Purpose in Life and Its Relationship to All-Cause Mortality and Cardiovascular Events: A Meta-Analysis

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ABSTRACT

Objective: To assess the net impact of purpose in life on all-cause mortality and cardiovascular events.

Methods: The electronic databases PubMed, Embase, and PsycINFO were systematically searched through June 2015 to identify all studies investigating the relationship between purpose in life, mortality, and cardiovascular events. Articles were selected for inclusion if, a) they were prospective, b) evaluated the association between some measure of purpose in life and all-cause mortality and/or cardiovascular events, and c) unadjusted and/or adjusted risk estimates and confidence intervals (CIs) were reported.

Results: Ten prospective studies with a total of 136,265 participants were included in the analysis. A significant association was observed between having a higher purpose in life and reduced all-cause mortality (adjusted pooled relative risk = 0.83 [CI = 0.75–0.91], $p < .001$) and cardiovascular events (adjusted pooled relative risk = 0.83 [CI = 0.75–0.92], $p = .001$). Subgroup analyses by study country of origin, questionnaire used to measure purpose in life, age, and whether or not participants with baseline cardiovascular disease were included in the study all yielded similar results.

Conclusions: Possessing a high sense of purpose in life is associated with a reduced risk for all-cause mortality and cardiovascular events. Future research should focus on mechanisms linking purpose in life to health outcomes, as well as interventions to assist individuals identified as having a low sense of purpose in life.

Key words: life purpose, meta-analysis, mortality, cardiovascular events.

INTRODUCTION

Having a strong sense of purpose in life has long been proposed as an essential component of psychological well-being and the development of human resilience (1). This was perhaps characterized best by Viktor Frankl, who noted that a sense of meaning was the distinguishing resiliency factor that allowed people to survive within the concentration camps of World War II (2). In general, purpose in life can be defined as a self-organizing life aim that stimulates goals, manages behavior, and provides a sense of meaning (3). The examination of life purpose has been formulated in various ways by different theorists. For example, a popular distinction that dates back to Aristotelian time distinguishes between hedonistic versus eudaimonistic pleasure, the latter being pleasure derived from meeting "spiritual" needs, such as the need for a sense of life purpose (4). Similarly, Ryff and Singer (5) have formulated purpose in life as a "basic psychological need," which, when satisfied, provides individuals with a sense of vitality and when absent, leads to tension and dissatisfaction. Ryff (6) further characterized purpose in life as a specific component of psychological well-being along with autonomy, environmental mastery, personal growth, positive relations with others, and self-acceptance. In subsequent work by Ryff and Keyes (7), purpose in life was identified as a separate and distinct construct which was independently associated with psychological well-being and weakly correlated with other positive psychological states such as happiness and positive affect.

Over the past decade, there have been a number of observational studies that have examined the relationship between purpose in life and health outcomes (8). Although many studies showed evidence of an inverse association between life purpose and health outcomes, some results were null after controlling for important biological and psychological covariates. A number of mechanistic studies have

CI = confidence interval, **CVD** = cardiovascular disease

SDC Supplemental Content

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suggested that purpose in life might exert its protective effects via direct physiology (e.g., lower cortisol levels in those with higher psychological well-being (9)) and/or through behavioral factors (e.g., increased physical activity (10) or diminished smoking rates (11)). To address some of these inconsistencies and assess for differential effects of purpose in life on health outcomes, we performed a meta-analysis of all prospective observational studies investigating the link between purpose in life, mortality, and cardiovascular events.

METHODS

Definitions, Data Sources, and Searches

The essence of life purpose, as described by McKnight and Kashdan (3), is a self-organizing life aim that stimulates goals, manages behavior, and provides a sense of meaning. Accordingly, purpose in life can be interpreted as different things to different individuals. Thus, for this meta-analysis, purpose in life includes measures such as usefulness to others, life engagement, and ikigai. Ikigai is a Japanese term that refers to a "life worth living." Life meaning was also included as a relevant search term. Although the literature suggests that life purpose is a component of meaning in life (12,13), for the purpose of this meta-analysis, we were interested in the net effect of purpose and meaning on important health outcomes. Thus, these 5 terms are used interchangeably throughout the manuscript to represent the construct of purpose in life. Furthermore, different instruments are used in different studies to assess for the purpose in life construct. Table S1, Supplemental Digital Content 1, http://links.lww.com/PSYMED/A260, provides additional information on these instruments along with sample questions.

The electronic databases PubMed, Embase, and PsycINFO were systematically searched with the following MESH terms: "purpose in life," "meaning in life," "usefulness in life," "engagement in life," "ikigai," "mortality," "cardiovascular," and "survival." Only published studies in English from peer-reviewed journals were selected. In addition, references from included studies and pertinent review articles were searched to identify other studies meeting selection criteria.

Study Selection

Articles were selected for inclusion in the meta-analysis if, a) they were prospective in nature, b) the study evaluated the association between some measure of purpose in life and all-cause mortality and/or cardiovascular events, and c) the authors reported the unadjusted and/or adjusted risk estimates and confidence intervals (CIs). We identified articles for further review by performing an initial screen of abstracts, followed by full-text reviews.

Data Extraction and Quality Assessment

The data were independently extracted by two authors (R.C. and C.B.) using a standardized protocol and reporting form. Disagreements were resolved by arbitration (A.R.) and consensus was reached after discussion. We extracted the following information: study characteristics (study name, authors, publication year, country of origin, sample size, study design, follow-up duration), patient characteristics (mean age, sex, major covariates), main exposure (method of assessment of purpose in life), and main outcomes (all-cause mortality, cardiovascular events). Unadjusted and fully adjusted relative risks, 95% CIs, and variables used in multivariate analysis were abstracted and evaluated. Study quality was assessed by the Newcastle-Ottawa scale (14). The Newcastle-Ottawa scale grades studies based on the following domains: representativeness of exposed cohort, selection of comparator cohort, ascertainment of exposure, comparability on basis of design or analysis, assessment of outcome, follow-up long enough for outcome to occur, and adequacy of follow-up of cohorts. Studies are graded as excellent, good, or fair quality based on their overall performance in each domain. Our primary study outcomes were all-cause mortality and cardiovascular events. Cardiovascular events (as defined by the included studies) were fatal/nonfatal myocardial infarction, sudden cardiac death, or fatal/nonfatal stroke. Six studies reported only all-cause mortality, two studies reported all-cause and cause-specific mortality, and two studies reported only cardiovascular events.

Data Synthesis and Analysis

Unadjusted and adjusted relative risks and hazards ratios reported by individual studies were used in the analysis. Because of known clinical and methodological heterogeneity of the studies, multivariate effect estimates were pooled using DerSimonian and Laird random-effects models (15). The study by Tanno et al. (16) reported separate relative risks for men and women, and thus were considered two separate studies for the purpose of analysis. The studies by Gruenewald et al. (17), Sone et al. (18), Okamoto and Tanaka (19), and Nakanishi et al. (20) reported that low/absent purpose in life was associated with higher events rates, whereas the remaining studies reported that high purpose was associated with reduced event rates. To ensure consistency of our data, the reciprocal of the relative risk was used for these studies. Heterogeneity was assessed using Higgins and Thompson with I^2 values of <25%, 25%–75%, and >75% correspond to low, moderate, and high levels of heterogeneity (21). Reasons for heterogeneity in study results were further explored using subgroup analyses. Subgroups analysis was performed according to country where the study was conducted, assessment method for purpose in life, age, and according to whether or not participants with baseline cardiovascular disease (CVD) were included. We also performed a sensitivity analysis to investigate the influence of each individual study on the overall meta-analysis results. Publication bias was tested using Egger regression test (22) and visual inspection of funnel plot. The Duval and Tweedie nonparametric trim-and-fill procedure was used to further assess the possible effect of publication bias in our meta-analysis (23). Duval and Tweedie trim-and-fill method uses an iterative procedure to "trim" (remove) smaller studies that causes funnel plot asymmetry and hence publication bias, use the trimmed funnel plot to estimate the true "center" of the funnel plot, and then replace the omitted studies and their missing "counterparts" around the center (fill). A 2-tailed $p < .05$ was considered statistically significant. All analyses were performed using Stata 11 (Stata Corp, College Station, TX).

RESULTS

Our initial search strategy yielded 28 eligible studies (Fig. 1). Twelve duplicate studies were removed. The study by O'Connor and Vallerand (24) was eliminated due to a lack of reported CIs. The study by Sirri et al. (25) was eliminated due to reporting only univariate odds ratios. The study by Koizumi et al. (26) was eliminated because the study population and recruitment period overlapped with the population in the study by Tanno et al. (16). Furthermore, the study by Tanno et al. had a larger sample size with a longer follow-up period. The study by Giltay et al. (27) was eliminated because it examined the relationship between mortality and dispositional optimism, a positive psychological state with separate characteristics. The study by Skrabski et al. (28) was eliminated because only correlations between purpose in life and mortality were reported. Finally, the study by Seki (29) was eliminated because it was published only in Japanese. Ten studies met our final selection criteria and were included in the meta-analysis.

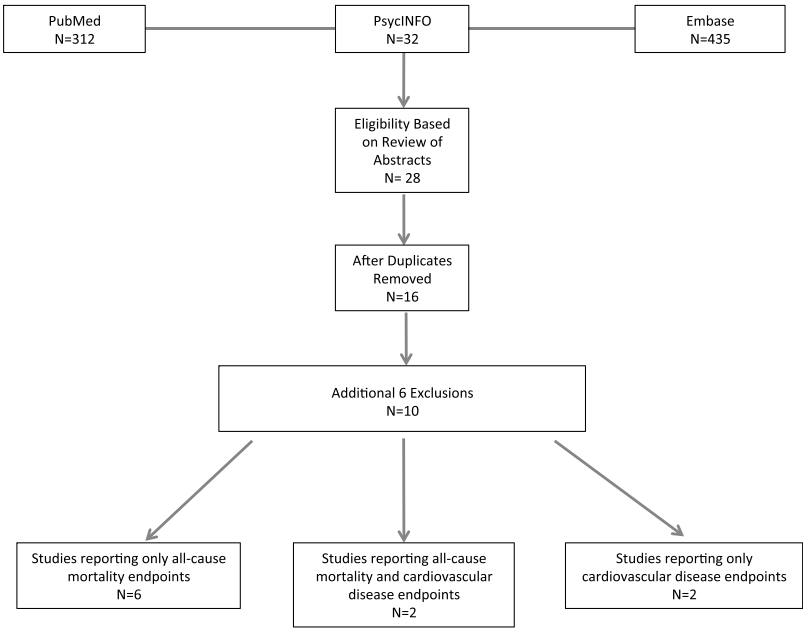

FIGURE 1. Flow diagram of literature search and selection process.

The overall study quality was excellent with a mean quality score of 8 (range, 7–9). The baseline characteristics of the included studies are listed in Table 1. The study population involved 136,265 participants with a mean follow-up of 7.3 years. Nine studies reported a mean age for the study population, with one (Nakanishi et al. (20)) reporting only a range. The mean age for the nine studies was 67 years. There were a total of 14,518 all-cause mortality events and 4316 cardiovascular events.

A significant association was observed between having a high sense of purpose in life and reduced all-cause mortality (unadjusted pooled relative risk = 0.67 [CI = 0.57–0.78; Fig. 2). After adjusting for all covariates listed in each individual study, high purpose in life remained a significant predictor of reduced all-cause mortality (fully adjusted pooled relative risk = 0.83 [CI = 0.75–0.91; Fig. 3). Similar results were noted when purpose in life was studied in relation to CVD events (Figs. 4 and 5).

Tests for heterogeneity among the studies were noted to be significant prompting subgroup analysis. Using adjusted risk ratios for all-cause mortality, subgroup analyses were performed according to study country of origin, questionnaire used to assess purpose in life, age, and according to whether or not participants with baseline CVD were included in the study population (Table 2). All subgroup analyses were highly significant.

Tests for publication bias were also performed (Figs. 6 and 7). No publication bias was found for unadjusted analysis; however, visual inspection of the funnel plot for all-cause mortality suggested the presence for publication bias for adjusted analysis. Egger test showed significant asymmetry (adjusted relative risk, $p = .024$). According to the trim-and-fill method, the association between purpose in life and all-cause mortality remained unchanged and was significant after imputing possible missing studies (adjusted relative risk = 0.82 [95% CI = 0.75–0.90], $p < .001$).

DISCUSSION

An extensive literature has demonstrated a consistent association between negative psychosocial risk factors and adverse clinical outcomes, including myocardial infarction, cardiac mortality, stroke, and all-cause mortality (34). Conversely, more recent study provides evidence that positive psychosocial factors can promote healthy physiological functioning and greater longevity (35). Purpose in life is a factor that can vary along a continuum of high to low, but until recently, its study from an epidemiological perspective had been lacking. Over the last decade, however, substantial study has been reported concerning the relationship between purpose in life and a variety of clinical measures of health and adverse clinical outcomes.

Our current study encompasses the examination of 10 prospective studies involving more than 136,000 participants, assessed for both all-cause mortality and cardiovascular events. In unadjusted analysis, eight of the nine studies showed a statistically significant decrease in risk for mortality among those with high life purpose. The risk ratios varied widely, from 0.24 to 0.92. Eight studies remained statistically significant after adjusting for significant covariates, which generally included age, sex, various cardiovascular risk factors, and a variety of psychosocial parameters. Overall, the risk ratio for all-cause mortality was 0.67 before risk adjustment and 0.83 after risk adjustment. Similar findings were

TABLE 1. Baseline Characteristics of Included Studies

Author (Reference)	Country	*N*	Mean Age, y	% Male	Follow-Up, y	Measure	Instrument	End Point(s)	Verification of End Point	No. Events (ACM/CVD)	Covariates
Gruenewald 2007 (17)	USA	1,030	74	45	7	Usefulness to others	Single question	ACM	National Death Index	252	Age, education, physical activity, alcohol, smoking, volunteer, social ties, depressed mood, self-efficacy
Sone 2008 (18)	Japan	43,391	60	48	7	Ikigai	Single question	ACM, cancer, CVD (excluded baseline cancer and CVD)	Death certificates	3048/971	Age, sex, marital status, education, employment status, self-rated health, perceived mental stress, bodily pain, physical function, body mass index, smoking, alcohol, time spent walking, sleep duration, hypertension, diabetes, kidney/liver/gastrointestinal diseases, arthritis, osteoporosis
Tanno 2009 (16)	Japan	30,155	57	100	13	Ikigai	Single question	ACM, cancer, CVD (excluded baseline cancer and CVD)	Death certificates	5855/1599	Age, sex, body mass index, smoking, alcohol, physical activity, sleep duration, education, job status, marital status, perceived mental stress, hypertension, diabetes
Tanno 2009 (16)	Japan	43,117	57	0	13	Ikigai	Single question	ACM, cancer, CVD (excluded baseline cancer and CVD)	Death certificates	4166/1405	Age, sex, body mass index, smoking, alcohol, physical activity, sleep duration, education, job status, marital status, perceived mental stress, hypertension, diabetes
Okamoto 2004 (19)	Japan	784	73	43	6	Usefulness to others	Single question	ACM	Death certificates	148	Age, sex, marital status, self-rated health, comorbidities, depression, social contact and social roles
Hill 2014 (30)	USA	6163	47	48	14	Purpose in life	Modified Ryff Well-Being	ACM	National Death Index	569	Age, positive social interactions, positive affect, negative affect, age at time of death, retirement status
Krause 2009 (31)	USA	1361	78	40	5	Meaning in life	Meaning in Life Questionnaire	ACM	Informant reported	217	Age, sex, education, marital status, self-rated health, serious illness, non-serious illness, functional disability
Boyle 2009 (32)	USA	1238	78	26	5	Purpose in life	Modified Ryff Well-Being	ACM	Proxy report and Social Security Death Index	151	Age, sex, education, race, depressive symptoms

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TABLE 1. *(Continued)*

Author (Reference)	Country	*N*	Mean Age, y	% Male	Follow-Up, y	Measure	Instrument	End Point(s)	Verification of End Point	No. Events (ACM/CVD)	Covariates
Kim—CHD 2013 (10)	USA	6739	69	42	4	Purpose in life	Modified Ryff Well-Being	CHD (included baseline CHD)	Interview	265	Age, sex, ethnicity, marital status, education, total wealth, functional status, smoking, exercise, alcohol, hypertension, diabetes, systolic blood pressure, diastolic blood pressure, body mass index, heart disease, depression, anxiety, cynical hostility, negative affect, optimism, positive affect, social participation
Kim—CVA 2013 (33)	USA	1546	72	49	2	Purpose in life	Modified Ryff Well-Being	CVA (excluded baseline CVA)	Self or proxy report or exit interview	76	Age, sex, coronary heart disease severity, self-rated health, anxiety, cynical hostility, depression
Nakanishi 2003 (20)	Japan	741	65–92	33	6	Ikigai	Single question	ACM	Death Certificates	112	Age, sex, change in disability, daily health promotional practices, medical treatments, changes in psychosocial conditions (participation in social activities, difficulty with relationships)

N = sample size of study population; ACM = all-cause mortality; CVD = cardiovascular disease; CVA = cerebrovascular disease; CHD = coronary heart disease.

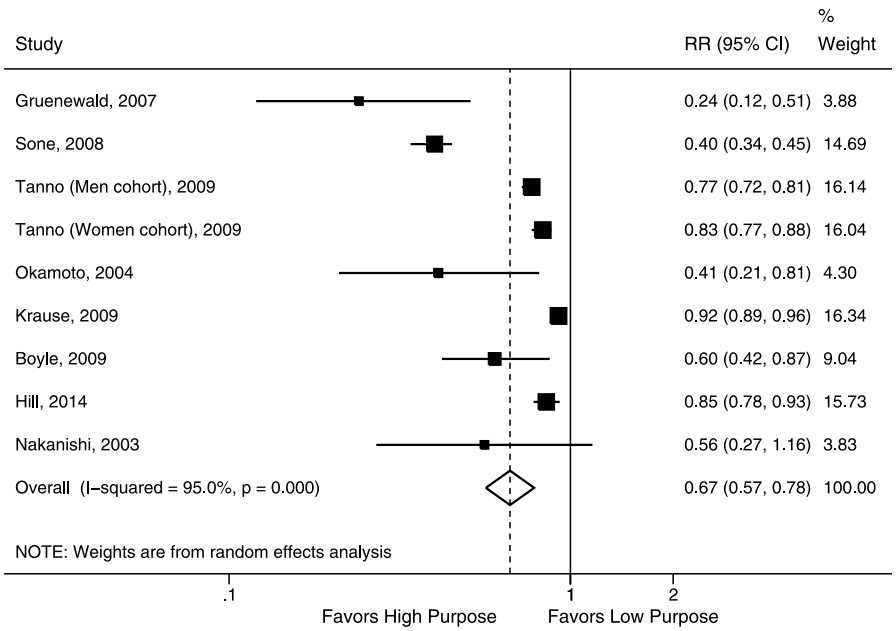

FIGURE 2. Unadjusted RRs for all-cause mortality according to high versus low purpose in life. Squares represent the risk ratio of the individual studies; horizontal lines represent the 95% CIs of the risk ratio. The size of the square reflects the weight that the corresponding study exerts in the meta-analysis. The diamond represents the pooled risk ratio or the overall effect. RR = relative risk; CI = confidence intervals.

noted for cardiovascular events, with an unadjusted risk ratio of 0.65 and an adjusted risk ratio of 0.83.

We further assessed results according to four parameters and their impact on all-cause mortality: the study country of origin, the method used to assess purpose in life, age, and whether or not participants with baseline CVD were included in the studies. The study of origin was evaluated because 5 of the 10 studies emanated from Japan, with the

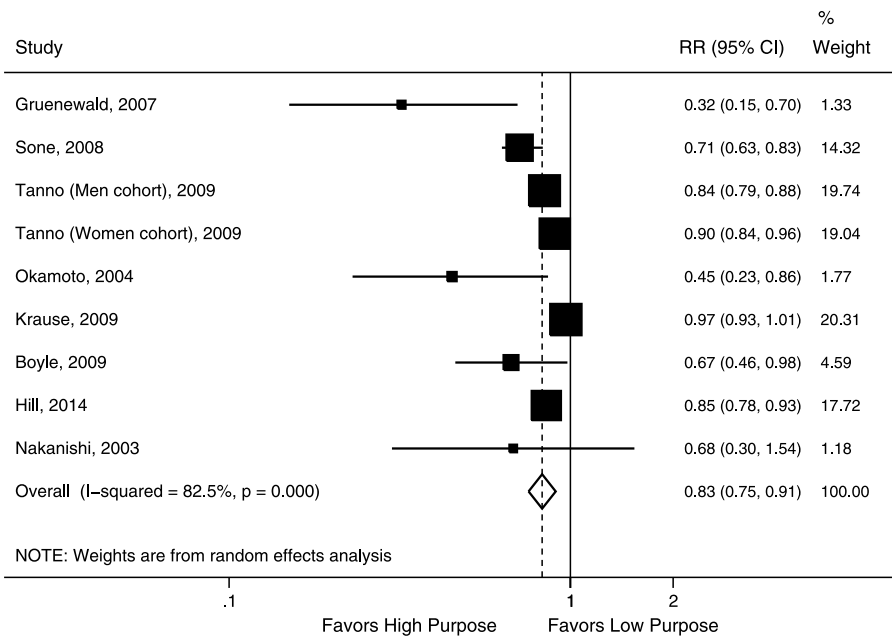

FIGURE 3. Adjusted RRs for all-cause mortality according to high versus low purpose in life. Squares represent the risk ratio of the individual studies; horizontal lines represent the 95% CIs of the risk ratio. The size of the square reflects the weight that the corresponding study exerts in the meta-analysis. The diamond represents the pooled risk ratio or the overall effect. RR = relative risk; CI = confidence intervals.

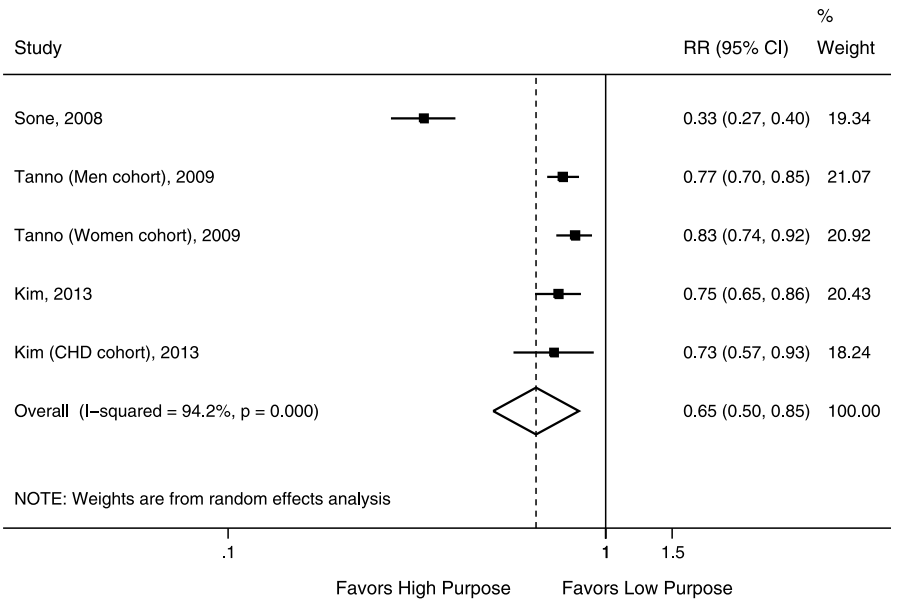

FIGURE 4. Unadjusted RRs for cardiovascular events according to high versus low purpose in life. Squares represent the risk ratio of the individual studies; horizontal lines represent the 95% CIs of the risk ratio. The size of the square reflects the weight that the corresponding study exerts in the meta-analysis. The diamond represents the pooled risk ratio or the overall effect. RR = relative risk; CI = confidence intervals.

other 4 originating in the United States. The risk ratios associated with purpose in life were similar in both countries. In addition, in one large European study of 12,640 individuals that did not meet criteria for inclusion in our meta-analysis (reported only correlation coefficients for meaning in life and mortality), life meaning, as assessed by a subscale of Rahe's Brief Stress and Coping Inventory, was found to be correlated with all-cause mortality (28). Five studies assessed purpose in life and all-cause mortality according to a single-item questionnaire, one used a Meaning in Life questionnaire and four used variations of the Ryff Well-Being scale. Despite these different assessment tools,

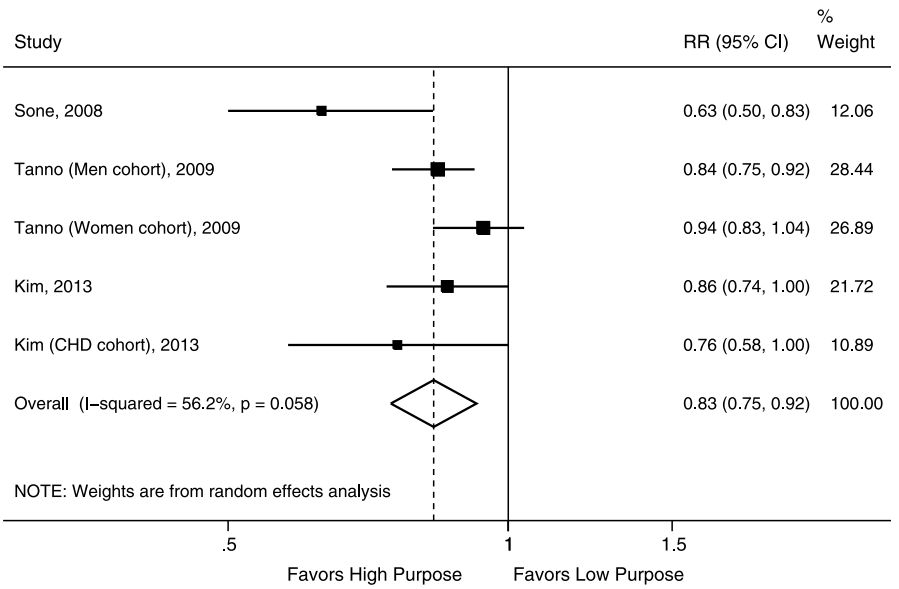

FIGURE 5. Adjusted RRs for cardiovascular events according to high versus low purpose in life. Squares represent the risk ratio of the individual studies; horizontal lines represent the 95% CIs of the risk ratio. The size of the square reflects the weight that the corresponding study exerts in the meta-analysis. The diamond represents the pooled risk ratio or the overall effect. RR = relative risk; CI = confidence intervals.

TABLE 2. Summary Statistics and Subgroup Analysis

	No. Studies[a]	RR (95% CI)	*p*	I^2
All-cause mortality				
Unadjusted	9	0.67 (0.57–0.78)	<.001	95.0%
Adjusted	9	0.83 (0.75–0.91)	<.001	82.5%
CVD mortality				
Unadjusted	5	0.65 (0.50–0.85)	.001	94.2%
Adjusted	5	0.83 (0.75–0.92)	.001	56.2%
Subgroup analysis of adjusted all-cause mortality				
By country				
USA	4	0.83 (0.70–0.98)	.036	83.2%
Japan	5	0.81 (0.73–0.90)	<.001	70.1%
By questionnaire used				
Modified Ryff Well-Being Scale	2	0.81 (0.68–0.97)	.026	30.7%
Other questionnaire	7	0.83 (0.74–0.92)	.001	85.7%
By follow-up				
Included participants with baseline CVD	5	0.63 (0.42–0.95)	.026	76.9%
No baseline CVD	4	0.84 (0.78–0.90)	<.001	68.6%
By age				
Mean age >65 y	5	0.63 (0.42–0.95)	.026	76.9%
Mean age ≤65 y	4	0.84 (0.78–0.90)	<.001	68.6%

No. = number; RR = relative risk; CI = confidence interval; CVD = cardiovascular disease.

[a] Men and women cohorts of the study by Tanno et al. (16) were considered as separate studies.

however, subgroup analyses involving the Ryff Well-Being questionnaire versus the single-item measures all suggest that they are significant predictors of all-cause mortality. Risk ratios also did not differ among studies that included versus excluded participants with preexisting CVD. Together, these findings indicate a robust relationship between purpose in life and mortality and/or adverse cardiovascular outcomes.

Prior Studies

Although the study of life purpose and hard clinical outcomes is only recent, an extensive prior literature has established a link between positive psychosocial functioning and health outcomes. A prior review by Pressman and Cohen (36) suggested an overall inverse association between positive affect, mortality, cardiovascular function, and other biological systems. Steptoe et al. (37) also observed broad

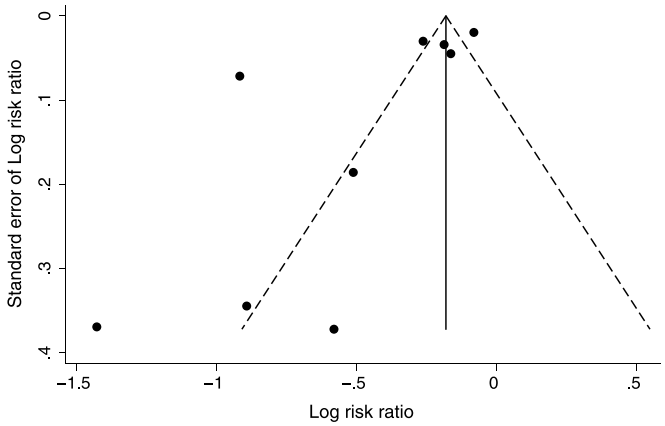

FIGURE 6. Funnel plots of unadjusted RRs for purpose in life and all-cause mortality. Squares represent the risk ratio of the individual studies; horizontal lines represent the 95% CIs of the risk ratio. The size of the square reflects the weight that the corresponding study exerts in the meta-analysis. The diamond represents the pooled risk ratio or the overall effect. RR = relative risk; CI = confidence intervals.

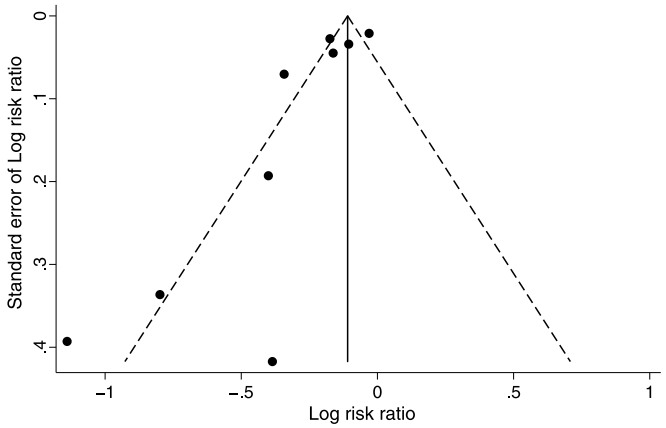

FIGURE 7. Funnel plots of adjusted RRs for purpose in life and all-cause mortality. Squares represent the risk ratio of the individual studies; horizontal lines represent the 95% CIs of the risk ratio. The size of the square reflects the weight that the corresponding study exerts in the meta-analysis. The diamond represents the pooled risk ratio or the overall effect. RR = relative risk; CI = confidence intervals.

biopsychosocial support for the relationship between positive affect and health outcomes. Similarly, in work by Chida and Steptoe (35), positive psychological well-being was consistently associated with reduced mortality in both baseline healthy and diseased populations. Although purpose in life is a component of positive psychological health, it was not specifically addressed in these three reviews. Boehm and Kubzansky (38) reviewed 28 studies involving positive psychological well-being and health outcomes, again with overall similar findings. Three of the included studies examined purpose in life (included in this meta-analysis) and found inverse associations with mortality. More specifically, purpose in life has been related to a variety of psychosocial and health-related outcomes. A meta-analysis of 70 studies demonstrated that purpose in life was associated with a greater sense of competence, stronger social integration, positive affect, and lower rates of depression (39). More recently, longitudinal study of older community-dwelling individuals without dementia revealed that those with a higher sense of purpose were less likely to develop impairment of physical abilities during follow-up (40). In other work, Boyle et al. (41) reported that the presence of a high sense of purpose in life predicted a lower risk for developing both Alzheimer's disease and mild cognitive impairment during a 7-year follow-up of 951 individuals. A subsequent substudy involving postmortem examination revealed that higher life purpose was associated with more benign global pathophysiological changes and plaque accumulation compared with those with lower life purpose at baseline (42). Combined, these studies strongly complement the findings of our study.

Potential Pathophysiological Mechanisms

To date, pathophysiological study concerning purpose in life has been relatively limited, but the findings are suggestive of a few basic mechanisms by which low life purpose might promote and high life purpose might deter disease. First, purpose in life might exert its affects through direct buffering of pathophysiological responses to psychosocial stressors, as suggested by a small number of studies. For instance, purpose in life has been found to be associated with better immune function (43) and better recovery from negative visual image stimuli as measured by the eyeblink reflex (44). Other work has suggested a potential relationship between purpose in life and reduced levels of salivary cortisol (9), but it should be noted that this finding may not be specific to any given dimension of Ryff's various domains of psychological well-being. Life engagement, a similar construct to life purpose, has also been inversely associated with hemoglobin A1C in patients with diabetes mellitus (45).

Second, purpose in life might also exert its clinical effects through behavioral mechanisms, such as a commitment to a healthier diet, physical activity, and avoidance of substance abuse. Such health-promoting behaviors have been noted with other positive psychological factors such as optimism (46) and strong social support (47). Although study of the effects of life purpose on health-promoting behaviors is not yet extensive, preliminary study has revealed an association between life purpose and higher levels of physical activity (10) and greater likelihood of being a nonsmoker (11). Furthermore, in a recent follow-up of 7168 individuals from the Health and Retirement Study, purpose in life was strongly associated with better use of preventive health services, even after adjusting for a variety of important covariates, including baseline health, positive affect, and socioeconomic factors (48). Other studies have found associations between purpose in life and higher levels of high-density lipoprotein and lower waist-hip ratios (49), reduced odds of disrupted sleep patterns (50), and greater maintenance of functional status among community-dwelling older adults (40).

Third, purpose in life might also exert beneficial effects by servings as an emotional buffer. Along these lines, Feder et al. (51) observed reduced symptoms of posttraumatic

stress disorder and higher positive emotions among earthquake survivors identified as having a higher sense of purpose in life.

Because most of these pathophysiologic arenas have only been sparsely studied so far, more investigation is needed to explore the potential pathophysiological and behavioral mechanisms by which purpose in life may be health promoting.

Limitations

Our study contains a number of important limitations. First, we did not restrict studies to only purpose in life. Rather, our meta-analysis assumed purpose in life to be a similar psychological construct to meaning in life, usefulness in life, engagement in life, and ikigai, and thus included all studies with these terms. Accordingly, there was considerable variation in the assessment tools used to assess purpose in life. Future study might seek to evaluate if there are practical distinctions between these constructs. For instance, it has recently been suggested that purpose in life is but a facet of what many refer to as meaning in life (12). According to this reasoning, we come to see life as meaningful when we feel that it has purpose, that we matter to the world in some way, and it is coherent and understandable for us. The concepts of purpose in life and meaning in life should thus be correlated, but not necessarily redundant with one another. Overall, four studies in our meta-analysis used variations of the Ryff Well-Being scale to assess for purpose in life (10,30,32,33), whereas one study used the meaning in life questionnaire (31), two used single-item measures of usefulness (17,19), and three used single item measures of ikigai (16,18,20). Despite these differences in definitions and assessment tools, however, we observed markedly consistent associations between purpose in life, all-cause mortality, and cardiovascular events. Second, although psychosocial risk factors typically manifest a graded relationship to the frequency of adverse clinical events, this could not be adequately assessed in our study. In the one study where a graded relationship was assessed, Kim et al. (10) noted that the relative risk for myocardial infarction was reduced by 27% for each unit increase in measured purpose. Third, our results manifested a high degree of heterogeneity. Although all subgroup analyses were significant predictors of all-cause mortality, the heterogeneity noted in the relative risk estimates may still be explained by differences in the definitions of life purpose, assessment tools used, and the extent to which other psychosocial factors were included as controlling covariates. Although prior work has established that purpose in life is a separate and distinct component of psychological well-being, it is possible that other psychosocial factors are contributing to the observed findings. Of the 10 included studies, 5 controlled for social support and 3 for the influence of positive affect. Because of the small number of studies, we were unable to compare effect sizes between those studies which controlled for other aspects of psychological well-being and those that did not. Mechanistically, purpose in life might exert its health effects (in part) by promoting positive health behaviors. Of the 10 included studies, 6 included health behaviors as important covariates, albeit with inconsistent definitions of health promoting behavior. Thus, this is an important limitation which requires further study. Also, religion and/or spirituality may be an important source of life purpose for many individuals. Unfortunately, none of the included studies examined this as a covariate. In addition, the presence of psychological ill-being could potentially influence the association between low life purpose and negative health outcomes. Although 6 of the 10 studies controlled for depression or depressed mood, this remains a limitation which warrants further investigation. Finally, analyses for publication bias suggested an absence of smaller studies with no beneficial impact of life purpose, as well as smaller studies of low methodological quality. After imputing possible missing studies, however, our findings remained unchanged.

Clinical Implications

The results of our study, along with other recent outcome studies, indicate that purpose in life is an important health variable that is associated with a reduced risk of adverse outcomes, including all-cause mortality, cardiovascular outcomes, stroke, dementia (41), and development of disability (40). Our results are of particular interest because purpose in life is a potentially modifiable factor that could result in downstream health benefits. Indeed, one population that has already been studied in this regard is the elderly, who are a convenient population to test the benefits of volunteering, an intervention that provides both social opportunity and purposeful engagement (52). Meta-analysis indicates that volunteering in older participants is associated with a reduced rate of mortality (53) and interventional studies have begun to demonstrate biological mechanisms by which volunteering can promote health benefits both among the elderly (54–56) and the young (57). Other specific interventions to develop and promote purpose in life, a component of well-being, include well-being therapy and meditation. Well-being therapy, developed by Fava (58) as an add-on component to cognitive behavioral therapy, seeks to emphasize positive life experiences. Prior work in this field demonstrated significant improvements in rate of relapse for major depression (59), as well as treatment of generalized anxiety disorder (60). Similarly, meditation therapy has been shown to improve components of well-being such as mindfulness and purpose in life (61).

In addition, it is conceivable that a sense of purpose and/or pursuit of meaningful activities moderate the effects of psychosocial stressors. For instance, Poulin et al. (62) have recently reported that giving to others predicted a reduced relationship between chronic stress and subsequent mortality.

Similarly, Brown et al. (63) noted reduced mortality among participants who were providers of instrumental social support but not among those who were recipients. In other work, volunteering was found to be associated with a reduced risk of mortality only among those who volunteered for altruistic reasons, but not among those who volunteered for self-oriented reasons (64). In this regard, future studies might further examine the extent to which a sense of purpose moderates a variety of stressors, such as caregiver strain, job stress, and prior exposure to trauma or abuse.

Accordingly, further study into the health-promoting effects of purpose in life is indicated. Additional work is needed to ascertain the optimal assessment tools for measuring purpose in life, evaluate whether there is a graded relationship between the depth of life purpose and subsequent health benefits, and extend such studies to patient populations. Given the strength of association between having low life purpose and negative health outcomes, interventional studies are also needed to assess the extent to which psychosocial therapies raise one's sense of life purpose.

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