RESEARCH ARTICLE

The impact of prenatal education based on the Roy adaptation model on gestational hypertension, adaptation to pregnancy and pregnancy outcomes

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Abstract

Objective: To analyse the impact of prenatal education on gestational hypertension, adaptation to pregnancy and on maternal and neonatal outcomes.

Methods: The quasi-experimental case-control study was conducted at Aydin Maternity and Children's Hospital, Aydin, Turkey, from October 2013 to July 2015, and comprised women with gestational hypertension. The sample was randomised into education and control groups with the former receiving informative education and the latter receiving due medical care alone. Roy Adaptation Model was used to determine the impact of prenatal education. SPSS 20 was used for data analysis.

Results: Of the 132 subjects, 68(51.5%) were in the education group and 64(48.5%) in the control group. Post-intervention, 11(16.2%) women in the education group and 37(57.8%)in the control group developed severe preeclampsia. Subsequently, 44(64.7%) in the education group had no preeclampsia. The corresponding number in the control group was 15(23.4%).

Conclusion: Education based on Roy Adaptation Model proved to be effective among pregnant women in keeping hypertension under control.

Keywords: Adaptation, Hypertension, Roy Adaptation Model. (JPMA 69: 11; 2019)

Introduction

Hypertensive illnesses in pregnancy are major causes of morbidity and mortality among mothers, foetuses and neonates all over the world.[1] The World Health Organisation (WHO) reports that about 10% of pregnant women are adversely affected by hypertensive illnesses and that more than 60,000 women lose their lives because of this.[2] Moreover, the fact that preeclampsia is responsible for the death of 500,000 neonates reveals that this disease is considerably threatening in terms of foetal outcomes.[3] In Turkey, the incidence of hypertensive illnesses in pregnancy is reported to range between 3.9% and 15.1%,[4-7] and in 2014, it was reported that 14% of maternal deaths were caused by hypertensive illnesses in pregnancy.[8] Studies report that the use of the Roy Adaptation Model (RAM) in cases of education and counselling provided a positive contribution to the process of adapting to pregnancy.[9-12] RAM classifies behavioural responses in four modes (physiological, self-concept, role function and interdependence domains) of adaptation as adaptive or non-adaptive. Nursing diagnoses are defined after non-adaptive behaviour is determined and then interventions are planned accordingly. Nursing intervention is the education provided that addresses the non-adaptive behaviour in the four domains of adaptation. Non-adaptive behaviour is responding not positively to environmental changes. The nurse then makes another assessment to track the effects of the intervention. If the individual develops an adaptive behaviour, the nursing intervention is taken as effective; if non-adaptive behaviour has developed, the intervention is considered to have been ineffective.[13,14]

The current study was planned to analyse the impact of prenatal education based on the Roy Adaptation Model on gestational hypertension, adaptation to pregnancy and on maternal and neonatal outcomes.

Subjects and Methods

This single-centre, randomised, quasi-experimental study was conducted at the Gynaecology and Obstetrics Clinics of Aydin Maternity and Children's Hospital, Aydin, Turkey, from October 2013 to July 2015, and comprised women with gestational hypertension. Quantitative data-collection was employed and the hospital was selected because it was the only maternity hospital in Aydin. Approval was obtained from the Ege University Nursing Faculty Scientific Ethics Committee and permission was obtained from the Aydin Province Public Hospitals Association General Secretariat. Written informed consent was obtained from all the subjects. Written permission was also obtained from Assistant Prof. Dr. Derya Tasci Beydag for the use of the Pain self-efficacy questionnaire- Acceptance of pregnancy subscale (PSEQ-AP).[17] The study was also registered at the

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Australia-New Zealand Clinical Trials Registry (ACTRN12617000225314). Using convenience sampling method, prospective subjects were enrolled. Since there was no study found in literature that dealt with the standardisation of care with regard to cases with gestational hypertension, therefore the sample size was determined on the basis of information obtained from the current study itself. The minimum number of individuals in the sample was determined using G*power at a 95% confidence interval (CI), effect size (d)=0.60, α=0.05 and power analysis= 0.80 (80%). The sample size stood at 44 women each in educational and control groups.

Those invited were pregnant women in their 20th-24th gestational weeks, were aged 18-35 years who had received a diagnosis of hypertension and were taking anti-hypertensive drugs, had experienced less than four and single pregnancies, having body mass index (BMI between 19-30, and consented to participate in the study were taking anti-hypertensives. Excluded from the study were those who were past their 24th gestational week, age outside the 18-35 years bracket, those who had experienced more than four pregnancies, had a BMI outside of 19-30 bracket, and those who did not consent to participate in the study.

Those who met the inclusion criteria were randomly allocated into two equal groups by using a computer-generated random number chart. For all consecutive pregnant women, numbers were written on envelopes, while the allocation data was entered on a separate paper that was put into the numbered envelopes which were then sealed. When the pregnant women met the inclusion criteria, she signed the informed consent form and was given her participation number. When the patient had reached the second stage, the envelope with the participation number on its cover was opened to reveal the randomisation.

Those who were followed up at other hospitals, or were unable to report regular blood pressure readings were left out (Figure-1). Demographic questionnaire,[9,15] RAM-based semi-structured interview form, maternal and neonatal outcomes assessment questionnaire and gestational hypertension prognosis form were prepared in line with the literature.[14-23]Prenatal Self-Evaluation Questionnaire[16] was developed to assess the adaptation of prenatal women to pregnancy and to the role of motherhood. The scale consists of 7 subscales and 79 items, the total tool and subscale internal consistency coefficients varied between 0.75 and 0.92. The Turkish version of the instrument has been tested for validity and reliability in 2008.[17] The tool has a high level of internal consistency reliability coefficient (a =0.81), and subscales' internal consistency reliability coefficients varied between 0.72 and 0.85. According to the item total score analysis results for the evaluation of the tool's reliability, a value of r=0.30-0.59 was found and no item was removed from the tool. The tool's test-retest reliability coefficient was at a high level (r=0.84). This study made use of the Acceptance of Pregnancy Subscale.[17] The subscale was used to evaluate the women's adaptation to pregnancy. The internal consistency coefficient for the acceptance of pregnancy subscale was 0.80. The subscale consists of 14 items. The highest possible score on this subscale is 56; the lowest is 14. As the scores decrease, the acceptance of pregnancy increases.[15,17]

The educational booklet was prepared in a manner that encompassed the four modes of adaptation described in RAM; physiological, self-concept, role function and interdependence.[9,12] To ensure the content validity of the educational booklet, eight faculty members, specialised in Obstetric and Gynaecological Nursing, were consulted. Meetings were held with the pregnant women in the education group four times; twice in Weeks 20-24 of pregnancy, once in their 30th-34th weeks and on the first and second days after the birth. At the first meeting, introductions were made using face-to-face interviews, consent forms were signed, and demographic questionnaire, PSEQ-AP and RAM-based semi-structured interview form were filled out. In addition, the pregnant women were asked to have their blood pressure measured and recorded once a week. Based on the data obtained from the semi-structured interview form, the non-adaptive behaviours according to the RAM modes of adaptation were determined. In the second meeting, which was held one week after the first monitoring, individual coaching was provided on how to cope with the stimuli causing the non-adaptive behaviour. Although the goal in this model-based education was to diminish or eliminate the impact of the stimuli that caused the non-adaptive behaviour, if behaviours or stimuli could not be changed, developing a positive perception became the objective. At the second meeting, five sessions were held — two sessions to cover the physiological mode, and one session each for the self-concept, role functions and interdependence modes. The sessions each took approximately 20-40 minutes. Additionally, behaviour changes proposed to be achieved until the next visit that would improve the pregnant women's adaptation to pregnancy and to illness during pregnancy were planned and an education booklet was given to the women.

At the third meeting (Week 30-34 of the pregnancy), the PSEQ-AP, the Hypertension Prognosis Form and the RAM-based semi-structured interview forms were filled out. Then, education was provided by means of the education booklet on areas of adaptation where problems were

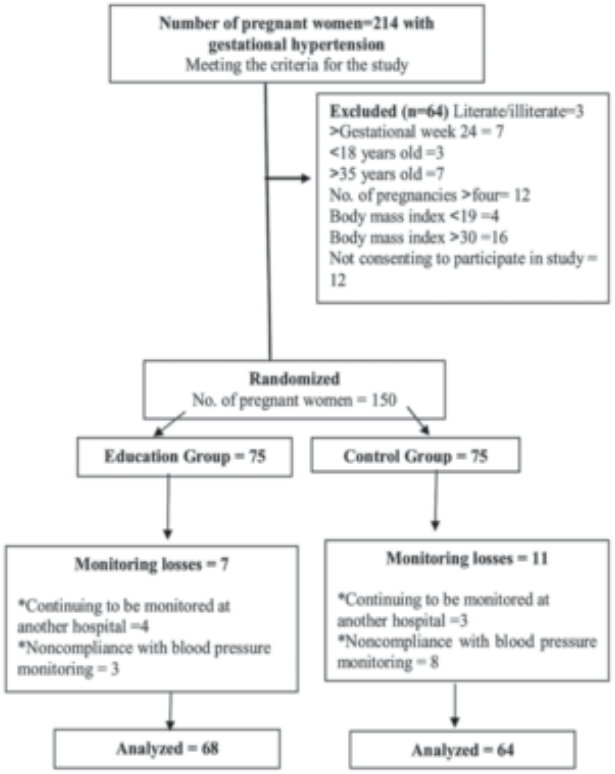

Figure-1: Randomisation flow chart.

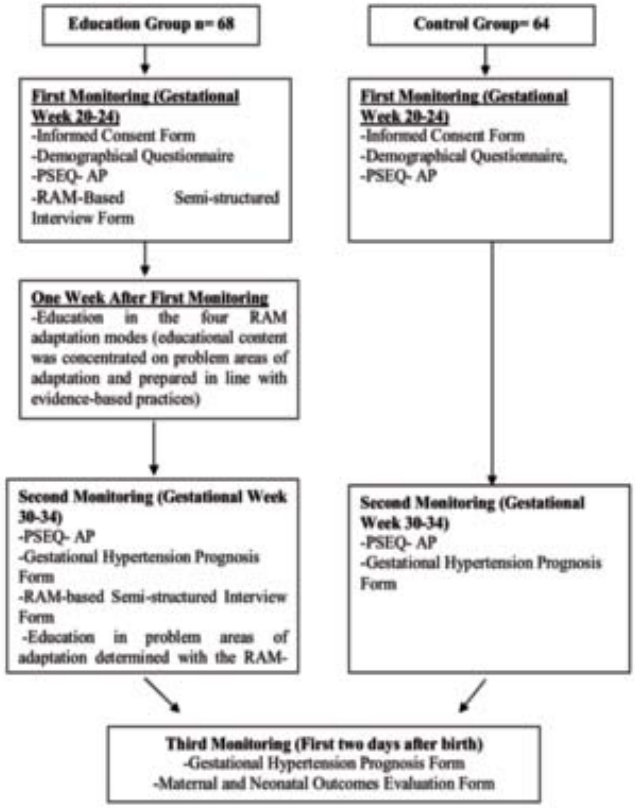

Figure-2: Study implementation steps.

experienced, after which planning was carried out for the next meeting to facilitate behaviour changes that could improve adaptation to pregnancy and prenatal illnesses. In the fourth week (Day 1 and 2 after the birth), the Gestational Hypertension Prognosis, Maternal-Neonatal Outcomes Evaluation Forms were filled out.

The meetings with the pregnant women in the control group were held in Weeks 20-24 and 30-34 of the pregnancy and on the first and second days after the birth. In the first meeting the pregnant women underwent face-to-face interview and consent forms, as well as the Identifying Characteristics Form and the PSEQ-AP were filled out, after which the women were given routine care. In addition, they were asked to have their blood pressure measured and recorded once a week over the period of the study. At the second meeting, the researcher filled out the PSEQ-AP and Gestational Hypertension Prognosis Form. At the third meeting, the Gestational Hypertension Prognosis and the Maternal and Neonatal Outcomes Evaluation Forms were administered. As against the control group, a programme of education based on the Roy Adaptation Model was provided to the education group in the second (a week after the first monitoring) and third meetings (Figure-2).

SPSS 20 was used to analyse the data. Numeric data was expressed as mean ± standard deviation (SD). Other data was defined in the form of frequency and percentage. The comparisons of two groups' sociodemographic and obstetric characteristics, their gestational hypertensive illnesses in the second and third monitoring and their neonatal outcomes were carried out with chi-square test. Comparisons between the two groups' obstetric characteristics' mean values, their PSEQ-AP mean scores at the first and second monitoring, their neonatal and maternal outcomes' mean values (normal distribution) were carried out with independent samples t-test. Data that did not distribute normally was analysed with Mann-Whitney U test. The relationships between infant's period of stay at the hospital and mother's period of stay at the hospital were identified using Pearson correlation analysis. The limit of significance was $p<0.05$ for all tests.

Results

Of the 214 women approached, 64(30%) were excluded. The remaining 150(70%) women were divided into two groups of 75(50%) each. Subsequently, 7(9.3%) in education group and 11(14.6%) had to be eliminated. The final sample size analysed was 132(62%) women;

Table-1: Sociodemographic and obstetric characteristics of the pregnant women.

Sociodemographic and obstetric characteristics	Education group (n=68)	Control group (n=64)	X^2 or t or Z/P
Educational status, n(%)			
Elementary School	51(75.0)	49(76.6)	0.422/0.810
Middle School	13(19.1)	10(15.6)	
High school - University	4(5.9)	5(7.8)	
Working status, n(%)			
Employed	14 (20.6)	8(12.5)	1.553/0.213
Housewife	54(79.4)	56(87.5)	
Rate of planned pregnancy, n(%)			
First delivery mode, n(%)	58(85.3)	54(84.4)	0.022/0.883
Normal	41(69.5)	41(80.4)	1.713/0.191
Caesarean section	18(30.5)	10(19.6)	
Second delivery mode, n(%)			
Normal	23(63.9)	13(56.5)	0.320/0.571
Caesarean section	13(36.1)	10(43.5)	
Experiencing discomfort during pregnancy, n(%)	14 (20.6)	16 (25.0)	0.365/0.546
Discomfort experienced, n(%)			
Anaemia	3(21.4)	4(25.0)	2.324/0.508
Nausea-vomiting	4(28.6)	7(43.8)	
Anaemia and nausea-vomiting	5(35.7)	2(12.5)	
Risk of miscarriage	2(14.3)	3(18.7)	
Age, Mean ± SD	26.60± 5.19	26.52± 4.83	-0.151*/0.880
Gestational week, Mean ± SD	21.29±1.43	21.38±1.41	-0.371*/0.711
Number of pregnancies, Mean ± SD	2.45±0.70	2.34±0.70	0.923/0.358
No. of live births, Mean ± SD	1.58±0.50	1.43±0.50	-1.497*/0.134
No. of living children, Mean ± SD	1.58±0.50	1.42±0.50	-1.604*/0.109
Total weight gained during pregnancy, Mean ± SD	20.26±4.60	21.45±3.86	-1.453*/0.146

*The Mann-Whitney U test was applied because normal distribution was not observed. Values are Z values.

68(51.5%) in the education group and 64(48.5%) in the control group. The educational and employment status as well as their planning of pregnancy of subjects in the two groups were statistically similar (p>0.05).

In the education group, 14(20.6%) women and 16(25.0%) in the control group stated that they had experienced discomfort in the first monitoring (Table-1).

At the second monitoring, the difference between the groups was statistically significant (p=0.000), with 10(14.7%) women in the education group having mild preeclampsia compared to 2(3%) in the control group. The rate of developing severe preeclampsia was

Table-2 Pregnant women's gestational hypertension illnesses and PSEQ-AP mean scores.

Monitoring Results	Education group (n= 68)	Control group (n=64)	X^2 or t or Z/P
Second monitoring			
No preeclampsia	47(69.1)	25(39.1)	26.042/0.000
Mild preeclampsia	10(14.7)	2(3.1)	
Severe preeclampsia	11(16.2)	37(57.8)	
Third monitoring			
No preeclampsia	44(64.7)	15(23.4)	42.587/0.000
Mild preeclampsia	11(16.2)	1(11.6)	
Severe preeclampsia	13(19.1)	48(75.0)	
PSEQ-AP, Mean ± SD			
First monitoring	44.12±11.09	40.89±10.56	-1.447*/0.148
Second monitoring	28.57±4.79	35.45±6.32	#DIV/0!

*The Mann-Whitney U test was applied because normal distribution was not seen. Values are Z values.
PSEQ-AP:

Table-3: Results of neonatal and maternal outcomes.

Neonatal and maternal outcomes	Education group (n=68)	Control group (n=64)	X^2 or t or Z/P
Presentation position disorder, n(%)	7(10.3)	8(12.5)	0.159/0.690
Congenital malformation, n(%)	4(5.9)	4(6.3)	0.000/1.000
RDS, n(%)	6(8.8)	9(14.1)	0.898/0.343
Neonatal hypoglycemia, n(%)	11(16.2)	15(23.4)	1.099/0.294
Neonatal hyperbilirubinemia, n(%)	6(8.8)	11(17.2)	2.056/0.152
Infant taken into intensive care, n(%)	9(13.2)	12(18.8)	0.749/0.387
Gestational week, n(%)			
Weeks 34-36	3(4.4)	1(1.6)	0.199/0.655
Week 37 and above	65(95.6)	63(96.4)	
Infant's head circumference, Median ±SD	34.50±0.89	34.31±0.66	1.366/0.174
Infant's length, Median ± SD	50.24±0.71	50.16±0.51	0.727/0.469
Infant's weight, Median ±SD	3533.69±274.70	3464.66±248.02	1.512/0.133
Gestational week, Median ± SD	39.26±1.23	39.08±1.01	0.949/0.345
First-minute Apgar score, Median ± SD	7.85±1.14	7.77±1.09	-0.075*/0.940
Fifth-minute Apgar score, Median ± SD	9.19±1.03	8.98±1.21	-0.942*/0.346
Infant's stay at hospital, Median ± SD	3.13±2.61	4.17±2.62	-3.538*/0.000
Mother's stay at hospital, Median ± SD	2.75±1.64	3.45±1.66	-152.75
Maternal systolic blood pressure, Median ± SD	139.29±14.51	152.83±9.04	#DIV/0!
Maternal diastolic blood pressure, Median ± SD	91.19±8.99	101.84±9.42	-5.674*/0.000

RDS: Respiratory Distress syndrome

11(16.2%) in the education group compared to 37(57.8%) in the control group (p=0.000).

At the third monitoring, an examination, by gestational hypertensive illnesses, of the distribution of the education and control groups revealed that the difference between the groups was statistically significant (p=0.000). The rate of developing mild preeclampsia was higher in the education group than in the control group, while the rate of developing severe preeclampsia was less in the education group (p=0.000). The difference between the group with mild preeclampsia and the group with severe preeclampsia was significant (p=0.000).

Mean PSEQ-AP score of the education group at the first monitoring was higher than that of the control group, but the difference was not significant (p>0.05). At the second monitoring, the statistical difference was significant (p=0.000) (Table-2).

The subjects in both groups were similar in terms of presentation position anomaly, the existence of congenital malformation, acute respiratory distress syndrome (ARDS), existence of neonatal hypoglycaemia, neonatal hyperbilirubinaemia, infant's admittance into intensive care and the gestational week at birth (p>0.05 each).

Neonatal outcomes of intrauterine development retardation, neonatal mortality, ablatio placenta were not seen in either group but neonatal infection was observed in only 1(1.56%) infant in the control group. Also, the only congenital malformation observed in both groups was neural tube defects.

The infants of women in the two groups were similar in terms of their head circumferences, lengths, mean weights, mean gestational week, mean scores of appearance, pulse, grimace, activity, and respiration (Apgar) in the first minute, and their mean Apgar score in the fifth minute (p>0.05 each). A significant difference between the groups was only found in terms of the infant's average stay at the hospital (p=0.000). A positive correlation was discovered between the infant's period of stay at the hospital and the mother's period of stay at the hospital (p=0.000). Similarly, the mothers in the education group had lower levels of average stay at the hospital, maternal systolic blood pressure averages, and maternal diastolic blood pressure averages compared to the mothers in the control group (p=0.000). Maternal mortality was not observed in either group, but maternal infection was seen in 1(1.5%) subject in the control group (Table-3).

Discussion

In the first monitoring prior to the education in this study, the socio-demographic and obstetric features of the education and control groups were found to be similar, as were their mean scores on PSEQ-AP. These findings are important in that they reveal the homogeneity of the two groups prior to the education.

According to the RAM, nurses focus on human and

environment interactions that promote maximum human development and well-being. People are defined as adaptive systems able to adapt to the environment. Therefore, nurses evaluate the adaptation status of human beings and plan interventions directed toward turning negative stimuli into positive responses. The primary goal of nursing is to promote adaptation.[14] In the second and third monitoring of the subjects, the incidence of mild and severe preeclampsia in the education group was lower than in the control group. This finding reveals that the RAM-based education was effective in keeping hypertension under control in pregnant women.

The mean PSEQ-AP score of the education group at the first monitoring was higher than that of the control group, but this difference was not significant. The PSEQ-AP mean score of the education group at the second monitoring was lower than that of the control group and this difference was significant. It was seen in the study that the RAM-based education enhanced the pregnant women's levels of adaptation to pregnancy. These results point to the effectiveness of a RAM-based education in gestational hypertension. A similar study with pregnant women at low risk reported that the RAM-based education increased the women's levels of adaptation.[9] Also, a study with pregnant women reported that the PSEQ-AP mean was 23.12±7.40.[11] A further study reported that PSEQ-AP mean was 24.0±7.9.[12] Another study reported that PSEQ-AP mean was 21.8±7.9.[10] As PSEQ-AP score decreases, the acceptance of pregnancy increases.[15,17] The mean scores of the pregnant women in both groups in this study were higher than those reported in the literature for low-risk pregnant women[10-12] Hypertensive disorders have many negative physiological and psychological effects on pregnancies.

The similarity between the education and control groups in this study in terms of presentation position anomaly, the existence of congenital malformation, ARDS, neonatal hypoglycaemia and hyperbilirubinaemia, the admittance of infants into intensive care, gestational week, the head circumference, length and weight of the infant, the gestational week at birth, and the mean Apgar scores in the first and fifth minutes shows that the RAM-based education did not have an impact on neonatal outcomes. However, the infants of the gravidae in the control group stayed in the hospital for a longer duration due to the medical condition of the mother. This shows that the RAM-based education was ineffective on neonatal outcomes. The study revealed that the RAM-based education had a positive effect on the gravida's systolic and diastolic blood pressure outcomes and shortened the duration of stay in the hospital. This shows that the RAM-based education was partially effective on neonatal outcomes.

In terms of limitations, the study was a single-centre research and its results are not generalisable. For this we need to have a large multicentre trial with large sample size. We could not do that due to unavailability of resources.

Conclusions

RAM-based education in pregnant women was effective in keeping hypertension under control and in enhancing levels of adaptation to pregnancy. It was ineffective on some neonatal outcomes and partially effective on others.

Disclaimer: None.

Conflict of Interest: None.

Source of Funding: None.

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