GYNECOLOGY

Physical activity and the pelvic floor

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Pelvic floor disorders are common, with 1 in 4 US women reporting moderate to severe symptoms of urinary incontinence, pelvic organ prolapse, or fecal incontinence. Given the high societal burden of these disorders, identifying potentially modifiable risk factors is crucial. Physical activity is one such potentially modifiable risk factor; the large number of girls and women participating in sport and strenuous training regimens increases the need to understand associated risks and benefits of these exposures. The aim of this review was to summarize studies reporting the association between physical activity and pelvic floor disorders. Most studies are cross-sectional and most include small numbers of participants. The primary findings of this review include that urinary incontinence during exercise is common and is more prevalent in women during high-impact sports. Mild to moderate physical activity, such as brisk walking, decreases both the odds of having and the risk of developing urinary incontinence. In older women, mild to moderate activity also decreases the odds of having fecal incontinence; however, young women participating in high-intensity activity are more likely to report anal incontinence than less active women. Scant data suggest that in middle-aged women, lifetime physical activity increases the odds of stress urinary incontinence slightly and does not increase the odds of pelvic organ prolapse. Women undergoing surgery for pelvic organ prolapse are more likely to report a history of heavy work than controls; however, women recruited from the community with pelvic organ prolapse on examination report similar lifetime levels of strenuous activity as women without this examination finding. Data are insufficient to determine whether strenuous activity while young predisposes to pelvic floor disorders later in life. The existing literature suggests that most physical activity does not harm the pelvic floor and does provide numerous health benefits for women. However, future research is needed to fill the many gaps in our knowledge. Prospective studies are needed in all populations, including potentially vulnerable women, such as those with high genetic risk, levator ani muscle injury, or asymptomatic pelvic organ prolapse, and on women during potentially vulnerable life periods, such as the early postpartum or postoperative periods.

Key words: exercise, pelvic floor disorder, pelvic organ prolapse, physical activity, sports, urinary incontinence

The burden of pelvic floor disorders

Pelvic floor disorders (PFDs) are common, with 1 in 4 US women reporting moderate to severe symptoms of urinary incontinence, pelvic organ prolapse, or fecal incontinence.[1] The estimated lifetime risk of surgery for either stress urinary incontinence (SUI) or pelvic organ prolapse (POP) is 20% by age 80 years.[2] Due to an increasing life span, the number of women who undergo POP surgery is estimated to increase by 47% from 2010 to 2050.[3] Given the high societal burden of these disorders, identifying potentially modifiable risk factors is crucial.

Physical activity (PA) is one such potentially modifiable risk factor. From a public health standpoint, understanding the relationship between physical activity and PFDs is important: given the magnitude of the burden suffered by women with PFDs, even a small reduction in risk would have an impact on a large number of women. As pointed out by DeLancey,[4] reaching a goal of 25% prevention would save <90,000 women each year from experiencing pelvic floor dysfunction. In this review, we summarize what is known about the association between physical activity and PFDs.

Data sources

The vast preponderance of research in these areas is cross-sectional and generally not population based. Ideally, a randomized clinical trial is obviously the best study design to understand the effect of PA done over a lifetime on PFDs. This is not only infeasible, but also randomizing women when young to a lifetime of exercise, or not, is unethical, given the many benefits of PA. Currently most of the available data pertain to urinary incontinence. Much less is known about POP and very little about fecal incontinence (FI).

For this review, we conducted a literature search to identify articles published in English-language journals from 1980 to March 2015. Additionally, we included a translated abstract if it contained sufficient information to provide the needed information. We did not restrict reporting based on quality of publications; the vast majority reported

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on a small population of women from one site. We searched PubMed using the search terms of exercise or physical activity or sport or athlete or work or occupation and urinary incontinence (UI) or FI or anal incontinence or pelvic organ prolapse or pelvic floor disorder.

Overview of physical activity

Physical activity defines any movement increasing energy expenditure. Physical fitness relates to characteristics an individual has that allows her to do daily activities with relative ease yet have reserve capacity to do greater levels of physical work upon emergent need (President's Council on Physical Fitness and Sports). Physical fitness includes a host of measurable attributes such as muscular strength and endurance and aerobic capacity that are in part heritable, which helps explain why like levels of physical activity do not always equate to the same levels of fitness in similar groups.[5-7]

It is now well known that physical activity has many benefits.[8-12] Most of the research about physical activity in women focuses on recreational activity (also known as leisure activity), which tends to be increasing worldwide, especially through walking.[13] Women do accrue PA in other domains such as in the home, although this type of activity has been steadily decreasing likely because of the availability of labor-saving devices.[14] Recently sedentary activity has emerged as an independent construct separate from recreational activity; that is, the negative health effects of being sedentary most of the day cannot be overcome by brief spurts of vigorous exercise.[15,16]

Given that obesity is associated with pelvic floor disorders, in particular urinary incontinence, persistent physical activity over a lifetime, which is associated with a decreased rate of weight gain, may help to prevent UI from developing.[17,18]

But is all physical activity good all the time? We can easily look to sports injuries to know that this is not the case.[19] Some sports cause more injuries and some people are more prone to them. Since the passing of Title IX legislations, girls' participation in high school sports has increased from <300,000 in 1972 to >3 million in 2013.[20] Furthermore, a worldwide survey consisting of approximately 65% female respondents indicates that high-intensity interval training was the biggest trend in the fitness industry for 2014, despite warnings about its increased potential for inducing injury.[21] Participation in sport and high-intensity PA among women heightens the need for understanding whether various types of physical activity modify the risk for pelvic floor disorders.

Measuring physical activity and pelvic floor disorders

Physical activity is most often measured by questionnaire, although it can also be measured objectively by accelerometry. Questionnaires are prone to recall bias and require varying degrees of literacy yet have been used extensively in population surveillance of PA.[13,22] Accelerometers, worn at the waist or on the wrist, quantify amounts of PA by assessing body acceleration, which have been used to identify intensity levels, such as light, moderate, and vigorous, as well as amounts of sedentary time.[23] However, accelerometry is less able to distinguish mechanical loads associated with PA. For example, accelerometry would not distinguish a woman walking with a heavy backpack from a woman walking without an additional load.

In the literature identified, most studies measured PA by questionnaires. In some cases, responses to the questionnaires were converted into metabolic equivalent (MET) values. A MET reflects the metabolic cost of an activity, and when multiplied by a measure of the duration, such as minutes of an activity done per week, PA exposure can be expressed as MET minutes per week. With few exceptions, the occupation was assessed using categorical variables, ranging from dichotomous heavy work (yes/no) to 6 self-described categories: laborers/factory workers, housewives, professional/managerial, service, technical/sales/clerical, or other. Most studies summarized only current recreational activities, whereas a few included past recreational activities or current occupational categories; one included childcare, eldercare, and housework.

Urinary incontinence was generally defined by questionnaires, both validated and unvalidated, and less frequently by pad testing. Most defined UI as any leakage during the specified time frame, and some required a certain level of frequency, bother, or severity. Pelvic organ prolapse was defined in one of several ways: as a symptom of bulge, as a finding on examination, and as a condition that led to surgery.

Physical activity and urinary incontinence

Urinary incontinence during exercise is common. The Table summarizes the prevalence of UI in various populations of active women and in control groups, if included. As evidenced by this table, even young nulliparas frequently report exercise incontinence, and the prevalence is greater in activities that involve repetitive jumping and bouncing. Whereas most studies rely on a self-report of UI, 2 confirmed UI with pad tests, in which leakage volume was estimated by subtracting the weight of a perineal pad after exercise from its weight before exercise.[24,25] In 18 girls who reported leakage during trampoline jumping, the mean change in pad weight was 28 g during a jump session.[25]

It appears that not only type of exercise but also dose makes a difference in terms of UI. In a different study of nulliparous trampolinists, those at the upper tertile of training volume reported the greatest negative impact from UI.[26] In another study suggesting that dose of exercise matters, women who trained for competitive purposes and were in the highest quartile of time spent in organized exercise per week were 2.5-fold more likely to report UI than inactive women in the lowest quartile; there were no differences between recreational exercisers who fell in the second and third quartiles compared with the inactive women.[27] In addition to type and dose of exercise, preliminary evidence suggests that eating disorders may also increase the risk of UI in athletes.[28,29] The etiology of this finding is unclear and deserves further study.