

Treatment of Anemia during Pregnancy (1931), by Lucy Wills ^[1]

By: Lynch, Lauren Keywords: [Anemia in pregnancy](#) ^[2] [Folic Acid](#) ^[3]

In 1931, physician Lucy Wills conducted a study of nutritional deficiencies that caused [anemia](#) ^[4] in pregnant women in Bombay, India, later renamed Mumbai. Anemia is a lack of healthy red blood cells in the blood. Wills published the results of her study in the medical article "Treatment of 'Pernicious Anaemia of Pregnancy' and 'Tropical Anaemia'" in the *British Medical Journal* in 1931. Wills's research contributed to knowledge of [anemia](#) ^[4] and the possible causes associated with the disease, such as the symptoms of fatigue and irritability. Wills attempted to connect the association of B vitamins and [anemia](#) ^[4]. Wills's findings influenced scientists to research the importance of [folic acid](#) ^[5], one of the B group vitamins, and the role it plays in the development of a [fetus](#) ^[6] and in women's health.

In the early twentieth century, many scientists and physicians were interested in the study of blood and blood diseases, a field called hematology. In her research, Wills studied [anemia](#) ^[4], a common problem in pregnant women in which the blood does not contain enough healthy red blood cells. Wills completed most of her research at the Haffkine Institute in Bombay, India, later renamed Mumbai, studying pregnant women who showed symptoms of [anemia](#) ^[4], such as excessive fatigue and weakness during their third [trimester](#) ^[7] of [pregnancy](#) ^[8]. Wills compared the health and symptoms of pregnant women with anemic symptoms with women who did not show signs of [anemia](#) ^[4] while pregnant. She also studied the impact of life styles between each group of women, including nutrition and dietary habits.

In her research study, Wills observed the differences between pregnant women with symptoms of [anemia](#) ^[4] and pregnant women without anemic symptoms. Wills also compared the nutrition and dietary habits practiced by the women in Bombay who were pregnant. Wills took blood samples from the patients and examined the levels of hemoglobin in each. Hemoglobin is a component of red blood cells that enables the blood to transport nutrients and oxygen throughout the body. Anemic patients lack a healthy amount of hemoglobin in their red blood cells, leading to fatigue, weakness, and shortness of breath.

In her research, Wills tested two methods of treatment for [anemia](#) ^[4] in pregnant women. First, Wills treated the symptoms of four anemic women by supplementing their diets with liquefied liver, which contains high concentrations of B vitamins. Wills hypothesized that treatment of concentrated liquefied liver would increase hemoglobin levels in the blood. Case one was a woman who had been on a strict vegetarian diet. She displayed symptoms of fatigue, fever, and swelling of the extremities. Normal red blood cell and hemoglobin levels in healthy women were about 4,060,000 red blood cells per milliliter of blood and sixty-nine percent hemoglobin. Prior to treatment, her blood sample showed only 450,000 red blood cells per milliliter of blood and twelve percent hemoglobin. Wills gave the patient two hundred and fifty grams of liver daily. The patient showed improvement in five days showing the hemoglobin to increase to fifty-five percent, and the red blood cell count in her blood increased to 3,020,000 cells. The three other cases of women treated with dietary supplements of liver showed similar increases in red blood cell counts and hemoglobin levels in the blood. Wills's research found that the liver extract helped increase hemoglobin levels and red blood cells counts for each woman.

Wills also tested the effectiveness of marmite in treating pregnant women with [anemia](#) ^[4]. Marmite is a yeast extract paste high in B vitamins like [folic acid](#) ^[5]. When studying the effects of marmite, Wills studied two women who were pregnant and two who were not pregnant to determine if the anemic symptoms she was treating only occurred in pregnant women. In cases five and six, the women were not pregnant but both showed anemic symptoms and high fevers. When given a spoonful of about four milliliters, of marmite twice daily, their symptoms ceased after twelve days. After treatment, the woman in case five displayed an increase in red blood cell count from 917,000 to 3,333,000 red blood cells per milliliter of blood, and her hemoglobin levels increased from twenty percent to approximately sixty percent. The woman in case six exhibited similar recovery, showing an increase from 812,000 to 3,544,00 red blood cells per milliliter of blood and an increase hemoglobin levels from fifteen to sixty-six percent after nearly six weeks of treatment. Cases seven and eight were both pregnant and experienced severe fatigue, high blood pressure, and diarrhea. Initially, the woman in case seven blood sample contained 990,000 red blood cells per milliliter of blood and was eighteen percent hemoglobin. After the marmite treatment of five days, her red blood cell count had increased to 2,490,000 red blood cells per milliliter of blood, and her hemoglobin level rose to fifty percent. Likewise, the woman in case eight displayed an improvement of healthy red blood cell count from 1,300,000 to 2,560,000 red blood cells per milliliter of blood and of hemoglobin level from thirty-four to forty-one percent after ten days. Wills found that treatment with dietary supplements of marmite, like supplements of liver, significantly increased both women's red blood cell and hemoglobin levels, and decreased the symptoms of [anemia](#) ^[4].

From her research, Wills hypothesized that both liver and marmite contained something that alleviated anemic symptoms and increased red blood cell counts and hemoglobin levels in the blood. Because liver and marmite both had high concentrations of

B vitamins and they both effectively treated [anemia](#)^[4], Wills claimed low B vitamin levels were the cause of [anemia](#)^[4] and could be avoided through a diet rich in B vitamin. After the study, Wills continued to treat the women with both liver and marmite to improve and maintain their health during their pregnant.

Wills's findings stimulated Bryan Hibbard to later research the role of [folic acid](#)^[5] in women's health during [pregnancy](#)^[8]. Hibbard continued researching the correlation between [folic acid](#)^[5] and the complications women were experiencing with low hemoglobin levels. He further demonstrated the relationships between [folic acid](#)^[5] and women's health and fetal development.

Sources

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