Sense of life worth living (ikigai) and incident functional disability in elderly Japanese: The Tsurugaya Project

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ABSTRACT

Objective: To test the hypothesis that elderly persons who feel ikigai (a sense of life worth living) have a lower risk of incident functional disability than those who do not. Recent studies have suggested that ikigai impacts on mortality. However, its impact upon disability is unknown. The aim of the present study was to investigate the association between ikigai and incident functional disability among elderly persons.

Methods: We conducted a prospective cohort study of 830 Japanese elderly persons aged ≥70 years as a comprehensive geriatric assessment in 2003. Information on ikigai was collected by self-reported questionnaire. Data on functional disability were retrieved from the public Long-term Care Insurance database in which participants were followed up for 12 years. Hazard ratios (HRs) and 95% confidence intervals (CIs) for incidence of functional disability were calculated for three groups delineated according to the presence of ikigai (“no,” “uncertain” or “yes”) using the Cox proportional hazards regression model.

Results: The 12-year incidence of functional disability was 53.3% (442 cases). As compared with the “no” group, the multiple-adjusted HR (95% CI) of incident functional disability was 0.61 (0.36–1.02) for the “uncertain” group and 0.50 (0.30–0.84) for the “yes” group.

Conclusion: A stronger degree of ikigai is significantly associated with a lower risk of incident functional disability.

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1. Introduction

Previous studies have proved that a positive psychological state is associated with a lower risk of mortality [1], incident coronary heart disease [2] and stroke [3].

In Japanese culture, having a sense of “life worth living” (ikigai) is a commonly used indicator of subjective well-being. Ikigai does not merely reflect an individual's psychological factors (well-being, hopes) but also consciousness about his/her motivation for living [4], because it has a meaning akin to having a “purpose in life” or a “reason for living.” In the most authoritative dictionary used in Japan, ikigai is described as “joy and a sense of well-being from being alive” and “realizing the value of being alive” [5].

Recently, we and other researchers have indicated that people with ikigai have a lower risk of mortality than those who do not feel it [6–10]. The increase in mortality risk has been attributed to cardiovascular disease, especially stroke [6]. Because stroke is one of the major causes of functional disability, it is expected that ikigai would contribute to disability prevention. However, we have not found any previous studies examining the association between ikigai and incident risk of disability.

In the present study, we attempted to test the hypothesis that elderly persons who feel ikigai have a lower risk of incident functional disability than those who do not.

2. Methods

2.1. Participants

The Tsurugaya Project was a comprehensive geriatric assessment implemented in 2003 that included medical status as well as physical and cognitive functions [11,12]. Among 2925 community-dwelling elderly people aged 70 or more and living in the Tsurugaya area of Sendai city (Japan), 906 provided written informed consent to participate in the study and agreement to review their Long-term Care Insurance (LTCI) information. We excluded some participants who had already been LTCI-certificated as having a disability (n = 75), or participants...
who did not answer the question about ikigai \((n = 1)\). Therefore, the present study analyzed data for 830 participants.

2.2. Measurements

When the project was conducted in 2003, \textit{ikigai} was assessed by the question: “Do you have \textit{ikigai} in your daily life?” The subjects were asked to choose one of three possible answers: “yes”, “uncertain” or “no”.

Other information was also collected at the same time, and we considered these data to represent potential confounding factors: age at the baseline (continuous variable), sex (men or women), cognitive function \((\leq 26, \geq 27 \text{ MMSE score})\) [13–15], depressive symptoms \((\leq 10, \geq 11 \text{ GDS score})\) [16], history of illness (stroke, bronchial asthma, hearing loss, cataract or glaucoma, osteoporosis), body pain (mild to severe, very mild to mild, none), urinary incontinence (yes, no), body mass index \((\text{in kg/m}^2): \leq 18.4, 18.5–24.9, \geq 25.0)\), serum albumin \((\text{in g/dL}: \leq 3.8, \geq 3.9)\), Timed up and go (TUG) test \((\text{in seconds (both men and women): } \leq 8.23, 8.24–9.66 \text{ and } \geq 9.67; \text{ in seconds (men): } \leq 8.01, 8.02–9.29, \geq 9.30; \text{ in seconds (women): } \leq 8.41, 8.42–10.1, \geq 10.2, \text{ the Tokyo Metropolitan Institute of Gerontology (TMIG) index of competence (} \leq 11, 12, 13\text{), METs/day score (} \leq 34.3, 34.4–36.5, \geq 36.6\text{), smoking (current, former, never), alcohol drinking (current, former, never), social support (lack, no lack), education level (age upon graduation from last school} \leq 17, 18–21, \geq 22\text{ years), job (unemployed, employed), hobby activity (none, former, current) and volunteer activity (none, former, current).}

Cognitive function was measured by using the Mini-Mental State Examination (MMSE) [13–15]. Depressive symptoms were measured by using the Geriatric Depression Scale (GDS). This was a Japanese version of the 30-item scale. Urinary incontinence was assessed by the International Consultation Incontinence Questionnaire (ICIQ) [17]. Body mass index was calculated as measured weight in kilograms divided by measured height in meters squared. Serum albumin was measured using blood samples which we collected for the project. The albumin concentration was measured at a clinical testing laboratory (SRL, Tokyo, Japan).

Physical function was assessed using two scales: the TUG test and the Tokyo Metropolitan Institute of Gerontology (TMIG) index of competence. The TUG test measures the time taken to stand up from a chair, walk 3 m, walk back the same way and sit down again [18]. We classified the participants into tertile groups \((\text{both men and women): } \leq 8.23, 8.24–9.66 \text{ and } \geq 9.67 \text{ s; (men): } \leq 8.01, 8.02–9.29, \geq 9.30 \text{ s; (women): } \leq 8.41, 8.42–10.1, \geq 10.2 \text{ s). The TMIG index of competence is a multidimensional 13-item index of competence [19], a higher score indicating higher competence in instrumental activities of daily living (IADL). We classified the participants into tertile groups (TMIG index of competence} \leq 11, 12 \text{ and 13).}

Habitual total physical activity was estimated by using a self-reported physical activity questionnaire [20]. We estimated total daily expenditure in terms of 4 domains: occupational activity (including housekeeping and commuting), leisure time activity, sleeping, and other activity. The degree of physical activity was calculated as the METs/day score, obtained by summing the number of hours spent on the respective 4 domains of activity per day multiplied by the metabolic equivalent, METs \((\text{kcal/kg/h})\). In this study, participants whose total time spent on occupational activity, leisure time activity and sleeping was beyond 24 h were defined as missing. We classified participants into tertile groups \((\text{METs/day} \leq 34.3, 34.4–36.5 \text{ and } \geq 36.6).\)

In order to investigate hobby activities of participants after retirement, we classified such activities into 3 categories: cultural activity \((\text{e.g. playing a musical instrument or drawing/painting}), \text{ exercise (e.g. playing golf, swimming, or mountain climbing)} \text{ and other activities. Participants who engaged in any activity for at least 1 category in the baseline survey were classified as “current”, those who had engaged in any hobby activities for at least 1 category but had stopped doing them were classified as “former”, and those who had not engaged in any hobby activity after retirement were classified as “none”. For volunteer activity after retirement, participants who engaged in any volunteer activity at the baseline were classified as “current”, those who had engaged in any activity but had quit were classified as “former”, and those who had not engaged in any such activities after retirement were classified as “none”.

To assess the degree of social support, we asked participants the following five questions [21]: “Do you have (1) someone with whom you can talk when you are in trouble, (2) whom you can consult when you do not feel well, (3) who can help you with your daily housework, (4) who can take you to a hospital when you feel ill, and (5) who can take care of you if you become bedridden?” For each of these five questions, we asked them to choose one of two answers: “yes” or “no”. We defined participants who answered “yes” to all five questions as having social support.

2.3. LTCI system in Japan

In this study, we defined incident functional disability as certification for LTCI in Japan, which is based on a nationally uniform standard of functional disability. LTCI is one of the national insurance systems and supports the daily lives of people who have handicaps or are elderly [22]. LTCI is a formal care-giving service, and individuals aged 65 years or older, and who need care, can use this service. It is based on an insurance premium, and citizens aged 40 years and older pay it. When elderly people make an application for LTCI to a municipal government, a care manager visits them to assess their requirement for care. A questionnaire compiled by the Ministry of Health, Labor and Welfare is used to assess physical and mental status.

The municipal government then calculates the standardized scores for physical and mental functions on the basis of the questionnaire and assesses whether the applicant is eligible for LTCI benefits (certification). If a person is judged to be thus eligible, the Municipal Certification Committee decides on one of seven levels of support, ranging from Support Level 1, Support Level 2, and Care Level 1 to Care Level 5. In brief, LTCI certification levels are defined as follows. Support Level 1: “limited in instrumental activities of daily living (IADL) but independent in basic activities of daily living (ADL);” Care Level 2: “requiring assistance in at least one basic ADL task;” Care Level 5: “requiring care in all ADL tasks”.

A community-based study has shown that levels of LTCI certification are well correlated with the ability to perform activities of daily living, and with cognitive function [23]. LTCI certification is used as an index of the incidence of physical disability among elderly Japanese [24].

The Sendai City Municipal Authority offered information on LTCI certification among elderly persons in Tsurugaya district under an agreement for epidemiological studies conducted in this district and data security protection.

2.4. Statistical analysis

We calculated the person-years of follow-up for participants from 1 July 2003 until the date of incident functional disability, the date of death, the date of moving out, or the ending day of the current study (30 June 2014).

The Cox proportional hazards regression model was used to calculate hazard ratios (HR) and 95% confidence intervals (95% CIs) of incident functional disability according to the response categories for \textit{ikigai} (“yes”, “uncertain” or “no”). The following two models were used to analyze the association between \textit{ikigai} and incident functional disability. Model 1 was adjusted by sex and age. To further examine whether this association was influenced by cognitive function, depressive symptoms, history of illness, bodily pain, urinary incontinence, body mass index, serum albumin, physical function, smoking, alcohol drinking and social support, Model 2 was adjusted by all potential confounding factors.

Since some participants who were confirmed to have incident functional disability might not have felt \textit{ikigai} because of poor health status.
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