

# Application of the Levine Theory and Health Belief Model in Anemia and Thrombocytopenia in Pregnancy: A Case Report

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## ABSTRACT

Pregnant women with anemia and thrombocytopenia are exposed to health risks. Therefore, Levine's conservation theory approach combined with the Health Belief Model theory could be applied to assist pregnant women to optimize their adaptive responses and achieve maximum health. Levine's conservation theory focuses on maintaining an individual's integrity and helping them to adapt to their conditions through the principle of conservation. For the Health Belief Model theory, the involvement and belief of pregnant women are the main aspects required to prevent and treat anemia and thrombocytopenia through their perceived susceptibility, seriousness, benefits, and barriers. Five cases of pregnant women with anemia and thrombocytopenia were provided nursing care that used Levine's conservation and Health Belief Model theory. Doing so resulted in the pregnant women adapting to their conditions and prevented any adverse impacts on their pregnancy.

**Keywords:** Anemia; Health Belief Model; Levine Conservation; Pregnancy; Thrombocytopenia

## INTRODUCTION

Pregnancy has been proven to cause physiological changes in hematological function (Townesley, 2013). Changes in blood hemostasis in hemoglobin and platelets are a form of blood disorder caused by pregnancy (Gernsheimer, James, & Stasi, 2013). Decreased hemoglobin levels (anemia) are the most common complication of pregnancy and are known as "physiologic anemia". Another blood disorder that is most often encountered during pregnancy is thrombocytopenia.

Thrombocytopenia is a condition in which the number of platelets in the body is lower than normal (Panepinto, 2011). Gernsheimer, James, & Stasi, (2013) stated that pregnant women who do not show signs of bleeding and have a platelet count of above 30,000/ $\mu$ l do not require any treatment until the time of delivery arrives, but in some cases, thrombocytopenia can be part of a complex disorder and can even be life-threatening for both mother and fetus (Myers, 2009).

Anemia and thrombocytopenia have the potential to cause pregnant women to experience bleeding and more serious conditions. Therefore, pregnant women need to be assisted to optimize their adaptive responses and maximize their health (Saini & Kalia, 2019). The nursing assessment of pregnant women with blood disorders in this case study used Levine's conservation theory approach combined with the Health Belief Model theory. Levine's theory of conservation states that individuals and the environment could become in sync over time with adaptive responses. The nurse's role in this case study is to help optimize individual adaptation and maintain their adaptive response to achieve maximum health (Saini & Kalia, 2019).

## METHODOLOGY

This research used a case study method with five cases; all respondents had anemia and thrombocytopenia during pregnancy. The data collection was conducted at the Central General Hospital from December 2020 to April 2021. The

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nursing process included assessment, nursing intervention, and nursing implementation involving medical records, patients and families, a primary nurse (PN), and an associate nurse (AN).

### **Ethical Consideration:**

The study received Ethical Clearance from Faculty of Nursing Sciences, University of Indonesia with the number Ket-272/UN2.F12.D1.2.1/PPM.00.02/2021 dated 6<sup>th</sup> July 2021.

## **RESULTS**

### **Case Report**

The report in this case study consists of five cases of pregnant women with anemia and thrombocytopenia.

#### **Case 1**

Mrs. R, a 30-year-old woman, gravida 2, para 1, had the first day of her last menstrual period (LMP) on 24 or 25 March 2020, had a uterine fundus height of 33 cm, and a strong and regular fetal heart rate of 137 beats per minute (bpm). On observation, the patient's blood pressure (BP) was 156/90 mmHg, heart rate was 56 bpm, her temperature was 36.5°C, and respiratory rate was 20 breaths per minute. Blood samples were taken and showed a hemoglobin (Hb) of 12.1 g/dL, hematocrit of 37%, leukocytes of 10,300/ $\mu$ l, and platelet count of 117,000/ $\mu$ l. The following are the results of the assessment that used Levine's conservation theory and the Health Belief Model:

#### **Conservation of Energy**

There was deficiency of rest and naps. The patient sleeps at 10 pm and wakes up at 4.30 am. Mrs. R weighs 75 kilograms, has a height of 155 cm, and a BMI of 31.2 kg/m<sup>2</sup>. She likes to eat fruits and vegetables. In terms of physical activity, the patient uses a wheelchair when mobilizing as she gets fatigued easily.

#### **Conservation of Structural Integrity**

The patient experienced bleeding from the gums when brushing their teeth and bruising under the skin. The patient tries to avoid procedures that can cause bleeding.

#### **Conservation of Personal Integrity:**

##### **Perceived susceptibility**

The patient had no history of decreased platelet count.

##### **Perceived seriousness**

The patient works as an analyst, so she knows the impact of thrombocytopenia.

##### **Perceived benefits**

The patient believes that if she comes to the hospital, she will be able to solve the problem.

##### **Perceived barriers**

The distance between the patient's house and the hospital is quite far.

#### **Conservation of Social Integrity**

The patient is a wife and mother to her family. In the home environment, the patient rarely interacts with neighbors, while in the work environment the patient is a staff member who has many colleagues.

#### **Case 2**

Mrs. A, a 28-year-old woman, gravida 2, para 1, presented at 37-38 weeks gestation. The patient did not remember her first day of LMP. She had a uterine fundus height of 29 cm and a strong and regular fetal heart rate of 144 bpm.

On observation, her BP was 127/60 mmHg, heart rate was 75 bpm, her temperature was 36.6°C, respiratory rate was 21 breaths per minute, and she had no signs of bleeding. Blood samples were taken and showed a Hb of 12.9 g/dL,

hematocrit of 38%, leukocytes of 8,600/ $\mu$ l, and platelet count of 91,000/ $\mu$ l. The following are the results of the assessment that used Levine's conservation theory and the Health Belief Model:

**Conservation of Energy:** The patient did not take rest and naps because the patient works during office hours (8 am-5 pm). She sleeps at 10 pm and wakes up at 5 am. She weighs 68 kilograms, has a height of 155 cm, and a BMI of 28.3 kg/m<sup>2</sup>. She likes to eat fruits and vegetables. For physical activity, the patient is working as a private employee.

**Conservation of Structural Integrity:** The patient was planned for a fetomaternal consultation for ultrasonography.

**Conservation of Personal Integrity:**

**Perceived Susceptibility**

The patient had no history of decreased platelet count.

**Perceived Seriousness**

The patient does not know the impact of thrombocytopenia.

**Perceived Benefits**

The patient tried to come to the obstetrics polyclinic to obtain treatment for her problem.

**Perceived barriers**

The patient had limited knowledge about thrombocytopenia during pregnancy.

**Conservation of Social Integrity:** The patient is a wife and mother to her family. She is also staff member in her workplace.

### **Case 3**

Mrs. Y, a 40-year-old woman, gravida 3, para 2, presented at 31-32 weeks gestation. The patient did not remember her first day of LMP. She had a uterine fundus height of 27 cm and a strong and regular fetal heart rate of 138 bpm.

On observation it was found that her BP was 89/64 mmHg, heart rate was 104 bpm, her temperature was 36.6°C, and respiratory rate was 22 breaths per minute. Blood samples were taken and showed a Hb of 8.4 g/dL, hematocrit of 26%, leukocytes of 9.870/ $\mu$ l, and platelet count of 335,000/ $\mu$ l. The following are the results of the assessment that used Levine's conservation theory and the Health Belief Model:

**Conservation of Energy**

The activities of the patients consist of taking care of the household and their children. She sleeps at 11 pm and wakes up at 4.30 am. She weighs 48 kilograms, has a height of 148 cm, and a BMI of 21.9 kg/m<sup>2</sup>. It was also noted that she looked rather pale. She also had warm skin perfusions with a capillary refill time of no more than 2 seconds, and conjunctiva pallor in both eyes.

**Conservation of Structural Integrity**

The patient was trying to follow the treatment process for her anemia.

**Conservation of Personal Integrity:**

**Perceived susceptibility**

The patient had no history of anemia.

**Perceived seriousness**

The patient does not know the impact of anemia on her pregnancy and fetus.

**Perceived benefits**

The patient hoped to obtain consultation and treatment at the polyclinic for her anemia problem.

**Perceived barriers**

The patient's last education level was junior high school, and she has limited knowledge about the prevention of anemia during pregnancy.

**Conservation of Social Integrity**

The patient is a wife and mother to her family. In the home environment, the patient often interacts with neighbors.

**Case 4**

Mrs. R, a 22-year-old woman, gravida 2. The patient is reported to have anemia since 2010. Her first day of LMP was 15 July 2020. She had a uterine fundus height of 26 cm and a strong and regular fetal heart rate of 135 bpm.

On observation, her BP was 104/57 mmHg, heart rate was 98 bpm, her temperature was 36°C, and respiratory rate was 20 breaths per minute. Blood samples were taken and showed a Hb of 6.9 g/dL, hematocrit of 24.8% leukocytes of 9,600/ $\mu$ l, and platelet count of 339,000/ $\mu$ l. Her peripheral blood smear also showed signs of leukemia. The following are the results of the assessment that used Levine's conservation theory and the Health Belief Model:

**Conservation of Energy**

The patient rarely takes naps. She sleeps at 9 pm and wakes up at 5 am. She weighs 69 kilograms, has a height of 156 cm and a BMI of 28.7 kg/m<sup>2</sup>. The patient is a picky eater and only likes eggs, tofu, and tempeh. For physical activity, she takes care of the household.

**Conservation of Structural Integrity**

The presenting complaints included feeling easily fatigued, dizziness, and short of breath when conducting regular activities at home. When these complaints appear, the patient usually lies down and turns her body to the left to rest for a while. However, the patient could still perform basic activities. Her husband and in-laws also try to encourage the patient to keep eating foods that are high in iron, such as rib soup with lime.

**Conservation of Personal Integrity:****Perceived susceptibility**

She was diagnosed with anemia in 2010 and acquired anemia in her first pregnancy in 2015.

**Perceived seriousness**

The patient does not yet know the impact of anemia on herself, her pregnancy, and her fetus.

**Perceived benefits**

The patient believes that by coming to the hospital she can change her behavior and eating style so that the Hb levels in her body will increase.

**Perceived barriers**

The patient does not like to eat meat and vegetables.

**Conservation of Social Integrity**

In the home environment, the patient rarely interacts with neighbors.

**Case 5**

Mrs. R, a 40-year-old woman, gravida 4, para 3, presented at 39 weeks gestation with a 24-hour history of premature rupture of membranes, anemia, and thrombocytopenia. Her first day of LMP was 25 May 2021. She had a uterine fundus height of 33 cm and a strong and regular fetal heart rate of 142 bpm.

On observation, her BP was 143/94 mmHg, heart rate was 96 bpm, temperature was 35.1°C, oxygen saturation was

98%, and respiratory rate was 20 breaths per minute. The presenting complaint included heavy and continuous bleeding gums in December 2021. Blood samples were taken and showed a Hb of 4.2 g/dL, hematocrit of 12%, leukocytes of 5,400/ $\mu$ l, and platelet count of 11,000/ $\mu$ l. The following are the results of the assessment that used Levine's conservation theory and the Health Belief Model:

### **Conservation of Energy**

The patient is in bed rest because of her watery discharge from the vagina. She weighs 63 kilograms, has a height of 156 cm, and a BMI of 25.8 kg/m<sup>2</sup>. She also had conjunctiva pallor in both eyes, as well as pale and cold extremities. The patient's physical activities before falling ill were household activities and taking care of her children at home.

### **Conservation of Structural Integrity**

Currently, the patient cannot do any activities due to her problematic health condition. The patient tries to remain on bedrest while seeking treatment at the hospital to solve the problem.

### **Conservation of Personal Integrity:**

#### **Perceived susceptibility**

The patient had a history of active bleeding gums (heavy and continuous) in December.

#### **Perceived seriousness**

Since being an inpatient in December 2020, the patient understood that anemia and thrombocytopenia could endanger her and her pregnancy due to continuous bleeding.

#### **Perceived benefits**

The patient came to the hospital and complied with the treatment.

#### **Perceived barriers**

The patient reported a lack of information about her current health condition.

### **Conservation of Social Integrity**

The patient is a wife and mother to her family. In the home environment, the patient has frequent interactions with neighbors.

## **DISCUSSION**

The similarity among the five cases is that there is a threat from the internal environment that has the potential to endanger the health condition of the pregnant women, namely, abnormal laboratory values, especially Hb and platelet levels. Therefore, the role of nurses is needed to assist the adaptation process by providing nursing interventions that are integrated with the concepts of Levine's conservation model theory and HBM (Health Belief Model). If nurses are able to help these pregnant women adapt, they should be able to keep up four modes of conservation to keep their health at its best (Saini & Kalia, 2019).

Levine's conservation consists of four modes: conservation of energy, structural integrity, personal integrity, and social integrity. Conservation of energy is defined as the effort needed to achieve a balance between energy demand and supply (Alligood, 2017). Energy conservation is achieved by maintaining nutrient intake, reducing energy expenditure, and avoiding fatigue. This energy balance aims to keep the body able to perform its physiological functions.

Pregnant women with anemia and thrombocytopenia are at increased risk for bleeding and nutritional disturbances during pregnancy. This can result in fatigue, weakness, decreased immunity, low birth-weight fetuses, child stunting, and even maternal and foetal death (Stephen *et al.*, 2018). The role of nurses in this conservation theory is to help patients achieve energy balance by providing nursing interventions that focus on maintaining nutritional balance and minimizing conditions that can threaten the patient's health (Alligood, 2017). Nurses can help patients to maintain and modify high iron nutrient intake, increase fluid intake, and avoid fatigue by limiting physical activity. Achieving an energy balance is useful so that the body can carry out its functions optimally (Nurhidayah *et al.*, 2019).

Conservation of structural integrity is defined as the effort needed to maintain and restore bodily functions by preventing physical damage and promoting the healing process. In the case of pregnant women with blood disorders, anemia and thrombocytopenia have the potential to cause bleeding during the childbearing period. This bleeding risk can be anticipated through nursing interventions such as preventing bleeding by observing signs of petechial or vaginal bleeding, avoiding the use of a rectal thermometer, and using a soft-bristled toothbrush (Kadhim, 2017). By taking efforts to conserve structural integrity, it is hoped that physical damage due to anemia and thrombocytopenia can be prevented and the healing process can be significantly improved.

The preservation of personal integrity, which is characterized as how people feel about themselves, is achieved following Levine conservation principle. Patients have the right and obligation to make decisions for themselves. Protecting and upholding the patient's privacy is a component of nursing interventions offered to achieve personal integrity. Concerns regarding the mother's health and the pregnancy are generally raised by the presence of anaemia and thrombocytopenia. Along with clinical circumstances like bleeding and exhaustion in the patient, worries and anxiety would rise.

The majority of patients in this case report have tried to modify their behavior to encourage positive changes, such as trying to seek help at the hospital, consuming beets and Fe tablets to increase Hb values, avoiding brushing their teeth too hard, and avoiding scratching their skin to avoid injury. For the conservation of personal integrity, self-esteem and individual self-confidence must be built to increase the body's defense (Ozcan & Eryilmaz, 2021; Saini & Kalia, 2019). When combined with the HBM theory, this personal integrity conservation is very appropriate because the personal integrity component contains beliefs that influence individual actions and involvement in their health (Abraham & Sheeran, 2014; Orbell, 2013).

The Health Belief Model has four basic variables, namely, perceived susceptibility, seriousness, benefits, and barriers (Abraham & Sheeran, 2014; Orbell, 2013). For the perceived susceptibility variable, in this case, pregnant women feel vulnerable to blood disorders. If a pregnant woman in her first pregnancy has thrombocytopenia or anemia, she will be more susceptible to the same thing in her next pregnancy. Therefore, pregnant women must report a history of previous pregnancies during antenatal care and perform blood laboratory tests to reduce the severity of the disease. In this case report, five patients have made efforts to prevent disease severity by following the advice of health professionals and doing routine antenatal care as well as conducting laboratory and ultrasound examinations at national referral hospitals.

The second variable is perceived seriousness. For this variable, pregnant women believe that the health problems they experience can lead to more serious impacts or problems, for example, pregnant women who experience anemia and thrombocytopenia may be at risk of bleeding. The third variable is perceived benefits, where pregnant women believe in actions or efforts to reduce adverse effects. Pregnant women who experience anemia and thrombocytopenia will routinely undergo periodic blood tests and always take steps to prevent bleeding to reduce the more serious impacts of the disease.

The last variable is perceived barriers, namely, barriers that are felt by pregnant women to achieve health. In the above-mentioned five cases, the obstacles felt by pregnant women in improving their health status were the distance from their house to the hospital, the lack of information about their health condition, and the condition of picky eating. Conservation of social integrity in Levine's theory is defined as the ability of individuals to interact with their social environment (Alligood, 2017). Unhealthy individuals can affect their family's condition and potentially threaten the individual's ability to interact with others. This condition can affect the patient's interactions with their children and their closest family members, such as husbands and parents. Therefore, nurses have the role of maintaining the patient's ability to provide support and education to the family (particularly the husband), increase family participation in care, and facilitate the patient's interaction with other people.

## CONCLUSION

Levine's conservation theory and Health Belief Model can be used as a framework for nursing care for gravida patients with anemia and thrombocytopenia as it prioritises conservation principles and individual involvement in health behavior to achieve maximum health. When nurses use nursing theory models, they can use them as a guide to give each

person the right and most complete care for their situation.

### **Conflict of Interest**

There is no conflict of interest in this research.

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