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Does pre-pregnancy BMI predict transfer to a hospital from a birth center for pain management?

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Abstract

Background: Birth centers are staffed predominantly by midwives and nurses who care for a patient population consisting of low-risk pregnancies. The American Association of Birth Centers requires that the birth center has an agreement with a local hospital to transfer patients if need-be before, during or after delivery in case any complications arise that may result in needing alternative care (Rathbun, 2017). The rate of obesity in the United States has been rising for years. Obesity affects overall health as well as a woman's pregnancy and pregnancy outcomes. Overall, an obese individual does not prioritize physical exercise and lacks healthy diet practices. These things contribute to a person's ability to fight illness, complete tasks and conserve energy for strenuous activity such as childbirth (Santos, et al., 2019).

Methods: This research project included data from Baby + Co. birthing center in Nashville, Tennessee. The sample population included low risk women seeking care at Baby + Co. from January 2019 through May 2019. I compared the pre-pregnancy BMI to whether or not the woman was transferred to a hospital during labor for pain control. **Results:** The regression coefficient for maternal age was not significant, indicating that age did not have a significant effect on the odds of observing the Yes category of "Transfer for pain." The regression coefficient for pre-pregnancy BMI was not significant, indicating that pre-pregnancy BMI did not have a significant effect on the odds of women transferring from a birth center to a hospital for pain. The regression coefficient for pregnancy weight gain was significant, indicating that for a one unit increase in pregnancy weight gain, the odds of observing the Yes category of "Transfer for pain" would increase by approximately 5%. **Conclusion:** It was found that extra weight gain during pregnancy had a greater effect on pain control than pre-pregnancy BMI. There is still much research to be done regarding BMI and pregnancy weight gain to determine the ideal weight gain for a pregnant woman.

Background

In the last several years, birth centers have been increasing in popularity. The reason that many prospective parents are shifting away from hospitals is because the care provided at a birth centers tend to be more personalized, comfortable, and cost effective. Birth centers are staffed predominantly by midwives and nurses who care for a patient population consisting of low-risk pregnancies. The American Association of Birth Centers requires that the birth center has an agreement with a local hospital to transfer patients if need-be before, during or after delivery in case any complications arise that may result in needing alternative care (Rathbun, 2017). One of the most common pain management techniques for women in labor in the US is pharmacological therapy, such as an epidural injection. There are risks involved with using epidural analgesia such as respiratory depression, loss of consciousness and epidural hematoma (Navas, et al. 2018). While this is not the safest pain management technique for the mother and baby, it is popular in hospitals across the United States. Baby + Co. is an example of a birth center in the United States, and this organization does not use pharmacological analgesics, like an epidural, to manage labor pain. As an alternative to this, they provide therapies such as hydrotherapy, music, deep breathing and nitrous oxide. All patients in this study utilized nonpharmacologic pain management techniques provided at Baby + Co.

The rate of obesity in the United States has been rising for years. Men, women and children in the United States have been affected by this trend. Excess weight predisposes individuals to many adverse health outcomes related to the heart, joints, liver, skin and many other vital organs (Charo & Lacoursiere, 2014). It is not a surprise to find out that obesity affects a woman's pregnancy and pregnancy outcomes as well. According to According to Santos, et.al (2019), an increased BMI increases the risk of complications during pregnancy and during labor such as preeclampsia, gestational diabetes, preterm birth and small and large for gestational age at birth. These findings are consistent with an additional study in 2015 comparing high pre-pregnancy BMI and pregnancy complications in Asian women (Somparsit, et al., 2015).

Overall, an obese individual does not prioritize physical exercise and lacks healthy diet practices. These factors contribute to a person's ability to fight illness, complete tasks and conserve energy for strenuous activity such as childbirth (Santos, et al., 2019). The question this study investigated more specifically is "Does pre-pregnancy BMI predict transfer to a hospital from a birth center for pain management?"

Objective

The objective of this research study was to determine the optimal pre-pregnancy BMI to produce a safe and positive experience for women in labor.

Methods

This research project included data from Baby + Co. birthing center in Nashville, Tennessee. The sample population included low risk women seeking care at Baby + Co. from January 2019 through May 2019. I compared the pre-pregnancy BMI to whether or not she was transferred to a hospital during labor for pain control. The independent variable in this study was pre-pregnancy BMI. I examined variables such as maternal age and pregnancy weight gain as well. The control variables in this study included: care at Baby + Co birth center, low risk pregnancy and no use of pharmacological pain therapy. With the direction of my mentor, Dr. Hope Ballentine, and professor, Dr. Cara Osborne, I had access to data from Baby + Co. which allowed me to appropriately analyze the effects of pre-pregnancy BMI for women in labor.

Results

The model was evaluated based on an alpha of 0.05. The overall model was significant, $\chi^2(3) = 19.25, p < .001$, suggesting that age, pre-pregnancy BMI and pregnancy weight gain had a significant effect on the odds of observing the Yes category of "Transfer for pain." McFadden's R-squared was calculated to examine the model fit, where values greater than .2 are indicative of models with excellent fit (Louviere, Hensher, & Swait, 2000). The McFadden R-squared value calculated for this model was 0.06.

The regression coefficient for age was not significant, $B = -0.02$, $OR = 0.98$, $p = .592$, indicating that age, did not have a significant effect on the odds of observing the Yes category of “Transfer for pain.” The regression coefficient for pre-pregnancy BMI was not significant, $B = -0.02$, $OR = 0.98$, $p = .671$, indicating that pre-pregnancy BMI, did not have a significant effect on the odds of observing the Yes category of “Transfer for pain.” The regression coefficient for pregnancy weight gain was significant, $B = 0.05$, $OR = 1.05$, $p < .001$, indicating that for a one unit increase in pregnancy weight gain, the odds a woman transferring for pain management would increase by approximately 5%. Table 1 summarizes the results of the regression model.

Table 1

Logistic Regression Results with age, pre_preg_bmi, and pregnancy_weight_gain Predicting Transfer_for_pain

Variable	B	SE	95.0% CI	χ^2	p	OR
(Intercept)	-4.88	1.62	[-8.06, -1.70]	9.04	.003	
age	-0.02	0.04	[-0.10, 0.05]	0.29	.592	0.98
pre_preg_bmi	-0.02	0.04	[-0.10, 0.06]	0.18	.671	0.98
pregnancy_weight_gain	0.05	0.01	[0.03, 0.07]	18.69	< .001	1.05

Conclusion

It was found that extra weight gain during pregnancy had a greater effect on pain control than pre-pregnancy BMI. Increased gestational weight gain also puts the baby at risk of preterm labor, cesarean delivery, small for gestational age and large for gestational age (Wang, et al., 2019). There is still much research to be done regarding BMI and pregnancy weight gain to determine the ideal weight gain for a pregnant woman. A limitation to this study was that it was limited to one birth center

population. The average and median pre-pregnancy BMI in this study was 20.9. A healthy BMI is 18.5-24.9 (“Calculate Your BMI - Standard BMI Calculator”). The average age of those in this study was 30.8 years and the median was 30 years. If the sample population was broadened to include all women of child bearing age in the U.S., the average BMI would be significantly higher at 28.4 and the average age would be 26.3 years (Matthews & Hamilton, 2016).

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