

論文の内容の要旨

論文題目 The association between coping behaviours and cardiovascular disease and cancer in a Japanese population cohort

(日本人集団における対処行動パターンと心血管疾患及びがんとの関連に関する研究)

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INTRODUCTION

Coping styles are behaviours or strategies used to manage daily problems and psychological stress, a known important and modifiable risk factor for a range of health outcomes including cardiovascular disease and cancer. The impact of stress can be minimized through adequate coping or enhanced through maladaptive coping.

Coping styles differ among individuals depending on their cognitive efforts and abilities and can be organised into strategies based on how the individual tackles a specific problem or stressor. Whereas approach coping tends to deal with the source of stress, avoidance coping is instead utilized to avoid the stressor. The categorization of coping into specifically approach- or avoidance-oriented may be particularly important for health outcomes.

Coping and cardiovascular disease

There is only limited knowledge available on the importance of coping styles on CVD related outcomes. Certain coping may be associated with important CVD risk factors such as body mass index, systolic blood pressure, and systemic inflammatory response, yet no studies have investigated the association between coping styles and CVD incidence or mortality in a pre-morbid population.

Coping and cancer

A number of studies have shown that specific stress coping styles may be associated with cancer diagnosis, cancer evolution and cancer survival. The major limitations of the published research on the association between coping strategies and cancer are the small sample sizes and that studies have focused solely on individuals already diagnosed with an illness prior to the assessment of coping styles. The use of a healthy population is crucial for the recognition of any true association between pre-morbid coping styles and cancer outcomes. There are no such studies to date.

Two main hypotheses have been suggested to explain the relationship between coping and the course of cancer: a biological (direct) effect which considers the influence of coping on immune function, and a behavioural (indirect) effect which focuses on individuals' own health conscious behaviours, e.g. attendance of screening examinations, and reactions to their illness including compliance with treatment and follow-up.

Objective

Cardiovascular disease (CVD) and cancer are the two major noncommunicable diseases in Japan.

The main objectives of the present study are thus, by using a large general population cohort:

- To assess the association between coping styles—both approach-oriented and avoidance-oriented—and CVD incidence and mortality, and
- To identify the impact of pre-morbid coping styles on cancer incidence and mortality.

In addition, since a combination of a planning coping style with other coping styles was reported to have a greater impact than that for a single coping style, associations between combinations of a planning coping style with each of the other coping styles was tested.

METHODS

The Japan Public Health Center-based prospective Study (JPHC Study) is a large cohort with a baseline population of 140,420 registered Japanese inhabitants identified by the population registries maintained by the local municipalities in 11 public health center (PHC) areas. Following the initiation of the first JPHC cohort aged 40-59 in 1990; the second JPHC cohort aged 40-69 was started in 1993. Surveys of JPHC-study participants were conducted at baseline and at 5-year and 10-year intervals.

Starting point for the present study was the third survey (2000-2004) which included questions on coping styles and information on lifestyle factors. Participants were individuals who responded to the self-administered 10-year follow-up questionnaire at age 50-79 years.

At baseline, there were 116,974 individuals identified in the study population after excluding subjects from Tokyo and Osaka as complete data was unavailable for incidence of myocardial infarction (MI), and stroke. Moreover, after excluding ineligible persons, 113,142 individuals remained. There were a total of 87,934 respondents to the third survey (response rate: 78%).

For analyses of CVD end points we further excluded individuals with a history of CVD before starting point, and those who failed to provide complete answers on coping, leaving a total of 57,017 individuals in the present study. All participants for CVD end points were followed from starting point until 31 December 2009.

For cancer analyses we excluded individuals who failed to provide complete answers on coping and those with a history of cancer before starting point. Additionally, to diminish the effects of reverse causality, individuals with a body mass index (BMI) less than 18.5 kg/m² (a possible sign of occult disease) were excluded. There were a total of 55,130 participants included in analyses of cancer end points. Participants for cancer end points were followed from starting point until 31 December 2011.

Identification of cause of cardiovascular mortality and cardiovascular disease incidence

The cardiovascular disease end points of the current study were mortality from IHD (ICD-10: I20-I25), cerebrovascular disease (ICD-10: I60-I69), as well as combined mortality from IHD and cerebrovascular disease (hereafter 'CVD mortality'). For cardiovascular disease incidence analyses, the endpoints in the current study were myocardial infarction (MI), stroke, and combined incidence of MI and stroke (hereafter 'CVD incidence').

Identification of cause of cancer mortality and cancer incidence

The end point of the current study was mortality from cancer (ICD-10: C00-C97). For individuals with multiple cancer diagnoses, only the first recorded event during follow-up was considered. Localized cancer was defined as cancer that at time of diagnosis had no distant metastases and had not spread to regional lymph nodes or adjacent organs. Screening-detected cancers were defined as cancers detected through screening examination only.

Coping styles

The main variable of interest in the current study was coping. Using an adaptation of questions from the Japanese version of the Stress and Coping Inventory, we evaluated six coping styles (planning, consulting someone, fantasizing, positive reappraisal, self-blame, and avoidance) by asking participants to respond to one question: 'How do you handle various problems and events that you experience daily?'. Coping styles were dichotomized from a 5-step Likert-scale.

Statistical analysis

Hazard ratios (HR) and 95% confidence intervals (CI) were used to characterize the relative risk of incidence of MI, stroke, CVD, or cancer, and cardiovascular and cancer mortality associated with coping styles. Interactions were considered between a) a planning coping style and the each of the five remaining coping styles, and b) between coping styles and the relevant demographic variables gender and age. Cox proportional hazards models were used to estimate HR while controlling for potential confounders.

RESULTS

Cardiovascular disease

The coping styles of positive reappraisal and planning were used by 21.8% and 19.9% of participants respectively, but only 3.9% of respondents actively utilized avoidance.

Incidence of MI and Stroke

Mean follow-up time for incidence was 7.9 years. During follow-up, there were 304 MI and 1565 strokes among the 57,017 subjects.

Following multivariable adjustment, a fantasizing coping style was positively associated with incident CVD (HR=1.26, 95% CI: 1.05—1.52) and stroke (HR=1.24, 95% CI: 1.01—1.53).

Sub-analyses on incidence of stroke subtypes (Tables 5-7) indicated that fantasizing was positively associated with subarachnoid haemorrhage (HR=1.72, 95% CI: 1.01—2.94) and that a planning style was inversely associated with ischemic stroke (HR=0.82, 95% CI: 0.68—0.99).

There were no significant interactions between planning and any of the five other coping styles for any of the incident cardiovascular end points.

Mortality

Mean follow-up time for mortality was 8.0 years. During this time, there were 191 and 331 deaths from IHD and cerebrovascular disease respectively. In the multivariable analyses, none of the coping styles were associated with any of the mortality end points.

There were no significant interactions between planning and any of the five other coping styles for any of the mortality end points.

Gender interactions

Gender interacted significantly with a planning coping style only for the intracranial haemorrhage mortality end point. In further gender-stratified analyses, a planning coping style was inversely associated with mortality from intracranial haemorrhage in men (HR=0.46, 95% CI: 0.23—0.92).

Cancer

Cancer incidence

Mean follow-up time for cancer incidence was 9.5 years. During follow-up time cancer was diagnosed in 5241 of the 55,130 participants. There was no association between coping styles and cancer incidence in the multivariable or sensitivity analyses.

There were no significant interactions between planning and any of the five other coping styles for overall cancer incidence.

Cancer mortality

Mean follow-up time for cancer mortality was 9.8 years, with 1632 cancer deaths occurring during follow-up. Positive reappraisal was inversely associated with cancer mortality (HR=0.84, 95% CI: 0.72—0.97), a result which remained statistically significant even when excluding cases in the first three years of follow-up.

There were no significant interactions between planning and any of the five other coping styles for overall cancer mortality.

Localized cancer and screening-detected cancer

Of the cancers registered in this study, 2563 cases were considered localized at the time of diagnosis and 1167 cases were detected through screening. None of the coping styles were associated with cancer stage although there was a significant interaction between planning and self-blame

Utilizing a planning coping style was associated with incidence of screening-detected cancers (HR=1.27, 95% CI: 1.09—1.47). There were no interactions between planning and any of the other coping styles for either of the screening related cancer end points.

Cancer subtypes

Some of the coping styles, as well as the interaction between a planning coping style with other coping styles, were associated with incidence and mortality from cancer subtypes.

CONCLUSION

Coping and cardiovascular disease

We have found that a fantasizing coping style is associated with a significantly increased risk of incident CVD, stroke and subarachnoid haemorrhage, whereas a planning coping style is associated with a reduced risk of incident ischemic stroke.

A reason why a planning coping style was not associated with reduced risk of MI or CVD-incidence could be that we have adjusted for several behaviours known to be associated with disease initiation, all of which can also be considered as indirect measures of coping. Previous research has highlighted the importance of coping mechanisms for blood pressure control through its influence on lifestyle factors. Behaviours important for cardiovascular end points, e.g. smoking, alcohol consumption and physical activity have all been associated with both coping styles and stress.

Studies demonstrate gender differences in coping styles where women utilize more avoidance coping styles than men. Moreover, coping may play a different role in men and women's cardiovascular functioning. Indeed, in this study gender interacted significantly with a planning coping style for the intracranial haemorrhage mortality end point with a planning coping style inversely associated with mortality from intracranial haemorrhage in men only. This indicates that future studies on the association between coping and CVD end points should consider gender-stratified analyses.

Coping and cancer

This study is the only study to date to address the association of coping styles with cancer outcomes in a healthy general population. Positive reappraisal was significantly associated with cancer mortality, and a planning

copied style was significantly associated with cancers detected through screening. Moreover, coping styles were associated with cancer subtype incidence and mortality, and a planning coping styles interacted with several of the other coping styles for cancer subtype end points. These results may promote the behavioural pathway hypothesis which involves early detection, patient information-seeking and medical decision-making among those utilizing approach-oriented coping.