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Effect of Midwife-led Counseling Based on Gamble's Approach on Anxiety and Depression during Pregnancy

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ABSTRACT

Background & aim: Pregnancy-related anxiety and depression are prevalent and increase the risk of negative maternal outcomes. Therefore, the current study aimed to examine the effect of midwife-led counseling according to Gamble's approach on pregnancy-related anxiety and depression.

Methods: This quasi-experimental study was carried out from April 4, 2023, to September 21, 2023, in Zahedan, Iran. Fifty-seven Iranian pregnant women at gestational ages of 18-24 weeks with a Hospital Anxiety and Depression Scale (HADS) score of ≥8 were allocated to two intervention and control groups using convenience sampling. The intervention group (n=28) received five counseling sessions according to Gamble's approach, while the control group (n=29) was subjected to the routine prenatal care. The HADS questionnaire was used to collect data before, immediately after, and two months after the intervention. Data were analyzed using Chi-square test, linear regression model, and repeated measures analysis of variance.

Results: The two groups were not significantly different in terms of anxiety (P=0.9) and depression scores (P=0.2) before the intervention. However, after the intervention, the anxiety and depression scores significantly decreased in the intervention group in comparison with the control group (P<0.0001). According to post-hoc analysis, in the intervention group, two months after the intervention, the levels of anxiety (P<0.007) and depression (P=0.001) were significantly lower compared to the pre-intervention stage.

Conclusion: Midwife-led counseling based on Gamble's approach may help to reduce symptoms of anxiety and depression during pregnancy. Further randomized controlled trials are needed to examine the effectiveness of this intervention in real-world healthcare settings.

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Introduction

There is an increased risk of developing mental disorders in pregnant women, primarily depression and anxiety (1). The prevalence range of anxiety in pregnant women ranges from 14 to 56%. Moreover, the global prevalence range of prenatal depression has been reported at 15-65% (2). Additionally, the prevalence is higher in low- and middle-income countries, compared to high-income countries (3). A study conducted by Keramat et al. (2021) showed that the rates of anxiety and depression among Iranian pregnant women were 31.7% and 32.5%, respectively (4).

Considering that mental health disorders are more common during pregnancy (5), untreated maternal mental disorders can increase the risk of adverse pregnancy and obstetric outcomes, thoughts of self-harm and suicide, and poor birth outcomes. Maternal mental disorders can also negatively affect the breastfeeding and postnatal care of the neonate and lead to emotional and behavioral difficulties in childhood (1-3, 6).

Although pharmacological therapy plays a role in the treatment of pregnancy-related depression and anxiety, their effects on pregnancy outcomes

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as well as infants' behavioral patterns are controversial (7). In addition to women who are concerned about side effects of medications on their infants, a number of women are not eligible to be referred to a specialist during screening, and the eligible ones are concerned with the stigma surrounding mental disorder medications (1, 6, 8). These women can benefit from non-pharmacological interventions including different approaches of psychological counseling (9).

Gamble et al. (2009) introduced a counseling strategy to enhance the mental health status of women during the antenatal and postnatal period by midwives. This approach involves nine strategies, namely the establishment of a therapeutic connection between the pregnant woman and the midwife, acceptance, working with the perceptions of the pregnant woman, supporting the expression of feelings, filling in the gaps, connection of the events with emotions and behaviors, enhancement of social support, reinforcement of positive approaches to coping, and exploration of solutions (10-11).

It should be noted that the majority of women receive prenatal and postnatal care from a midwife in primary healthcare centers (5). The World Health Organization also, has emphasized on integration of perinatal mental health in maternal and child health services and suggested performing interventions even by non-specialized mental health providers with proper training and regular supervision by mental health clinicians (12). Counselling approaches can be delivered through healthcare paraprofessionals including trained midwives in maternity counselling. Owing to cost-effectiveness, cultural acceptability, midwife-women relationship, and community embeddedness, these interventions may be more effective than psychotherapeutic interventions in terms of improving mental health outcomes (13-14). Furthermore, there is evidence indicating the effectiveness of midwife-led intervention (8). Therefore, it is important to expand midwives' role to identify, manage, and follow-up on women with mild to moderate symptoms of depression and anxiety (15).

Previous studies have demonstrated beneficial effects of counseling based on Gamble's approach on maternal psychological outcomes. Gamble et al. (2005) reported reduced psychological distress and depressive symptoms following traumatic childbirth (16). Similarly, Firouzan et al. showed that midwifery-led counseling based on Gamble's approach reduced fear of childbirth and improved childbirth self-efficacy among nulligravid women (17). In addition, reductions in postpartum anxiety (18), postpartum stress and depression (19), and psychological birth trauma (20) has been reported following Gamble-based counseling by midwives in primiparous women.

However, despite these promising findings, evidence regarding the effectiveness of Gamble's approach on antenatal anxiety and depression remains limited. The present study further contributes to the existing evidence by simultaneously assessing both anxiety and depression during pregnancy and evaluating the feasibility of integrating this midwife-led intervention into routine prenatal care in primary healthcare settings. Given the high prevalence and adverse consequences of antenatal mental health disorders and the need for accessible non-pharmacological interventions during pregnancy, further research in this field is warranted. Therefore, this study aimed to determine the effect of midwife-led counseling based on Gamble's approach on anxiety and depression during pregnancy.

Materials and Methods

The present study was a quasi-experimental study that was carried out on 60 pregnant women who referred to comprehensive healthcare centers in Zahedan, Iran between April 4, 2023, and September 21, 2023 .

The participants included Iranian pregnant women at gestational ages of 18-24 weeks with a Hospital Anxiety and Depression Scale (HADS) score of ≥ 8 (21). The inclusion criteria were singleton pregnancy, live fetus, lack of fetal congenital anomalies (based on sonography), ability to speak, read, and write in Farsi Language, lack of history of illicit drug use during pregnancy, and lack of history of high-risk pregnancy. Exclusion criteria were absence from the counseling session more than once, the occurrence of maternal-fetal complication during pregnancy, suffering from severe psychiatric disorders, including bipolar disease and psychotic disorder (based on the electronic

record system and the statement of women), intrauterine fetal death at any stage of the study, and occurrence of stressful events (e.g. death of close relatives) during the study period .

Sample size was determined 25 for each group based on the mean and standard deviation of anxiety for the intervention (15.25±6.22) and control (9.13±4.25) groups of a previous study performed in Iran, (22) with a power of 80% and α-error level (two-tailed) of 0.05 (Z1-α /2=1.96, and Z1-β=0.84). With considering a 20% of non-response rate in each group, approximately 30 pregnant women were required in each group (23).

To recruit the subjects, a multistage sampling method was used. First, the city was stratified into three areas based on socio-cultural and economic situation (i.e., northern, central, and southern areas). Afterward, considering the total number of healthcare centers, four centers were selected to recruit the intervention group using a simple randomization method based on the list of healthcare centers in each district. This list was prepared by managers at the district healthcare center and included all of the centers in each area of the city. To avoid the unintended leakage of data from the subjects in the intervention group to the control group, in each area, four centers next to the centers allocated to the intervention group were selected as the control. Finally, in each center, the names and addresses of all pregnant women at gestational ages of 18-24 weeks were extracted from the health registration system. The convenience sampling technique was utilized to assign the eligible women to the study groups (Figure 1).

Data collection tools included a demographic and obstetric characteristics questionnaire and the Hospital Anxiety and Depression Scale (HADS). The demographic questionnaire consisted of items related to maternal age, ethnicity, educational level, employment status, insurance coverage, parity, history of unwanted pregnancy and abortion, type of previous delivery, women and husbands' polygamy status, and husbands' educational level.

Hospital Anxiety and Depression Scale (HADS) was used to measure the variables, which is a self-report scale with 14 items, and are rated on a four-point (0-3) Likert scale. It is notable that items 1, 3, 5, 6, 8, 10, 11, and 13 are reverse-scored. Higher scores indicate more severe symptoms. This scale comprises two subscales (depression and anxiety), with a maximum score of 21 for anxiety and depression. The score ranges of 0-7, 8-10, and ≥ 11 represent normal, borderline, and significant cases of psychological morbidity (21). The Iranian version of the HADS was validated previously in another research with Cronbach alpha coefficients of 0.81 and 0.78 for the anxiety and depression sub-scales, respectively (24). In the current research, Cronbach's alpha coefficients for the anxiety and depression sub-scales of HADS were 0.78 and 0.86, respectively.

To collect data, all identified pregnant women in each healthcare center were called and the objectives of the study were explained to them. Women who gave their informed consent for participation in the research were invited to a mutually agreeable appointment in the health center to fill out the HADS. All eligible pregnant women with HADS-anxiety/depression scores of ≥ 8 were entered into the study and the subjects in the intervention group were invited to a five-session individual counseling program.

The second author of this study, a midwife with an MSc in Midwifery Counseling, was trained in counseling based on Gamble's approach by an expert psychologist (third author) for two months. In the beginning, e-learning materials (anxiety disorders; mood disorders, including depressive and bipolar disorders; interview techniques; active listening; and learning to reflect) were sent via email. The educational materials were divided into pieces and sent to the second author according to the designed plan. Consequently, two 45-minute sessions were held to discuss the materials, clear doubts, check whether the second author knew and understood the educational materials correctly, and provide her with effective feedback. In addition, four counseling sessions for pregnant women based on Gamble's principles were held by the second author, and the content of the sessions was sent to the third author via email. After reviewing the content of each interview, feedback on the audio recordings were sent to the second author via email.

The counseling sessions were held in a room different from the maternal and child health service room. The first session was held between

18-24 weeks of pregnancy. In total, five weekly counseling sessions were held. The questionnaires were completed by the second author (AY) in both control and intervention groups before, immediately after, and two months after the intervention (about 31-37 weeks of gestation). Contents of the sessions are summarized in Table 1. The control group received routine care and was informed that there would be a follow-up two months after the pregnancy.

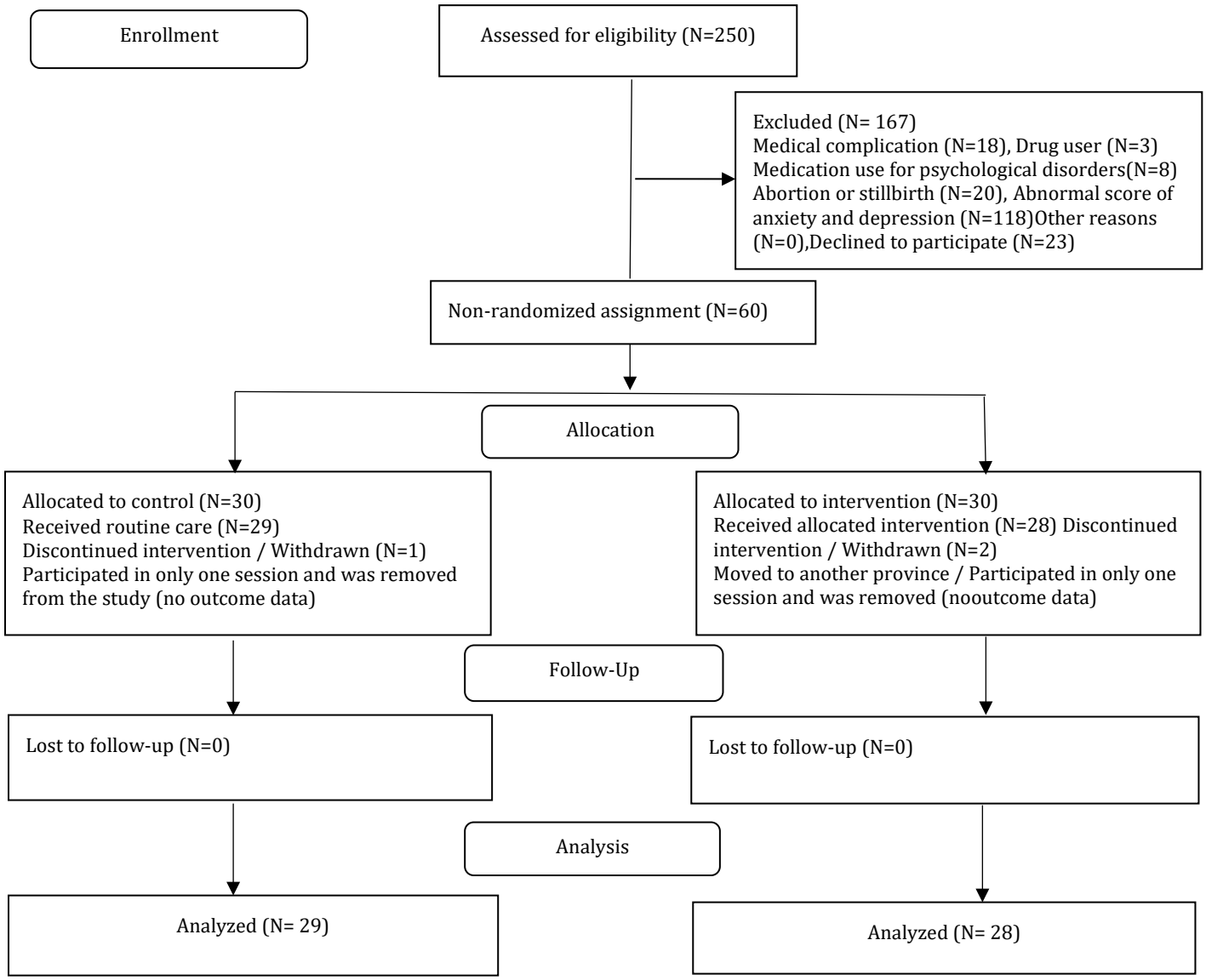

Figure 1. TREND flow diagram for selection of participants

Table 1. Content of counseling for the intervention group

Session	Content
In-person individual counseling (45-60 min)	Establishment of a therapeutic relationship, supporting the participant in expressing emotions and thoughts (open-ended questions about her pregnancy and emotional concerns), active listening, resolving ambiguities and misunderstandings regarding the issues under discussion, looking for her positive points, and actively emphasizing them. She was given an opportunity to discover positive ways to cope with the pressure. She was asked to take a "rest time" when the amount of pressure and excitement exceeded the tolerable limit.
In-person individual counseling (45-60 min)	The participant was encouraged to learn and use stress management skills and other methods to take care of her stress and psychological needs. Realistic expectations were created about overcoming stress and recovery. Their frustration was reduced by active listening with acceptance. Evidence was provided to demonstrate how families have made progress in solving their problems. At the end of the session, she was asked to understand the connection link between her previous expectations, thoughts, and beliefs and her current feelings and behaviors within a week and find a logical solution for them.
In-person individual counseling (45-60 min)	The participant was asked about the relationship of her expectations, thoughts, and beliefs with previous ones, promoting positive thoughts, and supporting her to make wise decisions about practical solutions. She was provided with solutions to deal with negative thoughts. Her merit and competence in solving her problems were acknowledged.
Virtual individual counselling (15-30 min)	The participant was supported in expressing emotions and thoughts (open-ended questions) and active listening. She was provided with solutions to deal with negative thoughts. Her merit and competence in solving her problems were acknowledged. She was reassured that there are important people, such as her husband, mother, sister, and friends, who can help her solve problems and give her peace.
Virtual individual counselling (15-30 min)	The participant was provided with current information about available social support groups. She was encouraged to use communication skills to improve her emotional conditions, the quality of her interpersonal relationships, solidarity, and family connection. Positive thoughts were reinforced for compatibility. Her positive opinions and beliefs were reinforced since they reflected a clearer understanding of the solution.

Analysis of the collected data was performed using SPSS software (version 21). A normal probability plot was used to check normality. Chi-squared and Fisher's exact tests were conducted to compare the two groups in terms of the categorical and binary variables. Additionally, repeated measures analysis of variance (ANOVA) and post-hoc Bonferroni test were employed to compare anxiety/depression mean scores over time. Furthermore, the assumption of sphericity was tested using Mauchly's test. Greenhouse-Geisser correction was used where sphericity could not be assumed. The findings were interpreted using the F value and P value in the Sphericity assumption line. Finally, linear regression analysis was conducted to evaluate the extent to which the education level of women and their husbands as well as Gamble's approach could predict anxiety and depression. Two-tailed tests of significance were employed to compare the variables between the control and intervention groups. It should be mentioned that the P values of less than 0.05 were considered statistically significant.

Results

The statistical analysis was performed on the data collected from 57 participants (28 in the intervention group and 29 in the control group). The two groups were not significantly different regarding their demographic characteristics, except for the education levels of women (P=0.03) and their partners (P=0.02). Moreover, no statistical significance was observed between the intervention (26.25±6.61) and control (26±6.02) groups regarding the age of women (P=0.8). Additionally, the employment status of the husbands in the intervention and control groups were not significantly different (P=0.09).

Table 2 summarizes the characteristics of women and their partners in the two groups.

Based on the findings, a statistically significant difference was observed between the two groups immediately and two months after the counseling session regarding the effect of counseling according to Gamble's approach to maternal anxiety (P<0.0001). The results also revealed that the mean anxiety score (5.82±2.07) was lower in the intervention group, compared to the control group (8.58±2.16) immediately after the counseling session.

Table 2. Frequency distribution of demographic characteristics of the study population in two groups (N=57)

Variable	Groups		P-Value
	Intervention (N=28)	Control (N=29)	
	N (%)	N (%)	
Women's age			
≤20	6 (21.4)	4 (13.8)	
21-30	15 (53.6)	19 (65.5)	0.8‡
≥31	7 (25.0)	6 (20.7)	
Ethnicity			
Baloch	17 (60.7)	20 (69)	0.5‡
Fars	11 (33.3)	9 (31)	
Educational level			
Primary school	8 (28.6)	18 (62.1)	
Middle school	11 (39.3)	5 (17.2)	0.03‡
High school	9 (33.1)	6 (20.7)	
Employment status			
Employed	21 (75)	25 (86.2)	0.2‡
Unemployed	7 (25)	4 (13.8)	
Insurance coverage			
Yes	2 (7.1)	3 (10.3)	>0.99†
No	26 (92.9)	26 (89.7)	
Women's polygamy			
No	26 (92.9)	27 (93.1)	>0.99†
Yes	2 (7.1)	2 (6.9)	
Parity			
0	8 (28.6)	8 (27.6)	
1	8 (28.6)	8 (27.6)	0.9‡
≥2	12 (42.8)	13 (44.8)	
Unwanted pregnancy			
No	9 (32.1)	11 (37.9)	0.6‡
Yes	19 (67.9)	18 (62.1)	
Number of prior abortion			
0	22 (78.6)	20 (69)	0.4‡
≥1	6 (21.4)	9 (31)	
Type of previous delivery			
No	8 (28.6)	8 (27.6)	
C/S**	7 (25)	4 (13.8)	0.2‡
NVD*	13 (49.4)	17 (58.6)	
Educational level of the husbands			
Primary school	8 (28.6)	17 (58.6)	
Middle school	11 (39.3)	3 (10.3)	0.02‡
High school	9 (32.1)	9 (31.1)	
Husband's polygamy			
No	28 (100)	27 (93.1)	0.4†
Yes	0 (0)	2 (6.9)	

* Normal vaginal delivery, ** Cesarean section, ‡Chi-squared, †Fisher's exact test

Table 3 presents the results of repeated measures ANOVA regarding the comparison of the changes in anxiety scores based on the stage of the study (pre-intervention, post-test, and follow-up) and time × group. Based on post hoc analysis with a Bonferroni adjustment, anxiety scores underwent a significant decrease from the pre-intervention stage to the post-intervention stage (P<0.0001), and also from the pre-intervention stage to 2-month follow-up (P<0.007). Moreover, there were significant differences between the post-intervention stage and 2-month follow-up (P<0.03).

Additionally, repeated measures ANOVA showed a significant reduction in depression scores in the intervention group over time (Table 3). Post hoc Bonferroni analysis indicated that depression scores significantly decreased from pre-intervention to immediately after the intervention (P<0.001) and from pre-intervention to the 2-month follow-up (P=0.001). No significant difference was observed between the post-intervention and 2-month follow-up assessments (P=0.3), suggesting that the improvement in depressive symptoms was maintained over time.

Table 3. Comparing the mean of anxiety scores among study groups at different stages

Time of assessment	Groups		Intergroup comparison† P-Value, $\eta_p 2$‡	Time× group P-Value, ηp2‡	Time effect P-Value, ηp2‡
	Intervention	Control			
	Mean (SD*)	Mean (SD)			
Anxiety					
Before intervention	8.28±1.94	8.31±1.54			
Immediately after intervention	5.82±2.07	8.58±2.16	<0.0001, 0.23	<0.0001, 0.34	<0.0001, 0.20
Two months after intervention	6.32±1.88	8.96±1.7			
Depression					
Before intervention	8.57±1.75	8.00±2.00			
Immediately after intervention	5.92±2.65	8.58±1.88	<0.0001, 0.17	<0.0001, 0.38	<0.0001, 0.14
Two months after intervention	6.39±1.93	9.44±2.69			

*Standard Deviation †Repeated measure ANOVA test with baseline control was used after the intervention
‡Partial eta- squared (effect size)

Linear regression analysis was performed to control the variables that differed between groups and could bias the findings. The results of linear regression indicated that the association between intervention and decrease in the level of anxiety and depression remained highly significant even after controlling the educational level of women and their spouses (Tables 4 and 5).

Table 4. Results of linear regression analysis for significant predictors of anxiety

Model	Unstandardized coefficients		Standardized coefficients	t	P-Value	95% CI (Lower Upper)
	B	Standard error	Beta			
Immediately after intervention						
Educational level						
Primary school	3.17	1.17	-	2.69	0.009	0.81–5.53
Middle school	-0.01	0.94	-0.002	-0.01	0.99	-1.90–1.88
High school	0.18	1.27	0.04	0.14	0.88	-2.37–2.73
Educational level of husband						
Middle school	0.27	0.90	0.04	0.30	0.76	-1.54–2.09
High school	-1.13	1.20	-0.21	-0.94	0.35	-3.54–1.27
Group	2.85	0.63	4.50	4.50	<0.0001	1.58–4.12
2 months after intervention						
Educational level						
Primary school	4.10	1.01	-	4.03	<0.0001	2.06–6.15
Middle school	-0.14	0.81	-0.03	-0.18	0.85	-1.78–1.49
High school	-0.15	1.10	-0.03	-0.13	0.89	-2.36–2.06
Educational level of husband						
Middle school	-0.15	0.78	-0.03	-0.20	0.84	-1.73–1.41
High school	-0.49	1.03	-0.10	-0.47	0.63	-2.57–1.59
Group	2.54	0.54	0.57	4.64	<0.001	1.44–3.64

Table 5. Results of linear regression analysis for significant predictors of depression

Model	Unstandardized coefficients		Standardized coefficients	t	P-Value	95% CI (Lower Upper)
	B	Standard error	Beta			
Immediately after intervention						
Educational level						
Primary school	3.51	1.26	-	2.78	0.008	0.97–6.04
Middle school	0.74	1.01	0.12	0.73	0.46	-1.28–2.78
High school	-1.07	1.36	-0.18	-0.78	0.43	-3.81–1.66
Education level of husband						
Middle school	-0.36	0.97	-0.06	-0.37	0.7	-2.31–1.58
High school	0.05	1.28	0.01	0.04	0.96	-2.52–2.63
Group	2.59	0.67	0.49	3.82	<0.0001	1.23–3.95
2 months after intervention						
Educational level						
Primary school	3.44	1.31	-	2.61	0.01	0.80–6.09
Middle school	0.55	1.05	0.009	0.05	0.95	-2.07–2.18
High school	-0.79	1.42	-0.12	-0.55	0.58	-3.65–2.07
Educational level of husband						
Middle school	0.38	1.01	0.06	0.38	0.7	-1.65–2.42
High school	-0.18	1.34	-0.0.3	-0.14	0.88	-2.88–2.51
Group	3.08	0.70	0.55	4.35	<0.0001	1.66–4.50

Discussion

The present study demonstrated that midwife-led counseling based on Gamble's approach significantly reduce both anxiety and depression scores among pregnant women, and these improvements were maintained at the two-month follow-up.

This finding is consistent with previous studies reporting reductions in postpartum anxiety, depression, stress and psychological birth trauma following Gamble-based counseling interventions (18-20). The similarity between these findings may be attributed to the core therapeutic components of Gamble's approach, which emphasizes emotional expression, linking thoughts, feelings, behaviors, and collaborative problem-solving within a supportive therapeutic relationship. These processes likely facilitate better emotional regulation and reduce maladaptive cognitive patterns that contribute to anxiety and depressive symptoms during pregnancy (13-14). Another contributing factor is the strong emphasis of Gamble's approach on enhancing social support. By encouraging women to identify and mobilize support from family and significant others during counseling sessions, the intervention helps buffer against pregnancy-related stressors, which may explain the sustained improvement observed at follow-up (2).

A notable strength of the present study is the use of five counseling sessions. The relatively greater intensity of the intervention compared with some previous midwife-led counseling interventions may have provided additional opportunities for therapeutic engagement, emotional expression, and reinforcement of coping strategies (16-17,22). This difference suggests that multiple sessions allow sufficient time to build a strong therapeutic alliance between the midwife and the pregnant woman, enabling participants to practice and internalize adaptive coping strategies (10-12,14).

Our findings extend the existing evidence by demonstrating the effectiveness of Gamble's approach during the antenatal period. While most previous studies have primarily evaluated postpartum outcomes, including anxiety, depression, stress, and psychological birth trauma (18-20), the current study shows that the psychological mechanisms targeted by this approach are relevant and effective throughout the perinatal continuum, including pregnancy (10,16). The maintenance of intervention effects at the two-month follow-up is particularly noteworthy. This sustained benefit suggests that participants developed transferable cognitive and emotional skills—such as self-reflection, adaptive coping strategies, and problem-solving abilities, which continued to be beneficial even after the formal counseling sessions ended (10-11).

The present study can add to the limited literature regarding the effect of midwife-led counseling according to Gamble's approach on improving anxiety and depression, especially during pregnancy. However, findings of the present research should be interpreted considering some limitations. First, due to time constraints, the women were followed up for 2

months. Therefore, in the present study, it was not possible to examine the postpartum effectiveness of the intervention. Second, a trained researcher conducted counseling for all participants of the intervention group. Therefore, this study needs to be replicated with midwives who face difficult challenges (e.g. overcrowding in health centers and time constraints) in providing midwifery care to examine the effectiveness of the intervention in the real world. Finally, the quasi-experimental design and non-random allocation of participants may limit causal inference and generalizability.

Conclusion

The results of the present study indicated that midwife-led counseling based on Gamble's approach is an effective intervention for reducing anxiety and depression symptoms in pregnant women. This approach is also a feasible and low-cost method that can be delivered by midwives with minimal resources. These findings support the integration of Gamble's counseling approach into routine maternal healthcare services within primary health centers. The findings suggest that Gamble's approach may be considered for integration into routine maternal healthcare services, pending confirmation by larger randomized controlled trials. In addition, pre-service and in-service training programs on perinatal mental health and Gamble's counseling model are necessary to equip midwives with the required knowledge and skills.

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Conflicts of interest

The authors declared no conflicts of interest.

Ethical approval

This research was performed with the full permission of the director of Health centers. Written informed consent was obtained from all participants. All interviews were conducted in a private room and the names of participants were not included in the data collection forms to preserve the anonymity and confidentiality. Participation was voluntary, with the right to withdraw without affecting the care participants received. Confidentiality and anonymity was maintained throughout the study.

Code of Ethics

The present research was approved by the Ethics Committee of Zahedan University of Medical Sciences, Zahedan, Iran (IR.ZUMS.REC: 1401.361).

Use of Artificial Intelligence (AI)

None.

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Authors' contribution

ZM contributed to the study design, data analysis, and writing the manuscript. AY contributed to the study design and data collection. MF contributed to the study design. HA contributed to the data analysis and interpretation. All authors read the article and approved the final manuscript.

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