Abstract Form

Abstract Title:

Association of antenatal urinary incontinence with ethnicity and pelvic floor muscle elasticity in a cohort of women in New Zealand.

Abstract Text:

Hypothesis / aims of study

Pregnancy and childbirth are known risk factors for the development of urinary incontinence (UI), with the onset of UI during pregnancy being strongly predictive of post partum UI (1). A recent study on the prevalence of UI in pregnancy among a multi-ethnic population in Norway demonstrated a wide variation in prevalence, but a significantly higher percentage of women of European origin (45%) experience some involuntary leakage compared to only 26% of African origin (2). The overall prevalence of UI in pregnancy is reported to vary between 18% and 60%, with prevalence increasing with gestational age (3). The predominant ethnic groups in New Zealand consist of peoples of Pacific Island (PI) and European origin. Reported incidence of UI in these two ethnic groups is generally higher for Pacific Islanders than European (4). Whilst many epidemiological studies have defined statistical relationships between risk factors for UI, the underlying mechanisms remain elusive. There is speculation that ethnic variability may be related to differences in collagen and muscle morphology, but knowledge is scant (1). We have previously developed an elastometer in order to quantify the elasticity of the pelvic floor muscles, which is linked to the passive element (collagen) of skeletal muscle. Our aim is to determine if elasticity of the pelvic floor muscles is related to ethnicity and/or the prevalence of UI in primiparous women at 36 weeks to 39 weeks gestation.

Study design, materials and method

This is part of an ongoing prospective, quasi-experimental, pre- and post-test cohort study. The primary outcome is to investigate associations between ethnicity and levator ani elasticity with avulsion injury following vaginal delivery. Secondary outcomes include any association of these parameters with symptoms of pelvic floor dysfunction. Inclusion criteria include primiparous women, singleton pregnancy, > 18 years of European or Maori/Pacific Island descent. All participants are seen twice; the initial assessment is between 36 weeks and 39 weeks gestation and again 3 months to 5 months post partum. At each visit, participants complete the ICI questionnaires on bladder, bowel and prolapse symptoms, undergo a transperineal ultrasound scan, elastometry testing, and digital palpation for Modified Oxford Score grading of the pelvic floor muscle.

Demographic data and delivery outcomes such as length of second stage labour, birth weight, and mode of delivery are collected. As this is an ongoing study, only the secondary outcomes related to UI will be presented here. UI is defined according to the International Continence Society as 'any involuntary leakage' (1). Elastometry of the pelvic floor muscle is calculated using previously defined protocols; higher values are suggestive of less compliant tissue (5).

Results

To date 156 women have enrolled in the study (95 European, 61 Maori/PI). Prevalence rates for UI have been calculated from the UDI-SF (n = 95 European, n = 56 PI/Maori Total = 151). Demographic data are presented in (Table 1).

	European	**PI/Maori**	***p*-value**
Age (years, mean ± SD)	29.1 ± 5.9	24.0 ± 4.7	< 0.01*
BMI (kg/m^2, mean ± SD)	29.7 ± 5.1	33.0 ± 6.3	< 0.01*
Antenatal Elastometry (N/m, mean ± SD)	341 ± 154	290 ± 99	0.04*
Antenatal Smoking (%)	2.2	19.7	< 0.01†
Antenatal Alcohol (%)	1.1	1.6	NS†
Antenatal UI (%)	67.4	66.1	NS†

Table 1: Demographic data, elastometry measures, urinary incontinence (UI), smoking and alcohol prevalence in European and Maori/Pacific Island women in their third trimester. * (t-test); † (Fisher's Exact Test)

The European group were significantly older, had lower BMI, consume less alcohol and do not smoke as much as Maori/PI during their pregnancy. There was no significant difference in the prevalence of incontinence in the Maori/PI women compared to the European group. Despite the significant difference in antenatal elastometry measures between Maori/PI and European women (p = 0.04), when stratified by continence status, according to ethnicity, the elastometry measures were no longer significant. (Table 2).

	Continent, *n* = 27	**Incontinent, *n* = 75**	***p*-value**
European, *n* = 62	366 ± 149	332 ± 157	NS‡
Maori/PI, *n* = 40	293 ± 104	297 ± 96	NS‡

Table 2: Mean and SD of elastometry measures (N/m) between Continent and Incontinent Maori/Pacific Island (M/PI) and European women at 36-39 weeks gestation ‡(two-way ANOVA showed no significant effect for the main effects of ethnicity and continence state (p>0.05), nor for their interaction (p>0.05).

Antenatal BMI was the only variable which was significantly associated with urinary incontinence at 36 weeks to 39 weeks gestation. (p < 0.01 95% CI -4.51 to -0.842) This finding is consistent with previous literature (3).

Interpretation of results

Our data shows that any effect of muscle stiffness related to ethnicity is outweighed by pregnancy itself by 36 weeks. The high prevalence rates of UI observed in this study, and the predictive association of BMI with UI is consistent with that previously reported in the late third trimester (3). Although there were no observed statistical differences in the stiffness measures of the pelvic floor antenatally between incontinent and continent women, elastometry measures continue to be measured postnatally. It remains to be seen if elastometry is related to postnatal UI or ethnic group.

Concluding message

Stiffness of the pelvic floor muscle late in the third trimester is not related to prevalence of UI in this ethnically mixed cohort of women. However, as recruitment is ongoing, the association of stiffness and UI postnatally will be of interest.

BMI is known to have a significant effect on UI development. Thus dietary advice should be an important aspect of antenatal care, including the potential relationship to postnatal incontinence.

References:

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