

Clinical Study

## Dementia and mild cognitive impairment among non-responders to a community survey

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### Abstract

We aimed to estimate the prevalence of mild cognitive impairment (MCI) among elderly non-responders to a community-based survey. We conducted a two-phase, population-based cross-sectional study of community-dwelling individuals aged 65 years or older in Tone, located in central Japan. The first phase of the study consisted of physical and cognitive examinations of individuals who responded to the first recruitment (quick-responders), whereas the second phase included individuals who did not respond in the first phase (delayed-responders). We compared the prevalence of MCI and dementia between delayed-responders and quick-responders. Of the 2,698 potential candidates, 1,888 (1,619 quick-responders, 225 delayed-responders, and 44 nursing home residents) were enrolled (70.0%). The prevalence of MCI was 2.3-fold increased in delayed-responders compared to the quick-responders (OR = 2.27, 95% CI: 1.37–3.77,  $p = 0.002$ , aged  $\leq 74$ ). In order to develop a method for the early detection of dementia, we must pay more attention to delayed-or non-responders.

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### 1. Introduction

To avoid underestimating the prevalence of dementia in epidemiological studies, it is important to consider the non-responders.<sup>1</sup> Response rates decline with age and the cognitive states of non-responders are lower than responders.<sup>2–4</sup> Some recent studies have examined the cognitive functions of non-responders; individuals who do not respond to a community-based study. Norton et al. evaluated the characteristics of non-responders in a community survey of elderly individuals aged 75 years and older and reported that non-responders appeared to be disproportionately cogni-

tively impaired.<sup>5</sup> In addition, Launer et al. compared cognitive functioning between non-responders and responders among community-dwelling elderly aged 65 years and more.<sup>3</sup> They reported that non-responders aged 74 years or younger, but not those aged 75 years and older, showed poorer performances on a cognitive test compared to responders. However, the results of non-responders are still inconsistent.<sup>6</sup>

During the last decade, there have been several attempts to distinguish abnormal cognitive impairment from normal cognitive decline associated with aging. Herein, the term mild cognitive impairment (MCI) is used to describe such transitional states. Currently, MCI<sup>7</sup> and Ageing-Associated Cognitive Decline (AACD)<sup>8</sup> are widely accepted definitions of the boundary states between normal aging and dementia. Although the reported conversion rate to dementia varies widely, individuals with MCI<sup>9</sup> and

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AACD<sup>10</sup> develop dementia at a rate of 10% per year and 28% over 3 years, respectively.

To our knowledge, the relationship between the prevalence of MCI and non-responders has not been examined in a relatively large community study. Thus, the aim of the present study was to compare the prevalence of MCI and dementia between responders and non-responders in a community-based study of the elderly.

## 2. Methods

We conducted the survey in Tone, a town consisting of 22 districts, in a rural area, Ibaraki, about 40 km northeast of central Tokyo, Japan. On 1 May 2001, 3,083 inhabitants aged 65 years and older (the potential candidates) lived in the town (15.7% of the total population of Tone). The proportion of the elderly in Tone was similar to that of the whole of Japan as of 2001.

Seven psychiatrists, eight psychologists and public health nurses were trained for the present study by the primary investigator. The protocol of this study was approved by the ethics committee of the University of Tsukuba.

### 2.1. The first phase

The first phase of the project (Fig. 1) was conducted from December 2001 to April 2002. Before the baseline examination, we sent a letter to each potential candidate and explained the project's objectives. After the study was explained to the individuals and written informed consent obtained, all responders underwent a screening interview. One week before the group screening, we telephoned each candidate and asked him or her to participate. We also asked the local welfare commissioners (*Min-sei-iin*: persons who are vested with promoting social welfare in each local area) to recommend individual residents to participate in the research. The individuals with whom a local welfare commissioner could not meet or contact after three telephone calls were excluded from the study (hereafter referred to as uncontactable individuals).

We visited each of the 22 districts once per week and conducted group screenings. We also visited a nursing home and examined 44 individuals using the same procedures as follows.

### 2.2. Assessment procedures

#### 2.2.1. Demographics, medical and psychiatric factors

The interview consisted of a structured questionnaire recording age, sex and education and assessing previous medical and psychiatric diseases and dementia risk factors, including alcohol and tobacco consumption. We also measured the height and weight of each responder.

#### 2.2.2. Mood state

The interview was followed by the 15-item short version of the Geriatric Depression Scale (GDS) for mood assess-

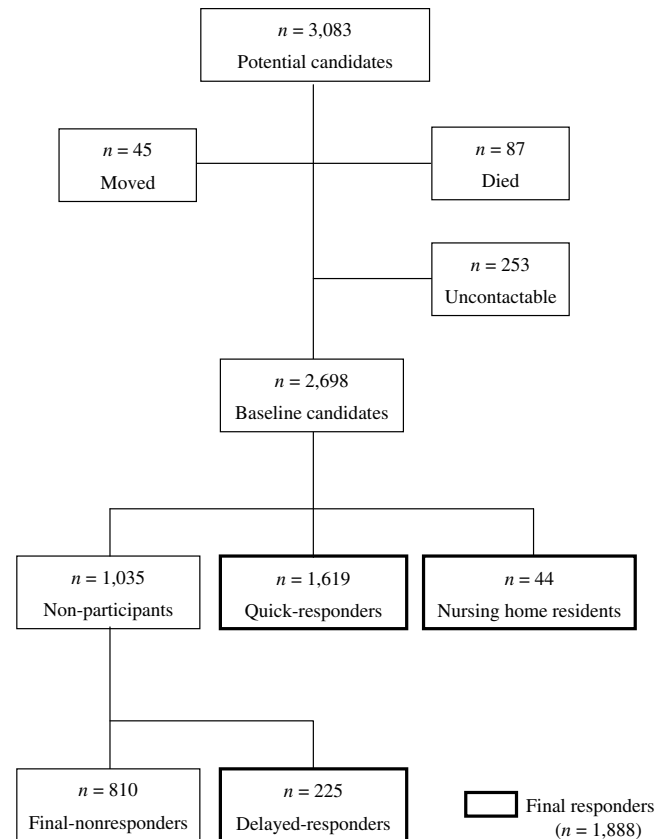


Fig. 1. Study population of the community-based survey conducted in Tone, Japan.

ment.<sup>11</sup> Those who scored six or more were considered to have depressive symptoms.

#### 2.2.3. Perceived memory difficulty

Responders were asked whether they had memory difficulties in general, as well as difficulties in specific areas according to the 19 items of the Détérioration Cognitive Observée (DECO), which was originally developed for an objective assessment of memory difficulty.<sup>12</sup> Responders were considered to have memory complaints if they indicated that they had problems on one or more of the items.

#### 2.2.4. Assessment of activities of daily living

Basic activities of daily living were measured using N geriatric rating scale for activities of daily living (N-ADL),<sup>13</sup> which determines the level of independence in five activities: walking/transferring, living area, dressing/bathing, eating and toileting. Responders were considered to be functionally intact if they reported no difficulty on any of the five items of the N-ADL.

#### 2.2.5. Neuropsychological assessment

After completing the interview, all responders underwent a group assessment which used a set of five tests measuring the following cognitive domains: attention, memory, visuospatial function, language and reasoning. We named this set of tests thereafter the 5-Cog. We evaluated atten-

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