Palestinian Medical and Pharmaceutical Journal

The Effect of an Empowerment Program Integrated with Family Support on Maternal Self-Esteem among Pregnant Adolescents in Palestine: A Randomized Controlled Trial

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(Type: Full Article). Received: 27th May 2025, Accepted: 1st Jul. 2025. Published: ××××, DOI: ××××

Accepted Manuscript, In Press

Abstract: Background: Adolescent pregnancy has an impact not only on the health of the baby but also on the physical, psychological, and social situation of the growing girl. Low maternal self-esteem can lead to self-doubt and a lack of confidence in motherhood. Aim: To examine the effect of an empowerment program integrated with family support on maternal self-esteem among pregnant Palestinian adolescents. Methods: This was a randomized controlled trial with a two-group pretest/posttest design. Fifty-eight pregnant adolescents were recruited from six governmental primary healthcare clinics in Palestine. The participants were randomly allocated to either the control group (n = 29) to receive only antenatal care, or the experimental group (n = 29) to receive both antenatal care and the proposed intervention. The demographic information, the Maternal Self-Report Inventory-Short Form (MSRI-SF), and the Family Support Questionnaire (FSQ) were the instruments used for data collection. Data were collected at 32 or 33 weeks (baseline) and 36 or 37 weeks (posttest). The statistical analyses included descriptive statistics, chi-square test, and t-tests. Results: The experimental group maternal self-esteem levels following the intervention significantly improved when compared to their baseline scores ($t = 15.12$, $p < .001$). Furthermore, the experimental group had significantly higher post-test scores than the control group ($t = 11.41$, $p < .001$). Post-intervention family support scores differed significantly between the experimental and control groups ($t = 5.93$, $p < .001$) and within the experimental group between pre- and post-intervention ($t = 10.24$, $p < .001$). Conclusion: This study shows that improving maternal self-esteem in pregnant adolescents in Palestine may be accomplished practically and successfully through an empowerment program integrated with family support.

Keywords: Empowerment program, Family support, Maternal self-esteem, Pregnant adolescents

Trial registration: ClinicalTrials.gov on 01/09/2021 with the code NCT05031130. https://clinicaltrials.gov/study/NCT05031130

INTRODUCTION

Early marriage is considered a violation of human rights [1], which deprives Palestinian adolescent girls of their basic rights in education and health [2]. It often results in school dropout, social isolation, and early childbearing [3]. According to a recent report of the United Nations Fund for Population Activities, the adolescent birth rate was 43 per 1,000 among girls between the ages of 15 and 19 [4]. Pregnancy during adolescence may expose adolescent girls to decreased self-confidence and may create problems with self-esteem [5]. It also creates a sense of powerlessness [6] and a lack of self-confidence in her ability to prepare for motherhood. These challenges can have a lasting impact on her psychosocial development and her future role as a mother.

Adolescent pregnancy impacts not only the baby's health but also the adolescent girl's physical, emotional, financial, and social well-being. Maternal self-esteem (MSE) is generally defined as a woman's value that is strongly related to her abilities [7]. Mercer and her colleagues defined MSE as a person's perception of how others see her and her self-acceptance of that perception [8]. MSE is an essential component of mothering [9]. It is directly related to mothers' sense of self-confidence and self-competence. It plays a mediating psychological role that influences women's adjustment, motivation, and adaptation to motherhood [10]. Low self-esteem is expressed as feelings of inadequacy, incompetence, and lack of confidence in overcoming challenges [11]. Self-esteem, particularly among pregnant adolescents, was negatively correlated with lack of skills regarding mothering, including breastfeeding and caring for their babies after giving birth [12]. Adolescent mothers demonstrate lower self-esteem than non-adolescent mothers [5]. The majority of adolescent girls feel that they are "bad moms" because they are too young to fulfill the expected norms of mothering [13]. Thus, the emotional well-being of the mother, which is tied to MSE, is a key factor for success in motherhood [9].

Pregnancy is a joyful time for most women but also an overwhelming and scary time with many vulnerabilities and challenges. Pregnancy is the time when women need the support of family members [14]. During pregnancy, expectant mothers not only experience hormonal changes but are also

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psychologically surrounded by the thought that, as first-time mothers, they are not able to cope with the upcoming new situation [15]. Without adequate emotional and social support from the family, these feelings can intensify and affect both the mother's mental health and prenatal outcomes.

Empowerment is expected to have a positive impact on a woman's well-being in the prenatal period and her readiness to handle the challenges of motherhood [16]. Family support is any help provided by a family member to another related by marriage [17]. Families provide support to one another by nurturing, sharing tasks, influencing, and exchanging information and feelings [18]. A lack of social support is perceived as unhelpful and can undermine a mothers' self-esteem [19]. In the present study, family support is composed of four functional constructs, namely, informational, emotional, instrumental, and appraisal support. Thus, empowering adolescents during pregnancy may be an opportunity to create long-lasting benefits, not only for pregnant adolescents but also for their baby after delivery.

To date, there has been limited research on programs designed to boost MSE, such as self-care training [20] and maternal role preparation programs [21]. These interventions have their own challenges, such as measuring general self-esteem and reaching a specific population of pregnant women, such as those undergoing in vitro fertilization. An interesting study by Chanthaboon [22] showed that a two-week postnatal empowerment program combined with husband's support significantly improved MSE scores among Thai adolescent mothers. However, to our knowledge, no study has reported on the impact of an integrated intervention on MSE in pregnant adolescents during the prenatal period.

Two hypotheses were adopted. The first hypothesis was that the mean MSE score in the experimental group after participation in the empowerment program integrated with family support (EPIFS) would be significantly greater than its baseline value. The second hypothesis was that the mean MSE of pregnant adolescents in the experimental group after participation in the EPIFS would be significantly greater than that of pregnant adolescents in the control group after receiving only routine care.

METHODS

Study Setting

The study was conducted in Nablus, one of the biggest cities in Palestinian Northern West Bank. The recruitment sites were six primary health care clinics run by the government. The period of collecting data was September 29, 2021 to August 22, 2022.

Antenatal Routine Care

Routine antenatal care was provided to all participants, and included weight, blood pressure, and abdominal assessment including fundal height and fetal presentation. Additionally, individualized education and counseling were also provided during each clinic visit, depending on the need of the pregnant adolescent. Antenatal visits were planned for checkups every four weeks until 28 weeks of gestation, then every two weeks until 36 weeks of gestation, and then weekly until delivery in accordance with standard care guidelines.

Study Design

A randomized, single-blind, pretest-posttest controlled group trial design to assess the effect of an integrated empowerment program with family support on MSE among pregnant adolescents. The trial was reported following the CONSORT checklist for randomized controlled trials.

Sample

Sample size estimation was based on previous research that evaluated MSE as the primary outcome. Using Cohen's d formula [23] and assuming a large effect size of 0.80, with power 0.80 and a significance level of 0.05, the total required sample size was 50 participants, 25 in the control group and 25 in the experimental group. To account for potential attrition, which was anticipated to be around 25% based on similar studies among adolescents, six additional participants were added to each group. The final sample size was 62, with 31 women in the control group and 31 in the experimental group.

Eligibility Criteria

Pregnant adolescents were enrolled if they met the following criteria: (1) primigravida, (2) aged 15–20 years, (3) at 32 or 33 weeks of gestation, (4) had no pre-existing medical conditions, (5) had no pregnancy-related complications such as preterm labor or gestational hypertension, (6) gave a positive response to at least one item on a perinatal depression screening checklist adapted from the Edinburgh Postnatal Depression Scale, (7) resided in Nablus city, (8) were able to read, write, and communicate in Arabic, and (9) were accompanied by a family member during the intervention.

Inclusion criteria for family members included having the intention 1) to stay with the adolescent throughout the intervention, 2) to continue to support them at home, and 3) to be readily available by phone during the intervention. Pregnant adolescents were excluded if they were: 1) unable to finish the intervention sessions, or 2) experienced obstetric problems during the intervention such as preterm labor or hemorrhage. In the case that a family member was unable to attend the intervention session or was unable to provide support at home, they were excluded.

Randomization

Midwives and nurses working at the participating clinics initially screened 113 pregnant adolescents for eligibility. To confirm homogeneity between the control group and the experimental group, the researcher employed minimized randomization software (Zeller version 2.01) to control for potential confounding variables and to randomize the participants into experimental and control groups. Subsequently, 71 adolescents met the inclusion criteria and consented to participate in the study, with 31 participants randomly assigned in the experimental group and 40 participants in the control group. Thirteen participants, including two participants from the experimental group and 11 from the control group, subsequently dropped out - resulting in a final analyzed sample of 58 participants. The participants' flow through the study is shown in Figure 1.

Study Instruments

The instruments used in this study were categorized into two groups: those used for the intervention and those used for data collection.

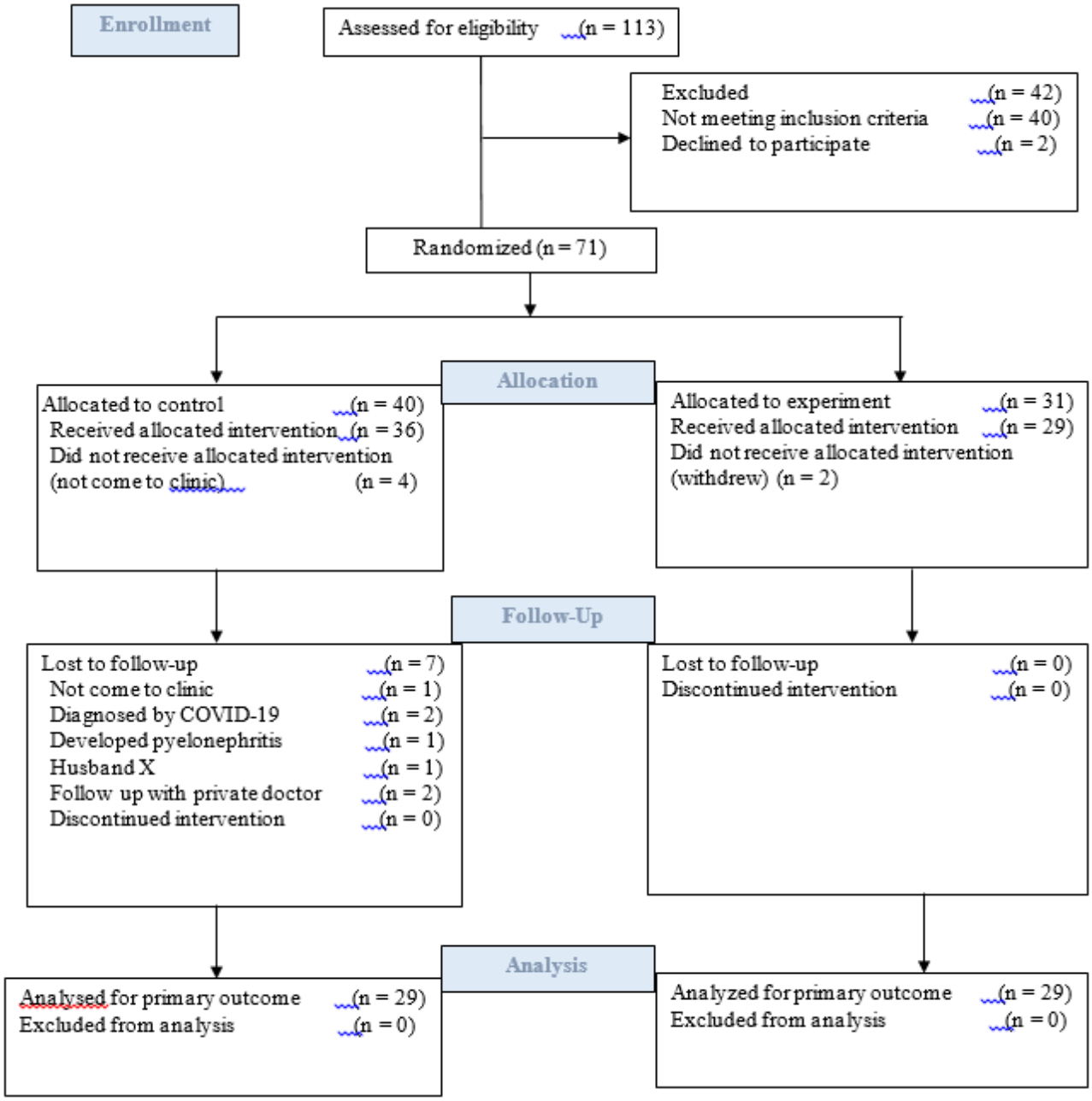

Figure (1): Consort Flow Diagram.

Intervention instruments

The intervention instrument delivered to the experimental group consisted of an Empowerment Program Integrated with Family Support (EPIFS), which was validated by three experts for content accuracy and linguistic appropriateness. The program was designed to enhance the self-esteem and coping skills of pregnant adolescents through structured, interactive activities and active involvement of family members. In addition, participants received a manual booklet to improve their knowledge, reinforce key program content, and support ongoing learning and self-reflection throughout the intervention period.

EPIFS

The program is a set of nursing interventions for pregnant adolescents and was developed by researchers based on Gibson's [24] four steps of empowerment. The empowerment steps were integrated with House's [25] four family support resources and a literature review, which together were designed to improve MSE among pregnant adolescents. The program was delivered in the form of one-on-one interactive instruction using a manual booklet guide, followed by practice sessions on key mothering skills that emerged from the literature review related to pregnancy and baby care. The duration of the intervention program was one month, following the structure and timeline established in a previous study [22]. The program was conducted during the antenatal period in the third trimester of pregnancy. It consisted of a total of five steps conducted in two sessions. The first session was given while the pregnant adolescent was at 32 or 33 weeks of gestation. In this period, the researcher started with Step 1, which began with building a relationship and creating collaboration with the pregnant adolescent and family member and explaining the activities

requested from the pregnant adolescent and family member during the intervention program. For Step 2, which involved discovering reality, the researcher asked open questions to explore the reasons behind low MSE. The researcher provided the time for pregnant adolescents to answer. In Step 3, critical reflection, the researcher received feedback from the participants on how to enhance MSE during their current pregnancy. For Step 4, taking responsibility, the researcher discussed and implemented the appropriate method to enhance MSE by referring to the manual booklet. The researcher went through each part of the manual booklet. The teaching methods used were discussion and demonstration of exercise, fetal kick count and chart, baby bathing, umbilical cord care, breast care during pregnancy, and breastfeeding.

The researcher also trained a specific family member to provide comprehensive support to the pregnant adolescent across four functional areas. First, emotional support was encouraged through shared activities such as exercising together and counting fetal kicks, actively listening to the adolescent's concerns, and offering motivational words when she demonstrated mothering skills. Second, informational support involved providing each family member with a manual booklet in Arabic that outlined key mothering skills for easy reference at home. Third, instrumental support consisted of teaching family members to help reduce the adolescent's daily burden by accompanying her, assisting with household tasks such as cooking and cleaning, and providing back massages. Finally, appraisal support focused on constructive feedback; after the adolescent practiced a skill, the family member was instructed to reinforce her efforts with affirmations such as "Well done" or "You will be a wonderful mother."

Between the 33 and 34 weeks of gestation, the researcher made a phone call to each pregnant adolescent, asking questions such as, "Did you practice exercise and breast care?'' "Are there any new challenges since our last meeting?" Another call was made to the family members, inquiring, for example, "What kind of support have you offered the pregnant adolescent?" The second session took place during the 34 or 35 weeks of gestation. In this session, Step 5 involved reviewing the home fetal kick chart with the adolescent and providing feedback. This step also enabled the researcher to assess the knowledge and skills acquired from the previous session by allowing the pregnant adolescents to re-demonstrate exercise, baby bathing, umbilical cord care, and correct positioning for breastfeeding. The duration of each step was as follows: 20 minutes for Step 1, 15 minutes each for Step 2 and Step 3, 40 minutes for Step 4, and 50 minutes for Step 5.

Manual Booklet

The manual booklet developed by the researchers was based on interventional studies that aimed to enhance MSE. It contains educational material regarding the knowledge and skills provided for pregnant adolescents in the intervention program. This manual booklet was provided to pregnant adolescents and family members. It consists of four parts. The first three parts are mainly directed at pregnant adolescents and aim to enhance MSE, namely, 1) the first part focuses on healthy eating, exercise, managing pregnancy–related complaints, and strategies to manage and tips for happiness; 2) the second part focuses on bonding and counting baby kicks; and 3) the third part prepares baby care, involving bathing, umbilical cord care, and breastfeeding (BF). The fourth section guides family members on how to support the adolescents during pregnancy.

Table (1): Empowerment program integrated with family support intervention step.

GA Week	Intervention steps (Time)	Activity
1st session GA 32 or 33 weeks	*Step 1*: Building a relationship and creating collaboration (20 minutes)	Welcoming words and introduction. Explaining the activities requested from pregnant adolescents and family member during the intervention program.
	Step 2: Discovering reality (15 minutes)	Exploring reasons behind low MSE. Exploring the impact of pregnancy on adolescent's MSE.
	Step 3: Critical reflection (15 minutes)	Giving feedback on strategies to enhance low MSE. Methods used to enhance MSE.
	Step 4: Taking responsibility (40 minutes)	Providing pregnant adolescents and their family members with knowledge and skills to improve MSE. Preparing family members to provide emotional, informational, instrumental, and appraisal support.
GA 33 or 34 weeks	Phone call	Ensuring that pregnant adolescents consistently take responsibility for exercising, counting and charting fetal kick, breast care. Encouraging family members for continued support to pregnant adolescents.
2nd session GA 34 or 35 weeks	*Step 5:* Holding on (50 minutes)	Reviewing adolescents' at-home fetal kick recordings. Re-demonstrating key skills (exercises, baby bathing, umbilical cord care, and breastfeeding positions) to both the researcher and a family member by the pregnant adolescents.

Abbreviation: GA: Gestational Age; MSE: Maternal Self-Esteem

Data Collection Instruments

Data were collected using three instruments: a demographic data form, the Maternal Self-Report Inventory–Short Form (MSRI-SF), and the Family Support Questionnaire (FSQ).

Demographic Data Form

Data from the pregnant adolescents and family members were obtained using a questionnaire built by the researchers. The three main parts of the demographic data were as follows. The first part included the general demographic information, which was divided into the following sections. 1) Demographic data of the pregnant woman, consisting of 13 items. 2) Demographic data of the husband of the pregnant woman, consisting of 6 items. The second part, which had 7 items, contained obstetric data during the prenatal period. In the third part 8 items were included related to family members.

MSRI-SF

The MSRI-SF was created by Shea and Tronick [10] and aimed to measure MSE among pregnant adolescents. It consists of 26 items with rating based on a Likert scale with five points, from 1 to 5 as the following: 1 completely false, 2 mainly false, 3 neither true nor false, 4 mainly true, and 5 completely true. The

range for the total scores is 26 to 130. Higher total scores represent higher self-esteem expressed by pregnant women. The CVI for English and Arabic was 1.00. The reliability was tested using Cronbach's alpha coefficient with 20 pregnant adolescents who met the sample criteria. The resulting coefficient was 0.84, meeting the acceptability recommended by Polit and Beck, which is 0.80 or higher [26].

FSQ

The FSQ was developed by the researcher based on House's (1981) concept of social support [25] to evaluate the support provided by family members after the intervention program compared to those in the control group. It consisted of 20 items covering four types of support given to pregnant adolescents: emotional, instrumental, informational, and appraisal support. Each item was rated on a five-point scale: 1 = Never, 2 = Sometime, 3 = Often, 4 = Very often, 5 = Always. The FSQ demonstrated high reliability in this study, with a Cronbach's alpha of 0.913, tested on 20 pregnant adolescents meeting the same criteria as the main sample.

Data Collection Procedures

Midwives or nurses in charge on duty at the antenatal clinics checked for eligible pregnant women, who were then asked for permission for the researcher to recruit them as participants. The study included pregnant women who agreed to participate and who met the inclusion criteria. Before data collection, a qualified midwife was recruited as a research assistant based on the criteria. She received one day of training, emphasizing the collaboration, study purpose, and data collection responsibilities to ensure objectivity and freedom from bias. The research assistant collected data during the day at the antenatal clinic. The intervention program was provided for the experimental group at 3 time points: 32 or 33 weeks of gestation, 33 or 34 weeks of gestation (home phone call), 34 or 35 weeks of gestation (follow-up), and routine care at the clinic. In the control group, pregnant adolescents provided informed consent and received routine antenatal care. At 32 or 33 weeks of gestation, participants attended regular follow-up appointments and received standard services offered at the primary antenatal clinic. At 34 or 35 weeks of gestation, they continued to receive routine care along with the clinic's usual counseling services. The MSRI-SF and FSQ were administered to both groups at 32 or 33 weeks of gestation as a pretest and at 36 or 37 weeks of gestation as a posttest.

Data Analysis

The demographic data of the pregnant and their family members were analyzed using percentages and numbers, while for quantitative data, statistical measures such as means, standard deviations, and frequency distributions were applied.

The differences between the demographic data of the control and experimental groups were evaluated using the chi-square test and independent t-test. The assumptions of the independent t-tests and paired t-tests revealed no violation of normality or homogeneity of variance; therefore, independent t-tests were used to evaluate the differences between the two groups in the means of the demographic data, MSE, and FSQ, and paired t-tests were used to compare the means before and after the intervention among the control and experimental groups.

Results

The demographic characteristics of pregnant adolescents and their accompanying family members were compared between the experimental and control groups using chi-square and the independent t-tests. As shown in Table 2, there were no statistically significant differences between the groups in the adolescents'' characteristics.

Table (2): Comparison of demographic characteristics of pregnant adolescents in the experiment and control groups. (n = 58)

Variable	Experiment (n = 29)		Control (n = 29)		t/χ^2	P-value
	n	%	n	%		
Age (years)	M = 19.45 SD = 0.78 (Min = 16, Max = 20)		M = 19.10 SD = 1.05 (Min = 18, Max = 20)		1.42[a]	0.16
Residency place					0.80[b]	0.78
City	9	31.00	10	34.50		
Village	20	69.00	19	65.50		
Religion					N/A	N/A
Islam	29	100.00	29	100.00		
Marital status					N/A	N/A
Married	29	100.00	29	100.00		
Education					1.32[c]	0.52
Preparatory	7	24.20	11	37.90		
Secondary	21	72.40	17	58.70		
Diploma	1	3.40	1	3.40		
Living in					0.74[d]	0.67
Husband house	25	86.20	27	93.10		
Husband parent house	4	13.80	2	6.90		
Type of housing					0.22[d]	1.00
Leasehold	2	6.90	3	10.30		
Owner	27	93.10	26	89.70		

Table (2): (Continued).

Variable	Experiment (n = 29)		Control (n = 29)		t/χ^2	P-value
	n	%	n	%		
Occupation					0.35[b]	0.56
Housewives	22	75.90	20	69.00		
Student	7	24.10	9	31.00		
Husband's attitude toward pregnancy					N/A	N/A
Happy and accept the pregnancy	29	100.00	29	100.00		
Relationship status with husband					2.24[c]	0.33
Excellent	27	93.10	24	82.80		
Good	2	6.90	4	13.80		
Fair	0	0.00	1	3.40		
Support person					2.76[c]	0.43
Your mother	4	13.80	7	24.10		
Your husband	23	79.40	20	69.00		
Mother-in law	1	3.40	2	6.90		
Sister	1	3.40	0	0.00		
Family type					N/A	N/A
Nuclear	29	100.00	29	100.00		
Number of persons living in home					1.02[d]	1.00
Two	29	100.00	28	96.60		
Four	0	0.00	1	3.40		

Note. [a]Independent t-test; [b]Pearson chi-square test; [c]Likelihood ratio test; fisher's exact test

However, Table 3 shows a statistically significant difference in the monthly income of the family members ($p < .05$). These income data refer specifically to the family members who accompanied the pregnant adolescents, not the adolescents themselves. Hypothesis testing revealed that MSE was significantly greater after than before the intervention in the experimental group ($t = 15.12$, $p < .001$). Additionally, after the intervention, MSE was significantly higher in the experimental group than in the control group ($t = 11.41$, $p < .001$) (Table 4).

Regarding family support, significant differences in mean scores were observed between the experimental and control groups at 36 or 37 weeks of gestation. Participants in the experimental group showed significantly higher family support scores after the intervention compared to their pretest scores at 32 or 33 weeks of gestation ($p < .001$) (Table 5).

Table (3): Comparison of demographic characteristics of pregnant adolescents' family members between the experiment and control groups (n = 58)

Variable	Experiment (n = 29)		Control (n = 29)		t/χ^2	P-value
	n	%	n	%		
Age (years)	M = 36.00 SD 12.43 (Min = 18, Max = 58)		M = 37.07 SD 13.18 (Min = 18, Max = 60)		-0.29[a]	0.78
Religion					N/A	N/A
Islam	29	100.00	29	100.00		
Marital status					3.28[b]	0.35
Married	24	82.80	24	82.80		
Divorce	0	0.00	1	3.40		
Widow	0	0.00	1	3.40		
Single	5	17.20	3	10.40		
Education					8.30[b]	0.14
Illiterate	1	3.40	1	3.40		
Primary	4	13.80	12	41.50		
Preparatory	14	48.30	7	24.10		
Secondary	7	24.20	6	20.70		
Diploma	0	0.00	1	3.40		
University	3	10.30	2	6.90		
Occupation					0.35[c]	0.56
Housekeeper	22	75.90	20	69.00		
Worker	7	24.10	9	31.00		
Monthly income (USD)					9.88[b]	0.04
Less than 300	5	17.20	5	17.30		
300 - 600	7	24.10	8	27.50		
> 600 - 900	6	20.70	11	37.90		
> 900 - 1200	5	17.30	5	17.30		
More than 1200	6	20.70	0	0.00		
Family member relationship					4.80[b]	0.44
Husband	3	10.30	5	17.20		
Mother	9	31.00	3	10.30		
Sister	3	10.30	4	13.80		
Mother-in-law	8	27.80	12	41.50		
Sister-in-law	3	10.30	2	6.90		
Brother-in-law's wife	3	10.30	3	10.30		

Note. [a]Independent t-test; [b]Likelihood ratio test; [c]Fisher's exact test

Table (4): Comparison of within- and between-group pretest and posttest mean maternal self-esteem scores (n = 58)

Time	Experiment M ± SD (n = 29)	Control M ± SD (n = 29)	t[a]	P-value
MSRI-SF (26 items, Min = 26, Max Score = 130)				
Pretest	89.28 ± 8.92	86.62 ±11.61	0.98	0.33
Posttest	113.69 ± 6.65	86.45 ±11	11.41	<.001
t[b]	15.12	-0.11		
P-value	<.001	0.92		

Note. [a]Independent t-test; [b]Paired t-test

Table (5): Comparison within and between groups of the pretest and posttest mean scores of family support (n = 58)

Time	Experiment M ± SD (n = 29)	Control M ± SD (n = 29)	t[a]	P-value
Family support (20 items, Min = 20, Max score = 100)				
Pretest	72.21 ± 7.59	73.86 ± 7.36	-0.84	0.40
Posttest	86.66 ± 4.46	73.17 ± 11.39	5.93	<.001
t[b]	10.24	-0.28		
P-value	<.001	0.79		

Note. [a]Independent t-test; [b]Paired t-test

Discussion

In societies such as the Palestinian, marriage is of great cultural importance as adolescent girls are expected to commit to their new home, childbearing, and child-rearing [27]. While these expectations promote a sense of duty, they often lead to problems such as dropping out of school, loss of social contacts and social isolation. These circumstances contribute to psychological problems, including reduced self-esteem, increased anxiety and depression [28; 29]. Childbearing and motherhood in Palestinian society, as in other countries, are closely linked to cultural norms that define the role of women in the family and community [30]. The balancing act between preparing for motherhood and traditional family constraints can undermine the self-confidence of adolescent mothers required for successful parenthood [31]. Maternal self-esteem, defined as a mother's confidence in her parenting abilities, may be weakened by a lack of social support [19], whereas strong social support serves as a protective factor, enhancing self-esteem and personal competence [32]. In addition, adequate prenatal education is crucial to improve adolescent mothers' readiness for their new role [33]. Therefore, this intervention was culturally adapted to combine empowering education with family support and to address both the psychological and practical needs of pregnant adolescents.

The results of this study demonstrate the effectiveness of an EPIFS for enhancing MSE in pregnant adolescents. Although a statistically significant difference in the income of family members was found between the groups, this variable was not expected to influence the outcome of the study. The income data related to the accompanying family members, not the adolescents themselves, and the intervention was designed to directly improve the pregnant self-esteem through empowerment and support. Therefore, the observed difference in income between the groups did not affect the internal validity of the study or its results. In the domain of maternal well-being during the prenatal period and preparation for motherhood, empowerment is a central factor [16]. Coined by Gibson [24], the concept of empowerment entails a multifaceted process encompassing the recognition, promotion, and enhancement of an individual's ability to address her or his needs, resolve challenges, and mobilize the necessary resources to take charge of his or her life. This construct effectively combines individual strengths and competencies [34]. In the current study, pregnant adolescents in the experimental group actively participated in efforts to address their low MSE concerning their readiness for the maternal role. Through this process, they worked to

strengthen their MSE. The approach involved imparting knowledge about the advantages of fetal bonding and equipping them with the skills to track and record fetal movements. Moreover, participants were encouraged to engage with their unborn baby by talking to and gently touching their fetus through the abdominal wall. The significance of bonding in enhancing MSE cannot be overstated [35], as fostering this connection ultimately leads to an enhancement of MSE. This result is supported by earlier research that highlighted the positive association between self-esteem and maternal-fetal attachment [36; 37].

Empowering pregnant with essential skills after delivery, such as baby care (including bathing and umbilical care) and breastfeeding preparation (covering the benefits of breastfeeding, various breastfeeding positions, and breast care), has proven to be a life-changing experience. This training instills a profound sense of power, control, and responsibility, which greatly influences the competence and adaptability of pregnant adolescents in their evolving roles as mothers [38]. This positive impact on MSE is rooted in newly discovered feelings of competence, the ability to give care, and the readiness for the profound responsibility of motherhood.

Social support through information sharing, appraisal, emotional, and instrumental support from family members could also promote MSE in pregnant adolescents. After training and guidance from the researcher, family members assumed a critical role as attentive listeners and motivators for pregnant adolescents, demonstrating that it is possible to overcome challenges. These findings align with a previous study by Malchi et al. [39], which suggests that informal support improves MSE and reduces stress during the transition to motherhood. Furthermore, the current study's findings are in harmony with the research of Mabetha et al. [40], which also showed that providing sufficient support to pregnant women enhances their relationship attachment, acceptance of the maternal role, and engagement in prenatal care and follow-up. Social support from family members therefore has the potential to promote MSE and ultimately contribute to reducing depression during pregnancy. In this study, MSE was improved by providing individualized guidance and training to pregnant adolescents. The current study's findings are in alignment with those of the study by Chanthaboon [22], which showed that empowerment programs combined with spousal support had a positive impact on MSE among Thai adolescent mothers, although the study design differed from that of the current study. Although Salimi Akin Abadi's study [21] differed from the present study as it assessed the Mercer mothering role, it nevertheless demonstrated the positive effects of preparation for the mothering role on MSE through group instruction. In summary, providing pregnant adolescents with the needed knowledge and skills enables them to become confident in their readiness for motherhood. Therefore, integrating an empowerment program with family support is effective in improving MSE among pregnant Palestinian adolescents.

Limitations and Recommendation

Despite obtaining an adequate sample size for data analysis, the small sample size and the fact that the study participants were chosen from mid to late adolescents could limit the generalizability. Consequently, future studies targeting early-stage pregnant adolescents may provide more comprehensive interventions. Furthermore, interventions conducted on healthy pregnant women and those at high risk were excluded from the study. Therefore, future studies targeting high-risk pregnancies may also contribute to improving this intervention. All participants in the study wanted a pregnancy, which is culturally accepted among Palestinians. Unwanted pregnancies are not accepted by conservative families. Therefore, providing EPIFS may be challenging, which limits the ability to conduct interventions in conservative communities. Moreover, to enrich the interpretation of MSE changes among participants, a mixed-methods approach to capturing this aspect is warranted in future study.

Conclusion

The outcome of this study showed the significant impact of integrating an empowerment program with family support on enhancing MSE among pregnant adolescents in Palestine. The positive effects observed can be attributed to comprehensive preparation and adherence to program guidelines. The pregnant adolescents and their family members were equipped with valuable knowledge, and the pregnant adolescents were given ample opportunities to practice and master the necessary skills. Notably, the empowerment program was implemented in collaboration with family support, which plays an active role. This approach ensured holistic and effective intervention for the participants.

Disclosure Statement

- **Ethics Approval and Consent to Participate:** The Institutional Review Board Committee for Social and Behavioral Sciences at Prince of Songkla University, Thailand (SBSIRB-PSU) (Code: PSU IRB 2021-St-Nur 009) gave approval to this study. Also, approval was obtained from the Institutional Review Board of An-Najah National University, Faculty of Medicine and Health Sciences, Nablus, Palestine (Ref: F. Med. Sep./2021/10), and permission was received from the Palestinian Ministry of Health, Nablus, before collecting data from primary health care clinics. After obtaining the necessary permission, a signed consent form was obtained from each pregnant adolescent and her family member. For those under 18 years of age, the consent form was obtained from their legal guardian or parent. Pregnant adolescents older than 18 years provided consent directly. Participants received assurances that the responses they provided would only be used for research and they were assured that they could leave the study at any time without facing consequences.
- **Consent for Publication:** Not applicable.
- **Availability of Data and Materials:** The data are available upon reasonable request.
- **Author's Contribution:** This study was the second part of Shurouq Ghalib Qadous doctoral thesis, which focused on maternal self-esteem, while the first part examined the effect of the study intervention on quality of life. Each of the authors listed in the manuscript contributed significantly to be eligible for authorship and has given their approval to the work's content. Shurouq Qadous is responsible for the designed the methodology, data collection and analysis, and reporting of the study results. Sopen Chunuan served as the major advisor and contributed to the conceptualization, methodology and study design, validation of instruments, assistance with data analysis and interpretation, revision of the manuscript, response to editorial feedback and final approval of the submitted version. Warangkana Chatchawet served as the co-advisor and contributed to the

conceptualization, study methodology and design, as well as the collaborative revision of the manuscript.

- **Competing Interests:** No competing interests.
- **Funding:** This research is funded by the Graduate School, Faculty of Nursing, Prince of Songkla University. In terms of study design, data collection, data analysis, etc., the funding source had no involvement.
- **Acknowledgments:** The researcher acknowledges thankfulness to all of the participants. The researcher would also like to thank the Graduate School, the Faculty of Nursing, Prince of Songkla University, for a funding grant for this study.

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