

## SYSTEMATIC REVIEW

Mojdeh Moghaddam, Yung-Chieh Yen, Alden L. Gross, and George W. Rebok

# Alzheimer's Disease: New Perspectives on Integration of Multidisciplinary and Multidimensional Approaches

Department of Mental Health Johns Hopkins Bloomberg School of Public Health, Baltimore, MD 21205, U.S.A.

## ABSTRACT

This systematic review highlights the significance of multidisciplinary approaches for studying preventive interventions for Alzheimer's disease (AD). The review features modern scientific techniques for studying AD onset and progression, with special attention to the joint contributions from the fields of neuroscience and public health. We emphasize the importance of early detection and prevention, and provide a reference tool for achieving and maintaining a healthier brain-mind-soul interaction in AD patients. Universal, selective, and indicated prevention strategies are discussed using integrated approaches that embrace a multidimensional framework encompassing biological, psychosocial, and spiritual dimensions of health. The biological dimension discusses gene therapy, drugs, and dietary interventions. The psychosocial dimension includes physical, social, and cognitive-behavioral interventions. Finally, the spiritual dimension explores the role of meditation or prayer as a coping strategy for those with AD. The world's elderly is one of the few growing natural resources in the world today, and concern for its health and well-being is of paramount importance.

■ **Keywords:** Alzheimer's disease, epidemiology, prevention, multidimensional framework, genomics

## BACKGROUND

Aging is one of the most significant social phenomena of the twenty-first century. A recent demographic projection estimates that approximately 20% of the United States population, or 72 million people, will be aged 65 years or older by the year 2030. The U.S. is a relatively young country in terms of population age compared with others such as China or India; it has been projected that 70% of the

world's older population by 2030 will be living in what are now called developing countries.<sup>1</sup> As average life expectancies in most populations increase, so do the problems associated with age-related dementias such as Alzheimer's disease (AD). A recent study by Brookmeyer et al<sup>2</sup> forecast a fourfold increase in the prevalence of AD by 2050 to 106.8 million cases. This translates into a prevalence ratio of 1.2% of the world population if nothing is done to curb either the onset or the gradual deterioration associated with the disease. The magnitude, both from a population-level but also an interpersonal perspective, is sizable, making this disorder a priority health issue worldwide.

AD is one of two main types of dementia, the other being vascular dementia, and accounts for over 60% of all incident dementia cases.<sup>3</sup> The onset and cognitive decline for dementia of the Alzheimer's type is gradual, which distinguishes AD from other dementias. It is difficult to obtain direct pathological evidence for this disorder, as there is not yet an understood etiology, so the diagnosis is made conditionally on the exclusion of other dementias. This difficulty presents challenges in diagnosis. Despite these challenges, based on a combination of psychiatric and neurological signs and symptoms, some studies suggest that an AD diagnosis can be made with 90% reliability.<sup>4</sup> According to the American Psychiatric Association's DSM-IV, the diagnostic features of AD include impairment in memory, aphasia, apraxia, agnosia, and a disturbance in executive function. AD's etiology is unknown but probably multifactorial in nature, so the challenges for prevention are immense.<sup>5</sup> Despite our current lack of understanding about the etiology, studies of AD can be compared because it is well-defined by widely accepted clinical criteria that show remarkable reliability across time and among different clinicians.

AD and all the issues related to it are becoming one of the greatest challenges facing public health, various medical disciplines such as gerontology and neuroscience, and society at large. It is a progressive, debilitating disorder with severe consequences not only for the patient and society but also for caregivers, family members, and friends. Early

**Address for correspondence:** George W. Rebok

Department of Mental Health, Johns Hopkins Bloomberg School of Public Health, 8th Floor Hampton House, 624 North Broadway, Baltimore, MD 21205, U.S.A.

Phone: (410) 955-8550, Fax: (410) 955-9088

e-mail: grebok@jhsph.edu