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Stress Urinary Incontinence Parous Versus Nulliparous Women Ages 18-35

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**STRESS URINARY INCONTINENCE
PAROUS VERSUS NULLIPAROUS WOMEN AGES 18-35**

By

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THESIS

Submitted to the Physician Assistant Studies Department
at Grand Valley State University
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2000

STRESS URINARY INCONTINENCE PAROUS VERSUS NULLIPAROUS WOMEN, AGES 18-35

Stress urinary incontinence (SUI) is the unintentional loss of urine with activities such as sneezing, laughing, and coughing. Reports vary regarding age groups affected by SUI. Surveys were randomly distributed to women ages 18-35 in the family practice setting, in order to determine the incidence and reporting of SUI. It was found that there is a relationship between vaginal delivery and incidence of SUI. The percentage of women who reported symptoms of SUI to their health care professionals was 26.1.

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CHAPTER 1 INTRODUCTION

Background of the Problem

The definition of urinary incontinence (UI) is the unintentional loss of urine (28). There are six different types of UI: stress, urge, mixed, overflow, functional, and nocturnal (28,33). Stress urinary incontinence (SUI) is the leakage of urine with activities such as sneezing, laughing, and coughing. Urge incontinence is an uncontrollable, sudden need to urinate. Mixed incontinence includes symptoms of both stress and urge incontinence (28). Overflow incontinence is secondary to inadequate detrusor muscle contractions. This allows the bladder to fill beyond maximum capacity and the end result is leaking of urine (22). Functional incontinence is associated with an inability or unwillingness to void appropriately (28). Nocturnal incontinence is leakage occurring at night. Most people produce a greater amount of urine during the day than at night, and when this pattern is lost there is greater incontinence at night (33).

Reports vary regarding age groups affected by UI. Some studies showed UI to be more common in the younger population, where others showed a greater prevalence in the older population. Considering the different types of UI, SUI occurs about 50% of the time (6, 37, 58, 61, 57). According to several studies, SUI is more frequent in multiparous women, therefore vaginal childbirth is thought to be a contributing factor to the development of SUI. The patient's symptoms usually develop during pregnancy or after childbirth (61).

Urinary incontinence in all forms is an expensive problem. In 1987 the estimated direct cost of UI to the healthcare system was \$10 billion dollars. (21, 14) The Agency

for Healthcare Policy and Research reported in 1996 that the direct costs associated with caring for people with UI was estimated at over \$15 billion per year. (1)

Most people, including practitioners who are not gynecologists, believe UI is a disease of older women who have given birth. Continence is considered to be “the norm” for the young female population. However, there is evidence of UI in young, nulliparous females (40) and underreporting of UI in women of all ages. (57) This study will focus on SUI in parous (previously given birth, for the purpose of this study vaginal birth only) and nulliparous (never given birth) females.

Problem Statement

Urinary incontinence is underreported in women of all ages, even though there are many successful treatments available (57). The problem is that SUI is believed to be a disease of mostly parous and elderly women but, in reality, SUI can be found in young, nulliparous females. While preparing for this study, urinary incontinence was informally discussed with several family practice physicians. Most practitioners conveyed the belief that UI, specifically SUI, occurred only in parous and elderly women. For these reasons this study focuses on SUI in a younger population.

Research Questions

What is the incidence and reporting of SUI in nulliparous versus parous women, ages 18 to 35, in the family practice setting? Why do some women not report their symptoms of SUI to their healthcare professional?

Significance to Profession

This study is significant to the healthcare profession in that it may increase the awareness of healthcare practitioners to the fact that SUI is not solely a disease of parous or elderly women. Healthcare professionals can use the knowledge gained from this study to increase their awareness of patients who present with symptoms of SUI.

CHAPTER 2 REVIEW OF LITERATURE

Normal Bladder Anatomy and Function

Anatomy

The bladder is located in the lower part of the pelvis, superior to the pelvic diaphragm, in the extraperitoneal space. The superior aspect of the bladder has a covering of peritoneum. The wall of the bladder is composed of transitional epithelium and a layer of smooth muscle known as detrusor muscle. The bladder has an internal area called the trigone which is the triangular space between the two ureteric openings and the urethra. The epithelium allows stretching to occur as the volume of urine inside the bladder increases. The involuntary detrusor muscle contracts to dispel the urine (31). The backflow of urine (vesicoureteral reflux) is prevented by the oblique angle at which the ureters join the bladder, the opening of the ureters being the shape of a slit, and the forcing shut of the ureteral openings with increases in bladder pressure (30, 52). The inferior portion of the bladder is known as the bladder neck and is the site of urethral attachment (22). The primary function of the bladder is to store urine until evacuation of the waste can occur (31, 22).

The female urethra is approximately 3 to 4 cm in length. It attaches to the neck of the bladder proximally, and opens distally to the outside of the body through the external meatus (31). Two sphincters around the urethra function to maintain continence: the internal and external urethral sphincters. The proximal urethra is composed of transitional epithelium and smooth muscle. The external urethral sphincter encircles the urethra at the level of the urogenital diaphragm. This structure is composed of the sphincter urethra muscle, a skeletal muscle, innervated by the pudendal nerve (31, 22).

Function

Both sympathetic and parasympathetic innervation are involved in urinary function. The level of sympathetic involvement is thoracic 10 through lumbar 2, which innervates the urethra. The function is to contract the trigone and bladder neck muscles, which inhibits reflux of urine and outflow of it through the neck of the bladder. The trigone is strictly sympathetic innervation. The parasympathetic nerves arise from levels sacral 2 through sacral 4, and innervate the detrusor muscle (31).

The bladder wall receives sensory innervation to stretch receptors from S2 through S4. As the bladder fills (200-300 ml stimulates the receptors, but up to 900 ml can be held in the bladder) afferent impulses are sent to the sacral cord. Sufficient afferent impulses result in parasympathetic stimulation to empty the bladder via contraction of the detrusor muscle and relaxation of the internal sphincter. The brain can override the spinal reflex up to a point, allowing the volume to increase in the bladder. Therefore, a person has control over urinary function. Damage to sensory nerves will result in increased distention. Damage to both sensory and motor components results in a neurogenic bladder, which ultimately shrinks in size over time (31).

Failure to store urine, or inadequate bladder compliance, leads to urinary incontinence. If the bladder is unable to distend it is unable to store urine. The fluid volume increases inside the bladder until the pressure is high. Eventually the pressure is greater inside the bladder than outside and urine will flow to an area of lower pressure. Incontinence is the escape of urine through the urethra (22).

Due to the location of the bladder within the pelvic cavity, the bladder is subjected to any rise in intra-abdominal pressure. Subsequently, there is an equal increase in pressure inside the bladder which is transmitted to the proximal urethra. With urethral hypermobility, an increase in intra-abdominal pressure causes the urethra and bladder to be displaced due to weakness of the pelvic floor. The bladder neck is pushed inferiorly and the pressures are not transmitted to the proximal urethra. Therefore, the bladder pressure exceeds the urethral pressure and leakage occurs (28, 7, 33). With normal support to the urethra and bladder by the vagina posteriorly and the levator ani muscles laterally, equal distribution of pressure allows for normal urinary function (no leakage) (43, 7, 13).

Other Supporting Structures

The pelvic diaphragm constitutes the floor of the pelvis and is made up of the coccygeus and levator ani muscles (31). The urethra passes through the urogenital hiatus of the diaphragm.

The bladder is supported by levator ani muscles and their fascia. The fascia of the levator ani connects the bladder and urethra to the pelvis. (10). Thickenings of the pelvic fascia form ligaments that provide support to the bladder. The median umbilical ligament attaches the anterosuperior part of the bladder to the umbilicus. The pubovesical ligament holds the bladder itself in place by connecting the bladder laterally to the pelvis. The rectovesical ligament also offers support by attaching between the rectum and the bladder (31). The pubourethral ligament attaches to the middle portion of the urethra and to the inferior pubic ramus. It holds the urethra against the pubic

symphysis anteriorly. Without the pubourethral ligament the urethra would separate from the pubic symphysis and would not be compressed upon increases in pressure. The urethropelvic ligament connects the neck of the bladder and proximal urethra to the lateral pelvic wall area. Further support is provided by the vesicopelvic and cardinal ligaments, and by the endopelvic and perivesical fascia.

The urogenital diaphragm is located below the levator ani muscles. The composition of the urogenital diaphragm is the deep transverse perineal and sphincter urethral muscles and fascia. Attachment of this muscle is to the ischiopubic rami. The urethra passes through the urogenital diaphragm. It is at this level that the neck of the bladder meets with the urethra in the female (31). The sphincter urethrae serves as the external urethral sphincter.

Types of Urinary Incontinence

Urinary incontinence can be defined as involuntary leakage of urine from the urethra. There are different types of urinary incontinence: stress, urge, mixed, overflow, functional, and nocturnal incontinence (22). Stress urinary incontinence is the leakage of urine with activities such as sneezing, laughing, and coughing (28) Urge incontinence is most common in the elderly female population (over 70 years) (33, 17, 56). With this condition the bladder contracts and the person feels a sudden, strong urge to void that rarely can be overcome (5, 42, 28). There are two main types of urge incontinence. Detrusor hyperreflexia is involuntary contractions of the detrusor muscle secondary to a neurological disorder. Detrusor instability is involuntary contractions secondary to urinary tract infections, cancer, stones, drugs, and fecal impaction, but many times the

cause is idiopathic (59, 42). Mixed incontinence is a combination of stress and urge incontinence, and usually occurs in the older female population (5, 28). With overflow incontinence, the bladder fills beyond capacity due to impaired detrusor muscle contractions. Consequently, excess urine leaks out of the urethra as the bladder pressure rises high enough to overcome the resistance of the outlet (22). Functional incontinence occurs in individuals who are impaired physically and mentally (42) The urinary tract itself is not an issue as it can function properly. Nocturnal incontinence is leakage that occurs at night.

Stress Urinary Incontinence (SUI)

Symptoms of SUI are described as uncontrolled leakage during activities such as exercise, coughing, laughing, lifting objects, movements (rising from a chair or bending), and sneezing (5, 17, 42, 28). The reason urine leaks during these activities is due to a sudden rise in intra-abdominal pressure (17, 42, 28).

The most affected age group with stress urinary incontinence is younger women (6). These females usually have normal urination habits (less than or equal to eight times per day or 2 times during the night) and, furthermore, have no neurological diseases or abnormal postvoid residual volumes (28). These individuals have normal bladders and leakage is unrelated to bladder contractions (7). It is the weakness of the pelvic floor and/or muscles of the urethra that contribute to the incontinence. Clinical findings that indicate pelvic floor weakness are the presence of cystocele, rectocele, or uterine prolapse (42). Some events which can weaken the pelvic floor and lead to SUI are giving birth,

myelomeningocele, irradiation, lesions of the spinal cord at the sacral level, low estrogen, and women who have had numerous surgeries for incontinence (28).

A hypermobile urethra and incompetent internal urethral sphincter, occurring alone or together, are the root of SUI. The internal urethral sphincter normally opens only for urination, and should be able to withstand rises in intra-abdominal pressures such as coughing, exercising and sneezing (33). With internal urethral sphincter incompetence, leakage occurs with only small increases in intra-abdominal pressure. This incompetence can either be acquired or congenital (28). A myelomeningocele can cause congenital urethral sphincter incompetence. Trauma, radiation, or sacral spinal cord lesions can cause acquired urethral sphincter incompetence (59).

Vaginal childbirth appears to be a major risk factor for SUI. This most likely is secondary to denervation of the pelvic floor due to pressure (5). Peters (42) states that when a woman is pregnant, the growing fetus puts pressure on the floor of the pelvis leading to stretched pelvic tissues. Additional stretching occurs when the fetus travels through the vaginal canal. As the fetus passes through the birth canal, pressure may be exerted by the head onto the pelvic floor. This can ultimately damage the pudendal nerve which innervates the lower urinary tract and the levator ani muscles (5). Damage to this nerve, or to the pelvic diaphragm, leads to a weaker pelvic floor. This damage can also occur in a woman who has had a cesarean section after a period of labor. (30, 61).

Umlauf and Mathis (58) used a questionnaire to examine the effect of delivery method and found no difference in the occurrence of incontinence. The leakage was attributed to the pregnancy itself, and not the actual delivery method (forceps, vaginal, cesarean) (25). A contradictory study showed that damage to the pudendal nerve, which

innervates the urethra, has been blamed on events occurring during pregnancy such as: long labor, tearing of the perineum, many deliveries, forceps delivery, and weight of the baby. Geelen et al (16) conducted a study to determine the effects of pregnancy on bladder and urethral pressure. The study included only nulliparous women ages 20 to 35 without symptoms of UI. At various gestational weeks (8, 16, 28, and 36 weeks gestation) and at 8 weeks postpartum, the urethral pressure was measured via urethrocytometry. This was done both at rest and with coughing. The results indicated that both pressures increased during pregnancy. Duration of labor, episiotomy, and weight of the newborn were unrelated to the pressure of the urethra. In the women who reported SUI, the pressure of the urethra was less than that of the other women overall. Furthermore, the pressure was not effectively transmitted to the urethra as in the other women. Without the pressure in the urethra, the urethra is not closed at times of stress, such as coughing. Stress incontinence was more likely in the women who had lower urethral pressures at the beginning of their pregnancies, suggesting that pregnancy and delivery aggravates UI. The urethral pressure was lower in women 8 weeks postpartum compared to the same women at 8 weeks gestation. The pressure the uterus exerts on the bladder as it increases in size is a significant factor in increasing the pressure of the bladder and urethra. The urethral pressure may never return to antepartum levels. It was reported that the pressure of the urethra was the same 1 year post-partum as it was at 8 weeks after delivery (16).

Muscles of the pelvic floor decrease in strength as one ages (33). During menopause, as stated previously, the pelvic floor muscles and urethra become weaker and thinner. This is secondary to less estrogen being produced by the ovaries. A

hysterectomy with bilateral oophorectomy will contribute to incontinence due to the loss of estrogen production (42).

Estrogen receptors are in abundance in the urethra. A deficiency of estrogen leads to atrophy of the lining of the urethra. Without an intact mucosa in the urethra the sphincters are less efficient. Less than normal estrogen levels predispose women to conditions such as urethritis, trigonitis, and cystitis (33).

A retrospective study that included young female athletes in low impact (swimmers) and high impact (gymnasts) sports was done to determine if there was a difference in incidence of incontinence. Surveys were sent to athletes who had participated in Olympic sports between the years 1960 and 1976. The two groups were similar regarding exercise habits, occupations, and medical/surgical histories. The low impact group reported more deliveries and a greater incidence of vaginal births. Both groups reported about the same incidence of SUI. Because the study was retrospective, one could legitimately question if the athletes' recall of bladder function was accurate. Another question may be whether swimmers can truly assess their urine loss while in the water. The author noted that intense high impact exercise may damage ligaments and lead to incontinence, and that modern gymnasts may be involved in more damaging moves than they were years ago (38).

Prevalence of Stress Urinary Incontinence

SUI is thought to occur primarily in the aged population. Though a great deal of it does occur in the elderly, studies have shown that it is prevalent in the younger population as well. In general, UI affects approximately 13 million men and women of all age groups in the United States alone (36). A study that consisted of phone interviews

with urologists to assess similarities in their practices found that 95% of urologists acknowledged treating female patients with urinary incontinence (15).

With people living longer, there is expected to be an increase in UI (36).

Approximately 50% of women of all ages have reported some type of UI ranging from a small amount to more frequent leakage. The greatest amount of leakage has been reported in those women over 65 years old (17). However, about 50% of females 18 years of age and older will have mild SUI (6).

To determine the incidence of UI in the general population, a cohort study was performed (45). The study reported incontinence to be higher in women than men, and that the incidence stayed about the same between ages 50 and 80 for women. The severity of leakage was assessed by the number of pads used, and more women than men reported using pads. Pad usage may not have been a good way to assess severity. Some may not care if they leak urine in their underwear, or possibly can not afford pads. Furthermore, the reporting of how many pads used may not have been accurate.

In another survey (50), 123 men and 124 women answered questions about urinary incontinence prior to being admitted to an acute care facility. The age range was 22 to 92 with a mean of 62 years. Some of the questions asked pertained to leakage during sneezing, and unintentional leakage. Three times as many females than males reported leakage. Pad use was reported by 66% of women and 38% of men.

Schultz et al (50) examined the occurrence of urinary leakage in women by age: 20% were less than 50 years old, 24% between 50-64 years old, 31% between 65-74 years old, 17% between 75-84 years old, and 9% were 85 years and older. Another important finding was that prior to hospital admission, 103 people reported UI, but only

10 of the 103 had it documented in their medical records at admission. This study also looked at the primary diagnosis and compared it to the incidence of UI: gynecological cases had an 80% occurrence of leakage, gastrointestinal 52%, infection/disease 46%, neurological 45%, nephrology 40%, cardiovascular 38%, respiratory 37%, skin 33%, musculoskeletal 26%, and all other diagnoses had a 52% occurrence of UI.

A study by Norton et al (37), in which questionnaires and interviews determined the prevalence of UI, reported that out of 201 women aged 16 to 86 years, 57% had SUI. The most common type of incontinence reported between ages 35 to 49 was SUI. An important point to note is that many of these women had not yet gone through menopause. Therefore, one could conclude that SUI is not exclusively a problem of aged and postmenopausal women.

A survey (61) in New Zealand compared the incidence of UI between vaginal deliveries and cesarean sections three months after delivery in women ages 15 to 45. The survey return of this study was 71% (the biggest return was 42% from women ages 25-29), with 34% reporting symptoms of UI. Though childbirth is a risk factor for UI, many primiparous women reported leakage beginning anywhere from before pregnancy to after delivery. A decrease in occurrence of UI was reported following cesarean section deliveries, especially in primiparous women without any previous UI. It should be made known, however, that there was no difference in incidence between women who had three or greater cesarean sections compared to those who delivered vaginally. The author offers a possible explanation of denervation of the bladder. Umlauf and Mathis (58) agrees that UI is less likely after cesarean section than after vaginal delivery and that, postpartum, women who deliver vaginally reported a greater incidence of leakage than

those who delivered by cesarean section. The authors agreed that increased parity, especially four or more deliveries, is a significant risk for leakage. Following vaginal delivery the prevalence of UI was 24.5%; following cesarean section delivery the prevalence of UI was 5.2% (61), suggesting that vaginal deliveries have a greater association with UI.

A study of Turkish women was conducted to determine incidence of UI (57) These females were of reproductive age (18-44) and reported to an outpatient clinic with a primary complaint of a gynecological nature. Those with the chief complaint of UI were excluded from the study. The research tool was a survey with questions ranging from obstetrical/gynecological history to urinary leakage and severity. Out of 1250 women participating in the study, 24.5% admitted to leaking urine involuntarily, with 3.1% having major incontinence (leakage more than once every day), and 21.4% minor incontinence (any leakage less than major). The least amount of leakage occurred in 18-29 year olds with 23.2% being minor leakage and 1.2% major. The greatest amount of leakage occurred in the 40-44 year olds, with 29.2% having minor leakage and 7.6% major. Nulliparous women had the lowest prevalence of major UI (1.2%), versus 1.6% for primiparous, 3.1% for multiparous and 7.3% for grandmultiparity (giving birth at least seven times). The prevalence of minor UI was lowest in the nulliparous and primiparous women with both being 16.1%, while minor UI occurred in 18.1% of multiparous women and 40.1% of grandmultiparous women. On average the women completing the survey for this study admitted that they had had these symptoms for approximately 4.5 years (less time in the younger than the older females). It may not be possible to apply these results to the general population as it was performed in a hospital where people were

coming in *not* for UI, but for regular health seeking care. Therefore, it did not encompass all those who do not seek care.

Another specific population surveyed (40) included female athletes at a major university. Questions pertained to occurrence of urinary symptoms while playing college sports, during other exercise (on their own), and in everyday life. The sports the athletes were involved in were tennis, track, gymnastics, basketball, volleyball, golf, hockey, swimming, and softball. None of these females had ever given birth. Questions also focused on unexpected leakage not only during sports, but also with coughing, sneezing, laughing, and en route to the bathroom. Out of 156 women surveyed, 144 of them completed surveys, and 28% admitted to SUI at least once: two just once, 12 rarely, 18 sometimes, and eight frequently. Gymnasts had the greatest incidence of SUI, followed by tennis players. Golf had the least incidence, with no women reporting leakage. Surprisingly, UI in junior high athletes was reported by 7 women, in high school athletes by 16 women, and in college athletes by 17 women, although only one woman admitted to wearing pads for leakage. Other activities causing leakage outside of college sports in 16% of the 144 women was running, aerobics, and riding bikes. Leakage was reported 15% of the time with coughing, 11% with sneezing, and 3% with lifting. This study did not relate UI to the menstrual cycle, weight, height, or how long they played sports and the amount of leakage was not reported .

A survey was performed in a family practice environment to determine the prevalence of UI in 833 females over age 25 and under 21 and on birth control pills (25). The questions were associated with SUI such as leakage upon coughing, laughing, and going up stairs, and about frequency of leakage and childbearing history. Three-hundred

and forty-three of the women reported UI with the following severity: 68% reported damp underwear, 18% needed to change underwear, 14% always wore protection. Of the 833 women, 15% reported that they often had leakage upon coughing, lifting, and laughing. The results of this study showed that UI was more common in premenopausal females (63%) than in postmenopausal women (51%). Urinary leakage in nulliparous women less than 25 years old was 31%, and interestingly only 17% overall for all ages of nulliparous women. These statistics lead one to believe that UI is less prevalent in older nulliparous women.

A study by Samuelsson et al (49) was done to determine the prevalence of UI. Women ages 20-59 in an urban community completed surveys pertaining to UI along with other general questions such as gynecological history, occupation, diet, and tobacco use. Patients were considered incontinent if they answered yes to involuntary leakage. They were categorized into the type of incontinence. Involuntary leakage of urine was reported by 136 of the 491 women who participated in the study. Comparing the occurrence among types of UI for women ages 20-59, SUI had the highest prevalence at 16% followed by mixed at 5%, urge at 2%, and all others at 5%. SUI on a daily basis was reported by 6.5% of the women. The incidence of SUI was broken down by age group with the highest incidence being 29% for women ages 40-49, followed by the 50-59 year olds at 22%, then 30-39 year olds at 17%, and 20-29 year olds at 2%. The average age of the continent women was 36.3 with 13% being postmenopausal, and the average age of the incontinent women was 46.1 with 29% being postmenopausal. There was no significant differences reported between the two groups in regard to marital status and occupation.

According to Umlauf and Mathis (58) urinary incontinence is prevalent in the younger population. Surveys were completed by 122 females ages 16-36 (average age of 22) who were 10 to 32 weeks postpartum. UI before pregnancy was reported by 6% of women of all ages, with no significant difference between ages. During pregnancy, 61% of women reported leakage with the 20-29 year olds having the highest prevalence (30%), followed by the 16-19 year olds (23%), and lastly by the 30-36 year olds (8%). After pregnancy, the 16-19 year olds reported the highest prevalence of urinary incontinence (9%); the 20-29 year olds and 30-36 year olds had a prevalence of 3% and 4%.

In summary, UI does not affect one specific age group but affects women of all ages, and SUI is diagnosed in 50% of all UI cases. Some studies proved UI to be more prevalent in a younger population where others proved it to be more common in the older population. Most studies agree that increased vaginal deliveries are associated with a higher incidence of UI, but UI may also occur in women who have had cesarean section or no children at all (6, 37, 58, 61, 57).

Clinician Awareness and Evaluation of Urinary Incontinence

Many health care professionals believe SUI to be a normal part of aging that occurs primarily in women who have given birth. Many clinicians do not know how to diagnose SUI. Often, the appropriate questions are not asked while taking a history, which then does not allow for the correct diagnosis (5, 40, 29).

Clinicians need to be aware of, and ask about, symptoms of SUI as patients are usually not willing to initiate such discussions (37). Since this is a sensitive issue, the patient-clinician relationship is very important. Educating patients can help to reduce the

fears. Furthermore, if more health care practitioners discuss SUI with patients there may be a decline in incidence due to earlier treatment (36).

Practitioners must be aware of the causes of all the various types of incontinence. Once a urinary problem is discovered, the cause should be sought (33). After a physician has become proficient at recognizing the symptoms of UI, the focus should be aimed at physical assessment. The vagina should be examined for skin changes (atrophy), inflammation, and cystocele (29). The appropriate diagnosis is important, for an inaccurate diagnosis can lead to unnecessary surgery and low success rates with various treatments since not all types of incontinence are treated the same way (23). Early forms of noninvasive treatment that practitioners should be familiar with include bladder training and pelvic floor exercises (36).

McFall et al (32) performed a study in which physicians were randomly surveyed by mail to assess practice trends in diagnosing and treating UI. The physicians were of various specialties: general practitioners, internists, obstetricians/gynecologists, and urologists. The study revealed that only 17% were aware of the clinical guidelines to evaluate and treat UI. Also, more than 40% of the internal medicine and family practice physicians admitted to recommending protective pads to patients as a form of treatment. This study showed that patients with UI are missed by physicians, and that not all physicians are adequate in diagnosing and treating UI.

There are a number of items that should be included in the management of patients who present to the family practice office with signs and symptoms of UI. A full evaluation of the patient is necessary, including risk factors and reversible causes of UI. All treatment options for the UI should be discussed, including the reversible causes. A

management plan that is in cooperation with the patient's goals and status should be devised. Finally, patients should be educated about their condition and ways to improve their quality of life (1).

The primary assessment of a patient with UI begins with a history and physical exam. Through the initial assessment, the health care provider should determine the type of incontinence, the degree to which the UI inhibits the patient's quality of life, and the existence of any associated conditions (47). Specifically, transient and functional causes of UI must be identified. Information on drinking habits, voiding habits, cystitis, atrophic vaginitis, constipation, and medication is needed to aid in determining the cause. It is also important to determine the existence of any medical or surgical conditions that may be contributing to the UI. More complicated causes of UI include tumors in the true pelvis, previous pelvic surgery, and neurological diseases. The basic assessment also includes deciding whether the patient needs further evaluation or a referral (34).

In summary, all female patients should be questioned about their continence during a routine history and physical examination. Many patients will not broach this issue with their clinicians unless the subject is addressed, either due to embarrassment or ignorance concerning the causes of UI (14).

History and Physical Exam

There are many areas that must be discussed in order to obtain a detailed history of a patient with UI. First, the type of incontinence must be examined and risk factors determined. The severity of the incontinence may be determined by the number of incontinence episodes, and protective pads used, in a 24 hour period. Other areas of the body must be considered as possible causes of the incontinence and therefore must be

inquired about. A health provider may include diabetes, current medical problems, neurological causes, constipation, cystocele, and tumors. The drinking and voiding habits of the patient must be determined, as well as their social routine. The questioning should include duration of UI, triggers of incontinence (such as cough or laugh), sexual function changes, and leakage protection used. Other urinary signs and symptoms should be discussed, including recurrent cystitis, dysuria, stranguria, hematuria, nocturia, and frequency of urination. Any medications the patient taking is of interest, especially diuretics, estrogens, psychotropics, anticholinergics, and antihypertensive medicines. Finally, any previous treatment and the patient's current expectations for treatment are discussed (34, 35, 48, 1).

The effect of incontinence on quality of life is a contributor to its severity. Quality of life of the patient needs to be assessed with a social history including the living arrangements of the patient and how the incontinence affects their work and social activities (1).

A questionnaire on UI, completed by the patient complaining of UI prior to their office visit, is extremely helpful to a clinician when meeting an incontinent patient for the first visit. Because the questionnaire is completed at home, the patient has ample time to consider her answers and list questions for the health care practitioner. The responses to the survey also encourage discussion during the initial meeting. Some items to include on a questionnaire are symptoms, gynecologic history, obstetric history including types of births and birth weights, bowel function, previous surgery, sexual function, medications, pad usage, quality of life, and any other medical or neurological disorders (10, 14).

The frequency/volume chart, completed by the patient, also provides diuresis information, fluid intake, incontinence episodes, the diurnal distribution of voidings, mean voided volume, and maximum voided volume (functional bladder capacity). The frequency/volume chart is an easy and inexpensive way to evaluate UI. It can be used to separate motor, urge, and stress incontinence by using the frequency of micturition and the range of voided volumes (34, 53).

A voiding diary may enable the clinician to identify triggers of the UI episodes. The diary should include fluid intake, voided volumes, amount of leakage, frequency of leakage, symptoms of urgency, activities that provoke episodes, certain foods or beverages that provoke leakage, and whether the incontinence episodes awaken the patient from sleep (41, 10, 48).

Once a patient is suspected to have SUI, their physical exam should be done with a moderately full bladder, and be examined in the lithotomy, sitting, and standing positions. The standing exam is important because a prolapse may be missed when performing an exam in the supine position (10, 47).

During the cough stress test the patient lies in the lithotomy position with a full bladder and is asked to cough while the practitioner watches the mobility of the urethra and also observes the leakage of urine through the external meatus (29). The cough stress test can also be done in the standing position (with a full bladder) with the legs shoulder width apart (60). According to Wall et al (60), the simple cough stress test has a sensitivity of 88.1% and a specificity of 77.1% for SUI when urine leakage is observed. It was also reported a positive and negative predictive value of 82% and 84.4% respectively. A cough induced detrusor contraction may occur during this test, where the

loss of urine continues after the straining. This occurrence may make interpretation of the cough stress test more difficult.

The Marshall test is similar to the cough stress test, and is used objectively to demonstrate anatomic SUI. The test is performed during the pelvic exam with a full bladder. The patient is asked to perform the Valsalva maneuver, which increases intra-abdominal pressure. If SUI is observed, the clinician attempts to stop the incontinence by manually supporting the anterior vaginal wall with two fingers on either side of the urethra in the vagina. The clinician then lifts the bladder neck. If the manual attempt is successful in stopping leakage, the test is considered positive and demonstrates that a patient would be a good candidate for surgery because the test mimics the results of surgery as treatment (14, 29).

The cotton swab test (or Q-tip test) evaluates hypermobility, or urethrovesical mobility, of the urethra. “Hypermobility is defined as a resting urethrovesical angle or a straining urethrovesical angle of greater than 35 degrees from the horizontal.” (47). A sterile and lubricated cotton-tipped applicator (a rigid straight catheter may also be used) is inserted through the urethra into the bladder. The applicator is then removed to the urethrovesical junction which is the bladder neck. At this point the resting angle is recorded. The patient is asked to perform the Valsalva maneuver, and the degree of rotation from the resting angle is recorded (the straining angle). If incontinence and hypermobility are demonstrated, the results are consistent with SUI (47, 10). The cotton swab test has been criticized because all hypermobility of the urethra does not constitute SUI. Also, the resting and straining angle are independent of bladder fullness, but

dependent on the location of the cotton swab in the urethra. However, the test is useful for demonstrating anatomic defect (26).

Urologic Assessment

UI can have more than one cause, therefore routine testing should be done to rule out fairly common disorders such as urinary tract and kidney infections. The routine assessment on a UI patient should include urinalysis, urine culture, and renal function tests (47).

Urine dip-sticks are a quick and easy screening method for UTI's, diabetes, and any signs of disease of the urinary tract. Because dip-sticks cannot detect infections caused by non-nitrite producing bacteria, or infections with less than one million bacteria, patients with UI and symptoms of a UTI should have a urine culture (34).

Additional Evaluation

If additional evaluation is necessary to diagnose SUI in a patient or determine the cause, several other options exist. Pad and Pyridium weight tests are used to demonstrate and quantify leakage of urine. The patient's first sensation to void and bladder capacity may be determined by cystometry (34). The voiding cystourethrogram (VCUG) is used to visually confirm the presence of SUI, to evaluate bladder neck position, vesicoureteral reflux, evidence of diverticula, the level of continence, and the presence of a cystocele. Bladder and urethral pressures can be measured by stress urethral pressure profilometry (UPP) (10). Urethrocystoscopy provides many observations of the anatomy as well as diagnosis of SUI (29). Hypermobility of the bladder neck can be demonstrated with

ultrasound (34). Magnetic resonance imaging can detect anatomical defects but it has not been used routinely in the evaluation of SUI (55).

Reasons for not Seeking Treatment

Some women do not seek treatment for UI at all, or wait to get help, for many reasons. Embarrassment, and fearing that the only treatment available is surgery, are a couple of reasons for delaying medical help (29). A study on UI, using a questionnaire (57) reported that 35 % of women with UI had never sought treatment. Furthermore, of the women who did not seek medical consultation, 90% of them did not think the symptoms experienced were important. Other reasons reported were being shame, low financial means, and fear of surgery. For the purpose of the study, incontinence was defined as leakage more than one time every day. Even though there were frequent symptoms, 66% of the women who reported incontinence had never sought medical help (57).

Another study (37) reported that many women delay seeking care until symptoms are intense, or they do not seek medical care at all. Twenty-five percent of women waited at least 5 years from the onset of symptoms to seek assessment from a primary care physician, while 33% waited 1 to 5 years, and 40% sought help within one year. This study reported that the severity of the symptoms was not associated with seeking medical care, and that unmarried women were more likely to obtain a consultation than were married women. The biggest reason for the delay in obtaining professional help was hope that the symptoms would resolve without medical intervention. Other reasons

reported support the previous studies mentioned. Embarrassment, fear of surgery, and the thought that this is normal for women were the reasons mentioned.

Some women simply believe that UI is a normal part of aging. Others fail to realize that there are specific causes, and that treatments are available (41, 22). Some women do not perceive the leakage as a problem, or think that it does not occur often enough to report (25).

In a study by Umlauf and Mathis (58) a majority of women admitted to not reporting symptoms of UI. In this study, unfortunately, those who did report the leakage did not all receive treatment (58).

Burgio et al (2) reported that, in male and female subjects 65-70 years old, leakage that occurred more frequently and in greater volume was associated with seeking treatment. Nocturnal leakage and mixed UI caused more patients to report to a doctor than those with daytime, stress, or urge UI. Those who presented for routine exams such as mammograms, physical exams, pelvic and rectal exams were more likely to seek treatment. Those who had friends with whom they talked about personal issues did seek treatment more frequently. The greater the number of close friends, the greater the reporting of symptoms. Surprisingly, decreased function in activities of daily living led to increased seeking of treatment. The biggest factor that led to seeking professional help was whether the patient felt the UI was problematic. Disagreeing with previous studies, the authors reported that the following factors had nothing to do with seeking treatment: age, being married, gender, financial support, distance from clinician, and level of education (2).

Over 50% of the subjects in a study conducted via survey reported symptoms of UI to a physician or nurse and were granted no medical intervention. Some subjects even stated that the clinicians offered minimal education on the issue, while others were not sympathetic, and acted embarrassed. Other practitioners simply did not have the time for the issue (24).

In summary, one could conclude from these studies that there are similar reasons among patients as to why treatment is not sought. The most commonly reported reasons mentioned were embarrassment, fear of surgery, and thinking UI is a normal part of aging. Good patient-clinician relationships, and education, may help to alleviate the current dilemma of patients not seeking treatment for UI.

Treatment

Behavioral

Most patients with UI will choose a non-operative treatment when given the option (9). Behavioral treatment for UI, such as pelvic floor exercises, have certain advantages. They do not elicit side effects and do not interrupt activities and work with time off for surgery (51)

Pelvic floor muscle exercises, also known as Kegel exercises, help to strengthen weak pelvic floor muscles and in effect may lessen the severity of incontinence if performed 30-200 times per day (44). These exercises are basically contractions of the pubococcygeus muscle.

Vaginal cone weights are available to aid in pelvic floor muscle exercises. They are small devices held by the vagina for 20-60 minutes per day, and are thought to

strengthen the surrounding muscles (39). When the body senses that the cone is slipping out of the vagina, the muscles of the pelvic floor are caused to contract. After the patient has mastered holding the cone for 15-30 minutes per episode, they can increase the weight of the cone (5).

Pharmacological Therapy

SUI may be improved by alpha-adrenergic agonists because the urethra is innervated by the sympathetic nervous system. Striated and/or smooth muscle tone is increased with alpha-adrenergic stimulation, in effect, strengthening urethral resistance (1). Also, some antispasmodics and analgesics may reduce symptoms such as frequency, urgency, post void fullness, and dysuria, and in effect lessen the patient's discomfort (7). Alpha-adrenergic agonists may be used to lessen the symptoms of SUI, but are rarely shown to eradicate them completely. These medications help by increasing urethral resistance and some can be found over the counter in some decongestants (18).

Vaginal and oral estrogen therapy can also relieve or lessen symptoms of SUI in some patients and also enhance a patient's response to other therapies. Estrogen supplementation is especially important in post-menopausal women and women with vaginal effects of estrogen deficiency (7, 5). Studies have shown that estrogen levels influence urethral closure pressure and urethral pressure transmission (19).

Surgical

Most surgical procedures to correct SUI are intended to increase pressure in the urethra during certain activities. This is accomplished by elevating and supporting the

urethrovesical junction either by an abdominal or vaginal approach. Several factors that may cause the surgical correction of SUI to fail are incorrect primary diagnosis, poor healing, secondary causes of SUI, poor correction of the anatomical defect during surgery, or a low resting urethral closing pressure (7). The goal of surgery to correct SUI is to return the urethrovesical angle to its original position. There are 100 or more different approaches and techniques used to perform these surgeries (19).

The retropubic suspension (Burch retropubic urethropexy) is a type of surgery that consists of an incision in the lower abdomen. Sutures are placed to secure endopelvic connective tissue and vaginal smooth muscle to the iliopectineal ligament (5). The transvaginal suspension is done through incisions in both the vagina and lower abdomen. The sutures are placed through the vaginal incision into the area near the bladder neck and urethra and then brought to the abdominal incision. Two variations of this procedure are the Raz and Stamey procedures. Anterior repairs, also known as Kelly Plications, allow support of the bladder with pubocervical fascia. All of the above are used for treatment of SUI due to hypermobility of the urethra without internal sphincteric deficiency (5). During a suburethral sling procedure material is sutured to the abdominal wall or pelvic bone after it is placed beneath the bladder neck and urethra (1). This surgery is for treatment of patients with internal sphincter deficiency alone or with urethral hypermobility (5).

Other Treatments

Pessaries are devices that are inserted into the vagina. They stop urine leakage either by lending support to the urethrovesical junction, or by blocking the urethral

meatus. However, patient responses to these devices vary. Many find them uncomfortable and difficult to use, while others are happy with the results (5).

Electrical stimulation treatment for SUI consists of passing an electrical current through the pelvic floor and in effect contracting the pelvic floor muscles while inhibiting detrusor activity (5). There are conflicting studies on the efficacy of electrical stimulation as a treatment of UI, possibly due to the differences in electrical frequency and duration of cycles used (54).

Periurethral injections are used to provide closure of the urethra during stress. Bovine collagen is used, and injected at the urethrovesicle junction with the aid of cystoscopic visualization. This treatment helps patients with SUI due to internal sphincter deficiency (59). Possible side effects are urinary tract infection and urethral irritation (5).

Patient Compliance

Patients have a tendency to be lax when it comes to caring for themselves, especially over a long period of time. Treatments other than surgery are usually intended to be life-long. Unfortunately, with long standing treatments, patients become less compliant. It is not likely for a woman to continually perform daily Kegel exercises, for example (5). Should the treatment not be instantly effective, which most are not, more patience and self-discipline is required of the patient. This may lead to a decrease in patient compliance. Most importantly, diagnosing the type of UI is very important, for an incorrect diagnosis leads to unnecessary and incorrect treatment and further decreases patient compliance (20).

Psychosocial Aspects and Quality of Life

“Quality of life is an abstract concept encompassing an individual’s perceived level of physical, psychological, and social well-being.” (27). Quality of life (QOL) is perceived differently by every patient. It is influenced by many experiences and beliefs throughout life. It is important to evaluate a patient’s quality of life and psychological state because that can be as important in treatment as a person’s physical state (27).

Women suffering from UI often will alter their way of life in place of seeking treatment for their condition. They will arrange their activities depending on the location of bathroom facilities, decrease social interactions, and alter sexual relationships. Many areas of life are affected including physical activities, hobbies, careers, and mental well-being (27).

Norton et al (37) reported several social affects of UI in their study on 201 women, 16 years of age and over, who were being assessed at a urodynamic clinic. The participants completed a survey regarding symptoms, severity, and emotional and social “consequences” of symptoms. The results indicated that these women with UI adjusted to their condition by avoiding fluids, wearing protective pads, avoiding lifting, and avoiding sexual intercourse. They reported that their incontinence affected their work and made them feel less attractive. Sixteen percent of these women also reported that their biggest problem was that they felt different from other women because of their condition.

Studies on quality of life would be beneficial to the evaluation of UI. These studies would quantify the effects that UI has on patients’ lives, the alterations they make,

their satisfaction with treatment and the reasons they seek help (27). All women view their UI differently in regards to the seriousness of the problem. Some of the factors affecting the patient's perception are cultural beliefs, age, race, marital status, sexual difficulties, duration, severity of symptoms and social pressure. Although previous studies show that duration and severity of symptoms do not appear to correlate well with quality of life, this is most likely because quality of life has many factors contributing to it and UI affects everyone differently. This idea adds to the argument that quality of life assessment is important, and needs to be considered when evaluating severity of UI (27).

A study was performed on the psychosocial impact of UI on women and its relationship to diagnosis and severity of leakage. The 69 women in this study were community-dwelling and age 55 or older with a mean age of 67.8. The Incontinence Impact Questionnaire was used to score psychosocial impact. The women were divided by urodynamic testing into two groups: those with sphincteric incontinence and those with detrusor instability with or without sphincteric incompetence. The severity of each woman's incontinence was determined by a voiding diary and a "fluid loss quantitation test". The Incontinence Impact Questionnaire measured psychosocial impact. The responses were then divided into three categories: activities of daily living, social activities, and self-perception. The study found that the social aspect most affected in these women's lifestyles was their planning of activities at unfamiliar locations because they did not know the location of a restroom. It was also shown that women with detrusor instability with or without sphincteric incompetence were more affected than women with sphincteric incompetence alone. The severity and frequency of the UI episodes was only slightly correlated with psychosocial scores, therefore these results

show that there is not a directly proportionate relationship between psychosocial impact of UI and objective measures of severity (62). There has been very little research on the psychosocial effects of UI (4) although there are disease-specific, and broad spectrum, quality of life questionnaires currently available (27).

Robinson et al (46) conducted a survey to discover whether a shorter interview process can be substituted for more lengthy questionnaires to measure QOL. The two forms mentioned in this study were the Incontinence Impact Questionnaire and the Urogenital Distress Inventory. In this study, patients over 60 from 41 primary care practices answered a brief telephone survey. They were considered to suffer from UI if they had experienced one episode per week in the last three months on average. Three hundred eighty-four women participated, and each answered a phone survey and filled out both the Incontinence Impact Questionnaire and the Urogenital Distress Inventory. This study found that a positive response to the question “Do you consider this accidental loss of urine a problem that interferes with your day-to-day activities or bothers you in other ways?” was correlated to a decreased QOL as measured by the two questionnaires. A primary health care practitioner may be able to assess the effect of UI on a woman’s QOL by simply asking whether their UI interferes with her day-to-day activities. Other symptoms that correlated with a decreased QOL were increased amounts of urine leakage per episode, more frequent voids, and more incontinent voids.

Some patients may benefit from speaking with the clinician about the way UI has affected their life. In response, it is important for clinicians to evaluate the way patients deal with their incontinence (14).

There are many studies that report the effects of UI on the elderly. Diokno et al (8) found that 73% of women with incontinence found it “very difficult” to deal with urine loss. Fifty-seven percent found it a “very embarrassing” problem, and 31% found it to be “somewhat embarrassing”. There are few reports on UI in younger women (below age 60), and even fewer on the psychosocial effect of UI on younger women.

CHAPTER 3 METHODOLOGY

Procedures

Family practice clinics in southwest Michigan area were selected from the telephone directory and contacted. They were given a brief overview of the research project including the subjects' inclusion criteria, survey content, and procedural outline of how to complete the research. Each office was asked to have at least 10 surveys completed. Upon providing verbal agreement to participate in the study, the offices were sent a one page authorization letter (Appendix A) once again explaining the research project, and a copy of the survey to be used. Upon reviewing this information the clinics signed and returned the authorization form to participate in the study. Packets containing explicit instructions (Appendix B), surveys, letters to the patient explaining the research project (Appendix C), patient consent forms (Appendix D), and sealable envelopes marked confidential were sent to each clinic. Each clinic received 20 packets in the event they chose to distribute more than the 10 promised surveys. The clinics distributed packets to women entering the offices who met the inclusion criteria. The patients were instructed to read and sign the informed consent letter and fill out the survey. Patients were asked to include their name and address on the back of the information letter should they want the results of the study. Once the patients completed the materials, they were instructed to put them in the sealable envelope marked confidential and return them to the designated person or place at the clinic. The clinics were given the option to distribute and collect the surveys at their convenience. For example, the receptionist could have handed them out when the patient signed in, or the nurse could have handed them out when the patient was taken back to the examination room. Phone calls to the clinics were made over a 2 month period to assess the status of the surveys. The clinics were given the time frame of 2 months to have the data collection completed. At the end of the 2

months the clinics were called and informed that the data collection period was over and that the completed data and research materials would be collected. Some clinics opted to return the data and research material through the mail.

Sampling Methods

The sample was one of convenience. Women who visited the clinics and met the inclusion criteria received a survey from the office staff. The research design was random, non-experimental, descriptive, survey research. Certain characteristics of the sample population were described without manipulating them. The variables that may have influenced a person's responses on the survey were: embarrassment, attitudes (of patient, health care practitioner, society), educational level of the subject, setting in which the survey was completed, and concerns about confidentiality.

Subjects

This was a sample of 49 English speaking women ages 19-35, nulliparous or parous, who sought patient care at a family practice office. This age group was chosen secondary to the belief that UI is a disease of older women. Exclusion criteria were women out of the above age range, non-English speaking women, and women that have been pregnant but have had an end result other than vaginal birth. A total of 200 surveys (Appendix E) were distributed. Fifty-three were returned and 4 were excluded based on the above criteria. Seven clinics (Appendix F) in southwest Michigan participated in the study.

Research Instrument

The tool used to collect the data was a one page survey (Appendix E) that included simple questions allowing the patients to circle a response. Two questions were more detailed and required the patients to write answers out. Some types of questions

that were included in the survey were: age, gender, parous versus nulliparous, type of delivery, symptoms of urinary incontinence, treatment, and health care professionals' response to urinary incontinence.

Analysis

A null hypothesis was used: there was no difference in incidence of urinary incontinence and reporting in nulliparous versus parous women ages 18-35. The data was analyzed by the Chi-Square test.

The responses to the survey question, "Have you ever spoken with a healthcare professional regarding involuntary loss of urine; if yes, what was that person's response, if no, why not?", was analyzed qualitatively. The responses are described in chapter IV.

CHAPTER 4 DATA ANALYSIS

Techniques of Data Analysis

A Chi-Square test was used to determine if a relationship existed between the variables. Survey responses were analyzed qualitatively using description of results.

Characteristics of Subjects

The subjects were 49 females ranging in age from 19 to 35 with a mean age of 27.7 years. Forty-eight women reported having health insurance. Thirty women had given birth vaginally. Of these, 43.3% (13/30) had one vaginal birth each, and 56.6% (17/30) had 2 or more vaginal births. The number of nulliparous women was 19. The age range of the women at the time of delivery was 15 to 30, with the average age of 23.9.

Incidence of SUI

A relationship was found between vaginal delivery and the incidence of SUI (Table A). Overall, 46.9% (23/49) of women (nulliparous and parous) reported symptoms of SUI. A significantly greater number of parous women experienced symptoms of SUI than nulliparous women. The Chi-Square test was appropriate (Table A) for the expected values were all more than 5.

Table A: Incidence of SUI and Vaginal Delivery

Vaginal Delivery	Symptoms of SUI (No)	Symptoms of SUI (Yes)	Total	% of Women Experiencing SUI
No	16	3	19	15.8%
Yes	10	20	30	66.6%
Total	26	23	49	

Test Statistic: 12.09

Degree of Freedom: 1

P-Value < .001

There was no relationship between the number of vaginal deliveries and the incidence of SUI (Table B). The incidence of SUI increases with any pregnancy resulting in vaginal delivery.

Table B: Incidence of SUI with Increasing Vaginal Deliveries

Number of Vaginal Deliveries	Symptoms of SUI (No)	Symptoms of SUI (Yes)	Total	% of Women Experiencing SUI
One	4	9	13	69.2%
Two or More	6	11	17	64.7%
Total	10	20	30	

Test Statistic: .068

Degree of Freedom: 1

P-Value = .794

The 3 women that were nulliparous with symptoms of SUI reported frequency of occurrence as, "once, a couple of times, and every few months." Of the 20 women that were parous and experienced symptoms of the SUI the frequency of symptoms was

reported as follows: daily 18.2%, weekly 22.7%, monthly 9.1%, every few months 31.8%, once,9.1%, and one woman reported SUI symptoms 2 to 3 times in her lifetime.

Table C reports the frequency of each trigger of SUI for parous females. In addition to those responses, one woman reported jumping as a response. Climbing stairs, sexual activity, and fear/nervousness were excluded from the table due to no response. The women were able to choose more than one trigger. Of the 3 nulliparous females that experienced SUI, 66.6% reported laughing and coughing as triggers, and 33.3% reported exercising and sneezing.

Table C: Triggers of SUI

Triggers of SUI	% of Women Experiencing Triggers
Laughing	60.0%
Excitement	5.0%
Exercising	35.0%
Coughing	75.0%
Lifting	15.0%
Straining	15.0%
Sneezing	90.0%

Reporting

The number of women who had admitted experiencing SUI was 23 (parous and nulliparous), but only 6 of them reported these symptoms to a health care professional (26.1%). The responses from their health care providers were as follows: 2 women were told it was due to pregnancy, 3 women were instructed to perform Kegel exercises, 1 woman was told she was too young to be diagnosed with SUI, 1 woman was given medication, and 1 woman was assessed via cystogram.

Seventeen women (parous and nulliparous) chose not to report their symptoms of SUI to a health care provider. Of these, 16 indicated why, with some women giving more than one reason: four thought it not to be a major concern, two stated that it only happened during pregnancy, four said it happens so rarely, three reported doing Kegels on their own, two thought it was normal, one reported always having a weak bladder, and one did not know why.

CHAPTER 5

DISCUSSION AND IMPLICATIONS

Discussion of the Findings

The results of this study indicate that SUI is found in younger women, as reported previously. However many people, including healthcare practitioners, believe UI is a disease of older women who have given birth and is a natural part of the aging process (40). The purpose of this study was to determine the incidence and reporting of SUI in nulliparous versus parous women, ages 18-35, in the family practice setting, and also to determine why some women do not report their symptoms of SUI to their healthcare professional. For example, are they embarrassed to broach the subject? If more patients discuss this sensitive issue with their health care providers, providers may, in turn, become more aware of the problem. However the burden cannot be put completely on the patients, as clinicians need to be aware of the basic questions to ask during a routine exam as well as how to assess for SUI.

It cannot be concluded from this study whether the increased incidence of SUI among parous women was a result of the pregnancy or from the trauma of vaginal delivery. Was it the weight of the baby on the pelvic floor throughout the third trimester that led to SUI, regardless of the delivery method (c-section or vaginal)? Was the SUI due to damage to the nerves innervating the muscles of the pelvic floor throughout the third trimester or from the trauma of the delivery? Another question to be answered is, does the degree of tearing during childbirth relate to the incidence of SUI?

There was a relationship between pregnancy resulting in vaginal delivery and the incidence of SUI. Due to the location of the bladder within the pelvic cavity, the bladder and urethra are subjected to any rise in intra-abdominal pressure. Pelvic floor muscles support the bladder and oppose the increasing intra-abdominal pressure. Pregnancy and giving birth are two contributors to a weakened pelvic floor and, subsequently, incontinence. Vaginal childbirth also contributes to SUI by denervation of the pelvic floor due to pressure. The pressure can be exerted as the fetus grows, or by the head of the fetus with passage through the birth canal damaging the pudendal nerve. This nerve innervates the lower urinary tract and levator ani muscles, therefore leading to a weaker pelvic floor when it is damaged. A woman who has had a cesarean section may also be at risk for this type of damage if there was a period of labor (5). In general, women who have given birth by any method are found to have lower urethral pressures than nulliparous women. This lower urethral pressure leads to SUI because, as stated previously, when there is an increase in intra-abdominal pressure it is transmitted to the bladder. When bladder pressure exceeds urethral pressure, leakage occurs (16).

There was no relationship between the number of pregnancies resulting in vaginal deliveries per woman and the incidence of SUI. There are not any conclusive reports on why increased deliveries do not increase the incidence of SUI. It may be that studies are solely researching the existence of SUI, not the severity of SUI, which may in fact increase with more deliveries.

Overall, 23 out of 49 (46.9%) of the women surveyed aged 19-35 reported experiencing symptoms of SUI. However only 26.1% of those women experiencing symptoms of SUI actually reported it to their healthcare providers. Several studies

reported embarrassment as the main reason for not reporting SUI symptoms to clinicians (16). Women experiencing SUI may be embarrassed because they feel they are too young to lose control of bladder function, or they may feel uncomfortable with their provider. Other reasons given for not reporting were low financial means and fear of surgery (11). Because SUI is not a health issue that is publicly discussed, many women do not realize that there are several treatment options available other than surgery. It seems clear that providers need to approach the subject, for many patients simply will not openly offer that information on their own.

Limitations of Study

This study relied on the truthfulness of the subjects. Unfortunately not all people are of integrity, and not all people understand the importance of honesty in research. It is possible that, for the sake of filling out the surveys quickly, subjects just circled all no answers, or denied the truth to avoid further explaining themselves in the narrative section of the survey. Hopefully most subjects were honest, as the data solely depended on it. There was not a way to assess the truthfulness of the subjects.

The surveys were given out at the convenience of the family practice office personnel. It was possible that women who were well known (medically and personally, or thought to be more compliant with the survey) were more likely to receive the survey, which may have missed other women with the symptoms. If this was the case the results may have been entirely different.

Suggestions for Further Research/Modifications

A future study may compare different pregnancy outcomes including vaginal birth, cesarean, spontaneous and induced abortion to determine if the increase incidence of SUI is due to pregnancy or the method of delivery. Factors to be considered in the different pregnancy outcomes would be, weight of the baby, presentation (breech versus vertex), premature, term, post-term, degree of tearing, episiotomy, and hours in labor.

In regards to reporting, a study might be done which focuses on healthcare practitioners including their habits of assessing patients for SUI and their knowledge of treatments available. One study could be done to educate healthcare providers on how to recognize and treat SUI, then later assess their practices.

Another recommended future study would be on the causes of SUI in only nulliparous women. Even though a very small number of these women reported it, it did occur. Some factors to be considered would be age, weight, hypoestrogenism, previous gynecological or urological surgeries, high impact activities, and congenital abnormalities as related to the issue. Age and weight are both factors to consider. For instance, is a young, overweight individual more at risk for SUI than an older, normal weight individual? Is estrogen effective in treating only postmenopausal women, or do premenopausal women also benefit from estrogen replacement or birth control pills containing estrogen? Previous surgeries are a factor because the patient may not have been diagnosed correctly initially, and they may have been treated with an inappropriate surgery (different procedures treat different types of SUI). Also, does scar tissue from a

previous surgery play a role in SUI? Is there a significantly greater incidence of SUI in females involved in high impact activities? Do certain sports actually weaken the pelvic floor? And finally, can a congenital abnormality be found that would contribute to the SUI, such as an abnormal urethrovesical angle?

Conclusion/Relevance to the Profession

This study is significant to the healthcare profession, as it demonstrated that SUI does affect both nulliparous and parous women ages 19-35. Therefore, practitioners should incorporate this knowledge into the history taking portion of female health maintenance exams. Clinicians should screen young, nulliparous women for symptoms of SUI by asking whether they ever have leakage of urine with activities such as coughing, laughing, or sneezing. By broaching the subject of SUI, the clinician is encouraging the patient to discuss any SUI symptoms with them. As shown by the research, many women afflicted by SUI believe it to be normal and therefore may not report it to clinicians without encouragement.

For women who are pregnant, or are thinking of becoming pregnant, preventative counseling is just as important as screening. A clinician can spend less than five minutes explaining how to perform Kegel exercises and informing the patient that these exercises have been shown to reduce the incidence of SUI in pregnant females and after delivery. Those five minutes have the potential of saving the patient from experiencing future symptoms of SUI.

After just one vaginal delivery, the incidence of SUI is shown to increase. For this reason, clinicians should concentrate on this population for screening and possible treatment of SUI. Furthermore, clinicians need to use the tools available to diagnose it. One idea is that a provider could give a patient who has completed delivery an SUI questionnaire, voiding diary, or a frequency/volume chart to complete at home and bring back at their six week appointment. These simple tools provide the clinician with information concerning incontinence episodes, mean voided volume, and functional bladder capacity. Above all, these are tools that are quick and effective in diagnosing SUI. Healthcare providers should also educate and increase awareness amongst themselves of the treatment options available to better serve patients with symptoms of SUI. Few of the provider responses given in this study reflected treatment guidelines concerning SUI. Other studies have shown completely outdated responses by clinicians, such as wearing protective pads. It is not practical to expect a woman to wear a protective pad in order to deal with SUI when there are an abundance of treatment options available. If women are supposed to feel that they can approach their providers with symptoms of SUI, adequate treatment options should await them, and this means educating clinicians. Something as easy as Kegel exercises should be the standard response of all clinicians when approached with problems of SUI, with other treatments discussed after the severity of the problem is accurately assessed.

Stress urinary incontinence is widely researched in the elderly population, but more research is needed in younger age groups. Studies have repeatedly shown that SUI does affect younger populations. However, no studies of nulliparous younger women and SUI have been undertaken. If SUI is caused by the mechanism of urethral

hypermobility and sphincter incontinence as the studies show, why are women across all age groups affected? Clinicians need to be studied to determine how much they do know concerning SUI. What would be the best way to educate already established clinicians? Lastly, once primary care clinicians have mastered recognizing SUI (with a complete assessment) and exhausted treatment recommendations within their realm of care (Kegels and ruling out other causes of UI) a referral should be made to a urologist for further assessment and treatment recommendations.

Stress urinary incontinence is a treatable disease. Once patients and healthcare providers are aware of this the prevalence of it should decrease. All women, regardless of their age, should not have to live with the symptoms of SUI.

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APPENDIX A
Agreement to Participate

Dear:

This form is in response to our previous phone conversation this week.

We, Lisa Stoner and Michelle Way, are graduate students in the Physician Assistant Studies at Grand Valley State University. We are conducting a research project on stress urinary incontinence (SUI) in parous versus nulliparous women ages 18-35. We will be comparing the incidence of SUI, self reporting of SUI to the health care practitioner, and also the reasons for not seeking treatment.

The study will be conducted in various family practice clinics in western Michigan. There are many benefits to participating in the study. We may be able to demonstrate that SUI may not be a problem solely of the elderly and parous women, therefore increasing awareness among clinicians that a more extensive history may be necessary. By participating in this study you will be helping to further develop knowledge in this area.

Upon your permission to allow us to conduct this study in your office, we will mail your office surveys with all the appropriate materials. Once 10 surveys are completed, you may return them with the unused surveys in your provided pre-paid self-addressed envelopes. We will contact your office approximately every two weeks to track the progress of completed surveys.

This letter acknowledges that your office intends to participate in our study pending approval from the Grand Valley State University Human Subjects Review Board.

Your participation in this study is appreciated.

Sincerely,

Lisa Stoner, PA-S
(616) 534-6309

Michelle Way, PA-S
(616) 785-7886

Please sign below and return in the enclosed self-addressed envelope. Thank you.

Name _____ Title _____

Signature _____ Date _____

APPENDIX B
Clinical Site Letter of Instruction

Date:

Clinic name

Address

Dear _____:

Enclosed are the materials needed to conduct our study on urinary incontinence. Your packet includes 30 patient packets that contain an introductory letter, a letter of informed consent, a short survey, and an envelope to ensure confidentiality. Please give one of these packets to each woman as she checks into your office that falls under the following criteria: a woman between the ages 18 and 35, and able to read and write English. She may read the contents of the packet and fill out the survey in the waiting room or in the patient exam room, whichever is most convenient for your office. Please tell the patient that this is simply a short survey and that all answers are confidential, not to be seen by any office personnel. Direct her to seal her informed consent and survey in the envelope provided and drop it off at the front desk or leave it in the room on her way out.

We will contact your office in one month to track the amount of surveys completed. Previously we agreed on 10 surveys being completed, however, we have enclosed extra surveys in the event that you are able to have more completed.

We greatly appreciate your participation.

Sincerely,

Lisa Stoner
(616)534-6309

Michelle Way
(616)785-7886

APPENDIX C
Patient Instruction Letter

To Whom It May Concern:

We are two students in the graduate level Physician Assistant Studies program at Grand Valley State University. We are conducting a study to compare stress urinary incontinence (involuntary urine leakage with activities such as sneezing, coughing, laughing, etc.) in women who have given birth versus women who have never given birth.

By completing this survey, you will be helping us to conduct a worthwhile study and further the base of medical knowledge in this area. We hope to educate medical professionals on the type of patient that needs to be questioned about stress urinary incontinence

Attached is a survey on which the data for our study will be based. If you are an 18-35 year old female, please take the time to fill out this quick survey and return it to the office staff. There is a sealable envelope attached to provide confidentiality. We want to thank you for your help and your time in completing the survey and informed consent form. Your personal information will not be linked to your answers in any way, and the clinic will not have access to your survey answers.

If you want the results of this study please write your name and address on the back of this form, and we will mail them to you. If you have any questions about the research or your rights as a research subject please contact:

Lisa Stoner
Principal Researcher
616-534-6309

Michelle Way
Principal Researcher
616-785-7886

Dr. Brian Curry
Thesis Chairperson
616-895-3442

Professor P. Huizenga
Human Subjects Research Review Board
GVSU, 616-895-2472

Thank you for your cooperation,

Lisa Stoner

Michelle Way

APPENDIX D
Patient Informed Consent Letter

Urinary Incontinence in Nulliparous and Parous Women

I understand that this is a research study comparing urinary incontinence (involuntary urine leakage) in women who have given birth versus women who have never given birth, and that the knowledge gained is expected to promote the care of women with symptoms of urinary incontinence. I understand that this study will include approximately 100 subjects.

I also understand that:

1. participation in this study will involve completion of one survey (approximately five minutes to complete) regarding any symptoms of urinary incontinence I may have experienced.
2. I have been selected for participation because I am a female between the ages of 18 to 35.
3. it is not anticipated that this study will lead to physical or emotional risk to myself.
4. the information I provide will be kept strictly confidential and the data will be coded so that identification of the individual participants will not be possible.
5. a summary of the results will be made available to me upon my request.
6. if I have any questions or concerns regarding this study I can call:

Lisa Stoner
Principal researcher
616-534-6309

Michelle Way
Principal researcher
616-785-7886

Dr. Brian Curry, PhD
Thesis Chairperson
616-895-3442

Professor P. Huizenga
Human Subjects Research Review Board
616-895-2472

I acknowledge that:

1. "In giving my consent, I understand that my participation in this study is voluntary and that I may withdraw at any time."
2. "I have been given the phone number of Paul Huizenga, Chairman of the Grand Valley State University Human Subjects Review Board to contact him if there are any questions concerning my rights as a participant in this study."
3. "I hereby authorize the investigator to release the information obtained in this study to scientific literature. I understand that I will not be identified by name."

"I acknowledge that I have read and understand the above information, and that I agree to participate in this study."

Participant signature

Witness

Date

Date

I am interested in receiving a summary of the study results

YES

NO

APPENDIX E
Graduate Research Survey

GRADUATE RESEARCH SURVEY

This is a confidential document. An envelope will be provided in which to return your response.

Age: _____ Sex: _____

Do you have health insurance? yes no

Have you ever been pregnant? yes no

Have you ever given birth vaginally? yes no
How many times? _____ How old were you each time? _____

Have you ever had accidental loss of urine? yes no

If yes, please circle the circumstances that trigger the loss of urine. You may circle more than one.

Laughing	Coughing	Sneezing	Sexual activity
Excitement	Lifting	Climbing stairs	Fear/nervousness
Exercise	Straining	Other: _____	

How often does this occur? (Please circle one that applies)
daily weekly monthly every few months once

Have you ever spoken with a health care professional (such as gynecologist, physician, physician assistant, nurse practitioner, physical therapist, or other) regarding involuntary loss of urine?

yes no

If yes, what was their response?

If no, why not?

Used with permission and adapted from: Kudwa, R. & Thompson, K. (1998). Real and Perceived Barriers to Evaluation and Treatment of Urinary Incontinence in Nulliparous Women.

APPENDIX F
Clinical Sites Participating in the Study

Clinical Sites Participating in the Study

1. AF Associates
2849 Michigan NE
Grand Rapids, MI 49506
2. Campustowne Professionals
4868 Lake Michigan Dr.
Allendale, MI 49401
3. Grand Valley Health Plan
529 Baldwin
Jenison, MI 49428
4. Horizon Medical
675 W. Randall
Coopersville, MI 49404
5. Metro Health Cascade
6807D Cascade Rd. SE
Cascade, MI 49546
6. Metro Health Grandville
3100 Wilson SW
Grandville, MI 49418
7. Dr. Steve VanNoord
1842 Baldwin
Jenison, MI 49428