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The Gravity of Weight

Nausea and Vomiting During Pregnancy: A Protective Mechanism?

Expectant women often experience distressing symptoms.

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KEY POINTS

- Nausea and vomiting are seen in up to 90% of pregnant women in the first trimester, when the fetus is most vulnerable.
- The term "morning sickness" is a misnomer, since nausea and vomiting typically last all day and are a normal part of pregnancy--not a disease.
- The symptoms may reflect an evolutionary adaptation to protect both mother and developing fetus from toxins and infections.
- In a very small percentage, the symptoms persist throughout pregnancy and may require a medical work-up and even hospitalization.



Pregnancy. Morning sickness is a common symptom of pregnancy, but sometimes nausea and vomiting persist well beyond the first trimester.

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For weeks, the very sight of food caused her “relentless nausea,” and she suffered from nearly continuous vomiting. She was so weak and faint that she could not get out of bed (Rhodes, 1972). “A wren would have starved on what she ate during those last six weeks,” records the

contemporary biographer of Charlotte Brontë, author of the 1847 novel *Jane Eyre*. (SP Allison and Lobo, 2020; Weiss, 1991).



Soviet propaganda postcard aimed at improving healthcare for expectant mothers by Russian artist Alexei Nikanorovich Komarov. Tobie Mathew Collection. Caption in Russian: "Working in the wash house while pregnant is harmful."

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Though Brontë's death certificate indicated she had phthisis (tuberculosis) and several of her siblings had died of TB, there was no indication she herself had the disease. Instead, though not all sources agree (Maynard, 1983), many believe that Brontë, newly and happily married, was indeed pregnant and was suffering from the pernicious vomiting of pregnancy, i.e., hyperemesis gravidarum. Ultimately Brontë died from her illness, just weeks shy of her 39th birthday. She had been married only nine months.

Nausea and vomiting are often the first signs of pregnancy, occurring in from 50 to 80% (Committee on Obstetric Practice, 2018) and, in some studies, 85% (McParlin et al., 2016) or even 90% of women (Fejzo et al., 2018; Petry et al., 2018). These are the symptoms commonly referred to as *morning sickness*, though this term is "misleading" as symptoms in the vast

majority of women last all day (Fejzo et al., 2019). For some, the term is "a complete misnomer" because "sickness" implies a disease, and these symptoms occur in healthy women who deliver healthy babies (Sherman and Flaxman, 2002).

Nausea and vomiting of pregnancy typically begin around 6 to 8 weeks, are usually self-limiting symptoms, and taper off by 20 weeks. Perhaps the first reference to vomiting in pregnancy was found on an Egyptian papyrus more than 2,000 years old (Fairweather, 1968). References appeared in textbooks on midwifery in the 17th and 18th centuries. By the late 19th century, there are citations in the American medical literature (Bacon, 1898).

Despite how common the symptoms, the pathogenesis of nausea and vomiting during pregnancy is not well understood. Studies have found that women who experience the symptoms are significantly less likely to miscarry (Sherman and Flaxman, 2002).

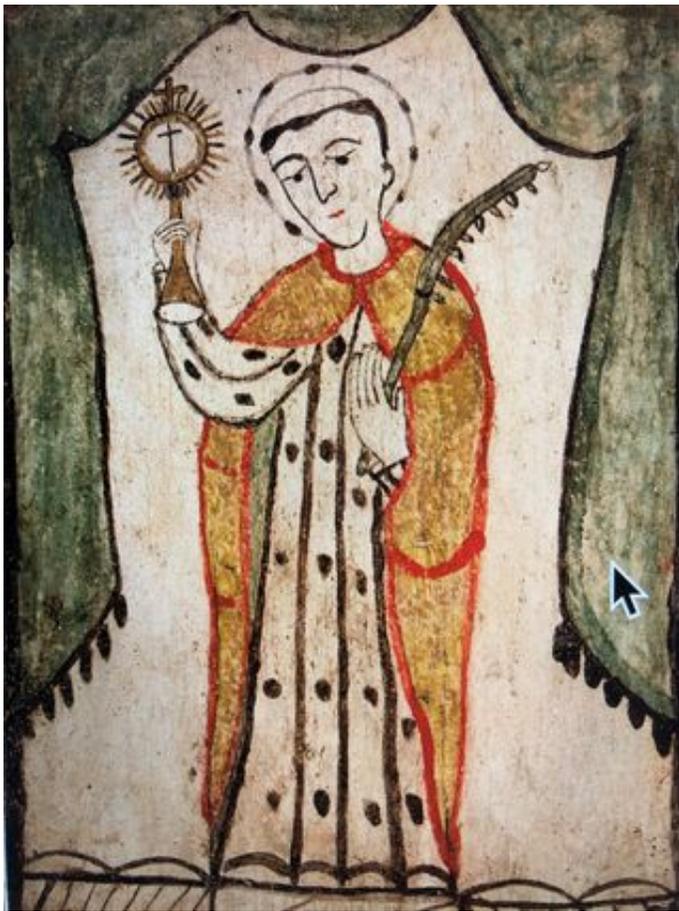
Some researchers have speculated that these symptoms, as well as the sensitivity and aversion that develop to certain smells, occur during the time the embryo is "most susceptible to disruption." As such, they are an "evolutionary adaptation" that occurred to protect a woman from potential food-borne infections or toxins that might be dangerous to the developing fetus. Further, some suggest that pregnant women tend to crave foods least likely to be toxic (Sherman and Flaxman, 2002).

The symptoms of nausea and vomiting have both a genetic and hormonal component as well. For example, the hormone human chorionic gonadotrophin (hCG), made by the placenta and often called the "pregnancy hormone," begins to increase within weeks after conception,



Soviet propaganda postcard aimed at improving healthcare of expectant mothers by Russian artist Komarov, 1920s. Tobie Mathew Collection. Caption in Russian: "Using a pedal-powered sewing machine while pregnant is harmful."

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Jose Aragon San Ramon Nonato, the Patron Saint of pregnancy and childbirth. Circa, 1835, by a "follower of Jose Aragon." Painted in New Mexico.

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continues to rise dramatically throughout the pregnancy, and may contribute to symptoms.

Significantly, as well, there is a major rapid surge during the first trimester in circulating levels of the peptide hormone GDF15, growth and differentiation factor 15 (O’Rahilly, 2017). GDF15 acts centrally, primarily in the area postrema, i.e., the vomiting center of the brainstem, to suppress food intake (Petry et al., 2018; Lockhart and O’Rahilly, 2019). These increased levels, which remain elevated until delivery, may “discourage” an expectant woman from ingesting substances that might harm the vulnerable fetus (O’Rahilly, 2017).

GDF15 may also have a “potentially adaptive” function as its levels increase

in response to stress and injury to tissues, with a role as a biomarker in cancer, cardiovascular, and renal disease (O’Rahilly, 2017). Still, its mechanism of action remains unclear (Lockhart and O’Rahilly, 2019). There is even a recent suggestion by O’Rahilly that increased circulating levels of GDF15 may be the mechanism by which metformin, the commonly prescribed medication for type 2 diabetes, reduces food intake and can lower body weight *in some patients*, with a significant correlation between higher levels of GDF15 and greater weight loss (Coll et al., 2020).

Further, increased circulating levels of GDF15 are seen in women whose nausea and vomiting continue during the second trimester: GDF15 has been implicated in the development of the *pernicious vomiting* of pregnancy, i.e., *hyperemesis gravidarum* (HG) (Petry et al., 2018), the disease from which Charlotte Brontë is thought to have

suffered and died. This severe condition of intractable vomiting not related to other causes is associated with potential morbidity for both pregnant women and their developing babies and occurs in 0.3 to 3% of pregnancies (with higher rates among some ethnic groups); it is the leading cause of hospitalization in the first half of pregnancy (London et al., 2017).

Before the advent of intravenous fluid replacement, it could lead to substantial weight loss, electrolyte imbalance, severe dehydration, and even death. To date, there is no consensus definition of hyperemesis gravidarum, and it remains "profoundly understudied" (Fejzo et al., 2019). Often, it is a "clinical diagnosis of exclusion" (Committee on Obstetric Practice, 2018). My next posting will continue this discussion of nausea and vomiting, with a focus on treatment, including the use of medication during pregnancy.



"The second month of pregnancy," circa 1825 by French artist Louis Leopold Boilly. Bibliotheque Nationale, Paris. Symptoms of nausea and vomiting during pregnancy can be uncomfortable and even debilitating for some women.

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