



# Aging society in Bangkok and the factors affecting mobility of elderly in urban public spaces and transportation facilities



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## ABSTRACT

Urbanization and aging of societies are two global trends in urban areas, especially in rapidly developing countries. Mobility of the elderly to access to public spaces is hindered by inadequate transportation infrastructure and services. The current study assesses this mobility problem in terms of access to public spaces using various modes of transportation. It utilized a mix of quantitative and qualitative methods. The data were obtained from elderly people aged 60 and older living in three different urban areas of Bangkok. Data collection was done using a questionnaire-based survey. Logistic regression was utilized for determining the significant factors affecting mobility of the elderly. It was found that the ability to travel without assistance, the distribution of public spaces with accessible transportation services, urban density, and urban development patterns influenced the mobility of elders. This study suggests inclusion of universal design principles in public projects, community planning, and the integration of transportation planning and urban systems.

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## 1. Introduction

Aging of societies has become a global phenomenon. The proportion of people aged 60 and older will double from 11% in 2006 to 22% in 2050 [1]. This is a particular problem in some developed countries like Japan and South Korea [2]. Increasing population and declining birth-rates occur over much shorter periods in developing countries [2]. Thailand's population is aging very rapidly. Its percentage of senior citizens increased from 5% in 1970 to 10% in 2006. It will likely be 30% by 2050 [3]. The population of Bangkok is aging faster than in Thailand's other provinces. The office of the National Economic and Social Development Board reported that in 2008 the proportion of elderly in Bangkok was 10% and in 2020 it will be 21% [4].

An increased elderly population requires changes in their living environment to make their lives easier. The major problems of the elderly are related to biological aging and the resulting decline in functional capacity. The rate of decline is largely determining by factors related to lifestyle, social, environmental, and economic factors [1]. Rapid Urbanization in Bangkok resulted from growth with insufficient infrastructure [5]. This led to a shortage of basic services, inadequate transportation

facilities, and deficient urban design. Low quality of life inhibits elder mobility and their participation in the society. Out-of-home activities enable the elderly to connect with people, places, and participate in activities that enrich their lives. The elderly need supportive environments that include transportation and access to public spaces. This study aims to elucidate the factors affecting elder mobility and their access to public spaces and transportation facilities in Bangkok. This study is useful for urban development and transportation planning to enable mobility of elderly people in developing cities with an increasingly aged society.

## 2. Literature review

The concept of mobility involves travel and access to desired places. Mobility is defined as the ability of any person to move between points in a community [6] at desired times with information about travel options and the ability to pay for transportation. [7]. Mobility encompasses six elements: travel and access to desired people/places, psychological benefits, a sense of independence, physical well-being and health, community involvement in social activities, and potential travel as in the case of an emergency [8]. Good mobility and decent transportation are important for the elderly to participate in society as age-related health problems and travel with access to public spaces becomes more difficult [9–11]. Mobility is often related to trip frequency, distance traveled, and mode of transportation [12,13]. It is possible to evaluate mobility from

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the perspective of a number of stakeholders [13,14]. Mobility can be measured in several ways as shown in Table 1.

Urban development to support the elderly has been promoted by the World Health Organization (WHO) to develop age-friendly cities, within urban environments that allow older people to remain active and healthy participants in society. Access to transportation, buildings, and outdoor places are components of age-friendly cities. They enable the elderly to independently engage in out-of-home activities.

### 3. Methodology

This study was designed to elucidate factors influencing elder mobility for out-of-home activities in urban Bangkok. The concept of mobility relates individuals, their means of transportation and destinations. The framework of the current study's methodology is shown in Fig. 1.

#### 3.1. Explore urban development and aging of society in Bangkok

The population of Bangkok is over 5.7 million, or 8.9% of the country's population [30]. Family size has become smaller. In 1960, there were 6.2 people per family compared to 2.3 in 2005. The numbers of children and people of working age declined, while the elder population steadily increased (Fig. 2). It is projected that the elder population (aged 60 and older) will exceed the population of children (aged less than 15 years) in 2020 [3].

Population density in inner city areas remains higher than in the suburbs. However, the population growth rate in the suburbs is also quite high. Areas of urban development in Bangkok can be divided into three zones: a commercial and historical zone, intermediate areas engulfed in urban sprawl, and the outer zone, which is currently used for residential and commercial purposes [31]. The built-up and residential areas consist of three categories. They are (1) an inner core area for conservation and tourism (high density), (2) an intermediate zone for

the new Central Business District (CBD) and transportation hubs (medium density), and (3) newer residential districts (low density).

#### 3.2. Selection of the study areas in Bangkok

Area selection considered 4 factors: (i) urban development patterns accounting for the state of physical, economic, and social factors in the City of Bangkok; (ii) urban infrastructure and service facilities, which are evolving along the main roads in the corridors of the developing axis; (iii) proportion of elderly; and (iv) predominate residential areas of the community.

Expansion of residential areas of Bangkok occurred along the main roads radiating from the city center. The main road corridor follows a northeast to southwest axis. This corridor was divided three zones. As shown in Fig. 3, the three circles represent the different urban development density zones of Bangkok. The center of the circles was set at the heart of the city where the selected road corridor begins. The smallest circle represents the inner zone with high urban density. The middle circle encompasses the intermediate zone where there is medium urban density. The largest circle depicts the outer zone having a lower urban density as categorized by BMA. In each of these zones, the district with the highest elder population was selected. In each district, sub-districts with predominately residential areas were selected for inclusion in the study. These sub-districts were (1) Jakrawat (JWK), (2) Bang Sue (BSE), and (3) Thungsohong (TSH) (Fig. 3).

#### 3.3. Pre-survey, selection of study parameters and variables, and population sampling

A preliminary survey was conducted in one district in the intermediate zone where the BMA recorded a large elder population. The intermediate zone is the area that is home to typical residential areas of Bangkok. It contains single family houses, condominiums, shophouses,

**Table 1**  
Factors affecting mobility of the elderly.

| Factors   | Explanation   | Literature                          |
|---|---|-------------------------------------|
| <i>1. Individual</i>  |   |                                     |
| 1.1 Opportunities for social and recreation time  | -The elderly tend to go outside their homes for leisure activities more than other age groups because the elderly have more free time.  | [15,16]                             |
| 1.2 Age, gender, disability   | -Being female, of advanced age, and disabled negatively impacts mobility.<br>-Women tend to require more assistance to maintain mobility.   | [17]<br>[18,19]                     |
| 1.3 Marital status, income, support from children, living arrangement, and support networks | The elderly living with family and children tend to have extra responsibilities. They have more out-of-home activities and are more likely to need transportation to maintain mobility.   | [15,18,20,21]                       |
| 1.4 Financial status  | Lack of financial support may reduce personal independence, access to activities, and social participation.   | [6,11,22]                           |
| 1.5 Housing type and residence location   | -Living in apartments or high density of residences is associated with more trips.  | [21]                                |
| 1.6 House ownership and educational level   | -Being highly educated and owning a house is associated with more trips outside the home.   | [6,11,22]                           |
| 1.7 Ability to drive and vehicle availability   | -The ability to drive, availability of a license and car ownership influence the transportation mode used.  | [6,11,22]                           |
| 1.8 Physical conditions   | -Disabilities make common activities exhausting. The elderly often prefer to spread activities out over longer periods of time. The feeling of lost independence may make the mobility hazardous and impossible.<br>-Physical impairment makes walking difficult for the elderly.   | [6,11,19,20,23,24]                  |
| 1.9 Psychological condition   | -Independence and freedom positively affect elder mobility.   | [25]                                |
| <i>2. Destinations (public space)</i>   |   |                                     |
| 2.1 The choice of places and activities.  | -Desired activities motivate the elderly.<br>-Shopping malls attract older women more than men.   | [17]                                |
| 2.2 The location of out-of-home activities  | -Geographically dispersed activities can make journeys longer.  | [6]                                 |
| <i>3. Transportation</i>  |   |                                     |
| 3.1 Transportation choices.   | -In the developed countries, most elderly rely on cars. In developing countries, they rely on public transportation. The use of public transportation by the elderly is increasing.<br>-Location of one's residence influences the choice of transportation modes.<br>-Available transportation in communities influences transportation mode used by the elderly.<br>-Cars and taxis are commonly used by the elderly living in suburbs since there are few alternatives and activities are more dispersed. In dense urban areas, most activities can be reached by walking or public transit. | [11,26,27]<br>[18]<br>[6,15]<br>[7] |
| 3.2 Distant and travel time.  | -Length of time required for travel influences elder mobility.  | [28,29]                             |

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