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Can women correctly contract their pelvic floor muscles without formal instruction?

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Abstract

Objectives—It is unknown how many women presenting for primary care can appropriately contract their pelvic floor muscle (PFM) or whether this ability differs between women with or without pelvic floor disorders. We sought to describe the proportion of women who initially incorrectly contract the PFM, and how many can learn after basic instruction.

Methods—This cross-sectional study enrolled 779 women presenting to community based primary care practices. During PFM assessment, research nurses recorded whether women could correctly contract their PFM after a brief verbal cue. We defined POP as prolapse to or beyond the hymen and SUI as a score of > 3 on the Incontinence Severity Index.

Results—PFM contraction was done correctly on first attempt in 85.5%, 83.4%, 68.6%, and 85.8% of women with POP, SUI, both POP and SUI and neither POP nor SUI, respectively (p=0.01 for difference between POP and SUI versus neither POP nor SUI). Of 120 women who initially incorrectly contracted the PFM, 94 (78%) learned after brief instruction. Women with POP were less likely to learn than women with neither POP nor SUI (54.3% vs. 85.7%, p=0.001). Increasing vaginal delivery and decreasing caffeine intake (but not age or other demographic factors) were associated with incorrect PFM contraction; only decreased caffeine intake remained significant on multivariable analysis.

Conclusions—Most women with no or mild pelvic floor disorders can correctly contract their PFM after a simple verbal cue, suggesting that population-based prevention interventions can be initiated without clinical confirmation of correct PFM technique.

Keywords

Pelvic Organ Prolapse; Stress Urinary Incontinence; Pelvic Floor Muscles; kegel exercise

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Introduction

Pelvic organ prolapse (POP) and stress urinary incontinence (SUI) are common in women.[1,2,3] Many do not seek medical intervention, but by the age of 80 nearly 11% will undergo surgery for POP or SUI[4]. The medical and social costs for these conditions are great and growing. Estimates of direct costs of POP and SUI surgery exceed one billion dollars[5] and costs for ambulatory care related to female pelvic floor disorders in 2006 exceeded $410 million[6]. Given these high rates of prevalence and cost, population based interventions must be better elucidated and evaluated.

Present interventions for POP are based on the understanding that the downward movement of the pelvic organs is caused by a lack of pelvic floor muscle support, resulting in a widening of the genital hiatus and stretching of the connective tissue. As its pathogenesis begins with the loss of support of the pelvic floor musculature (PFM), training these muscles with or without biofeedback has been found to be an effective therapy with almost no adverse consequences[7]. Multiple trials have attempted to determine the most efficacious PFM training programs but with wide and varying results. However, a recent Cochrane review suggests patients offered frequent appointments during the training period were more likely to report improvement than women doing pelvic floor muscle training with little or no supervision[8].

Other investigators have found that a sizeable minority of women with SUI seeking medical care are unable to initially contract their pelvic floor muscles correctly. When asked to “squeeze as if trying to stop the flow of urine”, about a third of women initially contract the gluteal, hip adductors, or abdominal muscles, rather than the levator ani muscles.[9,10,11,12,13] Therefore, women with SUI are advised to seek medical help before beginning a program of pelvic floor muscle exercises, such that they can first be properly educated on contraction technique.

An optimal prevention program would not require a medical intervention before implementation. It is not known whether all women have a significant rate of incorrect pelvic muscle contraction or whether this is limited to women with stress incontinence seeking medical advice. If women in the general population with or without stress incontinence or pelvic organ prolapse do contract their muscles correctly after one verbal cue, community prevention efforts would not need to include a pelvic examination by a trained medical professional to ensure correct technique.

Therefore, the aims of this cross-sectional study were to determine, in a group of women presenting for primary care unrelated to pelvic floor disorders:

1. the proportion that can correctly contract PFM on the first prompt, prior to basic instruction, and whether this differs in women with and without POP or SUI
2. and, of women who initially incorrectly contract their PFM, the proportion that then can correctly contract their PFM after basic instruction.

Material and Methods

Participants were part of a cross-sectional study that recruited women presenting to roughly 20 primary care level gynecological and family practice clinics in the Salt Lake City area between October, 2008 and February, 2012. Women were asked to participate when they presented for annual exam or through mailings from their clinic. Participants agreed to answer a questionnaire and undergo a brief pelvic exam as part of the PHysical ACtivity Study (PHACTS)[14]. Participants underwent Pelvic Organ Prolapse-Quantification (POP-Q)

examinations and Brinks pelvic muscle assessment by Registered Nurses trained by a single provider to administer the evaluation in a consistent and reproducible manner.[15,16]

On initial evaluation, the research nurses recorded whether women could correctly contract the PFM after hearing a brief verbal prompt, “Now please squeeze the muscles in the vagina and hold like you are holding urine”. A contraction was considered correct if the researcher felt inward pressure or upward traction on the examining finger in the vagina, without accompanying significant valsalva or gluteal squeeze. If incorrect (ie, no contraction or valsalva only), the research nurse gave brief instructions, “Please relax, now I want you to use your vaginal muscles instead of your bottom muscles.” The researcher recorded whether the woman could then learn to contract the PFM correctly.

Data collected included age, body mass index (BMI), ethnicity, educational level, parity, route of delivery, menopausal status, hormone replacement, chronic cough (by answering “yes” to the question “Has a doctor or other health care provider ever told you that you have a chronic cough?”), smoking (by answering “yes” to the question “Are you a current smoker?”), caffeine intake (by answering either [1] never or less than once per month, [2] at least monthly but not as often as everyday, [3] one to three times per day, or [4] more than three times per day to the question “In the last three months, about how often did you drink a cup of coffee, tea, or caffeinated soft drink?”), previous hysterectomy, and health status. Women were defined as postmenopausal when their last menstruation had occurred at least 12 months previously or if they had surgery removing both ovaries. For this analysis, pelvic organ prolapse was defined as maximal vaginal descent at or below the hymen (>/=0 cm) on Pelvic Organ Prolapse Quantification (POPQ) examination. Stress Urinary Incontinence was defined as both a score of >/= 3 on the Incontinence Severity Index[17,18] and predominant SUI symptoms by answering “yes” to leaking urine most often during the last 3 months when “performing some physical activity, such as coughing, sneezing, or lifting or exercise”.[19] While not relevant to this analysis, women in the parent study completed the Epidemiology of Pelvic and Incontinence Questionnaire (EPIQ)[20] and the Lifetime Physical Activity Questionnaire (LPAQ)[21].

Univariate analysis was used to test associations between correct and incorrect PFM contraction and the above variables. T-Test analyses were used for continuous variables and chi-square or Fisher’s Exact test for categorical variables. Finally, step-wise multiple logistic regression was employed to analyze factors associated with incorrect PFM contraction, with confirmation by principal components logistic regression to address a possible multicollinearity issue. Analysis was performed using SAS version 9.3.

Results

779 women met inclusion criteria. 166 women had POP and no SUI (21.3%), 133 had SUI and no POP (17.1%), 35 had both POP and SUI (4.5%) and 445 had neither POP nor SUI (57.1%). Demographic characteristics of the group are summarized in Table 1. PFM contraction was done correctly on the first attempt in 85.5%, 83.4%, 68.6%, and 85.8% of women with POP, SUI, both POP and SUI, and neither POP and SUI, respectively (Table 2). There was a significant difference in ability to contract correctly (P=0.01) for patients with POP and SUI compared to those with neither POP nor SUI. On univariate analysis, only increasing vaginal delivery and decreasing caffeine intake were associated with incorrect PFM contraction (Table 3). However, on multivariable analysis, only caffeine intake remained significantly associated with PFM contraction. A total of 530 (68.3%) of women drank at least one caffeinated drink per day and 246 (31.7%) drank this amount less than once a day; women that consumed more caffeinated beverages were **less** likely to demonstrate incorrect PFM contraction (OR 0.56, 95% CI 0.37, 0.87), when adjusted for

number of vaginal deliveries and other variables. This result was confirmed by principal components logistic regression.

Of the 120 women who initially incorrectly contracted the PFM, 94 (78%) learned after further brief instruction. Fewer women with POP were able to learn than women with neither POP nor SUI (54.3% vs. 85.7%, p=0.001). There was no such difference between women with SUI versus those with neither POP nor SUI (88.0% vs. 85.7%, p=1.00).

Discussion

PFM training has been shown to improve SUI and POP[22,23]. Studies that have evaluated a woman's ability to correctly contract the PFM after a simple cue have not been done in primary care or community level women. [24,25,26] Because a substantial minority of women seeking medical help for SUI are unable to contract the PFM correctly, it has been proposed that only a trained medical professional can assist in the evaluation and learning of proper contraction technique. However, our study demonstrates that most women examined in primary care clinic settings can correctly contract the PFM on initial exam and, for those who do not, can learn after a simple verbal cue.

Our population was not a 'disease-free' one. Many women with early symptoms or signs of SUI or POP do not present for treatment and indeed nearly one-half of women in our population had symptoms of SUI or prolapse to or beyond the hymen. In this population, other than those with both clinical POP and SUI, the vast majority (83–86%) contracted their PFM correctly with the first cue. This cue is consistent with what women might read in self-help information and supports the goal of less resource dependent training programs than that provided by physical therapy or physician offices. The fact that 1 in 6 women in the community may do PFM exercises incorrectly might prompt some to still recommend professional evaluation before embarking on a course of PFM training. However, given that most of these women will not present to a pelvic floor specialist, more will receive 'treatment' and the chance of harm in those who do not is low. Further, all women could be easily screened for by a primary care physician during an annual exam to confirm correct technique. The vast majority of women unable to contract correctly initially learn after a very brief secondary prompt. However, we did find a difference in the ability of women with POP to be able to learn compared to women with neither POP nor SUI. This finding implies that women with POP who initially do not contract their PFM correctly would likely benefit from a more rigorous PFM training program and would not be served as well by a simple community based setting.[27]

Within our study population, there was also no difference between ability to contract the PFM and age, BMI, smoking, chronic cough, history of hysterectomy, race, education, parity, menopause, or health status. While increasing vaginal delivery was associated with incorrect initial PFM contraction, on multivariable analysis this association was lost. This finding is consistent with a recent Dutch population based study but unlike the Dutch study we found no association between decreasing PFM contraction and increasing age[28].

We found that drinking at least one serving of a caffeinated beverage a day is associated with ability to correctly contract the PFM. This association has not been previously defined in the literature. We propose that women drinking caffeinated beverages have trained themselves to engage their PFM through the diuretic effects of such drinks, thus conditioning themselves to correctly utilize their PFM. Further studies are needed to confirm this association.

Strengths of this study include its large sample size and primary care based population. However, generalizability is limited by the fact that the great majority of women in our

study were highly educated, white, and non-smokers and similar results may not apply to other populations.

In conclusion, most women examined in primary care clinic settings can correctly contract their PFM after a simple verbal cue. However, those with both POP and SUI do not contract as well as the other populations on initial prompt. Most women who initially incorrectly contract their PFM can learn after basic instruction, though those with POP have a lower likelihood of learning. This cross sectional study demonstrated that population-based prevention interventions can be initiated without clinical confirmation of correct PFM technique. We recommend evaluation of whether our results apply in other more diverse populations. Further studies are needed to understand whether PFM exercises done in a community setting without personal training will improve outcomes.

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Table 1

Characteristics of the study population

	Total population (n=779)*
*POP no SUI**	166 (21.3%)
SUI no POP	133 (17.1%)
POP + SUI	35 (4.5%)
POP or SUI or both	334 (42.9%)
No POP no SUI	445 (57.1%)
Age	50.3 ± 6.8
Menopause	328 (44.4%)
Body mass index	26.0 ± 4.8
Education:	
(1)High school or less	88 (11.3%)
(2)Some college or college grad	465 (59.7%)
(3)Grad/Prof degree	226 (29.0%)
Race:	
(1)White	729 (94.3%)
(2)Other	44 (5.7%)
Vaginal delivery, continuous	1.85 ± 1.71
Vaginal delivery by category	
Zero	237 (30.9%)
1 or 2	291 (37.9%)
3 or more	239 (33.8%)
Total parity, continuous	2.2 + 1.7
Total parity by category	
Zero	149 (19.4%)
1 or 2	338 (44.1%)
3 or more	280 (36.5%)
Hysterectomy	100 (12.9%)
Current Smoker	29 (3.7%)
Caffeine Consumption	
Not everyday	246 (31.7%)
At least once per day	530 (68.3%)

	Total population (n=779)*
Chronic Cough	12 (1.5%)
Health status	
Excellent or verygood	609 (78.4%)
Good or less	168 (21.6%)
Able to contract pelvic floor muscles	659 (84.6%)

* POP= pelvic organ prolapse; SUI=stress urinary incontinence. N changes slightly due to missing values. Percents are out of nonmissing values.

Table 2

Ability to contract pelvic floor muscles (PFM) by pelvic floor condition

	Unable to contract PFM	Able to contract PFM	P Value
POP no SUI	24 (14.6%)	142 (86.6%)	0.16
SUI no POP	22 (16.5%)	111 (83.5%)	0.55
POP and SUI	11 (31.4%)	24 (68.6%)	0.01
SUI or POP or both	57 (17.1%)	277 (82.9%)	0.27
No POP no SUI*	63 (14.2%)	382 (85.8%)	

*Reference group for 'POP no SUI', 'SUI no POP', 'POP and SUI', and 'SUI or POP'

Table 3

Factors associated with incorrect PFM contraction

Variable	Correct PFM contraction N (%)	Incorrect PFM contraction N (%)	OR (95% CI)	P Value
Univariate Analysis				
Age (mean, SD)	50.3 ± 6.8	50.2 ± 6.9	0.97 (0.7,1.3) for change of 10 years of age	0.83
BMI (mean, SD)	26.1 ± 4.8	25.9 ± 4.9	0.9 (0.6,1.4) for a change of 10 units of BMI	0.79
Current Smoker				
Yes	27 (93.1)	2 (6.9)	2.5 (0.6,10.7)	0.21
No	632 (84.3)	118 (15.7)		
Caffeine				
At least once per day	463 (87.4)	67 (12.6)	0.527 (0.354, 0.784)	0.002
Not everyday	193 (78.5)	53 (21.5)		
Hysterectomy				
Yes	81 (81.0)	19 (19.0)	1.3 (0.8, 2.3)	0.28
No	575 (85.2)	100 (14.8)		
Race				
White	618 (84.8)	111 (15.2)	1.3 (0.5, 3.3)	0.60
Other	36 (81.8)	8 (18.2)		
Education				
Grad/prof degree	196 (86.7)	30 (13.3)	0.883 (0.437, 1.784)	0.45
College or college grad	388 (83.4)	77 (16.6)	1.145 (0.605, 2.166)	0.37
High school or less	75 (85.2)	13 (14.8)		
Vaginal deliveries, continuous (mean, SD)	1.79 ± 1.67	2.15 ± 1.88	NA	0.04
Vaginal deliveries, categorical				
3 or more	195 (81.6)	44 (18.4)	1.7 (1.01, 2.8)	0.11
1 or 2	244 (83.9)	47 (16.2)	1.4 (0.9, 2.4)	0.62
0	209 (88.2)	28 (11.8)		
Total parity, continuous (mean, SD)	2.2 ± 1.6	2.4 ± 1.9	NA	0.24
Total parity, categorical				
3 or more	232 (82.9)	48 (17.1)	1.33 (0.76, 2.35)	0.30
1 or 2	287 (84.9)	51 (15.1)	1.15 (0.66, 2.00)	0.97
0	129 (86.6)	20 (13.4)		
Menopause				
Yes	280 (85.4)	48 (14.6)	0.88 (0.59, 1.32)	0.54
No	344 (83.7)	67 (16.3)		

Variable	Correct PFM contraction N (%)	Incorrect PFM contraction N (%)	OR (95% CI)	P Value
Chronic cough				
Yes	11 (91.7)	1 (8.3)	0.5 (0.1,3.9)	0.50
No	648 (84.5)	119 (15.5)		
Health status				
Good or less	141 (83.9)	27 (16.1)	1.08 (0.67, 1.72)	0.76
Excellent	517 (84.9)	92 (15.1)		