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Effectiveness of yoga training programs to reduce depression and improve resilience of single mothers

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Single mothers are vulnerable to mental health such as depression, but emotional support is insufficient. Yoga is known to be effective in reducing negative emotions and promoting resilience. This study was conducted in order to verify the effectiveness of yoga training programs in reducing depression and improving the resilience of single mothers. Participants in the study included 20 single mothers who belonged to the Single Mothers Association, who were randomly assigned to training (n = 10) and nontraining (n = 10) groups. The yoga training program for single mothers consisted of Asana yoga, meditation, and mind expression through expert meetings; a total of eight sessions were conducted once a week for 120 min. Testing for depression and resilience was performed before and after the program in order to verify the effectiveness of the program. According to the results of the study, depression in single mothers who participated in the yoga training program was significantly decreased, and resilience was significantly increased. Therefore, the effectiveness of the yoga training program in lowering the depression of single mothers and improving resilience was confirmed. In the future conduct of many studies will be required in order to help the mental health of single mothers.

Keywords: Single mothers, Depression, Resilience, Yoga training program

INTRODUCTION

The number of single mothers in Korea surveyed by the National Statistical Office in 2019 was 20,761, and it is expected to be higher with consideration for single mothers not included in the survey. In Korean society, single mothers are often bullied or excluded from the original family because they are still perceived as 'obstructive' or 'violating social norms'. This negatively affects the mental health of single mothers. Due to economic difficulties and reduced social support, single mothers have mental health problems such as chronic stress, depression, and anxiety (Rousou et al., 2019), and it has been reported that they are more vulnerable to mental health disorders such as depression than married mothers (Kim et al., 2018). It is presumed that these results are due to the fear of social criticism as a single mother or abandonment by the family.

The number of single mothers raising children has shown a recent increase in Korea. They wanted to live in hiding, fearing damage to their children caused by themselves (Kim et al., 2012). Findings from another study showed that mental health had a greater effect on children from single-parent families compared with ordinary children (Crosier et al., 2007). Based on these results we can predict that the emotions of unstable and depressed single mothers can be directly linked to negative attitudes toward parenting. However, the focus of studies on single mothers has been on social support for resolving economic difficulties; these studies mainly discussed the degree of depression, anxiety, and stress according to the social relationship and economic level of single mothers (Kim et al., 2018; Rousou et al., 2019). However, few studies conducted to improve the mental health of single mothers through exercise have been reported. Therefore, it is necessary to provide emotional support along with economic support since the mental health of single mothers is very important not only for themselves but also for parenting.

In neurological terms, depressive disorder is associated with symptoms caused by decreased control of the vagus nerve (Henje

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Blom et al., 2014). A direct relationship between depressive symptoms and vagus nerve activity was suggested by Agelink et al. (2002). The degree of vagus nerve tension, which is associated with depression, affects the process of top-down and bottom-up emotional processing (Park et al., 2013), and this process has been reported to be essential for the relationship between emotions, communion, and vagus nerve balance (Farb et al., 2015). In this way, the brain and body can be helpful in mental and physical therapy through control of changes in the autonomic nervous system and emotions and behavior (Taylor et al., 2010), and mental and physical therapy has a positive effect on body perception, including conscious self-acceptance (Farb et al., 2015; Mehling et al., 2011). Accordingly, yoga has been proposed as an effective method for mental and physical therapy by Gard et al. (2014).

Yoga, which originated in ancient India, is a training method that fosters harmonization of the body, emotions, and thoughts, including relaxation, physical posture (Asana), breathing control techniques (Pranayama), and meditation (Dhyana). In particular, Hatha-yoga, which is well-known to the public, provides training in yoga movements that prepare the body for self-realization, that is, Asana. Physiologically, yoga stimulates the parasympathetic nervous system to aid in the function of the autonomic nervous system, thus it is used for prevention and treatment of disease (Stephens, 2017). As a result, yoga was recently recognized as a field of alternative medicine, and its complementary effect on mental and physical therapy has been identified (Prathikanti et al., 2017; Sullivan et al., 2018).

In addition, yoga has been reported to be effective in reducing negative emotions such as aggression, depression, and anxiety by promoting a sense of physical and mental calm, as well as improvement of self-regulation (Klainin-Yobas et al., 2015; Miller et al., 1995; Prathikanti et al., 2017). The practice of yoga focuses on the inner senses for improvement of emotional awareness, and caring for one's inner experiences increases resilience by enhancing self-pity and empathy for others (Gilbert, 2014). Resilience is the ability to avoid stress and return to the original state (Smith et al., 2010). In a recent study resilience was found to promote spontaneous brain activity against subjective well-being in adults (Kong et al., 2018). People with a high level of resilience are not swayed by their situation, are emotionally stable, and view the future with optimism. Although some people are naturally born with this resilience, it can also be acquired. Among the methods of physical movement for enhancement of resilience, the resilience enhancing effect of yoga training has been demonstrated in a number of studies (Dale et al., 2009; Gard et al., 2014; Trent et al., 2019).

Table 1. Physical characteristics of subjects

Characteristic	PG	CG	*F*	*P*-value
Age (yr)	40.50±6.75	36.40±6.41	0.50	0.181
Child's age (yr)	10.08±2.20	9.00±2.82	0.78	0.130
Depression	2.18±0.30	2.28±0.39	0.94	0.545
Overall resilience	3.43±0.37	3.33±0.44	0.40	0.612

Values are presented as mean±standard deviation.
PG, participating group; CG, control group.

In particular, yoga training is not only important for overcoming negative perceptions of single mothers and living independently, it can also be expected to have a positive effect on raising children. Therefore, the purpose of this study was to examine the effectiveness of yoga training in reducing depression and improving resilience for single mothers raising children.

MATERIALS AND METHODS

Subjects

Participants in the study included 20 single mothers who belonged to the 'A' Single Mothers Association, and 10 were assigned to the yoga training participation group and the control group. Permission to collect data from the association was obtained by the researcher, and written consent was obtained after the purpose of the research, anonymity of the data, privacy protection, and the possibility of giving up in the middle had been explained to the study participants. The general characteristics and homogeneity of the subjects are shown in Table 1.

Yoga training program

Details regarding Asana composition, meditation, and mind expression were explained through conduct of an expert meeting consisting of one sports psychology professor, one doctor in sports psychology, one representative of the association, and three yoga and meditation leaders. The main yoga movements include mountain posture, warrior posture, triangular posture, cobra posture, sphinx posture, cat & cow posture, and wind-out posture. It is characterized by a movement that causes the chest to open wide. Scheer et al. (2021) reported that slumped posture was found to increase muscle tension that results in negative emotions. Canales et al. (2010) suggested an association of depression with emotions and postures, and that chest-opening poses such as an upright body posture induced positive emotions. Based on the findings of these studies, yoga poses used in this program mainly consisted of

Table 2. Yoga training program

Session	Meditation (30 min) & mind expression		Yoga (60 min)	Breath (30 min)
1,2	Emotion	Think about the emotions you remember from the past week.	Breath, Baddha Konasana, Marjaryasana, Bitilasana, Adho Mukha Svanasana, peason Pose, Eka Pada Rajakapotasana, Pavatasana, Ustrasana, Bhujangasana, Pavanamuktasana, Savasana (Put a block on your back)	Breathing meditation
3	Cause	Think about whether there has been a problem for a week and think about the cause.	Breath, Pavatasana, Vyaghrasana, Phalakasana, Dhanurasana, Adho Mukha Svanasana, Marjaryasana, Bitilasana, Bhujangasana, Virabhadrasana, Utthita Trikonasana Paschimottanasana, Pavanamuktasana, Savasana (Put a block on your back)	Breathing meditation
4	Self-optimism	Recall yourself who was successful in the past. Think about yourself who was happy.	Breath, Eka Pada Rajakapotasana, peason Pose, Adho Mukha Svanasana, Bhujangasana, Marjaryasana, Bitilasana, Matsyasana, Eka pada Jathara Parivarttanasana, Halasana, Pavanamuktasana, Savasana (Put a block on your back)	Breathing meditation
5	Control	Practice stopping over the past week with regard to the emotions you remember.	Breath,Tadasana, Peason Pose, Eka Pada Rajakapotasana, Krounchasana, Paschimottanasana, Halasana, Bhujangasana, Adho Mukha Svanasana, Phalakasana, Dhanurasana, Pavanamuktasana, Savasana (Put a block on your back)	Breathing meditation
6	Positivity	Recall yourself who was successful in the past. Think about yourself who was happy. Imagine yourself successful in the future.	Breath, Pavatasana, Vyaghrasana, Phalakasana, Dhanurasana, Adho Mukha Svanasana, Marjaryasana, Bitilasana, Bhujangasana, Virabhadrasana, Utthita Trikonasana Paschimottanasana, Pavanamuktasana, Savasana (Put a block on your back)	Breathing meditation
7,8	Thankful	Find what you are grateful for. Hug yourself. Think of a person who is grateful to himself.	Breath, Eka Pada Rajakapotasana, Peason Pose, Adho Mukha Svanasana, Bhujangasana, Marjaryasana, Bitilasana, Matsyasana, Eka Pada Jathara Parivarttanasana, Halasana, Pavanamuktasana, Savasana (Put a block on your back)	Breathing meditation

chest-opening movements in every training session (Table 2). The completed program was conducted face-to-face for 10 single mothers in the participating group from September to November 2020. The time required for each session was 120 min, 30 min for meditation and mind expression, 60 min for yoga Asana, 30 min for meditation and breathing.

Research tools

Center for Epidemiological Studies Depression Scale (CES-D)

The CES-D developed by Radloff (1977) was used as an appropriate tool for measurement of depression in single mothers before and after yoga training. This scale consists of 20 questions asking about depressive symptoms one week ago; regarding the criteria for determining depression. Less than 15 points is considered normal, 16–20 points is considered low depression, 21–24 is considered severe depression, and 25–60 is considered severe depression. As a result of verifying the reliability, Cronbach alpha was 0.852.

Korean Resilience Quotient (KRQ-53)

The KRQ-53 developed by Shin et al. (2009) according to the domestic situation was used for measurement of the resilience of single mothers before and after yoga training. This scale consists of 56 questions asking about self-regulation ability, interpersonal relationship, and positivity; a total of 35 questions were used in the study, excluding 18 questions about interpersonal relationships. Because some of the contents of the interpersonal question could be regarded as sensitive to single mothers, such as 'other people's evaluation and interest', they were excluded through consultation between researchers. In the current study, reliability calculated using Cronbach alpha was 0.592 for emotional regulation, 0.695 for impulse control, 0.688 for cause analysis skill, 0.587 for self-optimism, 0.864 for life satisfaction, 0.778 for appreciate, and 0.881 for resilience.

Data analysis

Statistical data analysis was performed using the IBM SPSS Statistics ver. 21.0 (IBM Co., Armonk, NY, USA). First, calculation of Cronbach alpha was performed to verify the reliability of the scale. Second, an independent sample *t*-test was performed to determine the homogeneity of the yoga training program participating group and the control group. Third, a paired *t*-test was performed to verify the difference before and after application of the yoga training program between the participating group and the control group.

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Table 3. Changes in resilience and depression after yoga training (n = 20)

Factor	Group	No.	Pre	Post	*t*	*P*-value	*z*	*P*-value
Depression	PG	10	23.6 ± 5.91	12.9 ± 4.55	4.352	0.002**	-2.67	0.008**
	CG	10	25.5 ± 7.73	26.6 ± 8.77	-0.813	0.437	-0.77	0.442
Resilience								
Overall resilience	PG	10	119 ± 13.05	139 ± 5.21	-4.031	0.003**	-2.70	0.007**
	CG	10	115 ± 14.20	113 ± 9.86	-0.299	0.771	-0.41	0.683
Self-regulation								
Emotional control	PG	10	19.3 ± 3.83	22.7 ± 1.49	-2.915	0.017*	-2.30	0.021*
	CG	10	18.8 ± 2.97	18.2 ± 2.74	0.592	0.568	-0.49	0.622
Impulse control	PG	10	19.7 ± 2.79	23.9 ± 2.55	-3.956	0.003**	-2.55	0.011*
	CG	10	18.9 ± 3.14	18.2 ± 3.01	0.857	0.414	-0.69	0.491
Cause analysis	PG	10	20.5 ± 3.40	24.1 ± 3.07	-2.158	0.038*	-2.04	0.041*
	CG	10	20.8 ± 4.02	21.6 ± 2.67	-0.840	0.423	-1.66	0.096
Positivity								
Self-optimism	PG	10	21.7 ± 3.52	22.9 ± 1.91	-0.700	0.502	-0.491	0.623
	CG	10	22.3 ± 3.86	20.1 ± 2.51	0.677	0.515	-0.564	0.573
Life satisfaction	PG	10	14.8 ± 4.10	19.9 ± 3.10	-1.770	0.036*	-2.50	0.032*
	CG	10	12.5 ± 3.47	13.7 ± 2.98	-1.857	0.096	-0.41	0.082
Thankful	PG	10	23.9 ± 3.51	26.4 ± 2.31	-1.912	0.037*	-2.67	0.047*
	CG	10	21.9 ± 2.76	21.4 ± 3.02	-0.772	0.460	-0.42	0.674

Values are presented as mean ± standard deviation.
PG, participating group; CG, control group.
*P < 0.05. **P < 0.01.

RESULTS

A corresponding sample *t*-test was performed for comparison of the difference in scores for depression and resilience before and after participation in the yoga training program. As a result, statistically significant differences were observed with regard to depression (t = 4.352, P < 0.01) and resilience (t = -4.031, P < 0.01) of the participating group, which were significant with regard to emotional control (t = -2.915, P < 0.05), impulse control (t = -3.956, P < 0.01), cause analysis (t = -2.158, P < 0.05), life satisfaction (t = -1.77, P < 0.05), and thankful (t = -2.440, P < 0.05) factors. However, the average score (M = 22.9) for the self-optimism factors of the program participating group was higher than before the program participation (M = 21.7), but without statistical significance. On the other hand, in the control group, no statistically significant difference was observed with regard to depression, overall resilience, and subfactors.

The Wilcoxon test was performed in order to confirm the results of the paired *t*-test by assuming nonnormal distribution due to small sample size. Significance probabilities are shown in Table 3. The results of the Wilcoxon test were comparable to those of the parametric paired *t*-test.

DISCUSSION

This study was conducted in order to confirm the effectiveness of the yoga training program in reducing depression and improving resilience of single mothers. The discussion based on the research results is as follows.

First, based on the finding that respiratory exercise activates the aesthetic nerve and helps regulate the autonomic nervous system. this study provided training in yoga breathing with the aim of reducing depression in unmarried mothers (Henje Blom et al., 2014). Depressed people usually bend their heads, so that the spine is curled forward, and breathing is not smooth due to the tilt of the chest. Tweeddale et al. (1994) reported that regular breathing causes changes in metabolism and is effective for improvement of psychological symptoms such as depression. Based on the report by Taylor et al. (2010) and Muehsam et al. (2017), breathing and exercise affect the musculoskeletal system, cardiovascular system, and immune function, and also promote positive change in emotional well-being. These results support the findings of this study, which confirmed the effect of reducing depression through chest-opening movements and breathing training that aids breathing. Single mothers in the participating group were able to focus on

breathing naturally through repetition of chest-opening movements, and as the session passed, the time they had to focus on themselves increased. In fact, for single mothers in the participating group the depression score measured after nine sessions of breathing training had changed to the normal range (M = 12.9), which proved its effectiveness in lowering depression through breathing.

Second, the single mothers in the participating group did not perform the Asana movement properly at first, however, with repeated performance they gradually got used to it. It is thought that through this process of focusing only on Asana movement training, the ability of unmarried mothers to control themselves improved. The results of yoga training for enhancement of self-efficacy and self-esteem of healthy adults were investigated by Deshpande et al. (2009). Trent et al. (2019), who applied 2-month yoga and meditation programs to educational and social service professionals, reported a positive effect on adaptive resilience and psychological and professional well-being. It can be assumed that in this study yoga training had a positive effect on the ability for self-awareness and self-regulation of single mothers.

Third, positive emotions are known to be effective in resolving negative emotions such as depression and promoting resilience and psychological well-being (Taylor et al., 2017). The power of positive feelings, such as gratitude, passion, and hope are closely related to life satisfaction and well-being (Seligman et al., 2005), and happiness reduces negative emotions and maximizes positive emotions through a pleasant past, present pleasure, optimistic and hopeful future (Duckworth et al., 2005). Changing the internal resources of humans in a short period of time is difficult. However, positive expression and practice of one's thoughts against irrational and negative thinking is helpful in achieving positive change of internal resources (Taylor and Conger, 2017). In this study, selection of the topic of meditation was based on the sub-area of resilience, and after meditation, single mothers had time to express their minds.

To date, attempts to investigate improvement of the quality of life through social interest and economic support for single mothers have continued. However, few studies have focused on mental health by recognition of the inner strengths of single mothers through exercise therapy. Follow-up studies should be conducted for application of mental health programs that can be helpful in achievement of positive change in the thoughts and emotions of single mothers and their effectiveness should be investigated.

Finally, this study has several limitations. First, there is a limitation in generalizing the results because only 20 single mothers participated as subjects. In addition, yoga training programs may not be the only factor influencing psychological improvement. For example, the emotional support of the group during yoga training may have an effect on the psychological state.

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

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