

Network Analysis on Ageing Problems : Identifying Network Differences between Types of Cities

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Abstract

The research is to identify social networks of problems that have an influence on the quality of ageing people's lives by using social network analysis, based on the premise that there are differences in networks of ageing problems in urban and rural areas. From analyzing network of ageing people's problems using NodeXL, vertices in the networks of both urban and rural areas are well-connected. For urban areas, financial poverty is the core problem related to the quality of life. It has direct connections with illness and health, family responsibility, housing, role loss in community, and employment, which have positive or negative interactions with the quality of older people's lives. For rural areas, on the other hand, role loss in community is the major problem. It has direct connections with the elderly abuse, financial poverty, leisure activity, divorce, isolation and loneliness from society, education, and suicide. As a result, the research shows that the problems of ageing people have strong linkages and interactive effects with a structure of network, and the networks are different depending on types of places for living.

Keywords: Ageing Society, Quality of Life, Urban and Rural Areas, Network of the Elderly's Problems, Social Network Analysis

1. Introduction

Social work with older people is an element of almost of all countries that have been changing in recent decades in many ways including delivery system of welfare service, assessment of individuals' needs, etc[1][2][3]. The change in providing public service for the elderly around the world is closely related to the rapid growth in population of older people. Population ageing is an apparent sign for increasing median age in the population of a region due to declining fertility rates and rising life expectancy, which is a common trend in developed countries.

Asia and Europe are the two regions where a significant number of countries face population ageing. In these regions within twenty years, many countries will face a situation where the largest population cohort will be those over 65 and an average age will approach 50 years old[4]. In particular,

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South Korea has faced with a rapid growth of ageing people since 2000. Korea's population is ageing rapidly and will start falling from 2030 after peaking at 52 million. In 2040, more than half of Koreans will be older than 52. The median age of Koreans now stands at 40.8, but it will rise to 52.6 in 2040[5].

On the other hand, there are effects of an ageing population on our society in many different perspectives. The economic effects of an ageing population are considerable. Older people have higher accumulated savings per head than younger people, but spend less on consumer goods. Population ageing also increases some categories of expenditure, including some met from public finances. The largest area of expenditure in many countries is now health care, whose cost is likely to increase dramatically as populations age. The second-largest expenditure of most governments is education and these expenses will tend to fall with an ageing population. The expectation of continuing population ageing prompts questions about welfare states' capacity to meet the needs of their population. In the early 2000s, the World's Health Organization set up guidelines to encourage "active ageing" and to help local governments address the challenges of an ageing population with regard to urbanization, housing, transportation, social participation, health services, etc[6].

An ageing society has caused various problems. Problems of an ageing society in the past were considered simple challenges to be easily solved by welfare policies for health and poverty, but not today. Older people's problems have developed from an individual problem to a social one, changing our way to understand it into more complex perception. The problems include very complicated issues ranging from health to employment, finance, isolation, and death which have close relationships with social, political, economic, and cultural structures.

So far, we have depended on one-way causation as an approach for dealing with ageing problems, which just tests factors that have an influence on older people's lives. Due to the research tendency, it is not difficult to find various actions for going up the quality of aged people's life, but it is questionable whether those are effective ways of practically improving the quality of lives for the elderly since it is very difficult or even impossible to fully understand the complexity of causal relationships or dynamics of factors related to ageing problems. It is, also, important to point out that a structure of ageing problems can be probably different, depending on a geographical or spatial circumstance. That is to say, we need to recognize that a variety of problems of ageing people can have different structure-networks between urban and rural areas. It can be understandable that government's policies for ageing problems can be made with a new viewpoint for setting up their priority, and governments can find the ways to input their resource with higher efficiency instead of spending flat budget.

The research is to identify structural maps of the problems that have an influence on the quality of ageing people's lives by using social network analysis, based on the premise that there are differences in networks of ageing problems in urban and rural areas. The research will show a more expanded viewpoint to perceive ageing problems mapping the different networks between urban and rural areas.

2. Ageing Problems

There are various discussions on ageing problems in an ageing society. Sexuality and sexual health represent an important quality of life in later life[7]. The nature and extent of female sexual problems in later life remains unclear and, although it has been claimed that female sexual dysfunction is age related and progressive[8] concerns have been raised that this condition is not adequately defined[9], particularly from the perspective of women themselves. Ill health is not an inevitable consequence of ageing but a severe problem for some older people. Many public health campaigns encourage populations to pursue healthy ageing[10]. Religion's effects upon well-being in later life should be considered separately from other points

in the life span because older persons demonstrate the highest levels of religious participation of any age group, religious institutions frequently offer services of various kinds to elders, and religious traditions articulate values about ageing that support well-being[11].

In addition to the approach that comes to problems in an ageing society in a differentiated way, it is noted that many researches show the problems of ageing people as social problems with a comprehensive approach. With age comes wisdom, but it also comes with a bunch of problems. There are some psychological problems that can plague older adults, including depression, anxiety, substance abuse, and psychosis[12]. Problems related to the elderly include financial instability, poverty, victimization, isolation, dependency, lack of access to appropriate health care and inadequate housing[13]. In particular, types of older people's problems have continuously expanded from individual problems such as health and sexuality to social problems such as poverty, education, isolation from local community, etc. The problems that have been closely discussed or treated so far are very diverse: financial poverty, illness and health, elderly care, role loss in community, isolation and loneliness from society, elderly abuse, employment, housing, leisure activity, sexuality, suicide, education, family responsibility, divorce, death and hospice, etc.

3. Data and Measures for Social Network Analysis

The origins of social network theory began in the early 1930s within three different distinct groups (psychology, anthropology, and mathematics). Most notably, sociograms basically represented the mapping of relationships between individuals by displaying points connected by lines (geometry of interpersonal relationships)[14]. Sociograms were produced to help identify group leaders, isolates, directional ties, and reciprocity in friendship circles. This new approach uses graph theory as the mathematical measurement of the relationships between points and lines[15]. The original symbols used to describe groups of people as collections of points were as follows: "signed" (+ means "likes" and - means "dislikes"), "directed" (arrow from Person A to Person B and vice-versa), and "ties" (lines), which form a network structure[16].

The research takes the steps to conduct a social network analysis: (a) determining the type of analysis; (b) defining the relationships in the network using a theoretically relevant measure; (c) collecting the network data; (d) measuring the relations; (e) determining whether to include actor attribute information; (f) analyzing the network data; (g) creating descriptive indices; and (h) presenting the network data[17][18]. Among them, collecting the network data is a very important step because structural mappings of ageing problems rely on the data used in social network analysis.

The data for this research are taken from a survey that was conducted with 200 respondents aged 65 and older who reside in Daegu metropolitan city and some counties of Gyeongsangbuk-do province. A random sampling technique was used to obtain unbiased sample, allowing for the examination of difference between urban area and rural area in structural networks on problems in an ageing society. The surveyor met the prospective respondents on the street to conduct the survey. It was conducted from April 18 to March 2, 2017. The demographics of the respondents are shown in Table 1.

Table 1. Demographics of Respondents (N=200)

	Urban area %	Rural area %
Gender		
Male	47.3	48.9
Female	52.7	51.1
Age		
65 to 69	42.1	27.3
70 to 74	36.4	44.8
75 and older	21.5	27.9
Marital status		
Married	67.6	79.9
Single	10.2	4.2
Divorced/separated	0.3	
Widowed	21.6	15.9
Parents status		
Parent	100	100
Childless		

The purpose of the research is to identify structural networks on ageing problems in an ageing society, based on the premise that there are differences in the networks between urban area and rural area. The research used the questionnaire to measure which problems respondents consider their own problems that can affect the quality of their lives. Types of ageing problems were shown in the questionnaire : financial poverty, illness and health, elderly care, role loss in community, isolation and loneliness from society, elderly abuse, employment, housing, leisure activity, sexuality, suicide, education, family responsibility, divorce, death and hospice, and then the respondents were asked to choose some of them with their priority.

4. Results

We tried to construct networks of ageing problems in urban area and rural area using NodeXL that is an application that simplifies basic network analysis tasks and supports analysis of social media networks.

Figure 1 shows that in urban areas how ageing problems are connected in building a network. Vertices in the network are well-connected. As observed in the network, the average betweenness, one of the centrality measures, of the network is 4.500, which seems high. The average value of average shortest path to network is 1.04, and there is no unreachable pair. Also, the average Clustering Coefficient is 0.735. That is to say, both the average Clustering Coefficient and the number of unreachable pair suggest that vertices in the network are well-connected.

As we can see from the Figure 1, the network of ageing problems has 5 sub-categories that are directly connected with financial poverty, which shows that financial poverty is the major element connecting ageing problems in urban areas. Financial poverty has direct connections with illness and health, family responsibility, housing, role loss in community, and employment. Illness and health consists of suicide and death and hospice. Family responsibility is connected with divorce and the elderly care. Housing has a direct connection with leisure activity and sexuality. Role loss in community is linked with isolation and loneliness from society, the elderly abuse, and education. Finally, employment is connected with isolation and

loneliness from society and education. In particular, both sub-network of employment and sub-network of role loss in community are well-connected like a network.

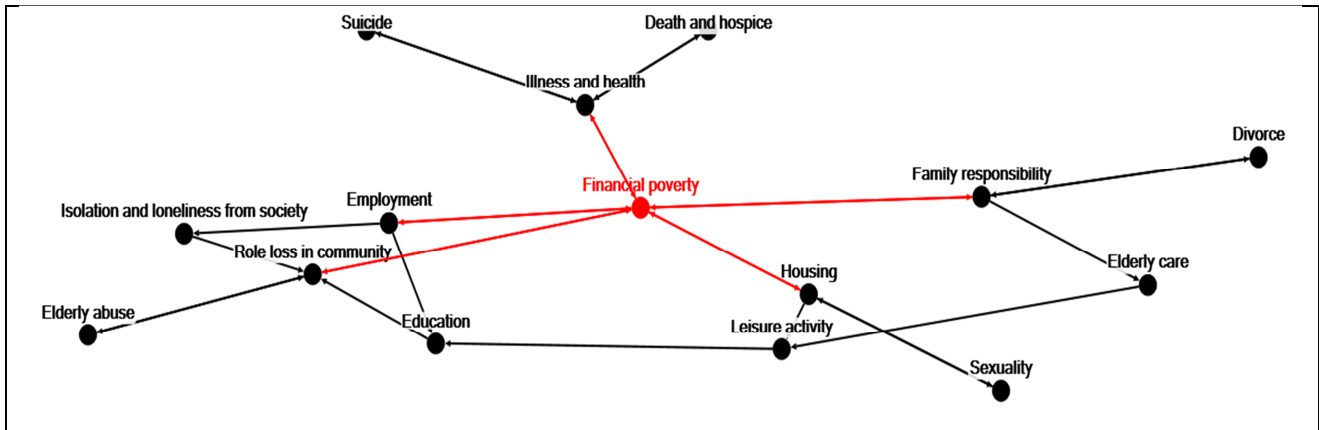


Figure 1. Network for Problems of Ageing People in Urban Area

Figure 2 also presents that vertices in the network are well-connected. As seen from the network, the average betweenness is 4.230. The average value of average shortest path to network is 0.95, and there is a vertex that is not connected with the whole network. The average Clustering Coefficient is 0.711.

As we can see from the Figure 2, the network of ageing problems has 7 sub-categories that are connected with role loss in community, which shows that role loss in community is the major element connecting ageing problems in rural areas. Role loss in community has direct connections with the elderly abuse, financial poverty, leisure activity, divorce, isolation and loneliness from society, education, and suicide. These networks, however, have a close linkage with each other. Speaking strictly, it is a little difficult for role loss in community to have 7 sub-categories. The elderly abuse is connected with the elderly care and family responsibility. Financial poverty has a direct connection with employment and family responsibility. Education is linked with illness and health, leisure activity, and death and hospice. Suicide is connected with illness and health and housing. Finally, isolation and loneliness from society, divorce, and leisure activity have a strong network with close directions. On the other hand, sexuality does not have any network with other problems.

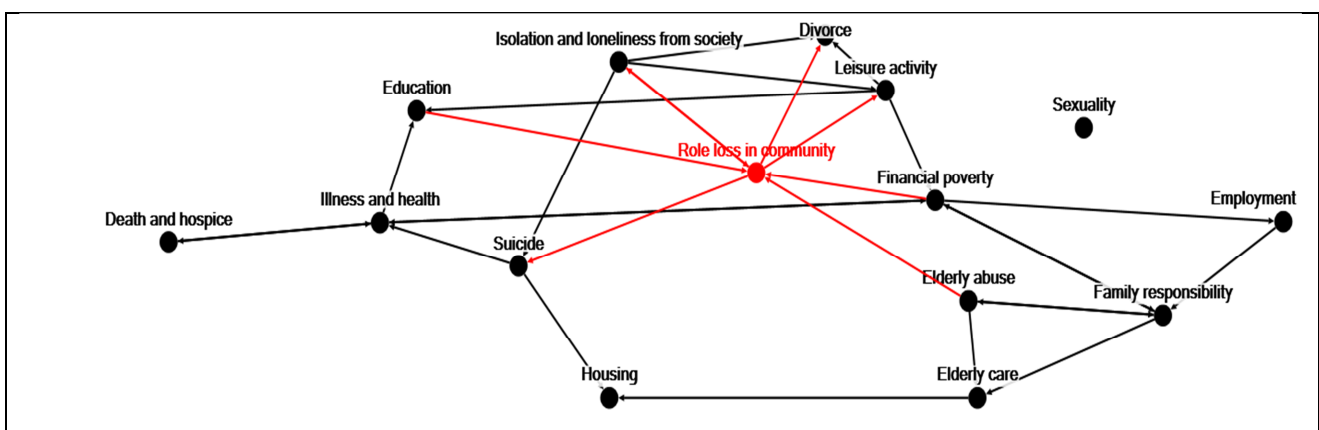


Figure 2. Network for Problems of Ageing People in Rural Area

5. Discussion

The main purpose of the research is to identify networks of the problems that have an influence on the quality of ageing people's lives, based on the premise that there are differences in networks of ageing problems in urban and rural areas. As we can see from the analytical results, the networks of ageing problems between urban and rural areas are different from each other. For urban areas, financial poverty is the core problem in an ageing society. It has direct connections with illness and health, family responsibility, housing, role loss in community, and employment, which have a positive or negative interaction with the quality of life. For rural areas, role loss in community is the major problem. It has direct connections with the elderly abuse, financial poverty, leisure activity, divorce, isolation and loneliness from society, education, and suicide.

There are some things that we can find from the analytical results. First, the life of ageing people living in urban areas is different from one of older people in rural areas. In particular, ageing people in urban areas have suffered from problems related to economic conditions that have been dealt as one of the most important factors affecting the quality of ageing persons' lives. The life of older people in rural areas is likely to be vulnerable to family and community-environmental conditions like being alone, family separation, and isolation from community cooperation. Second, ageing people in urban areas try to find their role of workers in a society focusing on participation in economic activities for earning living costs. On the other hand, the elderly in rural areas have more attention to existing together in their family or community than economic activity. Finally, vertices involved in the networks are well-connected, which means that ageing problems have strong linkages and interactive effects in these networks.

Along with these findings, the research points out that approaches for understanding or explaining ageing problems should be diversified with appropriate tools for analysis. Each ageing problem is not separated but connected, so we need to take a look at the problems with social network to be able to describe structural complexity of the issues caused by the advent of ageing society. The study, in this context, is an attempt research to make structural maps or networks for ageing problems with social network analysis and will be helpful with understanding and explaining how different those networks of the problems are in urban areas and rural areas.

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