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Brief report

Beyond BMI: Pregnancy-related weight stigma increases risk of gestational diabetes

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ABSTRACT

The objective of this research brief was to assess if prenatal weight stigma is a predictive factor for perinatal complications compared to pre-pregnancy body mass index (BMI). Data were assessed from 358 women. Results indicated weight stigma concerns increased the odds of gestational diabetes, with a stronger association than BMI.

1. Introduction

Accompanying rising global obesity rates is an increasing shadow pandemic: weight stigma [1]. Weight stigma refers to negative stereotypes associated with body weight that result in weight-based biases and discrimination [2]. Reproductive-aged women are particularly vulnerable to experiencing weight stigma given the focus on weight during pregnancy and the postpartum period [3]. Moreover, there is a positive relationship between body mass index (BMI) and the frequency of weight stigmatization, positioning women with obesity at the highest risk for exposure to weight stigma [4]. Previous studies in non-pregnant samples demonstrate weight stigmatization increases the risk for obesity comorbidities, such as metabolic syndrome [5,6]. In comparison to pre-pregnancy BMI, limited work has investigated the implications of weight stigma for prenatal health outcomes such as gestational diabetes.

The aim of the present study was to evaluate the relationships among pre-pregnancy BMI, weight stigma, and prenatal health outcomes previously correlated with BMI only (gestational diabetes, preterm delivery, caesarean section [C-section], low birthweight and macrosomia). In accordance with the non-pregnancy literature, we hypothesized that elevated BMI and higher weight stigma concerns would be associated with risk of prenatal complications.

2. Methods

Women ≥18 years of age, ≥13 weeks pregnant or <1 year postpartum, with a singleton pregnancy or birth, and residing in the United States were invited to complete an online survey. Detailed characteristics, recruitment information, and methodology are available elsewhere [4]. The present analyses include only postpartum women and examined: pre-pregnancy BMI, weight stigma, and prenatal outcomes. The parent study was approved by the University of California, Los Angeles Institutional Review Board.

2.1. Pre-pregnancy BMI

Self-reported height (in) and pre-pregnancy weight (lb) were collected to calculate pre-pregnancy BMI: weight (lb)*703/[height (in)]^2.

2.2. Weight stigma concerns

Weight stigma concerns were measured using the five-item Weight Stigma Concerns Scale [7]. Respondents indicate their level

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Table 1
Logistic regression results for pre-pregnancy BMI, weight stigma concerns, and frequency of weight stigma sources endorsed associated with prenatal outcomes.

Preterm birth:	B	SE B	*p*	OR	95% CI
Pre-pregnancy BMI	0.02	0.025	0.926	1.002	0.955, 1.052
Weight stigma concerns	−0.033	0.027	0.234	0.968	0.917, 1.021
Frequency of weight stigma sources endorsed	0.095	0.103	0.355	1.100	0.899, 1.346
Caesarean delivery:	**B**	**SE B**	***p***	**OR**	**95% CI**
Pre-pregnancy BMI	0.081	0.014	<0.001*	1.085	1.055, 1.115
Weight stigma concerns	−0.003	0.016	0.865	0.997	0.967, 1.029
Frequency of weight stigma sources endorsed	−0.058	0.063	0.357	0.944	0.835, 1.067
Gestational diabetes:	**B**	**SE B**	***p***	**OR**	**95% CI**
Pre-pregnancy BMI	0.032	0.018	0.071	1.033	0.997, 1.070
Weight stigma concerns	0.065	0.065	0.010*	1.067	1.016, 1.121
Frequency of weight stigma sources endorsed	−0.177	−0.177	0.057	0.838	0.699, 1.005
Low birthweight:	**B**	**SE B**	***p***	**OR**	**95% CI**
Pre-pregnancy BMI	−0.027	0.030	0.376	0.974	0.918, 1.033
Weight stigma concerns	0.005	0.032	0.865	1.005	0.945, 1.069
Frequency of weight stigma sources endorsed	0.036	0.121	0.767	1.037	0.817, 1.314
Macrosomia:	**B**	**SE B**	***p***	**OR**	**95% CI**
Pre-pregnancy BMI	0.041	0.017	0.016*	1.042	1.008, 1.078
Weight stigma concerns	−0.015	0.021	0.476	0.985	0.945, 1.027
Frequency of weight stigma sources endorsed	0.081	0.077	0.292	1.084	0.933, 1.260

BMI – body mass index; CI – confidence interval; OR – odds ratio; SE – standard error.
* $p < 0.05$.

of agreement on a 7-point Likert scale with statements regarding concerns that they would experience negative opinions or judgments or that they would be treated poorly because of their weight [7]. This scale demonstrated excellent reliability in this study (Cronbach's alpha = 0.96) [3].

2.3. Sources of weight stigma experiences

Women responded to the following question, "Since becoming pregnant, have you ever been treated differently because of your weight or has something or someone made you feel bad or uncomfortable because of your weight? Please indicate who or what the source of this experience was. Select all that apply." The number of sources endorsed was summed [3].

2.4. Prenatal outcomes

Participants self-reported gestational diabetes diagnosis, type of delivery, gestational age at delivery, and birthweight. Pre-term delivery was defined as birth earlier than 37 weeks gestation. Low birthweight and macrosomia were defined as birthweight <2500 g and >4000 g, respectively.

2.5. Statistical analysis

Previously, we demonstrated significant positive correlations among weight stigma concerns, number of weight-stigmatizing sources endorsed, and BMI [3]. Accordingly, the present study incorporated BMI, weight stigma concerns, number of weight-stigmatizing sources into a logistic regression model to assess the relationship with each prenatal health outcome. Data were presented as odds ratios (OR) with 95% confidence intervals (CI). Significance was accepted as $p < 0.05$.

3. Results

The sample included 358 postpartum women. Average pre-pregnancy BMI was 32.7 ± 10.6 kg/m^2. The predictive model was significant for gestational diabetes (χ^2 = [3, N = 317] = 17.616, p = 0.001), and weight stigma concerns made a statistically significant contribution (p = 0.01). The predictive model was also significant for C-section (χ^2 = [3, N = 318] = 44.474, $p < 0.001$) and macrosomia (χ^2= [3, N = 318] = 7.900, p = 0.048), and pre-pregnancy BMI made a statistically significant contribution to both variables ($p \leq 0.001$ and p = 0.016, respectively). Results were not significant for prediction of preterm birth (χ^2 = [3, N = 318] = 1.834, p = 0.643) or low birthweight (χ^2 = [3, N = 315] = 0.920, p = 0.821). Table 1 displays full models and associated OR values.

4. Discussion

These findings reinforce known prenatal risk factors associated with BMI, while adding novel information on the role of weight stigma in maternal health throughout gestation. Most notably, our model showed that weight stigma concerns were associated with greater risk for gestational diabetes.

The positive association between pre-pregnancy BMI and gestational diabetes has been consistently reported [8]. Interestingly, our model demonstrated that having elevated weight stigma concerns was uniquely associated with greater odds of developing gestational diabetes. Notably, this was stronger than the relationship between BMI and gestational diabetes. This finding dovetails with diabetes stigma often being compared to obesity stigma. That is, the root cause of both stigmas is the prevailing societal perception that each arises from an individual choosing an unhealthy lifestyle [1,9]. Perhaps this cohort of women also experienced parallel and intersecting stigmas toward weight and gestational diabetes, and this would explain the strong association with weight stigma concerns. The intersectionality of these stigmas is an important future direction for research.

Importantly, weight stigma has a significant negative impact on psychological health during pregnancy [1,10]. Recent clinical practice guidelines for obesity specify that mental health support should be offered to patients who may have experienced weight stigma [2]. Given the association between weight stigma and gesta-

tional diabetes evinced here, we suggest that this recommendation should also extend to the prenatal context. Specifically, gestational diabetes care may need to consider integrating psychological support to mitigate the impact of weight stigma on maternal health. Importantly, gestational diabetes management and maternal mental health improvements can also have positive effects on neonatal health, such as prevention of macrosomia, hypoglycemia at birth, and postpartum depression [11–13].

Strengths of this work are the relatively large sample of women (compared to previous work on weight stigma during pregnancy) and the use of a focused assessment tool to quantify weight stigma concerns [7]. Additionally, we tested a novel and timely hypothesis of weight stigma predicting prenatal complications in comparison to an established predictor (BMI). Thus, this finding enriches the growing body of literature documenting the biopsychosocial implications of weight stigma. Limitations include the use of a convenience sample and self-reported data. Furthermore, a more comprehensive assessment of weight stigma, including internalization, during pregnancy would be useful going forward [14,15].

5. Conclusion

Prenatal weight stigma may increase the risk for gestational diabetes, and this association here was stronger than with pre-pregnancy BMI. Our findings echo the broader literature evincing the relationship between pre-pregnancy BMI and prenatal health outcomes, while providing a novel foundation for understanding the deleterious role of weight stigma during pregnancy.

Author contributions

TSN and ACIR conceptualized the study. TSN completed data analysis. AJT, TSN, and ACIR contributed to data interpretation. ACIR and AJT conceptualized and carried out data collection and analysis for the parent study, from which this sample was assessed. All authors contributed to manuscript writing and approved the final submission.

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Conflicts of interest

All authors (TSN, AJT, ACIR) declare no conflicts of interest.

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