Urinary incontinence (UI) can be a financial and social burden to women who suffer from its effects. The most burdensome costs are sometimes those that are hardest to quantify, such as financial burdens from personal hygiene care, or the mental stress and social isolation that some women feel. There are many contributory factors to the development of UI, including parity, genetics, aging, and menopause. Specifically, stress urinary incontinence (SUI) is often related to the myriad of changes that occur to the pelvic floor (PF) with pregnancy and childbirth.

A more cost-effective and appropriate manner of addressing the growing problem of UI may be to identify factors in individual women that could be explored before problems from UI arise. If practitioners were aware of effective treatments for women in the primary stage of UI development, it may be possible to reduce the number of women who need more aggressive treatments, such as surgical correction. Earlier intervention may also help reduce the social costs to women with UI who live in fear, embarrassment, and ultimately, isolation from others.

COSTS ASSOCIATED WITH URINARY INCONTINENCE

Financial
The direct and indirect costs associated with UI are substantial (Harding & Thorpe, 2008; Hu et al., 2004; Morkved, Bo, Schei, & Salvesen, 2003; Walters, 2005). In 1995, the direct costs of treating UI in men and women of all ages were estimated to be between $16 and $26.3 billion (Culligan & Heit, 2000; Heit, Mudd, & Culligan, 2001; Subak et al., 2006; Thompson & Smith, 2002; Wilson, Brown, Shin, Luc, & Subak, 2001). In 2000, the estimated total cost of UI in the United States was $16.3 billion, with $12.4 billion spent on UI care for women alone. Routine incontinence care represented the largest expenditure (Hu et al., 2004). The annual costs of UI care are greater than annual direct costs for breast, ovarian, cervical, and uterine cancer treatments combined (Subak et al., 2006, Wilson et al., 2001).

The true cost of UI is difficult to determine, however, because...
the responsibility for the majority of expenses associated with routine UI care (such as absorbent pads and laundry) falls to the patient. These are large expenses that cannot be adequately accounted for in estimates of the overall cost of incontinence care (Bernier & Sims, 2009; Lingam, 2001; Pantazis & Freeman, 2006; Subak et al., 2006). Subak and colleagues (2006) performed a cross-sectional study of 293 women to estimate costs of routine care for female UI, and they found that women with severe UI pay approximately $900 annually for personal routine UI care. Nearly three-fourths of the women reported using pads, while more than half reported additional laundry loads. Eighteen percent of those women with severe UI or who experienced a stroke (Huang, Brown, Thom, Fink, & Yaffe, 2007). Older woman may also be physically unable to get to the toilet independently due to stroke, fractures, or overall weakness (Bernier & Sims, 2009).

Using data from 6,361 women age 65 and older who participated in the Study of Osteoporotic Fractures, Huang et al. (2007) performed an observational study to examine associations between cognitive and/or physical function decline and UI in older, community-dwelling women. They found that women with recent declines in physical function were more likely to report weekly UI. But women with cognitive decline had more difficulty coping with the symptoms of UI and were more likely to report that urine leakage interfered with daily activities (Huang et al., 2007). It is unclear whether cognitive function decline is independently associated with UI or if it is more a marker for disease processes that magnifies the impact of UI on quality of life (Huang et al., 2007).

**EDUCATION/ MANAGEMENT/ PREVENTION**

As stated previously, controlling or trying to manage modifiable risk factors for SUI may help contain UI while it is in the primary stages of development. Childbearing women could benefit greatly from advances in the management of risk factors. Professionals can work toward this goal through education, pelvic floor management during labor, and preventative measures.

**Practitioner Education**

Obstetrical practitioners bring much of their individual belief systems into the labor suite. These systems influence their practices of perineal care, including the use of episiotomy and other interventionist management (Hayman, 2005; Roberts, 2002). Stepp, Siddiqui, Emery, and Barber (2006) assessed general obstetrics textbooks to examine the quality and quantity of information about perineal injury at vaginal delivery. Utilizing a standard abstraction form consisting of 34 questions, their study surveyed the 7 most common obstetric books. They found that although the majority of textbooks accurately reflected the current literature, which recommends against routine episiotomy, there was limited discussion of the advantages and disadvantages of various types of episiotomy. There was also little information offered in these texts regarding risk factors associated with
and the prevention of perineal lacerations and episiotomies. Only two textbooks included a discussion regarding techniques to reduce perineal trauma at time of delivery. Stepp et al. (2006) also determined that a minority of the textbooks discussed the anatomy and physiologic role of the anal sphincters, levator ani (LA), and perineal body in maintaining anal continence and providing pelvic organ support.

Management

The use and frequency of instrumental assistance varies between labor and delivery management, and there are differences in the degree of supervision and training of resident obstetric staff (Hayman, 2005). A recent survey of fourth-year medical residents concluded that the majority of residents receive no formal clinical training in pelvic floor anatomy, episiotomy, or perineal repair, and they have limited supervision when engaged in those procedures (Stepp et al., 2006). More than two-thirds of British obstetricians revealed that training in repair of sphincter rupture was suboptimal (Sultan & Fernando, 2001). Supervision of trainees is crucial to adequate labor management and perineal management and repair (Sultan & Fernando, 2001). Stepp et al. (2006) recommend that pelvic surgeons who are familiar with anal sphincter and perineal anatomy and physiology should contribute to chapters in obstetrical texts where their expertise could be beneficial to medical professionals. They also encouraged more formal instruction in repair of perineal trauma occurring at delivery to improve long-term adverse outcomes to women.

Prevention

There are three levels of prevention – primary, secondary, and tertiary. Primary prevention effects a change by modifying risk factors prior to condition onset, secondary prevention effects change by identifying and treating people with preclinical disease, and tertiary prevention effects change by treating and managing people with clinical disease to postpone complications (Heit et al., 2001). In the case of SUI and childbearing women, the focus for prevention could shift toward decreasing trauma to the PF at delivery. Prevention could also focus on which environmental and genetic factors play a role in the development of SUI. Women could then focus on recognizing these factors and either avoid or modify them with the goal of decreasing their potential risk of SUI development.

Primary prevention. Primary prevention of pelvic floor injury is a difficult task to accomplish because the act of delivering a baby vaginally is a physically traumatic event (Heit et al., 2001). The majority of childbirth injuries to the PF occur after the first vaginal delivery. If the initial onset of SUI or urge urinary incontinence (UUI) was during or after the first pregnancy, long-term risks of SUI or UUI are greater (Altman et al., 2006; Viktrup, Rorkveit, & Lose, 2006). Subsequent deliveries, however, have not been found to be as influential on frequency of SUI or UUI long-term (Heit et al., 2001; Viktrup & Lose, 2001). With possible mechanisms of injury, including excessive stretching of perineal muscles and compression or excessive stretching of the pudendal nerve, primary prevention strategies might include antepartum pelvic floor exercises (PFEs) (see Figure 1) or elective primary cesarean section (CS) (DeLancey et al., 2007; Heit et al., 2001).

Pelvic floor management. Properly performed PFEs (also known as Kegel exercises) during pregnancy may prevent UI during pregnancy and in the puerperium (see Figure 1) (Morkved et al., 2003; Viktrup et al., 2006). Morkved et al. (2003) conducted a single-blind ran-

**Figure 1. Proper Performance of Kegel Exercises for Pelvic Floor Muscle Training**

Kegel exercises are performed to strengthen the muscles of the PF to help increase support of the bladder and urethra. They can also be used postpartum to facilitate circulation to the perineum, which promotes faster healing and increases PF muscle tone.

The woman should contract the muscles in the perineum/pelvic floor as if she is trying to prevent passage of intestinal gas. (The old adage of “stopping the flow of urine” can actually encourage urine retention and cause dysfunction of the micturition reflex.)

**She should feel the muscles draw upward and inward.**

Contractions should be intense, but should not involve abdomen, thighs, or buttocks.

**She should avoid straining or bearing-down motions while performing the contractions. (This can be avoided by exhaling gently with an open mouth as she contracts the muscles.)**

The woman should be able to hold this contraction for 5 to 10 seconds, but may need to work up to that.

**The woman should rest for 10 seconds between contractions.**

Kegels should be performed at least 10 times, 3 times a day, or from 30 to 80 times a day.

Sources: Bernier & Sims (2009); Culligan & Heit (2000); Herbruck (2009); Varney et al. (2004); Zdanuk (2004).
Primary prevention of pelvic floor injury is a difficult task to accomplish because the act of delivering a baby vaginally is a physically traumatic event.

domized controlled trial (RCT) to determine if intensive pelvic floor muscle training (PFMT) during pregnancy could prevent UI. In this study, 301 women were randomized to either a study group or a control group. Before randomization, all participants were educated in PF anatomy and instructed by a physiotherapist on how to properly contract PF muscles. Women in the study group met with a physiotherapist once a week for 60 minutes between the 20th and 36th weeks of pregnancy, and were recommended to perform two other PFE sets twice a day. The control group received routine care and were not discouraged from performing PFEs. Results showed that significantly fewer women in the training group reported UI at 36 weeks and at follow up 3 months postpartum.

Morkved and colleagues (2003) confirmed results from a study by Sampselle et al. (1998) that also showed performance of antepartum PFEs correlated with significant decreases in UI at 35 weeks gestation, 6 weeks, and 6 months postpartum. In the Sampselle et al. (1998) study, the routine care group showed significant increases in UI by comparison at those same intervals. Although differences disappeared at 12 months postpartum, PFEs performed in pregnancy may promote restitution of PF muscle strength, thereby reducing postpartum UI (Heit et al., 2001; Sampselle et al., 1998). However, intensive PFEs with physiotherapist training is time consuming and may be financially impossible for many women.

Woldringh et al. (2007) conducted a study to determine the short and long-term effects of PFMT during pregnancy in women already affected by UI during their pregnancies. Their study found that although PFMT did not appear to affect the severity of UI during the first half of pregnancy, women in the intervention group who performed PFEs with greater frequency and intensity showed greater improvement in UI symptoms overall. The impact of intensive antepartum PFEs has not been adequately studied to determine if this training impacts reduction of SUI in the long term, and therefore, further research is needed (Morkved et al., 2003; Viktrup et al., 2006).

Looking at older menopausal women who may be affected by UI, primary preventative measures may help delay onset of troublesome symptoms. Danforth et al. (2007) conducted a prospective analysis from the Nurses’ Health Study to examine the association between physical activity and risk of UI in women ages 54 to 79. After excluding for confounding factors, they examined data for 2,355 women and found that physical activity (primarily walking) was associated with a significant reduction in UI (p < 0.01). The reduction was more notable on SUI over UI. They concluded that older women who engage in moderate-intensity physical activity, including walking, lower their risk of UI by 20% to 25% (Danforth et al., 2007). This may be due to weight loss secondary to physical activity because the body mass index (BMI) of subjects decreased with increased physical activity. Physical exercise, which increases the intra-abdominal pressure, may result in simultaneous contraction of the PF, thereby strengthening it (Danforth et al., 2007).

Elective primary cesarean section. Elective primary CS is the only true primary prevention because injuries commonly occur after the first vaginal delivery, and CS after labor onset is not protective against injuries to the PF during childbirth (Borello-France et al., 2006; Heit et al., 2001; Visco et al., 2006). However, CS before onset of labor does not protect fully against UI or pelvic floor disorders (PFD), and CS carries increased risk to both mother and baby (Declerq et al., 2007; Leslie, 2004; Visco et al., 2006). Taking these risks into account, along with the fact that vaginal birth is generally a natural process, suggesting that women should have elective CS as primary prevention of PFD and UI does not seem like appropriate medical advice. Providers are obligated to give risks and benefits of all types of delivery modes (Leslie, 2004). A woman’s request for a primary CS may not necessarily be for the procedure itself, but may be more of a request for help or additional information. A woman may fear that she cannot face the birth process “alone” and needs a birth attendant who will stay with her and help her achieve a successful outcome (McFarlin, 2004).

Improved identification of women who may be at heightened risk for severe UI or PFD in the long term will aid in a better balance during management of labor and may identify those women who could truly benefit from an elective primary CS (DeLancey et al., 2007). Nulliparous women have problems with UI and PFD, and their incidence is similar to that of parous women in the postmenopausal years (Buchsbaum et al., 2002; Buchsbaum et al., 2006). Further research to determine what specific biologic and environmental factors contribute to UI and PFD development would benefit all women in primary prevention and may reduce the numbers of CS performed without medical indication.
Secondary prevention. Secondary prevention of UI is challenging because studies have inconsistently identified modifiable risk factors during vaginal delivery that predict UI postpartum. Compared to nulliparous women, parous women are at an increased risk of UI treatment or surgery later in life. In a multivariate analysis of a survey undertaken by 4,345 women, Foldspang, Mommsen, and Djurhuus (1999) found that the strongest predictors for UI were age equal to or greater than 40 at second vaginal delivery, UI immediately following birth, and UI during pregnancy. They did not find any obstetric factors that were significantly predictive of UI, and they speculated that the modifiable factors serve only as a proxy to indicate vaginal birth has taken place (Foldspang et al., 1999; Heit et al., 2001). Further research with a long-term design is needed to delineate these issues.

Secondary prevention strategies in women with pre-pregnancy or antenatal UI should address obstetric practices that can be modified in the second stage of labor when delivery is imminent. These measures can be enforced to decrease the pressure on the tissues of the PF that accompany delivery of the neonate. Employing the practice of delaying pushing until the natural urge to push occurs over forced and sustained Valsava pushing is one common strategy (Albers & Borders, 2007; Roberts, 2002; Roberts & Hanson, 2007). This strategy allows the fetal head to descend more slowly, giving time for vaginal tissues to stretch naturally, and it decreases the time and amount of sustained abdominal downward pressure on the pelvic structures. More effective maternal bearing down occurs when the fetus is allowed to drop further into the pelvis, encouraging the natural push reflex (Fraser et al., 2000; Roberts & Hanson, 2007).

Opting for a spontaneous delivery over forceps or instrument-assisted delivery whenever possible is associated with less trauma to the genital tract. Women who deliver by forceps demonstrate weaker PF strength postpartum, and intervention with any instrumentation during delivery increases the incidence of trauma (Hayman, 2005; Heit et al., 2001). Restricted use of episiotomy can also reduce perineal trauma. No benefits are found with routine use of episiotomy, and women often suffer greater genital tract trauma. No long-term benefit on urinary symptoms or a stronger PF from use of episiotomy has been identified (Albers & Borders, 2007; McCandlish, 2001).

Some other perineal management strategies that practitioners use often appear to have positive outcomes on the PF. However, studies have not proven them to make a significant enough difference in outcomes, and they are not recommended as standard practice at this time. Some of these strategies are perineal massage, maternal position at delivery, and management of the fetal head on the perineum.

One strategy often used to reduce PF trauma is antenatal and intrapartum perineal massage with lotion or warm compresses, which has the potential to make the tissues more elastic and accepting of the passing fetus (Albers, Sedler, Bedrick, Teaf, & Peralta, 2005). However, studies to date are inconclusive as to whether or not this is truly helpful in trauma reduction. Other strategies include maternal position at birth rather than supine (such as side-lying), and perineal management of the fetal head at delivery (hands-off vs. hands-on). Study results to date do not confirm whether position or perineal support at delivery is better for reduced perineal trauma (Caroci de Costa & Riesco, 2006; Heit et al., 2001; McCandlish, 2001).

Tertiary prevention. Tertiary measures need to address childbirth modes in women who have PF injuries and who desire future childbearing. Women with prior severe perineal lacerations (third or fourth-degree) may be candidates for CS delivery. These women are up to 7.5 times more likely to sustain recurrent severe perineal injury than women without any laceration history, and are 2.25 times more likely to suffer from recurrent severe perineal injury than women who had episiotomy but no instrument assistance (Heit et al., 2001).

For women who have undergone UI surgery, CS delivery may be the only method to preserve their surgical results. Women who underwent vaginal delivery post-UI surgery reported lower rates of postpartum continence than women who elected for a CS (73.3% vs. 92%) (Danier, Hall, Choe, & Bhatia, 1998). It might be fair to suggest that women with corrective surgery for UI or pelvic organ prolapse (POP) should undergo CS. Women with asymptomatic third or fourth-degree lacerations, or clinically evident anal sphincter defects, should consider that recurrence of these injuries and UI is greater with a second vaginal delivery and should consider CS as an alternative to vaginal delivery (Heit et al., 2001).

CONCLUSION

Defining the natural progression of PFD and UI would be ben-
eficial to many women (Bradley, Zimmerman, & Nygaard, 2007). This knowledge could help practitioners and researchers discover and utilize better treatments when caring for patients suffering from these problems. The costs to women, both financial and social, are significant. The full magnitude of the problem remains unknown because many women continue to live with the impact of PFD and UI—embarrassment, shame, or feeling that it is the price they pay for childbirth or aging (Pantazis & Freeman, 2006; Lingam, 2001).

Patient education is vital to compliance and is an appropriate role for the nurse because patient education and informed consent are cornerstones of nursing practice (McIntosh, 2005). Nurses must determine how to best increase patient compliance through education. Patients must learn to assume responsibility for their own health outcomes and make informed choices that benefit them and their health (Pantazis & Freeman, 2006).

Women should align themselves with practitioners who have values that are consistent with their own. Listening to a patient’s needs and providing her with unbiased information so she can make the best, informed decision concerning her health care is a responsibility of all care providers (McFarlin, 2004). Proper education of practitioners in measures that offer a more gentle birth process that is less traumatic to the PF may help in primary prevention or result in a significant delay in the development of PF and urinary issues.

PFD, UI, and POP are not inherently life-threatening diseases. Education regarding these conditions and their treatments should aim to improve quality of life with minimal side effects and risk (Wallace & Hooper, 2006). If the type and mechanism of birth-induced injury that directly contributes to an increased risk of UI could be positively identified, prevention strategies could then be developed to target high-risk women and avoid subjecting lower-risk women to unnecessary intervention (DeLancey et al., 2007). Because UI cure rates with any modality are not infallible, caregivers must strive to utilize techniques that facilitate the prevention of initial childbirth injuries to the PF to reduce the number of new cases (Heit et al., 2001).

References


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