

Hydration can impact pregnancy and birth outcomes

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Credit: AI-generated image ([disclaimer](#))

Water needs increase during pregnancy to support fetal development and maternal health, however little is known about the relationship between hydration status and outcomes on both mother and child. A Penn State study recently examined the hydration status of pregnant women, the impact of a behavioral intervention, and tested how underhydration

during pregnancy was associated with birth outcomes.

The researchers, including Asher Rosinger, Ann Atherton Hertzler Early Career Professor in Global Health and Director of the Water, Health and Nutrition Lab in the College of Health and Human Development, used data from the Healthy Mom Zone Study, which aims to regulate gestational weight gain in [pregnant women](#) with overweight or obesity. The work appears in the *European Journal of Nutrition*.

"Pregnant [women](#) are advised to consume 300 milliliters more water per day than nonpregnant, nonlactating women," said Rosinger. "However, water recommendations do not specify differential water needs or [hydration status](#) recommendations by [pregnancy](#) month or trimester, nor do they take into account body composition, knowing that overweight and obesity increases probability of being underhydrated."

In the study, 14 women received standardized prenatal care, while 13 women received standardized [prenatal care](#) plus the Healthy Mom Zone intervention, spearheaded by principal investigator Danielle Symons Downs, professor of kinesiology and obstetrics and gynecology, and associate director of Penn State's Social Science Research Institute.

According to Downs, the Healthy Mom Zone Study is an individually tailored, adaptive intervention aimed at helping overweight and obese women effectively manage their weight during pregnancy to reduce the likelihood of excessive gestational weight gain.

"High gestational weight gain can negatively impact both maternal and infant health, causing pregnancy complications such as gestational diabetes and high blood pressure," Downs explained. "Past intervention programs have had only limited success in effectively managing pregnancy weight gain among women who are overweight or obese. This is one of the first intervention studies to use an individually tailored,

adaptive design—tailored to each woman's unique needs—to manage weight gain in pregnancy."

The women in the Healthy Mom Zone intervention received weekly one-on-one meetings with a trained dietician to provide evidence-based education and counseling on gestational weight gain, physical activity, healthy eating, and related health behaviors, such as sleep, mental health care, and water intake. Hydration status was measured weekly via overnight urine osmolality in Rosinger's lab.

"To date, there are very few studies measuring hydration status over pregnancy, as they are usually limited to standardized care visits," said Rosinger. "We wanted to know how hydration status varies over pregnancy more closely, so we analyzed 653 urine samples taken weekly from pregnant women in the study. This analysis helped us understand variation in hydration status and enabled us to identify interventions that improve hydration status."

The researchers found that as the women progressed through pregnancy, they typically became underhydrated during the second trimester and early part of the third trimester. "We found that as most women remained active in the second trimester, they often experienced an increase in water output. If it wasn't adequately replaced by fluid intake, it could contribute to a greater risk of underhydration," Rosinger said.

The researchers also found that the Healthy Moms Zone [intervention](#) assisted the women in maintaining a healthier [hydration status](#), especially in the second and third trimesters compared to the control women.

The study also sought to discover how hydration levels can affect birth weight and length. The researchers found that during [second trimester](#), women who were inadequately hydrated had lower birth weight z-scores. "Interestingly, we did not see lower birth weights at end of third

trimester, indicating catch up growth," Rosinger said.

"Our results are significant considering increased water needs during pregnancy and research suggesting that large proportions of pregnant women in different parts of the world fail to meet recommendations on adequate water intake," said Rosinger. "We typically treat pregnancy as one stage with respect to [water](#) needs, but all stages are different and include varying experiences and physiological demands. Recommendations by trimester should be developed, along with an emphasis on staying hydrated. It's just as important as increasing dietary needs during pregnancy."

This research also supports the need for more widespread interventions such as the Healthy Moms Zone. In the future, the researchers would like to compare interventions to birth outcome results, as they have important implications for early life nutrition. They would also like to further understand the main barriers for overweight and obese women to maintain proper hydration in pregnancy, and if women with normal [weight](#) have the same risk of underhydration in the second and third trimesters.

More information: Asher Y. Rosinger et al, Variation in urine osmolality throughout pregnancy: a longitudinal, randomized-control trial among women with overweight and obesity, *European Journal of Nutrition* (2021). [DOI: 10.1007/s00394-021-02616-x](https://doi.org/10.1007/s00394-021-02616-x)

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