



Original Article

Self-Care Management Program Utilization among Antenatal Mothers with Pregnancy-Induced Hypertension

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ARTICLE INFO

Article history

Received: 2021-08-27

Received in revised: 2021-09-22

Accepted: 2021-10-13

Manuscript ID: JMCS-2108-1247

Checked for Plagiarism: **Yes**

Language Editor:

[Dr. Behrouz Jamalvandi](#)

Editor who approved publication:

[Dr. Sami Sajjadifar](#)

DOI:10.26655/JMCHMSCI.2022.1.12

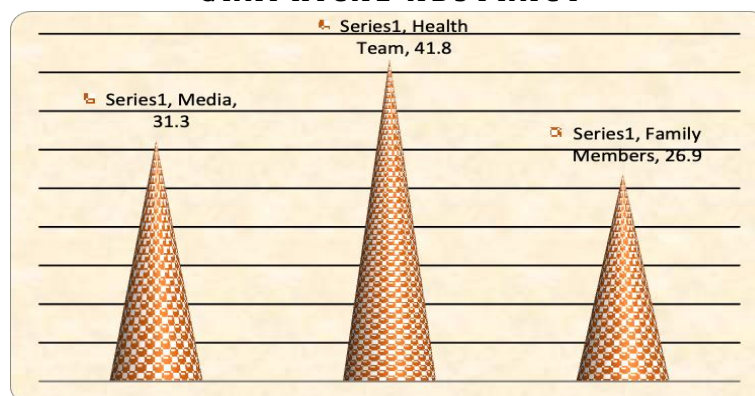
KEYWORDS

Self-care management program
Pregnancy-induced hypertension
Pregnancy
Antenatal mothers

ABSTRACT

Pregnancy complications contribute considerably to maternal and newborn morbidity and mortality. The present study aimed to evaluate the effect of self-care management program utilization among antenatal mothers with pregnancy-induced hypertension (PIH). The study used a quasi-experimental design. It study was carried out in the out-patient clinic in Benha university hospital, Egypt. Based on a purposive sample, 67 pregnant women diagnosed with pregnancy-induced hypertension were included. To collect the data, two instruments were used, a structured interviewing questionnaire, and self-care reported practice assessment. The analysis of data revealed that more than three quarters (80.6% of pregnant women) had incorrect knowledge about self-care of PIH and only 37.3 % of pregnant women had adequate knowledge score at pre-intervention that increased to 77.6 % in post-intervention. Additionally, a highly statistically significant difference was revealed between total self-care practices scores related to pregnancy-induced hypertension before and after intervention ($p < 0.001$). Also, a highly statistical difference was revealed between total knowledge and practice scores of studied women at pre and post-intervention ($p < 0.001$). The utilization of a self-care management program highly improved pregnant participants' knowledge and their self-care practice regarding the management of pregnancy-induced hypertension. The current study suggested that pregnant women be made more aware of pregnancy problems, including pregnancy-induced hypertension and its related impacts on mothers and fetal health, as well as a greater understanding of self-care management.

GRAPHICAL ABSTRACT



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Introduction

Pregnancy and childbirth are two of the most crucial events in a woman's life. It serves as a joyful and significant expression of gratitude for women who are transitioning into a new life as mothers. However, it can be dangerous to one's health, especially in poor nations, due to a lack of awareness and care [1].

Pregnancy-induced hypertension (PIH) is a major public health concern around the world. It is one of the most common pregnancy problems, which is linked to maternal and neonatal morbidity and mortality. Gestational hypertension is another term for PIH. It is a pregnancy-related condition in which hypertension develops at or after 20 weeks of pregnancy, marked by hypertension and proteinuria, as well as edema. Hypertension, proteinuria, and edema are all symptoms of this condition. It is diagnosed when a woman's blood pressure increases above 140/90mmHg after resting for at least two weeks in a row in a woman who is otherwise healthy [2].

Hypertension complicates 6-8 percent of pregnancies worldwide. In underdeveloped countries as well as certain industrialized ones, PIH accounts for 10-15% of all maternal deaths, including 18% in the United States. In addition, in developed countries, they are the second most common cause of perinatal death. In impoverished areas, PIH complications are severe. PIH is more difficult to prevent than postpartum hemorrhage and sepsis since it occurs later in the pregnancy [3]. Young primigravid women are more likely to have PIH risk factors. It occurs more frequently in pregnant women over 35, teenage pregnancy, and multiple pregnancies in diabetics, obese mothers, renal disease, thrombophilias, and molar pregnancy. It is also more common in low-income mothers who are less likely to have had proper prenatal care [4].

The exact causes of PIH are still unknown, and the mechanism remains uncertain. Abnormal placentation, i.e. placenta previa, vasa previa, and placenta accrete, is one of the etiological factors that appear to play a role in the development of PIH, immunological factors, genetic and nutritional factors. Intrauterine growth

restriction, preterm birth, low birth weight, neonatal respiratory distress syndrome, and increased admission to neonatal intensive care units are among the fetal and neonatal complications, as well as pregnancies complicated by hypertension diseases resulted in 17,933 stillbirths (9.2%) perinatal death [5]. Central nervous system dysfunction, t hepatocellular damage, thrombocytopenia, acute disseminated intravascular coagulation, pulmonary edema, pulmonary abruption, and oliguria, are among the short-term consequences of PIH in mothers. It also includes renal failure, heart failure, and placenta abruption [6]. The incidence of complication was 6% among 4188 women with PIH. Hematologic problems were prevalent, and placental abruption occurred in 2.8 percent of cases [7]. In the United States, about 2-3% of pregnancies are complicated by gestational hypertension. Pregnancy-related hypertension is the leading cause of death in the United Kingdom [8].

Individuals and families employ knowledge and attitudes, self-regulation skills and abilities, and social facilitation to attain healthy outcomes, particularly during pregnancy, through self-care management. Although PIH cannot be avoided, the negative consequences can be avoided via early discovery, appropriate self-care management, adequate monitoring, early detection of complications, and quick treatment [9]. Maternity nurses had a vital responsibility in improving antenatal care, the quality which includes education and support for expectant mothers. Health promotion, medical, and psychosocial services, such as health education, nutrition, counseling, social service assessment, and appropriate referral, can all be provided by the nurse at the same time [10]. They must be aware of the kinds of health-related activities in which pregnant women may engage. This awareness is critical for the assessment of safety and the interaction of these activities with biomedical care. If the nurse is familiar with traditional methods, she may be able to make appropriate referrals to help expectant mothers supplement their therapies, cope with symptoms,

and avoid adverse effects from treatments, as well as preserve and enhance their health [11].

Significance of the study

Pregnancy-related hypertension is still the leading cause of maternal and neonatal morbidity and mortality worldwide. It is known as the "salient killer" around the world; it's believed that 50,000 women die each year as a result of PIH complications. The maternal mortality rate in Egypt is estimated to be 45 per 100,000 live births according to [12]. Hypertensive disorders of pregnancy affect 5-10% of all pregnancies around the world, and the prevalence of hypertensive disorders of pregnancy among pregnant women in Egypt was 4.2 percent. Women with PIH were three times more likely to give birth to a baby with low birth weight, 4.3 times more likely to have a stillbirth, and four times more likely to have a baby with a poor Apgar score at five minutes [13]. Pregnant women can use self-care to manage PIH especially if they have adequate knowledge to identify PIH signs and symptoms and the needed assistance provided for them to seek proper care. The women's chances of not seeking timely care may be raised if they do not comprehend what is going on or have incorrect knowledge about PIH and its self-care management [14]. So, the current study aimed to evaluate the effect of self-care program utilization for the management of pregnancy-induced hypertension among antenatal women.

Aim of the study

The present study aimed to evaluate the effect of self-care management program utilization among antenatal mothers with pregnancy-induced hypertension through:

- a) Assessing the pregnant women's knowledge and self-care reported practices regarding the management of pregnancy-induced hypertension to identify their needs;
- b) designing and implementing self-care management programs according to women's needs; and
- c) evaluating the effect of self-care management programs on knowledge and self-care practice regarding the management of pregnancy-induced hypertension.

Research hypothesis

It was hypothesized that utilization of a self-care management program will improve the knowledge and self-care practice of pregnant women regarding the management of pregnancy-induced hypertension after implementation of the program than before.

Material and Methods

Research Design

A quasi-experimental research design, pre/post-test design), the single group was utilized.

Research Setting

The study was carried out at an outpatient clinic affiliated with the obstetric unit at Benha University. This setting was chosen for the availability of pregnant women who attend antenatal care visits and follows up.

Sampling

This study relied on purposive sampling. 67 pregnant women medically diagnosed with pregnancy-induced hypertension were selected according to the following inclusion criteria: Pregnant women at or after 20 weeks gestation, having blood pressure above 140/90 (diagnosed pregnancy-induced hypertension) accompanied by edema and proteinuria, or one of them, and consent to take part in the research.

Instruments

The following instruments were used to collect the study data.

A Structured interviewing questionnaire

It was developed by the researchers following a review of relevant literature. The questionnaire was written in plain Arabic and was divided into three sections:

Part (1): Demographic characteristics of pregnant women such as age, education, residence, and occupational status;

Part (2): Medical and obstetric history as Previous medical illness, history of PIH in previous pregnancies, gestational age, number of pregnancies, history of multiple pregnancies, history of abortion, history of antenatal care visits; and

Part (3): Knowledge of the studied women regarding pregnancy-induced hypertension. This

part was used twice before and after utilization of a self-care management program (pre/post-test), which is divided into two sections. Section (1) consisted of 8 questions as the definition of PIH causes, risk factors, signs of PIH, people who are at risk for PIH, consequences of PIH, effect of PIH on fetal and mother, the relationship between prevention of PIH and regular antenatal care. Section (2) was designed to assess women's self-care knowledge regarding the PIH, consisting of 10 questions such as knowledge regarding conditions that require extra caution of PIH. Knowledge of what to do when having PIH, Knowledge regarding features of PIH, knowledge regarding predisposing factors, knowledge regarding resting techniques, knowledge regarding food pattern, knowledge regarding exercise, knowledge regarding prescribed medication, knowledge regarding stress management, knowledge regarding lose excess weight.

Scoring system of knowledge

Each correct answer was counted as "1" while the incorrect answer was counted as "zero". The overall score of knowledge is obtained by adding the right answer scores together. The greater the score, the higher the level of knowledge. The following is a breakdown of the total knowledge score:-

- Adequate knowledge $\geq 75\%$ of the total score

- Inadequate knowledge $< 75\%$ of total scores.

Self-care reported practice assessment tool

It was adopted from Andalusia agency (2014), pertaining to clinical practice guideline for a woman at pregnancy and postpartum. It was pertained to assess self-care reported practice regarding pregnancy-induced hypertension [15].

Scoring system of self-care reported practice

If the answer was given, it was scored "one" and if not counted as "zero". The overall practice score was estimated by adding the scores for the done items. The total score, means, and standard deviations were calculated. The total score of practice was indicated as the following:

Satisfactory practice: $\geq 60\%$ of total practice score.

Unsatisfactory practice $< 60\%$ of total practice score.

A pilot study was conducted on 10% of the total number of women in the sample (6) to assess tool clarity, objectivity, feasibility, and comprehensiveness, and time needed to complete the tool. Because no changes were made, the women who were assigned to the pilot trial were included in the study.

Validity and reliability of the instruments

An expert panel of five obstetrics and woman health nursing specialists, three experts in obstetrics and gynecology health nursing and two experts in obstetrics and gynecology medicine, examined the instruments for comprehensiveness, appropriateness, and readability. The panel determined the instruments' face and content validity. Cronbach's Alpha coefficient test was used to determine reliability, and it demonstrated that each of the two instruments contained reasonably homogeneous items, as shown by the moderate to high dependability of each instrument. The knowledge questionnaire had an internal consistency of 0.89, while practice had an internal consistency of 0.77.

Self-care practice supportive material (Arabic Leaflet booklet)

It was designed by the researcher after reviewing related literatures including clinical practice guidelines for woman at pregnancy and postpartum [15]. Using simple Arabic language, the researchers provided the self-care practice supportive material for each woman for utilizing self-care practice. It was concerned with basic knowledge regarding PIH in addition to related self-practice management measures.

Ethical considerations

Before data collection, the study's purpose was explained to each women, and she gave her informed consent. Women were promised that their data would be used solely for research purposes and that they had the right to refuse or withdraw at any moment with no repercussions.

Fieldwork

Recruitment of the participants started from the beginning of January 2021 to June 2021, within

six months period. The researchers attended the pre-mentioned study setting for 3 days per week on Sunday, Monday and Wednesday, from 9.00 am to 12.00 pm (according to the outpatient clinic's schedule) until the end of the previous predetermined sample size. Before conducting the study, a signed permission was received from the predetermined hospital's institutional authority. After that, the researchers introduced themselves to the ladies who met the inclusion criteria and explained the goal of the study in order to gain their consent and cooperation in participating in it. To acquire women's confidence and trust, the confidentiality of information was assured. The researchers developed the instruments of data collection and self-care management supportive material. The self-management program was revised by professors of maternity nursing and obstetric medicine. The data were collected pre-and post-intervention; in the pre-test, data was collected from the women with PIH, then at the same time the researchers began the intervention. Then immediately post-intervention the researcher makes an evaluation using same pretest format. The process of data collection was carried out through four phases: Assessment, planning, implementation, and the evaluation phase.

Assessment phase

After assuring official approvals to carry out the current study, the researchers met the participants at outpatient clinic; each woman was interviewed and asked for participation and explain for each woman the proper way to fill the tools sheet accurately after obtaining their acceptance to share in the study. The instruments of data collection required approximately 20-30 minutes from the participants to complete the data collection forms.

Planning phase

In accordance with the needs indicated during the assessment process, as well as a review of the relevant literature. The researchers came up with self-care management supportive material about pregnancy-induced hypertension with simple Arabic language, which aimed to improve the knowledge and self-care practice of pregnant women regarding the management of pregnancy-

induced hypertension. It elucidated the areas of common deficit in pregnant women' knowledge and practice to manage pregnancy-induced hypertension. Self-care practice supportive material is distributed to each pregnant woman.

Implementation phase

In this phase, the intervention was administered. The researchers conducted six sessions for 60 minutes to each, i.e. two theoretical and four practical sessions. Theoretical sessions were composed of knowledge about PIH and its management, including definition, signs and symptoms, and causes; people who were at risk for PIH were discussed in first session, while complication and management of PIH, consequence of PIH, effect of PIH on fetus and mother, effect of regular antenatal care in the prevention of PIH were discussed in second session. Third session included self-care practice regarding what to do when having PIH, self-care practice regarding features of PIH and self-care practice regarding condition requiring extra caution. Fourth session included self-care practice regarding predisposing factors and self-care practice regarding resting techniques. Fifth session included self-care practice regarding food pattern, self-care practice regarding exercise and self-care practice regarding prescribed medication. Six session dealt with self-care practice regarding stress management and self-care practice regarding lose excess weight.

Evaluation phase

Using the same pre-test procedure, the effect of the self-care management program was evaluated.

Statistical Design

A personal computer was used to store, analyze, and present the data, as well as to create some graphic presentations for some key findings. A statistical software package was used to perform the calculations. Numbers, percentages, and correlations were used to portray data in tables and graphs.

Result and Discussion

Table 1 shows that 41.8% of the participants aged more than 30 years and 52.2% were educated to the secondary level. Nearly two

thirds 59.7% were from rural area and more than not employed. two thirds (67.2%) of the studied sample were

Table 1: Frequency and percentage distribution of studied sample demographic characteristics

Demographic characteristics.	Frequency	%
Age in years		
Less than 20	20	29.9
From 20-30	19	28.4
More than 30	28	41.8
Mean ±SD 28.34		
Educational level		
Read and write	14	20.9
Secondary education	35	52.2
University education	18	26.9
Residence		
Urban	27	40.3
Rural	40	59.7
occupation		
Employed	22	32.8
Not employed	45	67.2

Table 2 reveals that 67.2% of the participants did not have any previous medical illness. Also, three quarters (76.1%) of them did not have PIH in previous pregnancies and about two thirds (64.2%) were primigravida. Additionally, near than three quarters (73.1%) of studied sample

had no history of multiple pregnancies. Additionally, more than two thirds (67.2%) had no history of abortion also more than half (53.7%) of them had adequate number of antenatal visits.

Table 2: Frequency and percentage distribution of studied sample medical and obstetric history

Variable	Frequency	%
Previous medical illness		
No	45	67.2
Yes	22	32.8
PIH in previous pregnancies		
No	51	76.1
Yes	16	23.9
Number of pregnancies (gravida)		
Primigravida	43	64.2
Multigravida	24	35.8
History of Multiple pregnancies		
No	49	73.1
Yes	18	26.9
History of abortion		
No	45	67.2
Yes	22	32.8
Attendance of antenatal care (number of visits)		
Inadequate (<4 visits)	31	46.3
Adequate (≥4 visits))	36	53.7

Figure 1 represents that 52.2% of the participants were obese.

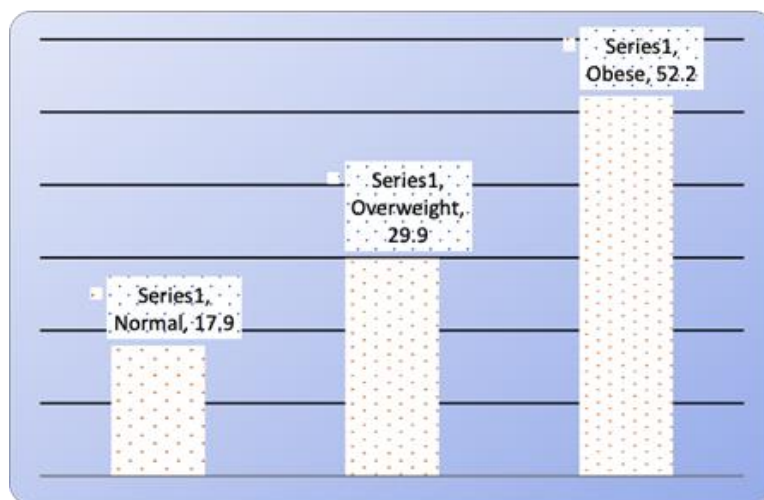


Figure 1: Percentage distribution of studied sample body mass index

Table 3 reveals a highly statistically significant induced hypertension at before and after difference between knowledge of pregnancy intervention ($p < 0.001$).

Table 3: Statistical differences of studied sample general knowledge of (PIH)

Knowledge Items	Pre intervention				Post intervention				X ²	p-value
	correct		incorrect		correct		incorrect			
	no	%	no	%	no	%	no	%		
Definition of PIH	26	38.8	41	61.2	55	82.1	12	17.9	26.2	0.001
Causes of PIH	27	40.3	40	59.7	48	71.6	19	28.4	13.3	0.001
Risk factors of PIH	35	52.2	32	47.8	52	77.6	15	22.4	9.47	0.001
Signs of PIH	42	62.7	25	37.3	47	70.1	20	29.9	0.83	0.001
People who are risk for PIH	35	52.2	32	47.8	43	64.2	24	35.8	1.96	0.001
Consequence of PIH	43	64.2	24	35.8	47	70.1	20	29.9	0.54	0.001
Effect of PIH on fetus and mother	40	59.7	27	40.3	48	71.6	19	28.4	2.11	0.001
Relationship of prevention of PIH with regular antenatal car	40	59.7	27	40.3	52	77.6	15	22.4	4.99	0.001

Figure 2 illustrates that antenatal woman had their information regarding PIH from health team (41.8%), followed by media (31.3%) and from family members (26.9%).

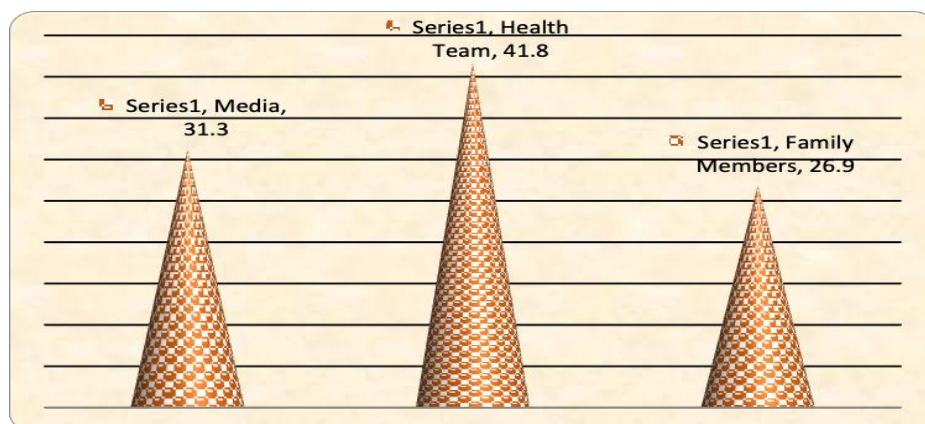


Figure 2: percentage distribution of source of information regarding PIH

Table 4 reveals a highly statistically significant difference between the studied women regarding PIH self-care knowledge at before and after intervention ($p < 0.001$).

Table 4: Statistical differences of studied sample self-care knowledge regarding of PIH

Knowledge Items	Pre intervention				Post intervention				X ²	p-value
	correct		incorrect		correct		incorrect			
	no	%	no	%	no	%	no	%		
Knowledge of what to do when has PIH	13	19.4	54	80.6	50	74.6	17	25.4	41.0	.001
Knowledge regarding features of PIH	15	22.4	52	77.6	52	77.6	15	22.4	40.8	0.001
Knowledge regarding condition requiring extra caution	17	25.4	50	74.6	54	80.6	13	19.4	41.0	0.001
Knowledge regarding predisposing factors	22	32.8	45	67.2	49	73.1	18	26.9	21.8	0.001
Knowledge regarding resting techniques	35	52.2	32	47.8	59	88.1	8	11.9	20.5	0.001
Knowledge regarding food pattern	46	68.7	21	31.3	54	80.6	13	19.4	2.52	0.001
Knowledge regarding exercise	30	44.8	37	55.2	57	85.1	10	14.9	23.8	0.001
Knowledge regarding prescribed medication	35	52.2	32	47.8	51	76.1	16	23.9	8.31	0.001
Knowledge regarding stress management	24	35.8	43	64.2	50	74.6	17	25.4	20.4	0.001
Knowledge regarding lose excess weight	32	47.8	35	52.2	55	82.1	12	17.9	17.33	0.001

Figure 3 illustrates that (37.3%) of studied women had adequate knowledge regarding PIH pre intervention that increased to (77.65%) post intervention.

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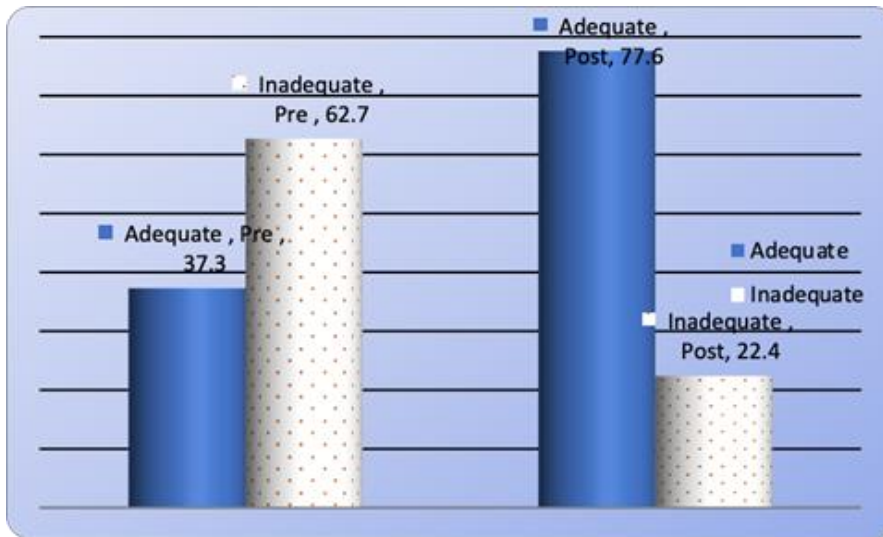


Figure 3: percentage distribution of studied sample total knowledge score regarding PIH at pre and post intervention

Table 5 indicates a highly statistically significant difference between self-care practices scores related to pregnancy induced hypertension at pre and post intervention phases ($p < 0.001$).

hypertension at pre and post intervention phases ($p < 0.001$).

Table 5: Statistical difference of studied sample self-care reported practices regarding PIH

Self-care reported practice	Pre intervention				Post intervention				X ²	P-value
	Done		Not done		Done		Not done			
	no	%	no	%	no	%	no	%		
Self-carepractice regarding what to do when has PIH	34	50.7	33	49.3	52	77.6	15	22.4	10.5	0.000
Self-carepractice regarding features of PIH	32	47.8	35	52.2	62	92.5	5	7.5	32.0	0.000
Self-carepractice regarding condition requiring extra caution	31	46.3	36	53.7	52	77.6	15	22.4	13.9	0.000
Self-carepractice regarding predisposing factors	24	35.8	43	64.2	49	73.1	18	26.9	18.8	0.000
Self-carepractice regarding resting techniques	37	55.2	30	44.8	52	77.6	15	22.4	7.52	0.000
Self-carepractice regarding food pattern	33	49.3	34	50.7	53	79.1	14	20.9	12.9	0.000
Self-carepractice regarding exercise	37	55.2	30	44.8	58	86.6	9	13.4	15.9	0.000
Self-carepractice regarding prescribed medication	38	56.7	29	43.3	52	77.6	15	22.4	6.63	0.000
Self-carepractice regarding stress management	16	23.9	51	76.1	51	76.1	16	23.9	36.5	0.000
Self-carepractice regarding lose excess weight	25	37.3	42	62.7	56	83.6	11	16.4	29.9	0.000

Figure 4 shows that more 79.2% of studied women had a satisfactory self-care practice level regarding management of PIH post

intervention compared with unsatisfactory practice pre intervention.

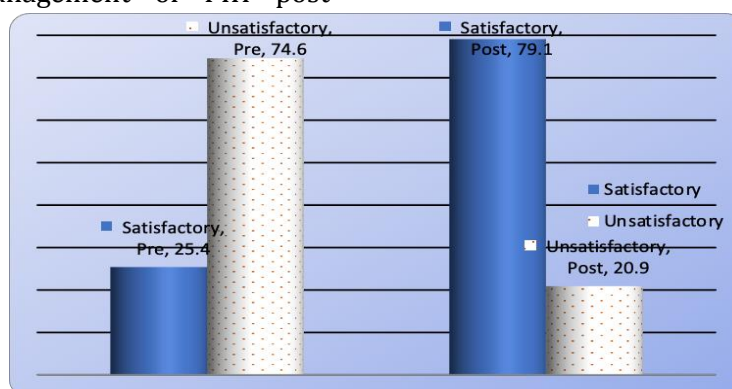


Figure 4: percentage distribution of the women total self-care practice score regarding management of PIH at pre and post intervention

Table 6 clarifies a highly statistically positive correlation between the studied women

knowledge and self-care practice at post intervention.

Table 6: correlation between total self-care practice and total knowledge pre and post intervention

Total Self-carepractice	Total Knowledge			
	Pre		Post	
	r	p-value	r	p-value
	- 0.17	0.16	0.62	0.000

Pregnancy is the most special time in a woman's life. It necessitates constant monitoring for safe containment, early diagnosis of anomalies, and prompt treatment. Women are a particularly susceptible group of people during pregnancy. In a given year, approximately 24 million pregnancies occur, with hypertension complicating 7–15 percent of all pregnancies [11]. Maintaining the health of mother and fetus is the primary goal of nursing care during the antenatal period by acquiring knowledge managing the symptoms and discomforts associated with pregnancy problems especially PIH [17]. So, the present study aimed to evaluate the effect of self-care management program utilization among antenatal mothers with pregnancy induced hypertension, hypertension in pregnancy, pathophysiology and treatment.

Regarding personal demographics, the present study showed that the study sample age was above 30 years with a mean age of 28.34 and more than half of educated to the secondary level. Additionally, about two thirds of studied women were from rural area. Moreover, more than two thirds of the studied sample not employed. These results were in same line with those of Muntaha *et al.* (2016) [18]. In a study about self-care management of pregnancy induced hypertension for pregnant women attending primary health care centers in Kirkuk City, it was found that most pregnant women were between the ages of 30 and 34. Also, Kashanija (2014) stated that more than half of pregnant women had secondary level of education and majority of them were unemployed [19].

Similar to this study, in a study of the influence of organized training on expectant moms with pregnancy-induced hypertension's knowledge of

pregnancy-induced hypertension care and birth readiness, Sharma *et al.* (2017) showed that the uppermost percentage of women was completed secondary level of education and were from rural area [20]. On other hand, these results were different from those of Fadare *et al.* (2016), reporting the study conducted in Southwest Nigeria about pregnant women's knowledge and attitudes towards pregnancy-induced hypertension management that most women's age were between 21 and 30 [21]. Most of the participants had a tertiary education, according to their educational qualification distribution pattern. The majority of those who took part were self-employed. Moreover, in a study of primid women's knowledge of gestational hypertension and self-care measure, Tanya and Annamma (2017) proved that majority of the sample had high school education. These differences in the results could be due to the difference in samples [22].

Concerning medical and obstetric history of studied women, the results of the current study evidence that more than two thirds of studied women did not have any previous medical illness. Also, three quarters of them did not have PIH in previous pregnancies. Additionally, more than fifty percent of the studied women were primigravida. Moreover, nearly three quarters of studied women had no history of multiple pregnancies, two thirds had no history of abortion and more than half of them had an adequate number of antenatal visits. These results are in agreement with those of Salim *et al.* (2017), a study on effectiveness of a structured education program in expectant mothers with pregnancy-induced hypertension's knowledge of pregnancy-induced hypertension management and birth readiness. They reported that the

majority of antenatal PIH women were primigravida, had a gestation period of 28 weeks, and had no history of multiple pregnancy or past history of medical disorders [22].

Also, these results were in line with those of Ronsmans and Campbell (2017), reporting that health care personnel were evaluated on their understanding and management methods of hypertension in pregnancy [23]. The majority of sample were primigravida and in second trimester. On other hand, these results were dissimilar to those of Phengsavanh *et al.* (2018) research on the effect of antenatal care on risk of pregnancy induced hypertension in lao PDR [24]. Also, these results were different from those of Ramesh *et al.* (2014), based on which the majority of the women had a history of hypertension and diabetes [25].

In relation to body mass, the results of the present study showed that more than half of studied women were in the obese weight group, with the remainder in the overweight and normal weight groups. The results of the present study corresponded to those of Muntaha *et al.* (2016) [18], reporting that more than half of sample were obese and that maternal obesity, as defined by maternal BMI, was positively linked with the likelihood of developing pregnancy-induced hypertension (BMI). This supports the results of the study by Villamor and Cnattingius (2016), who discovered a significant relationship between maternal body mass and the incidence of preeclampsia [26]. Also, Ahenkorah *et al.* (2016) revealed that obesity is linked to insulin resistance, chronic inflammation, dyslipidemia, and oxidative stress [27]. According to a Chinese study found that the frequency of pregnancy-induced hypertension escalates with rising BMI.

The results of the current study indicated the highest percentage of pregnant women get their health information from health team members then family members. These results are consistent with Wunpini (2018), who reported in the study of Pregnant women's awareness of pregnancy-induced hypertension and their health-seeking behaviors that majority of the pregnant women could seek health care from health centers when they notice any sign/symptoms of PIH [28]. Health centers have

been considered the ideal place to go when any person notice any sign/symptom of a condition. This results is however inconsistency with Tanya and Annamma's (2017) study in which the major source of information regarding PIH was from friends and relatives [28].

Regarding the knowledge of studied women in relation to PIH, the current study revealed a highly statistically significant knowledge improvement in relation to pregnancy induced hypertension after intervention phase compared with before intervention. This result is in line with that of Maputle *et al.* (2016) [29], who focused on the knowledge towards PIH among pregnant women in vhembe district, Limpopo Province, and reported that more than two thirds of the interviewed pregnant women exhibited poor knowledge about the condition, implying the importance of program intervention on improving their knowledge. However, this result was dissimilar to Vijayalakshmi and Jaya (2017). They addressed assessment of knowledge and practice about PIH among the prim gravid mothers with PIH and reported that more than half of sample had moderately adequate knowledge about PIH [30]. Further, this result was in agreement with by Fatema *et al.* (2017) who addressed the efficacy of modest educational interventions on knowledge of pregnancy-induced hypertension in Iranian pregnant women and showed that pregnant women use self-care to management PIH especially if they have adequate knowledge to identify the manifestation of PIH and the needed assistance provided for them to request early and suitable care [31]. If women have a poor grasp of the signs and symptoms of PIH, they are more likely to delay seeking treatment.

The results of the present study showed that overall self-care knowledge scores about PIH significantly improved after intervention compared with before intervention. This result is consistent with that of Tanya and Annamma (2017), reporting that near three-quarters of pregnant women had poor level of self-care knowledge regarding PIH. However, this result is contrasted with Maputle *et al.* (2017) [29], who showed that the study sample had high and moderate knowledge regarding PIH

management, especially on food intake pattern. These results may be due to the effect of utilization of self-care management program among antenatal women with pregnancy-induced hypertension.

The self-care reported practice of the studied women regarding PIH showed a highly statistically significant enhancement in self-care practices regarding PIH post intervention than pre intervention. This result is in line with that of Vijayalakshmi Jaya (2017) [30], reporting that majority of pregnant women had inadequate level of practice regarding PIH. To account for it, we can say utilization of Self-care management program had positive effect on pregnant women practices regarding PIH. The current study results showed that the studied women had satisfactory level of Self-care practices management regarding PIH post intervention compared with pre intervention phases.

Regarding the correlation between knowledge and practice scores, the present study revealed a highly positive association. Improving individual knowledge could help improve the practice.

Conclusion

Based on the results of the current study, a highly positive association was revealed between women's knowledge and self-care practice scores after intervention. However, there was a highly statistically significant difference (p-values 0.001) between before and after intervention periods in terms of PIH self-care knowledge. Additionally, across the pre and after-intervention periods, there was a highly statistically significant difference in total self-care practices scores related to pregnancy-induced hypertension. Therefore, utilization of self-care program has proved to improve the knowledge of pregnant mothers and their practices. Pregnant women are recommended to be more aware of pregnancy problems, particularly PIH, and its effect on maternal and fetal health and increase awareness of self-care management according to the findings of this study. Future research may be based on an applied research method to increase women's awareness of self-care management during

pregnancy particularly the PIH and its effect on maternal and fetal health.

Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Authors' contributions

All authors contributed toward data analysis, drafting and revising the paper and agreed to be responsible for all the aspects of this work.

Conflict of Interest

The authors declare no conflicts of interest.

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HOW TO CITE THIS ARTICLE

Hemmat Mostafa Elbana, Rehab Mdammed Abd Elhady, Howaida Ragab Mohammed, Self-Care Management Program Utilization among Antenatal Mothers with Pregnancy-Induced Hypertension, *J. Med. Chem. Sci.*, 2022, 5(1) 103-115
DOI: 10.26655/JMCHMSCI.2022.1.12
URL: http://www.jmchemsci.com/article_139556.html