ORIGINAL RESEARCH ARTICLE

Effects of laughter therapy versus walking on prenatal attachment and mental well-being of pregnant women: A randomized controlled study

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Abstract

This study aimed to comparatively reveal the effects of laughter therapy versus walking on prenatal attachment and mental well-being of pregnant women. The sample was identified through snowball sampling among eligible pregnant women and subsequently randomized into the laughter therapy and walking groups using random.org. This randomized controlled experimental study was conducted with 78 pregnant women (40 received laughter therapy, 38 walked regularly) in their 20-30th weeks of pregnancy. The study was conducted between April 25th, 2024, and June 25th, 2024. The pregnant women in the laughter therapy group received 20–30-minute laughter therapy sessions once a week for 8 weeks. The pregnant women in the walking group were given a walking program to follow for 8 weeks. In the laughter therapy group, the post-test Prenatal Attachment scores and the mean Mental Well-Being scores were found to be statistically significantly higher than in the walking group (Cohen d=0.59 ≈ 0.50; Cohen d=0.94 ≈ 1.0, respectively). We concluded that pregnant women who received laughter therapy had higher levels of prenatal attachment and mental well-being than those who walked. *(Afr J Reprod Health 2026; 30 [5]:34 -45).*

Keywords: laughter therapy, maternal-fetal relations, mental health, nursing, pregnancy, walking

Résumé

Cette étude visait à comparer les effets de la rhétorique et de la marche sur l'attachement prénatal et le bien-être mental des femmes enceintes. L'échantillon a été constitué par la méthode d'échantillonnage en boule de neige parmi les femmes enceintes éligibles, puis réparti aléatoirement en deux groupes : thérapie par le rire et marche, à l'aide du site random.org. Cette étude expérimentale randomisée contrôlée a été menée auprès de 78 femmes enceintes (40 ayant bénéficié de la rhétorique et 38 ayant pratiqué la marche régulière) entre la 20e et la 30e semaine de grossesse. L'étude s'est déroulée du 25 avril au 25 juin 2024. Les femmes enceintes du groupe rhétorique ont bénéficié de séances de 20 à 30 minutes de rhétorique une fois par semaine pendant 8 semaines. Les femmes enceintes du groupe marche ont suivi un programme de marche pendant 8 semaines. Dans le groupe rhétorique, les scores d'attachement prénatal post-test et les scores moyens de bien-être mental étaient statistiquement significativement plus élevés que dans le groupe marche (D de Cohen = 0,59 ≈ 0,50 ; d de Cohen = 0,94 ≈ 1,0, respectivement). Nous avons conclu que les femmes enceintes qui bénéficiaient d'une thérapie par le rire présentaient des niveaux d'attachement prénatal et de bien-être mental plus élevés que celles qui marchaient .*(Afr J Reprod Health 2026; 30 [5]: 34-45).*

Mots-clés: thérapie par le rire, relations materno-fœtales, santé mentale, allaitement, grossesse, marche

Introduction

Pregnancy is a process that causes significant anatomical, physiological, hormonal and psychological changes in the female body.[1,2] The prenatal period represents the term which begins with the first days of pregnancy and continues until delivery.[3-5] The mother's being less anxious throughout this period, resorting to stress coping methods, starting breastfeeding as early as possible and maintaining it are good indicators of prenatal attachment.[6] Prenatal attachment throughout pregnancy is further associated with the child's positive cognitive and socio-emotional development in the long term.[7] On the contrary, failure to achieve the expected emotional bond

throughout pregnancy may lead to complications such as anxiety, worry and depression. The bond and relationship between the mother and the fetus may be affected by many variables such as the woman's demographic characteristics (age, education and income status), personality structure, general health status, pregnancy history, stress, anxiety status and perceived support.[4,8] The woman's ability to accept the changes to her body throughout pregnancy and to transfer positive emotions to her baby constitutes the basis of this bond.[9] Women need support to tolerate the changes throughout pregnancy and to adapt to this new situation. Women should exhibit and adopt health promoting lifestyle profiles throughout pregnancy to experience a healthy process.[10] Current studies in the literature reveal that adaptation to and coping with changes experienced throughout pregnancy vary from woman to woman. It was further argued that the mother's talking to the fetus and interacting with the fetus by touching her belly help develop the prenatal attachment.[11-13]

Laughter therapy is a unique, universal, non-invasive and easily applicable approach. Laughter is reported to accelerate the release of endorphins in the individual, improving the mood, and alleviating the negative consequences of stress.[14-17] Laughter therapy is an intervention performed by inducing laughter behavior for the purpose of treatment and hence achieving the desired life by protecting and improving physical, psychological, social, mental and spiritual functions.[14,18,19] In studies examining physiological effects it was reported that cortisol and epinephrine reduce stress and growth hormone levels, increase lung capacity, improve the immune system and provide muscle relaxation.[14,17] Current studies in the literature argued that laughter therapy is an effective intervention for ensuring adaptation to changes experienced throughout pregnancy, improving mental well-being in the prenatal and postnatal period as well as the prenatal/maternal attachment levels.[3,11,20]

Walking is another important approach to developing health promoting lifestyle profiles throughout pregnancy. It was reported that fetal, maternal and neonatal adverse outcomes are reduced and that maternal and child health is also positively affected for women who engage in physical activity throughout pregnancy.[21-23] Studies on this subject emphasized that physical activity throughout pregnancy has many positive effects on physical health, alleviates anxiety and depression symptoms, improves the mental health and quality of life of women and has an effect on mother-fetus bonding.[1,21,24]

The mother's mental well-being during pregnancy is of great importance in having a healthy pregnancy process and in mother-baby bonding as a continuation of this process after birth. It is suggested that laughter therapy and walking have positive effects on prenatal attachment and mental well-being following physiological, psychological and social changes throughout pregnancy. However, when the literature is examined, it is seen that studies that comparatively address the effects of laughter therapy and walking on prenatal attachment and mental well-being are limited. The lack of evidence comparing the effectiveness of laughter therapy and walking interventions and demonstrating which approach provides greater benefits for pregnant women, creates a significant research gap in the field. This makes it difficult to develop scientifically based psychosocial support programs during pregnancy. Accordingly, the present study aimed to examine the effects of laughter therapy and walking interventions on prenatal attachment and mental well-being among pregnant women, considering both within-group changes over time and between-group interaction effects.

In this context, the following hypotheses were tested: (1) there is a significant difference between the pretest and posttest mean prenatal attachment scores of pregnant women in the laughter therapy and walking groups; (2) there is a significant difference between the pretest and posttest mean mental well-being scores in both groups;(3) the change in prenatal attachment levels is greater in the laughter therapy group than in the walking group;(4) and the change in mental well-being levels is greater in the laughter therapy group than in the walking group. Therefore, this study may contribute to the determination of both psychological and physical support methods of laughter therapy and walking that can be applied during pregnancy. There is a need for comprehensive information on this subject; therefore, it was decided to conduct this study. Based on the information obtained, this study can

be a scientifically useful resource for health professionals. In this context, this study aimed to comparatively reveal the effects of laughter therapy and walking on prenatal attachment and mental well-being of pregnant women.

Methods

Study design and participants

The research is a randomized controlled study with pre-test-post-test intervention. The study was conducted between April 25th, 2024, and June 25th, 2024. The local ethics committee approval (Sinop University Rectorate Human Research Ethics Committee, Protocol Number: 2024/33) and institutional permission were taken to conduct the research. Before starting the implementation, the pregnant women were informed about the study and written and verbal consent was obtained in accordance with the principle of confidentiality and the principles of the Declaration of Helsinki. The study population consisted of pregnant women who applied to a family health center. The sample size was determined based on the data from the study titled "The effect of laughter yoga on pregnancy symptoms, mental health and prenatal attachment"[11] conducted by Ağapınar Şahin and Bekar. In the power analysis conducted with the G*Power (3.1.9.7) program, it was determined that at least 28 pregnant individuals (56 individuals in total) should be employed for each group based on an effect size of 0.5, 80% power, and $\alpha = 0.05$ margin of error.
The sample was obtained through snowball technique among pregnant women who were reached through the author's communication network, agreed to participate in the study and met the inclusion criteria. The initial snowball method was used to determine the appropriate sample before randomization. After the appropriate sample was generated, all participants included in the study were completely randomly assigned to the laughter therapy and walking groups using random.org, thus eliminating researcher influence during the assignment process. After the eligible sample was formed, an independent researcher who was not involved in data collection or intervention delivery assigned participants to either the laughter therapy or walking group based on this sequence. Blinding of participants and researchers was not feasible. However, data analysis was conducted by a researcher who was not involved in the intervention process to minimize potential bias. The study was concluded with 78 pregnant women, 40 in the laughter therapy group and 38 in the walking group (Figure 1, Consort). Being over 18 years of age, having conceived spontaneously without any treatment and being between the 20th and 30th weeks of pregnancy, not having multiple or risky pregnancies, not having undergone abdominal surgery, having and being able to use the internet, and willing to participate in the study.

Data collection tools

Research data were collected via the Personal Information Form, the Prenatal Attachment Scale and the Warwick-Edinburgh Mental Well-being Scale (WEMWBS).

The prenatal attachment scale

The Prenatal Attachment Scale (PAS) was developed by Türkmen Çevik and Kurnaz (2019) to measure the level of prenatal attachment appropriate for Turkish culture. The 33-item scale has three sub-dimensions: "curiosity and excitement", "agreement and enthusiasm" and "hope". Higher score of the pregnant woman on the scale indicates a higher attachment level. The lowest and highest possible scores in the scale are 33 and 99, respectively. The internal consistency coefficient of the PAS was reported as 0.94.[25]

The Warwick-Edinburgh Mental Well-being Scale (WEMWBS)

The scale, originally developed by Tennant et al. (2007), was further adapted to Turkish by Keldal (2015). The 14-item scale is a 5-point Likert-type scale. Each item of the scale is scored over a 5-point Likert scale None of the time, Rarely, Some of the time, Often, All of the time. A total score between 14-32 indicates poor mental well-being, 33-51 indicates moderate mental well-being and 52-70 indicates high mental well-being.[26,27]

Intervention

All pregnant women were administered the Personal Information Form, the Prenatal Attachment Scale and the Warwick-Edinburgh Mental Well-being Scale (WEMWBS) as a pre-test. At the end of 8

weeks, the Personal Information Form, Prenatal Attachment Scale and Warwick-Edinburgh Mental Well-Being Scale were re-administered (post-test) to both the laughter therapy and walking groups.

Laughter therapy sessions

Individuals in the laughter therapy group were given a 20–30-minute online laughter therapy session, once a week, for 2 months by the certified author. Throughout the intervention, it was ensured that everyone's microphone and camera were turned on. The laughter therapy intervention was recorded via Zoom. The sessions were regularly scheduled taking into consideration the days and hours that pregnant women could attend. As a mutual agreement was reached on Tuesday as the most suitable day for the participants, laughter therapy was applied on Tuesdays between 20:00-20:45. In the laughter therapy session, first the practitioner introduced herself and the therapy, then she applied certain interventions like breathing exercises for a healthy life, keeping rhythm with music, and turning artificially initiated laughter into real through childish games. Each laughter therapy session consisted of clapping hands, warm-up and deep breathing exercises, games, and laughter exercises. The main part of the sessions consisted of four activities.

The first activity was hand clapping, where participants were asked to clap their hands facing each other, and warm-up exercises. The clapping activity, set to the rhythm of "1-2, 1-2-3", was accompanied by the slogans "Ho-Ho, Ha-Ha-Ha".[28] The second activity was deep breathing exercises. Each participant was asked to take a deep breath, hold it for 4-5 seconds, and then exhale slowly and in a controlled manner.[29]The third activity, including games aimed at generating laughter, lasted approximately 10 minutes. In this section, laughter and breathing exercises were accompanied by dancing and singing. The fourth activity included the implementation of laughter exercises[28]. In this section, various scenarios were employed, including "The Car Won't Start", "Milkshake" and "Laughter", which aimed to elicit unconditional laughter.[30]Finally, the therapy was concluded by having the pregnant women do a meditation/relaxation exercise for approximately five minutes. Feedback was received from the pregnant women after each session and new practices were added to the next session.

Walking trainings

The poster designed with visuals underlining the significance of walking throughout pregnancy, the positive effects of regular walking exercises and the things to be careful about while walking was posted on the online platform for the pregnant women in the walking group.

The poster included messages such as "walking positively affects the physical and emotional changes experienced by majority of the women throughout pregnancy", "walking is the safest and easiest activity to do during pregnancy", "regularly walking throughout pregnancy helps with body weight control, improves psychological well-being, protects cardiovascular health, and supports the muscle activity required for birth". The poster further emphasized the following points to be considered while walking: walking on flat ground, having water with you while walking, wearing appropriate sneakers, walking in the evening hours when the weather is hot but in a well-illuminated area, being in the fresh air while walking, walking at least 30 minutes at a slow pace at least 3 days a week, if not all of the week.

This poster was shared with the pregnant women every morning for 8 weeks. The walking performances of the pregnant women were controlled by questions asked every evening via the online platform.

Data analysis

Research data were statistically analyzed using the SPSS (Statistical Package for Social Science) 27.0 program. Comparison between groups in terms of qualitative variables were made with the chi-square test and Exact P values were reported. Comparisons between groups in terms of quantitative data were made using independent two-samples t-test when variance homogeneity was achieved and using independent two-samples Welch t-test when variance homogeneity was not achieved, and Cohen's d was reported as a measure of effect size. The statistical significance level was accepted as 5%.

Ethical considerations

Ethical approval for the research was sought and granted by 'SINOP' University Human Research Ethics Committee (Decree No: 2024/17-41, dated 29.02.2024) The research ethics principles specified in the Declaration of Helsinki were adhered to throughout the study. The pregnant women who participated in the study were informed about the study and their informed consents were duly obtained.

Results

Among the pregnant women included in the study, the mean age was slightly higher in the laughter therapy group (28.6 ± 3.81) than in the walking group (27.2 ± 4.14), while the mean age at marriage was similarly higher in the laughter therapy group (24.8 ± 3.57 and 21.6 ± 3.82, respectively). Among the pregnant women, those in the laughter therapy group were more likely to have a university education or higher (67.5%) compared with the walking group (28.9%). Similarly, middle income was more common in the laughter therapy group (77.5%) than in the walking group (42.1%). Most participants in both groups had a nuclear family structure (85% and 92.1%, respectively) and lived in the province (85% and 78.9%, respectively). A higher proportion of the walking group had been married for two years or more (78.9%) compared with the laughter therapy group (65%). First pregnancies were distributed similarly between groups (57.5% and 50%, respectively). Women at 25–29 weeks of gestation were slightly more common in the walking group (44.7%) than in the laughter therapy group (37.5%). Desired pregnancies were prevalent in both groups (85% and 81.6%, respectively). Having a male fetus was more common in the walking group (68.4%) than in the laughter therapy group (47.5%).

Statistically significant differences were observed between the two groups in terms of education, employment, income status and gestational week ($p=0.00$, $p<0.001$, $p=0.00$, $p=0.02$, respectively) (Table 1).

There was a statistically significant difference between the groups in terms of the pre-test and post-test prenatal attachment between the pregnant women and the fetus ($p<0.001$). The rate of mothers in the laughter group who communicated with the fetus by touching their belly and talking increased from 47.5% (pre-test score) to 92.5% (post-test score). The rate of mothers in the walking group who communicated with the fetus by touching their belly and talking increased from 34.5% (pre-test score) to 47.4% (post-test score) (Table 2).

The pre-test PAS total scores of the pregnant women revealed that mean PAS total score of the laughter group was statistically significantly lower than the walking group ($p=0.02$; Cohen $d=0.53 \approx 0.50$). The post-test PAS total scores of the pregnant women revealed that mean PAS total score of the laughter group was statistically significantly higher than the walking group ($p=0.01$; Cohen $d=0.59 \approx 0.50$). The post-test WEMWBS total scores of the pregnant women revealed that mean WEMWBS total score of the laughter group was statistically significantly higher than the walking group ($p=0.00$; Cohen $d=0.94 \approx 1.0$) (Table 3).

As there were differences between the pre-test measurements of the laughter and walking groups, further comparisons were made between the groups in terms of changes in the pregnant women based on the pre-test and post-test scores. The change in the mean PAS total scores of the pregnant women in the laughter group was found to be statistically significantly higher compared to the walking group ($p=0.00$; Cohen $d=0.80 \approx 0.80$). The change in the mean WEMWBS total scores of the pregnant women in the laughter group was found to be statistically significantly higher compared to the walking group (9.5±17) ($p=0.01$; Cohen $d=0.55 \approx 0.50$) (Table 4).

The study is limited because it was conducted with pregnant women receiving health services at a single-family health center. In addition, as seen in this study, it may vary according to some characteristics of the pregnant women in the laughter therapy and walking groups. It is recommended that the study be repeated in more than one center and with more participants.

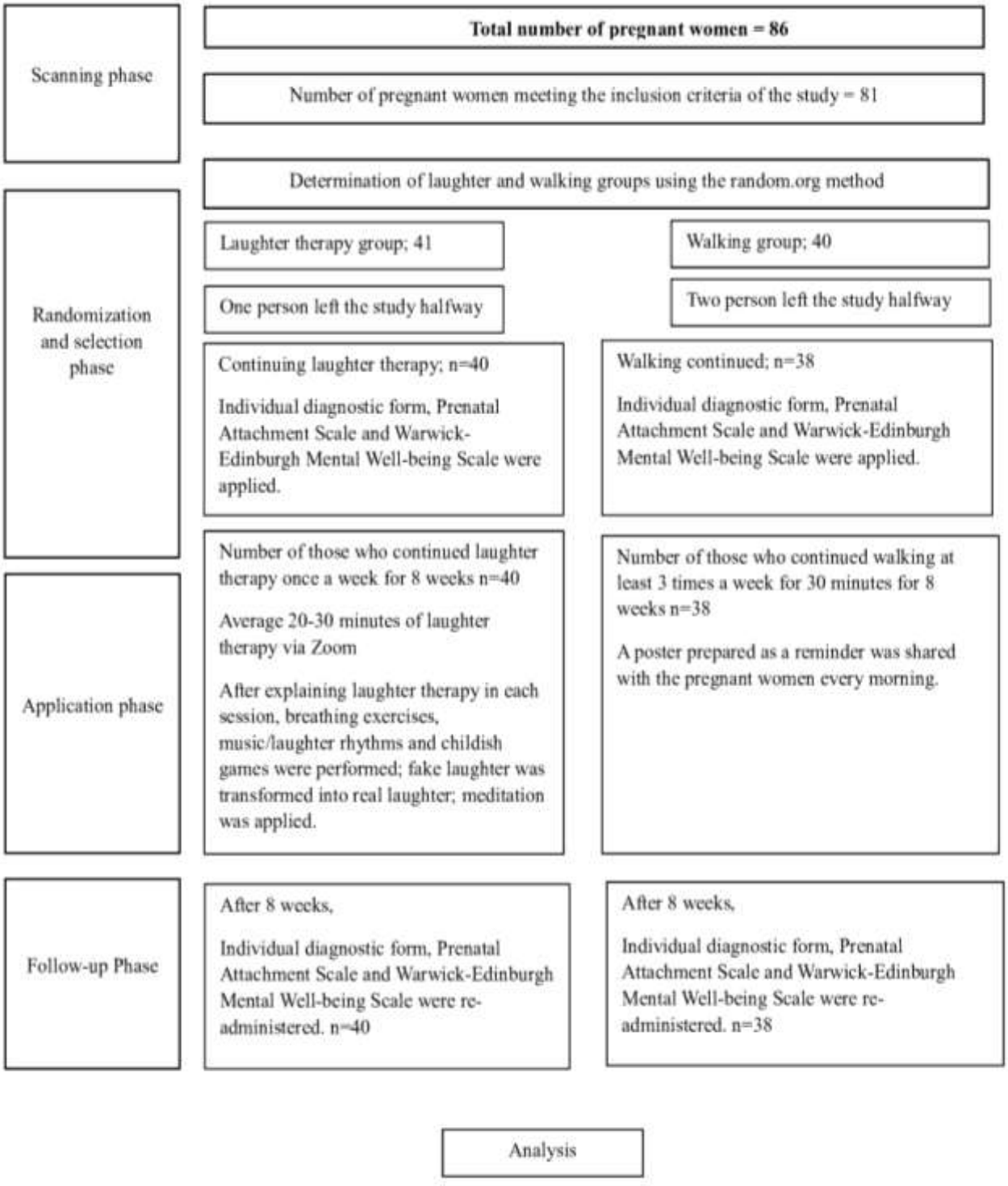

Figure 1: Flow chart of the study.

Table 1: Distribution statistics regarding the way of communicating with the fetus

	Laughter (n=40)	**Walking (n=38)**		
	n (%)	**n (%)**	**Chi-square**	**Exact p [a]**
How to Communicate with the Fetus (Before)			21.081	<0.001
I don't communicate	9 (22.5)	10 (26.3)		
Touching	2 (5)	15 (39.5)		
Talking	10 (25)	0 (0)		
Both touching and talking	19 (47.5)	13 (34.2)		
How to Communicate with the Fetus (After)			19.133	<0.001
I don't communicate	1 (2.5)	5 (13.2)		
Touching	2 (5)	15 (39.5)		
Both touching and talking	37 (92.5)	18 (47.4)		

a Chi-square test (Exact p)
%: Group (column) percentage

Table 2: Distribution statistics regarding the way of communicating with the fetus

	Laughter (n=40) n (%)	**Walking (n=38) n (%)**	**Chi-square**	**Exact p [a]**
How to Communicate with the Fetus (Before)			21.081	<0.001
I don't communicate	9 (22.5)	10 (26.3)		
Touching	2 (5)	15 (39.5)		
Talking	10 (25)	0 (0)		
Both touching and talking	19 (47.5)	13 (34.2)		
How to Communicate with the Fetus (After)			19.133	<0.001
I don't communicate	1 (2.5)	5 (13.2)		
Touching	2 (5)	15 (39.5)		
Both touching and talking	37 (92.5)	18 (47.4)		

a Chi-square test (Exact p)
%: Group (column) percentage

Table 3: Group comparisons regarding pre- and post-application measurements

	Laughter (n=40)	**Walking (n=38)**			
	$\bar{X}$±s	**$\bar{X}$±s**	**t**	**p [a]**	**Cohen d**
CE First	30.85±5.69	34.21±3.43	-3.175	**0.002**	-0.711
AE First	22.88±3.6	24.61±2.13	-2.602	**0.012**	-0.582
Hope First	28.38±5.02	28.76±3.28	-0.406	0.686	-0.091
PAS First	82.1±12.42	87.58±7.37	-2.383	**0.02**	-0.533
WEMWBS First	44.5±16.38	43.89±10.64	0.194	0.846	0.044
CE After	37.58±2.29	36.42±2.89	1.949	0.055	0.444
AE After	26.58±0.93	25.95±1.56	2.145	**0.036**	0.492
Hope After	32.48±1.36	31.45±2.08	2.573	**0.012**	0.589
PAS After	96.63±3.59	93.82±5.66	2.603	**0.012**	0.596
WEMWBS After	63.75±6.79	53.42±14.06	4.099	**<0.001**	0.944

a Independent two-sample Welch t test, $\bar{X}$: Arithmetic Mean, s: Standard deviation
CE: curiosity and excitement, AE: agreement and enthusiasm

Table 4: Group comparisons in terms of changes in measurements*

	Laughter (n=40) $\bar{X}$**±s**	**Walking (n=38)** $\bar{X}$**±s**	**t**	**p**	**Cohen d**
MH Change	6.73±5.55	2.21±4.03	4.123	<0.001 [b]	0.927
KC Change	3.7±3.48	1.34±2.27	3.561	0.001 [b]	0.798
Hope Change	4.1±5.04	2.68±3.81	1.393	0.168 [a]	0.316
PAS Change	14.53±11.58	6.24±8.71	3.584	0.001 [b]	0.806
WEMWBS Change	19.25±18.05	9.53±17	2.447	0.017 [a]	0.554

* Change: calculated as the difference between the after measurements and before measurements (After-Before).a Independent two-sample t-test, b Independent two-sample Welch t-test, $\bar{X}$: Arithmetic Mean,
s: Standard deviation
CE: curiosity and excitement, AE: agreement and enthusiasm

Discussion

This study comparatively evaluated the effects of laughter therapy and walking on prenatal attachment and mental well-being among pregnant women. The results demonstrated that both interventions led to improvements in prenatal attachment and mental well-being; however, laughter therapy produced substantially greater increases in both outcomes compared with walking.It was further observed that laughter therapy improves the mental well-being of pregnant women
and that pregnant women reach a higher level of mental (psychological) well-being following the laughter therapy. It was concluded that walking regularly improved the prenatal attachment level and mental well-being of pregnant women, however its effect did not create as big a change as laughter therapy.

This study revealed that the communication established by the pregnant women with the fetus by touching her belly and talking before laughter therapy increased almost two-fold after therapy. On the other hand, the communication established by the pregnant women with the fetus by touching her belly and talking before walking intervention improved somewhat following the intervention (post-test). In a study examining fetal behavioral responses of the baby against the mother's voice and touch using real-time, three-dimensional (3D) images (4D Ultrasound), it was reported that the fetus's arm, mouth and head movements increase when the mother touches her abdomen, compared to when the mother only talks or does nothing.[31] In a study comparing the stimuli created by the mothers' speech, touch and speech-touch combination during pregnancy on fetal movements and heart rate with pre-test and post-test on three different intervention groups, it was found that stimulation created by speech increases the fetal movement score by 1.3, stimulation created by touch increases the fetal movement score by 1.9, and stimulation created by a combination of speech and touch increases the fetal movement score by 2.2.[32] This argument supports the view that talking to the fetus and playing sounds such as music before birth can both improve fetal neuro-development and the emotional prenatal bonding as a valuable activity for the mother.[33] Such stimuli are often related to the mother's mental and emotional state. The mother touching her belly throughout pregnancy is a very common and indirect sensory-motor tactile stimulation that will affect the fetus.[5] It is further argued that women should refer to activities aiming at strengthening prenatal attachment such as talking to the fetus and touching the abdomen throughout pregnancy in order to both communicate with the fetus during pregnancy and develop a healthy mother-child relationship in the future. Therefore, it is important for nurses and other health professionals serving in this field to support pregnant women with relaxing practices such as explaining the significance of this issue to pregnant women during prenatal care and raising awareness.
The mean prenatal attachment scale scores of the pregnant women participating in this study before laughter therapy increased after the therapy and it was observed that the prenatal attachment levels of the pregnant women were quite high after laughter therapy. It was determined that the mean agreement, enthusiasm and hope sub-dimension scores of the pregnant women in the prenatal attachment scale increased after laughter therapy. It was further determined that the pre-test mean well-being scores of the pregnant women increased after laughter

therapy and that pregnant women had a higher mean well-being following the laughter therapy. Ağapınar Şahin and Bekar (2023), who comparatively examined the effect of laughter yoga on pregnancy symptoms, mental health and prenatal attachment in the intervention and control groups, found that the mental well-being and prenatal attachment levels of the pregnant women in the laughter yoga group were higher compared to the control group.[11] In another study examining the postpartum mental health and maternal attachment levels of the mothers who received laughter therapy throughout pregnancy, it was reported that laughter therapy makes a difference in improving postpartum mental health however does not affect maternal attachment.[3] A pretest-posttest randomized controlled trial in southern Taiwan to evaluate the effects of an aerobic exercise intervention on sleep quality and mother-infant bonding in pregnant women reveals the positive effects of walking and physical activity during pregnancy on supporting physical health, reducing stress, and improving maternal-fetal bonding.[24] Literature suggests that walking and low- to moderate-intensity exercise interventions offer potential benefits for maternal mood and bonding. Regular walking during pregnancy is not only a physical activity but also an approach that supports the mother-baby emotional bond and the mother's psychological well-being.[1,21-23] It was observed that the number of studies examining the effects of laughter therapy and walking on prenatal attachment during pregnancy are quite few. Current studies in the literature revealed that laughter therapy has beneficial effects on both psychological and physiological health, helps to reduce stress, is used as a coping method, and has therapeutic effects such as improving interpersonal relationships, daily life activities, quality of life and sleep quality.[14,19,34] In accordance with the results obtained herein, complementary and alternative therapies such as laughter therapy may be recommended to facilitate adaptation to the physiological, psychological and social changes experienced throughout pregnancy and to cope with various possible symptoms related to pregnancy. These therapies, when supported by health professionals, are concluded to be important in improving the psychological health and thus prenatal bonding of the pregnant woman, ensuring that they live a healthy pregnancy. The comparisons regarding the pre-test and post-test mean prenatal attachment levels of the pregnant women in the walking group and the laughter group revealed that although there was an increase in the post-test mean scores of the pregnant women in the walking group compared to the pre-test mean scores, it was concluded that the prenatal attachment levels of the pregnant women in the laughter group were higher, and the change in their pre-test and post-test mean scores was more significant. It was further found that the mean pre-test mental well-being score of the pregnant women in the walking group increased in the post-test, however these pregnant women had a moderate level of mental well-being. In a pre-test-post-test randomized controlled study conducted to evaluate the effect of an aerobics intervention on the sleep quality and prenatal attachment of pregnant women, it was reported that pregnant women who did exercises for 4 weeks had significantly higher maternal-fetal bonding levels in the post-test compared to the control group.[24] Cinar et al. (2019), who studied the relationship between health care interventions throughout pregnancy and maternal fatigue and prenatal attachment, concluded that expectant mothers who regularly did exercises and do not skip their follow-ups scored higher in the prenatal attachment scale.[35] In a systematic review examining the psychological effects of doing exercises throughout pregnancy, it was reported that pregnant women who did exercises experienced improvements in their psychological states such as sadness, hopelessness, anxiety, and a decrease in the frequency of prenatal depression. [22] In a systematic review and meta-analysis of observational studies examining the relationship between physical activity before and throughout pregnancy and maternal mental health, Cai et al. (2022) revealed that physical activity is associated with a decrease in the likelihood and severity of prenatal depression and anxiety, a decrease in stress level and an improvement in quality of life[21]. In a systematic review examining the effect of doing exercises on the mental health of pregnant women, it was concluded that the mental health of pregnant women who regularly did exercises was better and that their psychological well-being improved compared to that of women who did not regularly work out or did not work out at all.[23] It was reported that doing physical exercises at least once a week will significantly reduce the symptoms of depression of pregnant women and may be an important factor for preventing gestational depression.[1] The World

Health Organization (WHO) reports that doing at least 150 minutes of moderately-intense physical activity per week will reduce the risk of preeclampsia, gestational hypertension, gestational diabetes, excessive gestational weight gain, birth complications, postpartum depression and neonatal complications.[36] Although no study was found examining the prenatal attachment and mental well-being of pregnant women who walk regularly, the literature review further revealed that the number of studies examining the effects of different types of exercises on pregnant women were also limited. From this perspective, this study reveals similar results to the literature indicating the positive effect of walking, as a type of physical activity, on prenatal attachment and mental well-being. It is argued that doing physical exercises throughout pregnancy, especially walking, which is the easiest activity for pregnant women, can have a positive effect on mental well-being and reduce the risk of psychological distress during pregnancy. For this reason, health care professionals may be suggested to evaluate the exercise habits of pregnant women during prenatal monitoring and care and to direct pregnant women for regularly walking by drawing attention to the importance of doing exercises in planned trainings.

Comparing the changes in the pre-test and post-test prenatal attachment scores of pregnant women who received laughter therapy and who walked, it was determined that the change in the laughter therapy group was higher than in the walking group. Furthermore, the change in the pre-test and post-test mental well-being scores of pregnant women who received laughter therapy was determined to be higher than in the walking group. The effects of laughter therapy and walking applied during pregnancy on prenatal attachment and mental well-being were discussed herein by comparing the results against the literature. This study revealed the positive effects of both laughter therapy and walking throughout pregnancy. The study further concluded that laughter therapy had a greater positive effect on the prenatal attachment level and mental well-being of pregnant women compared to walking. The reason for this result may be attributed to the fact that laughter therapy is a different therapeutic approach performed by a certified trainer although walking is an activity that can be done at any time. The endorphin secreted as a result of conscious laughter can improve physical, psychological and social relationships, and is a type of cognitive-behavioral therapy that is especially effective in reducing and coping with stress in individuals.[14-18] The prenatal attachment levels of pregnant women, who have experienced a psychologically better pregnancy, will indirectly improve.[4]

It can be recommended for nurses and health professionals who spend the most time with pregnant women during their prenatal period should specialize in cognitive-behavioral therapies. It is further suggested to assess the psychological health and prenatal attachment status of women during gestational follow-ups, to recommend the pregnant women laughter therapy to reduce possible difficulties that may be encountered during pregnancy and provide counseling on the importance of regular walking for improving mental well-being and prenatal attachment levels.

Limitations

This study has several limitations. First, the snowball sampling method used to select participants before randomization may limit the representativeness of the sample. Second, the generalizability of the findings to pregnant women with different sociodemographic characteristics is limited. Therefore, the findings can only be evaluated for the study participants and can be transferred to similar settings

Conclusıon

The results of this study confirmed that prenatal attachment and mental well-being levels of pregnant women who received laughter therapy are higher than those who walked. The absence of negative effects of laughter therapy and walking makes these interventions safe, applicable and acceptable for the pregnant women in this study. Developing short training programs that include basic laughter therapy skills for nurses and healthcare professionals in the field will increase the sustainability of interventions. It will be important to organize laughter therapy sessions for pregnant women at regular intervals by specialized healthcare professionals, to provide walking plans tailored to each trimester, and to screen for psychological well-being during routine counseling sessions and guide them toward appropriate interventions. The nurses

and other health care professionals serving in this field are recommended to include practices such as laughter therapy and regular walking, which will support the physical, psychological and social health of pregnant women and improve maternal-fetal bonding, in their prenatal health development plans. The widespread use of a therapeutic approach, especially laughter therapy, and the specialization of health care professionals in this area will contribute to experiencing a healthy pregnancy. Such structured and applicable approaches can contribute to holistically supporting physical and psychological well-being during pregnancy. Future research with larger and more diverse samples and comparing psychosocial interventions will help strengthen evidence bases and further clarify how such practices benefit maternal mental health.

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Conflict of interest

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Contribution of authors

Ç.Y. contributed to the concept, writing, study design, data analysis and interpretation, drafting, and critical revision of the manuscript. M.E.A., contributed to the concept, study design, providing training, data analysis and interpretation. N.Ç., contributed to the data analysis and interpretation, drafting, review & editing, and validation. A.D., contributed to the study design, review & editing, data acquisition, data analysis and interpretation, and drafting of the manuscript. All authors read and approved the final version of the manuscript.

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