Factors Influencing Happiness of the Disabled Elderly in Khon Kaen Smart City

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This research aimed to study the factors that influence the happiness of the disabled elderly in Khon Kaen Smart City. The quantitative research method was used in order to obtain broad perspectives on the disabled elderly and the determinant factors influencing their happiness the assumption of which was then tested. The number of the disabled elderly under the study was 384, all being over 60 years of age. The structured interview was carried out prior to univariate and multivariate analyses, which were based on the Multiple Regression Analysis. The variables were selected by a normal approach before entering into the equation so as to explain the determinant factors of happiness. The results showed that the most common disability condition of more than half of the elderly in Khon Kaen related to their physical movement, followed by hearing disability or communication, visibility, and multiple disabilities. Their disabilities were caused by illness, accidents and old age, at 65.8, 17.5 and 8.1%, respectively. The highest average per total score related to the ways of living was found in surviving, at 63.0%, followed by choices in life, sustainability, struggling, and problem solutions. Nearly one third of the disabled elderly in Khon Kaen had a high degree of happiness in their lives (61.5%). The four elements of happiness receiving the highest averages from the total score were: 1) strong family (70.7%), 2) sense of belonging (67.0%), 3) social empowerment (63.6%), and 4) sufficient welfare assistance (61.3%). Hearing or communicating impairment and the ways of living of the elderly were the determinant factors of the elderly happiness at the significance levels of 0.01 and 0.05, respectively. All of the independent variables explained the variations of the disabled elderly happiness at 29.1 ($R^2 = 0.291$).

Key words: *Happiness, Disabled Elderly, Smart City*

Introduction

The changing demographic structure has brought about the aging society, which is a challenge for Thailand in the 21st century. There is a projected increase in population of the elderly aged over 60 years, from 20.0% in 2021 to 28.0% in 2030. That is when Thailand will completely become the Aged Society (Office of Personnel Research and Development, Office of the Civil Service Commission, 2018). This change leads to the necessity for governmental departments and divisions to set policy and approaches in promoting good quality of life for the elderly, enabling them to lead their lives happily and normally. For example, plans for the elderly should be added in the National Social and Economic Development Plans to correspond to the human rights concept and the policies of the United Nation and the Second Version of the National Plans for the Elderly (2002-2021), which is composed of five strategies: (1) preparing the aging population to be better, (2) Promotion and development of the elderly, (3) social protection system for the elderly, (4) assistance for the elderly and personnel involved with the elderly, and (5) compilation and development of knowledge related to elderly and the following up of work, according to the National Plans for the Elderly (National Elderly Committee, 2010). In the National 20-year Strategic Plans (2018-2037), the approaches have been set for propelling two strategies concerning the elderly. These strategies are (1) developing and enhancing of human resources with an emphasis on the elderly betterment, by encouraging post-retirement employment, and (2) creating opportunities, and social equality. The Thai population will be prepared for aging society in all the health, social, economic and environmental dimensions. The betterment of the elderly will be enhanced so that they will be able to live happily in the arriving aged society (Office of the Secretary of the National Strategic Committee, Office of the National Economic and Social Development Council, 2018).

The truth of life is – when people get older, they tend to have more risks of illness, disability and infirmity. The report on Thailand's Disabled Situation by the Ministry of Social Development and Human Security (2016) agrees with the disability survey conducted in 2017, which reported an approximate 3.7 million disabled people in Thailand, or 5.5% of the total population, and most of them (20.6% of the total population) were the elderly (aged over 60 years). It can be said that the elderly with disabilities accounted for 812,825 people or 49.5% of the total disabled population of the country. The most common disability found among elderly were related to movement or physical disability, followed by hearing or communicating disability and visual impairment. Most of the causes of disabilities – 30.8% -- were from illness and diseases such as hypertension, coronary stenosis, spinal inflammation, infection, diabetes and epilepsy, in that order. Most of the elderly with disabilities were mostly categorised in the group of bed-ridden patients or people with dependent conditions (The National Statistics Bureau and UNICEF Thailand, 2017). The elderly with disabilities had more limitations to perform daily activities or participate in social activities than healthy old people. Their personal situation can partly contribute to their fragility, especially their economic situation, for if the elderly person lives in a poor family, he or she then lacks the chance to develop the potential

and continuous rehabilitation from the beginning of the disability. They also lack the human capital for access to education, leading to unemployment and insecurity of life. If the physical capital or the environment and public services, for example, accommodation, transportation system, tourism places, official places, and expensive facilitating technologies, do not facilitate the living of the disabled elderly, then they are not able to utilise the mentioned places. In terms of social capital, likewise, the disabled elderly frequently face double standards of treatment and are forced out of society to be confined at home. Thus, they have limitations in access to news and information and participation in social activities as well as in the participation of setting policies (National Committee for Empowerment of Persons with Disabilities, 2017). The limitation of such capital of the disabled elderly impacts on their feelings of value and leads to negative attitudes and problems living in the family, the community and society.

Khon Kaen province is situated in the centre of the Northeast region, making the city the centre of the economic, educational and medical development (Khon Kaen Municipality, 2019). Thus, Khon Kaen province has been approved for the "Smart City" Project, which is under the National Economic Mobilization Policy (Thailand 4.0). The development of the Smart City under the National Agenda is channelled towards the development of infrastructure and technologies that meet international standards in six aspects, namely: (1) Smart Governance – a city that is directed towards good governance and transparent organisational management with efficient collaboration with the private sector for efficient and rapid services; (2) Smart Environment – a city with conservation of the environment and natural resources, efficient energy usage, reduction of energy consumption and greenhouse gas emission; (3) Smart Economy – a city of creative economy that facilitates businesses, creates product and service innovations, and new companies in the digital age; (4) Smart Mobility – a city where communication is convenient, efficient, and safe, with a mass transportation system; (5) Smart Living – a city where the quality of life has been developed, and is a pleasant and safe city to live in with complete educational and health infrastructures, including for example, a Generous Khon Kaen City Project, CCTV camera installation at over 1,000 places, and (6) Smart Citizens or Smart People – a city where people are full of consciousness and are socially equal, a city with facilities available for the disabled, the underprivileged and the elderly, and a city that provides a chance for people's participation (Khon Kaen Municipality, 2019).

Nevertheless, with the population of 1.8 million and the population growth rate of 2.09% annually, the city ranks fourth in the country in terms of the population size (The Central Registration Office, Governing Department, 2020). The elderly population is 279,606, or 15.5% of the total population. Of this number, 18,316 (6.6% of the total elderly population) received the state's allowance for person with disability. It was noted that the number of old people registered as disabled at the Office of Provincial Social Development and Human Security was as high as 10,856. The purpose of this registration is for the rights and benefits as per the Act of Empowerment of Persons with Disabilities and the Act of Disabled People Rehabilitation (Khon Kaen Statistics Office, 2016). This reflects that the disabled elderly in

Khon Kaen have access to their entitled rights and lead their lives relatively independently and happily with others in the society. Therefore, the researcher was interested to study the factors that affect the happiness of the elderly in Khon Kaen Smart City, for the results of the study would benefit governmental organisations and relevant organisations dealing with the aging society situation where there are old people with disabilities. The outcomes also include recommendations for the policy, development projects and problem solutions appropriate to the disabled elderly with different basic necessities and resources, but will lead to happiness in their ways of living.

Concept of Happiness of Disabled Elderly

The concept of "happiness" has emerged since the ancient Greeks. In the viewpoint of philosophers and Westerners like Aristotle (350 B.C.E), happiness is regarded as something that leads to the ultimate goodness, including intellect, knowledge and virtue. It therefore means 'existing,' good actions, and self-sufficiency, as these are the utmost goal of human life (Reece, 2019; Saowaluck Kittipraphat, 2010). Later, the happiness concept was internationalised and categorised as belonging to the social population. Economists use the concept in their studies of consumer groups, from the belief that people attempt to seek satisfaction and avoid any action that leads to agony or self-dissatisfaction. "Advantage" is thus the term used with the concept of happiness (Mill and Oskar, 1957; Bennett, 2010), and together means something that leads to benefits, satisfaction, goodness and happiness, including protection against or avoidance of the feelings of disturbance, agony, evil and unhappiness. Therefore, according to the principle of advantage, "happiness" is acceptance of activities that bring about happiness while the activities not bringing happiness are rejected (Stokes, 2012).

Thai people, especially people from the Northeast, value the importance of happiness, by connecting it with the Buddhism concept, the viewpoint of which is that all humans want to be happy, for happiness is important to the mental and physical conditions and impacts on the ways of living. With happiness, the brain can regulate the nervous system well and work efficiency increases (Office of Health Promotion Funding, 2009). The concept leads to the social happiness development. Bhutan is the first country to use the concept of happiness to measure the mass happiness of the people in the country. They aim at the happiness of the country population who are able to work to their fullest capacity. The measurement of happiness can be objective and subjective. Objective measurement is the use of observable tools, and the outcomes can be similarly observed, no matter who the observer is. For example, concrete happiness is measured by means of brain wave frequency measurement and heart rate, whereas the subjective method measures happiness according to personal feeling, for example, personal happiness, or self-satisfaction of life. Most academics call this measurement the Global Self-report, or self-evaluation of one's own happiness and life satisfaction, in order to understand the holistic view of life satisfaction during a certain period of time (Saowaluck Kittipraphat, Ornnicha Sawangfa, Kanokporn Nitnithiphruet, and Natthaporn Liamjaruskul, 2010;

Tobgay, Dophu, Torres, and Na-Bangchang, 2011). Recently, academics from various disciplines have seen the importance of the measurement of capabilities in living, and realised that poverty is not an obstacle to well-being. If a person is able to adjust to the poverty and adjusts the ambition to match the real situation, then the person can lead his or her life happily (Sirinan Kittisuksathit, Chalermpon Jamjan, Kanjana Tungchollathip, and Jarumporn Holamyong, 2013). This notion agrees with the European Union that sees the importance of society and culture, and has thus applied the Social Quality Concept that emphasises social, economic and cultural participation and community development to add to the well-being and potentialities of people in the community, through support by community members. This enables community people to have access to all necessary resources and the environment (Kusago, 2008).

Thus, it can be concluded that the concept of happiness was derived from a theological basis and has extended into sciences, economics and social science, which contain certain similarities, especially in creating happiness for people in the society. The happiness concept is a concept of continual interest in academic circles. Presently, academics see the importance of the measurement of happiness from informants' viewpoints rather than measuring happiness from the researchers' own perspectives. The concept of happiness therefore covers different dimensions, including physical, psychological, spiritual, economic, social and cultural aspects. The concept is useful in enhancing happiness of the people in the country, which leads to continuous development. A research study was conducted on happiness of the elderly in the Northeast of Thailand by Dusadee Ayuwat, Jongrak Hong-ngam, Kesinee Saranritthichai, Rukchanok Chamnanmak and Wanichcha Narongchai (2018), who found that their happiness is derived from four components: (1) healthiness – the elderly are healthy, not sick, does not have a congenital disease, can help themselves and can do household chores; (2) security – the elderly are secure in terms of economy and accommodation, have a job, earn income, have money to use without trouble and without having to depend on children, have savings, and have balanced income and expense; (3) strong family – the family members love and live in unity, supporting and assisting one another, obeying and following what the elderly say; and; (4) social empowerment – the elderly feel safe in life and assets, are respected by and have good relationship with people in the community. When the levels of happiness of the elderly were taken into account, the study found that, most of the elderly in the Northeast (52.8%) had high level of happiness, and 36.7% and 10.5% of the elderly had medium and low levels of happiness, respectively. It was noted that the overall happiness of the elderly in the urban and rural area was similar, i.e., 51.5% of the elderly in the urban area and 53.4% of the elderly in the rural area had a high level of happiness, while 37.9% and 36.2%, respectively, had a medium level of happiness. When classified by the four components, and from the average per total score, it was found that 81.4% of the elderly were happiest from having strong families, while 79.4% were happiest from social empowerment. The happiness of the elderly in terms of healthiness and security of life scored lower than the overall happiness of the elderly, i.e., at 74.4% and 71.6%, respectively.

Nevertheless, the research conducted on the marginal population in Thailand classifies the population into three categories: (1) people on the fringes of society, who could be marked or treated with double standards by the society or obstructed from society by one way or another, poor people, stateless people, small ethnic group, cross-national labourers, orphans, transgender people, sex-transformed people, prostitutes, drug users, ex-prisoners, etcetera; (2) people who have health requirements but have limited access to health care services (e.g. people who have no health security, people living in a remote area), and; (3) people at risk of being neglected or maltreated if not receiving long-term health care, e.g., the elderly, physically disabled people, mentally disabled people, house-ridden patients, bed-ridden patients, etc. From the review of literature from abroad and synthesis of the studied cases in Thailand, it was found that there are abundant of research studies conducted on the marginal groups of people mentioned earlier, but there has been limited studies on the elderly with disabilities, who can also be classified as a marginal group in at least two out of three of the above-mentioned categories. In other words, previous studies tended to examine the elderly and disabled people separately. Thus, the researcher found it interesting to study the factors that build happiness in life of the disabled elderly who live in the city that is being developed into a smart city.

Research Methodology

This research was conducted quantitatively with the analytical unit being at the individual level which was the disabled elderly persons. The population under study comprised those aged over 60 years old, holding Thai citizenship, living in and being the citizens of Khon Kaen, and having limitations in their daily living or in social participation due to impairments in seeing, hearing, moving, communicating, emotion, behaviours, intellect, learning, or other impairments. The names of the disabled elderly were obtained from the database of Khon Kaen Municipality. There were 1,020 disabled elderly people registered to receive the state's allowance for the disabled (Khon Kaen Municipality, 2020). The sample group size, calculated from the equation of K.V. Krejcie and D.W. Morgan (1970), was 384 people. The stratified sampling method was performed in the area with the highest number of disabled elderly persons. Data was collected through the scheduled and structured interview, the research tool developed from the research innovation on the happiness of the elderly in the Northeast of Thailand by Dusadee Ayuwat, Jongrak Hong-ngam, Kesinee Saranritthichai, Rukchanok Chamnanmak and Wanichcha Narongchai (2018). The verified questionnaire was coded according to the coding manual and computed by a software program for analysing social science research data (SPSS for Windows) in which the analyses were divided into two steps, namely, (1) univariate analysis, and (2) multivariate analysis. The multiple regression analysis was then conducted with normal entry of variables into the equation to explain the determinant factors for the happiness of the disabled elderly in Khon Kaen Smart City.

Research Results

1. The Disabled Elderly in Khon Kaen Smart City

From the sample group of 384 disabled elderly in Khon Kaen, 96.6% already registered as a disabled person. According to the 2007 Act of Promotion of Quality of Life of the Disabled, most of the disabled elderly under the study (52.9%) were in the third category of disability, physical disability, whereas 25.8% had hearing or communicating impairment. It was noted that over 6.0% of the disabled elderly had multiple disabilities. Nearly two thirds became disabled from illness. The illness that caused their disabilities started during the age range of 51-70 years, in particular, accounted for 44.9%, and from the age of 70 years and older accounted for 37.2%, with the average age of the elderly who became disabled from illness being 62.9 years and the highest age being 90.0 years. The second cause of disability was found to be from accidents, at 17.5%. It was also found that more than 8.1% of the disabled elderly became disabled from old age. Most of the disabled elderly (45.3%) were able to help themselves, 42.1% were able to partly help themselves, and as high as 12.6% were not able to help themselves at all (table 1).

As for the general characteristics of the disabled elderly in Khon Kaen Smart City under this study, most (59.9%) were females, and 40.1% were males. The age range of 39.6% was 71 – 80 years, and that of 32.6% was 60 – 70 years. The highest age was 98.0 years, and the average age was 75.1 years. The majority, three quarters, completed the primary education, followed by high school/ vocational certificate at 8.3% and 7.3%, respectively. Most, 59.6%, were married, while 28.4% were widowed/ divorced. Most of the disabled elderly (47.7%) lived in a family with one to three members, while 40.1% and 12.2% lived in a family with four to six members and more than seven members, respectively. The average number of members per family was four people and the maximum number of members found was eleven people. Most were found living with children and grandchildren (23.1%), followed by living with the spouse, children, and grandchildren at 18.8%, and with children only at 18.5%. It was noted that as high as 6.2% lived by themselves, which could have impacted on the degree of their happiness (table 1).

With reference to the congenital diseases of the disabled elderly in Khon Kaen, it was found that as many as 74.1% had a congenital disease or a health problem besides being disabled. The most frequently found disease was hypertension, which was also chronic, at 42.9%, followed by diabetes, at 24.5%, while 13.5% had complications from pressure sores and allergies at similar proportion, and 5.4% were equally found having stiffened joints, osteoporosis, lung infection, lupus, dermatitis, Alzheimer, or thyroid. The majority of the disabled elderly held the universal health scheme rights at 76.1%, followed by the government official health insurance at 19.7%. However, 2.4% were found as having no healthcare

coverage at all. When sick, they had to pay for the medical bill, which could have impacted on their happiness (table 1).

Table 1 Percentage of the disabled elderly in Khon Kaen Smart City classified by the general characteristics

General Characteristics	Percentage	General Characteristics	Percentage
Registration as a Disabled Person		**Cause of Disability**	
Registered	96.6	Disability at birth	5.0
Not registered	3.4	Disability from accident	17.5
Total	**100.0 (383)**	Disability from illness	65.8
Category of Disability (Order) (As per the Act)		Disability from old age	8.1
1 Visibility impairment	8.1	Disability from occupation	2.1
2 Hearing or communicating impairment	25.8	Unidentified cause	0.8
		Others	0.8
3 Disability in physical movement	52.9	**Total**	**100.0 (383)**
4 Psychological or behavioural disability	3.1	**Degrees of Disability**	
		Cannot help oneself	12.6
5 Intellectual disability	3.6	Can partly help oneself	42.1
6 Learning disability	0.5	Can help oneself	45.3
7 Redundant disability	6.0	**Total**	**100.0 (380)**
Total	**100.0 (384)**	**Age (Years)**	
Gender		60 – 70 years	32.6
Male	40.1	71 – 80 years	39.6
Female	59.9	81 – 90 years	25.2
Total	**100.0 (384)**	90 years and over	2.6
Highest Education Level		**Total**	**100.0 (384)**
Primary level	74.5	Mean = 75.1 years S.D. = 8.5	
Secondary level	7.3	Max.= 98.0 years Min. = 60.0 years	
High school/Vocational certificate	8.3	**Number of Family Members Living Together**	
Vocational diploma/associate degree	2.3	1 – 3 members	47.7
Bachelor's degree and higher	2.9	4 – 6 members	40.1
Others (uneducated)	4.7	7 members or more	12.2
Total	**100.0 (384)**	**Total**	**100.0 (384)**
Marital Status		Mean = 4.0 persons S.D. = 2.0 Max. = 11.0	
Single	11.5	persons Min. = 1.0 persons	
Married	59.6	**Congenital Disease or Health Problem**	
Widowed/divorced	28.4	No	25.9
Others	0.5	Yes	74.1
Total	**100.0 (384)**	**Total**	**100.0 (371)**
Rights for Health Care Service		**Chronic Diseases**	
Universal healthcare scheme	76.1	Hypertension	42.9
Official health insurance	19.7	Diabetes	24.5
Social security	1.0	Cholesterol	9.0
Other rights (VHV's rights)	0.8	Heart disease	5.6
No insurance	2.4	Ischemic stroke	3.4
Total	**100.0 (376)**	Joint infection from gout	3.1
		Others	10.4
		Total (Number of answers)	**100.0 (522)**

2. The Ways of Living of the Disabled Elderly in Khon Kaen Smart City

The majority of the disabled elderly in Khon Kaen Smart City (67.4%) were found to be able to carry out activities by themselves at a high level (14 – 20 points), while 19.3% were able to do activities on their own at a medium level (8 – 13 points). The disabled elderly who were not able do activities by themselves (0 point) accounted for 6.3%. The average score was 14.9, with the highest score of 20.0 (table 2). The ways of living of the disabled elderly in Khon Kaen were categorised into five types, namely: (1) choice of living; (2) struggling in living; (3) finding solutions to problems; (4) surviving for living, and; (5) sustainable living. The overall analysis showed that the ways of living of most of the elderly (61.2%) was high (22 – 42 points), while 22.4% and 16.4%, respectively, scored at the medium level (43 – 46 points) and at the low level (0 – 21 points). The average score was 33.6, with the maximum being 64.0 points. When considering the characteristics of their living from the average per total score, it was found that most of the disabled elderly (52.5%) showed the overall living capacities, with the highest scores being surviving for living at 63.0%, followed by choice of living at 61.5% and sustainable living at 61.0%. The disabled elderly lived by finding solutions to problems and struggled for living at a lower proportion than other aspects, i.e., 36.4% and 38.0%, respectively. This could be because the disabled elderly in Khon Kaen Smart City did not have problems or were not in the condition forcing them to struggle for living (table 2).

Table 2 Percentage of the disabled elderly in Khon Kaen Smart City classified by the overall capacities to do activities and the overall levels of their ways of living

Level of capacities to do activities	Percentage	Levels of the ways of living	Percentage
Can do activities by oneself (0 point)	6.3	Low level (0 – 21 points)	16.4
Can do activities by oneself at a low level (1 – 7 points)	7.0	Medium level (22 – 42 points)	61.2
Can do activities by oneself at a medium level (8 – 13 points)	19.3	High level (43 – 64 points)	22.4
Can do activities by oneself at a high level (14 – 20 points)	67.4	**Total**	**100.0 (384)**
Total	**100.0 (384)**	Mean = 33.6 points S.D. = 13.5	
Mean = 14.9 points S.D. = 6.2		Maximum = 64.0 points Minimum = 0.0 points	
Maximum = 20.0 points Minimum = 0.0 points			

Table 3 Average percentage per total score and basic statistics values of the ways of living of the disabled elderly

Ways of living	Mean	S.D.	Maximum	Minimum	Average percentage per total
Overall ways of living	**33.6**	**13.5**	**64.0**	**0.0**	**52.5**
Choice	12.3	5.9	20.0	0.0	61.5
Struggling	3.8	2.9	10.0	0.0	38.0
Solution to problems	5.1	3.3	14.0	0.0	36.4
Surviving	6.3	2.5	10.0	0.0	63.0
Sustainability	6.1	2.6	10.0	0.0	61.0

3. Happiness of the Disabled Elderly in Khon Kaen Smart City

The happiness of the disabled elderly in Khon Kaen Smart City could be analysed in part on the provincial policy and on the ways of living of the disabled elderly. The well-being condition owing to the family's well-being, in particular, has impact on the happiness and the degree of happiness of the disabled elderly. The happiness of the disabled elderly in Khon Kaen is divided into four components: sense of belonging, strong families, sufficient welfare assistance, and social empowerment. The analysis showed that the overall happiness of most of the disabled elderly in Khon Kaen (61.5%) was at the high level, scoring 87 – 129 points, while 35.4% showed a moderate level of happiness (44 – 86 points) and 3.1% showed a low level of happiness (0 – 43 points). The average score was 89.0, with the maximum score of 129.0 (table 4).

When the happiness in life of the disabled elderly was based on the average percentage per total score, it was found that 65.4% of the disabled elderly in Khon Kaen had overall happiness. Seventy percent (70.0%) were happiest with their strong families, while 67.0% and 63.6%, respectively, were happy from their sense of belonging and social empowerment. It was noted, however, that the happiness from receiving sufficient welfare assistance of 61.3% of the disabled elderly was the lowest. This could be from insufficient welfare aids, which impacted on their ways of living (table 5).

Table 4 Percentage of the disabled elderly in Khon Kaen Smart City classified by the overall degrees of happiness in life

Degrees of Happiness in Life	Percentage
Low (0 – 43 points)	3.1
Medium (44 – 86 points)	35.4
High (87 – 129 points)	61.5
Total	**100.0 (384)**
Mean = 89.0 points S.D. = 21.6 Maximum = 129.0 points Minimum = 0.0 points	

Table 5 Average percentage per total score and basic statistics values of the happiness in life of the disabled elderly

Happiness in Life	Mean	S.D.	Maximum	Minimum	Average Percentage per Total Score
Overall happiness in life	**89.0**	**21.6**	**129.0**	**0.0**	**65.4**
Sense of belonging	26.8	5.8	39.0	0.0	67.0
Sufficient welfare assistance	24.5	7.7	40.0	0.0	61.3
Strong families	19.8	6.5	28.0	0.0	70.7
Social empowerment	17.8	6.8	28.0	0.0	63.6
Sustainability	6.1	2.6	10.0	0.0	61.0

4. Factors Influencing Happiness of the Disabled Elderly in Khon Kaen Smart City

Multivariate analysis was performed to find the factors influencing happiness of the disabled elderly in Khon Kaen Smart City, based on the Multiple Regression Analysis [MRA] and normal selection of variables for entering into the equation. This was carried out in order to explain the factors behind the happiness of the disabled elderly. The principle of MRA necessitates measurement by interval scales for both the dependent and independent variables. When nominal scales are used, dummy variables must be set to find the factors influencing happiness of the sample group. In this research, the variables set as dummy variables before analysing included the types of disabilities, namely, 1) visibility impairment, hearing or communicating impairment, 3) physical or movement disability. Other variables set as dummy variables were: 4) female gender, 5) the education level higher than secondary level – the level lower than secondary was set as the reference group, 6) the marital status of being married, 7) absence of congenital disease, and 8) the universal health scheme. In addition, the variables that were measured in interval scales to be analysed included: 9) age, 10) number of family members living together, 11) ability to do activities, and 12) the ways of living.

The multiple regression analysis showed that all of the twelve independent variables explained the variations of happiness in life of the disabled elderly at 29.1% (R^2 = 0.291). The factors significantly influencing happiness of the disabled elderly in Khon Kaen were: the hearing or communicating impairment (Beta = 0.211) and the ways of living of the disabled elderly (Beta = 0.467) at the statistical levels of 0.05 and 0.01, respectively. The comparison of the factors influencing the happiness of the disabled elderly showed that the hearing or communicating impairment influenced happiness of the disabled elderly, with the regression coefficient (b) of 0.267, which means that when compared to other disabilities, the disabled elderly with hearing or communicating impairment would be 0.267 unit happier. Similarly, the ways of living of the disabled elderly influenced their happiness with the regression coefficient (b) of 0.416, i.e., when the way of living of the disabled elderly increased one unit, their happiness increased 0.416 unit. The independent variables that best predicted the change of happiness in life of the disabled elderly were the ways of living and the hearing or communicating impairment (table 6).

Table 6 Multiple regression analysis of the happiness in life of the disabled Elderly in Khon Kaen Smart City

Factors	b	S.E.	Beta	t	Sig.
Visibility impairment	-0.054	0.112	-0.027	-0.482	0.630
Hearing or communicating impairment	0.267	0.089	0.211	2.997	0.003
Physical and movement disability	0.129	0.078	0.117	1.656	0.099
Gender (1): Male	0.003	0.052	0.003	0.063	0.950
Age	0.050	0.031	0.075	1.630	0.104
Education level (1): Higher than elementary level	0.049	0.065	0.034	0.753	0.452
Marital status (1): Married	-0.047	0.053	-0.041	-0.879	0.380
Congenital disease (1): None	0.048	0.055	0.039	0.867	0.387
Number of family members living together	0.050	0.036	0.062	1.402	0.162
Health care rights (1): Universal coverage scheme	-0.019	0.058	-0.015	-0.330	0.742
Ability to do activities	-0.006	0.31	-0.010	-0.202	0.840
Ways of living	0.416	0.43	0.467	9.639	0.000

R = 0.539	$R^2 = 0.291$	F = 12.686	
$S.E._{est} = 0.473$	$R^2_{adj} = 0.268$	Sig of F = 0.000	

$_*$ and $_{**}$ Statistical significant at the levels of 0.05 and 0.01, respectively

Recommendations and Discussion

The study of the factors influencing happiness of the disabled elderly living in Khon Kaen Smart City, which was conducted using Multiple Regression Analysis and selection of normal enter of variables for the equation in order to explain the factors, showed that the independent variables of hearing or communicating impairment and the ways of living of the disabled elderly determined the happiness of the disabled elderly. The elderly having hearing or communicating impairment would be 0.267 unit happier in life when compared to other disabilities. Similarly, when the ways of living of the disabled elderly increased one unit, the elderly would be 0.416 unit happier. Therefore, in order to increase their happiness, activities that enhance happiness for the elderly should be accentuated, especially among those having hearing or communicating impairment. Decent ways of living should be promoted for the disabled elderly so that they would be able to manage their own living. This agrees with the study by Supanaree Wannapong and Jongrak Hong-ngam (2018), who found that the elderly aged over 60 years old in Khon Kaen believed that self-esteem mostly and significantly affected their happiness in terms of health, economy, family and society at the level of 0.01. The study by Jitnapa Chimjinda (2012), similarly indicated that the ability to take care of themselves and social empowerment together predicted the happiness of the elderly in a community in Nakhon Pathom at 57.60%, with statistical significance at the level of 0.01 ($R^2 = 0.576$). It can therefore be said that the better living conditions of the elderly leads to more happiness.

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