

## **The relationship between dementia prevalence of the female elderly, personal exercise habits and distribution of exercise spaces in Tainan City, Taiwan**

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Keywords: Elderly, Dementia, Exercise Behavior, Exercise Space

With advances in medical technology, the average human life expectancy extends and the global population is aging. Accordingly, the number of people with dementia is steadily increasing. Alzheimer's Disease International released the World Alzheimer Report in August 2015 and updated the data on dementia's global prevalence. There are an estimated 46.8 million people worldwide living with dementia in 2015. This number will reach 74.7 million in 2030 and 131.5 million in 2050. Due to the average life expectancy of female is longer than male, female people comprise a significant majority of the elderly population (United Nations, 2015). Moreover, the prevalence is higher for women than for men. (Alzheimer's Disease International, 2015). Hence, female elderly have become a high-risk group with dementia in the foreseeable future.

The estimated prevalence of dementia in people aged 60 or over is 4.7% in Asian, 5.9% in Europe, 6.4 in the America and 4.6% in Africa (Alzheimer's Disease International, 2015). In Taiwan, the prevalence of dementia in people aged 65 or over is 4.97% (Taiwan Alzheimer's Disease Association, 2012). Although the number in Taiwan is not particularly higher than other region around the world, the increase of proportion in the number of elderly people living with dementia (2015-2030 and 2015-2050) will be higher in Taiwan than in most of other countries. The calculation and data of the proportionate increases of elderly people with dementia are as follows:

The proportionate increases in the number of elderly people with dementia

$$= \frac{\text{the future number of elderly people with dementia} - \text{the current number of elderly people with dementia}}{\text{the current number of elderly people with dementia}} \times 100\%$$

According to the latest projection, the proportionate increases between 2015 and 2030 will be 69% in Asian, 28% in Europe, 67% in the America, 74% in Africa (Alzheimer's Disease International, 2015) and 84% in Taiwan (Taiwan Alzheimer's Disease Association, 2014). Also, the proportionate increases between 2015 and 2050: 194% in Asian, 78% in Europe, 216% in the Americas, 291% in Africa (Alzheimer's Disease International, 2015) and 240% in Taiwan (Taiwan Alzheimer's Disease Association, 2014).

Considering the number of elderly people with dementia is increasing rapidly in Taiwan, it will be a heavy burden for the families, social human resources and medical resources. Therefore, how to prevent and treat dementia from all aspects is one of the urgent issues in Taiwan. At present, although there are no effective treatment and intervention strategies for dementia, according to some studies, practicing aerobic exercise more than 4 hours per day or more than twice a week regularly can effectively reduce the risk of dementia about 50% (Rovio S. et al., 2005; Sumic A. et al., 2007; Kuo-Chin Huang et al., 2013).

The main factors that affect exercise behavior of elderly people consist with personal factors and external environmental factors (Nancy E. Sherwood et al., 2000; Lisa W. Boyette et al., 2002; Kuei-Min Chen et al., 2006). For the personal factors, the exercise habits play a significant role in affecting exercise behavior of elderly people. The exercise habits of the elderly people can decide the way, the time and the place they exercise. For the external environmental factors, according to the research report on movement policy of elderly in Taiwan released by the Taiwan Sports Administration in 2010, one of the main reasons of obstructing elderly people to do exercise is lack of exercise spaces. Due so, most elderly people would do exercises in or near their home. Hence the distribution of exercise spaces/ sporting facilities is an important factor affecting whether elderly people could exercise properly.

This paper selects the female elderly aged 55-75 as the study population cohort. Taking Tainan City as a case area, this paper expects to discuss the relationship between prevalence of dementia in the female elderly, personal exercise habits and distribution of exercise spaces. This paper will firstly identify the exercise spaces of

female elderly people in the research area, such as parks, schools, gyms and so on. By understanding what and where female elderly people would normally do for exercise, this study will examine the relationship between the sporting location and exercise habits. Secondly, this research will explore “the relationship between types of different exercise space and female elderly people with dementia” and “the relationship between types of different exercise space and female elderly people who exercise regularly”. Moreover, this paper will discuss the relationship of spatial distribution between exercise spaces, dementia prevalence of female elderly and exercise habits of female elderly by using GIS spatial analysis methods.

The result of this paper is expected to explore whether the number and spatial distribution of exercise spaces/facilities can influence the exercise habits of female elderly and the dementia prevalence of female elderly. Also, we intend to learn what kind of exercise spaces that female elderly will feel in favor of to do certain type of exercises. This paper aims to provide some information for setting more exercise spaces to enhance female elderly people’s willingness to do exercise and to reduce the risk of dementia for the elderly in the future.

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