Development of symptomatic pelvic organ prolapse over 10 years of mid-life follow-up is affected by occupational load-bearing for parous women

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Acknowledgements

- I acknowledge the land we are meeting on is the traditional territory of many nations including the Mississaugas of the Credit, the Anishnabeg, the Chippewa, the Haudenosaunee and the Wendat peoples and is now home to many diverse First Nations, Inuit and Métis peoples. I also acknowledge that Toronto is covered by Treaty 13 with the Mississaugas of the Credit

- Dr Erin Brennand, Natalie Scime PhD candidate

2

Introduction

- POP is common
  - 3-8% based on symptoms; 50% based on exam
- Peak prevalence in peri—menopausal years
- Risk factors
  - Parity, vaginal delivery, older age, high BMI, smoking
  - Chronic increases in intra-abdominal pressure and transmission onto pelvic floor
    - Chronic cough
    - Constipation
    - Heavy lifting
- Existing literature exploring **occupational lifting** and POP → conflicting results

3

Objective

In a cohort of diverse mid-life women:

- Document the risk of new-onset symptomatic POP
- Examine whether **occupational exposure to load-bearing** is a significant risk factor in the development of **symptomatic POP over a 10-year follow-up** window

4

Methods

5

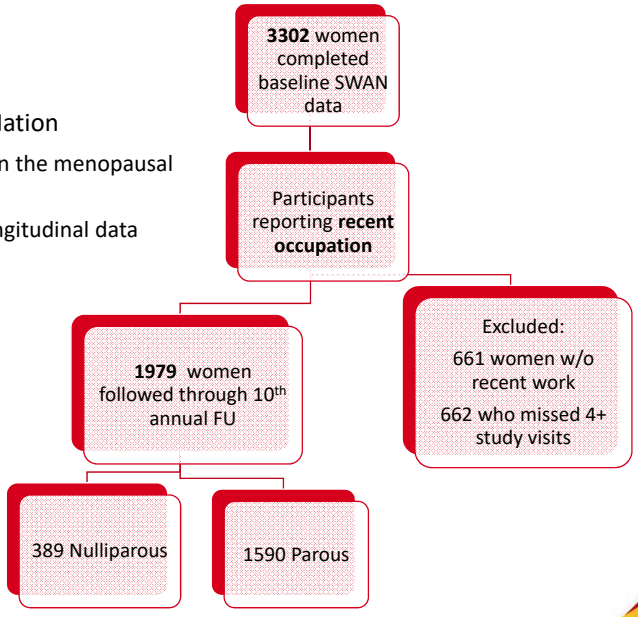
SWAN

- Study Participants
  - Eligibility:
    - 42-52
    - Identify with one of each site's designated racial/ethnic groups
    - Speak + read one of the designated languages
  - Exclusion:
    - No menses >3 mo before enrolling
    - Hysterectomy or BO before enrolling
    - Current pregnancy or lactation
    - Hormone use within 3mo

6

Study Population

- Study of Women's Health Across the Nation
  - Multiethnic, multisite, cohort study on the menopausal transition
  - Secondary analysis of prospective, longitudinal data



Exposure

- Occupational load-bearing in
  - Heavy **lifting**: "On a typica
    you **lift** heavy loads great
    than the weight of 2 gallo
  - Heavy **pushing**: "On a typical day/shift, how often do you **push** or move heavy equipment?"

FREQUENCY OF LIFTING AND/OR PUSHING

Never - "never" to *both* pushing & lifting

Infrequently - "never" or "less than half the time" to either

Frequently - "half the time", "more than half the time", or "always" to either

Never
Less than half the time
Half the time
More than half the time
Always

TYPE OF EXPOSURE: LIFTING

Never: "never"

Less than half the time: "less than half the time"

Half the time or more: "half the time", "more than half the time", or "always"

TYPE OF EXPOSURE: PUSHING

Never: "never"

Less than half the time: "less than half the time"

Half the time or more: "half the time", "more than half the time", or "always"

Outcomes

- 1°: development of symptomatic POP during mid-life over 10-year follow-up
  - **"Yes"** to: "Since your last study visit, have you had Pelvic prolapse or relaxation (the uterus, bladder, or rectum drops, sometimes bulging out of the vagina)?"

9

Statistical Analyses

- Covariates
  - Baseline age, parity, mode of delivery, BMI, race and ethnicity, family income
- Initial analyses: evaluate for effect modification by nulliparous vs parous status
- 1° Outcome – development of symptomatic POP during-midlife and **frequency** of load-bearing
  - Poisson regression, cRR and aRR (95% CI)
  - Sub analysis - development of symptomatic POP by exposure **type** (pushing vs lifting)

10

Results

- Effect modification did exist for parity; main analyses were conducted for parous women.
- 8.2% of 1590 parous women reported development of symptomatic POP

Characteristics of mid-life parous women by occupational load-bearing exposure

	Never n=799	Infrequent n=576	Frequent n=215	Standardized difference relative to "Never"	
				Infrequent	Frequent
Age at cohort entry (mean)	45.9	46.1	45.7	-0.05	0.08
BMI at cohort entry (mean)	27.5	27.9	29.3	-0.06	-0.24
Race and Ethnicity					
Black	29.1%	25.8%	40.6%	0.21	0.26
Chinese	11.1%	11.1%	7.8%		
Hispanic	2.1%	0.2%	2.6%		
Japanese	11.1%	10.5%	8.3%		
White	46.4%	52.3%	40.6%		
Smoking					
Never	62.3%	66.0%	61.4%	0.09	0.13
Past	23.7%	23.1%	20.9%		
Current	14.0%	10.9%	17.7%		
Family income range					
<$19,999	6.9%	8.2%	15.3%	0.10	0.58
$20,000-$49,999	32.3%	32.9%	48.8%		
$50,000-$99,999	42.0%	39.7%	29.3%		
$100,000 or more	18.5%	18.5%	6.0%		
Unknown/Missing	0.3%	0.7%	0.5%		
Parity (median, IQR)	2 (2,3)	2 (2,3)	3 (2,3)	-0.06	-0.41
Delivery types					
All Vaginal Deliveries	77.1%	77.2%	80.8%	0.01	0.18
All Caesarean Sections	8.5%	8.9%	10.8%		
Vaginal & CS	14.3%	13.9%	8.5%		

13

Development of symptomatic POP in mid-life parous women by occupational load-bearing frequency and type

	n/N	Crude RR	Adjusted RR*
Never Occupational Load-Bearing	52/799		
Infrequent	50/576	1.33 (0.92 – 1.94)	1.51 (1.04 – 2.20)
Frequent	30/215	2.14 (1.40 – 3.27)	2.03 (1.29 – 3.17)
Never Pushing	80/1051		
Pushing Less than Half the Time	38/403	1.24 (0.86 – 1.79)	1.34 (0.93 – 1.93)
Pushing Half the Time or More	14/136	1.35 (0.79 – 2.31)	1.22 (0.72 – 2.08)
Never Lifting >15 lbs	60/880		
Lifting >15 lbs Less than Half the Time	42/501	1.23 (0.84 – 1.80)	1.42 (0.97 – 2.08)
Lifting >15 lbs Half the Time or More	30/210	2.10 (1.39 – 3.16)	1.96 (1.27 – 3.03)

*Adjusted for age, BMI, parity, delivery modes, smoking status, race and ethnicity, income

14

Symptomatic POP that impacts daily life in mid-life parous women by occupational load-bearing frequency

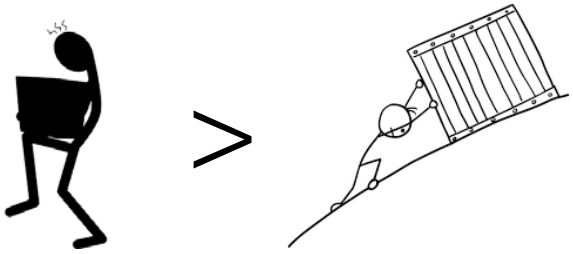
	n/N	Crude RR	Adjusted RR**
Never Occupational Load-Bearing	8/799		
Infrequent Occupational Load-Bearing	8/576	1.39 (0.52 – 3.68)	1.59** (0.64 – 3.95)
Frequent Occupational Load-Bearing	9/215	4.18 (1.63 – 10.71)	3.70** (1.36 – 10.05)

** Adjusted for age, BMI, parity, delivery modes, race and ethnicity

15

Discussion

- Parous women in SWAN cohort exposed to occupational load-bearing were more likely to develop symptomatic POP
  - Graded relationship with **frequency** of load-bearing
    - Infrequent: 1.51-fold risk
    - Frequent: 2.03-fold risk
- **Lifting >15lbs** appeared to be a bigger risk factor than heavy pushing



17

Strengths

- Generalizable to other mid-life women
- Translates across many occupations
- Acknowledges effect modification by parity
- Increasing frequency categories and graded relationship fits with biomechanical impacts

Limitations

- Cannot generalize to nulliparous women or those with hysterectomy
- Lacked information on exercise history, fitness capacity, pelvic floor muscle function
- Some in "Never" category may previously have been exposed to occupational load-bearing

18

Take Home Points

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Parous women exposed to frequent occupational load-bearing are at **2x the risk** of developing POP in mid-life

Lifting on the job appears to be a stronger risk factor

Mitigation strategies are needed for women in physically demanding jobs, to reduce risk of POP in the mid-life period

Top 5 Occupation Groups by OLB Frequency

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Never n=799	Infrequent n=576	Frequent n=215
Managers & Administrators, (n=161)	Teaching, (n=108)	Nursing, (n=21)
Teaching (n= 93)	Managers & administrators, (n=101)	Nursing aides & orderlies (n=18)
Secretarial & Office Work (n= 85)	Nursing (n=39)	Childcare (n= 15)
Accounting / Financial Officer (n = 68)	Secretarial & Office Work, (n=35)	Machine operators (n=13)
Social work (n = 25)	Sales, (n=25)	Postal and shipping (n=12)

20