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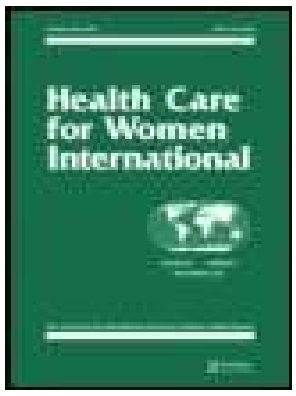

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Safiye Ağapınar Şahin & Mine Bekar

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ABSTRACT

The researchers' aim was to evaluate the impact of laughter yoga on pregnancy symptoms, mental well-being, and prenatal attachment. They carried out this study on 85 pregnant women randomized in a maternity hospital in the Eastern Anatolia Region of Turkey. The researchers collected data using the Pregnant Introduction Form, Pregnancy Symptom Inventory (PSI), Warwick-Edinburgh Mental Well-being Scale (WEMWBS), and Prenatal Attachment Inventory (PAI). After applying the laughter yoga practice, they found that mental well-being and prenatal attachment levels were higher in pregnant women in the experimental group and the difference was statistically significant. Thus, they concluded that laughter yoga was an effective practice in reducing the frequency of pregnancy symptoms and limiting daily activities by pregnancy symptoms and increasing mental well-being and prenatal attachment levels.

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Background

Laughter yoga *is* a unique complementary practice (Takeda et al., 2010). The effects of laughter are physical (Beckman et al., 2007). Researchers have reported that laughter helps release endorphins, known as natural painkillers, in our body and creates a feeling of happiness, and the effects of stress are reduced with the eye contact of laughing people (Jackson, 2007; Kataria, 2011; 2012). In laughter yoga, there is the idea that everyone can laugh for no reason, independently of humor, jokes, or comedy (Kataria, 2011). Laughter is explained by three main theories: superiority, incompatibility, and relaxation theories (Kuru & Kublay, 2017). In the superiority theory, there is the idea that laughter is associated with a sense of pleasure resulting from the misfortune of others. We can come across

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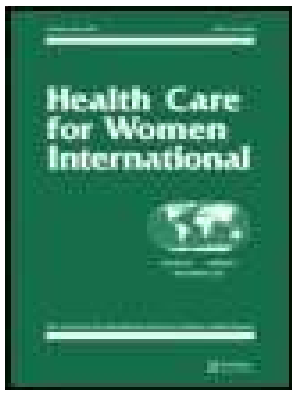

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this theory in the studies by Plato, Aristotle, and Hobbes (McDonald, 2012; Mulder & Nijholt, 2002). Plato asserts that humor is a kind of evil toward people who are considered relatively powerless. Hobbes sees laughter as an abrupt expression of realizing that we are better than others (Mulder & Nijholt, 2002). In the relaxation theory, there is the tendency that laughter originates from dilemmas and the idea that laughter is a way of releasing an individual's repressed energy (McDonald, 2012). The advocates of the incompatibility theory suggest that laughter is an expression of the pleasure we receive from the incompatible (Kulka, 2007). In this theory, laughter is based on nonsense, unexpected events, or irrelevant events (Kuru & Kublay, 2017).

Laughter is beneficial for physiological, psychological, social, and life qualities (Mora-Ripoll, 2010). Laughter yoga is a practice that improves well-being. Researchers have also revealed that laughter yoga increases mental well-being and positive emotions, increases self-esteem and sleep quality (Cha et al., 2012; Han et al., 2017; Ko & Youn, 2011; Namazi Nia et al., 2019; Weinberg et al., 2013), reduces the severity of depression, stress, and anxiety symptoms (Cha et al., 2012; Han et al., 2017; Ko & Youn, 2011; Weinberg et al., 2013). ; In a study performed in the field of obstetrics, the researchers have also identified that laughter yoga reduces postpartum fatigue (Sook et al., 2011), positively influences the immune responses of women in the postpartum period (Ryu et al., 2015), increases mothers' self-esteem, and is effective in coping with anxiety and depression (Kim, 2010).

Similar to traditional yoga, laughter yoga is an exercise in which laughter is added to breathing, yoga, and stress relief techniques (Satish, 2012). Since laughing all the time would be tiring, the thought of taking a break with breathing exercises has combined laughter with breathing exercises used in yoga. In laughter yoga, people benefit from the calming effect of breathing used in yoga on the mind (Kataria, 2011). Meanwhile, breathing exercise also increases the oxygen level in the blood by stimulating blood circulation (Rathfisch, 2015).

In the literature review, the researchers revealed no studies in which laughter yoga alone was used during pregnancy. In a study in which the researchers applied artistic antenatal interventions to pregnant women, such as music, laughter therapy, and note-taking technique, they revealed that these interventions did not have any effects on maternal attachment and had a moderate effect on enhancing general mental health (Kıyak, 2019). Likewise, in studies on yoga during pregnancy, researchers have found that yoga reduces preterm births, has a positive effect on birth weight, decreases intrauterine growth retardation caused by pregnancy-induced hypertension, reduces perceived stress and constant anxiety of

third-trimester pregnant women, enhances prenatal attachment and psychosocial health level of pregnant women (Akarsu & Rathfisch, 2018; Beddoe et al., 2009; Narendran et al., 2005), and affects reducing anxiety and depression in pregnant women at a high risk (Gallagher et al., 2020). As seen from previous studies, yoga positively affects the general health level of pregnant women. These effects can also be observed in laughter yoga, in which laughter is added to techniques similar to those in yoga.

Considering the physiological, psychological, and social effects of the gestation period and the relationship of all these effects with prenatal attachment, it can be assumed that laughter yoga can be beneficial for pregnant women.

The researchers' aim is to determine the impact of laughter yoga on pregnancy symptoms, mental well-being, and prenatal attachment. The World Health Organization emphasizes the importance of effective physiological, social, cultural, emotional, and psychological support in care during pregnancy (World Health Organization, 2016). In this respect, it is possible to provide this support to pregnant women with the study results. Furthermore, these results will contribute to the scientific literature by creating evidence-based information that midwives can use in their practices.

Material and methods

Study design and sampling

The researchers conducted this randomized controlled experimental trial in a pregnancy school affiliated to a maternity hospital in the Eastern Anatolia Region of Turkey between September 19, 2019, and March 06, 2020. Two hundred ninety people enrolled in the pregnancy school in question.

Inclusion criteria

- Pregnant women above 18 years of age,
- Having a spontaneous pregnancy,
- Not having a multiple and risky pregnancy,
- Not having undergone an abdominal operation,
- Not having a diagnosed physiological and mental illness,
- Not having any fetal anomaly and intrauterine growth retardation detected by ultrasonography,
- Not having practiced laughter yoga before,
- Those who accepted to participate in the study were enrolled in the research.

The researchers determined the study sample as 84 people in total, 42 in the experimental group and 42 in the control group, with an effect size of 0.73, a confidence interval of 95%, and a type 1 error of 0.05, based on the data of the study performed by Namazi Nia et al. and entitled "The impact of laughter yoga on mental well-being of cancer patients under chemotherapy" (Namazi Nia et al., 2019). The groups included 95 people, 48 in the experimental group and 47 in the control group. Pregnant women who enrolled in the pregnancy school, met the sample selection criteria, and accepted to participate in the study were assigned to the groups using the lottery method. The researchers determined the day when the groups would receive training using a similar lottery. While the pregnant women in the control group received routine pregnancy training, the pregnant women in the experimental group received routine pregnancy training and performed laughter yoga practices. Since four people did not attend the pregnancy school regularly and six people gave birth, the researchers excluded a total of ten people from the study. The study sample consisted of 85 pregnant women (Figure 1). In the post-power analysis based on the PSI post-test scores of pregnant women after the study, $\alpha = 0.05$, the researchers calculated the power as 87.4%. Furthermore, they accepted the statistical significance level as $p < 0.05$.

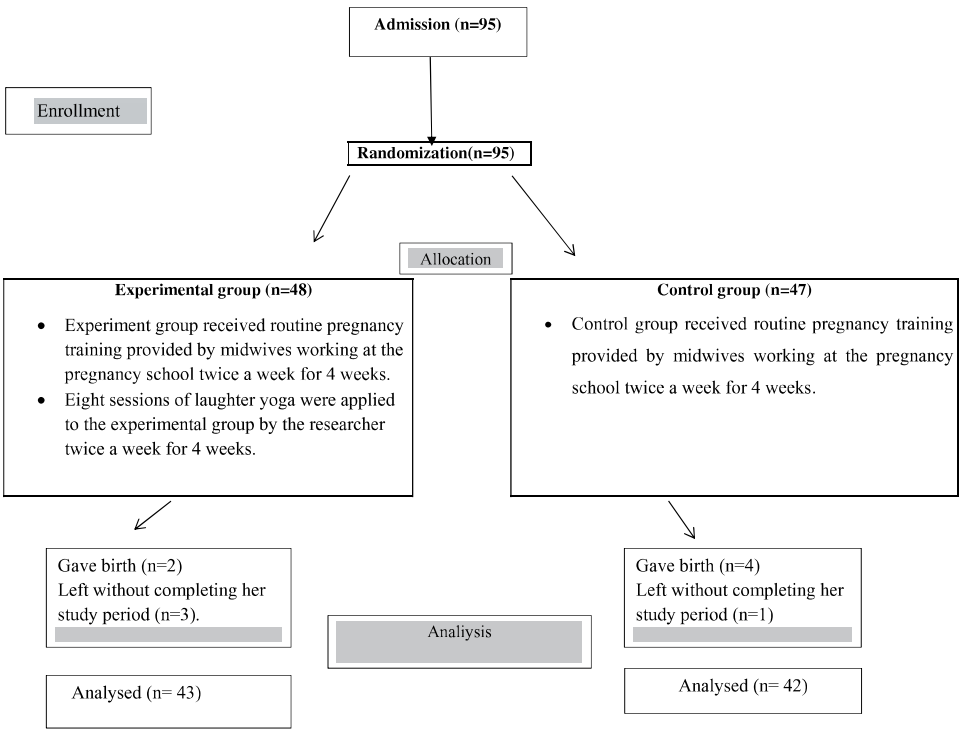

Figure 1. Flow chart of the study.

Instruments

The researchers collected data using the Pregnant Introduction Form, Pregnancy Symptom Inventory (PSI), Mental Well-being Scale (WEMWBS), and Prenatal Attachment Inventory (PAI).

Pregnant Introduction Form

This form, created by the researcher, consists of 8 questions about characteristics such as age, educational status, employment status, socio-economic status, family type, pregnancy planning status, gestational week, and infant's sex.

Pregnancy Symptom Inventory

Foxcroft et al. (2013) developed the above-mentioned inventory to evaluate the frequency of pregnancy symptoms and the limitation of daily activities, and Gürkan and Güloğlu (2020) performed its validity and reliability studies in Turkish. The inventory consists of 42 items. It is a tool to evaluate the frequency of symptoms experienced by pregnant women during pregnancy and the limitation of daily activities by these symptoms. It is a four-point Likert-type scale. In the first part of the PSI, consisting of two parts, the frequency of symptoms experienced during pregnancy is evaluated using a 4-point Likert-type scale. Each symptom is scored between 0 and 3 and evaluated as never (0), rarely (1), occasionally (2), and often (3). The total score that can be obtained from the first part of the PSI varies between 0 and 126. The increase in the score from the PSI is interpreted as the increased frequency of symptoms, and the decrease in the score is interpreted as the decreased frequency of symptoms.

In the second part of the PSI, the status of limiting daily activities by symptoms is evaluated using a 3-point Likert-type scale. The limitation of daily activities by each symptom is scored between 1 and 3 and evaluated as not limiting (1), little limiting (2), and very limiting (3). The total score that can be obtained from the second part of the PSI varies between 42 and 126. As the score obtained from the second part of the PSI increases, daily activities are limited by symptoms, and symptoms do not limit daily activities as the score decreases. Cronbach's alpha coefficient of the inventory *is* 0.82.

Warwick-Edinburgh mental well-being scale

Keldal (2015) performed the Turkish validity and reliability studies of the scale developed by Tennant et al. (2007) to measure mental well-being. The scale is a 14-item self-report scale. The WEMWBS deals with

individuals' positive mental health by including psychological and subjective well-being. The scale is a five-point Likert-type scale, and minimum 14 and maximum 70 points can be obtained from the scale. The scale's scoring is as follows: I strongly disagree (1), I disagree (2), I slightly agree (3), I agree (4), and I strongly agree (5). All items of the scale are positive. High scores obtained from the scale demonstrate high mental well-being. The scale's Cronbach's alpha coefficient is 0.89 in the validity and reliability study.

Prenatal Attachment Inventory

Researchers use the PAI, developed by Muller (1993), to explain the thoughts, feelings, and situations experienced by a woman during pregnancy and determine the level of attachment to the infant in the prenatal period. Yılmaz and Beji (2013) performed the validity and reliability studies of the PAI. The PAI comprises 21 items. Each item represents a four-point Likert-type item that can be scored between 1 and 4. It is scored as never (1), sometimes (2), often (3), and always (4). A minimum of 21 and a maximum of 84 points can be obtained from the scale. The increase in the score obtained by a pregnant woman indicates that the level of attachment also increases. Cronbach's alpha value of the internal consistency coefficient of the PAI was $\alpha = 0.71$.

Data collection

The researchers included two groups, control and experimental, in the study. The group undergoing laughter yoga training formed the experimental group, while the group undergoing routine pregnancy training constituted the control group. The researchers randomized the pregnant women enrolled in the research using the lottery method and determined the day when the groups would receive training as a result of a similar lottery. The researcher herself provided laughter yoga training. Midwives working in the pregnancy school provided the routine pregnancy training to both groups. They applied the Pregnant Introduction Form, Pregnancy Symptom Inventory (PSI), Mental Well-being Scale (WEMWBS), and Prenatal Attachment Inventory (PAI) to the pregnant women in the experimental and control groups at the first stage (pretest) and applied these forms to both groups again at the end of four weeks (post-test).

Midwifery interventions

Midwifery interventions applied to the experimental group

The researchers conducted the laughter yoga practice with five experimental groups (the number of people in the group was 9, 8, 7, 9, and 10). They implemented laughter yoga in the experimental group after the participants

received routine prenatal training at the pregnancy school. The researchers organized a 45-minute laughter session for the pregnant women in the experimental group and held eight 45-min sessions of laughter yoga in the experimental group twice a week for 4 weeks.

In the laughter sessions, applied for 4 weeks, the pregnant women were provided with 30 minutes of deep breathing exercises and milk shake, shoulders anti-stress technique, and laughter exercises such as laughter with mobile phones, laughing even when angry, and crying and laughing, and 15 minutes of laughter meditation and relaxation. The laughter yoga session applied to pregnant women consists of the sections specified in the studies by Kataria (2011) and Kataria (2012). In the laughter yoga session specially adapted to pregnant women, the researchers used the shoulder anti-stress technique, created by the master instructor of laughter yoga "Eser Mutlu" based on the idea of being creative in the study by Kataria (2012), and since crying and laughing have the same frequency, they combined these two exercises when using them in pregnant women. The researchers arranged the end of the session specifically for pregnant women.

Midwifery interventions applied to the control group

Pregnant women in the control group underwent the routine pregnancy training provided by midwives working at the pregnancy school twice a week for 4 weeks.

Data analysis

The researchers used the IBM SPSS Statistics 22 statistical package program to analyze the research data. They provided percentage, arithmetic mean, and standard deviation values as descriptive statistics. Furthermore, the researchers investigated whether the data were normally distributed by the Shapiro-Wilk normality test and Q-Q graphs and conducted the Wilcoxon signed-rank test to compare two dependent groups in non-normally distributed data, carried out the Mann-Whitney U test to compare two independent groups, performed the Kruskal-Wallis test for the comparison of more than two independent groups, and carried out Spearman's correlation analysis to determine the correlation between the scale scores. They considered the statistical significance level as $p < 0.05$.

Ethical considerations

Before starting the study, the researchers received approval from the Non-Interventional Clinical Research Ethics Committee (2019-05/42) and study permission from the relevant institution (numbered 44827528-604.02).

Results

The researchers presented the comparison of the descriptive characteristics of pregnant women in the experimental and control groups in Table 1. The pregnant women in the experimental and control groups displayed a homogeneous distribution with regard to descriptive characteristics. According to these variables, the researchers identified no statistically significant difference between the groups ($p > 0.05$).

The researchers showed the intra- and intergroup comparison of the pretest-post-test PSI, WEMWBS, and PAI scores of the pregnant women in the experimental and control groups in Table 2. They found no difference between the mean scores of the PSI-1st part, PSI-2nd part, WEMWBS,

Table 1. The comparison of the descriptive characteristics of pregnant women in the experimental and control groups.

	Experiment (n_e=43)		Control (n_c=42)		
Descriptive characteristics	*n*	%	*n*	%	*Test**
Age	$X_e \pm Sd_e = 25.95 \pm 3.35$		$X_c \pm Sd_c = 27.71 \pm 4.15$		
25 years and below	19	44.2	15	35.7	$X^2=0.818$ $p=0.664$
26–30 years	19	44.2	20	47.6	
30 years and over	5	11.6	7	16.7	
Education					
Primary school	6	14.0	3	7.1	$X^2=1.505$ $p=0.471$
High school	9	20.9	7	16.7	
University	28	65.1	32	76.2	
Working status					
Working	11	25.6	12	28.6	$X^2=0.096$ $p=0.756$
Not working	32	74.4	30	71.4	
Income status					
Income more than expense	9	20.9	6	14.3	$X^2=0.660$ $p=0.719$
Balance of income and expense	27	62.8	29	69.0	
Income less than expenses	7	16.3	7	16.7	
Family type					
Nuclear family	42	97.7	38	90.5	$X^2=1.989$ $p=0.158$
Extended family	1	2.3	4	9.5	
Pregnancy trimester					
Second trimester	19	44.2	16	38.1	$X^2=1.064$ $p=0.302$
Third trimester	24	55.8	26	61.9	
Pregnancy planning status					
Planned	35	81.4	29	69.0	$X^2=0.325$ $p=0.568$
Unplanned	8	18.6	13	31.0	
İnfant's sex					
Female	17	39.5	17	40.5	$X^2=1.741$ $p=0.187$
Male	17	39.5	15	35.7	
Not determined	9	20.9	10	23.8	
Total	43	100.0	42	100.0	

*Chi-square Test was applied.

Table 2. The intra- and intergroup comparison of the pretest-post-test PSI, WEMWBS, and PAI scores of the pregnant women in the experimental and control groups.

	Experiment ($n_e = 43$)	Control ($n_c = 42$)		
Scales	$\bar{X} \pm Sd$	$\bar{X} \pm Sd$	*Test**	*r****
PSI-1				*−0.16*
Pretest	47.90 ± 16.25	53.88 ± 19.64	*Z = −1.196 p = 0.232*	
Post-test	44.18 ± 19.56	50.78 ± 17.90	***Z = −1.442 p = 0.042***	
*Test***	*Z = −1.830 p = 0.067*	*Z = −1.653 p = 0.109*		
PSI-2				*−0.35*
Pretest	35.27 ± 14.69	41.09 ± 17.20	*Z = −2.032 p = 0.149*	
Post-test	32.27 ± 15.13	42.95 ± 16.87	***Z = −3.210 p = 0.001***	
*Test** r****	***Z = −2.135 p = 0.033 0.33***	*Z = −0.814 p = 0.416 −*		
				−0.24
WEMWBS				
Pretest	56.83 ± 9.96	53.85 ± 9.73	*Z = −1.562 p = 0.118*	
Post-test	59.51 ± 10.51	54.19 ± 11.34	***Z = −2.230 p = 0.026***	
*Test** r****	***Z = −2.841 p = 0.004 0.43***	*Z = −0.319 p = 0.750 −*		
PAI				*−0.33*
Pretest	67.48 ± 9.24	66.52 ± 9.14	*Z = −0.590 p = 0.555*	
Post-test	70.69 ± 10.15	63.00 ± 12.51	***Z = −3.066 p = 0.002***	
*Test** r****	***Z = −2.482 p = 0.013 0.38***	*Z = −1.895 p = 0.058 −*		

*Mann Whitney U Test was applied.
**Wilcoxon Signed Ranks Test was applied.
***Effect Size ($r = Z/\sqrt{n}$).

and PAI of the pregnant women in the experimental and control groups before the study ($p > 0.05$).

The mean scores of the PSI-1st part and PSI-2nd part of the women in the experimental group were lower after the study, and the difference was statistically significant ($p = 0.042$, $p = 0.001$, respectively). The WEMWBS and PAI mean scores of the pregnant women in the experimental group were higher after the study, and the difference was statistically significant ($p = 0.026$, $p = 0.002$, respectively).

The researchers determined that the PSI-1st part mean scores of the pregnant women in the experimental group did not change after the study, the PSI-2nd part mean scores decreased, and the difference was statistically significant ($p = 0.067$, $p = 0.033$, respectively). The WEMWBS and PAI mean scores of the pregnant women in the experimental group increased after the study, and the difference was statistically significant ($p = 0.004$, $p = 0.013$, respectively).

There was no statistical difference between the PSI-1st part, PSI-2nd part, WEMWBS, and PAI mean scores of the pregnant women in the control group after the study ($p > 0.05$).

The correlation between the pretest and post-test PSI, WEMWBS, and PAI scores of the pregnant women is shown in Table 3. The researchers determined a moderately positive, statistically significant correlation between the PSI-1st part pretest score and the PSI-1st part and PSI-2nd part post-test scores ($p \leq 0.001$). Moreover, they revealed a moderately positive, statistically significant correlation between the PSI-2nd part pretest

Table 3. The correlation between the pretest and post-test PSI, WEMWBS, and PAI scores of the pregnant women.

		Posttest			
Scales		PSI-1.	PSI-2.	WEMWBS	PAI
Pretest	PSI-1.	$r=0.692^{**}$ $p\leq0.001$	$r=0.516^{**}$ $p\leq0.001$	$r=-0.177$ $p=0.106$	$r=-0.083$ $p=0.452$
	PSI-2.	$r=0.509^{**}$ $p\leq0.001$	$r=0.597^{**}$ $p\leq0.001$	$r=-0.174$ $p=0.110$	$r=-0.044$ $p=0.692$
	WEMWBS	$r=-0.024$ $p=0.831$	$r=-0.170$ $p=0.120$	$r=0.668^{**}$ $p\leq0.001$	$r=0.261^{*}$ $p=0.016$
	PAI	$r=0.147$ $p=0.180$	$r=0.049$ $p=0.657$	$r=0.143$ $p=0.193$	$r=0.535^{**}$ $p\leq0.001$
Post-test	PSI-1.	–	$r=0.695^{**}$ $p\leq0.001$	$r=-0.138$ $p=0.207$	$r=-0.051$ $p=0.640$
	PSI-2.	$r=0.695^{**}$ $p\leq0.001$	–	$r=-0.312^{**}$ $p=0.004$	$r=-0.138$ $p=0.207$
	WEMWBS	$r=-0.138$ $p=0.207$	$r=-0.312^{**}$ $p=0.004$	–	$r=0.402^{**}$ $p\leq0.001$
	PAI	$r=-0.051$ $p=0.640$	$r=-0.138$ $p=0.207$	$r=0.402^{**}$ $p\leq0.001$	–

*Spearman correlation analysis was used.

score and the PSI-1st part and PSI-2nd part post-test scores ($p\leq0.001$). The researchers identified a moderately positive, statistically significant correlation between the WEMWBS pretest score and the WEMWBS post-test score and a weakly positive, statistically significant correlation between the WEMWBS pretest score and the PAI post-test score ($p\leq0.001$, $p=0.016$, respectively). There was a moderately positive, statistically significant correlation between the PAI pretest score and the PAI post-test score ($p\leq0.001$).

The researchers determined a moderately positive, statistically significant correlation between the PSI-1st part post-test score and the PSI-2nd part post-test score ($p\leq0.001$). Additionally, they found a moderately positive, statistically significant correlation between the PSI-2nd part post-test score and the PSI-1st part post-test score and a weakly negative, statistically significant correlation between the PSI-2nd part post-test score and the WEMWBS post-test score ($p\leq0.001$, $p=0.004$, respectively). There was a weakly positive, statistically significant correlation between the WEMWBS post-test score and the PAI post-test score ($p\leq0.001$).

Discussion

Pregnancy is a period of physiological, psychological, and social changes. Pregnant women experience many pregnancy-related symptoms such as nausea, vomiting, heartburn, frequent urination, and psychological changes during this period (Beji & Dişsiz, 2015; Taşkın, 2016). Researchers use many complementary and alternative therapies to support the health and well-being of pregnant women in this process (Peprah et al., 2017). They also use these therapies to alleviate pregnancy symptoms and improve the

psychosocial health of pregnant women (Field et al., 2004; 2008; Flynn et al., 2016; Furtado et al., 2019; Jallo et al., 2014; Moriarty, 2017). Since laughter yoga, one of the complementary practices, improves physiological, psychological, and social health (Mora-Ripoll, 2010; Mora-Ripoll, 2011; Tremayne & Sharma, 2019; Yim, 2016), pregnant women may also benefit from its positive effects.

The frequency of pregnancy symptoms (PSI-1st part) and the status of limiting daily activities by these symptoms (PSI-2nd part) after the laughter yoga practice were lower in the pregnant women in the experimental group than in the control group. The mental well-being and prenatal attachment levels of the pregnant women in the experimental group increased after the laughter yoga practice (Table 2).

Researchers have stated that laughter has physiological, psychological, and social benefits (Mora-Ripoll, 2011; Savage et al., 2017) and has at least one positive effect on well-being (Gonot-Schoupinsky & Garip, 2018). In studies on laughter yoga, researchers have revealed that laughter positively influences general health and well-being and leads to improved physical health and quality of life, increased level of subjective happiness, development of positive emotions, improvement of sleep disorders, a decrease in anxiety, depression and pain, a decrease in heart rate variability, and decreased postpartum fatigue (Beckman et al., 2007; Ko & Hyun, 2013; Ko & Youn, 2011; Law et al., 2018; Lee et al., 2020; Lee & Lee, 2020; Sook et al., 2011; Yazdani et al., 2014; Yu & Kim, 2009). In the present study, the researchers proved hypothesis H1,1 stating that "laughter yoga has an effect on pregnancy symptoms," hypothesis H2,1 stating that "laughter yoga has an effect on mental well-being," and hypothesis H3,1 stating that "laughter yoga has an effect on prenatal attachment." These results are consistent with the information in the literature.

In the literature, researchers have indicated pregnancy as a period of significant social, biophysical, and psychological changes (Taşkın, 2016). Pregnancy is a cultural phenomenon that expresses different feelings for all women. For most women, pregnancy is a period when they change their lifestyles and adapt (Raynor & England, 2010). During this period, 13.6% of women experience at least one pregnancy-related problem (Dönmez et al., 2018). Pregnancy-related physical and mental problems may adversely affect a woman's quality of life (Can et al., 2019). During this period, midwives provide information to pregnant women and support them by offering options regarding health care services. These options include traditional therapies and some complementary alternative therapies that can support the health and well-being of pregnant women (Peprah et al., 2017). Savage et al. (2017) stated that health care professionals could use the power of laughter to promote health. In another study, the researchers concluded that laughter yoga was a practice that could be used in

health promotion programs (Miles et al., 2016). Considering all these results, non-pharmacological laughter yoga, which pregnant women can easily apply, can be a supportive practice for midwifery practices.

The frequency of pregnancy symptoms (PSI-1st part) experienced by the pregnant women in the experimental group decreased after the laughter yoga practice (Table 2). The decrease in pregnancy symptoms may be due to the positive impact of laughter on health. Researchers have revealed the positive impacts of laughter yoga on general health and well-being, such as improved physical health, a decrease in sleep disorders, and decreased postpartum fatigue (Han et al., 2017; Sook et al., 2011; Yazdani et al., 2014), supporting the results of our study.

The researchers determined that the status of limiting daily activities by symptoms (PSI-2nd part) of the pregnant women in the experimental group decreased after the laughter yoga practice (Table 2). In other words, the impact on their quality of life decreased. Ko and Hyun (2013) revealed the effects of laughter yoga on quality of life and determined that laughter yoga increased quality of life. Lee et al. (2020) examined the impact of laughter on women with gynecological cancer and determined that physical, emotional, and functional well-being, among the health-related quality of life sub-dimensions, were positively affected by laughter training. Likewise, Ko and Youn (2011) concluded in their study that one hour of simulated laughter per week had positive effects on sleep quality. The results of these studies are consistent with our study.

Researchers have conceptualized mental health in different ways, as positive emotions such as feelings of happiness, a personality trait that includes self-esteem and psychological sources of competence, and the capacity to cope with difficulties (World Health Organization, 2004). Pregnancy and childbirth are psychological, biological, and social stress factors in a woman's life. These two conditions are accepted as important risk factors in the development and exacerbation of mental health problems (Goebert et al., 2007; Gul et al., 2019). It is very important to protect and improve mental health during pregnancy. Especially midwives play an essential role in improving and evaluating pregnant women's mental health (Buist et al., 2008; Vik et al., 2009). Laughter yoga can be one of the practices that midwives can use to improve mental health.

In our study, the mental well-being level was considerably higher in the pregnant women in the experimental group after the laughter yoga practice (Table 2). Likewise, in the studies conducted with different groups, the level of mental well-being was high in the experimental group to which researchers applied laughter yoga (Miles et al., 2016; Namazi Nia et al., 2019). The results of these studies support the findings of our study.

Many researchers have revealed that laughter affects mental health positively. Kıyak (2019) applied artistic antenatal interventions to pregnant

women and found that interventions such as music, laughter therapy, and the self-note-taking technique were effective in improving general mental health. Researchers determined that there was an improvement in mental health, a reduction in the levels of stress, anxiety, and depression in groups to which they applied laughter yoga (Bressington et al., 2019; Cha et al., 2012; Han et al., 2017; Kim, 2010; Kim et al., 2015).

In their literature review, Bahari and Lorica (2019) evaluated the impacts of laughter yoga on mental health and revealed that laughter yoga had therapeutic impacts on mental health, such as developing positive emotions, stimulating cognitive functions, decreasing stress, enhancing positive coping, and enhancing interpersonal relationships.

Mental health also contributes to individuals' quality of life (World Health Organization, 2004). Considering this situation, one of the methods to increase the quality of life of pregnant women may be to improve their mental health. Midwives take a key part in improving the quality of women's pregnancy-related experiences throughout the perinatal period. With these roles, they increase women's emotional health and well-being (Jomeen & Bateman, 2015). The use of laughter yoga in midwifery may also be a good alternative for enhancing pregnant women's mental health. The studies conducted and the information in the literature support our study.

Prenatal attachment levels increased in the pregnant women in the experimental group after the laughter yoga practice (Table 2).

Prenatal attachment is affected by psychological conditions experienced by pregnant women during pregnancy, such as psychosocial health level, the level of awareness, depression, anxiety, distress, and fear of childbirth (Alhusen et al., 2012; Coşkun et al., 2019; Gürol et al., 2020; Hopkins et al., 2018; Karakoç & Özkan, 2017; Srivastava & Bhatnagar, 2019; Tsao et al., 2019; Tunçel & Süt, 2019). In our study, the mental health level and prenatal attachment level increased after laughter yoga. Increasing the mental health level through laughter yoga may have increased prenatal attachment as a secondary effect.

Researchers have revealed that maternal-fetal attachment training increases mental health and attachment (Abasi et al., 2013). Likewise, telling pregnant women to touch their abdomen at the end of the laughter yoga session in our study and enabling them to imagine that they took the infant in their arms may have increased prenatal attachment by providing the effect in the maternal-fetal attachment training conducted in this study.

In the study, as the level of mental well-being (WEMWBS post-test) increased, the level of prenatal attachment (PAI post-test) also increased (Table 3). There are many studies supporting this result (Alhusen et al., 2012; Coşkun et al., 2019; Karakoç & Özkan, 2017; Tunçel & Süt, 2019; Zhang et al., 2020).

In our study, mental well-being and prenatal attachment levels were higher in the pregnant women in the experimental group after the laughter yoga practice (Table 2). In line with this finding, since both mental well-being and prenatal attachment levels increase together, there may be a positive correlation between mental well-being and prenatal attachment. Laughter yoga applied to the experimental group may also be a practice supporting a positive correlation between mental well-being and prenatal attachment.

Limitations and generalizability

It is the study's limitation that the researchers did not include first-trimester pregnant women in the study. It is possible to generalize the results obtained from the study only to the sample group in this research.

Conclusion and recommendations

The researchers revealed that laughter yoga was an effective practice in reducing the frequency of pregnancy symptoms and limiting daily activities by pregnancy symptoms and increasing mental well-being and prenatal attachment levels. The researchers suggest integrating laughter yoga into pregnancy schools and using it as a midwifery practice. According to the results obtained in the study, laughter yoga is an easy-to-apply, time- and cost-effective method to reduce pregnancy symptoms, increase mental well-being and prenatal attachment. Especially midwives working in the field of obstetrics are recommended to attend laughter yoga training so that they can include this method in their care. Midwives can contribute to improving women's health by using this method. The researchers found no studies in the literature in which only laughter yoga was used and its effect was determined. Therefore, they recommend conducting studies on different effects of laughter yoga on pregnancy. By conducting studies on the effects of laughter yoga training given during pregnancy, childbirth, and the postpartum period, researchers may also provide an evidence-based approach to improve women's health, contributing to the literature.

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Author contributions

Study design: SAS, MB
Data collection: SAS
Data analysis: SAS, MB

Study supervision: SAS, MB
Manuscript writing: SAS, MB
Critical revisions for important intellectual content: SAS, MB
All authors approved the final version for submission.

Conflict of interest statement

The authors have declared no conflict of interest.

Declaration of conflict of interest

There is no conflict of interest between any person or any institution.

Ethical approval

Before starting the study, approval from Sivas Cumhuriyet University Non-Interventional Clinical Research Ethics Committee and study permission from the relevant institution were obtained.

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