

Featured Article

Incidence of dementia and subtypes: A cohort study in four regions in China

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Abstract

Introduction: There is a dearth of literature on the incidence of dementia in China.

Methods: Using a stratified, multistage, cluster-sampling method, 16,921 nondemented participants ≥ 55 years were recruited from four regional centers in China in 1997 and followed up to 4.5 years. Cases were identified through a three-step protocol, according to standardized criteria for dementia, Alzheimer's dementia (AD), and vascular dementia (VaD).

Results: The crude incidence in persons ≥ 65 years was 12.1/1000 person-years for dementia, 8.2/1000 person-years for AD, and 3.1/1000 person-years for VaD. After adjusting for sociodemographic factors, older age and lower education were associated with a higher risk of incident dementia, AD and VaD; regional difference was associated mainly with incidence of VaD (north vs. south: hazard ratio [HR] = 3.59); modestly with AD (east vs. west: HR = 1.55).

Discussion: The incidence of dementia in Chinese population is comparable with that in Europe and United States.

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Keywords:

Dementia; Alzheimer's disease; Vascular dementia; Incidence; Risk factors; Prospective cohort study; Epidemiology; China

1. Introduction

Dementia—which is characterized by deterioration in cognition, function, and behavior—places an enormous burden on the society. In China, the prevalence of Alzheimer's disease (AD) and vascular dementia (VaD) are comparable with those in Western countries, with positive

associations for older age, lower education, and particular regions [1,2]. The incidence rate (that is, the rate of number of new cases of disease in a population over a period of time) has been found to be critical to assessing the disease etiology and is associated with potential risk factors.

Data on the incidence rate of dementia in China are scarce. According to studies involving mostly Caucasians, the rate of dementia ranges from 6.8 to 20.3 cases/1000 person-years (p-yrs) in individuals ≥ 65 years [3–8]. The average annual incidence of dementia and its subtypes: AD, VaD, and dementia by other causes has been reported to be 0.90%, 0.74%, 0.33%, and 0.08%, respectively

The authors declare that they have no conflicts of interest.

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[9,10]. Prince et al. reported incidence rates of 24.0/1000 p-yrs using their 10/66 instruments for case ascertainment, that is one-stage comprehensive diagnostic procedures including four scales: CSI “D,” animal naming verbal fluency task, 10-word list learning task and geriatric mental state–automated geriatric examination for computer-assisted diagnosis (GMS-AGECAT), and 15.1/1000 p-yrs as assessed by *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV)* criteria, based on a sample from urban and rural areas of Beijing [11–13]. Chen et al. [14] reported an incidence rate of 15.7/1000 p-yrs using GMS-AGECAT diagnosis based on a sample from Anhui Province. Although great strides have been made to establish the incidence rate of dementia in China, previous estimates have been extrapolated from data involving regional or limited size samples. China encompasses a very large geographical area and a widely diversified population comprising many different ethnic, cultural, and socioeconomic aspects. Thus, the local studies that have been published to date are limited in reflecting the overall epidemiologic situation of dementia in China. Because of major methodological differences between the local studies that have been published to date, it has not been feasible to derive a cross-country estimate of dementia incidence by integrating these studies. With the accelerated aging trend of the Chinese population (the latest statistics indicate that there are approximately 119 million people aged ≥ 65 years) [15,16], representative age-specific, sex-specific incidence rates of dementia in our country, as well as statistical comparisons of urban-rural, northern-southern, and eastern-western differences, are needed to target interventions and develop preventive strategies. Hence, to better characterize the overall epidemiologic profile of dementia in China, we conducted a population-based, prospective, cohort study in four geographically representative major regional centers in China, using extensive case ascertainment procedures.

2. Methods

2.1. Study areas

Similar to a study on the prevalence of dementia that we conducted in 1997 [1], we selected Beijing (northeast), Xi'an (northwest), Shanghai (southeast), and Chengdu (southwest) as the regions to perform our study, as we consider these regions to be representative of the broad spectrum of environmental, natural resource-related, economic, diet, cultural, and lifestyle variations across China.

2.2. Sample

Using a stratified, multistage, cluster-sampling methodology, population-based prevalence surveys were conducted on all people aged ≥ 55 years in the four aforementioned regions of China, which, as a subsample of the 1997 study [1], was adjusted and randomly selected at baseline based on

sample size calculation with considering cost efficiency. The comparison of baseline demographic characteristics between samples entering the incidence study and that not entering was not substantially different.

At baseline, we recruited all eligible residents ($n = 17,499$) from 29 communities in 12 urban districts and 57 communities in 15 rural counties. In total, 16,921 nondemented participants entered the longitudinal study at baseline, and 578 residents were excluded due to dementia. Our initial, small-scale, pilot follow-up visit, including 1055 participants from 21 urban and 44 rural communities, was conducted in 1999. Subsequently, between years 2000 and 2002, we conducted a second, large-scale follow-up visit comprising the full sample from 29 urban and 57 rural communities (Fig. 1). To ensure a high follow-up rate, we revisited the participant's household up to four occasions. If the participants had moved, we sought their vital status and current residence from contact information recorded at baseline, and sought to reinterview them, even though they may have moved outside the catchment area.

2.3. Clinical interviewer training

We trained 63 interviewers consisting of neurologists, psychiatrists, and medical students from university hospitals. The regional supervisors received 2 weeks of training and community practice in Beijing. All field workers completed training in their region, including pilot interviews in nonsampled communities. At the completion of training, the interrater reliability of the cognitive tests was assessed using ratings of a videotaped model interview. During fieldwork, the principal investigator and supervisors monitored interviews on site. Retraining was undertaken every 6 months.

2.4. Informed consent

We obtained multilevel ethics approvals from institutional review boards and community leaders. Participants were informed about the study at local civic meetings and through public announcements. All eligible residents were invited to participate in a voluntary basis and gave oral consent.

2.5. Dementia assessments and diagnosis

All participants were interviewed for cognitive impairment in their residence or local hospital by trained interviewers. The full details of these assessment and diagnostic procedures have been previously described [1]. Briefly, we used multiphase assessments for case ascertainment. In phase I (dementia screening), a door-to-door screening survey was conducted, during which the Chinese version of the mini mental state examination (C-MMSE) [17] and Chinese version of activities of daily life (CADL) [18,19] were administered. A demographic questionnaire was also administered to gather the participant's personal

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