standard deviation increase in purpose was associated with a multivariate-adjusted odds ratio of 0.78 for stroke (95% CI, 0.67–0.91, $p = .002$). Purpose remained significantly associated with a reduced likelihood of stroke after adjusting for several additional covariates including: health behaviors, biological factors, and psychological factors.
Conclusion: Among older American adults, greater purpose in life is linked with a lower risk of stroke.

Introduction

Chronic diseases cause an immense amount of social, financial, and personal burden. As researchers uncover the links between psychological factors and physical health, the search for psychological factors linked with disease onset intensifies. The logic behind this search is that the identification of such psychological factors may lead to innovative prevention and treatment efforts.

One condition, stroke, is especially costly for the US health care system. The prevalence of stroke among U.S. adults is roughly 7 million, with approximately 795,000 new cases reported annually [1]. In addition, the estimated direct cost of the condition in 2007 was $25.2 billion [1]. Because the risk for stroke increases with age, the identification of health-promoting constructs is particularly important for the expanding segment of older American adults facing the dual threat of declining health and rising health care costs.

While past research has mostly examined the detrimental impact of negative psychological states or traits (e.g., depression and anxiety) on health outcomes [2–4], researchers have more recently begun investigating how positive psychological characteristics (e.g., optimism and positive emotions) protect against illness and promote physical health, healthy behaviors, and longevity [5–13]. Among these positive psychological characteristics, purpose in life is a construct that contemporary psychologists have studied because of its potential to predict and promote better health [14–19]. Greater purpose has been associated with a reduced risk of Alzheimer's disease [20], reduced risk of heart attack among individuals with coronary heart disease [21], and increased longevity in both American and Japanese samples [14,22]. The definition of purpose in life varies throughout the field, but it is usually conceptualized as an individual's sense of directedness and meaning in his or her life [23]. The term "purpose in life" and "meaning in life" are often used interchangeably in the literature.

While prospective studies examining the association between purpose in life and cerebrovascular disease are uncommon, one recent study of 2959 Japanese respondents found an association between a one-item purpose in life measure and reduced stroke mortality over a

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13-year follow-up period [24]. Their analyses split purpose into a low or high category, and their multivariate model adjusted for five covariates: age, history of hypertension, history of diabetes, smoking habit, and perceived stress. However, further longitudinal research studies are needed to understand the relationship between purpose and cerebrovascular health.

In the present study, we extended existing work by using data from the Health and Retirement Study to examine the relationship between purpose in life and stroke in a nationally representative sample of American adults over the age of 50. In contrast to the study just described, we used a well-validated measure of purpose in life and controlled for a wider range of covariates, including several psychosocial variables that have been linked to stroke. We also examined stroke incidence rather than only stroke mortality.

We hypothesized that among older adults, higher purpose in life, as measured by Ryff and Keyes' Scales of Psychological Well-Being [18], would be associated with lower risk of stroke, even after adjusting for potential confounds. In order to examine the potential impact of covariates, we adjusted for sociodemographic, behavioral, biological, and psychosocial factors. We evaluated whether any observed effects between purpose and reduced stroke reflected the presence of other positive psychosocial constructs (optimism, positive affect, social participation) [7–11] or the absence of negative psychological factors (anxiety, cynical hostility, depression, and negative affect) [2–4].

Methods

Participants

The Health and Retirement Study (HRS) is a nationally representative panel study that has been surveying more than 22,000 Americans aged 50 and older every two years since 1992 [25]. We used psychological and covariate data collected in the eighth wave (2006), along with occurrences of stroke reported in the ninth wave (2008), tenth wave (2010), and during exit interviews. For respondents who died between 2006 and 2010, knowledgeable informants completed exit interviews and specified the respondent's cause of death. The University of Michigan's Institute for Social Research is responsible for the study and provides extensive documentation about the protocol, instrumentation, sampling strategy, and statistical weighting procedures [25].

Procedure

In 2006, approximately 50% of HRS respondents were randomly chosen and visited for an enhanced face-to-face interview. In order to prevent selection bias, the randomization and selection of respondents were carefully conducted by the coordinators of HRS. These respondents were asked to complete a self-report psychosocial questionnaire. The response rate was 90%. While HRS interviewed all couples in a household, only those 50 and older were included in the HRS database. Therefore, among those who were interviewed face-to-face, 7169 individuals were eligible for HRS at baseline. We excluded 430 individuals with a self-reported history of stroke at baseline, resulting in a final sample of 6739 respondents. We present the demographic characteristics of the study participants in Table 1.

Table 1
Distribution statistics of covariates

Measure	Mean/%	SD	Range
Age	68.78	9.84	53–105
Female	58.45%		
Married status	64.93%		
Race/ethnicity			
Caucasian	78.26%		
African-American	12.76%		
Hispanic	7.60%		
Other	1.38%		
Education			
<High school	18.56%		
High school	55.03%		
≥College	26.41%		
Total wealth			
1st quintile	16.07%		
2nd quintile	18.78%		
3rd quintile	21.64%		
4th quintile	21.47%		
5th quintile	22.04%		
Functional status	5.75	0.75	1–5
Smoking status			
Never	44.43%		
Former smoker	43.14%		
Current smoker	12.43%		
Exercise			
Never	62.24%		
Low	14.46%		
Moderate	20.63%		
High	2.67%		
Drink alcohol	51.85%		
Hypertension	54.83%		
Diabetes	18.45%		
Systolic BP, mm HG	133.32	21.60	72–224
Diastolic BP, mm HG	80.37	12.50	42–155
BMI, kg/m^2			
≤24.99	29.87%		
25–29.99	38.43%		
≥30	31.70%		
Heart disease	21.99%		

Measures

Self-reported health measures used in HRS have been rigorously assessed [25]. Self-reported health conditions have also shown substantial agreement with medical records [26].

Stroke outcome measurement

We defined stroke incidence as a first nonfatal or fatal stroke based on self or proxy-report of a physician's diagnosis using 2008, 2010, or exit survey data. Transient ischemic attacks are usually not conceptualized as full strokes in incidence studies because their symptoms are fleeting. Strokes that are assessed through self or proxy report correspond imperfectly with medical records. Although imperfect, the high correlation between self-reported strokes and hospital records has been well documented [26–30]. For example, a large-scale study reported that a self-reported stroke measure showed a positive predictive value of 79%, an estimated sensitivity of 80%, and a specificity of over 99% [27]. Furthermore, a previous study using HRS data confirmed that self-reported stroke is suitable for studying stroke and stroke risk factors [28].

Purpose in life

Purpose was assessed using a seven-item questionnaire adapted from the Psychological Well-Being Scales, a measure with evidence of reliability and validity in a nationally representative sample of adults (N = 1108) over the age of 25 [18]. Although the original scale includes 20 items, several shortened versions of the scale, ranging from 3 to 14 questions, have been developed and psychometrically assessed [31]. A slightly altered version of the seven-item scale that was used in this study has been psychometrically evaluated and validated in a previous large-scale study [31]. On a six-point Likert scale, respondents rated the degree to which they endorsed the following items: “I enjoy making plans for the future and working to make them a reality,” “My daily activities often seem trivial and unimportant to me,” “I am an active person in carrying out the plans I set for myself,” “I don't have a good sense of what it is I'm trying to accomplish in life,” “I sometimes feel as if I've done all there is to do in my life,” “I live life one day at a time and don't really think about the future,” and “I have a sense of direction and purpose in my life.” Negatively worded items were reverse scored. The seven items were averaged (all items were summed together, then divided by seven) to create a scale that ranged