An Analysis of Preference for Forest Therapy Programs Depending on the Emotional Characteristics of Subfertile Women

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ABSTRACT

This study aimed to analyze the preference of subfertile women for forest therapy programs depending on their emotional characteristics, and to provide basic data for the development of forest therapy programs in order to promote the mental health of subfertile women. Among the surveyed emotional characteristics of subfertile women, the level of emotions including pressure to become pregnant, impatience and frustration were high, while that of emotions including anxiety and fear; depression, hopelessness, helplessness, loneliness and sadness tended to be medium. The level of emotions including shame and guilt tended to be low. The top six forest therapy programs preferred by subfertile women include a deep breath of air /phytoncide, forest bathing/wind bathing/sun bathing, self-esteem recovery program, eating organic foods, low body bathing/foot bathing/hot spring bathing, and breathing/breathing exercises. Subfertile women highly pressured to become pregnant showed significant differences in the preference of the self-esteem recovery program, Domar's relaxation therapy, NLP therapy, and sleeping in the woods, while women with anxiety and fear showed significant differences in the preference of walking barefoot in forests, mountain walking in silence, listening to water sounds/ hand and foot soak, self-esteem recovery program, NLP therapy, cognitive behavior therapy, aroma therapy, integrated art therapy in forests, forest bathing/wind bathing/sunbathing, a deep breath of air/phytoncide, and observing stars. Women with depression, hopelessness, helplessness, loneliness, and sadness showed significant differences in eating organic foods, self-esteem recovery program, counseling/coaching, and cognitive behavior therapy. The significance of this study was to analyze the preference of subfertile women, as subjects, for forest therapy program. The results of this study are expected to be used as basis data for developing forest therapy programs for subfertile women.

Keywords: depress, pregnancy rate, subfertile stress

Introduction

The total fertility rate in the Republic of Korea in 2018 was 0.98, much below the total fertility rate required to maintain the current population (2.1) and the average total fertility rate of OECD countries (1.68; Lee, 2019). Worse yet, the number of those who were diagnosed with subfertility has continued to increase to at least 600,000 couples, resulting in a serious situation (Korea Institute for Health and Social Affairs [KIHASA], 2015). To address these issues, the Korean government introduced a program

for supporting subfertile couples in 2006 as an effort to promote childbirth, and has continued to pay for expenses for assisted reproductive procedures. In addition, from July, 2019, procedures for subfertile couples that used to be non-covered items such as artificial insemination and external fertilization started to be covered by the National Health Service, and the number of those born to subfertile couples over the past five years reached over 100,000. In 2017, 20,854 babies were born to subfertile couples, accounting for about 5.8% of the total number of newborn babies in Korea in 2017. The World Health Organization

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(WHO) defines infertility or sterility as the failure to achieve a clinical pregnancy after 12 months or more of regular unprotected sexual intercourse. The Korea Federation of Subfertility Family had carried on a national petition campaign since 2005, and contributed to the revision of the Mother and Child Health Act in 2016, replacing infertility with subfertility (Mother and Child Health Act, 2016). The term, subfertility, means a state of having difficulty in getting pregnant, and opens the possibility of childbearing.

Subfertile women, however, experience emotional difficulties from subfertility such as stress, depression and anxiety. Emotions are not only connected with humans' essential desire (Frijda, 1986), and are also known to have humans set their viewpoint toward themselves as well as others and to have a strong impact on interactions with others (Greenberg, 2004). It was also reported that the level of stress that subfertile women experience during the long and hard times of subfertility is similar to that of stress that cancer patients experience. Stress from subfertility was reported to reduce the rate of pregnancy, and repeated failures of pregnancy were found to increase stress from subfertility and depression, which again reduces the rate of pregnancy, causing a vicious circle (Domar et al., 1993). The extended subfertility makes subfertile women exhaust a substantial amount of energy and feel physical discomfort and even mental pain during repeated tests and treatments for subfertility (Kang, 2015). Subfertile women tend to avoid interpersonal relations and thus experience a sense of alienation and loneliness. At the same time, they tend to keep away from others who experience general childbirth in society, which makes them further isolated from society (Park, 2018). In particular, their unhealthy emotional state causes functional changes in the hypothalamic-pituitary-ovarian axis, which results in several negative effects such as menstrual irregularity by advancing or delaying ovulation (Ebbesen et al., 2009). It was also reported that 94.6% of subfertile women show mental pain and depressive symptoms from subfertility, which requires an urgent intervention in the emotional state of subfertile women (KIHASA, 2011). As an effort to address these issues, the Korean government has placed a professional counselor of subfertility in public health centers, and has provided a counseling service through subfertility clinics. However,

the rate of utilization has been very low and issues such as lack of expertise in subfertility counseling have been pointed out (Ministry of Health and Welfare, 2016), which requires the development of more substantial measures.

Forests provide an ideal therapeutic natural environment as they reduce stress and improve immunity (An et al., 2010). A number of scholars pointed out that forests treat people's mental and physical diseases in modern society in a fundamental way by reducing stress (Adevi and Grahm, 2011; Alvarsson et al., 2010; Frumkin, 2001; Grahm and Stigsdotter, 2010; Gullone, 2000; Lottrup et al., 2013; Mitchell and Popham, 2008; Simaika and Samways, 2010; Ulrich, 1983). In addition, contact with nature gives benefits to individuals who experience depression (Gonzalez et al., 2009), and even looking at photos of nature provides several effects such as refreshing, controlling emotions and improving will power (Johnsen and Rydstedt, 2013), and reduced the level of cortisol, a stress hormone (Sung et al., 2012). Another study showed that the more people looked at green colors, the more resilient they were from stress (Lee, 2007).

Ha (2014) pointed out that forest therapy programs need to reflect the characteristics and needs of participants. The needs or preference of participants in forest therapy programs have been analyzed in several earlier studies including an analysis of needs for the development of forest therapy programs (Kim, 2015), an analysis of preference of general adults on forest therapy programs (Kim et al., 2014a), an analysis of needs for the development of forest therapy programs utilizing urban forests (Park, 2018), and an analysis of needs for forest therapy programs depending on the level of stress (Kim et al., 2014b). However, there is almost no study on forest therapy programs for subfertile women or those related to subfertility or the effects of forest therapy. Against this backdrop, this study aimed to conduct a survey on the preference of subfertile women who came to a subfertility clinic in Seoul for forest therapy programs depending on their emotional characteristics, and to provide basic data for the development of forest therapy programs in order to promote the mental and physical health of subfertile women based on the results of analysis.

Research Methods

Subjects and research methods

In this study, questionnaire sheets were distributed to and collected from women who came to a subfertility clinic in Seoul on the spot using the convenience sampling method after directly informing them of the purpose of this study and obtaining their consent. The questionnaire survey was performed from January 21 to February 8, 2019. A total of 210 questionnaires were collected, but 200 were finally analyzed after excluding 10 questionnaires with incomplete information. Among the subfertile women who participated in the questionnaire survey, the number of those aged between 35 and 39 was the highest (79, 40%), followed by those aged between 30 and 34 (58, 29%), and those aged 40 or higher (55, 27.5%). The number of those who were married for less than one year was 9 (4.5%), and those who were married for 3-5 years, 51 (51%), and the number of those who were married for 5-10 years was the highest (52, 26.1%). The number of those who were diagnosed with subfertility after being married for 1-2 years was the highest (67, 34.4%), followed by within one year (40, 19.5%), 2-3 years (37, 19%), 3-5 years (38, 7.4%), and over 5 years (13, 6.7%). The number of those who tried to become pregnant for less than one year was the highest (74, 40%), followed by 1-2 years (49, 26.5%), 2-3 years (37, 20%), 3-5 years (19, 10.3%), 5-10 years (4, 2.2%), and over 10 years (2, 1.1%). The number of those who were treated for subfertility for less than one year was the highest (95, 47.5%), followed by 1-2 years (49, 24.5%), 2-3 years (37, 19%), 3-4 years (14, 7%), 4-5 years (9, 4.5%), and over 5 years (6, 3%). The number of those who did not have any experience of pregnancy was 111 (55.5%), and 87 women (43.5%) answered that they had the experience. In terms of subfertility treatments that they tried before, artificial insemination accounted for the largest (85, 47.2%), followed by test tube (51, 28.3%), and others (44, 24.4%). In terms of the cause of subfertility, male chromosome abnormality accounted for the largest (74, 37.8%), followed by ovulation disorder (29, 14.8%), and unknown (25, 12.8%).

Questionnaire composition

In terms of the emotional characteristics of subfertile women, six questions (pressure to become pregnant; anxiety and fear; depression, hopelessness, helplessness, loneliness and sadness; shame and guilt; impatience and frustration; and anger and sensitivity) were developed based on Kim et al. (2011) and Kang (2015) as they researched the overall emotions of subfertile women. The reliability coefficient (Cronbach's α) of the emotional characteristics of subfertile women was .88. About the preference of participants for forest therapy programs, 33 questions were developed based on the questionnaires developed by Kim (2015) and Park (2018) for analyzing needs as follows: seven questions about exercise-focused programs; two questions about water-focused programs; three questions about diet-focused programs; four questions about plant-focused programs; four questions about climate-focused programs; and 13 questions about mental health-focused programs. A total of 39 questions were developed to survey the emotional characteristics of subfertile women and their preference for forest therapy programs, and were reviewed by experts of forest therapy and subfertility. In this process, some programs mentioned in questions in the earlier studies were replaced with programs that were more effective and suitable for subfertile women. For instance, forest field day was replaced with pelvic exercise walking; drinking herbal teas with drinking herbal teas good for pregnancy; and personal relations with Domar relaxation therapy. The content of the questionnaire was listed in detail in Table 1.

Data analysis

The data collected in this study were analyzed using SPSS 21.0, and frequency analysis and cross tabulation analysis were conducted to analyze subfertile women's preference for forest therapy programs depending on their emotional characteristics.

Table 1. Survey contents for subfertile women

Contents	Category		Number of questions
Emotional characteristics	Pressured to become pregnant / anxiety, fear / depression, hopelessness, helplessness, loneliness, sadness / impatience, frustration / shame, guilt / anger, sensitivity		6
	Excercise-focused	Breathing / breathing exercises, yoga, barefoot walking in the woods, walk freely in the forest (wearing shoes), mountain climbing, mountain walking in silence, pelvic exercise walking	7
	Water-focused	Lower body bathing / foot bath / hot spring bath, listening to water sounds/ hand and foot soak	2
	Diet-focused	Drinking good herbal tea for pregnancy, eating organic foods, making food	3
Preferred forest therapy program	Mental, health-focused	Self-esteem recovery program, counseling/coaching, stress lecture (coping skills), Domar relaxation therapy, meditation(mindfulness, MBSR), NLP therapy, cognitive behavior therapy, couple therapy/ family therapy, aroma therapy, sleeping in the woods, reading in forest / writing therapy, integrated art therapy in the forest (art, music, movement, laughter, theater), horticulture in the forest	13
	Plant-focused	Viewing landscape, listening to the forest commentary, healing plant observation/storytelling, making natural products	4
	Climate-focused	Forest bathing / wind bathing / sunbathing, a deep breath of air /phytoncide, camping, observing stars	4
Total			39

Results and Discussion

Emotional characteristics of subfertile women

The level of pressure that subfertile women felt to become pregnant tended to be high as follows: medium, 47.5%; high, 35.5%; and very high, 10% (Table 2). The level of anxiety and fear was medium in general as follows: medium, 56.5%; high, 25.5%; and low 18%, and that of depression, hopelessness, helplessness, loneliness and sadness also tended to be medium as follows: medium, 48%; low, 32.5%; and high, 19.5%. The level of shame and guilt was low in general as follows: low, 32.5%; medium, 37.7%; and high, 12.1%. The level of impatience and frustration tended to be low as follows: medium, 46.5%; high, 33%; and low, 20.5%. When the level of emotional difficulties that subfertile women felt was divided into high, medium and low, the item of which “high” share was the highest was anger and sensitivity (33%), followed by depression, hopelessness, helplessness, loneliness and sadness (22.5%). and that of which “medium” share was the highest was depression, hopelessness, helplessness, loneliness and sadness

Table 2. Emotional characteristics of subfertile women related to subfertility (N=200)

Category	Degree	Frequency	Percent (%)
Pressured to become pregnant	Very high	20	10.0
	High	71	35.5
	Medium	95	47.5
	Low	14	7.0
	very low	0	0.0
Anxiety and fear	High	51	25.5
	Medium	113	56.5
	Low	36	18.0
Depression, hopelessness, helplessness, loneliness and sadness	High	39	19.5
	Medium	96	48.0
	Low	65	32.5
Shame and guilt	High	24	12.1
	Medium	75	37.7
	Low	100	50.3
Impatience and frustration	High	66	33.0
	Medium	93	46.5
	Low	41	20.5
Anger and sensitivity	High	39	19.5
	Medium	101	50.5
	Low	60	30.0

(56.5%), followed by shame and guilt (48%). The item of which “low” share was the highest was impatience and frustration (50.3%), followed by anxiety and fear (47.5%). These results were similar with the result of Kang (2015) on the emotional characteristics of subfertile women that the level of pressure that they felt to become pregnant tended to be high.

Preference of subfertile women for forest therapy programs

Preference of subfertile women for forest therapy programs

The preference of subfertile women for forest therapy programs surveyed in this study was as shown in Table 3. The program that showed the highest mean value was

Table 3. Forest therapy program process requirements for subfertile women

Variable	Category	M	SD
Exercise-focused program	Breathing / breathing exercises	4.06	0.73
	Yoga	3.73	0.83
	Walking barefoot in the woods	3.52	0.89
	Walking freely in the forest (wearing shoes)	3.96	0.75
	Mountain climbing	3.07	0.89
	Mountain walking in silence	2.81	1.04
	Pelvic exercise walking	3.62	0.82
Water-focused program	Lower body bathing / foot bath / hot spring bath	4.16	0.78
	Listening to water sounds / hand and foot soak	3.80	0.92
Diet-focused program	Drinking good herbal tea for pregnancy	4.05	0.83
	Eating organic foods	4.17	0.86
	Making food	3.53	1.02
Mental-focused program	Self-esteem recovery program	4.20	0.79
	Counseling / coaching	4.00	0.84
	Stress lecture (coping skills)	4.04	0.83
	Domar relaxation therapy	3.96	0.80
	Meditation (mindfulness, MBSR)	3.98	0.82
	NLP therapy	3.46	0.81
	Cognitive behavior therapy	3.49	0.90
	Couple therapy / family therapy	3.99	0.89
	Aroma therapy	3.80	0.94
	Sleeping in the woods	3.43	1.07
	Reading in forest / writing therapy	3.24	1.01
	Integrated art therapy in the forest (art, music, movement, laughter, theater)	3.41	1.00
	Horticulture in the forest	3.37	0.95
Plant-focused program	Viewing landscape	3.91	0.89
	Listening to the forest commentary	3.24	0.97
	Healing plant observation / storytelling	3.41	1.02
	Making natural products	3.23	0.98
Climate-focused program	Forest bathing / wind bathing / sunbathing	4.30	0.71
	A deep breath of air /phytoncide	4.41	0.68
	Camping	3.12	1.14
	Observing stars	3.46	1.05

a deep breath of air /phytoncide (4.41), followed by forest bathing/wind bathing/sunbathing (4.30), self-esteem recovery program (4.20), eating organic foods (4.17), lower body bathing/foot bathing/hot spring bath (4.16), breathing/breathing exercises (4.06), drinking good herbal teas for pregnancy (4.05), stress lecture(coping skills; 4.04), counseling/coaching (4), couple therapy/family therapy (3.99), meditation (mindfulness, MBSR) (3.98), walking freely in forests (wearing shoes; 3.96), Domar relaxation therapy (3.96), viewing landscape (3.91), listening to water sounds/hand and foot soak(3.80), aroma therapy (3.80), yoga (3.73), pelvic exercise walking (3.62), making food (3.53), walking barefoot in woods (3.52), cognitive behavior therapy (3.49), NLP(Neuro-linguistic programming) therapy (3.46), observing stars (3.46), sleeping in the woods (3.43), integrated art therapy in forests (3.41), healing plants observing /storytelling (3.41), horticultural therapy in forest (3.37), listening to forest commentary (3.24), writing therapy in forests (3.24), making natural products (3.23), camping (3.12), mountain climbing (3.07), and mountain walking in silence (2.81). The top six programs that were the most preferred included a deep breath of air /phytoncide, forest bathing/wind bathing/sun bathing, self-esteem recovery program, eating organic foods, lower body bathing/foot bathing/hot spring bathing, and breathing/breathing exercises, which coincided with the results of Kim (2015) and Park (2018) on preferred forest therapy programs that forest bathing, wind bathing and sunbathing were preferred.

Differences in preference for forest therapy programs depending on the emotional characteristics of subfertile women

Differences in the preference of subfertile women for forest therapy programs depending on their emotional characteristics were identified, and emotions and preferred programs that showed significant differences were found to be as follows:

(1) Pressured to become pregnant

The subfertile women who felt pressure to become pregnant showed significant differences in their preference for the following programs (Table 4): mountain climbing ($\chi^2=27.702$, $p < .01$), self-esteem recovery program ($\chi^2=16.773$, $p < .05$),

Domar relaxation therapy ($\chi^2=21.428$, $p < .05$), NLP therapy ($\chi^2=14.454$, $p < .05$), and sleeping in the woods ($\chi^2=23.814$, $p < .05$). When the level of pressure to become pregnant was medium, respondents were found to prefer NLP therapy (29.9%), mountain climbing (25.3%) and sleeping in the woods (22.2%) as medium, and self-esteem recovery program (22.3%) and Domar relaxation therapy (19.3%) as important. In terms of pressure to become pregnant, respondents were found to prefer the self-esteem recovery program the most.

(2) Anxiety and fear

The subfertile women who had anxiety and fear showed significant differences in their preference for the following programs (Table 5): walking barefoot in forests ($\chi^2=18.450$, $p < .05$), mountain walking in silence ($\chi^2=16.777$, $p < .05$), listening to water sounds/hand and foot soak ($\chi^2=21.172$, $p < .01$), self-esteem recovery program ($\chi^2=18.446$, $p < .01$), NLP therapy ($\chi^2=27.459$, $p < .01$), cognitive behavior therapy ($\chi^2=21.294$, $p < .01$), aroma therapy ($\chi^2=16.105$, $p < .05$), integrated art therapy in forests ($\chi^2=16.385$, $p < .05$), forest bathing/wind bathing/sunbathing ($\chi^2=17.063$, $p < .01$), a deep breath of air/phytoncide ($\chi^2=14.880$, $p < .05$), and observing stars ($\chi^2=18.971$, $p < .05$). When the level of anxiety and fear was medium, respondents were found to prefer a deep breath of air/phytoncide (29%) as very important, and self-esteem recovery program (26.3%), aroma therapy (25.9%), listening to water sounds/hand and foot soak (25.6%), and walking barefoot in forests (25%) as important. When the level of anxiety and fear was medium, subfertile women were found to prefer forest bathing/wind bathing/sunbathing (31.4%), NLP therapy (31.3%), cognitive behavior therapy (27.8%), mountain walking in silence(26.1%), integrated art therapy in forests (24.6%) and observing stars (23.5%) as medium. When the level of anxiety and fear was medium, respondents were found to prefer walking barefoot in forests (bare feet), listening to water sounds/ hand and foot soak, self-esteem recovery program, aroma therapy, and forest bathing/wind bathing/sunbathing as important, and a deep breath of air/phytoncide as very important. They preferred mountain walking in silence, NLP therapy, cognitive behavior therapy,

Table 4. Preferences for forest therapy programs depending on the pressure to become pregnant of subfertile women

	Variable	Frequency (%)					χ^2 (<i>p</i>)
		Very high	High	Medium	Low	Total	
Mountain climbing	It does not matter at all	1(0.6)	0(0)	3(1.8)	2(1.2)	6(3.6)	27.702 (.006**)
	It is not important	5(3.0)	9(5.4)	17(10.2)	2(1.2)	33(19.9)	
	It is average	4(2.4)	31(18.7)	42(25.3)	3(1.8)	80(48.2)	
	It is important	4(2.4)	17(10.2)	14(8.4)	3(1.8)	38(22.9)	
	It is very important	2(2.4)	2(1.2)	3(1.8)	0(0)	9(5.4)	
	Total	18(10.8)	59(35.5)	79(47.6)	10(6)	166(100)	
Self-esteem recovery program	It is not important	0(0)	1(0.6)	3(1.7)	0(0)	4(2.2)	16.773 (.05*)
	It is average	5(2.8)	8(4.5)	16(8.9)	1(6)	30(16.8)	
	It is important	2(1.1)	23(12.8)	40(22.3)	7(3.9)	72(40.2)	
	It is very important	12(6.7)	31(17.3)	28(15.6)	2(1.1)	73(40.8)	
	Total	19(10.6)	63(35.2)	87(48.6)	10(5.6)	179(100)	
Domar relaxation therapy	It does not matter at all	1(0.6)	0(0)	0(0)	0(0)	1(0.6)	21.428 (.044*)
	It is not important	0(0)	0(0)	3(1.8)	0(0)	3(1.8)	
	It is average	4(2.4)	11(6.6)	24(14.5)	2(1.2)	41(24.7)	
	It is important	5(3.0)	35(21.1)	32(19.3)	6(3.6)	78(47.0)	
	It is very important	8(4.8)	14(8.4)	20(12.0)	1(0.6)	43(25.9)	
	Total	18(10.8)	60(36.1)	79(47.6)	9(5.4)	166(100)	
NLP therapy	It does not matter at all	0(0)	2(1.4)	0(0)	0(0)	2(1.4)	14.454 (.018*)
	It is not important	0(0)	1(0.7)	2(1.4)	2(1.4)	5(3.5)	
	It is average	10(6.9)	25(17.4)	43(29.9)	2(1.4)	80(55.6)	
	It is important	3(2.1)	12(8.3)	22(15.3)	2(1.4)	39(27.1)	
	It is very important	5(3.5)	6(4.2)	6(4.2)	1(7)	18(12.5)	
	Total	18(12.5)	49(31.9)	73(50.7)	7(4.9)	144(100)	
Sleeping in the woods	It does not matter at all	0(0)	3(1.8)	1(0.6)	2(1.2)	6(3.6)	23.814 (.022*)
	It is not important	2(1.2)	4(2.4)	13(7.8)	2(1.2)	21(12.6)	
	It is average	4(2.4)	26(15.6)	37(22.2)	4(2.4)	71(42.5)	
	It is important	4(2.4)	14(8.4)	15(9)	1(0.6)	34(20.4)	
	It is very important	9(5.4)	12(7.2)	13(7.8)	1(0.6)	35(21)	
	Total	19(11.4)	59(35.3)	79(47.3)	10(6)	167(100)	

* $p < .05$, ** $p < .01$ by χ^2 test.

integrated art therapy in forests, and observing stars as medium, when the level of anxiety and fear was medium. In terms of anxiety and fear, respondents were found to prefer self-esteem recovery program, a deep breath of air/phytoncide and forest bathing/wind bathing/sunbathing the most.

(3) Depression, hopelessness, helplessness, loneliness and sadness

The subfertile women who had emotions including depression, hopelessness, helplessness, loneliness and sadness

showed significant differences in their preference for the following programs (Table 6): eating organic foods ($\chi^2=15.916$, $p < .05$), self-esteem recovery program ($\chi^2=13.246$, $p < .05$), counseling/coaching ($\chi^2=16.197$, $p < .05$), and cognitive behavior therapy ($\chi^2=24.044$, $p < .01$). When the level of depression, hopelessness, helplessness, loneliness and sadness was medium, respondents were found to prefer the program of eating organic foods (21.7%) as very important, and counseling/coaching (25.7%), self-recovery program (21.8%), and cognitive behavior therapy (21.5%) as important. In terms of emotions including depression, hopelessness,

Table 5. Preferences for forest therapy programs depending on anxiety and fear of subfertile women

Variable		Frequency (%)				$\chi^2(p)$
		High	Medium	Low	Total	
Walking barefoot in the forest	It does not matter at all	1(0.6)	1(0.6)	0(0)	2(1.2)	18.450 (.018*)
	It is not important	8(4.7)	7(4.1)	0(0)	15(8.7)	
	It is average	15(8.7)	38(22.1)	18(10.5)	71(41.3)	
	It is important	10(5.8)	43(25)	6(3.5)	59(34.3)	
	It is very important	6(3.5)	16(9.3)	3(1.7)	25(14.5)	
	Total	40(23.3)	105(61)	27(15.7)	172(100)	
Mountain walking in silence	It does not matter at all	5(3)	12(7.3)	2(1.2)	19(11.5)	16.777 (.033*)
	It is not important	11(6.7)	22(13.3)	9(5.5)	42(25.5)	
	It is average	9(5.5)	43(26.1)	11(6.7)	63(38.2)	
	It is important	10(6.1)	18(10.9)	5(3.0)	33(20)	
	It is very important	6(3.6)	2(1.2)	0(0)	8(4.8)	
	Total	41(24.8)	97(58.8)	27(16.4)	165(100)	
Listening to water sounds/ hand and foot soak	It does not matter at all	1(0.6)	0(0)	0(0)	1(0.6)	21.172 (.007**)
	It is not important	5(2.9)	4(2.3)	2(1.2)	11(6.4)	
	It is average	7(4.1)	33(19.2)	13(7.6)	53(30.8)	
	It is important	13(7.6)	44(25.6)	6(3.5)	63(36.6)	
	It is very important	18(10.5)	18(10.5)	8(4.7)	44(25.6)	
	Total	44(25.6)	99(57.6)	29(16.9)	172(100)	
Self-esteem recovery program	It is not important	0(0)	2(1.1)	2(1.1)	4(2.2)	18.446 (.005**)
	It is average	5(2.8)	20(11.2)	5(2.8)	30(16.8)	
	It is important	11(6.1)	47(26.3)	14(7.8)	72(40.2)	
	It is very important	30(16.8)	35(19.6)	8(4.5)	73(40.8)	
	Total	46(25.7)	104(58.1)	29(16.2)	179(100)	
NLP therapy	It does not matter at all	2(1.4)	0(0)	0(0)	2(1.4)	27.459 (.001***)
	It is not important	0(0)	2(1.4)	3(2.1)	5(3.5)	
	It is average	18(12.5)	45(31.3)	17(11.8)	80(55.6)	
	It is important	7(4.9)	30(20.8)	2(1.4)	39(27.1)	
	It is very important	9(6.3)	8(5.6)	1(.7)	18(12.5)	
	Total	36(25)	85(59)	23(16)	144(100)	
Cognitive behavior therapy	It does not matter at all	2(1.3)	1(0.6)	1(0.6)	4(2.5)	21.294 (.006**)
	It is not important	1(0.6)	3(1.9)	6(3.8)	10(6.3)	
	It is average	14(8.9)	44(27.8)	13(8.2)	71(44.9)	
	It is important	13(8.2)	33(20.9)	5(3.2)	51(32.3)	
	It is very important	9(5.7)	11(7)	2(1.3)	22(13.9)	
	Total	39(24.7)	92(58.2)	27(17.1)	158(100)	
Aroma therapy	It does not matter at all	2(1.2)	3(1.8)	0(0)	5(2.9)	16.105 (.041*)
	It is not important	0(0)	3(1.8)	1(0.6)	4(2.4)	
	It is average	15(8.8)	26(15.3)	12(7.1)	53(31.2)	
	It is important	8(4.7)	44(25.9)	14(8.2)	66(38.8)	
	It is very important	17(10)	21(12.4)	4(2.4)	42(24.7)	
	Total	42(24.7)	97(57.1)	31(18.2)	170(100)	

Table 5. (continued)

Variable		Frequency (%)				$\chi^2(p)$
		High	Medium	Low	Total	
Integrated art therapy in the forest (art, music, movement, laughter, theater)	It does not matter at all	0(0)	2(1.2)	2(1.2)	4(2.4)	16.385 (.037*)
	It is not important	6(3.6)	11(6.6)	5(3)	22(13.2)	
	It is average	16(9.6)	41(24.6)	13(7.8)	70(41.9)	
	It is important	7(4.2)	33(19.8)	3(1.8)	43(25.7)	
	It is very important	12(7.2)	11(6.6)	5(3)	28(16.8)	
Total		41(24.6)	98(58.7)	28(16.8)	167(100)	
Forest bathing / wind bathing / sunbathing	It does not matter at all	0(0)	1(0.6)	0(0)	1(0.6)	17.063 (.009**)
	It is not important	6(3.4)	8(4.6)	8(4.6)	22(12.6)	
	It is average	11(6.3)	55(31.4)	10(5.7)	76(43.4)	
	It is important	25(14.3)	41(23.4)	10(5.7)	76(43.4)	
	Total	42(24)	105(60)	28(16)	175(100)	
A deep breath of air / phytoncide	It is not important	0(0)	1(0.6)	0(0)	1(0.6)	14.880 (.021*)
	It is average	5(2.8)	4(2.3)	7(4.0)	16(9.1)	
	It is important	11(6.3)	47(26.7)	11(6.3)	69(39.2)	
	It is very important	26(14.8)	51(29.0)	13(7.4)	90(51.1)	
	Total	42(23.9)	103(58.5)	31(17.6)	176(100)	
Observing stars	It does not matter at all	6(3.6)	1(0.6)	0(0)	7(4.2)	18.971 (.015*)
	It is not important	2(1.2)	13(7.8)	3(1.8)	18(10.8)	
	It is average	13(7.8)	39(23.5)	12(7.2)	64(38.6)	
	It is important	10(6)	30(18.1)	6(3.6)	46(27.7)	
	It is very important	10(6)	15(9)	6(3.6)	31(18.7)	
Total		41(24.7)	98(59)	27(16.3)	166(100)	

* $p < .05$, ** $p < .01$, *** $p < .001$ by χ^2 test.

helplessness, loneliness and sadness, respondents tended to prefer the programs of self-esteem recovery and eating organic foods.

(4) Shame and guilt

The subfertile women who felt shame and guilt showed significant differences in their preference for the following programs (Table 7): half bathing/foot bathing/hot spring bathing ($\chi^2=15.806$, $p < .05$), stress-control skills (lecture) ($\chi^2=19.752$, $p < .01$), and observing stars ($\chi^2=29.724$, $p < .001$). When the level of shame and guilt was medium, respondents were found to prefer half bathing/foot bathing/hot spring bathing (23.2%) and stress-control skills lecture (21.1%) as important, and observing stars (22.4%) as medium. In terms of emotions including shame and guilt, respondents tended to prefer the programs of half bath-

ing/foot bathing/hot spring bathing and stress-control skills.

(5) Impatience and frustration

The subfertile women who had impatience and frustration showed significant differences in their preference for the following programs (Table 8): pelvic exercise walking ($\chi^2=15.346$, $p < .05$), lower body bathing/foot bathing/hot spring bathing ($\chi^2=17.490$, $p < .05$), listening to water sounds/hand and foot soak ($\chi^2=22.493$, $p < .01$), eating organic foods ($\chi^2=16.137$, $p < .05$), cognitive behavior therapy ($\chi^2=17.893$, $p < .05$), aroma therapy ($\chi^2=25.017$, $p < .01$), camping ($\chi^2=16.656$, $p < .05$), and observing stars ($\chi^2=16.950$, $p < .05$). When the level of impatience and frustration was medium, respondents were found to prefer lower body bathing/foot bathing/hot spring bathing (25.3%), aroma therapy (24.7%), listening to water sounds/hand and

Table 6. Preferences for forest therapy programs depending on depression, hopelessness, helplessness, loneliness and sadness of subfertile women

Variable		Frequency (%)				$\chi^2(p)$
		High	Medium	Low	Total	
Eating organic foods	It does not matter at all	0(0)	0(0)	1(0.6)	1(0.6)	15.916 (.044*)
	It is not important	0(0)	3(1.7)	1(0.6)	4(2.3)	
	It is average	5(2.9)	11(6.3)	18(10.3)	34(19.4)	
	It is important	12(6.9)	37(21.1)	13(7.4)	62(35.4)	
	It is very important	17(9.7)	38(21.7)	19(10.9)	74(42.3)	
	Total	34(19.4)	89(50.9)	52(29.7)	174(100)	
Self-esteem recovery program	It is not important	0(0)	1(0.6)	3(1.7)	4(2.2)	13.246 (.039*)
	It is average	5(2.8)	11(6.1)	14(7.8)	30(16.8)	
	It is important	11(6.1)	39(21.8)	22(12.3)	72(40.2)	
	It is very important	20(11.2)	38(21.2)	15(8.4)	73(40.8)	
	Total	36(20.1)	89(49.7)	54(30.2)	179(100)	
Counseling / coaching	It does not matter at all	0(0)	1(0.6)	0(0)	1(0.6)	16.197 (.040*)
	It is not important	0(0)	3(1.8)	2(1.2)	5(2.9)	
	It is average	10(5.8)	10(5.8)	19(11.1)	39(22.8)	
	It is important	12(7)	44(25.7)	18(10.5)	74(43.3)	
	It is very important	14(8.2)	25(14.6)	13(7.6)	52(30.4)	
	Total	36(21.1)	83(48.5)	52(30.4)	171(100)	
Cognitive behavior therapy	It does not matter at all	2(1.3)	1(0.6)	1(0.6)	4(2.5)	24.044 (.002**)
	It is not important	0(0)	2(1.3)	8(5.1)	10(6.3)	
	It is average	14(8.9)	32(20.3)	25(15.8)	71(44.9)	
	It is important	8(5.1)	34(21.5)	9(5.7)	51(32.3)	
	It is very important	7(4.4)	11(7)	4(2.5)	22(13.9)	
	Total	31(19.6)	80(50.6)	47(29.7)	158(100)	

* $p < .05$, ** $p < .01$ by χ^2 test.**Table 7.** Preferences for forest therapy programs depending on shame and guilt of subfertile women

Variable		Frequency (%)				$\chi^2(p)$
		High	Medium	Low	Total	
Lower body bathing / foot bathing / hot spring bath	It does not matter at all	1(0.6)	0(0)	0(0)	1(0.6)	15.806 (.045*)
	It is not important	1(0.6)	0(0)	2(1.1)	3(1.7)	
	It is average	0(0)	9(5.1)	15(8.5)	24(13.6)	
	It is important	9(5.1)	35(19.8)	41(23.2)	85(48.0)	
	It is very important	12(6.8)	20(11.3)	32(18.1)	64(36.2)	
	Total	23(13.0)	64(36.2)	90(50.8)	177(100)	
Stress-control skills lecture	It does not matter at all	0(0.6)	0(0)	0(0)	1(0.6)	19.752 (.011**)
	It is not important	1(0.6)	2(1.2)	2(1.2)	5(2.9)	
	It is average	3(1.8)	7(4.1)	24(14.0)	34(19.9)	
	It is important	6(3.5)	35(20.5)	36(21.1)	77(45)	
	It is very important	12(7)	18(10.5)	24(14)	54(31.6)	
	Total	23(13.5)	62(36.3)	86(50.3)	171(100)	
Observing stars	It does not matter at all	5(3)	1(0.6)	1(0.6)	7(4.2)	29.724 (.000***)
	It is not important	2(1.2)	3(1.8)	13(7.9)	18(10.9)	
	It is average	5(3)	21(12.7)	37(22.4)	63(38.2)	
	It is important	4(2.4)	18(10.9)	24(14.5)	46(27.9)	
	It is very important	7(4.2)	13(7.9)	11(6.7)	31(18.8)	
	Total	23(13.9)	56(33.9)	86(52.1)	165(100)	

* $p < .05$, ** $p < .01$, *** $p < .001$ by χ^2 test

Table 8. Preferences for forest therapy programs depending on impatience and frustration of subfertile women

Variable		Frequency (%)				$\chi^2(p)$
		High	Medium	Low	Total	
Pelvic exercise walking	It does not matter at all	0(0)	0(0)	1(0.6)	1(0.6)	15.346 (.053*)
	It is not important	2(1.2)	5(3)	3(1.8)	10(6.1)	
	It is average	18(11)	31(18.9)	13(7.9)	62(37.8)	
	It is important	21(12.8)	35(21.3)	13(7.9)	69(42.1)	
	It is very important	13(7.9)	9(5.5)	0(0)	22(13.4)	
	Total	54(32.9)	80(48.8)	30(18.3)	164(100)	
Lower body bathing / foot bathing / hot spring bath	It does not matter at all	0(0)	1(0.6)	0(0)	1(0.6)	17.490 (.025*)
	It is not important	1(0.6)	1(0.6)	2(1.1)	4(2.2)	
	It is average	4(2.2)	10(5.6)	10(5.6)	24(13.5)	
	It is important	27(15.2)	45(25.3)	13(7.3)	85(47.8)	
	It is very important	29(16.3)	26(14.6)	9(5.1)	64(36)	
	Total	61(34.3)	83(46.6)	34(19.1)	178(100)	
Listening to water sounds/ hand and foot soak	It does not matter at all	1(0.6)	0(0)	0(0)	1(0.6)	22.493 (.004**)
	It is not important	4(2.3)	4(2.3)	3(1.7)	11(6.4)	
	It is average	13(7.6)	26(15.1)	14(8.1)	53(30.8)	
	It is important	16(9.3)	39(22.7)	8(4.7)	63(36.6)	
	It is very important	25(14.5)	11(6.4)	8(4.7)	44(25.6)	
	Total	59(34.3)	80(46.5)	33(19.2)	172(100)	
Eating organic foods	It does not matter at all	0(0)	0(0)	1(0.6)	1(0.6)	16.137 (.040*)
	It is not important	0(0)	2(1.1)	2(1.1)	4(2.3)	
	It is average	6(3.4)	21(12.0)	7(4.0)	34(19.4)	
	It is important	19(10.9)	31(17.7)	12(6.9)	62(35.4)	
	It is very important	33(18.9)	30(17.1)	11(6.3)	74(42.3)	
	Total	58(33.1)	84(48)	33(18.9)	175(100)	
Cognitive behavior therapy	It does not matter at all	3(1.9)	0(0)	1(0.6)	4(2.5)	17.893 (.022*)
	It is not important	1(0.6)	3(1.9)	6(3.8)	10(6.3)	
	It is average	24(15.2)	37(23.4)	10(6.3)	71(44.9)	
	It is important	16(10.1)	25(15.8)	10(6.3)	51(32.3)	
	It is very important	10(6.3)	9(5.7)	3(1.9)	22(13.9)	
	Total	54(34.2)	74(46.8)	30(19)	158(100)	
Aroma therapy	It does not matter at all	4(2.4)	1(0.6)	0(0)	5(2.9)	25.017 (.002**)
	It is not important	0(0)	3(1.8)	1(0.6)	4(2.4)	
	It is average	20(11.8)	18(10.6)	15(8.8)	53(31.2)	
	It is important	12(7.1)	42(24.7)	12(7.1)	66(38.8)	
	It is very important	21(12.4)	15(8.8)	6(3.5)	42(24.7)	
	Total	57(33.5)	79(46.5)	34(20)	170(100)	
Camping	It does not matter at all	9(5.4)	3(1.8)	4(2.4)	16(9.6)	16.656 (.034*)
	It is not important	4(2.4)	16(9.6)	7(4.2)	27(16.2)	
	It is average	23(13.8)	33(19.8)	13(7.8)	69(41.3)	
	It is important	8(4.8)	18(10.8)	5(3)	31(18.6)	
	It is very important	13(7.8)	6(3.6)	5(3)	24(14.4)	
	Total	57(34.1)	76(45.5)	34(20.4)	167(100)	
Observing stars	It does not matter at all	6(3.6)	1(0.6)	0(0)	7(4.2)	16.950 (.031*)
	It is not important	3(1.8)	12(7.2)	3(1.8)	18(10.8)	
	It is average	18(10.8)	29(17.5)	17(10.2)	64(38.6)	
	It is important	17(10.2)	23(13.9)	6(3.6)	46(27.7)	
	It is very important	14(8.4)	11(6.6)	6(3.6)	31(18.7)	
	Total	58(34.9)	76(45.8)	32(19.3)	166(100)	

* $p < .05$, ** $p < .01$, *** $p < .001$ by χ^2 test

Table 9. Preferences for forest therapy programs depending on anger and sensitivity of subfertile women

Variable		Frequency (%)				$\chi^2(p)$
		High	Medium	Low	Total	
Pelvic exercise walking	It does not matter at all	0(0)	0(0)	1(0.6)	1(0.6)	20.046 (.010**)
	It is not important	3(1.8)	2(1.2)	5(3)	10(6.1)	
	It is average	8(4.9)	39(23.8)	15(9.1)	62(37.8)	
	It is important	12(7.3)	33(20.1)	24(14.6)	69(42.1)	
	It is very important	10(6.1)	8(4.9)	4(2.4)	22(13.4)	
	Total	33(20.1)	82(50.0)	49(29.9)	164(100)	
Lower body bathing / foot bathing / hot spring bath	It does not matter at all	1(0.6)	0(0)	0(0)	1(0.6)	18.045 (.021*)
	It is not important	2(1.1)	1(0.6)	1(0.6)	4(2.2)	
	It is average	0(0)	11(6.2)	13(7.3)	24(13.5)	
	It is important	16(9)	46(25.8)	23(12.9)	85(47.8)	
	It is very important	17(9.6)	30(16.9)	17(9.6)	64(36)	
	Total	36(20.2)	88(49.4)	54(30.3)	178(100)	
Making food	It does not matter at all	2(1.2)	0(0)	2(1.2)	4(2.4)	16.649 (.034*)
	It is not important	4(2.4)	8(4.7)	6(3.6)	18(10.7)	
	It is average	12(7.1)	29(17.2)	27(16)	68(40.2)	
	It is important	4(2.4)	28(16.6)	11(6.5)	43(25.4)	
	It is very important	12(7.1)	17(10.1)	7(4.1)	36(21.3)	
	Total	34(20.1)	82(48.5)	53(31.4)	169(100)	
Self-esteem recovery program	It is not important	0(0)	2(1.1)	2(1.1)	4(2.2)	21.028 (.002**)
	It is average	5(2.8)	12(6.7)	13(7.3)	30(16.8)	
	It is important	7(3.9)	37(20.7)	28(15.6)	72(40.2)	
	It is very important	24(13.4)	38(21.2)	11(6.1)	73(40.8)	
	Total	36(20.1)	89(49.7)	54(30.2)	179(100)	

* $p < .05$, ** $p < .01$, *** $p < .001$ by χ^2 test.

foot soak (22.7%), pelvic exercise walking (21.3%), and eating organic foods (17.7%) as important, and cognitive behavior therapy (23.4%), camping (19.8%), and observing stars (17.5%) as medium. In terms of emotions including impatience and frustration, respondents tended to prefer the programs of lower body bathing/foot bathing/hot spring bathing and eating organic foods.

(6) Anger and sensitivity

The subfertile women who had anger and sensitivity showed significant differences in their preference for the following programs (Table 9): pelvic exercise walking ($\chi^2 = 20.046$, $p < .01$), lower body bathing/foot bathing/hot spring bathing ($\chi^2 = 18.045$, $p < .05$), making foods ($\chi^2 = 16.649$, $p < .05$), and self-esteem recovery program

($\chi^2 = 21.028$, $p < .01$). When the level of anger and sensitivity was medium, respondents were found to prefer self-esteem recovery program (21.2%) as very important; lower body bathing/foot bathing/hot spring bathing (25.8%) as important; and pelvic exercise walking (23.8%) and making foods (17.2%) as medium. In terms of emotions including anger and sensitivity, respondents tended to prefer the programs of self-esteem recovery and lower body bathing/foot bathing/hot spring bathing.

Conclusion

This study was conducted to identify the preference of subfertile women for forest therapy programs depending

on their emotional characteristics, and to provide basic data for the development of forest therapy programs in order to promote the mental and physical health of subfertile women. Among the surveyed emotional difficulties that subfertile women experienced, pressure they felt to become pregnant was found to be very high. The emotional difficulties were divided based on their level. When their emotional difficulties were high, they tended to have impatience and frustration the most, followed by anxiety and fear; depression, hopelessness, helplessness, loneliness and sadness; and anger and sensitivity. The top six programs were the most preferred by subfertile women were found to be a deep breath of air/phytoncide, forest bathing/wind bathing/sunbathing, self-esteem recovery program, eating organic foods, lower body bathing/foot bathing/hot spring bathing, and breathing/breathing exercises. Differences in the preference of subfertile women for forest therapy programs depending on their emotional characteristics were identified, and pressure to become pregnant showed significant differences between self-esteem recovery program, Domar relaxation therapy, NLP therapy and sleeping in the woods. Emotions including anxiety and fear showed significant differences between walking barefoot in forests, mountain walking in silence, listening to water sounds/hand and foot soak, self-esteem recovery program, NLP therapy, cognitive behavior therapy, aroma therapy, integrated art therapy in forests, forest bathing/wind bathing/sunbathing, a deep breath of air/phytoncide, and observing stars. Emotions including depression, hopelessness, helplessness, loneliness and sadness showed significant differences between eating organic foods, self-esteem recovery program, counseling/coaching, and cognitive behavior therapy, while those including shame and guilt showed significant differences between lower body bathing/foot bathing/hot spring bathing, stress-control skills lecture, and observing stars. Emotions including impatience and frustration showed significant differences between pelvic exercise walking, lower body bathing/foot bathing/hot spring bathing, listening to water sounds/hand and foot soak, eating organic foods, cognitive behavior therapy, aroma therapy, camping, and observing stars, while those including anger and sensitivity showed significant differences between pelvic exercise walking, lower body bathing/foot bathing/hot spring bath-

ing, making foods, and self-esteem recovery program. The programs that were repeatedly mentioned in the results of differences in the preference of subfertile women for forest therapy programs depending on their emotional characteristics include self-esteem recovery program, half bathing/foot bathing/hot spring bathing and cognitive behavior therapy, which indicates that they tend to prefer mental health-focused programs. The results of this study are expected to be utilized as basic data in developing forest therapy programs for subfertile women who experience emotional difficulties from subfertility. There is still a limitation in this study. Since this study was conducted on about 200 subfertile women using a questionnaire survey, it is difficult to generalize the results of this study. To address this limitation, it will be necessary to provide forest therapy programs for more subfertile women, to analyze their experience and to develop more effective forest therapy programs for subfertile women based on the results.

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