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## Gender-specific differences of normative values of pelvic floor muscle function in healthy adults population: an observational analytical study

Iman Akef Khowailed

*University of St. Augustine for Health Sciences, ikhowailed@usa.edu*

Heather Disney

*University of St. Augustine for Health Sciences, hdisney@usa.edu*

Haneul Lee

*Gachon University, South Korea, leehaneul84@gachon.ac.kr*

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# Gender-specific differences of normative values of pelvic floor muscle function in healthy adults population: an observational analytical study

Iman Akef Khowailed , Heather Disney & Haneul Lee  
University of Saint Augustine

## Introduction

Female pelvic floor dysfunction (FPFD) is a common disease which has become one of the five common chronic diseases threatening women's health (Gachon et al. 2019). As the supporting structures, pelvic floor muscle (PFM) is critical to support the pelvic organs, maintain continence, and prevent prolapse. The quantitative evaluation of PFM function is of great value for the diagnosis and treatment of FPFD (Gachon et al. 2019). The demographics and the prevalence of pelvic floor dysfunction are well understood but there are no data on the normative values of PFM function and the preventive measures needed to serve this population (Jundt, Peschers, and Kentenich 2015).

## Purpose

To describe the normal reference values of PFM function in females and males of a healthy adult population using transabdominal ultrasound.

## Participants

A total of 200 healthy adults, including 71 males and 129 females participated in this observational analytical study. Subject were included in the study if they were healthy females or males aged 20–45. Exclusion criteria were (a) previous pregnancy, (b) previous pelvic surgery, (c) pelvic prolapse, (d) spinal surgery, (e) prostate cancer, (f) urinary tract infection, (g) breast feeding, (h) urinary incontinence, (i) radiation therapy, and (j) pelvic pain. Subjects were screened and were free of any PFDs. Physical activity questionnaire was also administered to assess the physical activity intensity levels and it was converted to MET value for analysis.

## Methods

Bladder base displacement was measured using a sagittal curved linear array 2–5 MHz transducer over the suprapubic region. The amount of bladder base movement on ultrasound was measured in all subjects from freeze frame ultrasound images and considered as an indicator of PFM function.



Fig 1. Set up for the ultrasound measurement

## Results

Statistical analysis revealed a significant difference in transabdominal ultrasound measurement for PFM function ( $p = .00000$ ). The bladder base displacement was significantly greater in males compared to females ( $0.65 \pm 0.42$  vs.  $0.38 \pm 0.35$ ,  $p < .001$ , 95% CI:0.16–0.38).

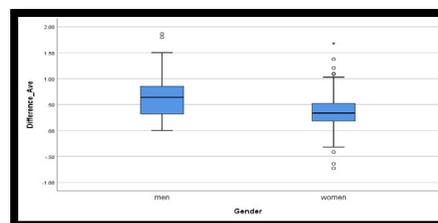


Figure 3. Average bladder base displacement of men and women

\*2 outliers were found in men

\*8 outliers and 1 extreme outlier were found in women

## Results

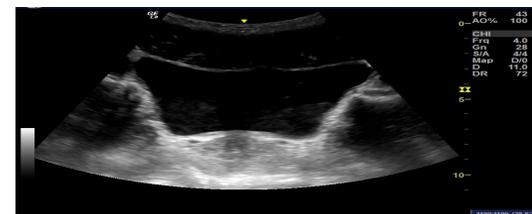


Fig 2A. Bladder base during resting position.

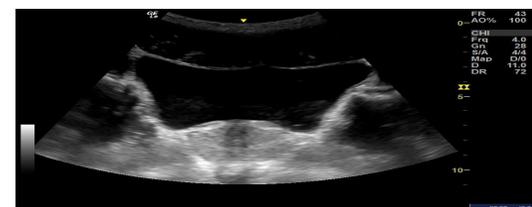


Fig 2B. Bladder base displacement during pelvic floor muscle contraction.

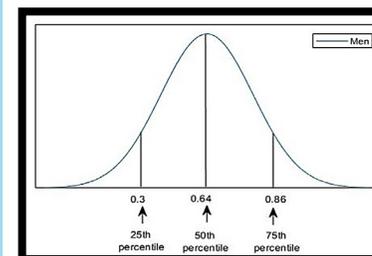


Fig 4. Normative PFM parameter in men

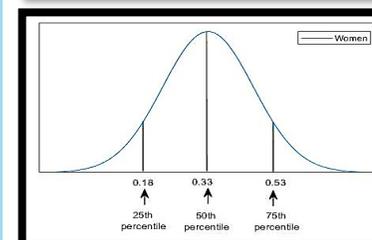


Fig 5. Normative PFM parameter in women

## Discussion and conclusions

- This observational analytical study is the first to reveal gender specific differences of the PFM function in healthy adult population.
- It also provides a stratification model for the PFM function in a normal distribution of a large sample of a healthy population.
- The study findings allow a reference baseline data to have an objective method for a clinical measure and establish appropriate plan of care. This stratification model will help to identify patients who are at risk for developing PFDs

All procedures and protocols were approved by Institutional Review Board of the university of saint Augustine, San Marcos, California.

## References

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- Jundt, K., U. Peschers, and H. Kentenich. 2015. The investigation and treatment of female pelvic floor dysfunction. *Deutsches Arzteblatt International* 112 (33–34):564–74. doi:10.3238/arztebl.2015.0564.

## Contact details:

[iakef@usa.edu](mailto:iakef@usa.edu)  
[hdisney@usa.edu](mailto:hdisney@usa.edu)  
[lechaneul84@gachon.ac.kr](mailto:lechaneul84@gachon.ac.kr)