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DOES EDUCATIONAL INTERVENTION ON LIFESTYLE MODIFICATION IMPROVE SIGNS AND SYMPTOMS OF MILD PREECLAMPSIA? A QUAZI-EXPERIMENTAL STUDY

SALLY EBRAHIM ALI
Assistant Professor, Maternity, Obstetric, and Gynecology Nursing, College of Health Sciences and Nursing, Nursing Program, Al-Rayan Colleges, KSA & PhD, RN, Dakahlia Governorate, Egypt.

RAGAA ALI ABDRABBO
Professor, Maternal & Newborn Health Nursing, Faculty of Nursing, October 6 University, Egypt.

AMANY SAMY BADAWY
Professor, Maternal & Newborn Health Nursing, Faculty of Nursing, October 6 University, Egypt.

TEREZA KHALIFA GARAS GIRGIS
Lecture, Maternal & Newborn Health Nursing, Faculty of Nursing, October 6 University, Egypt.

Abstract

Introduction: Preeclampsia is a progressive multisystem hypertensive disorder carries life-threating condition for mother and fetus. Lifestyle modification is an appropriate guideline to alleviate the signs and symptoms of mild preeclampsia. **Objectives:** This study aimed to assess the effectiveness of educational intervention on lifestyle modification on improving signs and symptoms of mild preeclampsia. **Methods:** A Quasi-experimental design was conducted on a purposive sample of 80 pregnant women with mild preeclampsia, they were assigned into two groups; the study group received session of health education about appropriate lifestyle modification for mild preeclampsia and followed the guidelines alongside the hospital treatment protocol, while the control group followed the hospital pharmacological treatment protocol. Participants in both groups were followed-up every two weeks until 36th weeks of gestation, then weekly until delivery. **Results:** Educational intervention on lifestyle modification improves the signs and symptoms and lowers the risk of severe preeclampsia. **Conclusion:** Lifestyle modification is an effective strategy in the management mild preeclampsia, and it is recommended to be added in hospitals' protocols.

Keywords: Mild Preeclampsia, Lifestyle Modification, Patient Education, Prenatal Care, Educational Intervention.

INTRODUCTION

Pregnancy induced hypertensive disorders are considered a leading cause for maternal morbidity and mortality. Preeclampsia is a disorder associated with new-onset elevated blood pressure, edema, and proteinuria after 20 weeks of gestation [1][2]. Hypertension during pregnancy is classified as mild when the systolic blood pressure is equal or more than 140 mmHg and/or diastolic blood pressure is equal or greater than 90 mmHg. While severe cases are identified when the systolic blood pressure is equal or more than 160 mmHg and/or diastolic blood pressure is equal or greater than 110 mmHg [3].

Signs and symptoms of preeclampsia are including high levels of blood pressure, proteinuria, edema, headache, nausea, vomiting, abdominal pain, lower backache,

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sudden weight gain, vision changes, shortness of breath, and anxiety [4]. As mentioned in a recent review, preeclampsia may be accompanied with complications as HELLP syndrome, ICU admission, and pulmonary hypertension [5]. In addition, preeclampsia leads to placental abruption, acute kidney injury, liver rupture, and cerebrovascular hemorrhage. Moreover, it has a negative effect on fetus as preterm delivery, growth retardation, and stillbirth [6].

Lifestyle modification improves the hypertension and lowers the complications of mild preeclampsia. Diet modification reduces weight gain, improves vascular function, and lowers inflammation [7]. Healthy lifestyle for pregnant women with mild preeclampsia can control the associated signs and symptoms and lower the hazards of preeclampsia [8]. The American Association of Pregnancy recommends left side-lying rest, diet modification, low salt, 8 glasses of water, and more frequent antenatal checkup to mild cases of preeclampsia [9]. In addition, a previous study recommended that dietary modification including increase intake of fruits and vegetables, fiber, plant-based food, and decrease intake of fat and salt had benefits for preeclampsia [10].

As illustrated in previous studies, lifestyle modification may control hypertension and minimize its risks to mothers and fetuses. Therefore, health educational sessions about lifestyle modification for women with mild preeclampsia have an important role to control its signs and symptoms and prevent worsening of the condition. Thus, the current study is conducted to assess the effectiveness of educational intervention on lifestyle modification on improving signs and symptoms of mild preeclampsia. Research objectives were assessing the signs and symptoms of mild preeclampsia before intervention among control and study groups. Then, designing and conducting health education program concerning lifestyle modification for women with mild preeclampsia in the study group. Finally, assess the signs and symptoms of mild preeclampsia after intervention among control and study groups.

MATERIAL AND METHODS

A Quasi-experimental design was conducted on a purposive sample of 80 pregnant women with mild preeclampsia attends at antenatal clinic affiliated to October 6 University Hospital, they were recruited equally into two groups; the study group (40 women) received session of health education about lifestyle modification and followed the guidelines alongside the hospital treatment protocol, while the control group (40 women) followed the hospital treatment protocol.

The sample size was determined using g-power analysis. The inclusion criteria are including pregnant women with mild preeclampsia (systolic blood pressure more than or equal to 140 mmHg and less than 160 mmHg, while the diastolic blood pressure is more than or equal to 90 mmHg and less than 110 mmHg), gestational age 20 – 24 weeks, and free from other medical health problems. Data was collected using two tools. The first tool was a structured interviewing questionnaire to assess personal data, obstetrical history,

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and previous pregnancies history. The second tool was an assessment sheet to assess signs and symptoms among the studied sample at initial assessment and follow-up.

The tool was reviewed by five experts in the field of Maternity & Newborn Nursing. A pilot study was carried out on 10.0% of the total sample to test the feasibility of the study, applicability of the tool, and examine the clarity of the questions. After conducting the pilot study, modification was done based on the results. Participants in pilot study were excluded from the study sample. The reliability of the tool was tested by Cronbach's Alpha test. Cronbach's Alpha test was (0.0843).

During implementation phase, participants in the control and study groups were interviewed to collect the demographics and obstetrical data. Then an initial assessment was done for both groups. Participants in the study group were received session about guidelines of lifestyle modification for mild preeclampsia and written brochure was distributed. It contains knowledge regarding nutrition, water intake, physical activities, rest and sleep, stress management, smoking, follow up, and nursing measures to relieve signs and symptoms of mild preeclampsia. The participants in the control group were following the hospital protocol, which included more frequent antenatal checkup, low salt diet, and pharmacological treatment as the hospital's protocols. Otherwise, Participants in the study group were following the lifestyle modification guidelines alongside the hospital protocol of mild PE, and warning sings. **During evaluation phase**, participants in both groups were followed-up every two weeks until 36^{th} weeks of gestation, then weekly until delivery for; blood pressure, weight, proteinuria, and symptoms of preeclampsia.

Ethical Consideration:

An approval from the research ethics committee of Faculty of Nursing, October 6 University was obtained (PRC-NU241002). The purpose and phases of the study were clarified to all participants and an oral approval consent was obtained to participate in the study. Women were assured about confidentiality and privacy and that this data was used for the research purposes only. They have the right to withdraw at any time without any justification.

IV: Statistical Design:

Raw data was coded and transformed into Microsoft Excel. Statistical analysis was done by IBM SPSS version 22.0. Qualitative data were represented using numbers and percentages. Quantitative data were described as means and standard deviations. Qualitative variables were compared using the qui square test (X^2) and the p-value is the degree of significance. An independence t-test was used to determine the differences between the means within two different groups. A significant level value was considered when the p-value ≤ 0.05, while a highly significant level value was considered when the p-value ≤ 0.001.

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RESULTS

Regarding personal data, the mean age in the control and study groups was (28.73±6.56 & 29.85±6.99) respectively. Regarding occupation, it was noticed that, about two thirds and most of the control and study groups were housewives (60.0% & 75.0%) respectively.

Nearly half of the control and study groups had secondary education (45.0% & 57.5%) respectively, and all of them were married. There were no statistical differences between the control and study groups ($p > 0.05$) as shown in table (1).

As regards obstetrical history, most of the control and study groups were multigravida (82.5% & 92.5%) respectively. It was noticed that (55.0% & 62.5%) of the control and study groups were multipara respectively.

The highest percentages of the control and study groups didn't experience abortion (72.5% & 57.5%). In addition, there was homogeneity between the control and study groups regarding obstetrical history ($p > 0.05$) as mentioned in table (2).

There were no statistically significant differences between the control group and the study group regarding the initial assessment ($p > 0.05$) as clarified in table (3).

There were statistically significant differences between the control and study groups regarding signs and symptoms of preeclampsia; lifestyle modification improves the condition and reduce the risk of severe features as shown in table (4), the participants are not included in the table after delivery.

Table (1): Distribution of the studied sample according to personal data (n= 80)

Variables	Control Group (n= 40)		Study Group (n= 40)		Test	p-value
	No	%	No	%		
Age (year)						
20-	15	37.5	14	35.0	**Chi-Square χ2**	
26-	9	22.5	6	15.0	1.892	0.60
31-	8	20.0	7	17.5		
More than 35	8	20.0	13	32.5		
Mean (SD)	28.73±6.56		29.85±6.99		t-test= 0.742	0.46
Occupation						
Occupied	16	40.0	10	25.0	**Chi-Square χ2**	0.23
Housewife	24	60.0	30	75.0	2.051	
Educational level						
Illiterate	2	5.0	4	10.0	**Chi-Square χ2**	
Primary	3	7.5	6	15.0	6.443	
Secondary	18	45.0	23	57.5		0.09
University	17	42.5	7	17.5		

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Table (2): distribution of the studied sample regarding obstetrical history (n= 80)

Variables	Control Group (n= 40)		Study Group (n= 40)		Chi-Square χ2	p-value
	No	%	No	%		
Gravidity						
Primigravida	7	17.5	3	7.5	1.829	0.31
Multigravida	33	82.5	37	92.5		
Parity						
Nullipara	7	17.5	3	7.5		
Primipara	11	27.5	12	30.0	1.835	0.40
Multipara	22	55.0	25	62.5		
Abortion						
None	29	72.5	23	57.5		
1	5	12.5	9	22.5	2.121	0.35
2	6	15.0	8	20.0		
Mode of previous delivery						
Normal Delivery	26	65.0	28	70.0		
Caesarean Section	7	17.5	9	22.5	4.211	0.12
No previous deliveries	7	17.5	3	7.5		

Table (3): distribution of the studied sample regarding initial assessment (n= 80)

Variables	Control Group (n= 40)		Study Group (n= 40)		Test	P-value
	No	%	No	%		
Systolic Bl.P Mean (SD)	141.00±2.58		141.50±3.62		t= 0.712	0.48
Diastolic Bl.P Mean (SD)	90.00±3.20		89.63±2.86		t= 0.552	0.58
Headache	31	77.5	23	57.5	χ2 = 3.647	0.09
Blurred vision	11	27.5	16	40.0	χ2 = 1.398	0.34
Abdominal pain	2	5.0	4	10.0	χ2 = 4.211	0.12
Nausea and vomiting	4	10.0	2	5.0	χ2 = 0.721	0.68
Constipation	8	20.0	6	15.0	χ2 = 0.346	0.77
Fatigue	29	72.5	21	52.5	χ2 = 10.733	0.16

Table (4): follow up assessment data of the studied sample (n= 80)

Variables	Control Group (n= 40)	Study Group (n= 40)	Test	P-value
1st follow-up				
SBP Mean (SD)	140.25±2.99	138.63±3.92	t= 2.086	0.04*
DBP Mean (SD)	89.63±4.14	87.63±4.38	t= 2.097	0.03*
Proteinuria Mean (SD)	1.32±0.35	1.12±0.32	t= 2.066	0.03*

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Headache	31	77.5	20	50.0	$\chi2 = 0.912$	0.01*
Blurred Vision	4	10.0	3	7.5	$\chi2 = 0.157$	0.69
Fatigue	21	52.5	11	27.5	$\chi2 = 5.208$	0.02*
Constipation	17	42.5	5	12.5	$\chi2 = 9.028$	0.003*
Second follow-up						
SBP Mean (SD)	144.50±9.53		140.63±7.09		t= 2.064	0.04*
DBP Mean (SD)	88.25±5.38		86.25±3.35		t= 1.997	0.05*
Proteinuria Mean (SD)	1.40±0.50		1.18±0.38		t= 2.266	0.03*
Headache	27	67.5	17	42.5	$\chi2 = 5.051$	0.03*
Blurred vision	19	47.5	8	20.0	$\chi2 = 6.765$	0.01*
Fatigue	28	70.0	19	47.5	$\chi2 = 4.178$	0.04*
Third follow-up						
SBP Mean (SD)	147.75±10.50		140.88±11.20		t= 2.832	0.006*
DBP Mean (SD)	91.00±6.72		87.13±6.09		t= 2.704	0.008*
Proteinuria Mean (SD)	1.45±0.50		1.23±0.42		t= 2.163	0.03*
Headache	26	65.0	15	37.5	$\chi2 = 6.054$	0.01*
Blurred Vision	22	55.0	11	27.5	$\chi2 = 6.241$	0.01*
Fatigue	35	87.5	24	60.0	$\chi2 = 7.813$	0.005*
Back pain	6	15.0	3	7.5	$\chi2 = 1.127$	0.28
Severe preeclampsia	4	10.0	2	5.0	$\chi2 = 0.721$	0.40
Forth follow-up						
SBP Mean (SD)	154.00±16.88		143.75±15.68		t= 2.814	0.006*
DBP Mean (SD)	94.25±8.74		88.75±8.38		t= 2.874	0.005*
Proteinuria Mean (SD)	1.98±0.92		1.58±0.78		t= 2.097	0.04*
Headache	27	67.5	14	35.0	$\chi2 = 8.455$	0.004*
Blurred Vision	21	52.5	10	25.0	$\chi2 = 6.377$	0.012*
Fatigue	29	72.5	31	77.5	$\chi2 = 0.267$	0.61
Back pain	10	25.0	5	12.5	$\chi2 = 2.051$	0.15
Abdominal pain	3	7.5	1	2.5	$\chi2 = 1.053$	0.31
Nausea and vomiting	12	30.0	5	12.5	$\chi2 = 3.660$	0.06
Severe preeclampsia	22	55.0	10	25.0	$\chi2 = 9.368$	0.025*
Delivery	4	10.0	1	2.5	$\chi2 = 1.920$	0.17
Fifth follow-up	**(n= 36)**		**(n= 39)**			
SBP Mean (SD)	162.11±22.00		148.41±16.76		t= 3.048	0.003*
DBP Mean (SD)	98.31±10.97		92.44±8.16		t= 2.642	0.010*
Proteinuria Mean (SD)	2.14±0.93		1.79±0.83		t= 2.097	0.09
Headache	31	86.1	26	66.7	$\chi2 = 3.880$	0.05*
Blurred Vision	18	50.0	10	25.6	$\chi2 = 4.748$	0.029*

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Fatigue	26	72.2	26	66.7	$\chi2 = 0.272$	0.60
Abdominal pain	10	27.8	2	5.1	$\chi2 = 7.145$	0.008*
Nausea and vomiting	13	36.1	4	11.1	$\chi2 = 7.139$	0.008*
Severe preeclampsia	18	50.0	10	25.6	$\chi2 = 9.470$	0.05*
Delivery	9	25.0	1	2.6	$\chi2 = 8.155$	0.004*
Six follow-up	**(n= 27)**		**(n= 38)**			
SBP Mean (SD)	161.81±22.09		152.41±20.14		t= 1.710	0.09
DBP Mean (SD)	95.26±6.80		91.63±6.38		t= 2.198	0.032*
Proteinuria Mean (SD)	2.19±0.74		1.74±0.79		t= 2.600	0.024*
Headache	22	81.5	20	52.6	$\chi2 = 5.746$	0.017*
Blurred Vision	11	40.7	7	18.4	$\chi2 = 3.927$	0.048*
Fatigue	25	92.6	20	52.6	$\chi2 = 11.833$	0.001**
Abdominal pain	5	18.5	10	26.3	$\chi2 = 0.541$	0.46
Nausea and vomiting	6	22.2	6	15.8	$\chi2 = 0.434$	0.008*
Severe preeclampsia	8	29.6	7	18.4	$\chi2 = 10.572$	0.22
Delivery	10	37.0	5	13.2	$\chi2 = 5.070$	0.024*
Seven follow-up	**(n= 17)**		**(n= 33)**			
SBP Mean (SD)	168.53±14.41		151.00±11.87		t= 4.629	0.000**
DBP Mean (SD)	102.0±5.92		91.52±6.62		t= 5.493	0.000**
Proteinuria Mean (SD)	2.47±0.62		1.67±0.60		t= 4.451	0.000**
Headache	14	82.4	12	36.4	$\chi2 = 9.507$	0.002*
Blurred Vision	4	23.5	3	9.1	$\chi2 = 1.943$	0.163
Fatigue	14	82.4	19	57.6	$\chi2 = 3.070$	0.080
Abdominal pain	4	23.5	2	6.0	$\chi2 = 3.242$	0.072
Nausea and vomiting	2	11.8	1	3.0	$\chi2 = 1.868$	0.172
Severe preeclampsia	13	76.5	6	18.2	$\chi2 = 20.763$	0.002*
Delivery	9	52.9	6	18.2	$\chi2 = 6.455$	0.011*
Eight follow-up	**(n= 8)**		**(n= 27)**			
Systolic Bl.P Mean (SD)	163.75±16.02		153.86±10.67		t= 4.629	0.045*
Diastolic Bl.P Mean (SD)	102.0±8.35		92.76±8.23		t= 5.493	0.008*
Proteinuria Mean (SD)	2.38±0.74		1.83±0.80		t= 4.451	0.093
Headache	6	75.0	10	37.0	$\chi2 = 3.548$	0.058
Fatigue	7	87.5	22	81.5	$\chi2 = 0.104$	0.692
Abdominal pain	5	62.5	12	44.4	$\chi2 = 0.805$	0.369
Nausea and vomiting	2	25.0	2	7.4	$\chi2 = 1.887$	0.170
Severe preeclampsia	4	50.0	14	48.3	$\chi2 = 8.138$	0.087

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DISCUSSION

The present study was aimed to assess the effectiveness of lifestyle modification nursing guidelines on improving signs and symptoms of mild preeclampsia. As observed in the findings of this study, lifestyle modification nursing guidelines alongside with pharmacological management lower the mean of systolic and diastolic blood pressure readings and its related symptoms among women in the study group rather than the control group with statistically significant. These findings are in the same line with Samson et al. the researchers concluded that lifestyle modifications are effective strategy for the management of pregnant women with stage one elevated blood pressure [9]. Moreover, Vamvakis et al. observed that lifestyle modifications lower systolic blood pressure from (142.8±4.1) in the baseline assessment to (123.3±8.9) in the end of the study, also lower diastolic blood pressure from (90.9±9.1) in the baseline assessment to (82.2±7.6) in the end of the study [10]. In addition, El Sayed and Desoky stated that, the educational sessions regarding lifestyle modification had a positive significant effect on improving the features pf mild preeclampsia. Lifestyle counselling lowers the systolic and diastolic blood pressure readings [11]. Furthermore, Filippou et al. reported that the Dietary Approaches to Stop Hypertension (DASH) reduces blood pressure levels [12]. Likewise, Smith, who noticed a reduction in diastolic and systolic readings among the DASH group [13].

The lifestyle guidelines in this study included instructions regarding appropriate physical exercise. Physical activity has physiological mechanisms such as systemic adaptation of the arterial wall, reduction of pro-oxidant levels and arterial stiffness, increases in central nitric oxide synthase activity and improvement in endothelial function clarifies the positive effects of participating in physical activities on blood pressure measurements [14]. These findings are enforced by Gao et al. who concluded that physical activities for pregnant women can lower the risk of pregnancy induced hypertension disorders because it improves placental blood flow, reduces oxidative stress, improves insulin resistant, which leads to better maternal and fetal prognosis [15]. In addition, a previous study reported that increased physical activities, from low to moderate level, significantly reduced blood pressure readings [14].

Stress and anxiety increase the heart rate and blood pressure because of high cortisol levels increase cortisol level [16]. Thus, the lifestyle modification nursing guidelines in this study included stress management instructions. The results of this study are emphasized by Smith et al. who noticed that relaxation techniques reduce systolic and diastolic blood pressure among women with pregnancy induced hypertension [17]. Otherwise, Smoking may be a predisposing factor for hypertension because of Carbon monoxide which reduces vascular tone and inhibits inflammatory cascades [18]. For these effects, participants in the study group were instructed to avoid negative and positive smoking. Andriani et al. found that female smokers had hypertension, while cessation of smoking reduced the blood pressure readings [19].

As observed with the results of the current study, lifestyle modification guidelines lowered the mean of proteinuria and its related symptoms. These findings are emphasized by

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Attini et al. the authors found that nutritional modification may control proteinuria in pregnant women [20]. In addition, the findings of the present study revealed that lifestyle modification nursing guidelines reduced the risk of severe preeclampsia with statistically significant. As same as Mekie et al. who found that nutritional counselling lowered the risk of developing severe preeclampsia [21]. Maternal nutrition nature is an important potential factor associated with the risk of preeclampsia [22].

Regarding the correlation between physical exercise and severe preeclampsia, Magro-Malosso et al. conducted that participating in aerobic exercise significantly lowered the incidence of hypertensive disorders during pregnancy [23]. As regards smoking, Lewandowska and Wieckowska analyzed the association between smoking and preeclampsia, they found that smoking increases the risk of preeclampsia [24]. Pregnant women in the current study were attended educational sessions regarding the appropriate lifestyle for pregnant women with preeclampsia and get a booklet. Use of handout booklets ensures the continuation of effective education as the guidelines are easier to be comprehended and adapted from the booklet and used in everyday life [25].

Strengthen and Limitation of the Study:

- Pregnant women were motivated to follow the instructions by saving their fetuses lives and preventing maternal and fetal complications.
- Some participants change the setting during follow up or delivered at another setting, they are replaced by another participants.

CONCLUSION

Based on the findings of this study, educational intervention on lifestyle modification lifestyle modification are effective and safe strategies for management of mild preeclampsia. In addition, lifestyle modification is an effective preventive strategy to lower the risk of severe preeclampsia. Health educational sessions using a PowerPoint presentation and distribution of a printed handout booklet are an effective method to allieviate the signs and symptoms of mild preeclampsia.

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