Risk Factors for Stress Urinary Incontinence in Women

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ABSTRACT

Urinary incontinence incurs serious medical, social, psychological, and economical implications, adversely affecting quality of life. Many women with SUI do not seek care for their condition as they are embarrassed to speak with a health care provider about their condition or fear that treatment will require surgery. The problem of urinary incontinence is more pronounced in India, as women usually do not seek treatment for their reproductive health problems and do not vocalize their symptoms. There is a culture of silence and low consultation rate among Indian women regarding such problems Hence, present review is undertaken to identify potential risk factors so that efforts can be made to alter these risk factors and thus can reduce the prevalence of SUI among women.

Keywords: Urinary incontinence; Risk factors; Women

INTRODUCTION

Stress urinary incontinence is defined as the complaint of involuntary leakage on effort or exertion, or on sneezing or coughing.[1] Urinary incontinence is more common in women than in men and may incur serious medical, social, psychological, and economical implications, adversely affecting quality of life. It may be an important barrier to regular physical and fitness activities in women.[2,3]

The risk of developing SUI among obese women with a body mass index of 30 or more (BMI ≥30) regardless of age and number of deliveries is twice compared to underweight women. People diagnosed with SUI also suffer from mental and social disorders such as depression, insomnia and other related problems. These factors negatively affect their social and sexual life. Consequently, due to the substantial importance of these problems, it is important to recognize potential risk factors on developing the disorder with the intention of preventing them or at least lower their effects.[4] Hence, present review is undertaken to identify potential risk factors so that efforts can be made to alter these risk factors and thus can reduce the prevalence of SUI among women.

Incidence of Stress urinary incontinence

The problem of urinary incontinence is more pronounced in India, where women usually do not seek treatment for their reproductive health problems and do not vocalize their symptoms. There is a culture of silence and low consultation rate among Indian women regarding such problems.[5,6] Women in India have also been reported to have a high tolerance threshold for seeking treatment. Embarrassment, shyness, lack of money/time, fear of surgery and pain are usually the reasons given by women for non-consultation.

In a cross sectional descriptive study by Trupti N. Bodhare et al[7] 53 out of 552 women (10%) reported episodes of UI. Fifty-seven percent of the women had symptoms of stress incontinence, 23% of urge, and 20% mixed symptoms. He concluded that 1 in 10 women report episodes of UI with impaired QOL. It is lesser than the global prevalence of UI which may be due to variations in definitions used, age groups and populations studied. Kumari et al[8] reported the overall prevalence of UI as 12%, among whom 46% had stress incontinence, 26% had urge, and 28% had mixed type.

Impact of SUI on QOL

Urinary incontinence interferes with the QOL in women causing embarrassment, sexual dysfunction, low work performance, depression and social isolation. QoL is a significant predictor of treatment-seeking for UI. Understanding the critical link between UI and QoL is pivotal to the efficacy of routine screening and early intervention.[9]

Tamanini et al[10] conducted a study to validate the 1CS-SUI-SF questionnaire by comparing with the King's Health Questionnaire (KHQ). KHQ is made up of 21 questions, divided between 8 domains, and a separate scale for measurement of severity of urinary symptoms. Scores can range from 0 to 100 and the higher the score obtained is, the worse is the QOL. The ICS-SUI- SF is a questionnaire that can be self administered. It is made up of four questions that evaluate the frequency, severity and impact of urinary incontinence, plus a set of eight self diagnostic items related to the causes or situations of UI. UDI-6 is a validated 6 item questionnaire that assesses LUTS including incontinence.

Shumaker et al[11] in a research work proved that two measures (UDI- 6 and ICS-SUI-SF score) provide detailed information on how UI affects the lives of women and that the two tools are psychometrically strong.

It is important to diagnose the three main types of urinary incontinence correctly - stress, urge or mixed incontinence - and to evaluate the impact of incontinence on quality of life. After a detailed history, a bladder diary and questionnaires are the most useful tools with which to determine what aspects of quality of life are most impaired - daily, work-related, recreational or sexual activities. Measures of quality of life have become essential in developing management plans and in follow-up.[12]

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DEMOGRAPHIC RISK FACTORS FOR SUI

Age

Aging is accompanied by a gradual rarefaction of the striated muscle cells in the urethral sphincter.[13] PFM strength is reduced and levator hiatus increased and urethral closure pressure likewise declines.[14,15] Pelvic denervation is greater whether or not they once bore children.[16]

Hijaz et al reviewed the literature relating advanced maternal age (AMA) with the occurrence of SUI.[17] They found that the data on the role of maternal age in development of SUI are inconclusive and evidence for an independent risk factor is more often observed in short term prospective studies. Cheen GD[18] concluded in their review article on functional and structural changes of the pelvic floor in ageing women that the ageing process plays a negative role on structure and function of PFM in aged women. Ageing may add to deterioration of pre existing pelvic floor dysfunction. As the age increases the strength decreases. But the negative correlation is stronger between manual muscle testing and age rather than between perineometry and age.

Alastair H. MacLennan et al[19] supported the fact that the advanced age is related to higher incidence of SUI.

Perucchini et al[20] found that with age there is a decrease in the muscle fiber to connective tissue ratio and muscle fiber diameter in the urethral sphincter. Thus, these same age related changes may occur in the pelvic floor, leading to poorer support in old women.

Weight and BMI

The pathophysiology of SUI is complex and remains elusive. Many variables influence this condition and obesity is commonly cited as an etiologic factor contributing not only to its development but also to its recurrence. Unfortunately, to date few objective data exist to support this widely held clinical impression. Theoretically obesity may create an increased intra abdominal pressure and thus expose the pelvic support structures and organs to a chronic state of PFM fatigue secondary to increased pressure. This could place obese patients at higher risk of developing SUI or for failing anti-incontinence procedures.

Cummings JM[21] identified obesity as one of the causative factors for SUI. Higher BMI is associated with higher prevalence of SUI, as the greater the abdominal pressure on the bladder area,the greater the risk of urinary stress incontinence. Noblett et al[22] suggested that obesity may stress the pelvic floor secondary to chronic state of increased pressure, and may represent a mechanism which supports the widely held belief that obesity is a common factor in the development and recurrence of SUI.

Mommsen and Foldspang[23] studied the possible role of obesity in the etiology of adult female urinary incontinence (UI). They proved SUI to be most closely associated with BMI. Yarnell JWG et al[24] found obesity as measured by Quetelet's index to be associated with UI.

Issues specific to pregnancy

The metabolic and hormonal modifications connected with pregnancy may both explain some of the urinary symptoms observed during pregnancy and entail long term consequences.

Parity

Individual susceptibility and aging do not suffice to explain why the SUI risk is greater in women who have given birth, even by cesarean section, than in nulliparas.

Valeton CT et al[25] evaluated the prevalence of UI, quality of life during pregnancy and postpartum in 343 women and pelvic floor function using pressure perineometry. They found that the prevalence of UI is higher during pregnancy (30.61%) and tends to decrease in postpartum period (6.78%). The mean vaginal pressure recorded was 3.60± 5.35 and 2.56± 3.24 mmHg during pregnancy and postpartum respectively i.e. vaginal pressure decreases postpartum. They also found that UI is associated with multiparity.

Caroci Ade S et al[26] did a longitudinal study on 226 primigravida women to assess the PFM strength during pregnancy and postpartum. They found that that the PFMS decreased slightly over pregnancy and this reduction was maintained upto the end of the postpartum period. They suggested that if there is a reduction in PFM strength in each pregnancy, even of low intensity, over the course of various pregnancies, this reduction would become exacerbated, causing morbidities. The women may present with morbidities in genitourinary tract in future.

Sixty-four percent of the incontinent women had borne more than two children in their obstetrical career in the study conducted by Trupti N. Bodhare et al[7] proving parity to be significant for outcome of UI.

Weidner et al[27] discovered an alteration of urethral sphincter electromyogram in pregnant nulliparas compared with non pregnant nulliparas of the same age, and this alteration was still present six months after delivery.

Results have shown negative correlation between number of deliveries and PFM strength. As the number of deliveries increase, the pelvic floor strength decreases. Goldberg RP[28] reported that twenty percent of primiparous women had a visible defect in the levator ani muscle, with the majority of defects seen in the pubovisceral (Kegel) portion of the levator ani.

Using MRI to compare levator ani anatomy in nulliparous women against those after their first vaginal birth, DeLancey et al found no levator ani defects in the nuliparous. Thus all these studies support our finding that increase in the number of deliveries will increase the weakness of PFM.[29]

Peschers et al[30] evaluated levator ani function before and after childbirth, and found that muscle strength was significantly reduced three- to eight days postpartum following vaginal birth, but not after caesarean, and returned to normal values within two months for most women. Allen and Hosker[31] also demonstrated a persistent reduction in muscle contraction strength.

A 10 cm H_2O drop in urethral closure pressure is likewise observed following childbirth, and it remains similar, whether delivery is vaginal or by cesarean section.[32]

Thomas et al[33] reported a higher prevalence in women who had had up to three babies compared with nulliparous women, but no appreciable difference occurred within that parous group. Incontinence was more common among women who had had four or more babies. This study found a linear increase in incontinence with increasing parity.

Mode of delivery

A loss or reduction in perineal muscle tone is very common among women who gave birth vaginally. Prenatal issues and childbirth can damage the pudendal nerve, caudal aspects of the levator ani muscle, fascial pelvic organ supports, and the external and internal anal sphincters.[34,35] This damage reduces PFM strength and may lead to increased bladder-neck and urethral mobility,[36] causing mobility of the urethrovesical junction.[37]

Literature also supports that the chances of pelvic floor weakness are more in vaginal deliveries than in caesarean. Pelvic nerve and muscle functions are generally protected by caesarean delivery with the timing of intervention largely determining the degree of protection.[38] Stress urinary incontinence is less common after caesarean delivery compared with vaginal birth, although it is not fully eliminated.[39]

Rortveit et al[40] demonstrated an increased risk of urinary incontinence among women who have delivered by cesarean section as compared with nulliparous women and a further increase among women who have had vaginal deliveries (8.4% higher prevalence). These results suggest that the mechanical strain during labor may add to the risk associated with pregnancy itself.

Alastair H. MacLennan et al[19] supported the fact that the mode of delivery increased all the major types of pelvic floor dysfunction. C- section, as the only mode of delivery, is not associated with a significant reduction in most types of pelvic floor morbidity compared with spontaneous vaginal delivery. However they found instrumental vaginal delivery to increase the risk of pelvic floor morbidity.

Jacqueline Jolleys[41] reported that pregnancy and not the mode of delivery predisposed women to incontinence. There seemed to be no difference in the prevalence of incontinence after normal childbirth compared with forceps or c-section.

Newborn weight

There is conflicting evidence about the association between birth weight and maternal risk for developing persisting stress urinary incontinence. Baracho SM et al[42] did a cross sectional study to study the potential predictors of SUI and data was collected for 5-7 months postpartum on 192 primiparous women. They found that the PFMS was the strongest predictor of SUI among the primiparous women who underwent vaginal delivery. A combination of PFM strength $\leq$ 35 mm H_2O, prior SUI, newborn weight > 2.988 kg & a new onset SUI in pregnancy predicted SUI in postpartum period. The model's accuracy was high (84%; p=0.00).

In a study conducted by Krue et al[43] in obese women regarding the influence of infant birth weight on postpartum SUI, it was demonstrated that the prevalence of incontinence was more in high birth weight group (>4000g), though the difference was not statistically significant (p>0.10).

Individual susceptibility

The hypothesis of a congenital factor may help to elucidate SUI observed in young or nulliparous women and the similarity frequently observed among members of the same family.[44-47] Indeed, Buchsbaum et al showed striking SUI concordance among sisters, regardless of parity.[47] Higher prevalence of SUI is reported in the daughters of mothers with declared UI.[48]

Role of pelvic floor muscle in SUI

Normal continence is maintained by the complex integration of pelvic, spinal and supraspinal factors.

The PFM are one of many factors contributing to the urethral closure mechanism for continence and are the target tissue in physical therapist management of incontinence and other pelvic floor dysfunctions.[49] Other important pelvic factors for continence are contraction of smooth and striated muscles within the urethral wall, patent vascular plexi, and intact ligaments and fascia supporting the bladder and urethra in their optimal position during an increase in abdominal pressure.[50,51]

Pelvic floor dysfunction and urinary incontinence among female athletes

A high prevalence of urinary incontinence among young, nulliparous female athletes. In fact, females participating in repetitive, high-impact sports are at the highest risk for urinary incontinence. In these athletes, the absence of sufficient pelvic floor strength and coordination to withstand sport related increases in intra-abdominal pressure results in physical activity related urinary incontinence, and may be a predictor of urinary incontinence in later adulthood.[52]

CONCLUSION

UI is distressing and has a negative effect on HRQoL. Various factors predisposing to SUI are complications in pelvic floor muscles function and factors such as pregnancy, birth trauma, increase age, and lifestyle. Many women with SUI do not seek care for their condition as they are embarrassed to speak with a health care provider about their condition or fear that treatment will require surgery. Another factor is lack of education of health care providers in evaluating and caring for the condition. Hence, identifying risk factors for SUI and education among health care providers can facilitate prevention strategies to decrease SUI prevalence among women.

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