

Effect of Relaxation Programs and Breathing Techniques on Stress Levels of Pregnant Women in Health Centers

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ABSTRACT

Pregnancy is a period that is highly vulnerable to increased psychological stress due to hormonal changes, physical discomfort, and psychosocial challenges experienced by expectant mothers. Poorly managed stress can negatively affect maternal health and fetal development, increasing the risk of preeclampsia, preterm labor, and low birth weight. One of the recommended non-pharmacological interventions to reduce stress is the implementation of relaxation programs and breathing techniques. This study aimed to determine the effect of relaxation programs and breathing techniques on the stress levels of pregnant women at Gunung Health Center, Padang Panjang City. A quasi-experimental study with a one-group pretest-posttest design was conducted among 32 second- and third-trimester pregnant women selected through purposive sampling based on predetermined inclusion criteria. Stress levels were assessed using the Pregnancy Stress Rating Scale (PSRS) before and after six sessions of Deep Breath relaxation conducted over two weeks. Data were analyzed using descriptive statistics and the Paired Sample T-Test. The mean stress score decreased from 24.6 (moderate stress) before the intervention to 15.8 (mild stress) after the intervention. The statistical analysis showed a significant difference ($p = 0.000$; $p < 0.05$), with 78.1% of participants experiencing reduced stress levels. These findings indicate that relaxation programs and breathing techniques are effective in reducing stress among pregnant women and should be integrated into routine antenatal care services to support maternal mental health.

Keywords: Relaxation, Breathing Techniques, Stress, Pregnant Women, Health Centers



INTRODUCTION

Mental health during pregnancy is one of the important indicators in efforts to improve the quality of maternal and child health globally. The various physiological, hormonal and psychosocial changes that pregnant women experience make this period vulnerable to psychological disorders, including stress, anxiety and depression. Mental health disorders in pregnant women not only affect the psychological condition of the mother, but also have the potential to have a long-term impact on the process of pregnancy and fetal growth and development. The latest Data shows that the percentage of pregnant women who experience depression reaches around 11.8%, while mothers who experience a combination of depression and anxiety reach 13.2%, a figure that illustrates how widespread mental health problems in the population of pregnant women have not been handled optimally (Halil & Puspitasari, 2023).

Stress in pregnant women can be categorized as one of the mental health disorders most commonly encountered in the practice of antenatal services. This condition arises as a result of a complex interaction between hormonal changes, the psychological burden of facing a new role as a mother, and the social and economic pressures that accompany pregnancy. If stress is not managed properly, the impact can extend to physical and emotional disorders of the mother, even affecting the quality of relationships with couples and families. This shows that stress in pregnant women is not merely an individual problem, but a family and social dimension (Yuliani et al., 2022).

Furthermore, mental health disorders experienced by pregnant women can develop into more serious conditions if not treated early. Prolonged stress can potentially trigger more severe episodes of depression, and in certain cases can contribute to an increased risk of maternal and infant mortality. This condition confirms the importance of early detection and intervention against stress in pregnant women as part of efforts to prevent pregnancy complications. Therefore, the handling of stress in pregnant women should be a serious concern for health workers, especially at the level of primary health care (Asfrestyanti et al., 2022).

Biologically, the stress experienced by pregnant women triggers the activation of the hypothalamic-pituitary-adrenal axis, which leads to excessive release of the hormones cortisol, adrenaline and noradrenaline. An increase in these hormones can disrupt blood flow to the placenta and trigger unexpected uterine contractions, increasing the risk of preeclampsia, preterm labor, and low birth weight babies. This biochemical mechanism explains how the psychological state of the mother can directly affect the safety of the pregnancy process. This evidence reinforces the urgency of stress management as an integral part of pregnant women's health services, not just a stand-alone psychological issue (Elvira, Lestari, & Fathurohman, 2020).

The link between stress and pregnancy complications is also confirmed through a systematic review of various current scientific articles. The study found a significant association between stress levels of pregnant women with the incidence of preeclampsia, with consistent statistical significance values found in various studies reviewed. The results of this review confirm that stress not only has an impact on the psychological comfort of the mother, but is also a real risk factor for serious obstetric complications. The consistency of the findings from these various studies further reinforces

the scientific basis of the importance of interventions against stress in pregnant women (Safaat et al., 2022).

At the national level, a literature review of various studies related to stress in pregnant women revealed that this condition is influenced by various factors, including the mother's age, employment status, social support, marital status, to the health condition of the mother herself. High levels of stress in pregnant women have been shown to negatively affect fetal health, such as fetal growth retardation, low birth weight, and premature birth. These findings show that stress problems in pregnant women are multifactorial and require a comprehensive approach to treatment. This national picture is an important basis for understanding how similar problems can occur in more specific regional contexts (Marwah et al., 2023).

The problem of stress in pregnant women is also found in the regional context of West Sumatra. Research conducted in the working area of one of the health centers in Padang city found that the stress of pregnant women in the face of childbirth is influenced by various factors, ranging from individual characteristics, social support, to the mother's knowledge of the labor process itself. The results of the study confirmed that pregnancy stress is a real phenomenon that occurs in the population of pregnant women in the primary health care area in West Sumatra, not just a theoretical issue. This condition gives an idea that similar problems are most likely also experienced by pregnant women in other Puskesmas working areas in the same province, including in Padang Panjang City (Yazia & Suryani, 2023).

As one of the first level health care facilities, Puskesmas has a strategic role in providing comprehensive antenatal services, not only focusing on the physical aspects but also the psychological aspects of pregnant women. In Gunung Puskesmas Kota Padang Panjang, routine antenatal services still focus more on physical examination and monitoring of obstetric conditions, while aspects of mental health of pregnant women have not received proportional attention. In fact, pregnant women who visit the facility are not a few who show complaints related to concerns about childbirth, the burden of household chores, and family economic conditions. The gap between the need for mental health services and the availability of structured intervention programs is one of the fundamental problems behind the need for further research in these locations.

Mental health services in health centers, including stress management in pregnant women, should be part of a promotive and preventive approach organized by first-rate health care facilities. This is in line with the finding that untreated mental health disorders can contribute to serious complications for both mother and baby. However, in practice, the implementation of structured stress management programs in many health centers, including in Mountain Health Centers, is still not optimal and tends to be incidental. This condition shows the gap between the ideal service needs and the real implementation in the field (Priyanto et al., 2023).

Various efforts to deal with stress in pregnant women can be done either through pharmacological or non-pharmacological approaches. The non-pharmacological approach is a safer option for pregnant women because of the minimal risk of side effects on pregnancy conditions. One of the non-pharmacological methods that are widely applied and proven to be safe is relaxation



techniques, especially deep breathing or breathing relaxation, which can be done independently by pregnant women without the need for tools or large costs. The ease of application of this technique makes it very potential to be integrated into antenatal care programs at the Puskesmas level.

Several previous studies have proven the effectiveness of relaxation techniques in reducing anxiety in pregnant women in the third trimester. The study showed that the combination of diaphragmatic relaxation, progressive muscle relaxation, and Breath relaxation had a significant effect on reducing anxiety in pregnant women approaching the time of delivery. The mechanism of this decrease in anxiety is thought to be related to a slowdown in breathing patterns that decrease the activity of the sympathetic nervous system so that the body is in a calmer condition. These findings provide an empirical foundation that respiratory relaxation interventions are not only theoretical, but have been clinically proven to improve the psychological condition of pregnant women (Mulyati, Novita, & Trisna, 2021).

Other research confirms that education about Deep Breath relaxation techniques given to pregnant women can reduce anxiety levels while increasing the psychological readiness of mothers in the face of childbirth. Providing education accompanied by a live demonstration of breathing techniques proved to be more effective than providing information passively. The results reinforce the argument that the active involvement of pregnant women in respiratory relaxation practices is the key to successful interventions. The consistency of the findings in various groups of pregnant women further strengthens the urgency of applying this technique more widely in primary health care facilities (Nurbaiti, Dewi, Surahmat, & Putinah, 2022).

More contemporary research has also shown that stress management programs, including breathing relaxation techniques, are effective in lowering the stress levels of III trimester pregnant women in the face of childbirth. However, the researcher observed that most of the existing studies are still limited to the context of reducing anxiety in the run-up to childbirth or to certain comorbid conditions such as hypertension. Meanwhile, studies that specifically examined the effect of relaxation programs and breathing techniques on the stress levels of pregnant women in general in health centers, especially in the city of Padang Panjang, are still very limited. This emptiness is the concern of researchers to be studied further.

Based on these findings, the researchers consider it necessary to conduct further research on non-pharmacological interventions against stress in pregnant women in more specific contexts and locations, considering that the psychosocial characteristics of pregnant women can differ between regions. Considering that similar studies have not been found specifically conducted in the working area of the Gunung Health Center of Padang Panjang City, as well as the high potential impact of stress on the well-being of mothers and fetuses, researchers are interested in studying in depth the effect of relaxation programs and breathing techniques on the stress levels of pregnant women in these locations. This study is expected to provide empirical evidence that can be used as a basis for the development of psychological intervention programs based on health centers that are simple, easy to apply, and sustainable. Thus, this study is expected to contribute to improving the quality of antenatal services are more holistic in the Working Area Gunung Health Center Padang Panjang.

METHODS

This study used a quasi experiment design with one group pretest-posttest design, where stress level measurements were performed before and after the intervention without using a comparison control group. The research was conducted at Mount Padang Panjang Health Center. The population in this study were all pregnant women in the second and third trimesters who conducted antenatal examinations in the working area of the Health Center during the study period. A sample of 32 people were selected using purposive sampling technique based on inclusion and exclusion criteria that have been set. Inclusion criteria in this study include pregnant women in the second and third trimesters who are willing to be respondents, do not have hearing or communication disorders that can hinder the implementation of interventions, are not experiencing severe pregnancy complications such as severe preeclampsia or antepartum hemorrhage, and are not undergoing pharmacological therapy for anxiety disorders or depression. Exclusion criteria included pregnant women who were not fully present in the entire series of intervention meetings, as well as pregnant women who withdrew in the middle of the research process.

Data collection was conducted using a standard questionnaire Pregnancy Stress Rating Scale (PSRS) which has been tested for validity and reliability, to measure the level of stress respondents before (pretest) and after (posttest) given the intervention. Interventions provided in the form of relaxation programs and deep breathing relaxation techniques (deep breathing relaxation), which was carried out as many as 6 meetings in a period of 2 weeks, with a duration of about 15-20 minutes each meeting, guided directly by researchers with Health Center health workers using standard modules operational procedures Deep Breath relaxation techniques. Before data collection, all respondents were given an explanation of the objectives, procedures, benefits, and rights and obligations as respondents, and were asked to sign a consent sheet (informed consent) as a form of willingness to voluntarily participate in this study. This study also maintains the confidentiality of the identity and data of respondents throughout the research process. Data analysis was conducted in stages, namely univariate analysis to describe the frequency distribution of respondents' characteristics and stress levels before and after the intervention, and bivariate analysis using Paired Sample T-Test to analyze differences in stress levels of pregnant women before and after the administration of relaxation programs and breathing techniques, with a degree of significance $p < 0.05$.

RESULTS

1. Characteristics of Respondents

Before outlining the results of the analysis of the stress level of pregnant women, first presented a picture of the characteristics of respondents who were the subject of research at the Mount Health Center of Padang Panjang City. Characteristics of respondents included age, parity, trimester of pregnancy, education level, and employment status, as presented in the following table.



Table 1. Distribution of Respondents Characteristics (n=32)

Characteristics	Categories	Frequency (n)	Percentage (%)
Age	<20 years	2	6.3
	20-35 years old	24	75.0
	>35 years old	6	18.7
Parity	Primigravida	13	40.6
	Multigravida	19	59.4
Trimester Of Pregnancy	Trimester II	14	43.8
	Trimester III	18	56.3
Education	SD	3	9.4
	SMP	7	21.9
	High school	18	56.3
	College	4	12.4
Jobs	Works	11	34.4
	Not working / IRT	21	65.6
Total		32	100.0

Based on Table 1, it can be seen that most of the respondents are in the healthy reproductive age group of 20-35 years (75.0%), with multigravid status (59.4%) and are in the third trimester of pregnancy (56.3%). In terms of education, the majority of respondents are high school educated (56.3%), and most are not working or have the status of a housewife (65.6%). This characteristic illustrates that the study respondents were dominated by pregnant women in the non-risk age group, but with a relatively high household domestic burden because the majority do not work, so it has the potential to affect the level of stress experienced during pregnancy.

2. Frequency Distribution of Stress Levels of Pregnant Women Before and After the Intervention

Table 2. Frequency Distribution of Stress Levels of Pregnant Women Before and After The Intervention (N=32)

Variable	Pretest n (%)	Posttest n (%)
Stress Category		
Lightweight	0 (0,0)	23 (71.9)
Medium	22 (68.8)	9 (28.1)
Weight	10 (31.3)	0 (0.0)
Total	32 (100,0)	32 (100.0)
	Mean $\pm$ SD	Min-Maxs

Variable	Pretest n (%)	Posttest n (%)
Pretest Stress Score	24.6 ± 3.2	18–31
Posttest Stress Score	15.8 ± 2.8	10–22

Based on Table 2, the stress level of respondents experienced considerable improvement after the intervention. Before the intervention, almost all respondents were in the moderate to severe stress category, but after six meetings in two weeks, the majority of respondents shifted to the mild stress category and no longer in the severe category. This decrease in the average stress score from 24.6 to 15.8 descriptively illustrates that relaxation programs and breathing techniques have a positive impact on the psychological condition of pregnant women who are respondents to the study.

3. Test Results Paired Sample T-Test Differences in Stress Levels of Pregnant Women Before And After The Intervention

To determine whether the difference in stress scores before and after the intervention was statistically meaningful, a bivariate analysis was performed using the Paired Sample T-Test, as presented in the following table.

Table 3. Test Results Paired Sample T-Test Differences In Stress Levels of Pregnant Women Before and After The Intervention

Variabel	n	Mean	SD	Mean Difference	95% CI	t	df	p-value
Stres pretest	32	24.6	3.2	8.8	7.6 – 10.0	15.23	31	0.000
Stres posttest	32	15.8	2.8					

Based on the results of the Paired Sample T-Test, there was a decrease in stress levels among pregnant women after the intervention. The mean stress score before the intervention (pretest) was 24.6 ± 3.2, while the mean score after the intervention (posttest) decreased to 15.8 ± 2.8, with a mean difference of 8.8 points. The statistical test showed a t-value of 15.23, df = 31, and p-value = 0.000 (p < 0.05). These results indicate that there was a statistically significant difference in stress levels before and after the intervention, suggesting that the intervention was effective in reducing stress scores among pregnant women.

Table 4. Frequency Distribution of Changes in Stress Levels of Respondents after Intervention (n=32)

Categories	Frequency (n)	Percentage (%)
Decreased Stress	25	78.1
Not Decreased / Fixed	7	21.9
Total	32	100.0

Based on Table 3, The Paired Sample T-Test results showed a significant difference between the stress scores of pregnant women before and after being given a relaxation program and



breathing techniques ($p=0.000$; $p<0.05$), with an average decrease in score of 8.8 points. Furthermore, based on Table 4, most respondents (78.1%) experienced a decrease in stress levels after participating in the intervention program, while a small percentage (21.9%) showed no significant change. These results show that relaxation programs and breathing techniques effectively reduce stress levels in the majority of pregnant women who responded to this study.

DISCUSSION

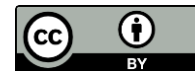
1. Frequency Distribution of Stress Levels of Pregnant Women Before and After The Intervention

The results showed that before the intervention of relaxation programs and breathing techniques, most respondents were in the moderate stress category, namely 22 people (68.8%), and ten others (31.3%) were in the severe stress category. None of the respondents were found to be in the mild stress category before the intervention was given. The average stress score on the pretest measurement is 24.6 with a standard deviation of 3.2, a minimum score of 18, and a maximum score of 31. This picture shows that almost all pregnant women who responded to the study experienced psychological stress at an alarming level before getting any intervention.

After being given a relaxation program and breathing techniques for 6 meetings in 2 weeks, there was a significant change in the distribution of stress levels in the category of respondents. A total of 23 people (71.9%) were in the mild stress category, nine people (28.1%) were still in the moderate stress category, and no more respondents were in the severe stress category. The average stress score on the posttest measurement decreased to 15.8 with a standard deviation of 2.8, a minimum score of 10, and a maximum score of 22. This decrease in the average score of 8.8 points illustrates the improvement in the overall psychological condition of the respondents after following the entire series of interventions.

The high proportion of respondents with moderate and severe stress categories before the intervention was in line with previous studies that showed that stress in pregnant women is influenced by many factors, such as age, parity, social support, marital status, and the health condition of the mother herself. These factors interact with each other, resulting in a varied psychological burden on each pregnant woman, and in many cases it accumulates into a fairly high level of stress before delivery. This condition confirms that stress in pregnancy is not a single phenomenon, but the result of the interaction of different aspects of the life of the expectant mother. This pattern is in line with a review of the literature showing that stress in pregnant women is multifactorial and has an impact on maternal and fetal health (Marwah et al., 2023).

The predominance of respondents in the third trimester in this study also contributed to the high stress score in the initial measurement. Pregnant women who are approaching the time of delivery generally experience increased concern related to the labor process, fetal condition, and readiness to face the role of Mother. This psychological condition is aggravated by increasingly significant physical changes towards the end of pregnancy, such as physical discomfort and activity limitations. A related study on the population of pregnant women in the primary health care area



in West Sumatra also showed a similar trend, where the stress of facing childbirth is largely influenced by the psychological readiness factor of the mother in the final trimester of her pregnancy (Yazia & Suryani, 2023).

Researchers assume that the high level of stress in the initial measurement of this study was also influenced by the characteristics of respondents who are dominated by housewives with secondary education levels. Limited access to information and lack of social interaction in mothers who do not work is suspected to make the psychological burden of pregnancy is felt heavier than mothers who have activities outside the home. In addition, the presence of respondents who are mostly multigravid status also allows the emergence of concerns based on previous experiences of childbirth, both pleasant and traumatic. The combination of these characteristics is thought to worsen the psychological condition of respondents before getting the intervention.

The significant decrease in the average stress score from 24.6 to 15.8 after the intervention can be explained through the physiological mechanism of the breathing relaxation technique itself. Breathing, which is done slowly, deeply and regularly, is able to decrease the activity of the sympathetic nervous system and increase the dominance of the parasympathetic nervous system, so that the body is in a calmer condition. This decrease in sympathetic activity has an impact on decreasing the production of the hormones cortisol and adrenaline, which are the main stress hormones. This mechanism underlies the effectiveness of the combination of diaphragmatic relaxation, progressive muscle relaxation, and Breath relaxation in reducing anxiety in pregnant women in trimester III (Mulyati, Novita, & Trisna, 2021).

The large proportion of respondents who moved from the moderate and severe stress category to the mild stress category after the intervention was also consistent with the findings of previous studies on the effectiveness of stress management programs in pregnant women in the third trimester. Intervention programs that are carried out in a structured and repeated manner over a certain period of time are proven to have a more optimal psychological impact than the provision of a single intervention. The consistency of intervention meetings also strengthened the relaxation effect felt by respondents, so that changes in stress categories that occur are permanent, not just temporary effects, as stated in a study on the effectiveness of stress management in pregnant women in trimester III (Khasanah, Lestari, & Nurhidayati, 2025).

Providing education along with live demonstrations of breathing relaxation techniques is also known to have a greater impact than providing information passively. The active involvement of respondents in practicing relaxation techniques at each meeting session allows for habituation or adaptation of the body to a more regular breathing pattern. This habituation ultimately has an impact on decreasing stress responses gradually and consistently over time, in line with the findings that Deep Breath relaxation technique education is effective in reducing anxiety levels in pregnant women (Nurbaiti, Dewi, Surahmat, & Putinah, 2022).

Researchers assume that the consistency of the frequency of meetings, which is six times in two weeks, be one of the determining factors in the success of interventions in reducing stress levels of respondents significantly. The frequency is considered sufficient to provide physiological and



psychological adaptation time for the respondent's body, without being too short so that the effect is not optimal, but also not too long so that the risk of reducing the level of compliance of the respondent follows the entire session. The duration of each session lasting 15-20 minutes is also considered quite ideal to provide a relaxing effect without making respondents feel burdened by the implementation time that is too long. This assumption is supported by the finding that respondents did not experience an increase in stress scores after the intervention in this study.

The absence of respondents in the severe stress category after the intervention is an important finding that shows that breathing relaxation techniques are able to provide a protective effect on the psychological condition of pregnant women who were previously in the most vulnerable condition. The effect of physiologically acting relaxation on the autonomic nervous system was assessed as having a more pronounced impact in the group with a high initial stress level than in the group with an already relatively low stress level. This is in line with narrative studies of various relaxation techniques that have consistently shown a decrease in anxiety and stress levels, especially in the group that was previously at the highest severity level (Hernawaty, Sriati, Maesaroh, Salsabila, & Nurafni, 2022).

Stress derived from psychosocial factors, such as social support, economic burden, and household conditions, tend to be more difficult to overcome with only one type of physiological intervention, thus requiring a more comprehensive and multidisciplinary approach. The multifactorial nature of stress in pregnant women causes not all respondents to respond the same to the intervention given. This condition is an important note that breathing relaxation techniques, although effective, are not the only single solution to all problems of stress in pregnant women, as confirmed in a study of factors related to the level of stress in pregnant women (Marwah et al., 2023).

The researchers assumed that nine respondents who were still in the moderate stress category after the intervention likely had additional psychosocial burdens that could not be directly addressed through breathing relaxation techniques, such as family economic problems, a history of unpleasant previous childbirth, or husband and family support that was felt to be less than optimal. These factors were not included in the measurement or intervention in this study, so that the effect of reducing stress felt by this group is not as optimal as other respondents. Researchers also suspect that the level of compliance in practicing relaxation techniques independently outside the meeting session also influenced the variation in results found in this group.

The results of the univariate analysis in this study also reinforce the importance of the role of primary health care facilities in integrating psychological stress management programs as part of routine antenatal care. The availability of relaxation programs that are simple and easy to apply, such as deep breathing techniques, can be an efficient solution in terms of cost and time for health centers with limited resources. This is in line with the importance of increasing the knowledge of health workers regarding the mental health of high-risk pregnant women as part of promotive and preventive efforts at the basic service level (Priyanto, Utami, & Ningrum, 2023).

Physiologically, the decrease in stress scores that occurred in this study is also in line with theories regarding the hormonal mechanism of stress in pregnant women, where excessive

activation of the hypothalamic-pituitary-adrenal axis will trigger excessive release of cortisol and have an impact on increasing the risk of pregnancy complications. A significant decrease in stress scores in this study indicates a potential decrease in such hormonal activity, although biochemical measurements of hormone levels were not performed in this study. This confirms the importance of non-pharmacological approaches in managing the stress of pregnant women without causing additional risks to the condition of pregnancy, as found in a study of the relationship of stress with the incidence of preeclampsia in pregnant women (Elvira, Lestari, & Fathurohman, 2020).

The following is an additional paragraph of the researcher's analysis, which can be inserted as the closing paragraph of the discussion of univariate analysis (16th paragraph):

The researchers considered that the results of this univariate analysis also indicate the importance of an individualized approach in the provision of respiratory relaxation interventions in pregnant women, considering that the response of each respondent to the intervention is not entirely uniform even though it is given with the same procedure and frequency. Variations in the reduction of stress scores among respondents found in this study showed that internal factors such as basic anxiety levels, personal coping mechanisms, and psychological readiness of each pregnant woman also determine the magnitude of the perceived benefits of a given relaxation program. Researchers also assume that the involvement of the family, especially the husband, during the intervention process can be a reinforcing factor that has not been explored in depth in this study, but has the potential to strengthen the effectiveness of similar programs in the future. Therefore, the researchers consider that the development of respiratory relaxation programs in Puskesmas in the future needs to consider a more personal approach and involve family support, so that the benefits of intervention can be felt more evenly by all pregnant women who are targeted by the program.

2. Test Results Paired Sample T-Test Differences in Stress Levels of Pregnant Women Before and after The Intervention

The results of bivariate analysis using Paired Sample T-Test showed an average value of the difference in stress score (mean difference) of 8.8 between measurements before and after the intervention. The value of t obtained is 15.23 at degrees of freedom (df) 31, with a significance value of $p=0.000$ ($p<0.05$). The 95% confidence interval is in the range of 7.6 to 10.0, which does not exceed zero, thus strengthening the evidence that the difference in stress scores is real and not by chance. These results showed that there was a statistically significant difference between the stress levels of pregnant women before and after being given a relaxation program and breathing techniques.

In addition to the difference in the average overall score, the results also showed that as many as 25 respondents (78.1%) experienced a decrease in stress levels after participating in the intervention program, while seven respondents (21.9%) did not show a decrease or relatively fixed stress scores. The proportion of respondents who experienced a decrease in stress levels illustrates that the majority of respondents responded positively to the intervention provided. Thus, overall it can be concluded that relaxation programs and breathing techniques effectively reduce stress levels in the majority of pregnant women who became respondents in this study, both seen from the



difference in the average score and the proportion of respondents who have improved psychological conditions.

The $p=0.000$ value obtained in this study is consistent with various previous studies that used a similar design to test the effectiveness of non-pharmacological interventions on reducing anxiety and stress levels in pregnant women in the third trimester. Research on the effect of prenatal yoga on anxiety levels in third trimester pregnant women, also showed a significant reduction in scores from an average of 30.06 to 11.00 with a value of $p=0.000$ using the same Paired T-Test. This common pattern of results reinforces the belief that relaxation-based non-pharmacological interventions, through both breathing techniques and other approaches, are consistently able to exert statistically significant impairment effects on the psychological state of pregnant women. This uniform pattern of results on various types of interventions also confirms the validity of the one group pretest-posttest research design in measuring the effectiveness of an intervention (Darma, 2025).

The magnitude of the t value of 15.23 in this study was also comparable to the findings in other non-pharmacological intervention studies that used the quasi experiment one group pretest-posttest design, such as the study on the effect of pregnancy exercise using birth ball on reducing anxiety levels in pregnant women in trimester III, which also showed a significant decrease from the category of severe anxiety at the initial measurement to a lighter category after the intervention. The large statistical value of the test produced in various similar studies indicates that interventions that are repeated and structured tend to produce stronger effects than single interventions. The consistency of this pattern reinforces the empirical basis that relaxation-based non-pharmacological interventions have considerable statistical power in significantly altering the psychological state of pregnant women (Karo Karo, Br Ginting, et al., 2025).

The researchers assume that the statistical significance values obtained in this study, coupled with a fairly narrow range of confidence intervals that do not pass zero, indicate that the effect of reducing stress due to intervention is consistent in almost all respondents, not just driven by some respondents with a very large decrease in scores. This consistency is thought to be related to the uniformity of intervention implementation procedures given to all respondents, both in terms of duration, frequency, and respiratory relaxation guidance techniques. The researchers also assessed that the magnitude of the t value obtained shows the strength of the effect (effect size) is large enough of this intervention to reduce the level of stress of pregnant women.

Theoretically, the statistical significance found in this study can be explained through the mechanism of action of respiratory relaxation techniques that affect the autonomic nervous system of the body. Deep breathing, which is carried out regularly and repeatedly, is able to consistently activate the parasympathetic nervous system, so that the effect of reducing psychological tension can occur gradually and persist in almost all respondents. This mechanism is in line with the finding that the combination of diaphragmatic relaxation, progressive muscle relaxation, and Breath relaxation exerted a significant effect on the decrease in anxiety in iii trimester pregnant women, who were also tested using a similar statistical approach. The consistency of these findings between

studies reinforces the scientific basis that the physiological effects of respiratory relaxation can be measured and proven statistically, not just subjectively (Mulyati, Novita, & Trisna, 2021).

An educational approach accompanied by live demonstrations and repetition of breathing relaxation practices at each meeting session is also known to contribute to the magnitude of statistical significance generated in various similar studies. The repetition of the practice in a structured way allows the strengthening of the physiological response of the body to a given relaxation technique, so that the resulting effect becomes more consistent and statistically measurable. A similar pattern of intervention implementation in this study, namely direct and repeated administration during six meetings, also supports the magnitude of the significance obtained. This is in line with the findings that education accompanied by direct practice of Deep Breath relaxation techniques is effective in significantly reducing anxiety levels in pregnant women (Nurbaiti, Dewi, Surahmat, & Putinah, 2022).

The researchers considered that in addition to statistical significance, the decrease in the average stress score by 8.8 points in this study also had important clinical significance, considering that the change shifted the stress category of respondents from the moderate category to the mild category in the majority. Statistical significance alone does not necessarily describe practical benefits for respondents, so researchers view it as important to assess changes in clinical categories as an additional indicator of intervention success. The relatively narrow range of confidence interval in this study also shows that the results obtained have a good level of precision and can be relied upon if applied to a population of pregnant women with similar characteristics.

The significant results of this study are also consistent with the findings of research on the effectiveness of stress management in pregnant women in the third trimester in the face of childbirth, which shows that intervention programs conducted in a structured and sustainable manner have been shown to be effective in reducing stress levels significantly based on statistical tests. The similarity of the results between this study and similar studies reinforces the generalization that relaxation-based stress management programs, including breathing techniques, can be widely applied to pregnant women in the third trimester in various areas of primary health care. The consistency of the findings in different contexts also supports the external validity of the results of this study (Khasanah, Lestari, & Nurhidayati, 2025).

Although overall the bivariate test results showed strong significance, there were still 21.9% of respondents who did not experience a decrease in stress levels after the intervention. This condition is in line with the view that stress in pregnant women is multifactorial and is influenced by various psychosocial aspects that cannot be entirely intervened through a purely physiological approach. Factors such as social support, family economic conditions, and previous pregnancy history also influence individual responses to an intervention, so variations in results between respondents are common in psychological intervention research. This confirms that although on average the group showed significant changes, the response at the individual level still needs to be considered in the interpretation of the results of the study (Marwah et al., 2023).

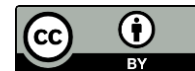


The researchers assumed that the seven respondents who did not experience a decrease in stress levels likely had a more dominant source of stress from external factors that cannot be directly addressed through breathing relaxation techniques, such as household problems or concerns about certain health conditions experienced during pregnancy. Researchers also suspect that the level of seriousness and consistency of respondents in practicing relaxation techniques independently outside the meeting session also contributed to the variation in results found in the group. In addition, the possibility of differences in individual stress tolerance thresholds is also thought to affect why a small percentage of respondents do not show the same improvement as the majority of other respondents.

The findings of statistical significance in this study also provide important implications for strengthening the role of health workers in health centers in detecting and dealing with stress in pregnant women early through measurable and evidence-based programs. The availability of empirical evidence on the effectiveness of simple and inexpensive breathing relaxation techniques can be the basis for strengthening the capacity of health workers in providing mental health education to high-risk pregnant women. This is in line with the importance of increasing the knowledge of health workers about the mental health of pregnant women as part of integrated promotive and preventive efforts in routine antenatal services in primary health care facilities (Priyanto, Utami, & Ningrum, 2023).

The significance of the reduction in stress found in this study is also relevant to efforts to prevent pregnancy complications related to the psychological condition of the mother, given that high levels of stress have been shown to be significantly associated with an increased risk of preeclampsia through the mechanism of excessive activation of the hormone cortisol. With the proven reduction in stress levels statistically through non-pharmacological interventions, the intervention has the potential to indirectly contribute to the Prevention of pregnancy complications based on psychological stress. This reinforces the argument that handling stress in pregnant women is not only psychologically beneficial, but also has preventive value for the safety of the mother and fetus as a whole (Putri & Wulandari, 2026).

Overall, the researchers considered that the results of the bivariate analysis in this study provide strong evidence of the effectiveness of relaxation programs and breathing techniques in reducing the stress level of pregnant women, both in terms of statistical significance and the proportion of respondents who experienced psychological improvement. The consistency between the results of univariate and bivariate analyses further reinforces the belief that the observed changes are not caused by chance factors, but are the real impact of interventions provided in a structured manner. Thus, relaxation programs and breathing techniques can be considered as one of the evidence-based intervention strategies that are feasible to be integrated in antenatal services at Gunung Puskesmas Kota Padang Panjang or other primary health care facilities with similar population characteristics.



CONCLUSIONS

Based on the results of research conducted at Gunung Puskesmas Kota Padang Panjang, it can be concluded that relaxation programs and breathing techniques have a significant effect on reducing the stress level of pregnant women in trimesters II and III. The average stress score of respondents before being given the intervention was 24.6 which was classified as moderate stress category, and after being given the intervention for 6 meetings in 2 weeks, the average stress score decreased to 15.8 which was classified as mild stress category. The results of the Paired Sample T-Test showed a value of $p=0.000$ ($p<0.05$), which proved that the difference in stress levels before and after the intervention was statistically significant, not by chance. In addition, 78.1% of respondents showed a decrease in stress levels after participating in the intervention program, which illustrates that the benefits of this program are felt by most pregnant women who were the subjects of the study. Thus, it can be concluded that relaxation programs and breathing techniques are non-pharmacological interventions that are effective, safe, easy to apply, and can be used as an alternative strategy in reducing the stress level of pregnant women in primary health care facilities.

Although this study managed to prove the effectiveness of relaxation programs and breathing techniques to reduce stress levels of pregnant women, there are some limitations that need to be considered in interpreting the results of the study. First, the study design used is one group pretest-posttest design without a control group comparison, so that the possibility of the influence of external factors (extraneous variables) to reduce the stress level of respondents can not be strictly controlled. Secondly, the number of samples in this study was relatively limited, namely only 32 respondents, so the results of the study cannot be widely generalized to the population of pregnant women in other regions with different characteristics. Third, the measurement of stress levels in this study only used a questionnaire instrument in the form of self-report, without being supported by biochemical examinations such as cortisol hormone levels, so that the observed decrease in stress could not be objectively confirmed from the physiological side. Fourth, the duration of monitoring in this study is relatively short, which is only two weeks, so it has not been able to describe the long-term effectiveness of the intervention given, including the possibility of recurrence of stress levels after the intervention program ends. Therefore, further research is recommended to use a study design with a control group, a larger number of samples, biochemical examination support, as well as a longer monitoring period, in order to obtain more comprehensive results and can be generalized more widely.

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