



Increased body mass index is protective against obstetric anal sphincter injury.



Laura Constable^{1,2,3}, Deepika Monga^{1,2}, Georgia Mylonas^{1,4}, Ellie O'Connor¹
1. Ballarat Health Services, Ballarat, Australia 2. Deakin University, Geelong, Australia. 3 Eastern Health, Melbourne, Australia. 4. The University of Notre Dame, Sydney, Australia



INTRODUCTION

- The prevalence of maternal **overweight and obesity** during pregnancy has increased worldwide and is a key co-morbidity in modern obstetric practice.¹
- Current estimates suggest that **30-40%** of reproductive-aged women in developed countries such as Australia, US and UK, are overweight or obese.²
- It is well established that increased body mass index (BMI) during pregnancy is associated with many **labour complications**.
- Approximately **85%** of women who undergo vaginal deliveries suffer some degree of perineal injury.³
- Current rates of OASIS during vaginal delivery are between **2.7% - 6.6%**.
- Severe perineal trauma, or obstetric anal sphincter injuries (OASIS), can lead to **faecal incontinence, pain, dyspareunia and large effects on quality of life**.⁴
- Two large European studies found a significant **protective effect of increasing BMI** on the rate of OASIS.^{1,5}
- Currently, there is a gap in the literature as to whether maternal BMI influences the risk of sustaining OASIS in an Australian population.

OBJECTIVES:

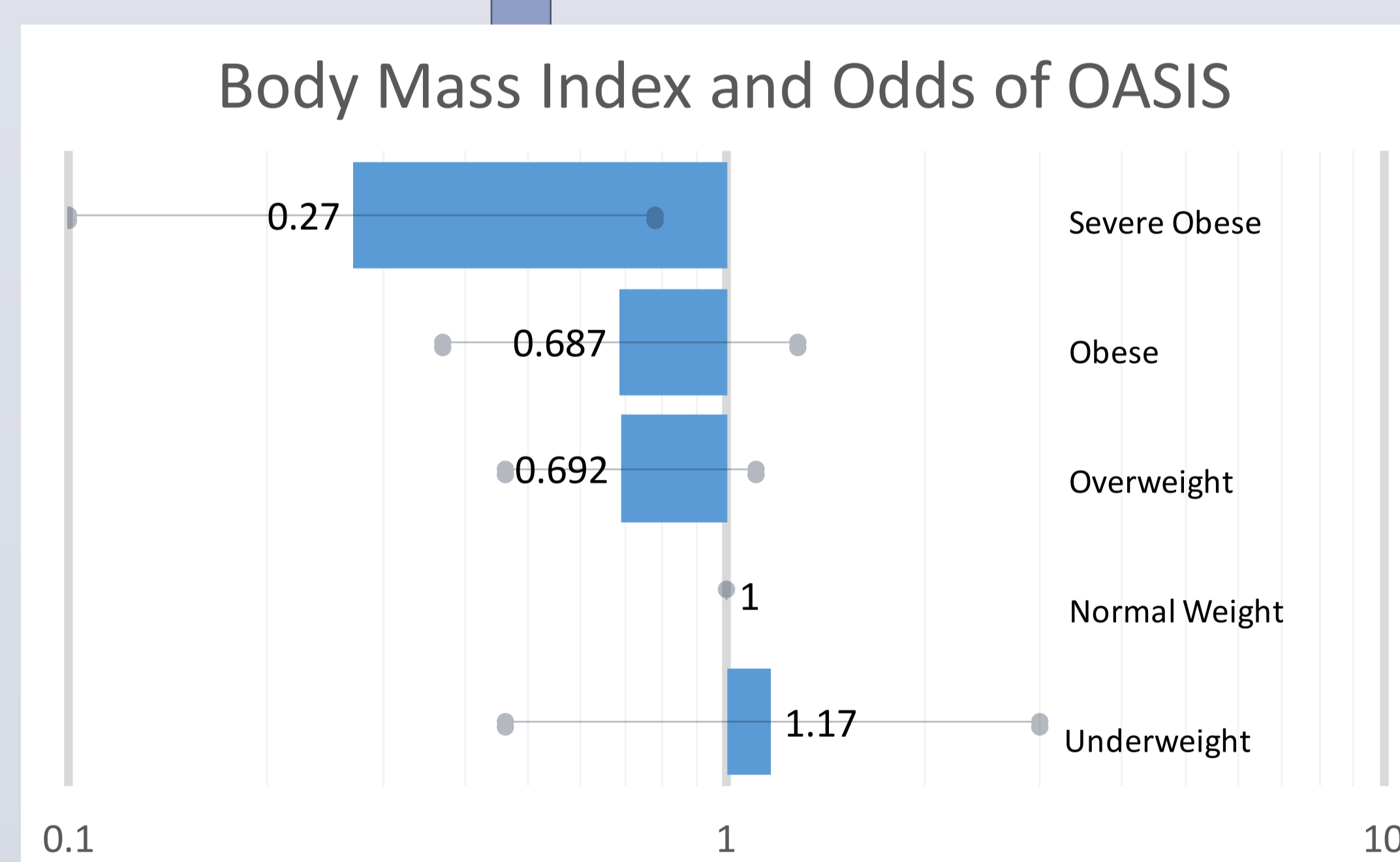
- To investigate the impact of increased body mass index on the rate of obstetric anal sphincter injury among nulliparous women in Victorian population.
- To investigate other risk factors for severe perineal trauma in this population.

METHODS

- Population:** Women with singleton pregnancies at a Victorian regional centre between 2007-2017 (n=15,124)
- Exclusion Criteria applied:** Multiparous, caesarean section delivery, gestation < 37 weeks, non cephalic presentation, birth weight > 4000g, shoulder dystocia (n=11,591)
- Missing data (n=198), total data available for analysis (n=3,335)
- Women were grouped by WHO Body Mass Index class
- Univariate analysis:** Pearson's Chi Square and **binary logistic regression** were performed to determine unadjusted odds ratios
- Data was considered statistically significant at p < 0.1 for inclusion in multivariable model.
- Multivariable analysis:** logistic regression was used to calculate adjusted OR with 95% CI.
- All statistics were performed by **SPSS** (Version 23, IBM Corporation)
- Ethics approval: Ballarat Health Services Human Research Ethics Committee.

RESULTS

Body Mass Index Group	Adjusted OR (95% CI)	p-value
BMI Dichotomised		
BMI <25 (Normal weight)	1.00 (Reference)	
BMI ≥25 (Overweight & obese)	0.60 (0.41-0.89) *	0.011*
BMI (WHO Categories)		
<18.5 (Underweight)	1.17 (0.46-2.99)	0.76
18.5 - <25.0 (Normal)	1.00 (Reference)	
25.0 - <30.0 (Overweight)	0.69 (0.46-1.11)	0.11
30.0 - <35.0 (Obesity)	0.687 (0.37-1.28)	0.236
≥35 (Severe Obesity)	0.27 (0.10-0.78)*	0.015*
BMI (kg/m²)	0.94 (0.90-0.98)	0.002*

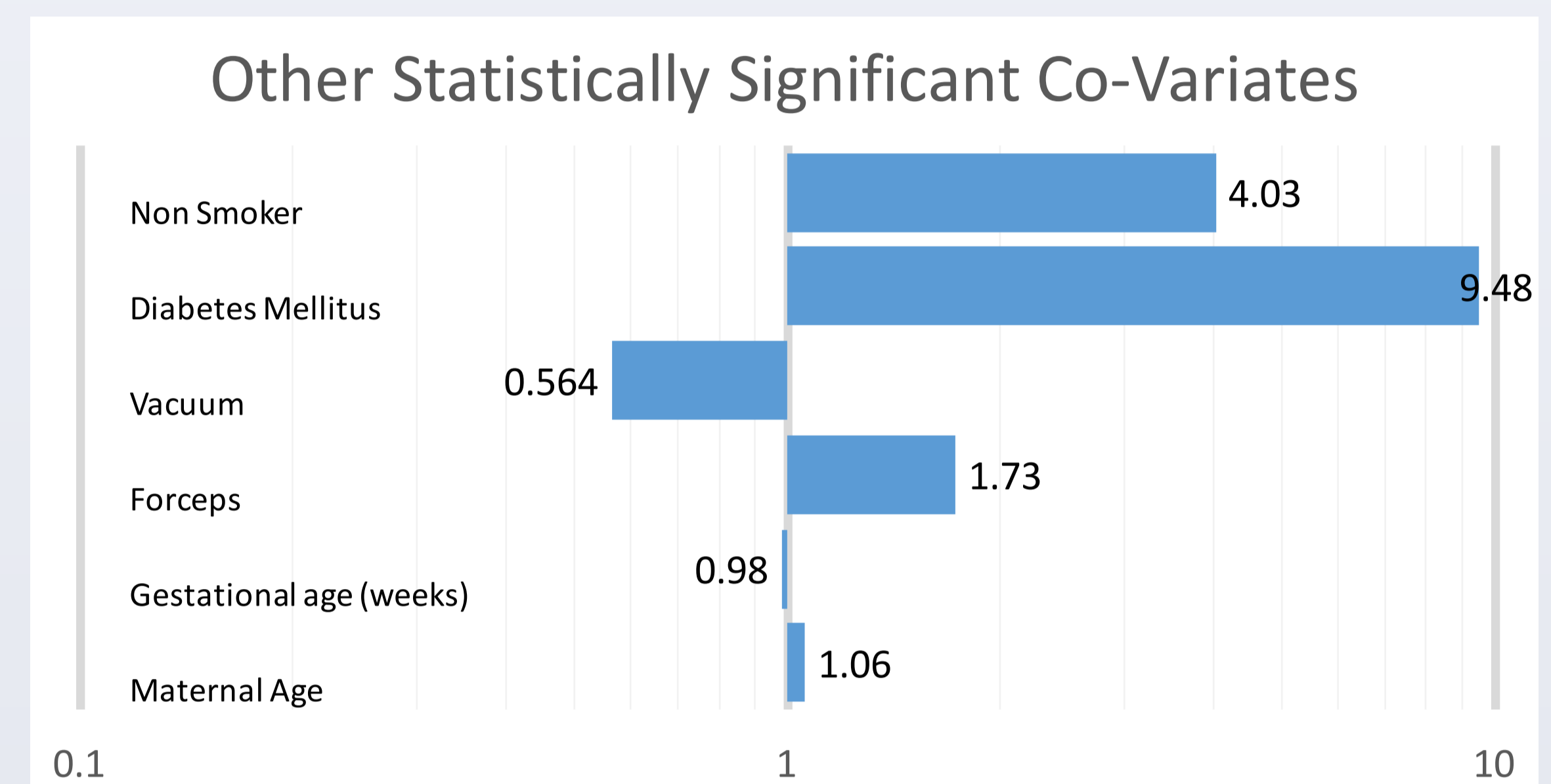


- Women with BMI ≥25 were **significantly less likely** to develop OASIS compared to women with BMI <25 (aOR 0.60, 95% CI 0.41-0.89, p value 0.011).
- In subgroup analysis, there was a **reduction in odds** of sustaining OASIS with each **increase in BMI class**.
- Women with BMI ≥35 had a significant reduction in odds of sustaining OASIS compared to normal weight women (aOR 0.27, 0.10-0.78, p value 0.015).
- For each unit of increase in body mass index (kg/m²), there was an approximate decrease in **odds of 6%** of sustaining OASIS (aOR 0.94, 0.90-0.98, p value 0.002).

Other statistically significant risk-factors for OASIS in multivariable logistic regression were:

- Forceps delivery** (aOR 1.73 95% CI 1.11-2.69)
- Non-smokers** (aOR 4.03, 95% CI 1.46-11.1)
- Maternal diabetes mellitus** (aOR 9.48, 95% CI 2.17-41.42)
- Maternal age** (years) (aOR 1.06 95% CI 1.03-1.10)
- Birth weight** (grams) (aOR 1.00, 95% CI 1.00-1.00)

Study covariates	Adjusted OR (95% CI)	p-value
Maternal Age (years)	1.06 (1.03-1.10)	0.000*
Birth Weight (grams)	1.00 (1.00-1.00)	0.000*
Gestational age (weeks)	0.98 (0.85-1.19)	0.848
Duration of active second stage (mins)	1.00 (0.999-1.003)	0.324
Birth Mode		
Forceps	1.73 (1.11-2.69)*	0.015*
Vacuum	0.564 (0.29-1.09)	0.087
Non-instrumental (Reference)	1.00 (Reference)	
Pre-existing Diabetes mellitus		
Diabetes mellitus	9.48 (2.17- 41.42) *	0.003*
Smoking		
Non smoker	4.03 (1.46-11.1) *	0.007



DISCUSSION

- Our results are similar to those from international studies^{1,5}
- Current proposed mechanisms for the **protective effect** of obesity on OASIS:
 - Distance** between the anal sphincter and vagina is significantly longer in obese women⁶
 - Increased **adipose** tissue and different composition of the perineum may allow more stretching⁵
 - Changes to **collagen, skin laxity and mechanical properties**, proposed thicker subcutaneous layer⁷
 - Metabolic changes leading to decreased **calcium** influx into myometrial muscle and myometrium contracts with less force and frequency¹
 - Oxytocin and oestrogen receptor efficacy** in smooth muscle is regulated by **cholesterol**, which is raised in serum and myometrium of obese women¹
- Further research could investigate the mechanism of this protective effect

CONCLUSIONS

- Women with BMI ≥25 were **less likely** to sustain OASIS compared to women with BMI <25.
- The **odds of sustaining OASIS decreased with each increase in BMI class**, which was statistically significant for severe obese women compared to normal weight women.
- These findings warrant further research in larger Australian populations and into the mechanism of this protective effect.
- This research furthers our understanding of women at higher risk of OASIS and has clinical relevance when counselling women about delivery options.

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Email: laura.constable@easternhealth.org.au