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The Use of NICU Education to Decrease Stress of Prenatal Patients on Bed Rest

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Abstract

Nearly 700,000 women suffer from pregnancy complications and are treated with bed rest in the hospital (Thorman & McLean, 2006). The hospitalized antepartum patient with a high-risk pregnancy can suffer from stress and anxiety due to the uncertainty of their pregnancy outcomes and the possibility of premature birth. Newborn intensive care unit (NICU) education with the high-risk prenatal women may reduce some of the boredom, loss of control, and fear of the unknown for prenatal women on bed rest. There is a lack of research using NICU education to reduce stress in the prenatal women on bed rest. The purpose of this clinical, innovative study was to examine whether on-line NICU education reduces the prenatal women's stress level while on bed rest. The study design was a quantitative experimental and qualitative evaluation of comments. It was hypothesized that providing NICU on-line education would decrease maternal stress and improve outcomes of premature infants. The study had two, randomly-assigned subject groups with a sample size of 119 subjects. The prenatal patients were provided with a private, local, web-based support group called "moms-in-waiting". The treatment group received on-line NICU education via the internet and the control group did not receive NICU education. The survey tool was the 10-item Perceived Stress Scale (PSS-10). Of the 119 participants, 50 took at least two surveys. The data were analyzed using the independent t-test. Although there was no statistically significant reduction in maternal stress in the intervention group, feedback from the participants on the final survey was positive. The participants commented that the NICU education website was helpful and 45% of participants took a NICU tour prior to delivery and thought it was very helpful. Further research needs to be completed on reducing maternal stress while on bed rest and outcomes of premature infants.

The Use of NICU Education to Decrease Stress of Prenatal Patients on Bed Rest

The March of Dimes (2008) reports preterm birth rate has increased more than twenty percent in the past twenty years. Advances in reproductive technologies have increased the prevalence of more viable pregnancies; conversely there has been an increased risk of antepartum patients being hospitalized for prenatal complications requiring bed rest.

Nearly 700,000 women suffer from pregnancy complications and are treated with bed rest in the hospital (Thorman & McLean, 2006). Pregnancy complications that cause them to be placed on bed rest are diagnoses such as hypertension, placenta previa, preterm labor, incompetent cervix, premature rupture of membranes (PROM), or multiple gestations. The activity restrictions these prenatal patients face in the hospital separate them from their usual supportive network. Antepartum activity restrictions can be extremely stressful to the prenatal patient because they are separated from their families and regular daily activities. Maternal child care nurses, advanced practice nurses, and physicians can help reduce stress and anxiety through education, information and supportive care.

The hospitalized antepartum patient with a high-risk pregnancy can suffer from stress and anxiety due to the uncertainty of their pregnancy outcomes and the possibility of premature birth. Researchers report that many studies have found a positive relationship between antepartum-related distress and adverse events in pregnancy and labor/delivery, such as spontaneous preterm delivery, fetal growth restriction, preeclampsia, and hypertension (Bauer, Victorson, Rosenblook, Barocas, and Silver, 2010). Despite these links between antepartum-related distress and negative pregnancy outcomes, there is a lack of research and knowledge about the prevention and treatment of antepartum-related distress while on bed rest in the hospital.

Starting newborn intensive care unit (NICU) education early with the high-risk prenatal women may reduce some of the boredom, loss of control and fear of the unknown for the prenatal women on bed rest. Turkan, Basbakkal and Ozbek (2008) stated that nursing interventions can be implemented to decrease the stress levels which parents experience when their infant is admitted to the NICU. Thorman & Mclean (2006) reported that simply giving parents a tour of the NICU can reduce parent's stress levels.

It is important to find evidence-based research on reducing a mother's stress level through NICU education to see if this correlates with a decrease in preterm delivery. March of Dimes (2008) states prematurity is the number one cause of death in the first month of life. Prematurity also puts infants at risk for respiratory distress (RDS), feeding difficulties, thermoregulation issues, hyperbilirubinemia, and delayed brain development. Providing education and information is one of the key components to reducing the stress level of the prenatal patient (Thorman & McLean, 2006).

There was a lack of knowledge in using NICU education to reduce stress in the prenatal women on bed rest. This research study sought to evaluate the clinical innovation of on-line NICU education and its influence on the stress of prenatal women on bed rest.

Theoretical Framework

The theoretical model that supported this study was the Uncertainty in Illness Theory (UIT) by Mishel (2008). Mishel proposed that uncertainty exists in illness circumstances that are unpredictable and complex, and when information is insufficient or inconsistent. The theory has three main concepts: antecedents of uncertainty, appraisal of uncertainty, and coping with uncertainty. The prenatal women is uncertain about her pregnancy, her expected child, and

stressed by the fear of the unknown factors of bed rest, which can make her situation unpredictable and complex (Mishel & Clayton, 2008).

Mishel's theory was pertinent to this project because prenatal patients on bed rest have a fear and uncertainty for their health and the health of their unborn child. Prenatal patients receive information from their families, the internet, nursing staff, and physicians. Information received may be insufficient or inconsistent. These uncertainties and the fear of the unknown may cause stress to the prenatal patient. These uncertainties may affect prenatal mother's beliefs, emotions and coping techniques. The stress created from uncertainty may affect health outcomes for the mother and fetus (Clauson, 1996).

Literature Review

The aim of this review was to examine the literature on perceived stress of the prenatal women and whether NICU education reduces the stress of the prenatal women on bed rest. The three key concepts of this literature review are perceived stress, bed rest, and NICU education. The intention was to gather the most current knowledge and help researchers, nurses, and clinicians achieve a better understanding of uncertainty and stress of the prenatal women on bed rest, and consequently aid in improving the health outcomes of the prenatal women and infant.

Perceived Stress

Perceived stress was subjective and deemed as when stress exceeds the demands of a person's available personal and social resources (Stark & Brinkley, 2007). Stark & Brinkley (2007) reported that health promoting behaviors can reduce stress in high-risk prenatal women. This was an effective piece of research supporting the importance of stress management techniques and health promoting self-care behaviors to alleviate the perceived stress of high-risk prenatal women and encourage health in the mother and infant. Dunn, Handley & Shelton

(2007) reported that prenatal women on bed rest may have physiological and psychological stress and anxiety that may persist into the postpartum period. Both studies related stress and anxiety to high-risk prenatal women requiring bed rest.

Bed Rest

Bed rest is maternal activity restriction either at home or in the hospital that involves confinement to your bed and separation from social support and regular daily activities due to pregnancy related complications (Dunn, Handley & Shelton, 2007).

Barlow, Hainsworth, & Thornton (2007) found that prenatal women experience stress when admitted to the hospital for pregnancy related complications such as hypertension. Researchers proposed high-risk antepartum patients may need a new model of care when hospitalized that helps reduce anxiety, and involves more effective coping strategies. In another study, high-risk pregnant women were also found to experience significant stress related to hospitalized bed rest. The researchers found that adding music and recreation therapy to stress reduction interventions may reduce stress in the high-risk prenatal patient on bed rest (Bauer, Victorson, Rosenbloom, Barocas, & Silver, 2010). Stress was measured in this study with a pre- and post-test tool, the Antepartum Bed Rest Emotional Impact Inventory. Patients were also evaluated 48 to 72 hours after the interventions of music and recreation therapy. Bed rest affects prenatal women's emotions, coping skills, and separates them from their family and social supports. Chronic stress may increase the risk for preterm delivery.

NICU Education

NICU education can be provided to parents on what to expect of a premature infant prenatally and postnatally (Thorman & McLean, 2006). NICU education is important to both mothers and fathers in the NICU. Researchers have found that NICU education, professional

support and personal communication are associated with parent satisfaction in the NICU (Knowalski, Leef, Mackley, Spear, & Paul, 2006). Turan, Babbakkal & Ozbek (2008) and Ahn & Kim (2007) found similar reports that NICU education, professional support and personal communication has been associated with parent satisfaction, improved parent perception of the infant, and reduced stress levels of parents having a premature infant in the NICU. Having a premature infant in the NICU is overwhelming to parents. It is important for NICU nurses and clinicians to use appropriate nursing interventions to reduce parent's stress and understand the source of their stress.

There was a gap in the literature regarding antenatal NICU education and its effects on maternal stress levels. The relationship between perceived stress and health promoting behaviors is unknown (Stark & Brinkley, 2007). The purpose of this study was to pursue the relationship between NICU education and its relationship to stress of the prenatal women on bed rest.

Experimental Design and Methods

This was a quantitative, experimental study with stratified random sampling. Sample size was 119. NICU education was provided through an on-line website called "Moms in Waiting." The study investigated if high-risk prenatal patient's stress on bed rest was reduced. Prenatal patients were randomly assigned to an intervention and a control group and their perceived stress levels were evaluated through surveys and the maternal data collection form (Appendix A). On-line NICU education was provided to the intervention group of prenatal patients on bed rest and the control group received no NICU on-line education. The treatment group received NICU education via the internet. The control group received standard information and care from hospital support staff while hospitalized. The control group did not receive the NICU education intervention. All patients had access to a blank journal for recording their personal feelings and

memories. Participants in the intervention and the control group also had access to a personal blog for journaling via the internet. All participants were encouraged to journal throughout their bed rest and delivery experience.

Stress levels of all hospital antepartum patients were measured by a Likert scale using the Perceived Stress Scale for Hospitalized Patients (PSS-10 HP) (Appendix B). If patients were discharged home or remained in the hospital on bed rest participants were asked to fill out the Perceived Stress Scale-10 (PSS-10) survey every week until delivery (Appendix C). The surveys are completed initially, weekly until delivery.

Participants had access to a post-delivery survey evaluating their perception of the education and support provided by the “Moms-in-Waiting” website while at home or hospitalized. The survey also evaluated the mother’s overall stress (Appendix D).

Setting and Sample

Participants were recruited using a convenience sample of prenatal patients on bed rest. Patients with bathroom privileges were also included. The data were collected on the antepartum units of Methodist Women’s Hospital, Bergan Mercy Medical Center, and Creighton University Medical Center. Patients were also referred by perinatologists if they were at home on bed rest. The inclusion criteria were:

- (1) on bed rest,
- (2) 19 years of age and older,
- (3) able to read, speak, and write English,
- (4) access to an e-mail account, and
- (5) access to a computer with internet services while in the hospital or at home.

Participants were women requiring bed rest for high-risk pregnancy. High-risk pregnancy is

defined as between the weeks of 18 and 36 weeks of gestation with a diagnosis such as: preterm labor, premature rupture of membranes (PROM), cervical insufficiency, hypertensive disorders of pregnancy, chronic hypertension, diabetes type 1 or 2, gestational diabetes, multiple gestation, placenta previa, placenta abruption, oligohydramnios, polyhydramnios, or exacerbations of chronic diseases.

Ethical Considerations.

Permission to conduct this study was obtained from the Creighton University Institutional Review board for the Human Subjects Research Education Program, and the three hospital's Institutional Review Boards. In addition verbal approval was obtained from the antepartum mangers of the three units. Subjects were provided essential information for verbal and signed informed consent and filled out a perinatal data collection form (Appendix-A). Benefits verses risks were assessed for this study and there were minimal risk to the subjects.

Measurement Methods

The initial tools for measuring stress were the Perceived Stress Scale (PSS-10 HP) for Hospitalized Patients (Cohen, Kamarck, & Mermelstein, 1983). Perceived Stress Scale (PSS-10) (Cohen, Kamarck, & Memelstein, 1983) was completed weekly by hospitalized patients and patients at home on bed rest (Appendices B & C). The PSS and PSS-10 HP had also been tested in previous studies and had an internal consistency of 0.85.

The PSS and the PSS-10 HP (Cohen, Kamarck, & Mermelstein, 1983) were both 10-item self-report items on feelings and thoughts with a five-point Likert scale. The PSS-10 HP was an initial screening survey for hospitalized patients on bed rest. The survey asked questions, such as "Since your hospitalization, how often have you felt nervous and "stressed?" The PSS-10 was taken by prenatal patients discharged home from the hospital on bed rest. The survey asked

questions, such as “Since last week, how often have you felt nervous and “stressed?” These items evaluated perceived stress during their current experience while on bed rest.

The Perinatal Data Collection Form (Appendix A) included information obtained from the mother and the mother’s medical record. Information collected included: maternal age, estimated date of conception (EDC), prenatal complications, length of bed rest, gestational age (GA) at start and end of bed rest, GA at birth, weight at birth, NICU admission and length of stay and birth outcomes. At the end of the study, participants were to fill out the Post-Delivery Maternal Survey (Appendix D). The survey asked the participants for feedback and comments on the support given by the study, their overall stress, and if the methods used in the study were helpful.

Data Collection Procedures

Information was collected from the obstetric registered nurse (RN) support staff and the patient’s medical chart to make sure patients met the inclusion criteria. Informed consent was not required for this study after approval by the IRB. Verbal consent was obtained from the prenatal patients via one of the investigators. A Creighton undergraduate nursing student, advanced practice nurses, and Creighton graduate students were the investigators. Once verbal consent was obtained, participants would sign themselves up using a valid e-mail address and a username was created via the internet through the “Moms-in-Waiting” website. The computer randomly assigned the patients to one of the intervention or control groups. All participants were provided a blank journal and pen for recording of feelings and memories. Participants were asked to take the initial PSS-10 HP when they signed up for the study. If participants remains in the hospital or were discharged from the hospital on bed rest they were asked to take the PSS-10

weekly. Investigators visited the three hospitals twice weekly to enroll participants. Once participants had delivered they were to take the Post-Delivery Maternal Survey.

The intervention group was the only group receiving the education about the NICU on the website and the ability to ask questions about the NICU with consultation from the advanced practice registered nurses. All participants were assigned personal blog sites for journal writing and documentation of experiences. The control group did not receive NICU on-line education or consultation from advanced practice nurses. The control group was provided support through the routine information and care by the hospital staff. Patients were referred to their physicians for medical questions.

NICU education was provided on the “Moms-in-Waiting” website. The website provided information and pictures about the NICU environment, neonates at different gestational ages, information on breast, bottle, and tube feedings, and procedures commonly seen in the NICU. Questions were encouraged through the NICU education site and via the advanced practice nurse consultant.

Data Analysis

Data were analyzed using excel on Microsoft. Differences in perceived stress of prenatal patients on bed rest between the control and the intervention group were analyzed using the independent t-test. Each of the group’s demographics and samples were examined using descriptive statistics.

Results

Estimated gestational age of the participants was 18 weeks to 33 weeks. Maternal age ranged from 19 years to 41 years. Approximately 66% of pregnancies were singleton and 33% were multiple pregnancies of the participants in the study. Out of the 119 participants, 50 took at

least two surveys. The independent T-test was not significant: the intervention group receiving NICU education and support did not have significantly less stress than the control group. The overall feedback about the NICU education from the participants was positive. Only 29 out of the 119 (24%) of the participants filled out a post-delivery survey and the majority of babies were admitted to the NICU after delivery (69%). There was an unequal amount of participants in each group.

Forty-five percent of participants toured the NICU and rated the NICU tour with an average score of 4.2 (on a 0 to 5 scale) as being very helpful at reducing their stress level while on bed rest. The participants rated the “Mom’s in Waiting” website and NICU education information received as helpful with an average score of 3.9. Participants rated their stress while at the hospital with an average score of 2.7 and mother’s rated how stressful their bed rest experience was (including best rest at home) with an average score of 3.1. The number of times a NICU nurse or neonatologist visited them while on bed rest were “too many”, “none”, and “daily”. The study was not sure if parents confused the neonatologist with the perinatologist in answering the question “daily” on how many times the neonatologist visited the mothers while on bed rest.

Discussion

The results of the study were not statistically significant reducing stress with NICU education, but the overall feedback from the participants was positive. Tours of the NICU were the highest rated intervention on the final survey; therefore, it would be beneficial for all high-risk moms to receive a tour of the NICU prior to delivery. Some of the comments received from participants on ways to decrease their stress were: having consistent care givers, having a

consistent plan of care, providing more sleep time, having a place for their family to stay, and providing social support among the women on best rest.

Even though the results of this research study were not significant; participants reported an overall satisfaction when NICU education was provided. Recommendations from mothers on bed rest should be considered and included in current nursing care and practice. Further research on reducing maternal stress and the premature infant outcomes should be considered. The sample size and level of participation of our patients were limited. Due to random selection, participants were limited to the intervention they received and may not have participated.

Conclusion

Bed rest can have physiological, behavioral, social, economic, and emotional impact on families causing undue stress due to fear of the unknown and uncertainty about the health of both the mother and her infant. High stress levels can cause women to deliver prematurely leading to an increase in premature births and low birth weight infants. Providing on-line NICU education and support can reduce some maternal stress so we recommend that more research be completed to reduce maternal stress while on bed rest to improve the outcomes of premature infants.

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Appendix-A
Perinatal Data Collection Form

Patient # _____ Email Address _____
Phone Number _____ Address _____
Maternal Age _____ Gestational Age at Bedrest _____
EDC _____ Gest Age at End of Bedrest: _____
Prenatal Complications _____

Primip _____ Multip _____ => PTL? _____ Other? _____

Estimated Fetal Weight & Sex (if known) _____

Date on Bedrest _____

Date off Bedrest _____

Total Length of Bedrest: _____

BIRTH OUTCOMES:

Gest Age at Birth _____ Weight _____

NICU: YES NO Length of Stay in NICU: _____

Neonatal Complications: _____

Father Involved: YES NO

Appendix B
Perceived Stress Scale (PSS-10 HP) for Hospitalized Patients Week 1– 10 items
(adapted from Cohen, S., Kamarck, T., Mermelstein, R., 1983, for inpatient use)

Instructions: The questions in this scale ask you about your feelings and thoughts during your hospitalization. In each case, please indicate with circling the corresponding number for how often you felt or thought a certain way.

1. Since your hospitalization, how often have you been upset because of something that happened unexpectedly?

0 = never 1 = almost never 2 = sometimes 3 = fairly often 4 = very often

2. Since your hospitalization, how often have you felt that you were unable to control the important things in your life?

0 = never 1 = almost never 2 = sometimes 3 = fairly often 4 = very often

3. Since your hospitalization, how often have you felt nervous and “stressed”?

0 = never 1 = almost never 2 = sometimes 3 = fairly often 4 = very often

4. Since your hospitalization, how often have you felt confident about your ability to handle your personal problems?

0 = never 1 = almost never 2 = sometimes 3 = fairly often 4 = very often

5. Since your hospitalization, how often have you felt that things were going your way?

0 = never 1 = almost never 2 = sometimes 3 = fairly often 4 = very often

6. Since your hospitalization, how often have you found that you could not cope with all the things that you had to do?

0 = never 1 = almost never 2 = sometimes 3 = fairly often 4 = very often

7. Since your hospitalization, how often have you been able to control irritations in your life?

0 = never 1 = almost never 2 = sometimes 3 = fairly often 4 = very often

8. Since your hospitalization, how often have you felt that you were on top of things?

0 = never 1 = almost never 2 = sometimes 3 = fairly often 4 = very often

9. Since your hospitalization, how often have you been angered because of things that were outside of your control?

0 = never 1 = almost never 2 = sometimes 3 = fairly often 4 = very often

10. Since your hospitalization, how often have you felt difficulties were piling up so high that you could not overcome them?

0 = never 1 = almost never 2 = sometimes 3 = fairly often 4 = very often

Appendix C
Perceived Stress Scale (PSS-10) for Weeks 2-8 – 10 items
(adapted from Cohen, S., Kamarck, T., Mermelstein, R., 1983)

Instructions: The questions in this scale ask you about your feelings and thoughts during your experience on bedrest. In each case, please indicate with circling the corresponding number for how often you felt or thought a certain way.

1. Since last week, how often have you been upset because of something that happened unexpectedly?

0 = never 1 = almost never 2 = sometimes 3 = fairly often 4 = very often

2. Since last week, how often have you felt that you were unable to control the important things in your life?

0 = never 1 = almost never 2 = sometimes 3 = fairly often 4 = very often

3. Since last week, how often have you felt nervous and “stressed”?

0 = never 1 = almost never 2 = sometimes 3 = fairly often 4 = very often

4. Since last week, how often have you felt confident about your ability to handle your personal problems?

0 = never 1 = almost never 2 = sometimes 3 = fairly often 4 = very often

5. Since last week, how often have you felt that things were going your way?

0 = never 1 = almost never 2 = sometimes 3 = fairly often 4 = very often

6. Since last week, how often have you found that you could not cope with all the things that you had to do?

0 = never 1 = almost never 2 = sometimes 3 = fairly often 4 = very often

7. Since last week, how often have you been able to control irritations in your life?

0 = never 1 = almost never 2 = sometimes 3 = fairly often 4 = very often

8. Since last week, how often have you felt that you were on top of things?

0 = never 1 = almost never 2 = sometimes 3 = fairly often 4 = very often

9. Since last week, how often have you been angered because of things that were outside of your control?

0 = never 1 = almost never 2 = sometimes 3 = fairly often 4 = very often

10. Since last week, how often have you felt difficulties were piling up so high that you could not overcome them?

0 = never 1 = almost never 2 = sometimes 3 = fairly often 4 = very often

Appendix D

Post-Delivery Maternal Survey (#_____)

1. *How stressful did you feel your hospital stay was?*

1	2	3	4	5
Minimal		Moderately		Very Stressful

2. *How stressful did you feel your entire bedrest experience was (including home bedrest)?*

1	2	3	4	5
Minimal		Moderately		Very Stressful

3. *How helpful was the online support group? (if you participated in that aspect of the research study)*

1	2	3	4	5
Minimal		Moderately		Very Helpful

4. *How helpful was the information received about the NICU? (if applicable)*

1	2	3	4	5
Minimal		Moderately		Very Helpful

5. *How helpful was writing in the journal?*

1	2	3	4	5
Minimal		Moderately		Very Helpful

6. *How many NICU nurse or neonatologist visits did you receive while hospitalized?*

7. *Did you tour the NICU?* (Circle response) YES NO

8. *How helpful was the tour?*

1	2	3	4	5
Minimal		Moderately		Very Helpful

9. *Is there anything you can think of that would have helped your hospital experience to be less stressful for you and/or your family? (add comments below or on back)*

BIRTH OUTCOMES:

Gestational Age of your BABY at birth? _____

Weight of your BABY at birth? _____

Was your BABY admitted to the Neonatal Intensive Care Unit (NICU) after birth: (please circle)

YES NO

How long did your BABY stay in NICU: _____

Did your BABY have any complications after birth?
