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ARTICLE

A Follow-Up Study on the Clinical Effectiveness and Satisfaction of an Online Mental Health Self-Care Program for Mothers in Korea

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ABSTRACT: Objectives: This study aimed to evaluate the clinical effectiveness, durability, and acceptability of a Korean medicine-based online mental health self-care program for mothers. **Methods:** This non-randomized comparative study evaluated the clinical effectiveness, durability, and acceptability of a Korean medicine-based online mental health self-care program for mothers. Group 1 (regular version) included 120 participants who attended one live session per week for 5 weeks, while Group 2 (shortened version) included 30 participants who completed five recorded sessions within 1 week. A total of 112 participants (93.3%) in Group 1 and all 30 participants (100%) in Group 2 completed the program and surveys. **Results:** Within-group analyses demonstrated significant improvements for depression (ΔCESD-10 [Center for Epidemiological Studies Depression Scale-10] = −2.38 ± 2.10, $p < 0.001$; Cohen's d = 1.10), anxiety (ΔGAD-7 [Generalized Anxiety Disorder Scale-7] = −3.82 ± 3.20, $p < 0.001$; d = 0.93), and stress (ΔPSS [Perceived Stress Scale] = −6.44 ± 4.50, $p < 0.001$; d = 1.12) in Group 1. Between-group analysis of covariance (ANCOVA) of postintervention scores showed significant differences favoring Group 1 in CESD-10 ($p < 0.001$) and GAD-7 ($p = 0.025$). These improvements were largely maintained through the 12-week follow-up (all $p < 0.001$), indicating both statistical and clinical significance. The average willingness-to-pay per session was 8562.5 ± 3609 KRW, and overall satisfaction was high. **Conclusion:** These findings demonstrate that the regular 5-week Korean medicine-based online program is effective, cost-effective, and capable of sustaining improvements in maternal mental health, supporting its potential use in community-based care strategies.

KEYWORDS: Online health care program; Korean medicine; COVID-19; mental health

1 Introduction

Coronavirus disease 2019 (COVID-19) led to a global public health crisis in 2020, affecting both the physical and mental health of individuals. Recent studies have reported that around 20 percent of Korean adults were at high risk of depression by December 2020, which was approximately 4.8 times higher than before the outbreak [1]. The stress caused by COVID-19 was reported to be 1.5 times higher than that caused by Middle-East Respiratory Syndrome, and 1.4 times higher than that caused by earthquakes [2]. According to the literature, individuals affected by COVID-19 may experience depression, anxiety, and stress, along with severe mental disorders, including panic attacks, impulsivity, sleep disorders, and posttraumatic stress symptoms [2].

During the continued spread of COVID-19 in 2022, workplaces, schools, and daycare centers for children closed their doors. These major changes led to an increased caregiving burden in women [3,4]. Additionally, school closures led to an immediate increase in unpaid care. During the lockdown period, women spent significantly more time as caregivers than men, and more mothers than fathers reduced their working hours or rescheduled their employment due to childcare needs. Women who spent long hours doing housework and parenting were more likely to report increased psychological distress [5], as the closure of schools and childcare facilities disrupted regular work rhythms [6]. Anxiety levels were also higher among women living with children than among those without children [7].

Increased maternal care due to COVID-19 is a global trend. In Norway, mothers who strongly believed women are natural caregivers provided more care during the lockdown, and consequently reported poorer mental health [8]. In the United States, there have also been reports of increased stress among caregivers. High levels of caregiver burden and psychological distress can disrupt one's daily life balance. Parents, particularly mothers, must often sacrifice their personal well-being to meet their children's needs [9,10]. Similar burdens to those described above are also present in Korea [11]. Accordingly, various online healthcare programs have been initiated due to the COVID-19 pandemic; however, these are still in the infancy stages, and the advantages of face-to-face interactions cannot be overlooked.

Korean medicine refers to traditional medicine in Korea, wherein various complementary and alternative medicine treatments—such as acupuncture, moxibustion, and herbal medicine—are utilized. Currently, Korea is in the process of producing Clinical Practice Guidelines (CPGs) for Korean medicine at the national level, which aims to provide evidence-based and standardized healthcare services [12]. CPGs have already been developed for anxiety disorder, autism spectrum disorder, dementia, insomnia, and hwabyeong—a Korean culture-specific term that refers to anger syndrome with both psychological and physical symptoms, mainly occurring in middle-aged women [13–15].

Therefore, this study aimed to apply an online healthcare program developed using acupuncture, moxibustion, mindfulness meditation, tea, and aroma oil to reduce mental stress. An initial short-term evaluation of this program, focusing on outcomes from weeks 1–5, was previously reported in the form of a research letter [16]. In the present study, we extend this investigation by analyzing follow-up outcomes at week 17, and assessing participant satisfaction. This extended evaluation aims to provide more robust and practical evidence on the program's effectiveness and feasibility as a long-term intervention for stress relief during the COVID-19 pandemic.

2 Methods

2.1 Study Settings

This nonrandomized comparative study evaluated an online mental health self-care program for mothers of elementary school children. All data, including demographic and health-related information, were collected directly from the participants of this study through online surveys administered before and after the program. The participants were assigned to either Group 1 (participating in the regular program [5 weeks]) or Group 2 (participating in the shortened program [1 week]). The program was conducted from 05 October to 04 November 2021. The regular program conducted classes in real-time, while the shortened program proceeded with recorded lecture videos. After the completion of all programs, postintervention tests were performed for participants (Fig. 1).

The protocol of this study was registered at CRIS (KCT0008298) and approved by the Woosuk University Institutional Review Board (IRB No.: WSOH IRB H2210-03). Written informed consent was provided by all the study participants.

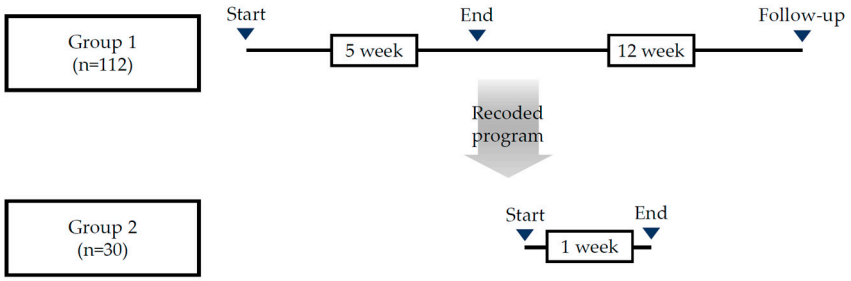

Figure 1: Study design.

2.2 Recruitment and Eligibility of Participants

Participants were recruited over a 2-week period via the Korean Medicine Association of Chungcheongnam-do and online posters. Interested individuals contacted the researchers by phone or email and were screened for eligibility by a Korean medicine doctor following a preliminary survey. This preliminary survey included demographic questions and the Patient Health Questionnaire-9 (PHQ-9) to determine eligibility. All participants were informed of the study's purpose and ethical considerations, and written informed consent was obtained. Participants received the necessary program materials as compensation. The inclusion and exclusion criteria for participant selection are summarized in Table 1.

Table 1: Inclusion and exclusion criteria for study participants.

Selection Criteria	Exclusion Criteria
1. Age between 20 and 70 years 2. Having children currently attending elementary school 3. Patient Health Questionnaire-9 (PHQ-9) scores of ≥4 or ≤19 4. Voluntarily signing the consent form for clinical research 5. Willingness to cooperate during the research period and comply with restrictions	1. Mental illness and difficulty in communication 2. Difficulty in communication due to being unconscious or critically ill 3. Conditions related to mental health requiring medications 4. Pregnancy 5. Participation in other clinical trials 6. Conditions that may affect the evaluation of this study according to the researcher's judgment for reasons other than those listed above

2.3 Sample Size and Assignment

The sample size (N = 150) was determined based on the study duration and budget. Participants chose either the regular or shortened version of the program based on their availability, and were assigned to groups at a 4:1 ratio, respectively.

2.4 Online Mental Health Self-Care Program

2.4.1 Program Development

This program was based on the model proposed by Lee [17] for developing Korean medicine-based health promotion and community-linked programs. A draft was created through literature review—including clinical practice guidelines, related reports, and existing programs—and finalized through expert and public health center consultations. Two Korean medicine neuropsychiatrists reviewed the content. The full program development has been previously published and is available online [18].

Before the program began, participants completed an online pre-questionnaire and received the necessary materials by mail. They then joined live-streamed sessions with instructional videos and practiced independently. The program ran twice daily, 2 days a week, over four sessions. Each weekly lecture lasted approximately 30 min and addressed topics such as causes of stress, recognizing depression, self-understanding, coping strategies, and sharing stressful situations. A group chat was created for ongoing

engagement and daily missions. The sessions were led by a professor from Woosuk University's College of Korean Medicine, an experienced researcher in preventive medicine. All materials were reviewed by experts for quality assurance (Table 2).

Table 2: Program outline.

Step		Main Program	Time
Previsit		Consent form and pre-questionnaire Shipment of supplies	- -
Week 1	Education	Program introduction (10 min) Causes of stress (10 min) Korean medicine practice training (10 min)	30 min
	Training	Pellet, hot pack (10 min), meditation (10 min), tea	20 min
Week 2	Education Training	Recognizing depression (30 min) Pellet, hot pack (10 min), meditation (10 min), tea	30 min 20 min
Week 3	Education Training	Knowing myself (30 min) Pellet, hot pack (10 min), meditation (10 min), tea	30 min 20 min
Week 4	Education Training	Improving oneself (30 min) Pellet, hot pack (10 min), meditation (10 min), tea	30 min 20 min
Week 5	Education Training	Sharing stressful situations (30 min) Pellet, hot pack (10 min), meditation (10 min), tea	30 min 20 min
End point		Postintervention questionnaire	-
Follow-up		Follow-up questionnaire	-

2.4.2 Interventions for Mental Care Program

The intervention combined Korean medicine-based physical, psychological, and lifestyle therapies into a structured program. Participants engaged in self-administered acupoint stimulation, mindfulness meditation guided by expert-created audio, psychoeducational lectures and exercises, and supplementary therapies (lavender oil and green tea) aimed at promoting emotional stability (Table 3).

Table 3: Interventions for mental care programs.

Component	Description
Acupoint stimulation	Magnetic pellets were applied to LI4 and LR3 acupoints [19], and a hot pack was used on CV4 instead of moxibustion [20]. These methods allow participants to perform self-stimulation to alleviate anxiety, depression, and fatigue [21].
Mindfulness meditation	A prerecorded guided meditation file was provided by a Korean medicine expert with >3 years of experience [22]. Participants practiced individually using the file.
Education	Sessions included understanding depression, recognizing stress symptoms, and learning coping strategies. Participants also practiced behavior change techniques and shared experiences.
Supplementary therapies	Lavender oil for aromatherapy [23] and green tea [24] were used to support mental and physical relaxation based on previous literature.

Note: Abbreviations: CV, Conception vessel; LI, Large intestine meridian; LR, Liver meridian.

2.5 Outcome Measurements

For the evaluation tools, the 2019 Standard Guidelines for Mental Health Examination tool [25] and Clinical Practice Guideline of Korean Medicine; *Hwabyeong* [26] were referenced. The Korean versions of the Center for Epidemiological Studies Depression Scale-10 (CESD-10) [27], Generalized Anxiety Disorder Scale-7 (GAD-7) [28], and Perceived Stress Scale (PSS) [29] were used to assess depression, anxiety, and perceived stress, respectively. To assess the improvement of *Hwabyung*, both the *Hwabyung* Standard [30] and a Visual Analog Scale (VAS) [25] were used. The Hwabyung Standard consists of two self-report subscales—personality traits and symptom severity—developed to evaluate individual vulnerability to *hwabyung* and the degree of symptom manifestation. Additionally, in reference to the CPGs, core somatic symptoms of *hwabyung* were measured using a VAS focusing on five key symptoms: vexation, indigestion, heavy-headedness, hot flash, and irritability (Table 4).

Table 4: Outcome measurements.

Period	**Observational Study**			
Visit	Screening[a]	Preprogram	5 weeks (end point)	17 weeks (follow-up)
Consent form	O	-	-	-
Demographic characteristics[b]	O	-	-	-
Case and drug history	O	-	-	-
PHQ-9	O	-	-	-
CESD-10	-	O	O	O
GAD-7	-	O	O	O
PSS	-	O	O	O
Hwabyung standard	-	O	O	O
Hwabyung VAS	-	O	O	O
Adverse events	-	-	O	O
Satisfaction	-	-	O	O

Note: O, present; -, not implemented. [a]According to the inclusion and exclusion criteria; [b]Height, weight, diagnosis of depression, experience of dosage, number of children, and job. Abbreviations: PHQ-9, Patient Health Questionnaire-9; CESD, Center for Epidemiological Studies Depression Scale; GAD-7, Generalized Anxiety Disorder Scale; PSS, Perceived Stress Scale.

2.6 Statistical Analysis

All analyses were performed according to the intention-to-treat principle, with the level of statistical significance set at $p < 0.05$. The homogeneity of baseline characteristics between groups was assessed using independent *t*-tests for continuous variables, and the χ^2 or Fisher's exact test for categorical variables.

Within each group, pre–post changes were analyzed using paired *t*-tests. Between groups, independent *t*-tests were first used to compare postintervention scores, followed by analysis of covariance (ANCOVA), with the corresponding baseline value as a covariate to adjust for initial differences. To correct for multiple comparisons across outcomes, the false discovery rate (FDR) was controlled using the Benjamini–Hochberg procedure.

For the follow-up analysis in Group 1, repeated-measures analysis of variance (ANOVA) was performed to evaluate changes across three time points: baseline, postintervention, and at the 12-week follow-up (equivalent to 17 weeks from baseline). All analyses were conducted using jamovi (version 2.6.26).

3 Results

This study evaluated the program's effects after 5 weeks to evaluate the effects of the non-face-to-face Korean medicine program on stress and depression in women with elementary school children. Data from

112 participants (93.3%) who completed all sessions and both the pre- and postintervention surveys were analyzed. Some of the participants attended the same lecture two to three times; however, this was not the case for many participants, and the attendance rate differed weekly. Repeated attendance was therefore not included in the analysis. Regarding the shortened program, data from 30 participants (100%) who completed all five sessions and the postintervention questionnaire were analyzed.

3.1 Basic Information of Participants

Table 5 shows the general characteristics of the participants. No statistically significant differences were observed between the experimental (n = 112) and control groups (n = 30) regarding height, weight, or body mass index (BMI). The BMI distribution, number of children, employment status, history of depression diagnosis, year of diagnosis, and experience with antidepressants were also comparable between groups ($p > 0.05$ for all). Most participants were housewives with one or two children, and most had not been diagnosed with depression or taken antidepressants prior to the study.

Table 5: Basic information of participants.

Classification		Group 1 (n = 112)	Group 2 (n = 30)	*p*-Value
		Mean (SD)/N (%)		
Height (cm)		162 (5.53)	163 (5.97)	0.745[a]
Weight (kg)		62.0 (10.8)	59.3 (9.97)	0.213[a]
BMI		23.5 (3.81)	22.4 (3.54)	0.144[a]
	Underweight	10 (7.0%)	4 (2.8%)	0.739[b]
	Normal	45 (31.7%)	15 (10.6%)	
	Overweight	24 (16.9%)	4 (2.8%)	
	Obesity	26 (18.3%)	6 (4.2%)	
	Stage 2 obesity	7 (4.9%)	1 (0.7%)	
Children	1	35	13	0.462[c]
	2	54	12	0.4829[b]
	≥3	23	5	0.4829[b]
Job	Regular job	25	4	0.4655[b]
	Irregular job	19	4	0.4655[c]
	Housewife	68	22	0.4655[c]
Diagnosis of depression	Yes	15 (10.6%)	5 (3.5%)	0.647[c]
	No	97 (68.3%)	25 (17.6%)	
Diagnosis year of depression	2017	1	0	0.656[b]
	2018	1	0	
	2019	2	0	
	2020	5	1	
	2021	6	4	
History of taking antidepressants	Yes	11 (7.7%)	3 (2.1%)	0.725[b]
	No	4 (2.8%)	2 (1.4%)	

Note: [a]Independent *t*-test; [b]Fisher's exact test; [c]Chi-squared test.

A homogeneity test was performed on the dependent variables between the regular and short program participants. There was no significant difference in the prior symptom scores (Table 6).

Table 6: Symptoms prior to participating in the program.

Variable		Group 1 (n = 112)	Group 2 (n = 30)	*p*-Value
		Mean (SD)	Mean (SD)	
CESD-10		3.80 (2.30)	3.83 (2.34)	0.950
GAD-7		7.31 (4.36)	8.47 (4.78)	0.210
PSS		20.77 (5.09)	20.63 (5.66)	0.900
Hwabyung standard	Personality	34.18 (9.00)	32.90 (10.89)	0.510
	Symptom	32.81 (13.24)	31.50 (13.49)	0.632
Hwabyung VAS	Vexation	4.43 (2.74)	4.63 (2.51)	0.712
	Indigestion	4.77 (2.98)	4.47 (3.01)	0.624
	Heavy headedness	5.74 (2.42)	6.07 (2.53)	0.518
	Hot flash	5.24 (2.78)	5.87 (2.93)	0.282
	Irritability	6.17 (2.77)	6.50 (2.93)	0.568

Note: Abbreviations: CESD, Center for Epidemiological Studies Depression Scale; GAD-7, Generalized Anxiety Disorder Scale; PSS, Perceived Stress Scale.

3.2 Effectiveness of the Program

Within-group analyses showed significant pre–post improvements in Group 1 across the CESD-10, GAD-7, PSS, Hwabyung Standard (personality and symptom subscales), and all VAS items ($p < 0.001$ by paired t-tests). In Group 2, paired t-tests also indicated significant reductions in GAD-7, PSS, and several VAS scores; however, the magnitude of change was smaller than in Group 1.

Between-group comparisons of postintervention scores using independent t-tests revealed significant differences favoring Group 1 in the CESD-10, GAD-7, and selected VAS items (vexation, hot flash, irritability). These findings remained significant after ANCOVA, adjusting for baseline values, and significance was preserved after FDR correction across multiple outcomes (Table 7).

Table 7: Changes in CESD-10, GAD-7, PSS, Hwabyung Standard, and VAS scores.

Classification	Group	Preintervention	Postintervention	p^a	p^b	p^c	q^d
		Mean (SD)					
CESD-10	1	3.80 (2.30)	1.42 (1.79)	<0.001	<0.001	<0.001	<0.001
	2	3.83 (2.34)	2.90 (1.90)	0.058			
GAD-7	1	7.31 (4.36)	3.49 (3.22)	<0.001	0.016	0.025	0.0495
	2	8.47 (4.78)	5.13 (3.45)	<0.001			
PSS	1	20.77 (5.09)	14.33 (5.08)	<0.001	0.339	0.344	0.382
	2	20.63 (5.66)	15.33 (5.14)	<0.001			
Hwabyung personality standard	1	34.18 (9.00)	28.07 (8.11)	<0.001	0.062	0.045	0.075
	2	32.90 (10.89)	31.20 (8.05)	0.373			
Hwabyung symptom standard	1	32.81 (13.24)	19.56 (10.28)	<0.001	0.068	0.055	0.079
	2	31.50 (13.49)	23.53 (11.33)	<0.001			
(VAS) Vexation	1	4.43 (2.74)	2.63 (1.82)	<0.001	<0.001	<0.001	<0.001
	2	4.63 (2.51)	4.00 (2.18)	<0.001			
(VAS) Indigestion	1	4.77 (2.98)	3.17 (2.13)	<0.001	0.872	0.906	0.906
	2	4.47 (3.01)	3.10 (2.02)	<0.001			
(VAS) Heavy headedness	1	5.74 (2.42)	3.69 (2.19)	<0.001	0.115	0.151	0.189
	2	6.07 (2.53)	4.37 (1.61)	<0.001			

Table 7: *Cont.*

Classification	Group	Preintervention	Postintervention	p^a	p^b	p^c	q^d
		Mean (SD)					
(VAS) Hot flash	1	5.24 (2.78)	3.10 (2.18)	<0.001	0.002	0.005	0.012
	2	5.87 (2.93)	4.50 (2.33)	<0.001			
(VAS) Irritability	1	6.17 (2.77)	3.49 (2.25)	<0.001	0.006	0.005	0.012
	2	6.50 (2.93)	4.77 (2.13)	<0.001			

Note: [a]Within-group comparison using paired *t*-test (preintervention vs. postintervention); [b]Between-group comparison using independent *t*-test (postintervention); [c]Between-group comparison using ANCOVA, adjusting for baseline score of each outcome; [d]False discovery rate-adjusted *p*-value (Benjamini–Hochberg procedure across 10 ANCOVA tests). Abbreviations: CESD, Center for Epidemiological Studies Depression Scale; GAD-7, Generalized Anxiety Disorder Scale; PSS, Perceived Stress Scale; VAS, Visual Analog Scale.

3.3 Follow-Up

For the follow-up analysis, data from 80 participants in Group 1 (regular program) who completed all preintervention, postintervention, and 3-month follow-up questionnaires were analyzed. In Group 1, repeated-measures ANOVA across three time points (baseline, postintervention, and at the 12-week follow-up) demonstrated significant time effects for the CESD-10, GAD-7, PSS, Hwabyung Standard symptom subscale, and VAS scores for vexation, indigestion, and heavy-headedness (all $p < 0.001$). Post hoc comparisons indicated that improvements from baseline were maintained at the 12-week follow-up. Only the Hwabyung personality subscale and VAS items for hot flash and irritability showed partial rebound between postintervention and follow-up; still, scores remained significantly better than at baseline.

These results confirm that the regular 5-week program produced significant short-term benefits that were largely sustained for 12 weeks after completion (Table 8).

Table 8: Program results, including follow-up.

Classification		Preintervention	Postintervention	Follow-up	p^a	p^b
CESD-10		3.98 ± 2.38	1.38 ± 1.66	1.43 ± 1.53	<0.001	<0.001
GAD-7		7.19 ± 4.12	3.41 ± 3.25	4.15 ± 2.55	<0.001	<0.001
PSS		20.8 ± 5.45	14.99 ± 4.90	15.21 ± 4.3	<0.001	<0.001
Hwabyeong Standard	Personality	34.08 ± 7.90	28.16 ± 8.52	30.43 ± 7.12	<0.001	0.001
	Symptom	31.49 ± 12.54	20.74 ± 9.92	20.9 ± 8.94	<0.001	<0.001
VAS	Vexation	4.50 ± 2.70	2.66 ± 2.00	3.23 ± 3.84	<0.001	0.010
	Indigestion	4.85 ± 2.93	3.21 ± 2.27	3.23 ± 1.72	<0.001	<0.001
	Heavy headedness	5.79 ± 2.32	3.85 ± 2.30	4.09 ± 2.19	<0.001	<0.001
	Hot flash	5.26 ± 2.75	3.19 ± 2.40	4.00 ± 1.89	<0.001	0.003
	Irritability	6.31 ± 2.62	3.75 ± 2.39	4.90 ± 2.58	<0.001	<0.001

Note: [a]pre-post; [b]pre-follow-up.

3.4 Satisfaction

Satisfaction and recommendation scores were assessed at both the postintervention and follow-up points. As shown in Table 9, participants in the regular program (Group 1) reported higher satisfaction scores than those in the shortened program (Group 2) at both time points (postintervention: 8.74 vs. 8.07; follow-up: 8.81 vs. 7.77). Recommendation scores were also higher in Group 1 at the postintervention time point (8.82 vs. 8.10).

To further quantify satisfaction, participant responses from Group 1 were converted into a 5-point Likert scale (1 = Very bad, 5 = Very good). The average scores were 4.69, 4.49, and 4.81 for overall satisfaction, satisfaction with the schedule, and satisfaction with the non-face-to-face delivery method, respectively. Regarding willingness to recommend the program, the average score was 4.49, indicating high acceptability and satisfaction across all domains (Table 10).

Table 9: Satisfaction and recommendation scores by group and time point.

Classification	Satisfaction (Postintervention)	Satisfaction (Follow-up)	Recommend (Postintervention)
Group 1	8.74 ± 0.81	8.81 ± 0.75	8.82 ± 0.80
Group 2	8.07 ± 1.01	7.77 ± 1.07	8.10 ± 1.37

Table 10: Detailed satisfaction ratings among regular program participants (Group 1).

Question	Answer	N (%)	Score
Are you satisfied with the overall program?	Very bad	2 (2.4%)	4.69 ± 0.72
	Bad	0 (0%)	
	Normal	1 (1.2%)	
	Good	16 (18.8%)	
	Very Good	66 (77.6%)	
Are you satisfied with the operating hours and schedule?	Very bad	2 (2.4%)	4.49 ± 0.89
	Bad	1 (1.2%)	
	Normal	8 (9.4%)	
	Good	16 (18.8%)	
	Very Good	58 (68.2%)	
Are you satisfied with the non-face-to-face online operation method?	Very bad	1 (1.2%)	4.81 ± 0.59
	Bad	0 (0%)	
	Normal	2 (2.4%)	
	Good	8 (9.4%)	
	Very Good	74 (87.1%)	
Are you willing to recommend the program to others?	Very bad	0 (0%)	4.49 ± 0.57
	Bad	0 (0%)	
	Normal	3 (3.5%)	
	Good	37 (43.5%)	
	Very Good	45 (52.9%)	

Participants were asked to rank the top two most preferred components of the program. As shown in Fig. 2, meditation (n = 27 first, n = 31 second) and education (n = 27 first, n = 34 second) received the highest combined preferences, followed by hot pack/moxibustion (n = 27 first, n = 21 second). Pellet stimulation (n = 14 first, n = 11 second), green tea (n = 6 first, n = 10 second), and aroma oil (n = 11 first, n = 4 second) were less frequently chosen. These results suggest that participants showed a strong preference for active interventions that engage the body or mind, such as meditation and education, compared to more passive or sensory components.

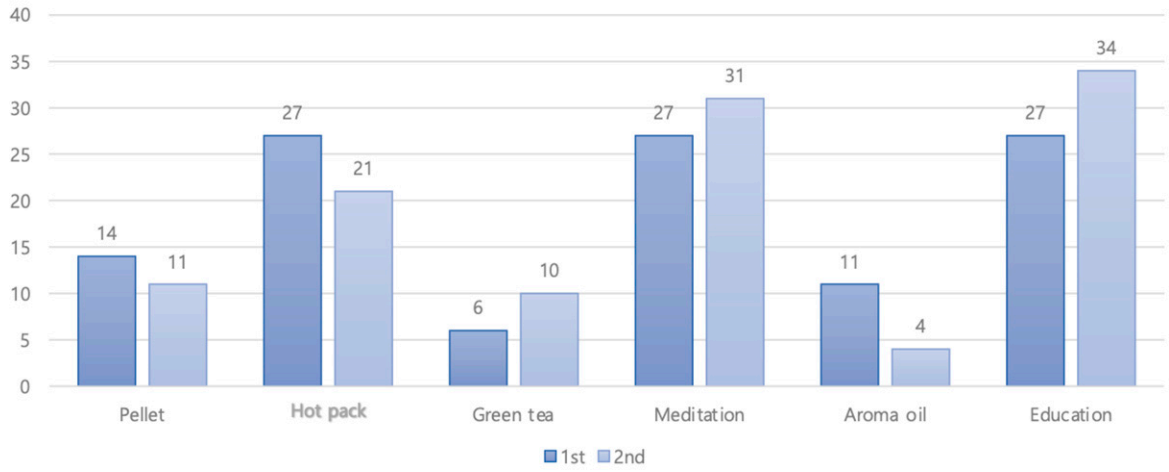

Figure 2: Satisfaction of the intervention.

4 Discussion

Women's mental health was disproportionately affected during the COVID-19 pandemic, with many reporting increased caregiving burdens and psychological distress [31–34]. These challenges were especially pronounced among the parents of young children, highlighting the need for accessible and sustainable mental health interventions. This study builds upon our previously reported short-term findings by providing extended data on follow-up effects, participant satisfaction, and economic acceptability [35].

To prevent COVID-19, the Korea Centers for Disease Control and Prevention and related societies are continuously issuing prevention rules and guidelines [36]. Additionally, guidelines and support centers have been established to protect mental health. To prevent a mental health crisis, acquiring reliable information, maintaining social networks, expressing emotions, and continuing daily life are considered important factors; however, most people have difficulty participating in the rapidly changing environment. Various health promotion programs have been launched to support this population [37]. The current study expands our prior work by incorporating a 3-month follow-up and additional participant-centered outcomes—such as willingness-to-pay and satisfaction—offering a more comprehensive assessment of the intervention's real-world applicability.

A total of 112 (93.3%) and 30 (100%) participants from Groups 1 and 2, respectively, completed all procedures and surveys and were included in the analysis. This study confirmed that the online Korean medicine-based program effectively improved depression, anxiety, and stress in mothers. The primary finding is that the regular, live, 5-week program was significantly more effective at reducing depression (CESD-10) and anxiety (GAD-7) than the shortened, recorded, 1-week program, even after controlling for baseline differences (ANCOVA). This suggests that the program's duration and live, interactive components are key factors for its therapeutic effect, rather than mere participation. Furthermore, the benefits of the regular program were not transient. Repeated-measures ANOVA demonstrated that these improvements were largely sustained at the 12-week follow-up, highlighting the program's potential to foster long-term mental health maintenance by equipping participants with durable self-care skills.

This study has several limitations. First, as this was not a randomized controlled trial, the self-selection of participants into programs may have introduced selection bias; participants in the regular program might have possessed higher motivation. To statistically mitigate this limitation, ANCOVA was used to adjust for baseline scores when comparing groups; however, as this method cannot entirely eliminate bias, the results should be interpreted with caution. Additionally, the sample primarily included relatively healthy

individuals with low baseline PHQ-9 scores, which restricts the generalizability of the findings to clinical populations with moderate to severe depressive symptoms.

Second, only the regular program group completed the 17-week follow-up, making it difficult to assess the long-term effectiveness of the shortened version. While both formats showed short-term improvements, the lack of sustained CESD-10 improvement in the shortened group suggests that program duration may play a critical role. Future studies should consider evaluating hybrid or intermediate-length formats to balance effectiveness and scalability.

Third, this study recruited participants during the COVID-19 pandemic, and the eligibility criteria required being a mother of elementary school children. Additional screening excluded those with severe mental illness, and collected prior diagnosis and treatment history. Nevertheless, it was not possible to determine with certainty whether the observed mental health difficulties had newly emerged in response to the childcare burden during the pandemic, or whether they reflected preexisting conditions.

Finally, while overall satisfaction with the program was high, the exclusive use of quantitative measures (e.g., Likert scale ratings) without qualitative feedback may limit a deeper understanding of participant experiences and barriers to engagement. Future research should incorporate mixed methods to better inform program refinement and implementation.

Despite its limitations, this study is meaningful as it is among the first to develop and apply an online mental care program based on Korean medicine for mothers with children. While several studies have explored online healthcare programs for mental health problems caused by COVID-19—such as exercise and online counseling using Social Network Service platforms in Taiwan [38], and an online exercise program developed for elderly people in Canada [39]—Few studies have investigated the parenting stress caused by COVID-19 in mothers with children. This study fills the gap by focusing on culturally tailored, accessible care for mothers, suggesting a need for further expansion and refinement of such targeted online programs.

5 Conclusions

This study confirms the utility of online Korean medicine programs. Since the onset of the COVID-19 pandemic, health promotion programs using mobile devices were expected to increase, and the government attempted to develop an online healthcare program; however, existing Korean medicine-related programs were insufficient. Therefore, we developed a program by incorporating interventions that are easy and convenient to perform alone. We evaluated the effects of the program and confirmed the possibility that the Korean medicine program could be completed online. As it is a program optimized in the era of COVID-19, it is likely to be used in more regions in the future, and the interventions used in this program are expected to be included in mobile healthcare programs.

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Informed Consent: Written informed consent was obtained from all participants after they were provided with a detailed explanation of the study procedures and information regarding the publication of the study results.

Conflicts of Interest: The authors declare no conflicts of interest to report regarding the present study.

Abbreviations

ANCOVA	Analysis of covariance
ANOVA	Analysis of variance
BMI	Body mass index
CESD-10	Center for epidemiological studies depression scale-10
CPG	Clinical practice guideline
COVID-19	Coronavirus disease 2019
DBDC	Double-bounded dichotomous choice method
FDR	False discovery rate
GAD-7	Generalized anxiety disorder scale-7
IRB	Institutional review board
PHQ-9	Patient health questionnaire-9
PSS	Perceived stress scale
VAS	Visual analog scale

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