

Effect of Applying Pregnancy Centered Care Model on Pregnant Women Health Behaviors and Prenatal Controls

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Abstract Background: Pregnancy Centered Care is a revolutionary model of prenatal care that offers education and prenatal care in a group setting that makes a positive contribution to the transition from conception to delivery rather than traditional hospital care. **The aim:** this study aimed to evaluate the effect of applying a pregnancy centered care model on pregnant women's health behaviors and prenatal controls. **Design:** A quasi-experimental design used to achieve the aim of this study. **Setting:** The present study conducted at an equipped room in the obstetric department, and outpatient clinic of the obstetrics and gynecological department of Benha University Hospital. **Sample:** A purposive sample of 220 pregnant women aged between (15-35years) recruited for this study. **Tools: using an interview questionnaire** to assess their socio-demographic characteristics and obstetric history of pregnant women. **Health behavior assessment scale** used to assess the health-promoting behaviors of pregnant women. The third tool was a **prenatal control questionnaire** that assesses the presence of minors' discomfort and prenatal controls. **Results:** The study results showed a highly statistically significant improvement in pregnant women prenatal health behaviors and prenatal controls after implementation of pregnancy centered care model at (p-value <0.001). A positive statistically significant correlation revealed between total prenatal health behaviors score and improving good prenatal controls of pregnancy centered care group compared to hospital routine care group at (p-value <0.001). **The current study concluded** that the pregnancy centered care model associated with improved prenatal health behaviors and prenatal controls compared to routine hospital care. **Recommendations:** the pregnancy centered care model is beneficial in improving maternal health behaviors and could be used as a model for best practices at antenatal clinics and as a guide for education and training of future maternity nurses.

Keywords: pregnancy centered care model, pregnant women, health behaviors, prenatal controls

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1. Introduction

Limited development of pregnancy models designed to provide comparable levels of safety with the added benefit of providing women with more information, interaction, and experience contributing to better health outcomes and healthier behaviors [1].

Both public and private hospitals in Egypt offer routine hospital care, caregivers track large numbers of caregivers in a limited time at obstetric outpatient clinics, leaving them unsatisfied with the short time spent in receiving care after a long wait. National research documented that Routine hospital care is not ideal due to long waiting periods, lack of continuity of care, and deficient social and psychological care [2].

Routine hospital care is not enough to decrease the risk of adverse pregnancy and birth outcomes, despite increased access to prenatal care services, further or different type of intervention still needed to improve overall maternal and child health outcomes [3]. Pregnancy Centered Care is a revolutionary model of prenatal care that offers education and prenatal care in a group setting that makes a positive contribution to the transition from conception to delivery rather than traditional hospital care [4]. Pregnancy Centered Care is regarded as a measure of the standard of prenatal care as the evidence suggests that PCC strengthens the prenatal care mandate to meet the needs of women [5].

PCC has become more prevalent, and women with health problems were the elements of the model [6]. Numerous researches argue that PCC could reduce the incidences of premature birth. PCC addressed in different

researches context that is suitable only for the healthy women in childbearing age or may also improve birth weight experience, increase breastfeeding rates improve antenatal controls [7].

Women in pregnancy-centered care receive visits to prenatal care and education at the same time, sessions begin earlier in the first or second trimester, and prenatal education is held separately from prenatal care visits [8].

PCC participants have the opportunity and time to exchange experiences with the same group members and facilitators of the group [9].

Education is targeted at prenatal care, promoting healthy behavior, avoiding risky behavior, improving diet, childbirth experience, monitoring for health problems, and complications of pregnancy [10].

Throughout gestation, health-promoting habits include regular physical activity, sleep, and consuming a nutritious diet leads to positive birth outcomes. Habits such as cigarette smoking, pollution exposure, and poor nutrition are well known as habits that have a detrimental effect on the pregnant health [11]. There is cumulative evidence that when pregnant women practiced health-promoting behaviors and reduced health-impairing behaviors, better prenatal controls are reported [12].

1.1. Significance of the Study

Deficiency of social and psychological support in prenatal care was perceived by 56.1% of the pregnant women and 86.3% perceived that the individual prenatal care is not appropriate familial contribution in care [2].

Most women receive prenatal care through routine hospital care (individual prenatal care) focused on screening for health-related complications. A health care provider is delivering routine prenatal care to a woman throughout the pregnancy regularly. Each appointment includes at least an assessment of maternal weight, blood pressure, and prescribed laboratory tests irrespective of women's need for extensive prenatal care. PCC model is the most commonly adopted model of caring and recognized as the foundation of the relationship between the health care professional and the pregnant women. It improves pregnancy outcome besides saving caregiver time and energy and improve woman satisfaction [13]. Benha University Hospital is considered the official center in the city of Benha with a higher flow rate of female attendants. Therefore, the present study was aimed to evaluate the effect of applying pregnancy centered care model on pregnant women's health behaviors and prenatal controls.

1.2. Operational Definitions

1.2.1. Pregnancy Centered Care (PCC) Model Structure

Applied in groups, each comprises between eight and twelve women with the same month of delivery. Every group meets six times during the gestation period; every session takes approximately 2 hours of explanations and sharing information on the basic elements of pregnancy-centered care using different teaching methods and supporting resources such as data shows, baby models, and flip charts [14]. Among the most relevant definitions that shaped the

PCC model is that created by the Australian College of Midwives including:

- respect for the values, preferences and expressed needs of women;
- involvement of women in self-care activities;
- guidance, education and communication;
- physical comfort, emotional support and relief of fear and anxiety;
- involvement of family support is optional, and finally
- Evaluation of outcomes [15].

1.2.2. Prenatal Health Behaviors

The effectiveness of the PCC model was tested using findings from prenatal health behaviors that measure health habits in health-promoting behaviors and health-impairing behaviors [16].

1.2.3. Prenatal Controls

Pregnancy is a stressful time for many mothers, as women were almost worried about perceived pain and poor outcomes of childbirth. Prenatal controls are a reliable indicator of safer and healthier pregnancy [17].

1.3. Aim of the Study

This study aimed to evaluate the effect of applying pregnancy centered care model on pregnant women's health behaviors and prenatal controls.

1.4. Hypotheses of the Study

Two research hypotheses were tested to fulfill the aim of the present study.

Hypothesis 1: "Pregnant women who receive the PCC will adapt prenatal health behaviors and engage less in health impairing behaviors more than those who receive routine hospital care."

Hypothesis 2: "Pregnant women who receive the PCC will have greater prenatal control than those who receive routine hospital care."

2. Subjects & Methods

2.1. Technical Design

2.1.1. Study Design

The quasi-experimental design utilized in this study.

2.1.2. Study Setting

The study conducted at Benha University Hospital in Benha, Egypt, in the following settings:

1. Antenatal outpatient clinics for interviewing and physical assessment (booking visit) of the two groups of pregnant women (pregnancy centered care group & hospital group).
2. The session conducted in an equipped room in the obstetric department. It includes an adequate number of seats, data display, and supporting materials such as baby model, flip-charts needed for the application of pregnancy-centered model education, skills, and follow-up for the focused group.

2.1.3. Sampling

A purposive sample of 220 pregnant women recruited in this study. The sample size estimated using the following equation based on the previous year's admission census report in outpatient clinics (Benha University Hospital Census, 2017) [18].

$$n = \frac{N}{1 + N(e)^2}$$

Where: n= sample size, N = Population size, e = Margin of errors which is $\pm 5\%$, Confidence level = 95%, a study power of 80%.

In the current sample size, the dropout rate was not considered as the following inclusion criteria replaced the declined participants: pregnant women on the booking (before 20 weeks), single pregnancy, free of any medical or obstetric problems (e.g., diabetes, pregnancy-induced hypertension) and educated women as data collection tools were self-administered.

2.2. Sample Technique

First, the sample selected before 20 weeks of gestation as it is time for the initial visit to prenatal care (booking visit) to be assigned early to a specific care model (before receiving any other care model) and to continue proper follow-up. Second, two hundred and twenty eligible pregnant women recruited and assigned to the group or routine hospital group centered on pregnancy. Third, based community women (n = 110 assigned to 11 subgroups, each consisting of 10 women at a specific pregnancy stage to join in future sessions), and the same number allocated to the daily hospital care group.

2.3. Tools of Data Collection

2.3.1. Structured Interviewing Questionnaire (SIQ)

The researcher developed it after an extensive review of relevant literature. It completed by the participants and includes two parts.

Part 1 concerned with socio-demographic characteristics for all participants. The demographic characteristics included age, education, address, telephone number, and employment status.

Part 2 includes obstetric history that encompasses gravidity, parity, present pregnancy assessment, which include gestational age and start of prenatal care.

2.3.2. Prenatal Health Behavior Scale (PHBS)

It is a self-administered questionnaire designed to assess health-promoting behaviors in pregnancy. Pregnant women convert taught information into healthy behaviors. Researchers asked them how often the woman has participated in each of the 17 activities over the past two weeks. "Originally, the PHBS graded by reversing health-impaired habits and replacing them with healthy behaviors [19]. The women's responses for each behavior evaluated against a 3 point scale, ranging from 0 (never), 1 (sometimes) to 2 (always). PHBS scored as:-

- Impairing behaviors counted if the total score < 60% of total prenatal health behavior score (<20 degrees).

- Promoting behaviors counted if the total score 60-80% of total prenatal health behavior (>20-27degrees).

- Highly healthy promoting behaviors counted if the total score of 80 % of the total prenatal health behavior score (>27 degrees).

2.3.3. Prenatal Controls Questionnaire (PCQ)

Prenatal controls questionnaire is a self-report questionnaire that include two items; the first item addressed the extent to which the PCC model decreased minors discomfort during pregnancy and prevent health problems from occurring (e.g., nausea, vomiting, heartburn, fatigue, frequent urination, vaginal discharge, and low back pain)which include 15 sub-items.

The second items assess indicators of promoting healthy pregnancy (e.g., improve the prenatal adjustment and experiences, pregnancy progress, keeping a healthy baby, proper preparation for labor and delivery process), which include ten sub-items. Throughout previous work, this instrument had excellent psychometric properties [20,21]. The women's responses for each item evaluated against a 3 point scale, ranging from 0 (not at All), 1 (to what extent), and 2 for (a lot). PCQ scores classified as poor controls registered if the score was below 60 percent (< 30 degrees) and good controls if the total prenatal control score was equal to or above 60 percent (more than 30 degrees).

2.4. Operational Designs

2.4.1. Preparatory Phase

- 1) Review of literature about pregnancy centered model. This review included a review of relevant recent and past, national, and international literature.

- 2) The tools developed and subjected to assess its validity and reliability.

Tools validity

The three tools subjected to validation in previous studies. For our study, Arabic translation has been done to the original questionnaires. Content validity of the Arabic version was confirmed by a panel of 5 experts in maternity nursing before introducing it to the participants. Validation was done to ensure a correct translation of the questions and carried the intended meaning they were designed to achieve.

Tools reliability

Cronbach's alpha test used to assess the tool reliability, which was ($\alpha=0.78$) for Prenatal Health Behaviour Scale (PHBS), and the prenatal controls were ($\alpha = 0.83$). It indicates a high internal consistency of an instrument.

2.4.2. Pilot Study

A pilot study conducted on 10% of the pre-assigned sample size in order to assess the consistency of interventions and the acceptability of the prenatal care model in the real clinical area. No modifications made, and the women involved in the pilot study included in the primary sample as the measurements of the study were clear and the PCC model acceptable.

2.4.3. Research Process and Field Work

The fieldwork extended over two months for the formation of the PCC model subgroups from the beginning

of February 2018 to the beginning of April 2018. The booking data collected through three days weekly (Sunday, Tuesday, and Thursday) from 9 am to 12 pm. Implementation of the model sessions and follow up carried out to end of September 2018 covering six months.

A-pregnancy centered care group

The intervention group cared for, according to the PCC care model. The model carried out in three phases: preparation of the model of care, implementation of the model, and follow up outcomes.

Phase 1: Preparation for the model

(1) Researchers training

Before interviewing the study group, the researchers were trained to ensure the success of the newly Introduced model; the researchers subjected to three training sessions. The training sessions implemented over three weeks in which the researchers learned how to apply PCC model of care. Researchers allocated the educational and skill-building tasks of each participant by the end of the training.

2) Formation of the PCC model subgroups

At the booking visit, the researchers explained the aim and the nature of the study to the women who fulfilled the criteria of inclusion, then each potential woman assigned to PCC model subgroups. Each PCC model subgroups consisted of 1 ten pregnant women at a similar stage of pregnancy. Eleven subgroups were part of the main design of the PCC. All members of the same group asked to attend as a group in the upcoming visits and the women's attendance based on a prescheduled antenatal care schedule of ten structured sessions. Every session took about two hours. The attendance of the companions was optional.

Phase 2: Implementation of the model sessions.

-The implementation involved the provision of prenatal care through PCC model sessions. Every session runs in an organized sequence. All studied women received physical evaluation during the first part of each booking session, filling the interview, and prenatal health behaviors questionnaires in the antenatal setting. It followed by a discussion in an equipped room in the obstetric department to complete the session's content that focused on healthy and unhealthy behaviors as general, minors discomfort of pregnancy, and prenatal care.

-The participant sat in a circle, and the researchers began with self-introductions, group rules reminders (e.g., confidentiality, respect), and a brief relaxation/breathing exercise. During the sessions, women gave chances to contact each other socially. They encouraged participation in self-care activities as they trained by the researchers on how to weigh themselves, take measurements of blood pressure, listen to the heartbeat of the baby, and determine the due date of delivery using the due date gestation wheel.

- In the subsequent sessions, pregnant women actively participated in care by performing such skills and recorded the findings on their charts — the women allowed to discuss such findings with the researchers. Education provided through sessions of mother classes that covered specific topics of pregnancy as the health-promoting behaviors that should be adopted during pregnancy (e.g., proper nutrition, practice exercise), health impaired behaviors that should be eliminated, emotional coping, minor discomforts in each trimester sequentially and how to manage it. Also, perceptions of prenatal health

problems (critical signs that need urgent consultation) and preparation for delivery (emotionally, physically) were discussed.

- To promote women's skills, the researchers demonstrated and permit the women to re demonstrated certain activities such as how to do self-practices (e.g., personal hygiene, episiotomy care after delivery or care of cesarean section incision) and baby care (e.g., breastfeed, cord care, bathing) by using simulated baby and perineum models as supportive materials, for preparatory sessions for labour and delivery.

The researchers guided group discussion at the group setting between each participant of the subgroup and knowledgeable guest speakers (i.e., female companions).

Discussions targeted sharing experiences from others. Thirty minutes were assigned to perform discussions around pregnancy concerns of group participants. Besides, Arabic leaflets included the previously explained topics that were given to the pregnancy centered care group.

Phase 3: Follow up and outcomes.

Participants' phone numbers have taken for follow up after ending the study session. The upcoming visits were at 24th, 28th weeks of gestation. The subsequent four visits were planned every two weeks, while the last four visits were every week till delivery. The research excluded participants who did not attend a sufficient number of scheduled sessions (i.e., four antenatal care visits). On the other hand, the model outcomes were assessed by prenatal health behaviors scale and prenatal controls questionnaire after the model of care.

B-The Routine Hospital Care Group:

-The hospital group attended the outpatient clinics for receiving the routine antenatal care. The health care provider took women's personal history and present complaints of women for diagnosing any health problems. With performed examination in only 5-10 minutes. There were no scheduled plans for follow-up visits for those groups. Furthermore, the relatives were not allowed to join women during their visits to antenatal care.

-The researchers interviewed the hospital group twice, firstly at the booking visit for filling interviewing and prenatal health behavior questionnaires. The researchers then took the phone number to assess the last visit before delivery to assess prenatal health behavior and prenatal controls in order to evaluate the care given to the hospital group.

2.4. Administrative Approval

Official approval to conduct this study issued from the Dean of Faculty of Nursing to the director of the Benha University Hospital before beginning the data collection, the researchers interviewed each study participant and received informed consent.

2.5. Ethical Considerations

Each woman informed about the purpose and the study benefits at the beginning of the interview throughout the study. Every woman gave oral consent before the data collection was initiated. Confidentiality ensured throughout the study process and questionnaires filled in a private, quiet room. Everyone had a choice of continuing

or withdrawing from the study. The research conducted in compliance with the World Medical Association *Code of Ethics (Helsinki Declaration)*.

2.6. Statistical Design

Data verified before computerized entry. The statistical package for social sciences (SPSS version 22) used for data analysis, followed by data tabulation and presentation. Quantitative data described using minimum and maximum, mean, and standard deviation. Test of significance (Chi-square, independent samples Student's t-test). A significant level value was considered when $P \leq 0.05$ and a highly significant level value considered when $P < 0.001$.

3. Results

Part I: Socio-demographic characteristics of the studied women.

Table 1 illustrates that the mean age \pm SD of the hospital group is 24.5 ± 1.7 years and the mean age \pm SD of the centered model group is 24.9 ± 1.8 years, less than three-quarter of both groups lived in a rural area, and more than half of both groups are housewives with middle education.

Regarding gravidity, more than three-quarters of both groups were multi-gravida with mean gestational age \pm SD (16.2 ± 2.6) for hospital and (16.4 ± 1.2) for the centered model group.

Part II: Effect of applying pregnancy centered care model on the adoption of prenatal health-promoting behaviors.

Table 2 shows that there are highly statistically significant difference between the hospital routine cared and centered model groups in sub-items of

health-promoting behaviors (get enough sleep at night, drink milk or eat milk products such as yogurt or cheese, drink enough fluids and eat a balanced meal, rich in vitamins and minerals as fruits) and also sub-items of health-impairing behaviors (Stand on your feet for long periods of time, expose to cigarettes smoking or source of pollution) with (p -value < 0.001). Also, there were highly statistically improvements between both groups in the total prenatal health behaviors scores before and after applying models of care with (p -value < 0.001).

Table 1. Distribution of routine hospital care group and pregnancy centered care group according to their Socio-Demographic Characteristics. (No=220)

Items	Hospital group		Centered group	
	No (110)	%	No (110)	%
Age				
20-25 years	97	88.2	101	91.8
26-30 years	13	11.8	9	8.2
Mean \pmSD	24.5 ± 1.7		24.9 ± 1.8	
Address				
Urban	45	40.9	33	30
Rural	65	59.1	77	70
Level of education				
-High education	32	29.1	30	27.3
-Middle education	66	60	69	62.7
-primary education	12	10.9	11	10
Occupation				
housewife	64	58.2	58	52.7
worked	46	41.8	52	47.3
gravidity				
Primi-gravida	37	33.6	27	22.5
Multi-gravida	73	66.4	83	75.5
Gestational weeks				
Mean \pmSD	16.2 ± 2.6		16.4 ± 1.2	

Table 2. Distribution of routine hospital care group and pregnancy centered care group related to mean \pm SD of prenatal health behaviors scale. (No=220)

PHBS	Hospital group (No=110) Mean \pm SD	Centered group (No=110) Mean \pm SD	t-Test	P-value
1- Health-promoting behaviors				
1-Perform muscle stretches exercise for at least 15 minutes	0.83 ± 0.76	0.98 ± 0.87	1.58	0.115
2-Get enough sleep at night	4.49 ± 1.03	7.01 ± 0.70	21.02	$< 0.001^*$
3-Drink milk or eat milk products such as yogurt or cheese	23.3 ± 2.3	24.6 ± 1.60	4.82	$< 0.001^*$
4-Eat enough food to satisfy hunger	13.58 ± 2.2	13.59 ± 2.5	0.20	0.876
5-Drink enough fluids	23.3 ± 2.3	24.6 ± 1.60	4.82	$< 0.001^*$
6-Eat high fiber foods such as whole-grain bread or cereals	13.57 ± 2.2	12.59 ± 2.5	0.20	0.754
7-Eat a balanced meal, rich in vitamins and minerals as fruits	3.97 ± 2.13	6.05 ± 0.88	39.39	$< 0.001^*$
8- Avoid the use of substances that may be harmful during pregnancy	15.3 ± 2.3	22.6 ± 1.60	4.82	$< 0.001^*$
2- Health-impairing behaviors				
1-Do much bending during the day	43.5 ± 7.0	67.0 ± 6.5	1.45	< 0.05
2-Eat food high in fat or oil	22.5 ± 8.0	14.5 ± 7.0	0.662	< 0.05
3-Eat snacks food instead of a regular meal	53.5 ± 7.0	64.0 ± 8.5	5.83	> 0.05
4-Stand on the feet for long periods	30.5 ± 3.0	29.0 ± 6.5	4.97	$< 0.001^*$
5- Drink things with caffeine such as coffee, sodas	84.5 ± 9.0	89.0 ± 8.5	0.662	> 0.05
6- Lift heavy objects	49.5 ± 3.0	73.0 ± 7.5	0.65	< 0.05
7- Expose to cigarettes Smoking or source of pollution	94.5 ± 8.0	56.0 ± 6.5	15.88	$< 0.001^*$
8-Skip a meal, such as breakfast or lunch	50.5 ± 3.0	44.0 ± 8.5	3.83	> 0.05
9-Eat more food than needed	22.5 ± 8.0	14.5 ± 7.0	0.662	< 0.05
- Total PHBS before the model of care	24.6 ± 2.4	26.3 ± 2.67	5.86	$< 0.001^*$
- Total PHBS after the model of care	40.73 ± 6.7	62.67 ± 6.4	14.78	$< 0.001^*$
Total PHBS score	65.33 ± 9.1	88.97 ± 9.07	15.98	$< 0.001^*$

Table 3. Distribution of routine hospital care group and pregnancy centered care group related to Mean \pm SD of prenatal controls (PC) scores (No=220)

Prenatal controls (PC)	Hospital group (No=110) Mean \pm SD	Centered group (No=110) Mean \pm SD	t-Test	P-value
1. Improve the prenatal adjustment and experiences	2.97 \pm 1.13	7.05 \pm 0.83	42.42	<0.001*
2. Improve progress of the pregnancy	5.38 \pm 1.05	8.01 \pm 0.90	31.04	<0.001*
3. keep the baby healthy	10.52 \pm 2.4	11.56 \pm 2.2	0.16	0.753
4. proper preparation of labor and delivery process	0.81 \pm 0.79	0.98 \pm 0.84	1.58	0.115
-Total (PC) scores before the model of care	23.3 \pm 2.3	24.6 \pm 1.60	4.82	<0.001*
- Total (PC) scores after the model of care	49.2 \pm 5.37	70.33 \pm 4.77	0.356	<0.001*
Total PC score	72.5 \pm 7.67	94.93 \pm 6.37	13.42	<0.001*

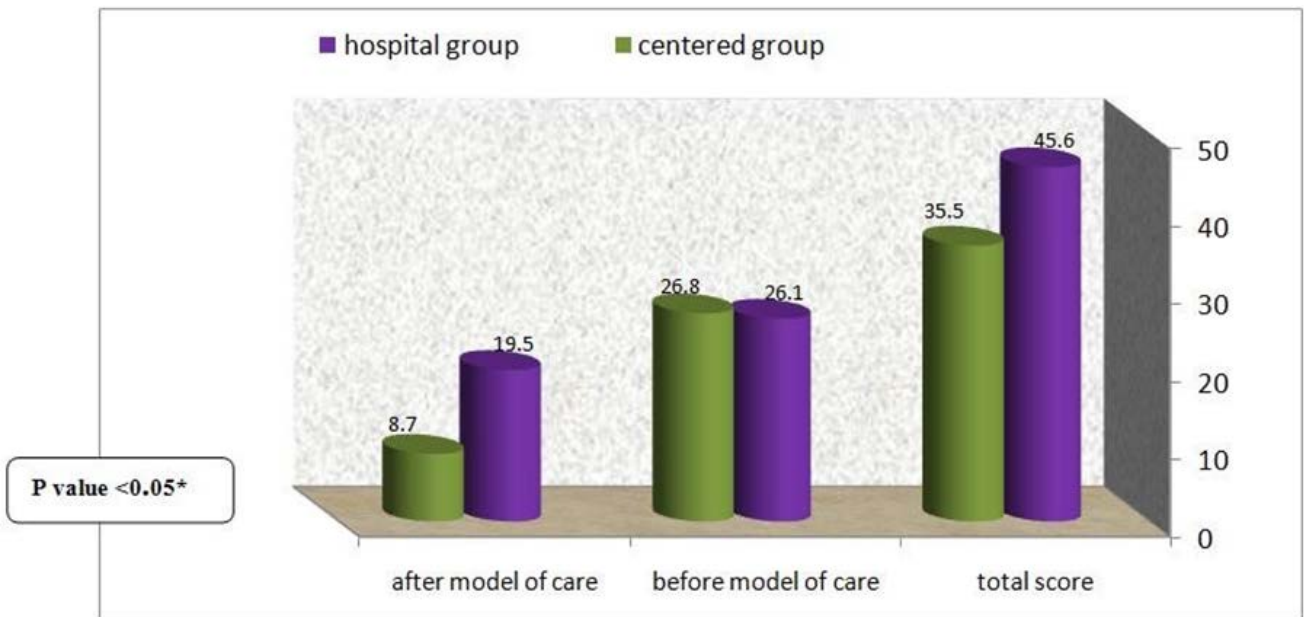


Figure 1. Distribution of routine hospital care group and pregnancy centered care group related to mean \pm SD of total minors discomfort and health problems scores before and after implementation model of care (No=220)

Table 4. Correlation of routine hospital care and pregnancy centered care group with total prenatal health behaviors scores and prenatal controls scores (No=220)

Score	Model of care	Good prenatal controls		Poor prenatal controls	
		r	p-value	r	p-value
Total PHBS score	Pregnancy centered care group	.525	<0.001*	.1666	> 0.05
	Routine hospital care group	.254	> 0.05	.413	<0.05

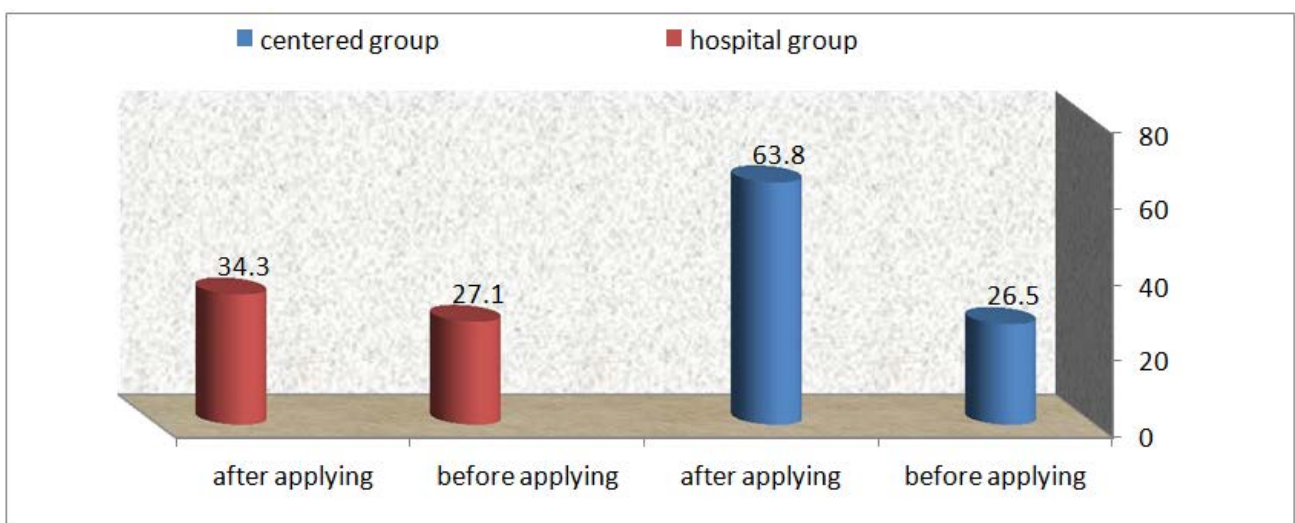


Figure 2. Distribution of overall pregnancy centered care scores and routine hospital care scores before and after applying each model of care

Part III: Evaluate the effect of applying pregnancy centered care model of care on prenatal controls mean scores.

Table 3 documents a highly statistically significant difference between routine hospital care group and pregnancy centered care group regarding prenatal controls sub-items (improve the prenatal adjustment and experiences, improve the progress of pregnancy). Also, there is a highly statistically significant difference between total prenatal control scores of pregnancy centered group and hospital group before and after applying the model of care at (p -value <0.001). Table 4 shows that there is a high positive correlation between total prenatal health behavior scale and good prenatal controls of pregnancy centered care group as compared to the hospital care group at (p -value <0.001).

Figure 1 notifies that mean \pm SD of total minors discomfort and health problems scores of hospital and centered groups before applying the model of care are (26.1 ± 7.1 , 26.8 ± 5.0 respectively) which decreased after implementation of pregnancy centered care model to be (19.5 ± 1.40 , 8.7 ± 3.84 respectively) with statistically significant difference between both groups at (p -value <0.05).

Figure 2 shows that there are highly statistically improvement in the overall pregnancy centered care scores compared to hospital care scores before and after applying each model of care with (p -value <0.001).

4. Discussion

Pregnancy centered care is an innovative model of prenatal care which claimed to minimize the gap between what is provided and what is looked for. The elements of pregnancy centered model based on assessment, education, and skills-building as an integrated approach to prenatal care [22]. The current study aimed to evaluate the effect of applying a pregnancy centered care model on pregnant women's health behaviors and prenatal controls.

Regarding socio-demographic characteristics, the current study clarified that most of the studied participants were in the age group 20-25 years. This finding was supported by [23], who stated in a study on "applying pregnancy centering model on certain prenatal care outcomes" conducted in Egypt that the mean age of participants was 22.5 ± 1.7 . Meanwhile, the result of the current study was not following [24], who mentioned that the mean age of the participants was $29.7 (\pm 4.0)$. This difference may be attributed to cultural differences; in Egypt, culture is directed to early marriage and start pregnancy as early as possible, with no adequate spacing between births.

Furthermore, the current study documented that more than two-thirds of the studied women had middle education, and more than two-thirds of them lived in rural areas. Besides, more than half of them were housewives. In the opinions of the researchers, it represents a broad sector of our Egyptian society that always attend governmental hospitals seeking care and treatment, so they require continuous attention and concerns. These findings were in line with the study of [25], who presented that the studied women had a demographic profile of a lower level

of education with lower household income. Also, these findings supported by [24], who concluded that two-thirds of the studied sample had a moderate school education, and half of them were unemployed. The present study revealed that the mean \pm SD of the gestational weeks of a hospital group at booking visit was 16.2 ± 2.6 and for centered care group was 16.4 ± 1.2 , and more than three-quarters of the studied pregnant women were multigravida. These results were consistent with a cohort study of [26], aimed to evaluate the effects of participation in pregnancy centered group on the utilization of family-planning services following delivery compared to women who had received individual prenatal care, documented that more than the half of both groups were multigravida.

The aim of our study achieved through the present findings that showed a highly statistically significant difference between pregnancy centered group and routine hospital care groups in the total prenatal health behaviors scales before and after applying models of care at (value <0.001). Therefore the first research hypothesis, "Pregnant women who receive the PCC will adapt prenatal health behaviors and engage less in health impairing behavior more than those who receive routine hospital care," was achieved. This finding was in agreement with [27], who showed that centering group care would reduce adverse birth outcomes, enhance reproductive health, change health risk behavior over time and improve psychological well-being during and after pregnancy.

Also [28] added in a study of a comparison of health behaviors subscales (health-promoting behavior, health impairing behavior) of women in centering pregnancy and traditional prenatal care and reported that participants from the CP group scored lower on the health impairing behaviors index compared to those in the traditional prenatal care group.

Meanwhile, this was not in accordance with [29] who conducted a study aimed to examine patterns and predictors of health behavior practices across two time periods of (mid, late) pregnancy, and reported that women's health behavior practices were entirely consistent from mid- to late pregnancy and observed no decline in women's efforts to take care of themselves or to refrain from harmful practices. This discrepancy with our results comes back from the difference of demographic and obstetric profile between two studies' participants. As the other study reported, that the age of the participants was approximately 30 years old ($SD=4.8$), lived in the USA, and the vast majority completed high school. Besides, half of the participants had a higher annual household income, and the majority were primiparous. It helped their study participants to adopt healthy behaviors and have some welfare to be far from engaging in impairing behaviors as (e.g., lifting heavy objects, do much bending, excessive standing, eating high fat /oily food, or eating more food than necessary). Also, once the studied women decided to complete pregnancy joins pregnancy classes to coexist with their babies, this is what is missed in our society.

Regarding the second hypothesis of the current study, "Pregnant women who receive the PCC will have better prenatal controls than those who receive routine hospital care." The current study revealed a highly statistically

significant difference between routine and centered groups regarding prenatal control sub-items, as PCC can improve the prenatal experiences and improve the progress of the pregnancy. Also, a highly statistically significant difference in total prenatal control scores between centered and hospital groups before and after applying the model of care with (p -value <0.001). These results were in the same line with [29] results, which revealed a significant correlation with prenatal controls at mid and late pregnancy regarding items of (women felt prenatal controls could prevent medical problems from occurring during pregnancy, keep baby healthy, improve emotional adjustment during pregnancy and promote the progress of pregnancy).

The current study clarified that there was a statistically significant difference regarding total minor discomforts and health problems scores between routine and centered groups before and after applying the model of care with (p -value <0.05). It positively affects the pregnancy outcome of the centered model that reassuring and promoting pregnant women's health via the model sessions. It also allows the participated women to share their fears or anxiety as well as gained various relief measures or experiences from the researchers and other participants in the group. On the other hand, the women became more knowledgeable about the warning signs of pregnancy. In contrast to these advantages were what is missing in the routine hospital care group as the health care provider did not give much time to let women express their feelings or stresses, or there no chance to listen to the complaints of each other in the group.

These findings were consistent with [23] who denoted that, pre-intervention the mean scores of distress in the centered and prenatal groups were relatively identical (27.8 ± 2.1 vs. 28.1 ± 2.0), whilst post-intervention mean distress scores of the centering group was significantly lower than that of the prenatal group by 7.4 points ($p <0.001$). The current study showed a highly statistical positive correlation between total prenatal health behaviors scale and improving prenatal controls of pregnancy among centered care group compared to hospital care group at (p -value <0.001). This was in accordance with [29] who showed in a study on "psychosocial correlates of health-promoting and health-impairing behaviors in pregnancy" whether health behavior explained additional variance in prenatal controls, that prenatal controls in late pregnancy were positively correlated with health-promoting and health-impairing behavior at both time points (mid and late pregnancy). Additionally [30] concluded that a more significant indicator of prenatal controls had been contributed previously to better health behaviors in pregnancy.

Pregnancy centered care had been recognized as the best model for delivering prenatal care by prioritizing the woman's needs, assigning to prenatal controls and predictors of deteriorations, learning skills, promoting healthy pregnancy through adopting healthy behaviors, and reducing the stress of the participants. The present study revealed a highly statistically significant improvement in the total pregnancy centered scores compared to routine hospital scores before and after applying the pregnancy centered care model. This finding was supported by [31], who clarified that pregnancy

centered may be a community-based care strategy that contributes to improving women's health, knowledge, and behaviors to optimize outcomes for mothers and children. This finding was in agreement with [32], who studied the perception toward conducting the pregnancy centered model in the Egyptian teaching hospitals and documented that pregnancy centered is a model for providing complete prenatal care to women within a group setting. Prenatal assessment, knowledge, and skills development occur in an atmosphere that could facilitate learning, encourage free exchange, and develop mutual support, adding that pregnancy centered model not only has a powerful effect on the women who participate but also provides benefits for the hospital system.

5. Conclusion

Based on the findings of the present study, the hypotheses of the current study were achieved as the PCC model associated with improved prenatal health behaviors and increased prenatal controls rather than routine hospital care.

6. Recommendations

The study findings stimulate the following recommendations: 1-Pregnancy centered care model could be used as the best practices at antenatal clinics and as a model for education and training of future midwives nurses.

2-Further studies are recommended to study the effect of applying pregnancy centered care model on delivery and post-partum preparations (knowledge and practices).

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