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CLINICAL & BASIC RESEARCH

The Effect of Group Prenatal Care on the Empowerment of Pregnant Adolescents

Randomised controlled trial

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abstract: ***Objectives:*** This study aimed to evaluate the effect of group prenatal care (GPNC) on the empowerment of pregnant adolescents. ***Methods:*** In this trial, 294 pregnant adolescents (aged 15–19 years) were randomly assigned into the GPNC (n = 147) and individual prenatal care (IPNC; n = 147) groups, where they received 5 sessions of GPNC (90–120 min) and IPNC, respectively, between the 16th and 40th weeks of pregnancy. The empowerment of participants in the two groups was measured using the Empowerment Scale for Pregnant Women. Data were analysed using various tests. ***Results:*** The mean total score of pregnant women's empowerment in both groups after the intervention was 86.46 ± 4.95 and 81.89 ± 4.75, respectively (β = 6.11, 95% confidence interval: 4.89, 7.33; *P* <0.0001). ***Conclusion:*** GPNC can improve pregnant adolescent empowerment. The current study's results can provide a foundation for implementing the GPNC model in Iran.

Keywords: Adolescent Pregnancy; Empowerment; Centring Prenatal Care; Group Prenatal Care.

Advances in Knowledge

- *This study showed that group prenatal care improves adolescent pregnant women's empowerment.*

Application to Patient Care

- *Implementing alternative prenatal care such as group prenatal care can improve maternal empowerment and consequently minimise maternal and neonatal adverse outcomes among adolescent pregnant women.*

Adolescent pregnancy is any pregnancy that occurs when the mother is aged between 13 and 19 years.[1] It is a major concern in developing and undeveloped countries.[2] In undeveloped countries, approximately 21 million girls aged between 15 and 19 years become pregnant each year, and approximately 12 million of them give birth to their babies.[3] Pregnant adolescents are at a greater risk of having adverse pregnancy outcomes, such as preterm birth, pre-eclampsia, low birth weight and maternal and neonatal mortality.[4,5] In addition, they often have a low level of education and a poor socioeconomic status, which can lead to adverse maternal and neonatal outcomes.[4] In Iran, adolescent pregnancy is expected to increase due to the recent changes in Iran's population policies aimed at promoting population growth and increasing the young population.[6] However, appropriate prenatal care can improve pregnancy outcomes among pregnant adolescents.[7] This care aims to optimise the well-being of the adolescent mother and her fetus through education and early detection of pregnancy-related adverse outcomes.[8] Improved access to high-quality prenatal care and increased knowledge during pregnancy both empower pregnant adolescents and decrease their pregnancy problems.[9,10] Empowerment of pregnant adolescents can improve maternal and neonatal health outcomes.[11] Empowerment during pregnancy includes promoting a feeling of satisfaction, increasing independence, improving interaction with others and increasing psychological energy among pregnant women to achieve a successful pregnancy and childbirth.[12]

In public health centres in Iran, prenatal care is provided individually by a midwife, while in private clinics, it may be provided by a midwife or an obstetrician. Prenatal care is provided in eight individual visits which last for 10 to 15 minutes each. Based on this schedule, the average total length of prenatal visits during pregnancy is merely two hours, and this limited time does not allow the educational needs of pregnant women to be met.[13]

Group prenatal care (GPNC) is considered to be an efficient and effective way of providing prenatal care.[14] One of the known models of GPNC is centring pregnancy, which is a woman-centred model of GPNC that brings women together in groups.[15] GPNC is unique in that it is a group, not a class. Instead of

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a hierarchical transmission of information, GPNC facilitates the sharing of experience and knowledge by healthcare providers.[15]

In this model of care, 8–12 women with a similar gestational age meet for prenatal care sessions which last for approximately 60–90 minutes. After the weight and height of the pregnant women are measured, they share their experiences in the group session. Compared with individual prenatal care (IPNC), GPNC places emphasis on education and social support. In this model of care, pregnant women are involved in their own health care and share their knowledge, skills and experiences with one another.[15]

Evidence suggests that GPNC improves pregnancy outcomes—such as birth weight, increased breastfeeding initiation and increased family planning uptake—and reduces the incidence of adverse pregnancy outcomes, such as low birth weight and preterm birth.[16–18]

GPNC provides more time for pregnant women to improve their knowledge and active participation in self-care which, in turn, can increase their decision-making ability, self-efficacy and empowerment.[15,19]

Given the importance of adolescent pregnancy empowerment to maternal and neonatal health outcomes and considering the paucity of research on this issue in Iran, the current study was conducted to evaluate the effect of GPNC on adolescent pregnancy empowerment.

The general objective of the study was to evaluate the effect of GPNC on the empowerment of pregnant adolescent women. The specific objective of the study was to assess the effect of GPNC on the dimensions of pregnancy empowerment, including self-efficacy, joy of having an addition to the family, self-esteem, future image and support and assurance from others. This was a mixed-method study which was conducted to evaluate the effect of GPNC on adolescent pregnancy outcomes in Ahvaz, Iran.

Methods

This was a parallel randomised controlled trial conducted between August 2021 and July 2022.

The participants in this study included married pregnant adolescents aged between 15 and 19 years who received prenatal care at public health centres in Ahvaz, Southwest Iran. Women were eligible to participate in this study if they: were aged between 15 and 19 years, had a singleton pregnancy with a gestational age of 16 to 22 weeks, were gravida one or two and had a low-risk, intended pregnancy. Women with any medical conditions that made pregnancies high-risk, such as diabetes mellitus and high blood pressure, were excluded from the study.

Based on the objectives of the current study and according to a previous study,[20] which assumed the power of 80% and $\alpha = 0.05$, the sample size was calculated to be 132 women for each group, using the following formula:

$$\frac{(Z_{(1-\alpha/2)} + Z_{(1-\beta)})^2 [P_1(1-P_1) + P_2(1-P_2)]}{d^2}$$

where $Z_{1-\alpha/2}$ is 1.96 at a 95% confidence interval; $Z_{1-\beta/2}$ is 0.84 at the power of 80%, *P1* = 0.156 (proportion of preterm birth in adolescent pregnant women in the control group), *P2* = 0.052 (proportion of preterm birth in adolescent pregnant women in the intervention group) and *d* the clinically significant difference (0.104). Given the possible 10% attrition rate, 147 women were considered for each of the intervention and control groups.

The lead researcher (FM) visited the 37 public health centres in Ahvaz and screened the health records of pregnant adolescents for those who met the inclusion criteria. Eligible adolescents were then called by phone and briefed on the general objectives of the study. Those who were willing to participate in the study were invited to the health centre for a face-to-face meeting, where they were given detailed explanations regarding the study objectives, duration and method; assured of confidentiality regarding their information; and informed of their right to withdraw from the study at any stage.

After the eligible women were recruited, they were randomised based on the block randomisation method (using a random sequence computer programme), with block sizes of four and six and an allocation ratio of 1:1. To conceal random allocation, the type of intervention was written on a paper and placed inside opaque envelopes, and all envelopes were kept by an individual who was not involved in sampling or data collection. Because of the nature of the intervention, it was not possible to blind the researchers or participants. However, both the researchers and participants did not know about the order of participation until the commencement of the study. After informed consent was obtained, the participants were randomised into groups and received either IPNC (control group) or GPNC (intervention group) [Figure 1].

Six public primary health centres which had the largest number of pregnant adolescents among the 37 centres in Ahvaz were selected for sampling. Ahvaz, the capital of Khuzestan province, is one of the most

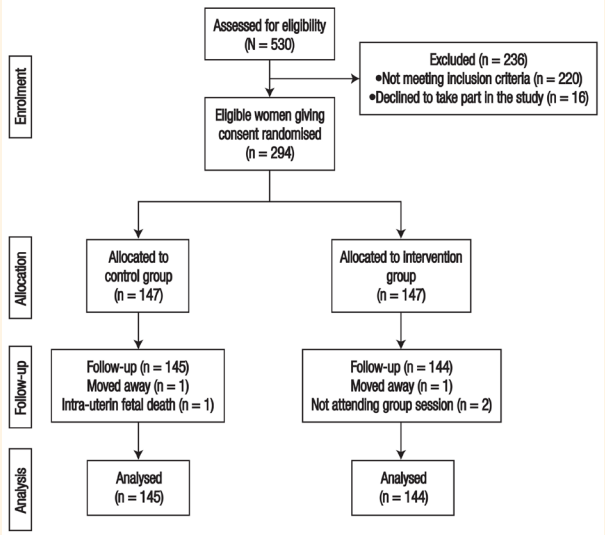

Figure 1: Flow diagram of the recruitment and retention of participants in this study.

Table 1: Topics discussed during the group prenatal care sessions

Session	Weeks of gestation	Content
1	16–20th week	Danger signs in pregnancy; dental hygiene; discomforts and common complaints of pregnancy; nutrition and supplement.
2	24–30th week	Mental health; sexuality.
3	31–34th week	Childbirth and the benefits of natural childbirth; how to check for fetal movement.
4	35–37th week	Preparation for childbirth; breastfeeding; neonatal care.
5	38th week	Labour symptoms; the right time for the next pregnancy.

populous cities in Iran and is located in Southwest Iran.

The first prenatal care visit for women in the intervention group was conducted individually at 6–10 weeks of pregnancy. During this session, a demographic questionnaire was completed through face-to-face interviews. The adolescents in this group were further classified into 25 subgroups, each subgroup consisting of 5–6 adolescents at approximately the same gestational age who participated in a total of five sessions (each lasting for 90–120 minutes) during their pregnancy.

At the beginning of each group session, the lead researcher (FM) individually measured each woman's fundal height and auscultated the fetal heart. During the first session, the pregnant adolescents were taught how to measure their blood pressure and weight. At each session, blood pressure and weight were measured under the supervision of a midwife, and after these measurements, the discussion for that session began. The group sessions were conducted in a circle, and the content of the discussion was based on a prenatal care booklet issued by the Iranian Ministry of Health [Table 1].

Groups were organised by the lead researcher; a topic that was relevant to the gestational age of the group members was introduced, and the women were asked to present their experiences about it. The pregnant adolescents were encouraged to participate in prenatal care educational sessions and express their ideas, knowledge and experiences with respect to care; then the necessary training was provided by the midwife in simple language. The participants were also allowed to ask questions and voice their concerns about pregnancy and childbirth. Other aspects of prenatal care such as blood and urine tests and ultrasounds were handled individually by a laboratory technician and a radiographer, respectively, and the participants were not involved in these measurements. There was a 'private time' at the end of each session during which participants were allowed to ask private questions and get their urine and blood tested or undergo an ultrasound scan. The ample time spent with a midwife and peers in GPNC allowed the mothers to talk freely with each other and be more comfortable asking their questions. As a result, they gained a vast amount of useful information. The control group received routine IPNC, which was provided by a midwife employed in the health centre.

The data collection instruments used were a demographic and obstetric questionnaire and the Empowerment Scale For Pregnant Women. The demographic and obstetric questionnaire consisted of questions about the mother's age, gestational age,

gravidity, educational level and occupation and the educational level and occupation of the husband, as well as his economic status.

The content validity of the demographic and obstetric questionnaire was confirmed, and participants in the intervention and control groups were asked to complete the questionnaire at the outset of the study. The Empowerment Scale For Pregnant Women was completed in two phases—before the intervention (at 6–10 weeks of gestation) and after the intervention (at 38–40 weeks of gestation)—by women in the two groups. The Empowerment Scale For Pregnant Women was developed by Kameda and Shimada and comprises 27 questions in five dimensions, namely self-efficacy (which includes six items related to the feeling of being able to manage pregnancy and childbirth), future image (which includes six items related to the goals and aims of the pregnancy, childbirth, the parents' hope for the future and becoming a parent), self-esteem (which includes seven items related to acceptance of being pregnant and a mother), support and assurance from others (which includes four items concerning acceptance and support) and the joy of having an addition to the family (which includes four items regarding the joy of having a new family member).[12] This scale is scored using a 4-point Likert scale, ranging from 1 (strongly disagree) to 4 (strongly agree). The total scores of the scale range from 27 to 108, with a higher score indicating higher pregnancy empowerment. The validity and reliability of this scale have been evaluated by HajiPour *et al*. in Iran in 2012.[21] In that study, the internal consistency of the scale, using Cronbach's alpha, was 0.72, with a sample size of 40 participants. The stability of the scale, using the test–retest method on 40 participants within a two-week interval, was 80%. A midwife assisted the lead researcher with data collection.

All data were analysed using the Statistical Package for the Social Sciences (SPSS) Version 22.0 (IBM Corporation, Armonk, New York, USA). The Shapiro–Wilk test was used to check for normality of the data distribution. The independent t-test was used to compare the age, body mass index and mean total score of pregnant women's empowerment between the two groups. The Chi-squared test was used to compare categorical data, such as gravidity, educational and economic status, occupation, family support and living with the spouse's family. Logistic regression was used to detect differences in terms of pregnancy empowerment between the two groups, after adjusting for confounding variables. A *P* value of < 0.05 was considered statistically significant.

The study design was approved by the ethics committee of Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran (Ref. ID: IR.AJUMS.REC.1400.235), and it was also registered in the Iranian Registry for Clinical Trials (Ref No: IRCT20210703051764N1). Each participant provided written informed consent before the commencement of data collection.

Results

At the end of the study, 5 participants dropped out (the reasons are listed in Figure 1), and 98.29% of participants completed the study. The mean age of

Table 2: Socio-demographic characteristics of the participants in the group prenatal care and individual prenatal care groups (N = 294)

Variable	Mean ± SD or n (%)		*P* value
	GPNC	IPNC	
	(n = 147)	(n = 147)	
Age in years	17.42 ± 1.31	17.40 ± 1.28	0.858
Gravidity			0.064
1	138 (93.9)	135 (91.8)	
2	9 (6.1)	12 (8.2)	
BMI at base line in kg/m^2	22.48 ± 2.51	22.50 ± 2.31	0.857
Educational level			0.769
Primary	24 (16.6)	21 (14.3)	
High school	100 (68.0)	102 (69.4)	
High school diploma	24 (16.3)	23 (15.6)	
Economic status			0.656
Good	37 (25.1)	42 (28.6)	
Moderate	72 (49.0)	70 (47.6)	
Poor	38 (25.9)	35 (23.8)	
Occupation			0.498
Housewife	145 (98.6)	147 (100.0)	
Employee	2 (1.4)	0 (0.0)	
Family support			0.526
Very good	124 (84.4)	121 (82.3)	
Good	22 (15.0)	25 (17.0)	
Fair	0 (0.0)	1 (7.0)	
Inappropriate	1 (0.7)	0 (0.0)	
Living with the spouse's family			0.48
Yes	118 (80.3)	112 (76.2)	
No	29 (19.7)	35 (23.8)	

SD = standard deviation; GPNC = group prenatal care; IPNC = individual prenatal care; BMI = body mass index.

Table 3: The scores of total empowerment and its dimensions in the group prenatal care and individual prenatal care groups (N = 294)

Variable	Mean ± SD		*P* value	β*	CI 95%
	GPNC	IPNC			
	n = 147	n = 147			
Self-efficacy					
Before intervention	14.65 ± 1.95	14.72 ± 1.58	0.997		
After intervention	18.21 ± 2.12	16.19 ± 1.79	<0.0001	2.52	(2.19–2.86)
Future image					
Before intervention	18.12 ± 1.68	18.09 ± 1.66	0.824		
After intervention	19.57 ± 1.57	18.95 ± 1.54	<0.0001	0.67	(0.44–0.9)
Self-esteem					
Before intervention	20.94 ± 1.66	20.63 ± 1.75	0.069		
After intervention	21.79 ± 1.75	20.90 ± 1.85	<0.0001	0.69	(0.41–0.97)
Joy of having an addition to the family					
Before intervention	12.36 ± 1.28	12.34 ± 1.22	0.986		
After intervention	13.13 ± 1.69	12.84 ± 1.40	0.009	0.51	(0.28–0.74)
Support and assurance from others					
Before intervention	12.16 ± 1.30	12.28 ± 1.21	0.394		
After intervention	13.70 ± 1.1	13.04 ± 1.07	0.094	0.76	(0.13–1.65)
Total score of empowerment					
Before intervention	78.29 ± 3.81	78.07 ± 1.20	0.579		
After intervention	86.46 ± 4.95	81.89 ± 4.75	<0.0001	6.11	(4.89–7.33)

SD = standard deviation; GPNC = group prenatal care; IPNC = individual prenatal care; CI = confidence interval.
**Estimating the regression coefficient.*

participants in the GPNC and IPNC groups was 17.42 and 17.40 years, respectively (*P* = 0.085) [Table 1]. Most of the participants had an elementary level of education and were categorised as being at a moderate level regarding their economic status. The two groups did not have any significant differences in terms of age, parity, educational level, economic status, family support and occupation [Table 2].

The mean total score of pregnant women's empowerment in the two groups before intervention was 78.29 ± 3.81 and 78.07 ± 1.20 (*P* = 0.579). Additionally, the two groups had no significant differences in all the dimensions of empowerment before intervention [Table 3].

The mean total score of pregnant women's empowerment in the GPNC and IPNC groups after the intervention was 86.46 ± 4.95 and 81.89 ± 4.75, respectively (*P* <0.0001). After the intervention, the total score of empowerment and all its subscales were higher in the intervention group than in the control group. Following an adjusted linear regression analysis, significant post-intervention differences were observed between the two groups regarding the total score of empowerment and all its subscales except for the 'support and assurance from others' subscale [Table 3].

Discussion

This study aimed to evaluate the effect of GPNC on adolescent pregnancy empowerment. According to the results, after the intervention, the mean score of the 'self-efficacy' dimension improved significantly in the GPNC group compared to the control group. Active participation of adolescent mothers in self-care increased their decision-making power and self-efficacy, which contributed to their empowerment. This finding is similar to that of Heberlein *et al.*[22] Furthermore, McKinnon *et al.* found that GPNC improved maternal self-efficacy.[16] However, in contrast to the current study's findings, Somji *et al.* did not find statistically significant differences in self-efficacy

between the two groups.[23] The differences in results between their study and the current one could be due to the instrument used to measure pregnant women's self-efficacy.

The current study's results also showed that the self-esteem dimension improved significantly in the GNPC group compared to the control group, following the intervention. Low levels of self-esteem can reduce access to healthcare services and acceptance of effective interventions.[24] In contrast, a high level of self-esteem is effective in helping the mother cope with the challenges of pregnancy and childbirth.[25] As a result, self-esteem can affect a pregnant woman's experience and pregnancy outcomes.[26] Social support increases the mother's competence and empowerment by improving her self-esteem and reducing stress during the period of transition to motherhood.[27] The current study revealed that GPNC affected the self-esteem dimension by providing the women with information, peers and midwife support. This finding aligns with that of Herrman *et al*. who found that the information, support and peer relationships available in group care helped pregnant women to develop their skills and ability to deal with stressful factors and increased/promoted their self-esteem and sense of empowerment.[28]

The current study showed that the mean score of the 'future images' dimension significantly increased in the GPNC group compared to the IPNC group. 'Future image' refers to a realistic picture of the long- and short-term aims of pregnancy, childbirth and motherhood.[12] Acquiring information and social support helps pregnant adolescents to improve their mood and self-image, reduce their worries related to pregnancy and be more accepting of childbirth.[29]

Further, the current study's results showed that the mean score of the 'joy of having an addition to the family' dimension significantly increased in the GPNC group compared to the IPNC group, after the intervention. Pregnant adolescents have mixed feelings about pregnancy. For some, having a child gives them a meaningful life and will help them in their transition to adulthood, while for others, pregnancy and motherhood is a negative event.[30,31]

The education and support provided through GPNC prepares pregnant women for the transition to motherhood.[22] In the current study, by preparing them for motherhood, GPNC appeared to instil the feeling of joy of having an addition to the family in pregnant adolescents.

Pregnant women are very concerned about their health and their baby's well-being.[32] These concerns are often because they have inadequate information about the physical and emotional changes associated with pregnancy.[30] Knowledge acquisition during pregnancy enables women to adapt to the physical and emotional changes associated with pregnancy.[32]

Holding group care sessions and providing ample opportunities for expecting mothers to talk about their pregnancy concerns have been found to enhance their knowledge and reduce their worries.[22,33] Furthermore, interaction with peers during GPNC sessions and the exchange of information and pregnancy experiences that occurs provide peer support. Therefore, GPNC can lead to informational and emotional support.[34] Of course, protecting each woman's privacy may be a concern during GPNC. In the current study, none of the participants had any concern about lack of privacy. Although, a number of studies, such as that by Sultana *et al*., have shown that GPNC facilitates information exchange and the provision of emotional support by peers and health care providers,[35] others, including that of Kennedy *et al*., did not find any significant differences in social support measures between the two methods of prenatal care, and their participants preferred to have private time with the health care provider.[36] In the current study, there were no significant differences in the 'support and assurance from others' subscale between the two groups on adjusted linear regression analysis; however, following a dependent t-test analysis, a significant difference was observed between the two groups. Further, it seemed that GPNC promoted the feeling of receiving support and approval from others.

According to the findings of this study, after the intervention, the total empowerment score was significantly improved in the GPNC group compared to the IPNC group. In other words, compared to IPNC, GPNC has a greater effect on adolescent pregnancy empowerment. This result is supported by that of El Sayed and Abd-Elhakam which showed a positive effect of GPNC on pregnant empowerment.[37] Additionally, in a study by McKinnon *et al*., GPNC improved empowerment in pregnant women.[16] Trudnak suggested that women who engaged in GPNC received more education and support and were more empowered to make decisions about their pregnancy and childbirth.[38] In contrast, Somji *et al*. found no differences between the GPNC and IPNC groups in terms of empowerment.[23] The difference between their study findings and those of the current one could be attributed to the instrument used to measure pregnant women's empowerment.

To the best of the authors' knowledge, this is the first study to evaluate the effect of GPNC on adolescent pregnancy empowerment in Iran. Despite

its strengths, this study has some limitations. First, the participants could not be blinded to the study condition. However, randomisation was used to minimise bias, and the women did not know their grouping prior to the commencement of the study. Second, most of the participants in this study were from low-income families in Ahvaz city, and this may affect the generalisability of the results. Third, the involvement of the researcher in the group discussion may have been a source of bias.

Conclusion

GPNC can improve pregnant adolescents' empowerment. The results of the current study can provide a foundation for the implementation of the GPNC model in Iran.

AUTHORS' CONTRIBUTION

FM, PA, MI and ElM were involved in the design of the study. FM collected the data. FM, NS, PA, ElM and EeM contributed to data analysis and interpretation. PA and FM prepared the manuscript. All authors read and approved the final version of the manuscript.

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CONFLICT OF INTEREST

The authors declare no conflicts of interest.

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