

## Efficacy of an Intervention Based on Theory of Planned Behavior on Self-Care Management among Women with Pregnancy Induced Hypertension

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### Abstract:

**Background:** Pregnancy induced hypertension is an important cause of foetal ,maternal morbidity and mortality, particularly in developing countries. All of these deaths occurred could have been prevented through improving women 'self-care . The theory of planned behavior is one of the most frequently used theoretical frameworks for explaining behavioral intentions. Educational intervention based on theory of planned behavior will be more effective in changing the women' intention and behavior. This study aimed to evaluate the effect of an intervention based on theory of planned behavior on self-care behaviors among women with pregnancy induced hypertension.

**Methods:** A quasi-experimental design was utilized. Setting: The study was conducted at obstetrics and gynecology outpatient clinic affiliated to Benha university hospital. A purposive sample of 75 pregnant women were included in the current study. Three tools were used for data collection; first tool: interviewing questionnaire to collect data about the subjects' socio-demographic data, medical and obstetric history and knowledge regarding pregnancy induced hypertension.. Second tool; theory of planned behavior questionnaire, it composed of the four main constructs include attitude, subjective norms, perceived behavioral control and intention. Third tool : self-care behavior questionnaire

**Results:** There were highly statistically significant differences ( $P<.001$ ) regarding to pregnant women' knowledge, and theory of planned behavior constructs include attitude, subjective norms, perceived behavioral control and intention after the intervention based theory of planned behavior as compared to before. Also, self-care behavior regarding pregnancy induced hypertension was improved after intervention based theory of planned behavior.

**Conclusion and recommendation:** The application of theory of planned behavior was effective in improving pregnant women's knowledge and self-care behavior regarding pregnancy induced hypertension. The nurse should implement educational intervention based on theory of planned behavior for women with pregnancy induced hypertension regarding management of self-care behavior.

**Keyword:** Self-care behavior, Pregnancy induced hypertension, Theory of planned behavior.

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### I. Introduction

pregnancy induced hypertension (PIH) is the development of hypertension in pregnant women after 20 weeks gestation without the presence of protein in the urine or other signs of preeclampsia. Hypertension is defined blood pressure greater than 140/90 mm Hg. [1]. Pregnancy induced hypertensions like preeclampsia is one of the primary causes of death [2]. The risk of a woman in a developing country dying from a maternal-related causes during her lifetime is about 33 times higher compared to a woman living in a developed country [3]. The prevalence of hypertension in reproductive-aged women is estimated to be 7.7%. [4]

Globally, PIH remains a dangerous medical condition and one of the direct causes of maternal morbidity and mortality. The effect of maternal death on household income, household productivity and household disintegration has been widely described [5] Although the cause of PIH is unknown, certain factors are known to increase the risk of PIH, such risk factors include null parity(never given birth), obesity, anti-phospholipid antibody syndrome, diabetes mellitus, kidney disease, chronic hypertension, prior history of preeclampsia, maternal age (>35 years and younger than 20 years), multiple gestation, having donated kidney and sub-clinical hypothyroidism or thyroid antibodies. [6] Acutely, PIH can be complicated by preeclampsia and eclampsia, the development of hemolysis, elevated liver enzymes, low platelet count hemorrhagic or

ischemic stroke, liver damage and dysfunction, acute kidney injury, and acute respiratory distress syndrome (ARDS). [7]

Self-care is an important component of effective prevention and management of pregnancy induced hypertension. It helps women to make informed health decisions and make use of available health resources. The World Health Organization's definition of self-care includes "the ability of individuals, families and communities to promote health, prevent disease, maintain health, and cope with illness and disability with or without the support of a health-care provider. [8] Self-care practices are one of the most important elements in people's health and well-being and have a greater importance than professional health services in treating PIH. It refers to the activities carried out by individuals and families that aim to health improvement, disease prevention, illness limitation and health restoration, therefore, the occurrence of disease complications and disability are decreased in patients who follow good self-care practices than those with poor self-care practices that includes eye care, self-monitoring of glucose in blood and urine, periodic health checkups, proper intake of medications, dietary intake as well as physical activity. [9,10] Trainings should be designed based on health education theories and models. These theoretical frameworks provide a systematic view of events or achievements and provide the required guidance to the educational needs assessment, design, implementation, and evaluation of educational interventions [11]. The theory of planned behavior (TPB) is an appropriate framework to use during pregnancy because it includes factors that may be influenced by aspects of the pregnancy. For example, a woman's attitude about self-care and may change due to her personal beliefs about the risks or benefits of self-care during pregnancy.[12].

The theory of planned behavior (TPB) is a practical theoretical perspective to evaluate factors influence individual's decision to engage in an specific behavior. The TPB consists of 4 constructs: attitudes, subjective norms, perceived behavioral control, and behavioral intention .It is an extension of the theory of reasoned action which includes an additional construct called the perceived behavioral control. The TPB assumes that behavioral intention determines behavior directly and indicates that three factors influence an individual's intention, namely attitudes toward a behavior, subjective norms, and perceived behavioral control (PBC) [13–16]. This theory links an individual's attitude and behavior, and states that attitude and belief toward behavior, PBC, and subjective norms, together shape an individual's intentions to engage actual behavior at specific place and time [17]. Attitude results from an individual's opinions about an issue and evaluation of the responses associated with those opinions. Attitude refers to the individual's positive and negative evaluations of performing some behavior, and different people have different attitudes toward an issue. PBC indicates the perception of whether or not a behavior is under the intentional control of an individual. It refers to an individual's perception of the ease or difficulty of performing the behavior of interest. [12,13,18].The nurse has an important role in management of hypertension, she is not only identifying and treating women with PIH but also should promote a healthy life style and preventive strategies by encouraging women to maintain healthy diet, increase physical activity , manage stress and support and teach women to adhere to treatment regimen [19,20].

## **1.2. Significance of the study**

Pregnancy induced hypertension is an important cause of feto-maternal morbidity and mortality, particularly in developing countries. It occurs in about 5-8% of all pregnancies [21]. The prevalence of PIH in developing countries ranges from 1.8 to 16.7% as the prevalence of PIH occurs in 10% of pregnancies in African women, which is significantly higher than the global average of approximately 2% [22,23]. Severe hypertension increases the mother's risk of cardiac failure, heart attack, renal failure and cerebral vascular accidents. In addition, the fetus is at increased risk from complications like poor placental transfer of oxygen, growth restriction, preterm birth, placental abruption, stillbirth and neonatal death hypertensive disorders represent the most common medical complications of pregnancy with a reported incidence of 5–10% [24].Every day in 2015, about 830 women died due to complications of pregnancy and childbirth. Almost all of these deaths occurred in low-resource settings, and most could have been prevented [25]. In Egypt, maternal mortality ratio is reported to be 45 per 100000 live births according to WHO [26]. In a study conducted to estimate the prevalence of hypertensive diseases of pregnancy in Egypt (4.2%) had pregnancy induced hypertension, (3.8 %) had preeclampsia and eclampsia was (0.3%).[27]

## **1.3. Aim of the study:**

The aim of this study was to evaluate the effect of an intervention based on TPB on self-care behaviors among women with PIH . This aim achieved through:

- Assessing pregnant woman' knowledge and self-care behaviors necessary for BP control using theory of planned behaviour to identify their needs.
- Designing and implementing an educational intervention based on theory of planned behaviour according to pregnant women' needs.

- Evaluating the effect of an educational intervention on pregnant women' knowledge and self-care behaviors using theory of planned behaviour.

#### **1.4. Research hypothesis**

knowledge and self-care behaviors necessary for BP control of women with PIH will be improved after implementation of an educational intervention based on theory of planned behaviour.

## **II. Subjects and Methods**

**2.1. Research design:** A quasi experimental design was used to test the study hypothesis.

**2.2. Setting:** This study was conducted at obstetrics and gynecology outpatient clinic of Benha university hospital, Benha city.

#### **2.3. Sample type and criteria:**

A purposive sample of 75 women with PIH were recruited for the study and fulfilled the following inclusion criteria; woman after 20 weeks of pregnancy, having BP levels SBP140–159 mmHg and DBP 90–109 mmHg in two separate measurements, free from obstetrical complication as (bleeding, gestational diabetes) or other chronic disorders affect pregnancy such as (heart disease, asthma or epilepsy), and agreed to participate in the study.

#### **2.4. Sample Size**

According to Benha university hospital statistical center, 2018, flow rate of women with PIH was 900 women at the end of year 2018. Ten percent of flow rate (90 women) was selected. Considering dropout during study. Therefore the sample size was 75 pregnant women with PIH.

**2.5. Tools of data collection:** Two tools were used to conduct the study:

**2.5.1. First tool:** Structured interviewing questionnaire was developed by the researchers in Arabic language after reviewing of related literature. It involved three main parts:

- Socio demographic data of women with PIH such as; age, education ,income, occupation, residence and telephone number.
- Medical and obstetric history of women with PIH such as; gravidity, Parity, Abortion, Family history of PIH and antenatal follow up
- Knowledge of women with PIH. This part was used before and after the application of TPB (pre/ post-test format). It included eight open ended questions which include; definition, causes, signs and symptoms of PIH, effect of PIH on pregnant women and fetus, preventive measures of PIH, and importance of treatment.

*Scoring system of knowledge:* A correct answer was scored "two", incomplete answer was scored "one" and the unknown or incorrect answer scored "zero". The total knowledge score was calculated by adding the scores for the correct answers. The total possible score ranged from 0 to 12 point. The higher scores reflect higher levels of knowledge about PIH.

**2.5.2. Second tool:** The TPB questionnaire, it was developed, established and modified based on a comprehensive literature. [12,28,29 ]and translated to Arabic language. This part was used before and after the application of TPB (pre/ post-test format). This tool encompassed four main subscales of TPB.

##### **i. The attitude subscale**

It consists of 20 items assessing overall attitudes towards each of the treatment activities that include measuring blood pressure , oral medications, exercising, and following dietary recommendations daily. For each activity, participants rated how beneficial (1 – harmful to 7 -beneficial), valuable (1 - worthless to 7 – valuable), good (1 – bad to 7 -good), necessary(1 – unnecessary to 7 – necessary), and pleasant (1 – unpleasant to 7 – pleasant). The maximum score of attitude = 140.

##### **ii. The subjective norms subscale**

It consists of 16 items to which participants are asked to consider their perceptions of how the important people in their life would view the treatment activities (i.e., measuring blood pressure, oral medications, exercise, diet). Participants rated if the important people in their lives think they should engage in each of these activities rated on a 1 (should not) to 7 (should) scale. Participants also rated if the important people in their lives would want them to engage in each of these activities on a 1 (strongly disagree) to 7 (strongly agree) scale. Furthermore, participants rated if they feel under social pressure to perform these activities using a scale from 1 (strongly disagree) to 7 (strongly agree). They also rated the expectations they believe exist to perform each of these

activities on a scale from 1 (extremely unlikely) to 7 (extremely likely). The scores were 1 for no confidence, 2 for somewhat confidence and 3 for confidence. The maximum score of attitude = 116.

**iii. The perceived behavioural control subscale**

It consists of 20 items. Participants rated how much control they have over each of the treatment activities from 1 (no control) to 7 (complete control). They also rated whether or not following each of the activities is entirely up to them on a scale from 1 (strongly disagree) to 7 (strongly agree) and their confidence in their ability to follow each of the activities on a scale from 1 (strongly disagree) to 7 (strongly agree). Lastly, participants rated how possible it is for them to follow each of the activities on a scale from 1 (impossible) to 7 (possible) and how easy it is for them to engage in each of the activities on a scale from 1 (difficult) to 7 (easy). The maximum score of behavioural control = 140.

**iv. The intention subscale.**

It consists of 20 items. Participants rated how much they intend to do each of the treatment activities out of the next seven days on a scale from 1 (strongly disagree) to 7 (strongly agree). The maximum score of intention = 84.

**2.5.3. Third tool: The self-care behavior questionnaire.**

It consists of 8 items relating to compliance with dietary , physical activity performance, blood pressure monitoring & Compliance with drug . Participants rated the extent to which they had performed each of the treatment activities .This part was used before and after the application of TPB (pre/ post-test format). Responses were rated on a 7-point scale from 1 (*a small extent*) to 7 (*a large extent*). The maximum score of self-care behaviors = 56.

**2.5.3. Tools Validity:**

The tools were reviewed for content validity by a jury of five experts in the field of community health nursing and obstetrics and woman health nursing to ascertain relevance and completeness.

**2.5.4. Tools Reliability:**

Reliability of tools was tested by using Cronbach's Alpha coefficient test, which revealed that the tools consisted of relatively homogenous items as showed by the moderate to high reliability of each tool. The internal consistency of knowledge was 0.88; Attitude Subscale was 0.89, The subjective norms subscale was 0.79, The perceived behavioral control subscale was 0.80 and The intention subscale 0.83. The internal consistency of self-care behavior scale was 0.81

**2.6. Ethical considerations:**

Before data collection, the women with PIH were informed about the purpose of the study. They were given an opportunity to refuse or to participate in the study. Also they were assured that, their information would remain confidential and used only for the research purpose.

**2.7. Pilot study:**

A pilot study was carried out on 10% of the sample (9) pregnant women to assess the tools clarity and objectivity as well as estimation of the time needed to fill the questionnaire. The participants involved in the pilot were excluded from the study sample.

**2.8. Field work: (intervention construction)**

A written official approval to conduct this research was obtained from the Dean of faculty nursing to director of Benha university hospital. Other written official letter was taken and delivered to the director of obstetrics and gynaecology outpatient clinic, in order to obtain their agreement to conduct the study after explaining its purpose. The study was carried out through four main phases: assessment, planning, implementation, and evaluation. These phases were carried out from beginning of January 2018 to the end of August 2018, covering along a period of 8 months. The previous mentioned setting was visited by the researchers two days/week (Sunday and Thursday) from 9.00 am to 12.00 pm according to the schedule of obstetrics and gynaecology outpatient clinic.

**2.8.1. Assessment phase:**

The researchers interviewed the women with PIH after reviewing her medical record, ensure of her health status, explained the aim of the study, and asked for participation. Upon consent to participate, each women with PIH was interviewed to assess general characteristics, knowledge regarding PIH, as well as TPB questionnaire to evaluate the participants' attitude, subjective norms, perceived behavioural control and intention, also women with PIH were asked to fill the self-care behavior questionnaire .The data obtained during this phase constituted the baseline for further comparisons to evaluate the effect of TPB on self-care behavior. Average time for the completion of interviewing questionnaire (20-25 minutes). A number of

interviewed women / week ranged from 4-5 women. The questionnaire is filled by the researcher during waiting time of the women during their antenatal visits.

### **2.8.2. Planning phase:**

Based on the TPB constructs, and in view of the related literature. The intervention was designed by the researchers in a form of printed Arabic booklet to satisfy the participants' deficit knowledge. It instructs mothers about PIH. It includes the significance of PIH as a cause of maternal mortality, definition of PIH, causes and risk factors for PIH, complications of PIH for the woman and the fetus, preventive strategies of PIH, medical treatment of PIH, plant and animal food sources high in iron, food sources high in vitamin C, and self-care behaviours that include measuring blood pressure, oral medications, exercising, and following dietary recommendations.

### **2.8.3. Implementation phase**

During implementation of the intervention programme applied TPB constructs. Knowledge has been suggested to affect women's perceptions and influence behaviour. The intervention focused on providing appropriate strategies based on women's motivation to change self-care behaviour. Comprehension of the learning in each session was checked at the end of the session to ensure that participants understood the issues that were raised in the workshops. An important component of TPB intervention was the use of participants' pre-intervention attitudes and beliefs about self-care behaviours. These beliefs were used as a basis for discussion and to help develop intentions to engage in healthy behaviours. According to visits' time schedule of participants, they were interviewed in a private room at an outpatient clinic. The intervention involved four sessions conducted to a small group (2-3) of the women with PIH. The duration of each session lasted from half an hour to one hour including periods of discussion according to their achievement and feedback. At the beginning of the first session an orientation to the intervention and its aims took place as follows, *Session 1* explored participants' attitudes and beliefs about self-care behaviour. Pre-intervention information on the group's overall attitudes and beliefs was used as a basis to consider the perceived advantages and disadvantages of adhering to healthy behaviour. *In Session 2*, participants considered the barriers (e.g., cost, lack of time) that prevent them from making each of self-care behaviours that include measuring blood pressure, oral medications, exercising, and following dietary recommendations daily, common triggers to unhealthy behaviours, and how unhealthy habits develop. Discussion also focused on the group's overall perceptions of social support from significant others (subjective norms) for self-care behaviours that include measuring blood pressure, oral medications, exercising, and following dietary recommendations daily. Participants were encouraged to identify people in their lives (e.g., spouse or partner) who affect their self-care behaviours and to develop strategies for dealing with unsupportive individuals or groups. *Session 3* completed the intervention with a focus on fostering a sense of control over behaviour change. Participants generated strategies to deal with barriers preventing them from meeting their healthy behaviour goals. Feedback was given in the beginning of each session about the previous one. Different teaching strategies were used such as lectures, group discussions, critical thinking and problem solving. Supportive tools that function as stimulus control to support desired changes, include stickers and flyers that reinforce the concepts of the intervention and emphasize the effects of PIH on mother and foetus.

### **2.8.4. Evaluation phase**

Evaluation was applied by comparing knowledge and behaviour change regarding self-care behaviour before and after implementation of TPB based intervention. This was done through reusing the same tools after three months in post-test to evaluate the effect of the implemented intervention.

### **2.9. Statistical analysis:**

Data analysis was performed using Statistical Package for Social Sciences (SPSS version 20). Descriptive statistics were applied (e.g., frequency, percentages, mean, and standard deviation). Test of significance (paired t test and chi-square test) was applied to test the study hypothesis. Correlation coefficient was calculated between TPB construct and total knowledge and self-care behaviour. A statistically significant difference was considered at  $p\text{-value} \leq .05$ , and a highly statistically significant difference was considered at  $p\text{-value} \leq .001$ , while the  $p\text{-value} > .05$  indicates non-significant results.

## **III. Results**

**Table (1)** Represents socio-demographic characteristics of the studied subjects. It was clear that 44.0% of the pregnant women were aged from 26-32 years, with a mean age  $26.79 \pm 4.92$  years. Regarding pregnant women's educational qualification, 40.0% of them had secondary education. As regards their income, 68.0% of women reported insufficient monthly income. Furthermore, 56.0% of them were housewives. In addition, 64.0% of the women were rural areas residence.

**Table (2)** Displays that, 36 % of the pregnant women were gravidal1-2 times. Moreover, parity for 36.0% of the women were >2 times. In addition 66.7% of the woman reported regular antenatal follow up. Furthermore, 20.0% of them had a pervious family history of PIH.

**Table (3)** displays that there were highly statistically significant differences (P<.001) before and after the intervention in relation to women' knowledge about definition, causes, signs and symptoms of PIH as well as effect of PIH on pregnant women and fetus, preventive measures of PIH and importance of treatment.

**Fig. (1)** clarifies the distribution of the studied subjects according to their total knowledge score. It was clear that, only 4.3 % of the studied subjects had good knowledge regarding PIH at pre intervention phase while only 44.3% of them had good knowledge.

**Table (4)** reflects that, there were general improvements (P<.001) in all TPB constructs include (attitude, subjective norms, perceived behavioral control and intention) before and after the intervention and Also statistically significant differences and improvements (P<.001) were found in relation to self-care behaviors before and after the intervention.

**Fig. (2):** demonstrates the total attitude of the studied women before and after intervention. It was clear that, 66.7 % of the studied women had negative attitudes pre-intervention. Meanwhile post intervention the negative attitudes become 16.0 %. Moreover, there was a significant difference between results (P = 0.05) before and after intervention.

**Fig. (3):** displays the total subjective norms of the studied women before and after intervention. It was clear that, 14.7 % of the studied women were high subjective norms pre-intervention. Meanwhile post intervention the women with high subjective norms become 76.0 %. Moreover, there was a significant difference between results (P = 0.05) before and after intervention.

**Fig. (4):** reflects the total behavioral control score of the studied women pre and post- intervention. It was clear that, 10.7 % of the studied women were high behavioral control pre-intervention. Meanwhile post intervention the women with high behavioral control become 44.0 %. Moreover, there was a significant difference between results (P = 0.05) before and after intervention.

**Table (5)** illustrates that, there were a positive, highly statistically significant correlation (P ≤ .01) between studied women' subtotal score of TPB construct (attitude, perceived behavioral control, subjective norms and intention) and the women' self-care behaviours before and after intervention, Moreover, a positive highly statistically significant correlation (P ≤ .001) between the women' total knowledge scores and their self-care behaviours scores before and after the intervention.

**Table (1)** Distribution of the study subjects according to their socio-demographic characteristics. (n = 75)

Characteristics	No	%
<b>Age</b>		
18-<25	19	25.3
26-<32	33	44.0
≥32	23	30.7
<b>Mean ± SD</b>	26.79±4.92	
<b>Educational qualification</b>		
- Read and write	26	34.6
- Secondary education	30	40.0
- University education	19	25.4
<b>Income</b>		
- Insufficient	51	68.0
- Sufficient	13	17.3
- Sufficient and save	11	14.7
<b>Occupation</b>		
- Housewife	42	56.0
- Work	33	44.0
<b>Residence</b>		
- Rural	48	64.0
- Urban	27	36.0

**Table (2)** Distribution of the study subjects according to their medical and obstetric history. (n = 75)

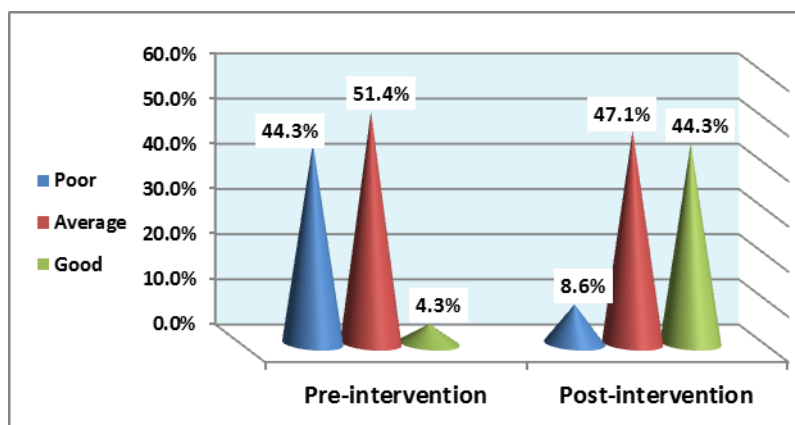
Characteristics	No	%
<b>Gravidity</b>		
- Primigravida	24	32.0
- 1-2 times	27	36.0
- ≥3 times	24	32.0
<b>Parity</b>		
- Nulliparous	24	32.0
- 1-2 times	24	32.0
- >2 times	27	36.0
<b>Abortion</b>		
- Yes	8	10.7

-	No	67	89.3
<b>Antenatal follow up</b>			
-	Regular	50	66.7
-	Irregular	25	33.3
<b>Family history of PIH</b>			
-	Yes	15	20.0
-	No	60	80.0

**Table (3):** Distribution of the studied subjects according to their knowledge toward PIH pre and post intervention (n=75).

Items	Pre-intervention						Post-intervention						$\chi^2$	P value
	Correct answer		Incomplete answer		Don't know		Correct answer		Incomplete answer		Don't know			
	No	%	No	%	No	%	No	%	No	%	No	%		
Definition of PIH	5	6.7	41	54.7	29	38.7	35	53.8	27	41.5	3	4.6	46.02	<.001**
Causes of PIH	3	4.0	39	52.0	33	44.0	34	52.3	28	43.1	3	4.6	52.33	<.001**
Signs and symptoms of PIH.	3	4.0	35	46.7	37	49.3	38	58.5	24	36.9	3	4.6	60.42	<.001**
Effect of PIH on pregnant women	0	0.0	38	50.7	37	49.3	38	58.5	24	36.9	3	4.6	69.70	<.001**
Effect of PIH on the fetus	0	0.0	34	45.3	41	54.7	39	60.0	23	35.4	3	4.6	73.60	<.001**
Preventive measures of PIH	0	0.0	42	56.0	33	44.0	39	60.0	23	35.4	3	4.6	69.19	<.001**
Importance of treatment	0	0.0	37	49.3	38	50.7	42	64.6	20	30.8	3	4.6	76.62	<.001**

\*\* Highly statistically significant difference at  $P \leq .001$



**Fig. (1)** Distribution of the study subjects according to their total knowledge toward PIH (n = 75).

**Table (4)** Mean differences of subtotal TPB constructs of the study subjects pre and post intervention (n=75).

Items	Maximum score	Pre-intervention	Post-intervention	Paired t test	P value
<b>TPB constructs score</b>					
- Attitude	140	56.48±16.402	104.00±9.272	-29.825	<.001**
- Subjective norms	112	37.70±10.13	78.60±6.83	-41.247	<.001**
- Perceived behavioral control	140	59.46±10.99	110.20±5.802	-51.488	<.001**
- Intention	84	26.64±6.573	62.21±6.448	-45.149	<.001**
<b>Self-care behavior score</b>					
	56	24.21±3.059	42.35±4.10	-29.67	<.001**

\*\*A highly statistical significant difference ( $P \leq .001$ )

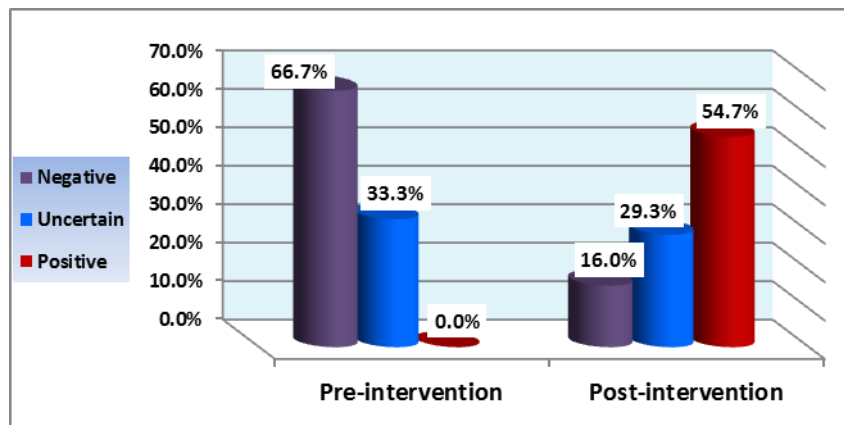


Fig. (2) Distribution of the study subjects according to their total attitudes pre and post- intervention (n = 75)

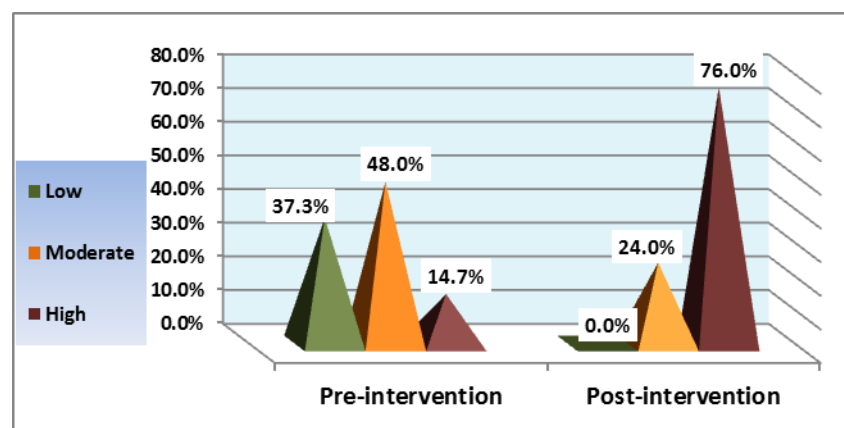


Fig. (3) Distribution of the study subjects according to their total subjective norms pre and post- intervention (n = 75)

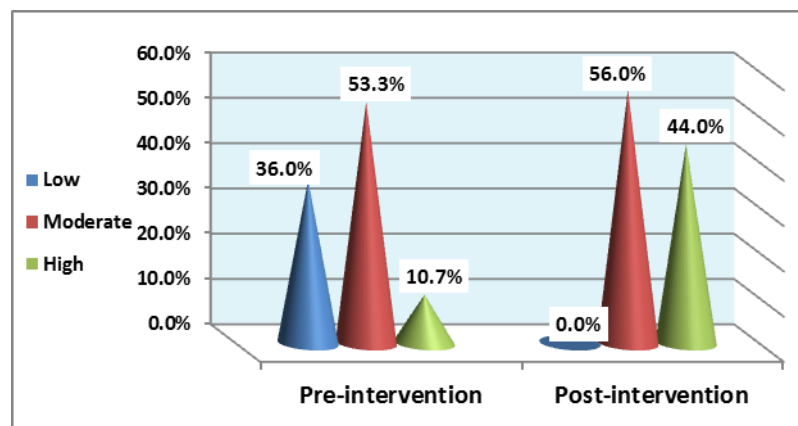


Fig. (4) Distribution of the study subjects according to their total behavioral control score pre and post- intervention (n = 75)

Table (5): Correlation coefficient between study subjects' subtotal score of TPB construct , their total knowledge score and their self-care behaviours scores before and after intervention (n = 75).

Variables		Self-care behavior	
		r	P
TPB constructs score			
- Attitude	Pre-intervention	0.163	>0.05
	Post-intervention	0.376	<0.001**
- Subjective norms	Pre-intervention	0.076	>0.05



-	Perceived behavioral control	Post-intervention	0.436	<0.001**
		Pre-intervention	0.218	<0.05
-	Intention	Post-intervention	0.487	<0.001**
		Pre-intervention	0.032	<0.05
	<b>Total knowledge score</b>	Post-intervention	0.569	<0.001**
		Pre-intervention	0.031	>0.05
		Post-intervention	0.586	<0.001**

\*\*Correlation is highly statistically significant at  $P \leq .01$

#### IV. Discussion

Pregnancy induced hypertension represents a significant cause of maternal and perinatal morbidity and mortality. [30] The TPB is one of the most frequently used theoretical frameworks for explaining behavioral intentions [28]. Greater understanding of factors contributing to self-care motivation and to self-care behaviors has important clinical significance. Developing and testing models that predict the likelihood of persons engaging in multiple health-related behaviors are needed to support clinical practice [29]. The TPB focuses on theoretical constructs reflecting individual's motivational and cognitive factors as strong predictors of performance of the behavior. The TPB assumes the most proximal determinant of the behavior is intention to perform a behavior, which, in turn, is strongly affected by attitude and subjective norm toward a behavior and perceived behavioral control over performance of a behaviour [12]. Educational intervention based on TPB will be more effective in changing the women' intention and behavior. [31]. So the present study was conducted to evaluate self-care behaviors of women with PIH before and after the application of educational intervention based on TPB

As regard socio-demographic characteristic of the studied women, it was found that more than one third of the women were aged from 26-< 32 years with a mean age 26.79±4.92 years.. This finding is consistent with a study done by **Tessema, et al., 2015** [32] entitled "Preeclampsia and associated factors among pregnant women attending antenatal care in Dessie referral hospital, Northeast Ethiopia: a hospital-based study", found that having personal or family history of hypertension and older maternal age were factors associated with Preeclampsia. It's also, obvious from current study that the pregnant women with PIH who living in the urban areas was lower than that of pregnant women living in rural areas. This could be due to the reason that pregnant women from rural areas lack of knowledge about PIH, and inaccessibility to health care facilities. This is not consistent with **Belay & Wudad, 2019**. [33] who conducted a study about "Prevalence and associated factors of preeclampsia among pregnant women attending anti-natal care at Mettu Karl referral hospital, Ethiopia: cross-sectional study". They found that more than half of pregnant women living in the urban areas. The dissimilarity between the present study findings and the latter study may be due to the difference in the place of two studies and health care facilities of targeted population where the current study conducted in Egypt while the latter study conducted in South West Ethiopia.

Obstetric and medical history of a pregnant woman play great role in determining PIH. The present study displayed that, less than one quarter of the pregnant women had a pervious family history of PIH and were 1-3 years regarding birth spacing. This result is congruent with **Gudeta & Regassa, 2019** [34] who had studied "PIH and associated factors among women attending delivery service at Mizan-Tepi University Teaching Hospital, Tepi General Hospital and Gebretsadik Shawo Hospital, Southwest, Ethiopia" found that positive family history of pregnancy induced hypertension and gestational age were predictors of pregnancy induced hypertension.

The current study had been evaluated the knowledge of the studied pregnant women regarding PIH before and after intervention based TPB, therefore, the findings of the current study pointed out that the studied pregnant women had deficient knowledge below the average level about PIH before the educational intervention based TPB. These findings agree with at least three other researches. *First*, **Ouasmani et al., 2018**. [35] who had assessed "the knowledge that Moroccan pregnant women, both in Morocco and in the Netherlands, have of HDP in terms of symptoms, complications, treatment and management.". He found that the knowledge of Moroccan women, living in Morocco or in the Netherlands, of symptoms and alarm signs related to hypertensive disorders of pregnancy was very limited. *Second* **Maputle, et al., 2015** [36] who study "Knowledge towards Pregnancy-induced Hypertension among Pregnant Women in Vhembe District, Limpopo Province". Their study revealed knowledge deficit about PIH symptoms, prevention of complications and about the impact of PIH on the unborn baby and recommended implementing the focused health education programs during antenatal visit. *Third* **Ezel, et al., 2018** [37] who had evaluated "knowledge and prevalence of pregnancy-induced hypertension/eclampsia among women of childbearing age at Same District Hospital in Tanzania", found that most of the respondents were said to have no knowledge of PIH thereby increasing maternal mortality.

Furthermore, The current study results showed highly significant improvement ( $P < .001$ ) in the pregnant women' knowledge about definition, causes, signs and symptoms of PIH as well as effect of PIH on

pregnant women and fetus, preventive measures of PIH and importance of treatment. The possible explanation for this improvement of knowledge post intervention might be reflect the impact of educational intervention based TPB on enhancing knowledge and awareness accretion. In this regard **Sargazi et al., 2014** [38] After educational intervention the mean value of knowledge, attitude, and control of perceived behavior, behavioral intention, and adopting screening behaviors increased significantly in the intervention group, while these changes weren't significant in the control group. In addition, **Zeidi et al., 2013**[39] found significant increases in the mean scores of attitude , subjective norms , intention , self-report behavior, knowledge and safety behavior in experimental group.

Generally, attitudes, subjective norms, and perceived behavioral control are all potential predictive factors of intention to engage in a particular behavior. According to the TPB, the single best predictor of a person's behavior is the intention to perform that behavior. Behavioral changes may be influenced by various factors such as personal awareness and beliefs. In other words, people's awareness and beliefs have the main role on improving health behaviors. The findings of the current study revealed general improvements in all TPB constructs include (attitude, subjective norms, perceived behavioral control and intention) before and after the intervention and Also statistically significant differences and improvements ( $P < .001$ ) were found in relation to self-care behaviors before and after the intervention. These evidence suggest that TPB-based interventions are more effective at improving attitude, subjective norms, perceived behavioral control and intention toward self-care management behaviors. This result was supported by at least five other researches. *First* **Jafaralilou et al., 2019**[40] study, who showed statistically significant differences in the helmet use behavior ,attitude, subjective norm, behavioral control, and behavioral intention of intervention group. while no statistically significant differences were observed in awareness, the behavior, and the theory constructs in the control group after the intervention .*Second*, **Didarloo et al., 2017**[41] who had applied TPB to improve obesity-preventive lifestyle among students and found that before the intervention, there was no significant difference between the two groups in the mean of the scores of both the TPB constructs and their health performances. However, three months after the intervention, the mean score of attitudes, subjective norms, perceived behavioral control and behavior of students changed, and all these changes were statistically significant between two groups ( $p < 0.05$ ).Also, concluded that the TPB could be an appropriate theoretical basis for designing and evaluating interventions to encourage people to avoid a sedentary lifestyle and inactivity. *Third* **Shafieinia et al., 2016** [42] who had applied TPB on physical activity among female employees and found a significant increase in the scores of attitude, perceived behavioral control, behavioral intention and the physical activity behavior before and after educational intervention in the case group after the educational intervention. In addition, other studies of educational intervention based on TPB have proven their effectiveness on different health behaviors such as self-care behavior in women with type 2 diabetes by **Didarloo et al., 2016** [43], improved preventive behavior of urinary tract infection in pregnant women by **Jalali et al., 2014** [44], and the self-care behaviors for prevention of hypertension among Iranian girl teenagers by **Pooreh et al., 2014** [45].Also, **Steinmetz et al., 2016**[46] attempts to change human behavior in order to improve the life of participants as an essential part rely on TPB not only to understand and predict behavior but also to guide the intervention

On the contrary, **Bastani, 2012** [47] who had studied the effect of education on nutrition behavioral intention on 104 women were recruited from premarital counseling clinics in Tehran. The researcher didn't find any significant difference in the nutrition behavioral intention after the intervention. The difference between the current study result and Bastani study may be attributed to the difference in the targeted studied subjects where the current study targeted pregnant women with PIH while Bastani study targeted premarital women. In addition, our study based on the TPB framework, that foster increasing intention expectations while Bastani nutritional program didn't based on any model or theory.

In general, the more favorable the attitude and subjective norms in relation to the behavior and the greater perceived behavioral control, the stronger the individual's intention to perform the behavior will be. It is expected that the relative importance of attitude, subjective norm, and perceived behavioral control to predict intention is different for various behaviors and situations. Therefore, in some applications, we may find that only attitude has a significant effect on intention; in others, attitude and perceived behavioral control are sufficient to create intention, and in other applications, all 3 predictors are effective. It is obvious from the present study that there is a significant improvement of the total attitude of the studied women after intervention than pre intervention phase indicating that participants had a more positive attitude for self-care management practices. This goes in line with **Sarayloo et al., 2019** [48].They found that in both the intervention and control groups, There were significant differences between the two groups in terms of perceived behavioral control, intention, attitude, or childbearing behavior. furthermore, the previously mentioned **Shafieinia et al.,2016** [42] Found that training has improved attitude toward physical activity compared to the stage before the training and people in the case group possessed higher attitude scores toward physical activity compared to who was in control group.

Perceived behavioural control refers to the degree that people feel that they have voluntary control over their behavior If there are restrictions on performing the behavior, an individual feels that he/she does not have

adequate facilities or time to perform that behavior then the individual may not experience a strong intention to perform that behavior, despite having a positive attitude and high subjective norms. The present study showed statistically significant improvement of the total behavioral control score after intervention than pre intervention so, the women will have strong intention to perform self-care behaviors. This is consistent with **Dydarlu , 2011**[49].who reported significant improvements in the mean score of perceived behavioural control for self-care behaviors among intervention-group women with type II diabetes after implementation of his educational intervention. On the other hand, **Mehri et al., 2011 & Barati et al., 2011** [50,51 ] reported no significant changes in the mean scores of Perceived behavioral control in their intervention groups after a TPB-based intervention, which isn't consistent with the results of the present study. The difference between the two educational programs and results of our study is due to that perceived behavioural control depends on the presence or absence of perceived facilitators of or barriers to an ability or behavior, there might have been numerous barriers in these programs or previously existing barriers that were not completely resolved via the two educational programs.

The correlations between pregnant women' subtotal score of TPB construct, total knowledge score and their self-care behaviours were investigated in the current study. Accordingly, there was a positive, highly statistically significant correlation ( $P \leq .01$ ) between intention of studied pregnant women' scores with their self-care behaviours before and after the intervention. It is not surprising that stronger intention can increase self-care behaviours of women with PIH as mentioned by **Akbar et al., 2015**[52]. who stated that individuals with strong intention are able to take action faster than individual with weak intention .This finding also, agree with **Damayanti et al., 2018** [53]. who had implemented " TPB on the factors affecting self-care management in Type 2 Diabetes Mellitus Patients " They found that intention and self-efficacy directly correlated with self-care management and their correlations were statistically significant. Also, a positive, highly statistically significant correlation ( $P \leq .01$ ) between attitude, subjective norm, perceived behavioral control of studied pregnant women' scores with their self-care behaviours before and after the intervention. These findings agree with at least five other researches. *First*, **Khadivzadeh, et al.,2016** [54]. who had evaluated " the predictive factors for self-care behaviors based on TPB in patients with gestational diabetes treated with insulin".He found a significant relationship between self-care behaviors and theoretical variables of subjective norms, perceived behavioral control, and behavioral intention. *Second* **Yekaninejad , et al., 2012** [55]. who study " factors associated with physical activity in adolescents and applicated the TPB ". His study indicated the a significant correlation was found between behavior of physical activity in high school students and the variables of perceived behavioral control and behavioral intention. *Third* **Gholami, et al., 2014**[56]. who had evaluated " the predictors of fruit and vegetable consumption behavior in Ilam based on constructs of TPB ", found that attitude and perceived behavioral control could predict the intention for safe driving behavior and drivers who had more positive attitude and more perceive behavior control were more likely to have intention toward driving safety. Furthermore, behavioral intention and perceive behavioral control predicted safety driving behaviors. *Fourth* **Hatefnia, et al., 2018** [57]. who found that the hypertensive women who engaged in regular physical activity had a higher positive attitude and subjective norms mean score than those who did not. *Fifth* **Alami, et al., 2019** [31]. They found that perceived behavioral control (PBC) and knowledge had significant associations with intention behaviors to take nutritional supplements.

On the other hand, no statistically significant relationship was observed between salt consumption behavior of the participants and the variables of attitude, subjective norm, perceived behavioral control, and behavioral intention in a study by **Agh Atabi et al., 2015**[58]. In addition, a study by **Ashoogh et al., 2013**[59]. entitled as "utilizing TPB to predict the safe driving behaviors in truck drivers", no significant and direct relationship was found between driving behavior of the samples and variables of subjective norms and behavioral intention .

People's awareness and beliefs have the main role on improving health behaviors. Our present study showed a positive highly statistically significant correlation ( $P \leq .001$ ) between the women' self-care behaviours and their total knowledge scores before and after the intervention. This goes in the same line with at least three other studies . *First*, the study by **Rasouli et al., 2019** [60]. who study the effect of self-care before and during pregnancy to prevent and control preeclampsia in high-risk women and found positive relationship between knowledge about self-care for gestational hypertension, and the prevention and control of preeclampsia. Also, *Second* ,the previously mentioned **Hatefnia, et al., 2018** [57]. found that the hypertensive women who engaged in regular physical activity had better knowledge of its beneficial effects than those who did not. This difference can be explained by the education about hypertension. *third*, **Eng Kooa, et al., 2014** [61].Who investigate the intention and behavior of engineering students based on TPB. They the relationship of students' real behavior with their knowledge and behavioral intention.

## V. Conclusion

Based on the results of the present study, it can be concluded that, the above mentioned results proved and reinforced the study hypothesis. The application of TPB was effective in improving knowledge and self-care behaviors among women with PIH that was observed in improving women's attitude, subjective norms, perceived behavioral control, intention and self-care behaviors at post intervention phase as compared to pre intervention. Also, the findings highlight the importance of the TPB as a useful framework for promoting behavior changes and evaluating participants' progress.

## VI. Recommendations

Based on findings of the current study, the following recommendations can be suggested:

- The nurse should implement educational intervention based on TPB for women with PIH regarding self-care management.
- The curricula of nursing education should involve TPB as an effective health promotion model.

Further studies also recommended:

- Evaluating the effect of TPB on adoption of positive behaviour among pregnant women using a larger sample and different geographical areas in Egypt.
- Compare the effectiveness of TPB with other behavioural models.

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