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Original article

History of diabetes and risk of suicide and accidental death in Japan: The Japan Public Health Centre-based Prospective Study, 1990–2012

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Abstract

Aim. – This study looked at whether a history of diabetes mellitus (DM) is associated with a higher risk of externally caused death (by suicide and accident), using data for a large population-based prospective cohort from an Asian population.

Methods. – Data collected between 1990 and 2012 from the Japan Public Health Centre-based Prospective Study were analyzed, and Poisson regression models were used to calculate adjusted risk ratios (RR) for external causes of death.

Results. – The population-based cohort comprised 105,408 Japanese residents (49,484 men and 55,924 women; mean age: 51.2 [SD 7.9] years). At baseline, 3250 (6.6%) men and 1648 (3.0%) women had a history of DM. During the follow-up period, 113 external deaths (41 suicides and 72 accidents) were noted among those with a history of DM, with 1304 external deaths (577 suicides and 727 accidents) among those without such a history. A higher risk of external death (men, RR: 1.4, 95% CI: 1.2–1.8; women, RR: 1.6, 95% CI: 1.01–2.4) was observed in those with a history of DM. Also, among those aged 40–49 years (RR: 1.9, 95% CI: 1.3–2.7) and 50–59 years (RR: 1.4, 95% CI: 1.05–1.9) at baseline, the risk of external death was significantly higher in those with a history of DM.

Conclusion. – Compared with people with no history of DM, those with such a history had a significantly greater risk of externally caused death (particularly accidental deaths) in both genders and in those aged ≤ 59 years at baseline.

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Keywords: Accidents; Asian population; Cohort studies; Diabetes mellitus; Prospective studies; Suicide

1. Introduction

Diabetes mellitus (DM) has become a serious worldwide public health problem [1]. In particular, the prevalence of type 2 diabetes has reached epidemic levels in Asia [2]. Epidemiological studies indicate that people with a history of DM may face a higher risk of premature death [3] or external causes of death,

the latter of which may include suicide and accidents [4–9]. The higher risk of suicide may be due to mental distress and impairment of physical and/or cognitive functioning due to DM-related conditions such as cardiovascular disease, nerve damage, kidney disease and eye disease [10]. DM is also associated with a higher risk of death by accident. Physical disabilities, such as decreased physical/cognitive capacities and impaired vision [7], and mental distress, particularly depression [11], may also increase the risk of accidental death among those with a history of DM.

In addition, physical/cognitive impairment and mental distress may be behind the factors affecting the risk of external death in those with DM. Previous studies have suggested that the risk

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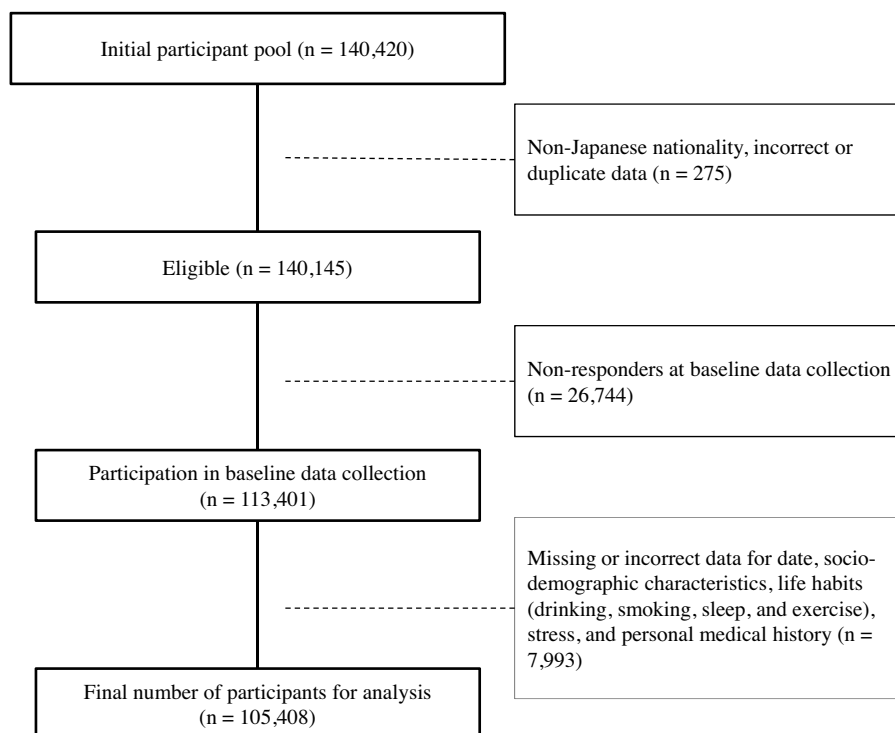


Fig. 1. Flow diagram used to select the study cohort participants.

factors for suicide and accidental death may overlap somewhat [12]. However, to our knowledge, only a few large population-based cohort studies have examined the association between DM history and the risk of external causes of death in Western countries [4,5,9], whereas no population-based prospective study has done so in an Asian population, within which both DM [2] and external causes of death, especially suicide [13], have become major public health issues.

Thus, in the present study, the aim was to examine whether a history of DM is associated with a higher risk of externally caused death (by suicide or accident), using data from the Japan Public Health Centre-based Prospective Study (JPHC Study) [14,15], a multipurpose population-based prospective cohort study that aimed to clarify the risk as well as protective factors associated with various outcomes, including externally caused death.

2. Material and methods

2.1. Study design

In collaboration with nationwide public health centres, the National Cancer Centre, National Cardiovascular Centre and other institutions in Japan, the JPHC Study was initiated in 1990 for Cohort I and 1993 for Cohort II. All residents aged 40–59 years in Cohort I, and those aged 40–69 years in Cohort II, residing in 11 public health centre areas at the time of recruitment were selected as potential participants, resulting in a total of 140,420 residents (68,722 men and 71,698 women), of whom 140,145 were eligible for the present study (Fig. 1). Public health centre areas were selected with due consideration of variations

in mortality rate, geographical distribution and feasibility. The study design has been described in detail elsewhere [14,15].

The study protocol was approved by the Institutional Review Board (IRB) of the National Cancer Centre in Tokyo, Japan, and also by the IRB of the National Centre of Neurology and Psychiatry in Tokyo.

2.2. Baseline survey

A self-administered questionnaire was distributed to all registered residents at baseline to obtain information regarding sociodemographic characteristics; lifestyle habits, including drinking, smoking, hours of sleep, frequency of physical exercise and level of stress; and personal medical history. The questionnaire was distributed mostly by hand (with some sent by post to participants) in 1990 for Cohort I and in 1993 for Cohort II. Incomplete answers were supplemented by telephone interviews. Details of the baseline survey have been reported previously [14]. Of the 140,145 eligible individuals, 113,401 (53,351 men and 60,050 women) responded to the questionnaire at baseline (response rate: 81.0%). Those who completed the baseline questionnaire, which described the purpose and follow-up methods of the JPHC Study, were considered to also have provided their consent to participate in the study.

2.3. Assessment of diabetes mellitus

Information regarding the patient's history of DM, as well as of cancer, stroke and ischaemic heart disease, was obtained in the baseline survey by the following two questions:

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