

Introduction

Unhealthy Gestational Weight Gain (GWG) is a growing concern due to the increased risk for adverse maternal and infant outcomes. In 2009, the Institute of Medicine (IOM) created guidelines for GWG based on prepregnancy body mass index (BMI).¹ However, according to a 2016 national study, only 32% of women gained weight within the IOM recommendations.² Literature shows that both inadequate and excessive GWG are associated with numerous adverse perinatal outcomes.^{3,4}

The racial/ethnic disparities in GWG are also well documented in studies. Since GWG in the mother can influence the development of the fetus, there may be resulting perinatal outcomes that disproportionately affect particular populations. Various studies have found that minorities (i.e. Asian, Black, and Hispanic) have a higher prevalence of inadequate GWG, while White women are more likely to experience excessive GWG.⁵ Thus, we hypothesized that, as a minority group, Middle Eastern women would be more likely to gain inadequate weight.

There is very little research on perinatal outcomes in Middle Eastern women in the United States. Middle Eastern is an ethnicity that is frequently grouped into the racial category of White. This lack of specific data creates an urgency for research. It is of note that the Detroit metropolitan area has one of the largest Middle Eastern populations in the United States.⁶ The increased proportion of Middle Eastern residents in Detroit provides a unique opportunity to investigate how GWG impacts perinatal outcomes in this population. The results of this project will improve the information that clinicians have on the impact of GWG and perinatal outcomes in Middle Eastern women. This data will allow for better recommendations regarding individualized counseling for appropriate GWG.

Aims and Objectives

The goals of this study are to characterize GWG in Middle Eastern women and to determine if the amount of GWG is associated with adverse pregnancy outcomes in Middle Eastern women.

Methods

A retrospective chart review was conducted on 255 Middle Eastern women who gave birth at Beaumont Dearborn Hospital July-December 2019 and their newborns. The mothers' prepregnancy and postpregnancy weight were used to determine the GWG categories of inadequate, adequate, or excessive based on the IOM's guidelines. Composite maternal outcomes (gestational hypertension, gestational diabetes, preterm birth, and delivery type) and composite neonatal outcomes (hyperbilirubinemia, hypoglycemia, small and large for gestational age) were compared. One-Way Analysis of Variance (ANOVA) and multivariable logistic regression models were used to analyze the data. IRB approval was obtained - IRB#2020-224.

Results

After exclusions, a total of 255 women were included in the study. Out of these women, 35% gained inadequate weight, 34.5% gained adequate weight, and 30.5% gained excessive weight. Various maternal demographics were collected to investigate if there was an association between these factors and GWG (Table 2). The statistically significant characteristics included age (p=0.03), prepregnancy BMI (p=0.02), diabetes mellitus (0.02), autoimmune diseases (p=0.03), and para (p<0.01). There was no significant difference between groups for composite maternal outcomes or composite neonatal outcomes (inadequate vs adequate and excessive vs adequate- Table 1). However, the multivariable model showed that after adjusting for smoking, parity, and past medical history, the only significant factor for maternal outcomes was age. Each year increase in maternal age was associated with 11% greater odds of having at least one of the 4 maternal outcomes (OR: 1.11; P<0.001).

Table 1: Maternal and Neonatal Outcomes

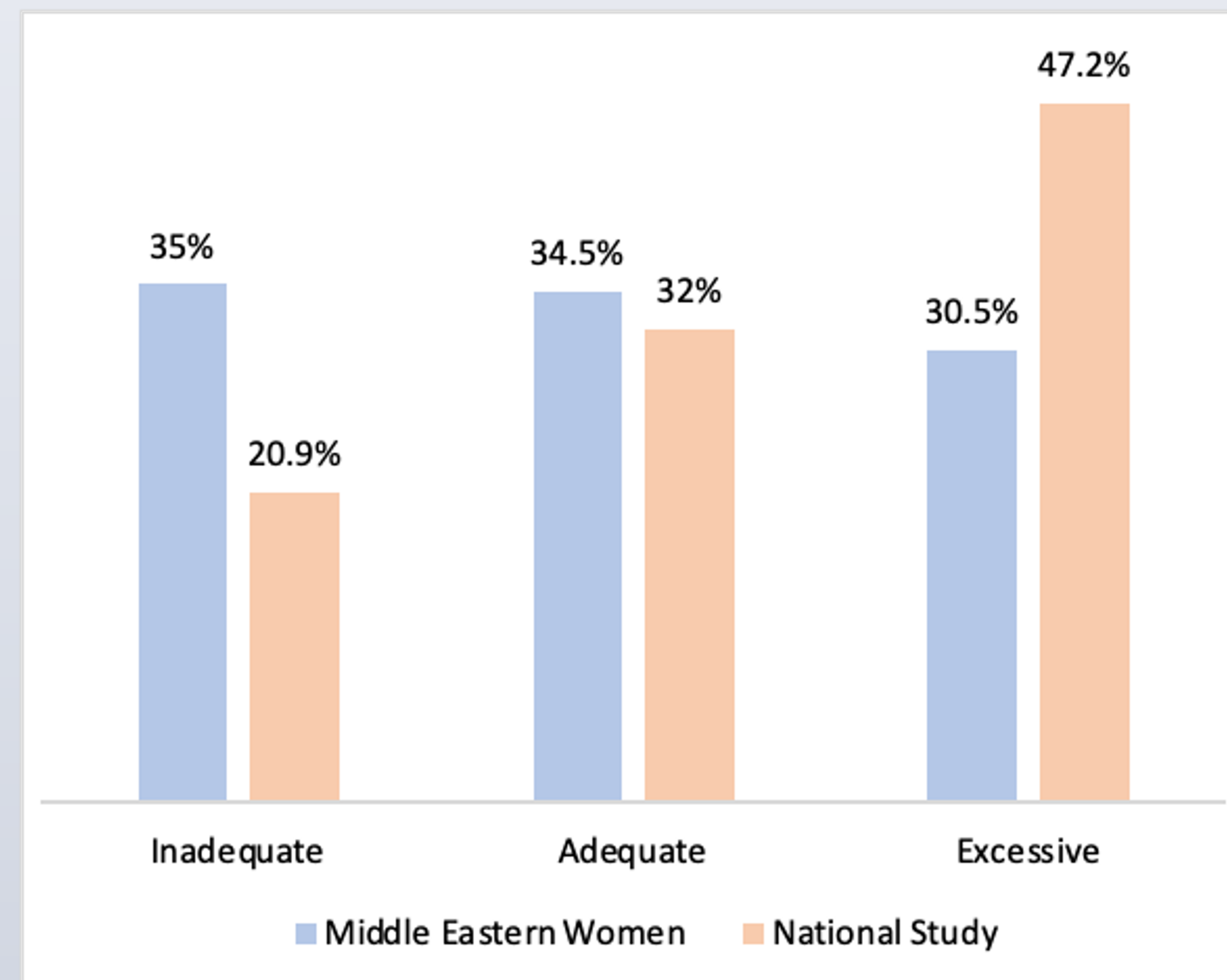
Characteristic	Any Maternal Outcome		Adjusted odds ratios		Any Neonatal Outcome		Adjusted odds ratios	
	Total	Yes n (%)	OR (95% CI)	P-value	Total	Yes n (%)	OR (95% CI)	P-value
Weight Gain Category								
Adequate GWG	88	36 (40.91)			88	32 (36.36)		
Excessive GWG	78	28 (35.90)	0.76 (0.39-1.51)	0.44	78	24 (30.77)	0.82 (0.41-1.63)	0.56
Inadequate GWG	89	34 (38.20)	0.67 (0.34-1.31)	0.24	89	32 (35.96)	0.97 (0.50-1.87)	0.92
Total	255	98 (38.43)			255	88 (34.51)		

Table 2: Maternal Demographics and Characteristics - by Weight Gain Category

	Inadequate GWG (N=89)	Adequate GWG (N=88)	Excessive GWG (N=78)	P-value
Age				0.03¹
N	89	88	78	
Mean (SD)	30.53 (5.14)	28.63 (5.29)	28.67 (5.43)	
Advanced Maternal Age (≥ 35), n (%)				0.22 ²
No	69 (77.5%)	76 (86.4%)	67 (85.9%)	
Yes	20 (22.5%)	12 (13.6%)	11 (14.1%)	
Prepregnancy BMI				0.02¹
N	89	88	78	
Mean (SD)	26.71 (5.79)	25.35 (4.29)	24.79 (3.22)	
Diabetes Mellitus, n (%)				0.02²
No	85 (95.5%)	88 (100.0%)	78 (100.0%)	
Yes	4 (4.5%)	0 (0.0%)	0 (0.0%)	
Hypertension, n (%)				0.39 ²
No	89 (100.0%)	87 (98.9%)	78 (100.0%)	
Yes	0 (0.0%)	1 (1.1%)	0 (0.0%)	
Autoimmune Diseases, n (%)				0.03²
No	89 (100.0%)	88 (100.0%)	75 (96.2%)	
Yes	0 (0.0%)	0 (0.0%)	3 (3.8%)	
Gravida				0.06 ¹
N	89	88	78	
Mean (SD)	3.42 (1.79)	2.82 (1.72)	2.92 (1.88)	
Para				<0.01¹
N	89	88	78	
Mean (SD)	2.03 (1.49)	1.33 (1.38)	1.33 (1.42)	

¹ANOVA F-test p-value; ²Chi-Square p-value;

Figure 1: Trends in GWG Based on 2009 IOM Guidelines



Conclusion

When compared to the results of the national study, our data suggests that Middle Eastern women are more likely to gain inadequate weight compared to the general population (Figure 1). With only 34.5% gaining adequate weight, these findings indicate a strong need for education and interventional programs to assist pregnant women in gaining the appropriate amount of weight. Although there is research on how to prevent excessive weight gain during pregnancy, very little attention has been given to address inadequate weight gain.⁷ It is important to note that since minorities are more likely to fall below the recommended weight gain during pregnancy, they disproportionately suffer from this lack of research.

There were several limitations of our study. Multiple variables, such as ethnicity, smoking, and the prepregnancy weight and height, were self reported. Additionally, the scope of the study was limited by a small sample size which was further reduced due to missing weight data. Although we tried to adjust for any potential confounding variables, residual confounding effects may still exist. Furthermore, the women in this study were all from one hospital, so the data may not be generalizable to other areas.

Although this study suggests that Middle Eastern women are more likely to gain inadequate weight compared to the general population, there was no significant difference between GWG groups for composite maternal or neonatal outcomes. More research is needed to parse out the effects of GWG on perinatal outcomes in order to provide improved individualized counseling for better maternal and infant health.

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