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Mobility and transport potential of elderly in differently accessible rural areas

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ABSTRACT

The aim of this paper is to examine the mobility characteristics of the elderly in rural settlements with different accessibility (low accessibility, medium accessibility, and high accessibility), defined in relation to the facilities that are important to the elderly and the transport network density. Another aim is to define and analyze the transport potential of the rural elderly population. The paper is based on research carried out in 2012 and 2013 in rural areas of Serbia. The data were collected through a household survey specially designed for rural areas, from a sample of 346 elderly respondents. Based on the data analysis, it was found that mobility of the rural elderly population in Serbia is generally low, but there are significant differences among rural settlements with different accessibility, with age and possession of a driving license having a major impact on mobility. It was also found that the transport alternative choice set of the majority of respondents consists of four modes of transport, which is due to the fact that the rural elderly live in multi-member households. However, considering the identified demographic trends in Serbian rural areas, the transport potential of the elderly is likely to be lower in the future, and this should inform future rural transport policy with the aim of mitigating transport deprivation and social exclusion.

1. Introduction

In recent years, the elderly population in Serbia has become a frequent object of research in the social sciences. Like the majority of European countries, Serbia also could be called a 'country of the elderly'. According to data from the last census in 2011 (Statistical Office of the Republic of Serbia, 2012), the elderly population (persons aged 65 or more) account for 17.4% of the overall population, but 20.1% of the rural population. Demographic changes had begun to occur even in the 1950s, but reached the critical point in 2002 when the number of elderly persons exceeded the number of the youngest class, and such trends have continued until the present (Ševo et al., 2009).

In Serbia today, a large number of elderly persons live in rural areas. Although the rural environment can be pleasant to live in at an advanced age, there are some problems that make it harder for elderly people to access facilities and services especially health centres. These negative aspects are particularly expressed in current generations of elderly people, born immediately before, during, and after the Second World War, who are poorly educated. Only a small number among them own a driver's license, primarily because of low car ownership in rural areas before the 1980s. The intensive motorization of rural areas had a higher impact on persons in the succeeding generation, who were prepared to take driving tests. Therefore, the observed (elderly) generation can be considered a 'driving-missing generation'.

This non-driving elderly population is currently facing additional aggravating circumstances in living in Serbian rural areas. Given the industrialization of cities and the intensive migration of younger people to urban areas, the rural environment is being affected by depopulation. As a result, many facilities and services in rural areas have become unsustainable, to the detriment of the local population. Those who are most affected by these changes are the elderly who, due to the absence of a driver's license or for health reasons, are unable to travel often to urban centres to pursue basic activities. The accompanying problems are poverty and social exclusion.

Considering the different geographical characteristics of rural areas in Serbia, these problems have different intensities in different communities. It seems that the situation is the most severe in mountainous dispersed-type rural settlements, where a large number of young people are leaving and the elderly people left behind have to take care of themselves. On the other hand, the lower-lying areas are characterized by compact settlements, where the possibility of easier organization of activities and services results in higher accessibility and better quality of life.

From previous research worldwide, it is known that accessibility determines the demand for transport among rural settlements.

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Therefore, the aim of this paper is to examine the mobility characteristics of the elderly population in rural settlements with different accessibility, which is defined in relation to the facilities that are important for the elderly. Accessibility is a very important factor because it drives mobility and social inclusion. This is a social aspect of mobility, i.e. the mobility of the elderly population is considered an indicator of their personal independence and social inclusion. The main goals are to discover whether and how the accessibility of rural settlements affects the mobility of the current elderly population in Serbia, and define a quantitative measure of the possibility of the rural elderly realizing certain trips to determine their transport potential.

The paper is organized in the following way. Section 2 is a review of the relevant literature followed by a description in Section 3 of the research carried out. Section 4 presents a methodology for the classification of rural settlements based on the accessibility of facilities that are relevant to the elderly. Section 5 presents the analysis of results related to mobility, transport potential, and transport alternative choice set. Section 6 discusses the results obtained. The paper concludes by presenting the conclusions obtained and indicating directions for future research.

2. Literature review

2.1. Concepts of mobility, accessibility, and transport potential

In the existing literature, mobility and accessibility are two concepts that often overlap without clear distinction. Mobility is usually defined as the movement of people from one place to another, and is measured as the number of trips or distance travelled per day, although there are some authors who consider it at the annual level (e.g. Titheridge et al., 2009) or as frequency of activities (e.g. Scheiner, 2006).

As Geurs and Van Wee (2004) emphasized, accessibility is often a misunderstood and ambiguously defined concept. The literature offers different accessibility measures such as network measures, spatial separation measures, contour measures, gravity measures, random-utility and constraints-based measures, as well as composite measures (Lin et al., 2014; McGrail and Humphreys, 2009); or, according to the perspective taken, infrastructure-, location-, person-, and utility-based measures (Geurs and Van Wee, 2004). Going a step further, Geurs and Van Wee (2004) applied a holistic approach to accessibility definition for evaluation of land-use and transport strategies – they proposed that accessibility should involve four types of components: land-use, transport, temporal, and individual. These authors defined accessibility as 'the extent to which land-use and transport systems enable (groups of) individuals to reach activities or destinations by means of a (combination of) transport mode (s)'. This is the main definition used in contemporary transport studies.

The difference between mobility and accessibility is reflected in the fact that mobility indicates the number of movements/trips made with a purpose, while accessibility indicates the ease with which an individual can reach a facility or service (trip destinations).

Another related concept is the transport potential, which is closely related to the notion of the transport alternative choice set. In this paper, transport potential is a quantitative measure of the possibility of an individual using certain transport alternative for a given trip. In this sense, transport potential determines the membership level of some transport alternative in the transport alternative choice set. Unlike mobility and accessibility, which are extensively addressed in the literature, transport potential is a rare research topic at least in the form addressed in this paper. To the best of our knowledge of the available literature, this concept is related only to walking, wherein it involves four key indicators: population densities, employment densities, land use mix, and street network density (Matley et al., 2000). Therefore, it can be concluded that a research gap related to this topic exists.

2.2. Mobility, accessibility, and quality of life of the rural elderly

The elderly population's mobility has been intensively studied for many years. However, as Metz (2000) pointed out, there are different meanings of mobility in elderly people that are used in studies from different fields. For example, mobility could be related to the realized trips to access facilities and services, but it could also relate to the physical ability of an individual to move, not only to fulfil a certain purpose (shopping, health, attending social events), but also to exercise for better health. There are two research directions here: gerontological studies, which study elderly population mobility in the context of psychophysical well-being, and travel studies, which examine elderly population mobility in the context of realized trips and travel potential that is distantly related to individual health. However, both gerontological and travel studies examine the various determinants of the same concept – the quality of life in old age.

In many developed countries in the world, travel research related to rural elderly population has expanded over the last decade (Yen et al., 2014). Mobility and activity spaces were some of the main research focuses. Titheridge et al. (2009) found that elderly persons who are main drivers of the household car make 50% more trips than those who only occasionally have access to a car, and 80% more trips than those who do not have access to a car; however, the fact that those data were not disaggregated by rural/urban areas should be considered. Other studies suggest that good spatial accessibility of public transport improves the mobility level of rural elderly even if they are able to use a car, while free travel passes cannot compensate for poor public transport services (Ahern and Hine, 2012). Regarding gender differences, older rural women are better prepared for life without a car than older rural men (ibid.).

Food shops, health centres, and financial institutions such as post offices and banks are among the facilities that are the most common/important trip destinations for the rural elderly, and are indicated as destinations of 'necessary' trips (Ahern and Hine, 2012; Titheridge et al., 2009). There are many factors that influence accessibility of these facilities (Lin et al., 2014). If they are located locally, then network connectivity, distance, infrastructure design, and topography are the most important factors; for example, Findlay et al. (2001) found that older people are more likely to shop in a local environment. If they are located in another settlement, then the characteristics of the public transport service (travel time, travel cost, bus stop distance, service frequency, etc.) are the most important factors.

As trips to access health services are among the most important made by the rural elderly (Ahern and Hine, 2012), extensive research is related to accessibility of health services. Goins et al. (2005) identify five types of barriers to health care among which are transport difficulties especially the need to travel outside the local community for specialized treatments. Results from Spain show that the rural elderly use health services almost three times less frequently than their urban counterparts because of transport problems (Fernández-Mayoralas et al., 2000). Ahern and Hine (2012) indicate that health centres are not well served by public transport lines, so rural elderly have to spend more energy, money, and time to get there often relying on family and friends. Considering the increasing proportion of the elderly in the population, Philip et al. (2003) suggest that the rural elderly would pose increased demands upon health services, which should be considered when defining future transport planning strategies.

In countries that provide good social support and accessible public transport services to elderly people (see, for example, Ahern and Hine, 2012; Suen and Mitchell, 2000), mobility research is more focused on their recreational activities than on access to basic facilities and services (Gagliardi et al., 2007; Kasper and Scheiner, 2002). It was found that rural elderly people participate in recreational activities less frequently than their urban counterparts (Gagliardi et al., 2007) and that sporting activities and hobbies were the privilege of elderly people who still drive (Gagliardi et al., 2007), although Scheiner (2006) found that there is no difference among inhabitants of settlements with different amounts of facilities. These and other authors (Föbker and Grotz, 2003; Kasper and Scheiner, 2002; Mattson, 2010; Su et al., 2006; Van den