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Bed Rest and Its Continued Use in Women with High-Risk Pregnancy: A Review of Literature

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**Abstract**

Bed rest is defined as confinement to bed and restriction of activity. In the clinical setting bed rest includes strict bed rest, strict bed rest in Trendelenburg position, bed rest with bathroom privileges, and up ad lib (Irion, Irion, Lewis & Giglio, 2012). Bed rest has been the standard treatment for over the past 30 years in preventing preterm birth and complications arising from high-risk pregnancy despite the lack of evidence to support its safety and effectiveness for the mother and fetus (Maloni, 2010). The purpose of this literature review and critique is to provide information about the adverse physiologic and psychological effects of bed rest and introduce studies using an alternate treatment of exercise for this high risk population with positive results.

*Keywords:* bed rest, high-risk, pregnancy, negative effects, exercise, pregnancy complications, preterm birth

## **Bed Rest and Its Continued Use in Women with High-Risk Pregnancy: A Review of Literature**

### **Introduction**

In the United States, antepartum bed rest (ABR) is prescribed by 90% of obstetricians to approximately 1 million out of the 4 million pregnant women labeled high risk each year (Irión, Irión, Lewis & Giglio, 2012; Maloni, 2010; Maloni, 1996). High risk pregnancy is defined as a pregnancy that puts the mother or fetus at increased risk for morbidity or mortality during pregnancy, labor, or after delivery (Irión et al, 2012). The types of complications that make a pregnancy high risk include: preterm labor, preterm premature rupture of membranes, placenta previa, multiple gestation, hypertension, diabetes, suspected fetal growth retardation, vaginal bleeding (Maloni 2010). Antepartum bed rest is prescribed by the obstetrician to promote safety and inhibit physical activity, which is believed to cause preterm birth during (Maloni, 2010; Aleman, Althabe, Belizan & Bergel, 2010). The research supporting the claim that ABR is effective in preventing preterm birth has failed to prove that there is improvement of fetal outcome with this treatment (Maloni, Kane, Suen & Wang, 2002; Maloni, 2010). Randomized control trials that compared the treatment of women with bed rest versus ambulation showed a higher risk of miscarriage in the bed rest group (Aleman et al, 2010). While most studies conducting research on bed rest in this high risk population examine the experience of these women, very few take a quantitative approach to look for alternate methods of treatment. The few studies that have successfully implemented a quantitative approach in alternate methods of treating high-risk pregnancy do not seem to have an impact on current health practices today.

### **Problem Statement**

According to research done by Rubarth, Schoening, Cosimano & Sandhurst (2012), there is more scientific evidence that supports the fact that ABR has more risks than benefits despite the continued use of therapeutic bed rest for pregnancy complications. There are many adverse side effects associated with ABR, such as muscle atrophy, deep vein thrombosis (DVT), psychological distress, low birth weight, cardiovascular and physical deconditioning. New research has been exploring alternative treatments to take the place of bed rest with great success and far less risks. This literature review will examine the current and past literature of antepartum bed rest on high-risk pregnancy and provide information on adverse physiologic, psychological effects, and introduce information of specialized exercise that has been proven.

### **Theoretical Framework**

In order to explore the adverse effects of bed rest, previous researchers have used Roy's Adaptation Model. This model describes a person as an adaptive system who uses coping processes to adapt to environmental stimuli or lack thereof. Coping mechanisms are used to achieve four adaptive modes: physiologic, self-concept, role function, and interdependence (Roy, 2013). Adjustment to motherhood is already a huge transition and very much a challenge. With this struggle already evident, it is even more so for women with a high risk pregnancy that have become physically deconditioned from bed rest, mentally and emotionally exhausted from procedures and the knowledge that they risk negatively affecting the fetus with any movement. The goal of nursing is to educate and promote adaptation for individuals in the four adaptive modes, therefore contributing to health and quality of life. This is done by assessing existing coping mechanisms and expanding those abilities to enhance environmental interactions (Roy, 2013). Exercise has been proven to have numerous physical and psychological benefits.

Studies have shown that physical activity has a positive effect on happiness, mental health, self-efficacy, self-esteem, life satisfaction and positive mood (Taspinar et al, 2014; Khazae-pool et al, 2015). Given that this framework focuses on the ability for a person to adapt to stressors makes it appropriate and applicable to women with high-risk pregnancies.

### **Review and Critique of the Literature**

Several studies and literature reviews have been written to evaluate the effectiveness of bed rest. Topics that have been evaluated are the physical and psychological effects of ABR and the effectiveness of exercise on the high-risk mother's and fetus' health. Each study and literature review contained four main themes: adverse physical effects, psychological effects, lack of evidence to support ABR, and proposal of alternative method mainly movement. These studies and literature reviews contained various procedures and results, along with strengths and limitations.

### **Physical Effects of Antepartum Bed Rest**

Physical mobility is essential to the health, well-being, and independence of an individual. During pregnancy physical health of the mother is directly related to the physical health of the fetus. Strength and stamina is essential for the woman's labor and post-partum period of providing for the newborn. Having a physically weak body can greatly impair the mother's ability to care for the needs of the newborn. It is well known that lying in bed for extended periods of time is not healthy in the elderly or recent surgery patient, but little thought is given to prolonged bed rest on pregnant women which can make recognizing symptoms difficult for the healthcare provider.

Maloni (2010) provides a comprehensive analysis of evidence of the prescription of ABR and its physiologic, behavioral, and experiential side effects. Maloni finds there may be a

possibility that ABR may work to decrease incidence of preterm birth, but evidence is still lacking despite her review of 125 articles of both qualitative and quantitative research studies in the disciplines of nursing, medicine, psychology, social science, biological, and aerospace sciences. Maloni found seven main physiologic alterations in her review: muscle function, maternal weight, infant birth weight, bone loss, thrombosis, antepartum and postpartum symptoms. She identifies the different research methods, findings, population, and limitations. This literature review was extensive and convincing. The author informs the reader that only well written and unquestionable research methods were included. The only weakness found in this review was that some articles, but few, articles were old from the 1960s and 1970s, but only a few, which makes this article appear outdated itself and therefore not current. Otherwise, this literature review is substantially informative, organized, and trust worthy. The author attempts to include articles for ABR, but many lacked significant information that no good argument could be made to counter the research against ABR. Maloni and other experts in the field of obstetrics and gynecology agree that it is the duty as health care professionals to do no harm, and that bed rest should not be a standard treatment and the practice should be eliminated.

A clinical study by Maloni and Park (2005), details the deterioration of muscle function in the postpartum period. The purpose of this study was to determine the type and frequency of postpartum symptoms during recovery from ABR across 6 weeks. The design was a longitudinal repeated measures study that included a convenience sample of 106 postpartum women with high-risk singleton pregnancies treated with ABR. The inclusion criteria were that the women had a single gestation, 21-33 weeks, 16 years and older, were healthy before pregnancy, and various diagnoses (preterm labor, premature rupture of membranes (PROM), placenta previa, abruption, incompetent cervix). What the researchers failed to include was how they defined

their term, “healthy before pregnancy”. Exclusion criteria and very general description of locations were also mentioned along with approval of the IRB. The findings were that postpartum symptoms decreased over time, but at the 6 week mark women treated with ABR had persistent symptoms that took longer to subside compared to women not treated with ABR. They also found that length of bed rest was positively correlated to the quantity and persistence of symptoms. Two limitations of this study are that the data was not collected at the same points in time for all participants, which can skew comparison of results and the study relied on self-report. These weaknesses can impact the accuracy of the results and therefore they cannot be generalizable.

The main tool used in this study was the Postpartum Symptom Checklist (PSC). The author described the tool and mentioned that it relied on self-report of symptoms. It also included an area where women can write other symptoms not listed. The validity and internal consistency was previously established in a past study by Maloni in which reliability was proven with a Cronbach’s alpha score ranging from 0.79-0.84. Another tool used was the Demographic Assessment Tool. After obtaining data from hospital records, participants were interviewed about the length of hospital and home bed rest; since compliance with home bed rest could not be proven only length of hospital bed rest was analyzed. Interrater reliability for this tool was 0.98, which quantifies a good consistency of the raters.

### **Psychological Effects of Antepartum Bed Rest**

Two trials that evaluated the mental effects of bed rest in pregnant women with high-risk pregnancies have been identified. The first is a qualitative repeated study by Maloni, Kane, Suen, and Wang (2002), which included a convenience sample of 63 high-risk pregnant women (diagnosis of preterm labor, PROM, incompetent cervix, abruption, multiple gestation, or



combination, English speaking, gestation 20-34 weeks, and 16 years or older). Data was then collected on these women to describe dysphoria and collect a list of symptoms to identify the relationship between dysphoria and the length of pre-admission home bed rest, hospital bed rest, and maternal and fetal risk. These women were asked to fully complete two antepartum data collections or be dropped from the study. The inclusion criteria made this study non-generalizable and was restricted to only English speakers; the sample primarily Caucasian. This criterion alone creates a gap in valuable data of the low socio-economic status and populations of other ethnicities and backgrounds. Three tools were used: the Multiple Affect Adjective Checklist-Revised (MAACL-R), Hobel test, and Creasy test. The MAACL-R was used to assess dysphoria in the women. Dysphoria was highest upon hospital admission and decreased over time. Dysphoria scores were highest in women that scored high on the Hobel and Creasy tests, which scored the level of obstetric risk and maternal mood. The result of this study concluded that gestational age at birth is positively correlated with postpartum dysphoria. The authors explained how all tests and instruments passed reliability and validity checks.

The second study by Lederman, Boyd, Pitts, Roberts-Gray, Hutchinson, and Blackwell (2013) is a qualitative and quantitative, cross-sectional and longitudinal study using the maternal dimensions model of maternal development. The primary tool was the Interview Schedules for Dimensions of Maternal Development in Psychosocial Adaptation to Pregnancy used on a convenience sample of 41 women with no medical or obstetrical complications at the time they entered the study. The purpose of this research was to elicit, analyze, and describe the subjective meanings and interpretations of women's experiences with severe complications of pregnancy that resulted in hospitalization to prevent preterm birth. The researchers found that women experience hospitalization as a burden to be endured for the health and well-being of the infant.

They also addressed that attention needs to focus on preventing and treating adverse effects of bed rest. Some weaknesses that this article had are that a small sample was used and therefore cannot justify it to be generalizable; additionally, the researchers did not clarify any inclusion or exclusion criteria other than having no medical problems. In regard to the interview tool, examples of questions were written and the opportunity for the women to leave feedback was encouraged. However, the researchers failed to discuss how they proved validity or reliability of the tool. Lastly, the researchers admitted that the data analysis using Colaizzi's method was incomplete because of the inability to track the participants after they were discharged to validate the findings of the researchers.

Although this article had some weaknesses, its strengths make it a valuable addition to research in this area. This article defined operational terms and the review of literature was current and mostly from 2000s. Some interview questions were included enough to give the reader a general idea of the theme of each section of questioning. Saturation and redundancy was achieved and confirmed; the method of participant selection was discussed along with approval of IRB. The detail of the common themes in the survey and discussion of each category make this research valuable for the qualitative component and adds to the overall literature in this area of the many psychological effects of bed rest.

### **The Effects of Exercise on High-Risk Pregnancy**

The research studies previously discussed demonstrate the negative implications of bed rest, and alternative methods for preventing preterm birth need to be explored. The next article demonstrates the successful attempt of an alternative method to bed rest. The main objective of the research conducted by Irion, Irion, Lewis & Giglio (2012) was to determine trends in physical therapy interventions for high-risk pregnancy and to arrive at a consensus on the

diagnostic specific interventions. Nursing practice focuses on care for the individual and most importantly patient specific care, which this article introduces. This was a qualitative study gathering the professional opinions of expert physical therapists practicing in the area of high-risk pregnancy. The request for participation was sent to members in acute care, home health, and women's health sections of the American Physical Therapy Association. Essentially, the therapists were recruited via e-mail with a survey; survey completion indicated the participants' consent. The researchers sifted through the primary survey that questioned the participant's experience in physical therapy with the high-risk pregnant population. From there the researchers selected 26 participants based on their practice setting, clinical experience (mean 15 years, median 12 years, range 35 years), and regional distribution. The expert panel were sent 3 rounds of questioning with open and closed-ended questions using a Likert scale. To get consensus on the open-ended questions, the answers were input into HyperResearch computer program to create closed ended questions for the panel to again answer. Consensus was reached for all except 6 questions in which the expert panel had answers too diverse to attempt a fourth round. For the panel to reach a consensus on most questions suggests very well generated questions and a utilization of excellent computer software.

Consensus was reached in the following areas: the definition of bed rest (level 1 modified bed rest-bathroom privileges, level 2 complete bed rest-no bathroom or out-of-bed privileges, level 3 Trendelenburg-complete bed rest in Trendelenburg position with no out-of-bed privileges), disciplines involved in high-risk pregnancy, problem list, goals, interventions, "red flags" (conditions defined as anything that would require modification or cessation of a physical therapy session), education and support services. Several tables in the article demonstrate to what extent consensus was reached for each item in percentage. The 6 items that

could not get a consensus were: number and frequency of inpatient physical therapy visits, use of antiembolic stockings, use of pneumatic devices to prevent DVTs, exercise intervention for women with known DVT and hypertensive disorder, intervention for known DVT and a high-risk diagnosis other than hypertensive disorder, contraindications for use of heel slide exercise during high-risk pregnancy.

Few weaknesses were found in this article. The title did not express the type of study or population adequately and all operational terms were not discussed fully in the introduction but later on in the article. Some figures were unnecessary to include, such as several screenshots of the computer software data, which did not contribute to the discussion or significance of the report. Furthermore, the population was very small which makes this study not generalizable. This article did exhibit several strengths. The overall idea of this study was astutely assembled; a thorough description of the selection of the expert panel was provided, important questions were addressed; the option to modify responses and comment further on questions was available, and all items grouped into tables showed the percentage of agreement. The data analysis was discussed at great lengths which strengthened the discussion of the findings. This study provides a safe transition to inform health care providers on different types of care for the various types of high-risk diagnoses.

The coping mechanism of exercise can safely be used as a means to relieve physiologic and psychological stress and tension in a woman carrying a high-risk pregnancy. Several published reports emphasize the minimization of abdominal activity because it can trigger uterine stress and in turn increases the risk of preterm labor. In a quantitative study using a pre-test and post-test design researchers investigated the response of maternal blood pressure, heart rate, and uterine contractions to a 30-min bed rest exercise session in hospitalized women with

different diagnoses of high-risk pregnancy (Brun, Shoemaker, Bocking, Hammond, Poole & Mottola, 2011). Physiologic measurements like weight and muscle atrophy were not measured and could have enhanced the study. Eleven women were randomly assigned to a bed-rest exercise, a music group, or a bed-rest and music group involving no exercise. The theory behind the music discussed in the literature review describes how music is effective in reducing anxiety and improving physiological measures like heart rate, blood pressure and fetal heart rate. For exercise, music helps to alleviate or prevent physiological distress and can eliminate or stabilize factors that augment existing complications. This research was approved by an IRB and women gave written informed consent. The experimental group consisted of 6 participants and the control group consisted of 5; the interview questions on how the researchers picked these women were not included. Inclusion criteria were: gestational hypertension, pre-eclampsia, intrauterine growth restriction (IUGR), multiple gestation, threatened preterm labor. Exclusion criteria were: placenta previa, severe pre-eclampsia, and smoking. The researchers excluded smokers to have better control over the data and not have to incorporate confounding factors that could negatively affect the research outcomes. The type of bed rest all women were on was complete bed rest with bathroom privileges.

Before the start of the study, the researchers performed a familiarization session with each woman on the exercise equipment (an elastic band), and the specific exercise regimen. Instructions were given on technique, breathing, and perceived exertion. The exercise primarily focused on muscle conditioning of the back, arms and legs (specific muscles were described in the literature). The teaching and exercise regimen was done by a certified kinesiologist and supervised by a registered nurse. The actual session was 70 minutes which was conducted as follows: assessment (blood pressure, heart rate, and contractions), pre-intervention (rest),

assessment, intervention (exercise and music), assessment, post-intervention (recovery), assessment. The study did not discuss how the researchers determined reliability and calibration of heart rate monitor. Additionally, it is not mentioned if different blood pressure cuffs were available, whether the blood pressure was taken automatically or manually, or how they proved reliability of the equipment. The results of this study were that there were no changes in maternal blood pressure or in uterine contraction following the exercise intervention. Therefore, the study suggests a supervised bed-rest exercise intervention may have minimal risks and help alleviate physiological effects of hospitalized bed rest.

The few weaknesses of this study included having a small sample and its statistical analysis was discussed briefly. Although this study had positive results it cannot be generalizable because of the small sample. This study had much strength including the success of the exercise program not having adverse side effects in this high-risk population. The article defined all operational terms, described the type of bed rest all participants were prescribed (complete bed rest with bathroom privileges), did not endanger this high risk group and followed recommendations from experts and previous studies.

### **Nursing Implications**

Antepartum bed rest (ABR) has yet to be supported through randomized controlled trials and is still used for the fact that health care providers prefer to have a treatment rather than to offer nothing at all and is still used under the assumption of health care providers that ABR provide positive results for women. It is perplexing that there are no guidelines or standard criteria on what diagnoses warrant a specific type of bed rest; although, the recent attempt by Irion, Irion, Lewis & Giglio (2012) to provide standardized criteria for bed rest yielded no consensus among the experts. Many professionals in the field of women's health and obstetrics

have agreed that ABR should not be a standard intervention for women with high-risk pregnancy. The duty to do no harm is of utmost importance and with the many physical and psychological adverse effects of ABR, it is clear that this treatment is harmful and that rehabilitation time is significantly prolonged compared to women not treated with bed rest.

Since bed rest is still used as treatment today, implications for clinical nursing practice include recommending safe activities for the mothers to engage in if their doctor recommends bed rest. The clinical nurse will also continuously assess and compare vitals before, during and after activity to ensure safety. If a patient is prescribed bed rest at home, a referral should be made to other rehabilitation programs. The main patient care outcome desired is the decrease of rehabilitation time so that women can return to a normal level of functioning after giving birth.

The author proposes to replicate a successful study by Brun et al (2011) using a larger and diverse population that investigates the response of maternal heart rate, blood pressure, and uterine contractions in an attempt to make the results of this study generalizable.

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