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# TEMPORAL CHANGE IN VISITOR PERCEPTION AFTER THE THERAPEUTIC FOREST CONSTRUCTION PROJECT - A CASE OF MT. MINJUJISAN, SOUTH KOREA

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## ABSTRACT

*This study examined the visit characteristics and recognition of visitors on a forest healing program of the Therapeutic Forest over time. Visitors to the Therapeutic Forest of Mt. Minjujisan in South Korea in 2011 and 2016 were surveyed. A structured questionnaire was distributed and collected on site. The results showed that visitors preferred autumn for participation in the forest healing program and visited the Recreational Forest more frequently as a place for the program over time. Most visitors to the Therapeutic Forest were quite satisfied with forest healing program as well. The visitors in 2016 showed more satisfaction with the program than those who visited in 2011. Overall, people who had felt that their physical and mental status was at a low level had been visiting the Therapeutic Forest increasingly over time, and that they were very satisfied with the program as before. The forest healing program should focus on improving the personal evaluation on the health status and the degree of satisfaction of his or her own life.*

**Key words:** Environment Management, Welfare Facility, Outdoor Recreation Industry.

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## 1. INTRODUCTION

Many people living in modern society are interested in the healing effect of forests [11]. The dramatic change in natural environments surrounding human beings has cause more concern regarding health care than before. Owing to the greenhouse effect, the mean temperature of the earth has been increasing and the numbers of people who visit forests are also increasing. The forest provides a solution to finding a way back to a healthy living style with a sound environment. This study examined the healing function of forests on human health, and relationships between them. The environmental factor of forest stimulates the psychological, mental, and physical healing of humans and fosters the ability to cope with and respond to

threats and competition in a stressful world. Many studies over the last few years have confirmed the common empirical notion, in which exposure to a forest causes remarkable healing changes to physical, mental, and social life. Forests can be effective in promoting the health of human beings even if they are used for a short period of time. Generally, natural environments, including urban parks of everyday surroundings and artificially constructed forests, are associated with stronger positive health effects compared to urban environments, and outdoor recreation in a green environment has been shown to relieve stress in urban dwellers [13, 14]. In addition, the incidence of positive emotions is significantly higher in forest areas than in urban areas. The physiological health effects of forests come from phytoncide, anions, and other environmental elements in the forest. Some research has shown that phytoncide also helps improve emotional stability. People feel better when they are in a forest, even when they are just looking at, sitting in, or walking slowly in a forest. The forest is the best place to promote and naturally heal the body's health.

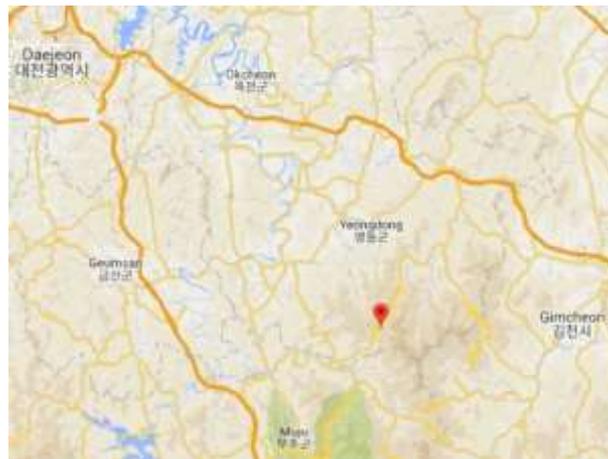
The healing or restorative value of forests is an emerging issue in eastern cultural society, including South Korea, with the trend of the Life of Health and Sustainability. To accept this social demand, the Korea Forest Service has launched the Forest for Human Health project since 2007, including the development of a model of the Therapeutic Forest [15]. Regarding the forest healing function for health promotion, the Forest Culture and Recreation Act of 2017 in South Korea defines forest recreation as "total lifestyle formed by the interaction between forests and humans, and relaxation and healing in the forest". The forest healing function has been used for a long time for forest recreation in Korea. The terms "healing" and "therapeutic" generally refer to a beneficial process that promotes overall well-being [18]. According to Cooper-Marcus and Barnes [4], they are used to describe the following: 1) relief from physical symptoms, illness or trauma; 2) stress reduction and increased levels of comfort for individuals dealing with emotionally and/or physically tiring experiences; and 3) improvement in the overall sense of well-being. Forest healing or forest therapy can be defined as a part of natural healing methods that make people physically and psychologically healthy based on various environmental elements in forest. The factors of forest therapy include not only the psychological and sociological aspects revealed by human behavior in a forest, such as self-recognition, meditation, and conversation, but also material aspects, such as phytoncide, anion, light, humidity, sound, and landscape. Frumkin [6] suggested that certain types of contact with the natural environment might benefit human health according to four aspects of the natural world: animals, plants, landscapes, and wilderness. Tsunetsugu et al. [17] insisted that forests affect humans through their impact on each of the five human senses, e.g. scenery, the smell of wood, sound of running streams or the rustling of leaves, and feeling the surfaces of leaves and trees.

The natural environment has an effect as a restorative environment [2, 16, 19]. A number of applied psychologists have proposed that exercise is effective in enhancing the concentration [7]. Ewert [5] proposed that the activities conducted in forest settings reportedly provide preventive and therapeutic health benefits [14]. Conceptual ideas within environmental psychology and therapeutic landscapes reported in the literature highlight the link between natural landscapes and mental well-being [3, 10, 13]. Natural landscapes have a more positive effect on health than urban landscapes. Verlarde et al. [18] insisted that "therapeutic landscape" concept is being adapted and expanded to cover not only healing places, but also places that promote well-being and maintain health with the goal of analyzing what influences the visitor experience. Evolutionary theories of landscape preferences explain the benefits of natural scenes as reflecting the landscape qualities that satisfy human biological needs [18]. Contacting with forests or viewing forest scenes helps reduce stress, promote more positive moods and feelings, and facilitate recovery from illness [15]. Hiking and walking for pleasure in wilderness areas is strongly associated with viewing of the natural

environment [1]. Milligan and Bingley [12] reported how woodland can form important resources for the promotion of well-being of young adults and for alleviating stress and anxieties. Wilderness offers the best of natural environments for people to view, an experience that is ranked high in participation surveys of outdoor and wilderness users [1]. This understanding of the relationship between the natural environment and health provides the background for the approach in this study to investigate the characteristics of visitors' participation in a forest healing program for individual and social health and well-being. In addition to the popularity of natural healing treatment, the demand for a forest healing program is increasing continually. Therapeutic Forests have also been increasingly recognized as the number of visitors has increased. Hence, this study examined the visit characteristics and recognition of visitors on the forest healing program of the Therapeutic Forest over time.

## 2. METHODS

This study surveyed the visitors of the Therapeutic Forest of Mt. Minjujisan, located at Yeongdong province of South Korea. The mountain is a famous mountain with an elevation of 1242m above sea level on the border of three provinces of South Korea among Chungbuk-do, Jeonbuk-do, and Gyeongbuk-do. The mountain is also located near one of the major metropolitan cities of Korea, i.e. Daejeon metropolitan city approximately 90km away from Mt. Minjujisan (Figure 1).



**Figure 1** Location map of Mt. Minjujisan (from <http://www.google.com/maps/>)

Visitors from urban areas can enjoy the healing effects of natural forest throughout four seasons because Mt. Minjujisan region is used as a natural recreation forest that retains the mystery of ancient times with an old traditional temple, the Jikjisa. The forest road along the recreational forest gives the nostalgic feeling of one's hometown, and the various vegetation in the dense forest provides an opportunity for families, friends, and students to learn about nature [8, 9]. The Therapeutic Forest was originally established in 2011 as the Recreational Forest of Mt. Minjujisan.

The first survey at Mt. Minjujisan was conducted on the first year of designation as the Therapeutic Forest in 2011 when the forest roads for the purpose of healing visitors were being developed. After five years of development, the same place was visited again for the second survey in 2016. Both surveys were implemented on the same date on the weekend of 12th November of each year. The largest numbers of visitors were expected to visit the Therapeutic Forest on weekend rather than weekdays. The questionnaire was composed of items that could identify the characteristics of participation in a forest healing program and personal evaluation on their own physical and mental status as well as socio-demographic

information (Table 1). General information of visitors, including gender, age, and marriage status, was obtained. A personal evaluation was conducted to understand the attitudes of the visitors to the forest healing program of the Therapeutic Forest, such as the health status, life satisfaction, and visiting satisfaction. The participation characteristics were asked, such as preferred participation accompanist, season, transportation, and place. The instrument was composed mainly of a 5-point Likert type scale for measuring the attitude. The questionnaire was distributed and collected face-to-face onsite. As a method of analysis, the collected questionnaire were first coded into data using Microsoft Excel software, and descriptive analysis and t-test were then performed at the 95% confidence interval using SPSS packages.

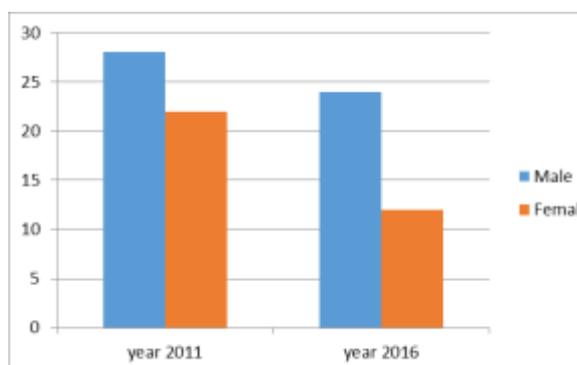
**Table 1** Content of the questionnaire

Category	Items
Demographic factor	Gender, Age, Marriage status
Participation characteristics	With whom do you join in the forest healing program?
	Which season do you prefer to participate in the forest healing program?
	Which transportation do you prefer to participate in the forest healing program?
	How often do you join in the forest healing program at a specific place? (e.g. National Park, urban park, recreational forest, and neighborhood forest)
Personal evaluation	How do you evaluate your personal health status?
	How do you evaluate your personal life satisfaction?
	How do you evaluate your visiting satisfaction on the forest healing program?

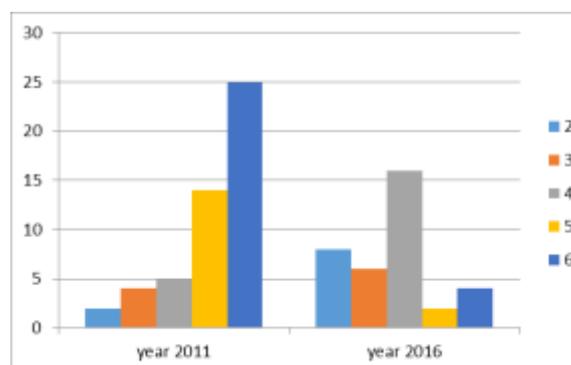
### 3. RESULTS

#### 3.1 Comparison of the demographic information

The general characteristics of the visitors were revealed by an analysis of the socio-demographic data using descriptive statistics. A total of 50 visitors to the Therapeutic Forest of Mt. Minjujisan answered the questionnaire in 2011, whereas 36 visitors were surveyed on the same place and date in 2016. The number of respondents was 28% lower than that at 2011. Among the people who visited the Therapeutic Forest in 2011, males and females comprised 56% and 44%, respectively. Males participated more than females. Five years later in 2016, this gender distribution changed only slightly. The ratio of male respondents in 2016 increased 10.7%, whereas the ratio of female respondents decreased. In 2016, the proportion of male respondents were relatively higher than in 2011 (Figure 1a).



(a) Gender



(b) Age

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**Figure 2** Comparison between year 2011 and 2016

In 2011, 4%, 8%, 10%, 28%, and 50% were < 29 years, 30 - 39 years, 40 - 49 years, 50 - 59 years, and > 60 years, respectively. The age group visiting the Therapeutic Forest was comprised mostly by those in their 60s with those in their 20s being the least represented. More elderly people visited the Therapeutic Forest than young people in 2011. In 2016, the ratio of those under 20s increased to 18.2% compared to the respondents of 2011. The number of those in their 30s and 40s increased by 8.7% and 34.4%, respectively, whereas the number of people in their 50s and 60s decreased by 22.4% and 38.9%, respectively. The largest increase and decrease was those in their 40s and 60s, respectively (Figure 1b). Among the respondents, 84% were married and 16% were single. More married people participated than singles. In 2016 the ratio of married people decreased by 17.3% with a concomitant increase in the ratio of singles. As of 2016, the proportion of respondents without spouses was relatively higher than that in 2011 (Figure 1c).

### 3.2. Comparison of the visit characteristics

The visiting characteristics of the respondents for participation in a forest healing program were assessed. According to the accompanist in 2011, approximately 64% of respondents came with their family or with a group from elderly welfare organizations: 12% were friends; 8% were alone; and 16% were others that included social clubs and relatives. In 2016, none of the respondents visited alone. The ratio of visiting with family increased by 30.7%, whereas those with friends and groups decreased by 0.9% and 5.8%, respectively. The number of people who visited alone showed the greatest change. As of 2016, the number of visitors with families has increased (Figure 1d). According to the preferred season in 2011, more than 70%

preferred spring (44%) and autumn (34%), which is warmer than winter, followed by summer (~ 12%). In 2016, people who consider spring as the healing season showed the greatest decrease by 16.2%, whereas the number of people considering autumn as a healing season increased by 32.7% (Figure 1e). According to the preferred transportation in 2011, 56%, 32%, 8%, and 4% of visitors chose the automobile, tourist buses, public buses, and bicycles, respectively. In 2016, all visitors used the automobile as a transportation method. People who visited by public transportation have the greatest decrease compared to that in 2011 (Figure 1f). The preferred type of park or forest for the forest healing program was examined. The visitors showed a different distribution between 2011 and 2016 (Table 2). The type of park or forest included National Park (NP), Urban Park (UP), Recreational Forest (RF), and Neighborhood Forest (NF).

**Table 2** Percentage of a preferred place for forest healing program (%)

		Never visit	Once a week	Once a month	Twice a year	Once a year
Year 2011	NP	4	6	34	46	10
	UP	0	68	32	0	0
	RF	0	4	16	58	22
	NF	0	26	48	18	8
Year 2016	NP	5.6	11.1	22.2	33.3	27.8
	UP	5.6	16.7	27.8	38.9	11.1
	RF	5.6	11.1	5.6	55.6	22.2
	NF	11.1	11.1	27.8	27.8	22.2
% Difference	NP	△1.6	△5.1	▽11.8	▽12.7	△17.8
	UP	△5.6	▽51.3	▽4.2	△38.9	△11.1
	RF	△5.6	△7.1	▽10.4	▽2.4	△0.2
	NF	△11.1	▽14.9	▽20.2	△9.8	△14.2

\* NP : National Park, UP : Urban Park, RF : Recreational Forest, NF : Neighborhood Forest, △: Increase, ▽: Decrease

The respondents in 2011 and 2016 visited the NP as the preferred place for healing activities twice a year the most. As a place for healing activities in both 2011 and 2016, NP was visited every six months on average, but there was a 12.7% decrease in the visiting frequency. On the other hand, more respondents visited a NP once a year in 2016 than in 2011. NPs are the farthest from the city compared to other natural recreational parks or forests. Indeed, it is difficult to visit them frequently, so it is suitable as the number of visits to NPs for forest healing activities. The respondents in 2011 visited the UP as a preferred place for healing activities once a week the most, while the respondents in 2016 had visited twice a year the most. As a healing place, visiting an UP every week decreased the most, by 51.3%. On the other hand, the respondents visiting an UP twice a year in 2016 increased the most (38.9%). The respondents in 2011 and 2016 visited the RF as a preferred place for healing activities twice a year the most. As a place for healing activities in both 2011 and 2016, RF was visited every six months on average. On the other hand, the visiting frequency decreased slightly by 2.4%, and relatively frequent visits to a RF as a healing place every week increased by 7.1% in 2016. As a healing place, RF has shown an increase in visiting frequency. The respondents in 2011 and 2016 visited the NF as a preferred place for healing activities once a month the most. As a healing place, visiting NF once a month decreased the

most, but there was a 20.2% decrease. On the other hand, the respondents visiting NF once a year in 2016 showed the greatest increase of 14.2%.

### 3.3. Comparison of personal evaluation

A personal evaluation of the respondents on the status of the healing effect was performed. The visitors revealed different aspects in terms of the mean values (Table 3). In 2011, the health status of people was found to be 34% in good condition, 40% in normal condition, and 26% in poor condition. Almost 70% of people thought themselves as having a reasonable health conditions. In 2011, the mean score of the health status was 3.10, while the score was 3.06 in 2016. The visitors' personal feelings about their own health status declined slightly. A t-test showed no significant difference in the personal evaluation of their health status between in 2011 and in 2016 ( $p=0.840$ ). Many visitors in both years thought that they were in their usual health condition.

**Table 3** Comparison of personal evaluation

Category	Year 2011		Year 2016		t-value	p-value
	Mean	S.D.	Mean	S.D.		
Status of personal health	3.100	1.129	3.056	0.791	0.215	0.831
Satisfaction on life quality	3.720	1.325	3.111	0.950	2.354	0.021
Satisfaction on forest healing program	4.000	0.756	4.222	0.866	-1.265	0.209

\*S.D.: Standard Deviation

In 2011, the rate of satisfaction with life quality was follows: very satisfied (36%), satisfied (28%), usual (20%), dissatisfied (4%), and very dissatisfied (12%), which means that more than 80% of respondents have a positive outlook in their lives. This result changed slightly in the survey of 2016. In 2011, the mean score of life satisfaction was 3.72, whereas the score was 3.11 in 2016. A difference between them showed a decrease in the degree of satisfaction with life quality, which was confirmed by the t-test ( $p=0.021$ ). Although the visitors were satisfied with their life quality in both years, the visitors in 2016 were less satisfied. In 2011, the satisfaction with the forest healing program was 80% of those who experienced forest healing; 16% were usual, and 4% were dissatisfied. Most visitors were satisfied with the use of healing forests. As of 2016, the proportion of people who were very satisfied with the forest healing program increased by 44.4%. In 2011, the mean score of visiting satisfaction was 4.00, whereas the score was 4.22 in 2016. The visiting satisfaction of respondents had increased, which was confirmed by a t-test ( $p=0.209$ ). Many visitors in both years reported that they were very satisfied with the forest healing program.

## 4. CONCLUSIONS

This study examined visiting characteristics and recognitions of visitors on the forest healing program of the Therapeutic Forest over time. The results are summarized as follows.

(1) From an analysis of the socio-demographic factors, the proportion of male respondents, respondents in aged in their 40s, or single respondents were higher than in the previous year.

(2) From the characteristics of the participation in a forest healing program, the number of people who visited with their families was increasing. The number of people considering autumn as a healing season was increasing. In addition, fewer people visited by public transportation in 2016 than in 2011.

(3) From an analysis of the preferred places for the forest healing program, the number of respondents visiting NP once a year in 2016 increased the most compared to 2011. The respondents visiting an UP twice a year in 2016 increasing the most. As a place for healing activities in both 2011 and 2016, the RF was visited every six months on average, but the number of visits to the RF once a week increased. The respondents visiting NF once a year in 2016 increased the most.

(4) From an analysis of the personal evaluation on the respondents' status, many visitors thought that they were in reasonable health in both years, but the mean score of the visitors' personal feeling about their own health status declined slightly. The degree of satisfaction with everyday life decreased significantly over time, but the visitors were satisfied with their life quality in both years. Many visitors in both years reported that they were very satisfied with the forest healing program.

Currently, the Therapeutic Forest is being increasingly recognizable as the number of visitors has increased. The change in people's perceptions of forest and nature has increased the demand for forest healing programs along with the popularity of natural healing treatment. Accordingly, the establishment of more Therapeutic Forests is planned over time. The problem should be identified for better quality of forest healing programs by linking with specialized natural therapists and medicine when Therapeutic Forests become more common. Hence, there is also a need for national policies and support. These results suggest that the forest healing program should focus on improving the personal evaluation their health status and on the degree of satisfaction with everyday life. In particular, the degree of satisfaction with life quality has been decreasing significantly over time. Therefore, people who had felt their physical and mental status at a low level were visiting the Therapeutic Forest increasingly over time, and that they were very satisfied with the program. The following provides are some suggestions for the development of a forest healing program. First, the effects of forest therapy need to be enlarged from empirical knowledge to medical treatment, which has been proven scientifically. Second, forest therapy needs to be stimulated to establish institutional devices, such as certification and insurance, which helps spread the effect of forest therapy. Third, mountain villages near a forest play important roles in both activating a healing program and cultivating professionals. Further consideration with the current findings is the manner with which the instrument is developed. In a further evaluation of survey, an issue related to human health care needs to be addressed. More scientific and medical verification of the functions and mechanisms of health promotion and disease healing is needed. The research focus will be on the development of forests and programs to promote the healing function to the maximum extent. More research will be needed to popularize the effect of forest therapy through a forest healing program in the Therapeutic Forest in South Korea.

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