

**DEVELOPMENT AND TESTING OF A SCALE
TO MEASURE SELF-EFFICACY FOR PELVIC MUSCLE EXERCISES
IN WOMEN WITH URINARY INCONTINENCE**

by

Barbara Ann Shelton Broome

BSN, Kent State University, 1989

MSN, Kent State University, 1991

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DISSERTATION COMMITTEE ACTION FORM

The dissertation of Barbara Ann Shelton Broome has been approved
by the following committee of faculty of the University of Pittsburgh.

Faculty Member

School

B. Joan McDowell, PhD
Chairperson

Nursing

Mary E. Kerr, PhD

Nursing

Ann Lyness, PhD

Nursing

Carol Baker, PhD

Education

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Development and Testing of a Scale to Measure Self-efficacy for
Pelvic Muscle Exercises in Women with Urinary Incontinence

Barbara A. Shelton Broome, PhD

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Previous research has demonstrated that behavioral interventions utilizing pelvic muscles can reduce or eliminate incontinence for many individuals. Active patient participation is a key component for all behavioral interventions; thus, a person's self-efficacy, the belief in one's ability to successfully participate in a behavior and one's belief that the behavior will produce a specified outcome, is an important ingredient to successful outcomes. Behavior specific measures of self-efficacy provide information about individual perceptions of a specific ability. To date, only one scale has been located that was developed to measure self-efficacy for pelvic muscle exercises in women with urinary incontinence, however psychometrics for the scale were not reported (Svengalis, Nygaard, Cervone & Kreder, 1995).

The purpose of this methodological study was to: 1) develop an scale that can be used to measure perceived self-efficacy for pelvic muscle exercises; and, 2) test the scale for reliability and validity in a group of women with incontinence. The 23 item scale incorporated items from self-efficacy expectation and outcome expectation, the two domains of self-efficacy theory as they relate to urinary incontinence.

Psychometric analysis of reliability and validity was determined from data collected from a sample of 115 cognitively intact incontinent women recruited from community and religious groups in Northeastern Ohio.

The estimated internal consistency reliability of the Broome PMSES using Cronbach's alpha was .97 and test retest 14 days later was .72. Validity was examined by correlating the Broome PMSES with the depression and quality of life measures. The correlation, although modest for the depression ($r = -.25$, $p < .01$) and quality of life measures ($r = -.36$, $p < .01$) was in the anticipated direction.

An additional clinic sample of 20 women treated for incontinence was recruited from continence treatment programs. In this sample, those women who reported fewer UI accidents after treatment had a significantly ($p = .012$) higher mean self-efficacy score at baseline than those who reported no reduction in accidents.

The preliminary data from this study provides a foundation which can be used to modify the instrument and to examine reliability and validity in other populations with urinary incontinence.

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I. Statement of the Problem

Urinary Incontinence (UI) is a physiological disorder that can have psychological, sociological, and economic ramifications for patients and their families (Agency for Health Care Policy and Research [AHCPR], 1996). During the past 15 years, attention has focused on the treatment of this common problem. The National Institutes of Health Urinary Incontinence Consensus Conference (1989) recommended that the least invasive and lowest risk intervention be utilized first in the treatment of UI. The Agency for Health Care Policy and Research Urinary Incontinence Guideline Panel (1992; 1996) concurs with the consensus statement. Behavioral interventions, such as pelvic muscle exercises, meet the criteria of low risk and minimal invasiveness (AHCPR, 1996; National Institutes of Health Urinary Incontinence Consensus Conference, 1989). Pelvic muscle exercises require active patient participation, thus motivation and belief that the exercises are beneficial are important to success. Success of behavioral interventions may be related to one's self-efficacy (Bandura, 1977a). Self-efficacy reflects one's confidence to perform specific behaviors, such as pelvic muscle exercises and one's belief that the performance of the behavior will produce a specific outcome (Bandura, 1977a; 1982; 1986).

Self-efficacy is a domain specific construct; therefore, a propensity for performing one behavior does not necessarily transfer to other behaviors (Bandura, 1977a; 1977b; 1986). Because the behavior does not necessarily transfer, it is necessary to develop behavior specific measures for the construct under study (Bandura, 1989; Hofstetter, Sallis, Hovell, Bryon, Jones, Rummani, Scott, Wagers, & Weiss, 1990). This enables interventions to be individually tailored to increase and reinforce self-efficacy for the

specific behavior.

Measures of self-efficacy have not been a part of the detailed physiological and psychosocial UI assessment (AHCPR, 1996; Engberg, McDowell, & Wilkerson, 1996). The measurement of self-efficacy for the performance of pelvic muscle exercises as a behavioral intervention for UI can provide important information regarding one's motivation and belief about the efficacy of the prescribed intervention. The measurement of self-efficacy may also provide a foundation for better understanding the relationship between self-efficacy and successful outcomes (Grembowski, Patrick, Diehr, Durham, Beresford, Kay, & Hecht, 1993; Hofstetter, et al., 1990).

The purpose of this research was to:

- 1) develop an instrument that can be used to measure perceived self-efficacy and outcome expectation for the performance of pelvic muscle exercises and strategies to prevent urine loss in women with urinary incontinence;
- 2) determine the reliability and validity of the self-efficacy instrument using a group of women age 50 and older.

Definition of Terms

Urinary incontinence

The involuntary loss of urine (The National Institutes of Health Urinary Incontinence Consensus Conference, 1989).

Behavioral interventions

“Specific interventions designed to alter the relationship between the patient's symptoms and one's behavior and/or environment for the treatment of maladaptive urinary voiding patterns. This may be achieved by modification of the behavior or environment” (AHCPR, 1996 p.125).

Pelvic Muscle Exercises

“A behavioral technique that requires repetitive active exercise of the pubococcygeus muscle to improve strength and ability to use these muscles to prevent urine loss” (AHCPR, 1996 p. 128).

Pelvic Muscle Strategies

Specific contraction of the pelvic muscle (pubococcygeus) to prevent stress or urge urinary accidents (Payne, 1996).

Self-efficacy Expectations

“The judgment of one’s capability to accomplish a certain level of performance” (Bandura 1986, p. 391).

Pelvic Muscle Exercise Self-efficacy

The belief that a person has in the ability to perform pelvic muscle exercises and that the behavior will decrease involuntary urine loss.

Self-efficacy Outcome Expectations

“A person’s judgment of the likely consequences of a behavior” (Bandura, 1986, p. 391).

Depression

“An alteration in mood ranging from a mild sadness to overwhelming despair.” For this study depression will be measured by the Geriatric Depression Scale (Yesavage, Brink, Rose, Lum, Huang, Adey, & Leier, 1983).

Quality of Life

**Maximization of satisfaction by living life to its fullest and functioning to the optimum of one’s capability at all stages of life (Miller, 1983).
“Maintenance of health, financial resources, social approval, self-esteem, and social status” (Nordstrom & Lubkin, 1990). For this study, quality of life will be measured by the Incontinence Impact Questionnaire-Short Form (Uebersax, Wyman, Shumaker, McClish, Fantl, and the Continence Program for Women Research Group (1995)).**

Overview

Urinary incontinence (UI) is defined as the involuntary loss of urine (The National Institutes of Health Urinary Incontinence Consensus Conference, 1989). An estimated 15 to 35% of the adult ambulatory population 60 and older that live in the community suffer from UI. The prevalence rates for women are twice that of men (AHCPR, 1996). The National Association for Continence (Personal Communication, July, 17, 1997) estimates that of the 13 million Americans with incontinence, 85 percent are women. Studies of those persons reporting UI, indicate that 25 to 35% experienced frequent leakage of urine (Diokno, Brock, Brown, & Herzog, 1986; National Institutes of Health Consensus Conference, 1989; Nygaard & Lemke, 1996). The Medical, Epidemiological, and Social Aspects of Aging (MESA) study funded by the National Institutes of Aging and conducted by Diokno and colleagues (1986) reported that 37.7% of females and 18.9% of males age 60 and older reported experiencing UI.

Wetle, et al., (1995) examined prevalence rates and correlates of difficulty holding urine in a population of community dwelling older people. Data were collected from participants (N=3809) age 65 and older during a home interview. Findings of this study indicated that overall, 44% of the women and 34% of the men interviewed, reported frequently experiencing some difficulty holding urine until they could reach a toilet. The prevalence and severity of involuntary urine loss in this sample increased with age (Wetle, et al., 1995).

The variance in epidemiological data regarding UI prevalence rates may be due in part to inconsistent definitions of incontinence, differences in questionnaires, settings, and methodology, as well as the reliability of self-report data (Diokno, et al., 1986; Mohide,

1986; National Institutes of Health Urinary Incontinence Consensus Conference, 1989; Resnick, Beckett, Branch, Scherr, & Wetle, 1994). The actual prevalence of UI may be higher than reported since many sufferers fail to report the occurrence of UI to their health care provider. Reasons suggested for the failure to report UI is that many individuals may believe UI to be a normal phenomena associated with aging or that UI is untreatable, therefore not worth discussing (Baum, Suarez, & Appell, 1991; Burgio, Ives, Locher, Arena, & Kuller, 1994; Smith, Newman, & Blackwood, 1992).

Implications

Involuntary loss of urine has multiple implications for the sufferer (National Institutes of Health Urinary Incontinence Consensus Conference, 1989; Ouslander, & Schnelle, 1995) The individual suffering from UI may avoid social situations to prevent embarrassment related to leaking and odor (Ashworth & Hagan, 1993; Dowd, 1991; Hunskar & Vinsnes, 1991). Lam, Foldspang, Elving, and Mommsen (1992) administered questionnaires to a random sample of women (N=511) to examine the social activity of women age 30 to 59 with UI. Analysis of the questionnaires revealed that 19.4% (n=99) of the women had abstained from social activities, 17% (n=89) abstained from non-intimate social activity, and 6% (n=30) from sexual intercourse (Lam, et al., 1992). Others have noted that UI is also a major barrier to social interests, entertainment, or physical recreation (Grimby, Milsom, Molander, Wiklund, & Ekelund, 1993; Hunskar & Vinsnes, 1991; Wetle, et al., 1995). Those individuals with UI who are socially active often incorporate elaborate plans and precautions into their activities to avoid urinary leakage and to maintain secrecy about their UI (Dowd, 1991; Jeter & Wagner, 1990).

Depression and anxiety have been suggested to occur in incontinent persons (AHCPR, 1996; Burgio, Whitehead, & Engel, 1985; Grimby, et al., 1993; MacCaulay, Stern, Holmes, & Stanton, 1987; Rosenzweig, Hischke, Thomas, Nelson, & Bhatia, 1991). Women with UI have been reported to have higher levels of depression than an aged matched comparison group without UI (Maccaulay, et al., 1987; Rosenzweig, et al., 1991). The Medical Epidemiological and Social Aspects of Aging survey reported that psychological well-being declines with increasing severity of the incontinence. Women with UI are also more likely to report a poorer quality of life (Hunnskaar & Vinsnes, 1991; Wyman, Harkins, Choi, Taylor, & Fantl, 1987). Fantl and colleagues (1991) compared the quality of life of women with UI who were treated with a control group that was not treated for UI. The women treated for UI had a 50% improvement in quality of life when compared to the control group. Scores for the control group were virtually unchanged.

Cognition has also been noted to impact UI. Those patients with cognitive impairment may not recognize the need to void, have difficulty finding the toilet, and preparing to void (Engberg, et al., 1996). Intact cognitive functioning has been suggested to be an important factor in maintaining or regaining continence (Seifel, Millis, Lichenberg & Dijkers, 1994). Any evaluation of UI should include an assessment of cognitive status to facilitate the identification of causative factors for UI and the ability of the person to participate in pelvic muscle re-education.

Secondary conditions that may occur in individuals with UI are rashes, pressure sores, alterations in skin integrity, and urinary tract infections (Engberg, et al., 1996; Newman & Smith, 1992). The secondary conditions may be the result of incorrect use of absorbent pads or garments to collect urine leakage and inadequate skin care. Meticulous

skin care is imperative to prevent skin breakdown and urinary tract infections (AHCPR, 1996; National Institutes of Health Urinary Incontinence Consensus Conference, 1989). The most efficacious method of skin preservation is reported to be a no-rinse cleanser used in conjunction with a moisture barrier (Byers, Ryan, Regan, Shields & Carta, 1995). However, this is costly and not always practiced.

The financial impact of UI was examined by Baker and Bice (1995). They analyzed a sample (N=1778) of low income elderly admitted to a state sponsored assistance program of home care. Gender, race, marital status, and significant hospitalizations were not statistically different. Findings of the study were that individuals with UI: 1) suffered more disability; 2) are more likely to use more expensive paraprofessional service and purchase medical equipment; and 3) cost an estimated 25% more to the public in home care costs. The total cost of UI in 1995 was reported to be more than 16.4 billion dollars annually. Of this total 11.2 billion dollars is spent for community dwelling individuals and an additional 5.2 billion dollars is spent on continence care in nursing homes (AHCPR, 1996; National Association for Continence, personal communication, July 17, 1997).

Classifications of Incontinence

UI can be caused by anatomical or physiological factors and is described as either acute or chronic.

Acute UI

Acute or reversible UI refers to episodes of incontinence that are of a sudden onset, usually related to an acute illness or an iatrogenic problem (Kane, Ouslander & Abrass, 1994). Some common causes of acute UI include medications such as diuretics,

anticholinergics, calcium channel blocking, or alpha-adrenergics. These medications alter the micturition process and change bladder and sphincter dynamics (AHCPR, 1996; Baum, et al., 1991; Kane, et al., 1994). Other reasons for an acute episode of UI include restricted or limited mobility, urinary tract infections, or medical conditions that create an increase in fluid volume states, such as occurs in congestive heart failure and poorly controlled diabetes mellitus (Kane, et al., 1994). When the underlying precipitating event is removed, the UI is resolved.

Chronic or Persistent UI

Chronic or persistent UI is unrelated to an acute illness. Chronic UI is persistent and can become worse over time (Kane et al., 1994; Engberg, et al., 1996). Types of chronic or persistent UI examined in this study are stress, urge, and mixed (Engberg, et al., 1995; Kane et al., 1994). Stress UI is the involuntary loss of small amounts of urine that can occur when the intravesical pressure exceeds the maximum urethral pressure (Abrams, et al., 1988). This occurs during activities that increase intra-abdominal pressure such as coughing, laughing, or lifting (Kane et al., 1994; Engberg, et al., 1996).

Urge UI is the involuntary leakage, usually of large amounts of urine, associated with an abrupt and strong desire to void (Abrams, et al, 1988; Engberg, et al., 1996). Urge incontinence may be idiopathic or associated with involuntary detrusor contractions or hypersensitivity. Neurological disorders, such as a cerebral vascular accident can also be associated with urge UI (Abrams, et al., 1988). Many times, no specific etiology can be identified despite detailed evaluation (National Institutes of Health Urinary Incontinence Consensus Conference, 1989).

Symptoms of both stress and urge UI is called mixed UI (Houston, 1993). Mixed incontinence is common in older women. Almost always either stress UI or urge UI will be predominant. Stress UI in older patients with mixed incontinence usually has been of a long duration with urge UI occurring more recently (Diokno, 1990).

Other types of chronic incontinence are overflow and functional incontinence. Overflow incontinence occurs when the bladder does not empty completely leading to frequent leakage of small amounts of urine (Abrams, Blaivas, Stanton & Anderson for the International Continence Society Committee on Standardization of Terminology, 1990; National Institutes of Health Urinary Incontinence Consensus Conference, 1989). Causes of overflow incontinence include neurological impairment or mechanical obstruction (AHCPR, 1996).

Functional incontinence occurs when factors such as immobility or severe cognitive impairment impacts a person's ability to maintain continence (Abrams, Blaivas, Stanton, & Anderson for the International Continence Society Committee on Standardization of Terminology, 1990; National Institutes of Health Urinary Incontinence Consensus Conference, 1989). Barriers within the living environment may also impede the ability to use the toilet and maintain continence (Kane, et al., 1994).

Prevalence of Types of UI

Prevalence of the types of UI was examined by Diokno and colleagues (1986) in a community sample of elderly. Women (N=434) age 60 and older that participated in the MESA study provided information about their incontinence. The information was categorized according to established criteria for stress, urge, mixed, and other UI. In this

study, the prevalence rates for stress UI were 26.7% (n=116), urge UI 9.1% (n=39), mixed stress and urge UI 53.3% (n=241), and other UI 8.9% (n=38).

Sandvik, Hunskaar, Vanvik, Seim, and Hermstad (1995) used urodynamic evaluations and an epidemiological survey to assess types of UI among community dwelling Norwegian women age 20 and over (N=745). The type of incontinence was initially determined from self-report questionnaires followed by urodynamic studies and a gynecological examination to verify the type of incontinence. The prevalence of the different types of UI was: stress 77%, urge 12% and mixed 11%.

Peacock, Wiskind, and Wall (1994) retrospectively analyzed the medical records of African-American (N=143) women with a mean age of 52 years presenting to a urogynecology clinic in Atlanta, GA. to help define the clinical and urodynamic parameters of UI and prolapse. Chart review was used to collect data. All patients included in the chart review had undergone detailed physical examinations and urodynamic studies. Cystometric diagnosis were as follows: detrusor overactivity or urge 40.5%, genuine stress 30.7%, mixed 20.9%, and nonspecific 7.6%. The most common complaint of the patient by type was urge (33.3%), followed by stress (31.4%) and non-specific (11.3%). Urogenital prolapse was fairly common in this group, but there was no consistent correlation between the presence of a cystocele and type of UI (Peacock, et al., 1994).

Treatment

Treatment of UI is based on a thorough assessment to confirm the presence of UI, the type of UI, identification of contributing factors, and the determination of patients that may require further evaluation prior to any therapeutic interventions (AHCPR, 1996).

The information obtained during assessment is also vital in implementing the appropriate treatment for UI.

Treatment and interventions for UI are medications, mechanical devices, surgery, and behavioral modification. Several medications have proved beneficial for UI; however risk to benefit ratios are not clear (AHCPR, 1996). Medications for urge and stress UI may be effective in decreasing unwanted urine loss. For urge incontinence, medications with anticholinergic and smooth muscle relaxation properties are used to reduce uninhibited detrusor contractions and to increase bladder capacity (National Institutes of Health Urinary Incontinence Consensus Conference, 1989; Kane et al., 1994). Alpha-adrenergic agonists are used as pharmacological agents to produce smooth muscle contraction at the bladder outlet to decrease stress incontinence (National Institutes of Health Urinary Incontinence Consensus Conference, 1989). Estrogen replacement therapy may also be useful for UI and has been used in women that have estrogen deficiencies to reduce urgency and frequency of urge UI and in combination with adrenergic agonists to treat stress UI (Kane, et al., 1994; National Institutes of Health Urinary Incontinence Consensus Conference, 1989). The side effects of the pharmacological agent used, the characteristics of the UI, and patient and physician preference must all be weighed in the decision to use medications as an intervention (Kane, et al., 1994).

Surgery has also proved to be effective when other interventions for pelvic prolapse, bladder neck, or urethral obstruction fail (Kane, et al., 1994; McCormick, Newman, Colling & Pearson, 1992). Surgery may also be indicated in certain cases of stress UI that are not responsive to pharmacological and behavioral interventions (Kane et

al., 1994). However, the long term results of surgery for UI remain under investigation. Mechanical devices such as urethral plugs, weighted vaginal cones, and pessarys have been shown to be effective in selected situations (AHCPR, 1996).

Behavioral interventions have been shown to be successful as a treatment for stress and urge UI (Burgio, Courtland-Robinson & Engel, 1986; McDowell, et al., 1992), although the long term effects of these therapies also need further study (AHCPR, 1996). Behavioral interventions are noninvasive, free from side effects, and can be used in conjunction with other treatments for most individuals with the most frequently occurring UI (e.g., urge, stress and mixed UI; AHCPR, 1996; National Institutes of Health Urinary Incontinence Consensus Conference, 1989). The following section provides and describes behavioral interventions used to treat incontinence.

Behavioral Interventions

Successful behavioral change is enhanced by biofeedback (Burgio, Robinson, & Engel, 1986; Burgio, Whitehead, & Engel, 1985; Kegel, 1948). Biofeedback is not a treatment in itself, but a technique used to assist a person to gather information about their pelvic floor muscle activity using visual and auditory signals. The response is amplified and processed in the form of a measured response that is immediately fed back to the person (Burgio & Burgio, 1986; Payne, 1996; Shives, 1990). The behavioral interventions used for incontinence are a group of techniques designed to change a person's behavior to more effective responses to situations in which unwanted urine loss is likely to occur (Payne, 1996). Behavioral therapy includes lifestyle changes, specific pelvic muscle techniques and strategies to prevent the occurrence of UI (Payne, 1996).

Pelvic muscle exercises are used to treat stress, urge, and mixed UI in cognitively intact patients. The goal of pelvic muscle exercises in the treatment of UI is to strengthen and identify the pelvic floor muscles so they can be used to restore a normal pattern of voiding and continence. Pelvic muscle exercises involve contracting and relaxing the pubococcygeus muscle (Bump, Hurt, Fantl, & Wyman, 1991; Dougherty, Bishop, Mooney, Gimotty, & Williams, 1993; McDowell, Burgio, Dombrowski, Locher, & Rodriguez, 1992; Tries, 1990). This behavioral intervention requires that the patient understand the purpose of pelvic muscle exercises and how to properly perform these exercises. The basic instruction for the initial program typically includes: 1) identification of the pubococcygeus muscle; 2) contracting the muscle for 2 to 10 seconds depending on the patient's ability, and 3) relaxing the muscle for 2 to 10 seconds. Typically the patient is given instructions to perform a total of 45 exercises in sets of 15 contractions three times a day, every day (Burgio, et al., 1986; McDowell, et al., 1992; Newman & Smith, 1992; Smith, et al., 1992; Tries, 1990).

Historical Perspective

Pelvic muscle exercises are based on the research of Dr. Arnold Kegel (1948, 1952). Kegel's research provided the foundation for pelvic muscle exercises as a behavioral intervention for UI (Kegel, 1952, 1956). Kegel (1948) noted that during childbirth there was a stretching and tearing of the perineal muscles with possible nerve injury. He believed it was not enough to merely approximate the margins of lacerated muscles and fascias and restore the gross perineal structures to return normal function. He proposed that a return to function requires a demand for use and suggested perineal exercises to: 1) promote a return of normal muscle function postpartum, and 2) restore

muscle function in women still of the childbearing age to prevent a relaxation of the pelvic musculature in the future (Kegel 1948). Kegel (1948; 1951; 1956) proposed pelvic muscle exercises (Kegel exercises) as a means to restore and strengthen visceral tone and pelvic muscle function after childbirth (Kegel, 1956; Kegel, 1952). The exercises involved are directed toward “drawing in the perineum” (Kegel, 1948, p. 242) to restore normal muscle function.

Kegel believed that success in performing the exercises depended on women being aware of the perineal muscle function. He viewed knowledge of the pubococcygeus muscle as essential for clinical results to be obtained from the physiological therapy (Kegel, 1951; 1952).

Pelvic Muscle identification and re-education

A variety of approaches are used in the identification of the pubococcygeus muscle. Some clinicians use verbal feedback during a digital examination of the vagina or rectum to help patients identify pelvic muscles. Patients are instructed to contract the muscles around the examiners fingers (Brink, Sampsel, Wells, Diokno, & Gillis, 1989; Newman & Smith, 1989). Still others advocate identification using biofeedback with direct auditory or visual feedback to the patient (Burgio, et al., 1986; Burgio, et al., 1985; Fantl, et al., 1991; Kegel, 1951; 1956; McDowell, et al., 1992, Tries, 1990).

Biofeedback provides information about the performance of pelvic muscle contraction and relaxation. Kegel was one of the first to use biofeedback via a perineometer to assist women in identifying the pubococcygeus muscle (Kegel, 1951; Kegel, 1952). The apparatus included a pressure sensitive vaginal probe attached to sphygmomanometer. When the patient would contract the pelvic muscle around the

probe, the pressure would cause the needle of the sphygmomanometer to move. With this hand held sphygmomanometer, the patient could see the results of her efforts. Kegel reported success in relieving stress UI in patients with primary relaxation or atrophy of the anterior vaginal muscles when the patient had at least partial muscle control (Kegel, 1956). Kegel experienced an 80% reduction in UI and advocated women to exercise and strengthen the pelvic muscle following childbirth (Kegel, 1951). Since the mid 1980s, researchers have used pelvic muscle exercises to treat stress, urge, and mixed UI (Burgio, et al., 1985; Burns, Pranikoff, Nochajski, Hadley, Levy, & Ory, 1993; Fantl, et al., 1991; Flynn, Cell, & Luisi, 1994; McDowell, Engberg, Weber, Brodak, & Engberg, 1994; McIntosh, Frahm, Mallett, & Richardson, 1993; Newman & Smith, 1992).

Individual programs of pelvic muscle exercises and strategies are developed based on the patient's history, type of UI, and ability to follow through with the prescribed exercises (AHCPR, 1996; Brubaker & Kotarinos, 1993; Newman & Smith 1992). Successful behavioral interventions for urinary incontinence require individuals who are motivated and willing to put in the time and effort to perform the prescribed regime. A factor which may impact motivation is self-efficacy. One's perception about ability to perform a prescribed behavior and the benefits of that behavior may regulate the amount of energy a person is willing to expend on the behavioral regime (Bandura, 1986; Maddux & Lewis, 1995). Knowledge of self-efficacy for the performance of pelvic muscle exercises is an important element in developing patient focused interventions to promote skill mastery.

Only one scale has been developed to measure the perceived self-efficacy and outcome expectations of women with urinary incontinence. Svengalis, Nygaard, Cervone,

and Kreder (1995) developed a 100 point, seven item scale to measure perceived self-efficacy, outcome expectations, and motivation for the performance of pelvic floor exercises. The randomized sample consisted of women (N=71) enrolled in a study to compare the outcome of pelvic muscle exercises performed with and without a specially designed motivational video tape. The study group was composed of 37 women with stress incontinence, 17 with detrusor instability or urge UI, and 17 with mixed incontinence. Success was objectively measured by a 50% decrease in UI episodes per day following a 3 month course of daily pelvic muscle exercises. Overall, there was a 42% decrease in the number of UI episodes per day. Perceptions of self-efficacy for performing exercise repetitions rose from 74% at baseline to 80% at week three. Perceptions of self-efficacy were not found to differ among subjects using the motivational tape or the verbal and written instructions. Belief that the treatment program could cure or be of significant help was 83%. Separate self-efficacy scores for the urge and stress groups were not provided. The overall improvement in self-efficacy with behavioral interventions suggest concept validity; however, no formal psychometric evaluation was performed to assess the reliability and validity of the scale. The generalization of the results to other populations is limited because of the small sample size (N=71) initially and at follow-up (n=35). Only one question assessed outcome expectations limiting the variability of the responses for outcome expectations.

Self-efficacy expectations and outcome expectations play a role in behavioral change (Bandura, 1986). Measuring self-efficacy expectations and outcome expectations for pelvic muscle exercises can assist in the assessment of individual perceptions of pelvic

muscle exercises. Based on this assessment, interventions may then be tailored to enhance skill mastery and self-efficacy.

Theoretical Framework

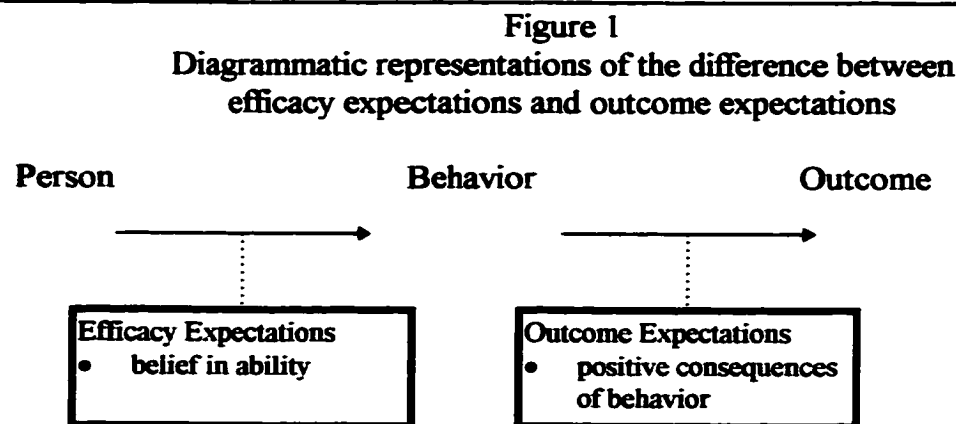
Self-efficacy is described as the personal judgments one makes about ability to execute courses of action in a particular set of situations (Bandura, 1977a; 1986). Self-efficacy was developed within the context of social cognitive theory (Bandura, 1977a; 1977b; 1986). Social cognitive theory views human behavior as a continuous reciprocal interdependent interaction between behavioral, cognitive, and environmental determinants (Bandura, 1977b). This theory is an approach to understanding human cognition, action, motivation, and emotion (Maddux, 1995). Assumptions of social cognitive theory are:

1. Individual experiences, courses of action, the outcomes of the action, and communication are based on symbolism.
2. Most behavior is purposive or goal-directed and is guided by anticipatory thinking.
3. People are self-reflective and analyze personal thoughts and experiences.
4. People are capable of self-regulation by selecting and regulating the environment.
Personal behavior is based on selecting and altering the environment based on personal standards.
5. People learn vicariously by observing the behaviors of others.
6. Behavior has plasticity because of the interaction of complex physiological and experiential forces.
7. Environmental events, inner personal factors (cognition, emotion, and biological events), and behavior are interactive.

The assumptions of social cognitive theory should be validated since individual human behavior may vary. The principle of triadic reciprocal causation among the cognitive, affective, and biological states is the most important assumption of social cognitive theory. These factors all exert a dynamic influence on behavioral change (Bandura, 1977b; 1986). However, the relative influence and power exerted by these interdependent factors will vary from one situation to another. This is because Social Cognitive Theory proposes that behavior is determined by expectancies and incentives. Expectancies are the values that a person places on a particular outcome. Expectancies influence behavior because a person will choose to perform an activity that will maximize a positive outcome. Individual interpretation of outcome or consequences impact behavioral change (Bandura, 1977a; 1991).

Social Cognitive Theory was the foundation from which self-efficacy theory was derived. Self-efficacy theory proposes that outcomes are determined by one's actions. One's perception of capabilities will impact how one behaves, the level of motivation, thought patterns, and emotional reactions in taxing situations (Bandura, 1977a, 1977b). Thus, one's judgment of perceived efficacy is concerned with how well one can execute courses of action in a particular set of situations (Bandura, 1982). This personal judgment about capabilities can influence thought patterns and emotional reactions during actual and anticipatory events. Additionally, one's perception that a given behavior will produce certain outcomes also has an impact on self-efficacy (Bandura, 1977a; 1977b; 1981; 1982; 1986). The components within the theory of self-efficacy stem from the premise that successful behavioral change and performance of an activity is dependent upon a strong

sense of perceived self-efficacy and outcome expectations. This concept is described in Figure 1.



From Bandura, A. (1977a) *Self-efficacy: Toward a theory of behavioral change*. *Psychological Review*, 84,(2), 191-215.

Efficacy Expectations

Self-efficacy expectations are not concerned with the skills a person has, but with judgments of what a person can do with the abilities one possesses (Bandura, 1977a, 1977b). Efficacy expectations is the conviction that one can successfully execute the behavior required to produce outcomes. The strength of a person's conviction of personal effectiveness is a determinate in whether one can even try to cope with difficult situations. When one has a strong sense of perceived self-efficacy, anticipatory fears and inhibitions are reduced and positive coping is promoted (Bandura & Cervone, 1983; Ozer & Bandura, 1990). Positive efficacy expectations impact the choice of activities, energy, length of time, and effort when confronted with an obstacle or new learning experience. An individual makes a choice of developing new skills or enhancing existing skills based on individual judgment of personal ability to perform an activity or course of action

(Bandura, 1986). This choice will influence thought patterns and emotional reactions during adverse or challenging situations (Bandura, 1982; 1986). Efficacy expectations vary on several dimensions that may impact performance (Bandura, 1977a). These are the magnitude, generality, and the strength of the expectation (Bandura, 1977a; 1986).

Magnitude

Magnitude relates to the level of difficulty of a task being measured, and the person's efficacy expectations in performance of the activity. Under a given set of conditions people may believe they can perform a behavior; however, if the set of circumstances change, people may not feel secure in the ability to perform the behavior (Maibach & Murphy, 1995). The efficacy expectations of different individuals may be limited to simple tasks or expanded to include very taxing ones (Bandura, 1977a). For example, a person may believe he or she can perform pelvic muscle contractions while sitting and holding a child in his/her lap, but may not feel confident in the ability to perform the same exercises while standing with the child.

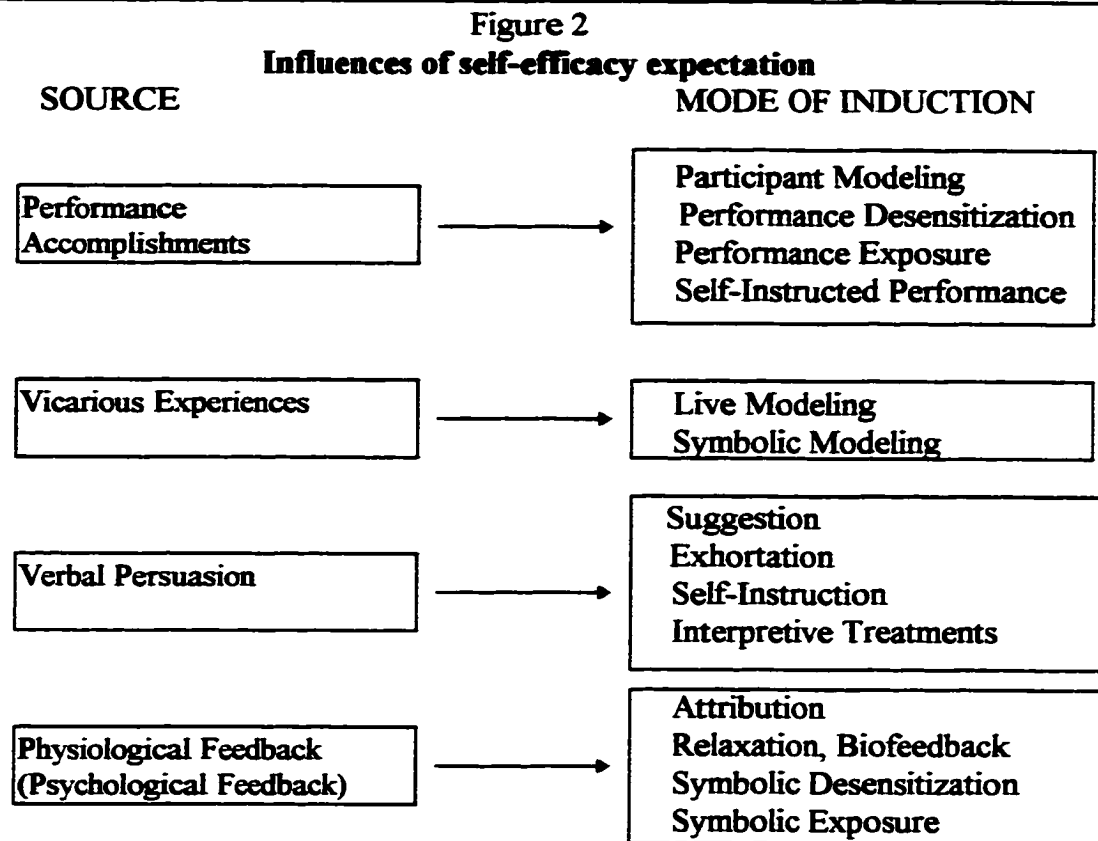
Generality

Generality is the degree to which a person's perceived self-efficacy for one activity can be transferred to another activity (Maddux & Meier, 1995). Self-efficacy is not generalizable across all domains and situations; thus, a person may have strong efficacy expectations for running and have weak self-efficacy expectations for swimming. Generality also refers to the extent that success or failure may contribute to a person's self-efficacy (Bandura & Schunk, 1981). If one is able to perform the prescribed pelvic muscle exercises and has a decrease in involuntary loss of urine, this success has a positive impact on performance as well as outcome expectations.

Strength

Strength is the degree to which people believe they can succeed at a given level or magnitude of an activity (Bandura, 1977a; Maddux & Meier, 1995). For example, a person may feel capable of performing pelvic muscle exercises when guided by the health care provider, but may not feel confident in performing the activity without such guidance. Weak efficacy expectations are easily extinguishable by failures. Any assessment of self-efficacy expectation should include a detailed analysis of magnitude, generality, and strength.

Self-efficacy expectations about personal resources and performance abilities can be enhanced in four principal ways: 1) performance or enactment experiences, 2) vicarious experiences, 3) verbal persuasion, and 4) physiological feedback (Bandura, 1977a; Rankin & Stallings, 1996). The information obtained from these sources can influence efficacy perceptions about abilities as Figure 2 demonstrates (Bandura, 1986). These sources may independently or collectively influence behavior. The mode of induction or mechanism of acquiring skills can be from a variety of sources. For example, developing the skill of public speaking can be acquired from modeling behavior after others (vicarious experience) or by repeated successful public speaking performances (performance accomplishments). One can also be exposed to the same stimulus over time, such as speaking at public gatherings multiple times, resulting in performance desensitization and exposure.



From Bandura, A. (1977). Social Learning Theory. Englewood Cliffs, NJ: Prentice Hall.

Performance/Enactment Experiences

Performance experiences are the most powerful sources of self-efficacy information (Bandura, 1977a). Performance experiences are the most influential because they are based on personal mastery. Success raises mastery expectations, while failure lowers them. If one experiences failure, but later experiences repeated success, the impact of failure will be reduced (Bandura, 1977a; Bandura, 1986). Failures may be positive experiences if mastery occurs by sustained efforts which strengthens self-efficacy.

Vicarious Experiences

Vicarious experiences are based on observation, modeling, and imitation (Maddux & Meier, 1995). People observe the behavior of others, note the consequences of the behavior and use this information to form expectations about their own behavior and consequences. The success of others can influence the intensity and persistence of individuals in activities. Based on the behaviors of others, individuals are able to identify with and model themselves based on the vicarious experience (Bandura, 1977a). Talking with others who can successfully perform pelvic muscle exercises and decrease episodes of unwanted urine loss can enhance a person's belief in ability to perform an activity. Vicarious experiences can produce significant and enduring results as well as changes in performance ability expectations (Bandura, 1986).

Verbal Persuasion

People may be led through verbal suggestion into the belief they can cope with experiences that in the past were deemed to be overwhelming. The effectiveness of verbal persuasion can be influenced by the perceived expertness, trustworthiness, and attractiveness of the source (Maddux & Meier, 1995; Petty & Cacioppo, 1981). A person who has been successful with pelvic muscle exercises is in a prime position to effectively persuade others. A health professional discussing pelvic muscle education and urine loss in a knowledgeable manner may also influence a person's belief in ability to perform the exercises. Self efficacy experienced in this manner can also be easily extinguished by negative experiences, since efficacy is not based on performance, but on the suggestion of the positive performance (Bandura, 1986).

Psychological/Physiological Feedback

Stressful and taxing situations arouse emotions that may impact belief in personal competency. Fear reactions generate additional fear through anticipatory reactions (Bandura, 1977a; Bandura, 1986). Thoughts of inability, failure, and distress may create situations that inhibit the ability of the person to cope. The psychological state can directly affect belief in performance ability. Physiological states may also impact self-efficacy. Fatigue, pain, and lack of stamina are some of the physiological elements that can negatively impact self-efficacy.

Outcome Expectations

The second component of self-efficacy is outcome expectations. An outcome expectation is “a judgment of the likely consequences such behavior will produce” (Bandura, 1986). Outcome expectations are a person’s subjective probability that a certain behavior, if performed will lead to a particular outcome. Outcome expectations are determined primarily by self-efficacy expectations and can be predicted from efficacy expectations (Bandura, 1986). The differentiation between outcome and efficacy expectations is a result of personal beliefs. The outcome people anticipate depends largely on how well they expect to perform (Bandura, 1986). A person can believe a particular course of action will produce certain outcomes, but if one has doubts about performance ability, then outcomes have no influence on action (Bandura, 1977b).

There are two subtypes of outcome expectancy (Kirsch, 1995). The first subtype has been identified as means-ends belief. Means-ends belief is a subjective probability that a particular behavior, if performed at a given level of competence, will be followed by a particular outcome. For example, the belief that performing pelvic muscle exercises

diligently will eliminate UI is a means-ends belief. The second type is described as personal outcome expectancy (Kirsch, 1995). An example of personal outcome expectancy is when a person expects to avoid accidental leaking of urine by performing pelvic muscle exercises. A causal relationship exists between self-efficacy and personal outcome expectations. If one believes a certain course of action will produce certain outcomes, this becomes the ends-means belief. However, if doubts exist about ability to perform the activity, then behavior will not be influenced. Behavior is dependent on both means-ends beliefs and perceived self-efficacy. One must believe performance of behavior in a particular activity will produce certain valued outcomes (Kirsch, 1995). Thus, one's belief in the behavior and the value of the outcome directly impact one's course of action.

Empirical Analysis

Bandura has empirically examined self-efficacy theory in a variety of studies. Bandura and Adams (1977a, 1977b) investigated the use of systematic desensitization as a method of effecting behavioral change for persons with snake phobias. The researchers noted that the creation and strengthening of self-efficacy promoted behavioral change and mediated anxiety arousal. Motivation for exercise and goal attainment was also found to be linked to personal self evaluation and perceived self-efficacy (Bandura & Cervone, 1983). Additionally, setting personal goals that are attainable, including skill mastery and feedback can help to foster an increase in perceived self efficacy (Bandura & Schunk, 1983; Ozer & Bandura, 1990). Other researchers have tested Bandura's theory in a variety of health-related studies (Ewart, Taylor, Reese & DeBusk, 1983; Grembowski, et al, 1993; Ries, Kaplan, Limberg & Prewitt, 1995; Robertson & Keller, 1992).

Grembowski and colleagues (1993) examined how improved health status improves self-efficacy in a cognitively intact group of senior citizens. Self-efficacy was tested in cardiac rehabilitation (Carroll, 1995; Ewart, Stewart, Gillian, Kelemen, Valenti, Manley, & Kelemen, 1986; Robertson & Keller, 1992; Vidmar & Rubinson, 1994). The theory has also been tested with diabetes education (Skelly, Marshall, Haughey, Davis, & Dunford, 1995), back pain rehabilitation (Altmaier, Russell, Kao, Lehmann, & Weinstein, 1993) and exercise behavior (Poag & McAuley, 1992). In these studies, self-efficacy positively impacted outcomes.

Bandura's self-efficacy theory has provided the theoretical framework for studies of health promotion and maintenance in cardiac patients (Ewart, et al., 1983; Gilliss, Gortner, Shinn, & Tompkins, 1993; Gortner & Jenkins, 1990). Perceived self-efficacy was suggested to be related to recovery behaviors, improvement in affective status, and improved quality of life. Studies of pulmonary rehabilitation (Ries, et al., 1995), prostate cancer (Boehm, Coleman-Burns, Schlenk, Funnell, Parzuchowski, & Powell, 1995), pain behavior (Buescher, Johnston, Parker, Smarr, Buckelew, Anderson, & Walker, 1991), and physician counseling behaviors (Thompson, Schwankovsky, & Pitts, 1993) have also used self-efficacy theory as a guide to research. In many of the behaviors examined, self-efficacy has been noted to be a causal mechanism in the health behaviors investigated. Only one study of pelvic muscle exercises as a behavioral intervention for urinary incontinence has used self-efficacy theory (Svengalis, et al., 1995). The scale used in this study to measure self-efficacy for pelvic muscle exercises has no reported reliability and validity (Svengalis, et al., 1995). Measurement of outcome is limited to only a question which restricts variability of responses.

The purpose of this research was to develop a scale and assess its reliability and validity to measure the self-efficacy and outcome expectations for the performance of pelvic muscle exercises in women with UI. This assessment may facilitate the development and implementation of a treatment plan that enhances self-efficacy to perform pelvic muscle exercises and strategies to reduce UI. The results of this study will be valuable in providing preliminary data about the reliability and validity of the Broome Pelvic Muscle Self-efficacy Scale.

II. Review of Literature

Treatment modalities for UI are primarily behavioral interventions, pharmacological, and surgical (AHCPR, 1996; Engberg, et al., 1996; McCormick & Palmer, 1992). A behavioral intervention used successfully is pelvic muscle exercises (Burgio, Whitehead, & Engel, 1985; Burgio, Courtland-Robinson, & Engel, 1986; Fantl, 1991; McDowell, et al., 1992). However, for pelvic muscle exercises to be successful, patients must be motivated to perform the exercises as prescribed. Motivation and belief in treatment play a key role in behavioral change (Maddux, Brawley & Boykin, 1995). Self-efficacy theory can provide a framework for examining behavioral change as it relates to the performance of pelvic muscle exercises for UI.

This chapter will first review research on self-efficacy theory. Self-efficacy use in self-directed learning, empowerment, and performance motivation will be examined. Research on chronic illness and of behavioral change using self-efficacy theory as a means to promote behavior change in individuals will also be examined in a variety of research studies. Additional studies examine the relationship among self-efficacy, depression, and quality of life. The review of literature will also examine the use of pelvic muscle exercises with and without biofeedback. Finally, the use of self-efficacy theory as a means of teaching pelvic muscle exercises will be presented. The one previous study that utilized self-efficacy theory as it relates to the performance of pelvic muscle exercises will be discussed.

Self-Efficacy and Health Promotion Behaviors

Bandura's self-efficacy theory has been tested in health promotion research.

Bandura tested the theory of self-efficacy in mathematical skill in children (Bandura & Cervone, 1983), empowerment in women sexually abused (Ozer & Bandura, 1990), and in studies of motivation (Bandura & Schunk, 1981) (Appendix A).

Bandura and Schunk (1981) identified children (N=40) of predominantly middle-class background with a mean age of 8.4 years. The subjects had gross arithmetic deficits. A mathematical performance pretest was given consisting of 25 subtraction problems graded in levels of difficulty. Subjects solving more than four problems were excluded from the study. The subjects were also given a test for mathematical self-efficacy. The subjects were randomly assigned to one of three treatment groups or a control group. The treatment groups were based on variations in goal setting: 1) proximal goal or completing at least 6 problems, 2) distal goals or completing all the problems by the end of the sixth session, or 3) without any reference goals. The mathematical pretreatment test and self-efficacy measures were re-administered at week four and at the end of treatment. No significant difference was found between males (n=21) and females (n=19). The main effect of treatment and the interaction between treatment ($F[3.36]=10.13$) and experimental phases ($F[6.72]=5.96$) was found to be highly significant ($p<.001$). Those subjects with proximal goals had a greater increase in perceived self-efficacy than the other treatment groups ($p<.05$) or the control group ($p<.01$). The more material the subjects mastered, the higher the perceived self-efficacy ($p<.01$). This study provided some evidence of the effect of proximal goals on self-efficacy.

Ozer and Bandura (1990) recruited women (N=43) enrolled in self-defense programs to examine the effect of mastery modeling. The age range was 18 to 55 years with a mean of 34 years. Of the women included in the study, 38% had been physically assaulted, none had been raped but 27% had sexual intercourse forced on them in one or more relationships. Perceived coping of self-efficacy for interpersonal activities, self-defense, and cognitive control were measured by a coping self-efficacy instrument. Information about anxiety arousal, avoidance behavior, self-protective skill assessment, past experience with physical, sexual assault data, and control mastery were also collected. Subjects (n=23) completed the instrument twice: once prior to mastery modeling and then 5 weeks later without any intervening treatment. The remaining subjects (n=20) were administered the same measures only once at week 5. The program incorporated skill training and mastery of self-defense techniques with subjects actively participating in a scenario fighting off a would be assailant. During the fight scenario, the subjects not actually participating in the fight became active vicarious participants to the fight. Subjects were also instructed in attitudinal and verbal techniques for potentially assaultive encounters. The treatment phase involved 5 four and one-half hour sessions over a 5 week period. Subjects were evaluated 6 weeks post modeling treatment. This study demonstrated that perceived self-efficacy increased with mastery modeling by the end of treatment ($p < .0001$) and was maintained over the 6 week follow up ($p < .001$). The subjects judged themselves to be better prepared to distinguish between safe and risky situations with a reduction in their sense of vulnerability ($p < .0001$). Mastery modeling also decreased the subject's avoidance behavior ($p < .05$) and increased participation in social activities ($p < .001$).

Women who had been sexually assaulted in the past ($n=28$) were compared to those that had not been ($n=15$). The women who had been sexually assaulted surpassed the women in the control group of ruminative thinking ($t=1.99$; $p<.06$), reduction in negative thoughts ($t=1.99$; $p<.05$), and diminished anxiety over sexual assault ($t=2.33$; $p<.03$). This study supports the relationship of skill mastery to enhanced self-efficacy.

The impact of feedback on performance appraisal was examined by Bandura and Cervone (1983). Subjects ($N=90$) from an introductory psychology course were randomly assigned to one of four treatment groups: goal alone ($n=20$), feedback alone ($n=20$), no goal or feedback ($n=20$), goal and feedback with self-evaluative questionnaires ($n=20$). A control group of subjects ($n=10$) had goal and feedback but without self-evaluative questionnaires. Subjects were instructed that they were participating in an experimental program that may prove useful for planning and evaluating post coronary rehabilitation programs. The measure used in this study was a Schwinn Air-Dyne ergometer exercise device connected to an odometer which recorded exercise readings at one minute intervals. A background questionnaire about health habits and physical readiness was completed prior to participating in the study. The subjects with goals were asked to select their goal from a representative range found in a rehabilitation setting. However, regardless of the goal selected by the subject, a pre-determined representative range of 40% performance increase was embedded in the goals. Feedback for the current session was received from a video screen which provided information about the current session in relationship to the previous exercise session. The next video screen instructed the subjects to complete a questionnaire near the video terminal. The questionnaire measured the subject's level of satisfaction with personal performance and perceived self-efficacy. After

completing the questionnaire, the subjects continued exercising on the ergometer for an additional 5 minutes. At the conclusion of the experiment, subjects completed a questionnaire asking about their perceptions of the attainability of the 40% increase. The results of this study indicate that those subjects that had both feedback and goals more than doubled their performance when compared to the subjects receiving either the goal alone, feedback alone, or the control group. Subjects increased their performance level by 42% without goals and 85% with goals. Subjects that perceived their initial performance as substandard, increased subsequent performances ($r=.37, p=.05$). The more dissatisfied subjects were with their initial performance, the more they heightened their next performance ($r=.51, p=.01$). Self dissatisfaction and perceived self-efficacy jointly determine performance changes. These mediating forces were highly predictive of subsequent performance change ($r=.63, p<.002$).

Self-efficacy has been suggested to be a predictor of behavioral change. Examination of the predictive value of self-efficacy has been examined in several studies (Appendix B) (Carroll, 1995; Ewart, et al., 1983; Ewart, et al., 1986; Grembowski, et al., 1993; Robertson & Keller, 1992). Robertson and Keller (1992) examined exercise adherence in patients with coronary artery disease. They administered five scales that reflected the components of the health belief model and variables that could provide an explanation of adherence to an exercise regime. The scales administered were The Benefits Scale, The Barriers Scale, Severity Scale, Jenkins Self-Efficacy Scale, and The Activity Scale. The scales were administered to a sample (N=51) of patients 4 to 8 months post-coronary artery bypass graft (CABG) or percutaneous transluminal angioplasty (PTCA). The sample consisted of 38 male and 13 females. The mean age of

the participants was 61.39 years. Prior to their surgery of CABG (n=26) or PTCA (n=25), most of the participants were active walkers, walking an average of three or more times a week. There were no significant differences between the PTCA and CABG groups except that the CABG patients were older. The mean self-efficacy score of the CABG patients was 9.57 (SD=.54) compared to the PTCA group mean of 9.32 (SD=1.13). A positive correlational relationship was found between activity and self-efficacy ($r=0.352$, $p=0.005$) in both groups. Perceived barriers, type of surgery, and self-efficacy in that order explained 31% of the variance in exercise adherence in the sample. Those patients with high self-efficacy were more adherent to exercise. Self-efficacy may be a factor in health promotion behaviors.

Carroll (1995) examined self-efficacy in elderly patients recovering from coronary artery bypass surgery. A convenience sample of patients (N=133) age 65-87 with a mean age of 71.8 completed the Exercise of Self-Care Agency Scale, The Jenkins Self-Efficacy Expectation Scale, and The Jenkins Activity Checklist pre-operative, at discharge, and at 6 and 12 weeks post operative. Analysis of the data found that the lowest mean scores for self-efficacy expectations were at discharge with increases seen at 6 and 12 weeks post surgery (Carroll, 1995). This increase in exercise activity in this sample over time is consistent with Bandura's explanation of the dynamic nature of self-efficacy (Bandura, 1977a, 1977b, 1986). The mean self-efficacy scores in this sample were compared to a younger sample with a mean age of 61.39 years (Robertson & Keller, 1992). The mean self-efficacy scores in this sample (M=4.6) was lower than the mean scores (M= 9.5) of a younger sample 4 to 8 months post coronary artery bypass graft. The researchers suggest the need to enhance self-efficacy and decrease sources of negative efficacy

arousal to promote positive outcomes. This is especially true for the elderly who may need additional coaching, assistance, and guidance to feel more efficacious.

Self-efficacy was used as a predictor in a study of programmed exercise in coronary artery disease in a sample of men (N=40) with a mean age of 55 (Ewart et al., 1986). The sample performed a baseline treadmill measure of exercise and completed a jogging self-efficacy scale. The patients were assigned to either a supervised exercise group of jogging and volleyball or jogging and circuit weight training and advised to maintain a target heart rate range of 70% to 85% of the maximal rate achieved on their initial treadmill test. Compliance was evaluated at the end of the 10 week session. Compliance was defined as the number of minutes a patient exercised above or below the pre-set target range based on radial pulse and a holter monitor electrocardiogram. Calculation of group exercise means indicated those patients with low (M= -2; SD=9) or medium (M= -5; SD=12) self-efficacy exercise mean scores underachieved or exercised below the target rate while those with high (M=7; SD=11) self-efficacy exercise scores over-achieved or exercised above the target rate. These results suggest that self-efficacy exercise scores were able to predict in advance the exercise achievement of patients. This can be useful in identifying patients that may require specific interventions to facilitate behavioral change.

Self-efficacy has also been used in other health related research. Altmaier and colleagues (1993) examined the predictive capability of self-efficacy in patients (N=45) with low back pain. Patients were enrolled in a rehabilitation for education and physical therapy. All patients completed a self-efficacy measure for low back pain, a measure of patient functioning and a low back pain rating scale. Pain scores at admission were higher

($M=2.38$, $SD=.80$) than at discharge ($M=2.17$, $SD=.88$). Self-efficacy scores were also lower at admission ($M=118.10$, $SD=48.32$) than at discharge ($M=142.45$, $SD=48$). At follow-up the mean self-efficacy scale was 142.45 ($SD=48.72$). Changes in self-efficacy accounted for 5% of the variance in low back pain rating scores, 16.5% of the variance in present pain intensity, and 11% pain rating index scores. The results indicated that self-efficacy is associated with improved functioning and lower reports of pain. During rehabilitation, efficacy expectations of performance accomplishment, vicarious experience, verbal persuasion, and emotional arousal may all be affected. This is consistent with Bandura's theory of self-efficacy.

Self-efficacy behavior among older adults for the behaviors of exercise, dietary fat, weight control, alcohol intake, and smoking was assessed in adults ($N=2524$), age 65 and older (Grembowski, et al., 1993). The majority of the participants were female (61%), white (96%), and over the age of 65 (67%). Assessment of self-efficacy and outcome expectations were obtained at baseline using a self-efficacy scale developed for the study. Findings indicate that self-efficacy and outcome expectations had positive correlations with expectations for the behaviors of exercise ($r=.53$), dietary fat intake ($r=.42$), alcohol intake ($r=.40$), and smoking ($r=.51$). The individuals with higher efficacy expectation and outcome expectations reported better health and fewer physician visits (Grembowski, et al., 1993). The authors suggest that older adults with higher self-efficacy and outcome expectations are more likely to perform preventative behaviors than their counterparts with low self-efficacy. This study is consistent with Bandura's theory of the influence of perceived self-efficacy on health behavior (Bandura & Adams, 1977a; Bandura & Adams, 1977b).

Self-efficacy theory has also been the theoretical foundation for many health promotion studies of behavioral change. Boehm and colleagues (1995) developed an intervention study to examine self-efficacy in African-American men (N=123) regarding knowledge of prostate cancer and screenings. Two scales specific to prostate screening knowledge and prostate screening self-efficacy were administered pre and post education and screening program. The educational program was an overview of prostate cancer detection and treatment. The screening was a prostate specific antigen assay. Reported self-efficacy scores ranged from 4 to 20. The mean pretest self-efficacy score was 14.6 (SD=4.2) and posttest score was 17.0 (SD=4.1). The correlation between the two scores was significant and positive ($r=.54, p< .001$). A t-test was examined to determine whether there was a difference in cancer screening self-efficacy scores following the program. There was a significant improvement in the participants' self-efficacy following the program ($p<.001$). This study provides some evidence that education and screening programs which are components of performance accomplishments and verbal persuasion may influence self-efficacy expectations and increase knowledge (Boehm, et al., 1995).

Gortner and Jenkins (1990) examined the self-efficacy of first time and repeat patients (N=156) undergoing coronary artery bypass grafting and/or valve replacement. The patients and their significant others were recruited at two North California surgical centers and invited to participate. The sample consisted of male (n=125) female (n=31) patients post intensive care. The mean age was 59.0 and 57.0 respectively. A group or cluster of patients was randomly assigned to the experimental or control group. Both groups received routine information on recovery and viewed standard programs on recovery prior to discharge. The experimental group also viewed a tape on family coping

and conflict resolution followed by a brief counseling session. The experimental and control group were interviewed prior to surgery to obtain efficacy assessments for the behaviors of walking, lifting, climbing, general activities, and self-reports of activity (Gortner & Jenkins, 1990). Data on efficacy assessments and self-reports of activity were also obtained from the patients prior to discharge and at 4, 8, 12, and 24 weeks. The experimental group was followed by telephone on a weekly basis for 4 weeks to monitor recovery. The group was coached toward activity to provide reassurance and reinforce risk factor reduction. Results of a repeated measures analysis showed that the experimental patients showed significantly higher self-efficacy for walking, as measured by the Jenkins Self-Efficacy Scales between weeks 4 and 8 ($p=0.021$) and continued between weeks 8 and 24 ($p=0.050$). The relationship of self-efficacy to vigour (mood states) was significant ($r=.41$, $p<0.01$) for walking at weeks 4, 12 and 24 weeks. An inverse relationship for all patients was noted between self-efficacy and fatigue (mood states) for walking. Self-efficacy expectations summed for all physical activity at 8 weeks were a predictor for self-report activity at 24 weeks. Using a regression model, between 8.6% and 18.2% of the variance in self-reported activity could be explained by self-efficacy expectations. Being in the experimental group, having higher pre-surgical activity, and being male were also significant predictors of increased activity. The findings from this study suggest that patient recovery is enhanced and sustained by improved self-efficacy and low intensity interventions, such as telephone calls to provide verbal persuasion (Gortner & Jenkins, 1990).

Ries and colleagues (1995) in a randomized clinical trial examined the effects of a comprehensive program of pulmonary rehabilitation for patients with chronic obstructive

pulmonary disease. Patients (N=119) were randomly assigned to a comprehensive program (n=57) that included education, physical and respiratory instruction, psychosocial support, and supervised exercise training or to a less comprehensive and more education intense program (n=62). Outcome measures of exercise performance ($p < .10$), dyspnea ($p < .001$), breathlessness ($p < .001$), and muscle fatigue associated with exercise ($p < .001$) and self-efficacy significantly improved ($P < 0.05$) during the 2 month core rehabilitation program, but were nonsignificant at 12 months between the education and rehabilitation groups. An explanation offered is that short term rehabilitation interventions may be ineffective for long term change (Ries, et al., 1995). The authors suggest the development of programs that promote long term behavioral change.

Self-efficacy and pain behavior were examined by Buescher and colleagues (1991). Male patients (N=72) with a diagnosis of rheumatoid arthritis were recruited to participate in the study. Patients were videotaped for ten minutes in the morning to assess AM stiffness. Stiffness was coded using 7 specific pain behaviors: guarding, bracing, grimacing, sighing, rigidity, active rubbing, and self-stimulation. A joint count was done by an experienced rheumatology nurse to yield a standard quantification of pain, tenderness, and swelling. The Arthritis Self-Efficacy Scale was used to measure arthritis pain behavior and The Beck Depression Inventory was used to the cognitive, affective, and somatic symptoms of depression. The Arthritis Self-Efficacy scale had subscales for self-efficacy for physical function (FSE), pain management (PSE), and for controlling other arthritis symptoms (OSE). Based on the subject's scores on The Beck Depression Inventory, no relation between depression and pain behavior scores was found. Regression analysis was used to examine the relationship between the subscales of self-

efficacy and pain behavior and demonstrated that as self-efficacy increased, pain behavior decreased. The subscales when added to the model accounted for 7% (FSE), 5% (PSE), and 6% (OSE) of the total variance.

The variance predicted by self-efficacy ranged from 5% to 7%; therefore, other variables beside self-efficacy appear to be related to the pain behavior. Patients that self-reported a higher self-efficacy reported fewer symptoms of depression. The researchers noted that although the effects of self-efficacy were relatively small, self-efficacy is related to pain behaviors in rheumatoid arthritis.

Thompson, Schwankovsky, and Pitts (1993) examined physician self-efficacy to try and explain why some physicians are more aggressive in counseling patients than others. Surveys (N=400) were mailed to physicians and 21% (n=85) were returned. An 18 item scale measuring counseling self efficacy and a 9 item questionnaire to assess the physicians' perception of the cause of smoking and being overweight were included in the survey. The correlation between the physician's sense of self efficacy and counseling was ($r=.29, p<0.05$) and the correlation between self-efficacy and training was ($r=.26; P<0.01$). Physicians with a greater sense of self-efficacy and those with more training in health promotion techniques were more likely to counsel patients (Thompson, et al., 1993). Physicians who felt more effective used strategies of informing patients about health risks, while physicians with less training were more likely to tell patients to get their impulses under control. The researcher suggested that physician self-efficacy may be affected by patient feedback about their efforts. Much of the feedback that is received by the health care provider may be negative, which may impact feelings of efficacy and the subsequent

counseling provided to patients. The study concluded that the self-efficacy of the health care provider may be a factor in counseling efficacy for behavioral change.

Self-efficacy has not been measured for interventions to treat UI. However, self-efficacy has been evaluated in other disease states and has consistently demonstrated that self-efficacy impacts health behaviors. Promotion of self-efficacy increases health related behaviors and the maintenance of those behaviors.

Self-Efficacy and Depression

Bandura (1977a) proposed that depression will occur when either self-efficacy or outcome expectancy is low. There is thought to be a reciprocal relationship among self-efficacy, performance, and one's emotional state (Bandura, 1977a; 1977b; Yusuf & Kavanagh, 1990). Depression is described as "an alteration in mood ranging from a mild sadness to overwhelming despair. It is characterized by feelings of sadness, emptiness, dissatisfaction, lowered self-esteem, inactivity, and self-depreciation" (Lewis & Grainger, 1989).

Depression may be created by personal perception of cognition, negative events, and physiological states. Depression occurs when one feels a perceived inefficacy in controlling valued outcomes (Bandura, 1982). This perception impacts the choice of activities one chooses to engage in and the effort and persistence one is willing to invest in the activity (Bandura, 1982, 1986). Self-evaluation of accomplishments are often devalued by those with low self-efficacy because success is based on high performance standards (Bandura, 1982). When outcomes are highly valued, depression is likely when outcome expectancy is high and performance expectation is low (Bandura, 1982; 1986).

If one believes he/she is incapable of performing desired behaviors to produce a valued outcome, depression may result. This emotional state then alters perceived self-efficacy for performing an activity. One may not be willing to invest the time in an activity when the outcome expectancy is low. This reciprocal relationship may result in continued low efficacy and outcome expectations unless interventions are utilized to break the cycle by increasing self-efficacy, decreasing depression, and increasing performance (Bandura, 1982;1986).

Several studies have examined self-efficacy and depression. Davis-Berman (1988) recruited members (N=176) of a Senior Citizen's Center to participate in a study to examine the relationship between self-efficacy and depression (Davis-Berman, 1988). Depression was measured by the Depression Adjective Checklist and self-efficacy was measured by a General Physical and Social Self-Efficacy Inventory. The mean score on the general self-efficacy scale was 14.5 (SD=3.4), social self-efficacy 4.17 (SD=1.9), and physical self-efficacy 15.4 (SD=4.4). The mean score on the Depression Adjective Checklist was 30.8 (SD=4.4) indicating low levels of depressive symptoms. Physical self-efficacy accounted for 30% of the variance in depression scores, while general self-efficacy accounted for 9.37% of the variance (Davis-Berman, 1988). This study suggests that perceptions of strong self-efficacy perceptions are related to the absence of depression.

Grembowski and colleagues (1993) examined the relationship between self-efficacy and depression. The Center for Epidemiological Studies-Depression scale (CES-D), the Quality of Well-Being Scale and a efficacy expectation and outcome expectation scale specifically developed for this study were administered to a sample (N=2524) of

senior citizens. The majority of the participants were female (61%), white (96%) aged 65-74 (67%) and rated their health as relatively good (73%). In this sample, quality of well-being was positively correlated with CES-D scores ($r=.35$; $p>.05$). Socioeconomic status and efficacy expectations were associated with less depression and higher rating of health ($p<.001$). Women rated their health state better than men but reported more depressive symptoms (Grembowski, et al., 1993).

These studies suggest a negative correlation between self-efficacy and depression. The lower the perceived self-efficacy, the greater the reported depression.

Self-efficacy and Quality of Life

The effect of self-efficacy on quality of life has been investigated in several studies of health related behaviors. In the research of Grembowski and colleagues (1993), self-efficacy was measured by a scale specifically developed for this study. Efficacy expectations were operationally defined by a participant's perceived ability and likelihood to control a specific health behavior (Grembowski, et al., 1993). Outcome was operationally defined as the perceived harmfulness of the behavior. Senior citizens ($N=2524$) were administered the questionnaires. Findings were that individuals with higher self-efficacy and outcome expectations reported better health status and fewer physician visits ($r=.25$). Quality of well-being in this study was an integrative assessment of physical activity, mobility, social activity, self-care, and symptoms. The higher the score, the better the perception of well-being. Partial regression coefficients indicate a positive association existed between efficacy expectations and quality of well-being ($r=.009$; $p<.0001$). The findings of this study suggest that older adults with high efficacy

expectations for health related behaviors have better functional, mental, and self-rated health than older adults with low self-efficacy (Grembowski, et al., 1993).

The relationship of self-efficacy to pain behavior in patients with arthritis was examined by Buescher and colleagues (1991). Self-efficacy was measured by the Arthritis Self-efficacy Scale. Increased self-efficacy was found to be significantly related to physical function ($r=.39$, $p=.0008$), pain management ($r=.32$, $p=.006$), and control of arthritic symptoms ($r=.33$, $p=.004$). Fewer pain behaviors were exhibited by patients with high self-efficacy. Confidence of patients in their ability to manage their disease may affect physical movement and expressions of pain. Buescher and colleagues (1991) suggest that interventions aimed at maintaining optimal function may improve self-efficacy and quality of life.

Cunningham, Lockwood, and Cunningham (1991) examined quality of life in cancer patients. Subjects were referred to a psychoeducational program intended to enhance the patient's sense of control over mental and emotional states. Weekly log sheets were kept by the patients and reflected the time spent each day practicing coping skills. Self-efficacy was measured using The Stanford Inventory of Cancer Patient Adjustment (SICPA). Quality of life was measured using the Functional Living Index-Cancer (FLIC) a general quality of life measure and the Profile of Moods State (POMS) which measures affective states. Findings showed high intercorrelations ($r=.50$ to $.70$, $p=.001$) among the SICPA, FLIC, and POMS. Improvements in perceived self-efficacy, quality of life, and mood was noted after the coping skills training intervention ($r=.56$, $p<.001$). The researchers suggest that coping skills enhance perceived self-efficacy which improve mood and quality of life. These studies suggest a relationship between perceived

self-efficacy and quality of life. Belief in ability has been noted to impact behavior in a positive way. This impact may also enhance perceived quality of life.

Self-efficacy and quality of life are positively related while depression and self-efficacy are negatively related. The choices, goals, effort, and persistence of an individual can be impacted by individual self-efficacy (Bandura, 1977a;1982). Interventions that are tailored to increase self-efficacy may improve depression and quality of life.

Urinary Incontinence

UI is defined as the involuntary loss of urine (National Institutes of Health Consensus Conference, 1989). Prevalence rates for UI is 15 to 35% in the adult ambulatory population over 60 living in the community (Diokno, 1995). UI appears to be an under-reported common symptom in the elderly (Burgio, et al., 1994; O'Brien, Austin, Sethi, & O'Boyle, 1991). A variety of reasons for the under-reporting of UI have been cited which include the health habits of the incontinent person, social support, embarrassment, and the belief that UI is a natural part of aging for women (Burgio, et al., 1994; National Institutes of Health Urinary Incontinence Consensus Conference, 1989; McCormick, Newman, Colling, & Pearson, 1992).

Incontinence is either transient (acute) or persistent (chronic). Transient UI is associated with, but not limited to underlying medical conditions, such as urinary tract infections, delirium, untreated metabolic disorders, and environmental factors (Ames & Hastie, 1995; Burgio, Burgio, McCormick, & Engel, 1991; Ouslander & Schnelle, 1995). Classifications of chronic or persistent UI are urge with or without detrusor instability, stress, a mixture of stress and urge, overflow, and functional incontinence (AHCPR, 1996).

The goal of behavioral interventions for UI is to restore a normal pattern of voiding and continence. Pelvic muscle exercises are recommended as a behavioral intervention with minimal risk for the treatment of stress, urge, and mixed incontinence (AHCPR, 1996; National Institutes of Health Urinary Incontinence Consensus Conference, 1989). This intervention requires the patient to develop an understanding of the purpose of pelvic muscle exercises and how to properly perform these exercises.

Many researchers and clinicians have examined the efficacy of pelvic muscle exercises (PME) and the active use of the pelvic floor as a behavioral intervention for UI. PME have been implemented in clinical settings with and without biofeedback. Biofeedback is used to enhance the learning of PME by providing visual or audio feedback of pelvic muscle contraction and has been examined in many studies (Bump, Hurt, & Wyman, 1991; Bruns, Prankoff, Nochajski, Hadley, Levy, & Ory, 1993; Burgio, Courtland-Robinson, & Engel) (Appendix C). Verbal feedback is noted to promote behavioral change and performance of pelvic muscle exercises; however, the correct performance of the exercise is a concern noted in the research of Bump and colleagues (1991). A clinical sample of subjects (N=47) was evaluated urodynamically for UI and had urethral pressure profiles performed at rest and during Kegel exercise after verbal instruction. In this study, urethral pressure was the determinant of an effective Kegel effort. Only twenty-three subjects (49%) had an effective Kegel effort without an increase in vesical or abdominal pressure. A clinical study comparing biofeedback and verbal feedback was conducted by Burgio, Courtland-Robinson, and Engel (1986). Twenty-seven women between the ages of 29 and 64 with stress incontinence were assigned either to a biofeedback or verbal feedback group. Although both groups demonstrated a

decrease in unwanted urine loss, the biofeedback group improvement was significantly greater ($p < .05$). The biofeedback group had a 75.9% reduction of UI while, the verbal feedback group had a 51% reduction in UI. The study suggests that to achieve maximum benefit, verbal instruction alone is insufficient.

Burns and colleagues (1993) compared the effectiveness of biofeedback-assisted pelvic muscle exercises and pelvic muscle exercises without biofeedback in a group of community dwelling older women to a control group. Biofeedback-assisted PME was provided by the use of a vaginal probe. All subjects were coached in the procedure for relaxation and contraction of the pelvic muscle. The subjects would practice the PME at home and over 4 weeks, the sets increased by 10 until a maximum of 200 exercises per day were attained. Bladder diaries were kept by all the subjects as a measure of urine loss. Subjects were randomized into one of two treatment groups or a control group. Treatment for group 1 was verbal instruction for pelvic muscle exercises and for group 2 biofeedback-assisted pelvic muscle exercises. The control group did not receive treatment. Both Group 1 and 2 had a significant reduction ($p < .01$) in episodes of incontinence. Group 1 decreased mild incontinence 76%, moderate 44%, and severe (52%. Group 2 decreased mild incontinence 63%, moderate 57%, and severe 68%. The control group decreased UI 0% for mild incontinence, 10% for moderate, and 12% for severe. Both the pelvic muscle exercise alone (54%) and biofeedback (61%) groups demonstrated a greater reduction in urine loss when compared to the control group (6%). However, there was no significant difference between the biofeedback and verbally taught pelvic muscle groups (Burns, et al., 1993). These studies suggest that biofeedback and

verbal pelvic muscle exercise instruction may enhance performance, an important component of self-efficacy expectations.

The use of PME and strategies to prevent urine loss were examined in cognitively intact patients with incontinence (N=39) (Burgio, Whitehead, & Engel, 1985). During a four week baseline period, patients were instructed to void every 2 hours while awake. Patients kept detailed bladder diaries of voiding frequency, incontinent episodes, volume of leakage, and circumstances associated with each incontinence episode. Data collected from the baseline assessment were used to categorize the incontinence into stress and urge UI with or without detrusor instability. During the treatment phase, patients were instructed to continue to void every two hours while maintaining symptom diaries. Patients also were to attend 1 to 8 biofeedback sessions to teach pelvic muscle contractions, 2 to 4 weeks apart, depending on individual progress. During the biofeedback sessions, the patient viewed bladder, rectal, and external anal sphincter pressure on polygraph tracings under various conditions such as during bladder filling, with a full bladder, and when pelvic muscles were contracted. Patients also practiced pelvic muscle exercises without biofeedback in the clinic. Patients were instructed to perform 51 pelvic muscle contractions each day without biofeedback. PME were based on the type of incontinence. Patients with stress UI (n=18) were given biofeedback instructions in the use of strategies to prevent stress UI. The patients with detrusor instability also received biofeedback assisted PME and instructions on how to inhibit bladder contractions and subsequent UI. At the conclusion of treatment, all patients had a reduction in incontinence. Patients with stress UI decreased their incontinence an average of 82% ($p < 0.01$), those with detrusor instability decreased their incontinence an average

of 85% ($p < 0.05$) and persons with urge without detrusor instability decreased their incontinence an average of 94% ($p < 0.01$). This study provides evidence about the effectiveness of pelvic muscle exercises augmented with biofeedback.

In another study, Burgio, Courtland-Robinson, and Engel (1986) examined the effectiveness of teaching pelvic muscle exercises using biofeedback compared with verbal feedback. Women ($N=24$) between the ages of 29 and 64 were evaluated. Baseline information was collected from patient-maintained bladder diaries recording the size and frequency of urinary accidents. The diary also provided information about voiding patterns. Physiological assessment included: 1) assessment of urine loss while performing provocation maneuvers, 2) sphincter strength, and 3) a gynecological examination to identify factors that may impact the outcome of pelvic muscle physiotherapy. The factors identified to impact the outcome of pelvic muscle physiotherapy were vaginal deliveries, gynecological surgery, cytocele, rectocele, and vaginal prolapse. The patients were assigned to either a bladder-sphincter feedback ($n=13$) or a verbal feedback group ($n=11$). The groups were equalized for age and frequency of baseline incontinence. Training was four biweekly sessions lasting approximately one hour. During the bladder-sphincter training session, both visual and verbal feedback was given. The training session for the verbal feedback group entailed the therapist inserting two gloved fingers in the vagina and instructing the patient to tighten the muscles around the fingers. Verbal reinforcement of appropriate responses were used during the session to teach correct pelvic muscle contractions. Verbal and written instructions were given to both groups for the continuation of the exercises and diaries at home. Four weeks after treatment the groups were re-evaluated. Frequency of UI was compared at baseline and four weeks post

treatment. UI decreased in the verbal (51%) and biofeedback (75.9%) groups. At the 6 month follow-up visit, the biofeedback group experienced a 65% mean reduction of incontinence which compared to the 4 week post treatment mean of 75% ($t=.58$, $p<.05$). The verbal feedback group demonstrated an insignificant mean improvement of 45.7% to 56.7% when compared to 4 weeks post treatment. In this study, combined visual and verbal biofeedback appear to be more effective than verbal feedback. This study supports Kegel's hypothesis that visual feedback reinforces effort (Kegel, 1952). The visual biofeedback provides the patient with the performance enactment, verbal, and physiological feedback, components of Bandura's self-efficacy theory (Bandura, 1977a, 1977b, 1986).

The success of verbal and visual biofeedback to teach PME is also noted in a study by McDowell and colleagues (1992). These researchers implemented biofeedback assisted pelvic muscle exercise for a group of community dwelling older adults ($N=29$). The women ($n=27$) and men ($n=2$) participating in the study were evaluated by a multidisciplinary health care team. Selection into the study was based on the results of the health history, physical examination, urodynamics testing, laboratory data, history of UI of at least a 3 month duration, bladder diaries documenting 2 or more accidents per week, and an intact cognitive status as evaluated by a score of 23 or greater on the MMSE (McDowell, et. al., 1992). Individuals with stress, urge, or mixed stress and urge UI were included in the study. Treatment sessions were 30 to 90 minutes in duration and occurred at 2 to 4 week intervals. The number of sessions were individualized depending on the patient's progress. Subjects documented UI and toilet voidings in the bladder diaries. During the clinic treatment sessions, patients were taught how to contract and relax the

pelvic muscles while keeping the abdomen relaxed. Patients received biofeedback regarding their efforts using vaginal electromyography or anorectal manometry of their pelvic and abdominal muscles activity. Patients were then instructed to perform 45 contractions a day in 3 sessions of 15 contractions each (McDowell, et al., 1992). Duration of each contraction was based on individual patient ability and was gradually increased up to 10 second contractions. Patients were further instructed in specific behaviors to prevent stress and urge urinary accidents. Outcome was measured by comparing pre and post treatment bladder diaries. All individuals in the study experienced some reduction in accidental urine loss. The mean number of UI episodes before treatment of 16.9 per week was reduced to a mean of 2.5 per week following treatment. There was a mean overall reduction of 82%. Comparison of the frequency of accidents pre and post treatment indicated that 29 patients improved at least 50%, 20 patients improved at least 70%, 14 patients were at least 90% improved. No accidents were reported by 10 patients post treatment. This study suggests that interventions tailored to the patient's skill level can promote mastery, enhance self-efficacy and outcome expectations and a positive treatment outcome.

Bump and colleagues (1991) examined the performance of Kegel exercise after brief verbal instruction. Subjects (N=47) aged 23-83 years with a mean age of 53.6 were included in this study. Evaluation included urodynamics and urinalysis. A standardized urodynamic evaluation included uroflowmetry with post void residual urine, urethrocytometry, passive and dynamic urethral pressure profiles. After completing the urodynamic evaluation, a passive urethral pressure profile was repeated. Subjects were asked to contract the muscles they used to keep from losing their urine. The subjects were

instructed to contract and hold the same muscle until told to relax. The result obtained during the procedure was designated the Kegel urethral pressure profile. Effective Kegel effort was described as greater than or equal to 120% of the passive urethral pressure profile. Of the subjects, 60% (n=28) had an effective Kegel effort. Ineffective Kegel effort was noted in 40% (n=19). Differences in Kegel effort was not attributable to age, parity, weight, any passive profile measures, prior continence surgery, pelvic prolapse, or hypoestrogenism. Bump and colleagues (1991) postulate that incorrect performance of Kegel exercises may actually lead to progression of the structural defect and increase incontinence by decreasing maximum urethral closure pressure. The researchers also concluded that simple verbal or written instruction does not provide adequate preparation for the performance of a Kegel exercise program. Bump and colleagues (1991) suggest assessment, verbal instruction, and feedback be used to teach PME.

Biofeedback used when learning pelvic muscle exercises may be useful in contributing to self-efficacy. The components of performance enactment and physiological feedback may be enhanced when verbal persuasion and visual feedback are provided to increase cognitive understanding of pelvic muscle exercise.

Rose, Baigis-Smith, Smith, and Newman (1990) studied patients referred to the Visiting Nurse Association (VNA) (N=18). The patients had a mean age of 77 years and were frail and homebound. The patients referred to The Health Department (N=21) had a mean age of 77 years. These patients were fairly healthy but lacked transportation to a clinic. All patients received a complete medical, social, functional, and mental status assessment, as well as a physical examination. Treatment for the VNA and Health Department groups included educational information regarding ways to reduce

incontinence such as habit training, relaxation, diet, and bowel regimes. VNA patients were also instructed in pelvic muscle exercises using biofeedback. The Health Department protocol was the same except the instruction for the performance of pelvic muscle exercises was verbal. All patients were instructed to do 50 pelvic muscle exercises divided over a period of three times a day. Bladder diaries were kept by the patient during the two week period between visits. At the end of treatment, the VNA group demonstrated a 78% decrease in the number of accidents per week from baseline ($p < 0.02$). The Health Department group had a 79% ($p < 0.0005$) decrease in accidents per week. The VNA (frail elderly and biofeedback instruction) and the Health Department sample (fairly healthy elderly, verbal instruction) both had a significant decrease in UI accidents. This study suggests pelvic muscle exercises either with biofeedback or verbal instruction may reduce urinary accidents even in various groups of elderly.

Maintenance of pelvic muscle exercise was examined by Dougherty and colleagues (1993). Women ($N=65$) age 35 to 75 and older completed a study to examine the effect of pelvic muscle exercise on women with stress UI. Subjects were parous with mild to moderate stress UI. A baseline assessment included a health history, general physical, neurological examination, and pelvic muscle assessment with an intravaginal balloon device developed by the researcher, and 24 hour bladder diaries. The intervention was an audiotaped relaxation session with special attention to the relaxation of the abdominal muscles and a 16 week protocol of pelvic muscle exercises to be performed three times a week. The initial protocol was a series of 15 pelvic muscle contractions three time a week (level 1). Every four weeks an additional ten repetitions were added until a maximum of 45 repetitions were performed daily (level 4). Significant decreases in

urine loss were noted between the control period and level 4 pelvic muscle exercise as noted by a 24 hour bladder diary ($p \leq .0001$). In addition, episodes of urine loss decreased from 2.6 grams per day to 1.0 grams per day on a 24 hour pad test. Follow-up surveys were mailed when subjects were out of the study 8 to 20 months and 14 to 26 months. At the 8 to 20 and 14 to 26 month follow-up, 87% of the participants reported that their urine loss was the same or further diminished; 10% of the participants at the 8 to 20 month follow-up and 9% of the participants at the 14 to 26 month follow-up reported an increase in UI episodes. Most subjects reported they continued with pelvic muscle exercises at 8 to 20 months (71%) and 14 to 26 months (57%). However, only 17% of the participants at 14 to 26 months continued at the established frequency of three times per week and only 6% continued with 35 repetitions. This study suggests the success of pelvic muscle exercise training does not promote maintenance behavior.

Bishop, Dougherty, Mooney, Gimotty, and Williams (1992) found age to be a variable that impacted improvement in intravaginal pressures. A sample of women (N=43) age 35 and older without incontinence as a primary concern were studied. A health history, pelvic examination, and patient ability to perform pelvic muscle contractions were evaluated at the baseline assessment. Intravaginal pressures were obtained from the subjects using a custom fitted intravaginal balloon device. The subjects then completed a 12 week program of pelvic muscle exercises. Subjects that did not have an improvement in intravaginal pressure had a mean age of 57.5 (SD 11.8) while those that reported much improvement had a mean age of 50.4 (SD 8.1). Also those that did not improve had 2mm Hg or less maximum intravaginal pressure during baseline testing; while those that were successful had intravaginal pressures of 15 mm hg or greater during testing. Training was

similar for all age groups thus the researchers suggest older subjects and those with low maximum intravaginal pressure may need more time to achieve optimal effects. The elderly may require more reinforcement of activities to maintain pelvic muscle exercise frequency and duration.

Burns and colleagues (1993) compared the effectiveness of biofeedback pelvic muscle exercise, verbal instructed pelvic muscle exercises, and maintenance of treatment effects over the clinical trial time of 3.5 years in a sample of female volunteers (N=123) age 55 and older with stress or mixed UI. The number of incontinence episodes decreased significantly ($p < .001$) in the biofeedback (M=5; SD=6) and verbal (M=8; SD=10) instructed pelvic muscle exercises groups. Treatment effects were maintained for at least 6 months. This study suggests that biofeedback and verbal instruction enhances performance and maintenance which is an important component of self-efficacy expectations and outcome expectations (Burns, et al., 1993).

UI and Depression

Powerlessness, self control, self-esteem, and depression have been noted in research studies that examine the psychological component of UI (Grimby, et al., 1993; Rosenzweig, et al., 1991). Rosenzweig and colleagues (1991) examine the effect surgical treatment of stress UI has on the psychological status of women. Women (N=63) age 29-71 completed a subjective symptom questionnaire related to incontinence, therapy, and psychological status pre and postoperative. Pre and postoperative findings were compared to examine for differences related to whether a patient was considered subjectively or objectively cured. A patient was considered to be objectively cured when there was no visual loss of urine during postoperative urodynamic studies. Subjective cure

was defined as when a patient no longer complained of stress UI. Patients who were subjectively or objectively cured reported a significant improvement in psychological status. Increased depression was reported when the subject perceived the surgery as unsuccessful (Rosenzweig, et al., 1991).

Grimby et al. (1993) used the Nottingham Health Profile Questionnaire to assess a group of women (N=120) age 65-84 suffering from UI with an age matched comparison group. Part I of the Nottingham Health Profile Questionnaire reflects the degree of discomfort or distress in the areas of energy, emotional reactions, sleep, social isolation, and physical mobility. The mean score of the incontinent women for emotional disturbance was 15 (SD=1.8) and for social isolation the mean was 15.3 (SD=1.7) when compared with the control group mean of 10.1 for emotional disturbance (SD=1.0) and social isolation mean 7.1 (SD=.08). These scores indicate the women with UI had more emotional disturbance and social isolation than the control group. Further, women with urge and mixed UI (stress and urge) reported more emotional disturbance than their age-matched counterparts. This study suggests that UI may have a detrimental effect on the daily lives of women which may contribute to social isolation (Grimby, et al., 1993).

Burgio, Whitehead, and Engel (1985) used a sample of 48 women age 60-86 to assess biofeedback, habit training, and relaxation as a treatment for UI. All patients were evaluated urologically. Psychological measures included the MMSE and the CES-D scale for depression. Inclusion in the study required MMSE scores of 20 or greater. Baseline diaries were kept by the patients for 4 weeks and used in conjunction with the medical examination to assign a primary diagnosis for type of UI. Treatment measures were: 1) visual feedback in conjunction with verbal reinforcement for stress UI, 2) inhibition of

involuntary detrusor contraction for detrusor motor instability, and 3) teaching a more effective pattern of responding to urgency in urge UI without instability. Improvement after treatment was 82% for stress UI, 85% for detrusor motor instability, and 94% for urge incontinence without instability. CES-D scores range from 0 (no depression) to 60 (high level of depression). Depression scores in this study ranged from 0 to 45 with a mean of 10.6. This mean reflects lower levels of depression in the subjects. Clinical improvement in those patients with motor instability or urge UI were inversely related to depression ($r = -.67$; $p < 0.01$). However, depression scores were not related to clinical improvement in those with stress UI ($r = 0.06$; $p > 0.05$). This study suggests that depression and UI are inversely related, especially in patients with motor instability and urge UI. These patients may require interventions that address issues related to self-efficacy, depression, as well as UI.

The Medical, Epidemiologic, and Social Aspects of Aging (MESA) study reported psychosocial correlates of UI (Diokno, 1995). The MESA reported that 73% of incontinent respondents felt it was difficult to deal with unwanted urine loss and 57% felt urine loss was an embarrassing problem. The relationship between UI and psychological distress was noted for the measures of affect stability, depression, and life satisfaction (Diokno, 1995). Macaulay, Stern, Holmes, and Stanton (1987) also examined psychological factors in the etiology and treatment of UI. They found that patients with detrusor instability or sensory urgency were significantly ($p < .05$) more anxious when compared with a population of general medical inpatients. Patients with UI were also more depressed than the continent medical population.

The impact of UI on the treatment seeking behaviors of older adults with UI was examined by Burgio and colleagues (1994). The subjects (N=1104) completed a Health Risk Appraisal, assessment of depression (CES-D), cognitive function (Mini-Mental State Examination), functional status, and social support during an interview. The researcher suggested the severity of the incontinence, the volume of the accident, and financial status all impact the decision to report it to a physician. The type of incontinence also impacted the decision to report it to a physician. Those with mixed were more likely to tell their physician (44%) compared to those with stress (31%) or urge only (32%). Nocturnal episodes also increased the likelihood of reporting (54%) compared to daytime accidents (36%). Additionally, the people in this study who reported incontinence tended to have lower cognitive status and higher depression scores. These studies suggest there may be a relationship between UI and depression.

Quality of Life and UI

Quality of life is defined as the maximization of satisfaction by living life to its fullest and functioning to the optimum of one's capability at all stages of life (Miller, 1983). Another definition offered by Nordstrom and Lubkin (1990) describes quality of life as maintenance of health, financial resources, social approval, self-esteem, and social status. Strauss (1975) adds to the previous definitions the idea that to have real quality, the client must control and manage the environment as it relates to one's condition and individual lifestyle. Quality of life measures, like self-efficacy measures, are encouraged to be condition specific (Shumaker, Wyman, Uebersax, McClish, and Fantl, for the Continence Program in Women Research Group, 1994). Advantages of condition-specific quality of life measures include higher face validity, more in-depth assessment of specific

concerns, and issues relative to the population under investigation and the potential of being more sensitive to changes within the population (Shumaker, et al., 1994).

Disadvantages cited include the inability to compare the results with other population norms. Measures developed that are population specific include the Incontinence Impact Questionnaire (Shumaker, et al., 1994). The Incontinence Impact Questionnaire is a 30 item scale that examines variables impacting on the every day experience of UI. Reliability of the subscales of the instrument range from .48 to .90. Test-retest is reported to be .71. Face, construct, and criterion validity were reported as satisfactory (Shumaker et al., 1994). Research on UI has examined the quality of life as it relates to UI using the Incontinence Impact Questionnaire.

Fantl, et al., (1991) examined the efficacy of bladder training in women (N=123) living in the community. The women age 55 and older experienced at least one episode of involuntary urine loss a week. Psychosocial scales administered were the MMSE, Older Americans Resources and Services, Activities of Daily Living Scale, Incontinence Impact Questionnaire, as well as pelvic and urodynamic evaluations. Subjects were randomized into treatment (n=60; six month bladder training protocol) and control (n=63; no treatment) groups. All variables were examined prior to, immediately after and six months following treatment. Quality of life scores were available for 82 of the 123 subjects. Quality of life scores as measured by the Incontinence Impact Questionnaire have a range of 0 (no impact on quality of life) to 3 (greatly impacting quality of life). The scores for the treated group decreased more than 50% from a baseline mean of .51 (SD= .41) to post treatment mean of .23 (SD= 0.28). The scores indicate an improvement in perceived quality of life (p=.001). Scores for the control group were fairly constant. The baseline

mean was .49 (SD= 0.55) and the post treatment mean was .48 (SD= 0.59). This study strongly implies that quality of life is impacted by UI.

These findings are consistent with a previous study by Wyman and colleagues (1987) that found a perceived loss of control of urine, such as occurs in detrusor instability, results in higher scores on the Incontinence Impact Questionnaire which are indicative of a perceived poorer quality of life. Women (N=69) age 55 and older with a mean age of 67.8 and reporting one episode of incontinence per week were included in a clinical trial for behavioral treatment for UI. Degree of incontinence was assessed using a bladder diary and objective degree of incontinence through urodynamic studies. Based on the urodynamic studies, subjects were grouped into two categories 1) sphincter incompetence (n=47) with a mean age of 65.2, or, 2) detrusor instability (n=22) with a mean age 74.3. Results from the Incontinence Impact Questionnaire were analyzed by frequencies and responses into two categories: no or slight impact and moderate to severe impact. The frequency of moderate to severe impact in the area of daily activities was 21.9%, social interaction 12.0%, and self-perception was 21.4%. Those subjects with sphincter incompetence had mean scores on the Incontinence Impact Questionnaire of 12.5 (SD=11.6) and the unstable group with or without detrusor instability who had mean scores of 20.2 (SD=16.2; $t=2.27$; $p<.03$). The mean scores indicated that the detrusor group was impacted more by the incontinence than the sphincter incompetent group. Age did not significantly correlate with the Incontinence Impact Questionnaire scores ($r=0.07$). The correlations of incontinence episodes and the Incontinence Impact Questionnaire in the sphincter incompetent group was higher ($r=0.34$, $p<.03$) than in the detrusor instability group ($r=0.21$, $p<.03$). The correlation between Incontinence Impact Questionnaire

score and urine loss for the two groups was $r = .08$ and $r = .17$, respectively (Wyman, et al., 1987). The authors note this is a modest relationship and that severity of incontinence may not be related to psychosocial impact. Quality of life and severity of incontinence are subjective; therefore, interventions need to be specific to each person.

The Sickness Impact Profile (SIP) was used by Hunskaar & Vinsnes (1991) to assess the quality of life of women in the community with UI. The SIP is a standardized questionnaire consisting of 136 statements that measure sickness-related dysfunction in every day life. Women (N=76) age 40 to 70 and older were recruited to participate in the study. Data collection included a general health questionnaire, medical history, a continence history and the SIP. The women were classified into groups based on age and type of UI. Thirty-six women were middle age (40-60) and forty were elderly (age 70 or older). Ages 61 to 69 were not represented in the study. In the middle age group 36% were classified as having stress and 64% urge UI. In the older population 55% had stress and 45% urge UI. Differences were found among the age and symptoms of the groups. In the category of stress UI, older women did not experience as much dysfunction as middle aged women ($p < 0.05$). Dysfunction did not differ significantly between the middle aged and elderly women with urge symptoms. Overall, urge symptoms were associated with higher levels of dysfunction as measured by the Sickness Impact Questionnaire (Hunskaar & Vinsnes, 1991). This study found that greater volumes and frequency of urine loss was related to higher total sickness impact scores ($p < .05$).

Grimby and colleagues (1993) used the Nottingham Health Profile Questionnaire to collect data from women (N=1794) who agreed to participate in a mail survey of UI. Those women who responded to the mail survey were invited to attend a designated

continence clinic for investigation and treatment. Responses of the subjects on the questionnaire were also validated during the interview. The assessment included a detailed medical history and physical examination. The Nottingham Health Profile Questionnaire was then administered to the first 120 women (mean age of 75.4) with confirmed UI. Subjects with UI were categorized into stress (n=34), urge (n=48), mixed UI (n=38). The results of the Nottingham Health Profile Questionnaire were then compared to a representative sample of women all age 76 from the same urban population assessed as a part of another longitudinal study. Assessment of quality of life scores on the Nottingham Health Profile Questionnaire indicated the women with UI had scores indicative of more emotional disturbance and social isolation than their peers. The women with urge UI also had the highest scores which indicated more emotional disturbance. These studies are similar to findings from the MESA study (Diokno, 1995; Diokno, et al., 1986). Diokno (1995) reported that data from the MESA study indicated women with UI had more negative affect, depression, and less life satisfaction than their continent peers.

UI can impact many dimensions of one's life. Social isolation, depression, changes in quality of life, and self-concept have been noted to occur (Diokno, 1995; Grimby, et al., 1993). Physiological problems such as a loss of skin integrity, urinary tract infections, and increased medical expenditures also may occur because of UI (AHCPR, 1996; Baker & Bice, 1995; Engberg, et al., 1996; Hunskaar & Vinsnes, 1991). The Urinary Incontinence Guideline Panel recommend that the least invasive intervention be used first (AHCPR, 1996). Pelvic muscle exercises meet this criteria. However, the success of behavioral interventions require motivated patients who are willing and able to actively participate in their therapy. A factor which can impact patient participation and success is self efficacy.

Self-efficacy as described by Bandura (1977a, 1977b, 1982, 1986) may be an important variable in behavioral change and maintenance of that change. Evaluation of self-efficacy prior to interventions can be useful in identification of individuals that may need additional or specifically tailored interventions in order to be successful in their efforts to perform activities to prevent urine loss (Gist & Mitchell, 1992). Therefore, a scale to measure self-efficacy for performance of pelvic muscle exercises and outcome expectations can be an important tool that may provide practitioners with a method to assess and intervene effectively in the performance of behavioral interventions for UI.

Only one instrument designed to measure self-efficacy as it relates to the performance of behavioral interventions to decrease unwanted urine loss has been published (Svengalis, et al., 1995). To test the instrument a sample of 71 women was enrolled in a randomized trial comparing the outcome of pelvic muscle exercises done with and without the aid of a specially designed audiotape. The main outcome measure of success was a 50% reduction in the number of incontinent episodes per day as recorded in a patient-completed diary after 3 months of treatment of daily pelvic muscle exercises. Subjects completed the self-efficacy instrument after learning the exercises and 3 weeks into the exercise program. Perceptions of self-efficacy for performing pelvic muscle exercise repetitions of the women (n=55) rose slightly from 74% at baseline to 80% at week 3 after completing the course of treatment ($t[58]=1.87, p<.07$; Svengalis, et al, 1995). A weak association between increases in perceived self-efficacy from baseline to week 3 and a decrease in incontinence episodes was found ($r=.312, p<.07$). Psychometrics of the instrument for reliability and validity are not reported (Svengalis, et al., 1995). An additional limitation of the instrument used in this study is that the

evaluation of outcome expectations is limited to only one question, limiting variability of responses. Self-efficacy has been shown to be a means of explaining and examining behavioral change in a variety of health related studies and may be a factor in the maintenance of behavioral change.

Summary

Self-efficacy theory was tested in health promotion research. The components of efficacy expectations: performance accomplishments, vicarious experience, verbal persuasion, and physiological feedback were found to positively related to outcomes. Domain specific measures as encouraged by Bandura (1977a; 1986) were used to evaluate self-efficacy in these studies of behavioral change. Overall, those individuals with higher self-efficacy were more successful in behavioral change than those individuals with lower self-efficacy scores. Depression and self-efficacy were also examined in this literature review. An inverse relationship between depression and self-efficacy was reported. The higher the individual self-efficacy, the lower the depression. The studies also suggest an positive relationship between quality of life and self-efficacy.

Urinary incontinence may impact many areas of a person's life. The psychosocial impact is presented in the literature review. Quality of life and urinary incontinence have been suggested in the studies to have an inverse relationship. Quality of life decreases as incontinence increases. Depression has also been suggested to increase as incontinence increases. Behavioral treatment for incontinence include verbal and biofeedback assisted pelvic muscle exercises. The success rate of behavioral interventions for urinary incontinence are inconsistent. The literature reviewed offers no explanations for this variance. One possible explanation is a person's self-efficacy. Because self-efficacy has

been found to impact other health related behavioral interventions, it may be related to outcomes in the behavioral treatment of incontinence.

However, the relationship of behavioral interventions for the treatment of UI has only been examined in one study. One reason for the lack of research in this area may be the need for an appropriate scale with psychometric properties to measure self-efficacy as it relates to UI. No scale has been developed with psychometric properties that can be used to examine a person's belief in ability to perform pelvic muscle exercises and belief that performance of pelvic muscle exercises will eliminate or decrease incontinent episodes. The scale developed by this researcher may provide clinicians with an instrument assessed for reliability and validity to measure self-efficacy for pelvic muscle exercises. If self-efficacy is shown to be a factor impacting learning pelvic muscle exercise, interventions that foster positive self-efficacy can be developed and incorporated into a behavioral program utilizing pelvic muscle exercises to treat UI.

III. Methodology

This chapter describes the methodology used in this study and includes a description of the self-efficacy scale developed by the researcher. Procedures used to examine the reliability and validity of the scale are also described.

Phase I. Development of the Self-Efficacy Scale

I. Identification of construct.

The major construct identified in the current study was self-efficacy as related to the performance of pelvic muscle exercises. Identification of self-efficacy for the performance of pelvic muscle exercises was guided by Bandura's (1977a, 1977b, 1982, 1986) belief model that self-efficacy measures need to be domain specific. Self-efficacy is not a generalizable construct (Bandura, 1982; Maibach & Murphy, 1995); therefore, items indicative of self-efficacy beliefs and behaviors must be specific to behavioral interventions (Bandura, 1977a, 1977b, 1986). Questions developed for the self-efficacy scale were consistent with the two domains of self-efficacy: perceived performance expectations and outcome expectations.

II. Generation of an item pool.

A pool of 60 items (Appendix D) was generated based on the construct of self-efficacy related to pelvic muscle exercises. The items reflected the two domains of Bandura's theory of self-efficacy: perceived performance expectations and outcome expectations (Bandura, 1977a; Bandura, 1977b; Bandura, 1986). Items were neutrally worded to avoid the introduction of bias (Devellis, 1991). In this step of the development, redundancy was permitted to increase overall inclusiveness of the phenomena

(Devellis, 1991). Item length was not an immediate concern during this construction phase.

III. Determining the format for measurement.

The format for measurement was a rating scale. Rating scales are useful when measuring opinions, beliefs, and attitudes (Devellis, 1991; Nunnally & Bernstein, 1994). Scaling was in ten point intervals, which was encouraged by Dr. Bandura to provide subject response variability (A. Bandura, personal communication, Sept. 10, 1995). Scores can range from 0% to 100%. A score of zero (0%) indicates no belief in the ability to perform the indicated behavior or in outcome expectations, while a score of 100 (100%) indicates complete belief in ability to perform the indicated behavior or in outcome expectations.

IV. Initial item pool reviewed by experts.

Devellis (1991) suggested the experts critique the relevancy, clarity, and conciseness of each item to the phenomena being measured. The item pool was reviewed by three experts in UI and two experts in self-efficacy (Appendix D). The experts were also asked whether additional items should be added to the pool. Based on the advice of these experts, some items were eliminated and others revised.

The development to this point resulted in a 23 item scale which is divided into two subscales: efficacy expectations and outcome expectations (See Appendix E). Part A is a 14 item subscale which examines efficacy expectations by asking subjects to respond to items illustrating a variety of situations. Subjects are asked to indicate how confident they are in performing activities such as contracting pelvic muscles, performing pelvic muscle contractions while lying down, standing, and sitting. The subjects are also asked to

indicate how confident they are that they can perform strategies to prevent unwanted urine loss when they awaken at night with a strong urge to urinate.

Part B of the instrument is a 9 item subscale that examines outcome expectations. In part B, subjects indicate their confidence that the activity (performance of pelvic muscle exercises) will prevent unwanted urine loss. Using a rating scale of 0 to 100, the subjects circle the number that best responds to their belief that pelvic muscle exercises will prevent unwanted urine loss in certain situations. Some of the situations included in the instrument are coughing, sneezing, laughing, waiting in line for a restroom, and awakening at night with a strong urge to urinate.

Subscores are averaged. Total scores for part A and B are averaged for a total instrument score. The score ranges are from 0 to 100. The higher the score, the greater the person's perceived efficacy and outcome expectation. The range of scores are 0-33 (low self-efficacy), 34-70 (moderate self-efficacy) and above 70 (high self-efficacy). These ranges were based on the total possible score equally divided. The scores can then be used to assess a person's perceived efficacy expectation and outcome expectations. The readability of the scale was assessed using the Flesch-Kincaid (Person & Rose, 1993). It is based on the average number of syllables per word and the average number of words per sentence and results in a grade level. The grade level of the Broome Pelvic Muscle Self-efficacy Scale is 8.3.

The remaining guidelines that Devellis (1991) and Nunnally and Bernstein (1994) specify relate to the administration of the items to a sample and the evaluation of the items with respect to reliability and validity. Procedures related to these steps of the scale development are described in the following sections of this chapter. Included are a

description of: 1) the sample used in the evaluation, 2) the calculated reliability and validity estimates, 3) the additional instruments used in the evaluation, and 4) the procedures used for the self-efficacy scale evaluation in the two samples.

Phase II: Testing the Scale.

Testing the scale involved administering the scale to a sample of community dwelling women with UI. A small substudy of a group of women treated with pelvic muscle exercises at continence clinics for UI also completed the scale before treatment.

Description of Sample

A sample of 115 community dwelling women age 50 and older with UI were recruited from multiple sites in Northeastern Ohio in order to collect data for the examination of the technical qualities of the scale.

In addition to the community sample, a small clinic sample of 20 women were recruited from continence clinics in Pittsburgh and Northeastern Ohio. Using the Broome PMSES, data were collected from subjects prior to treatment for UI using pelvic muscle exercise and after using a dichotomous question regarding perception of success or not being successful eliminating or decreasing accidental urine loss using pelvic muscle exercise.

Rationale for Sample size

The sample size for the community sample was determined by examining the literature on data analysis procedures (Comrey, 1988; Nunnally & Bernstein, 1994; Tinsley & Tinsley, 1987). As a part of the examination of the structure of the instrument, a factor analysis was performed. Based on the suggestion of Tinsley and Tinsley (1987)

that 5 to 10 subjects per item be used and the accessibility of the proposed sample population, 115 subjects were used for this evaluation.

Sample size of the clinic sample was determined primarily by subject availability.

It is recognized that further studies are needed.

Inclusion criteria

Participation in this scale evaluation process required that the subjects:

- 1) be cognitively intact as determined by The Clock Drawing Test (Appendix F; Tuokko, Hadjistavropoulos & Beattie, 1995). Scores of 8-10 are considered indicative of intact cognition.
- 2) 2) have self-reported at least one symptoms of urge, stress, or mixed urge and stress UI. The symptoms of urge incontinence included leaking on the way to the bathroom and sudden urgency to urinate but leaking urine before reaching the bathroom. Stress was described as the loss of urine when laughing, coughing, lifting, or sneezing, and mixed incontinence included symptoms of both urge and stress incontinence.
- 3) be women age 50 and older.
- 4) have the ability to hear, see printed material, and understand verbal and written English. An additional criteria for the subsample was the completion of behavioral treatment (e.g. pelvic muscle exercises) at a continence clinic. The women completed the Geriatric Depression Scale. No women was clinically depressed.

Rationale for Inclusion Criteria

It is important that the participants be cognitively intact so that their responses are likely to be reliable. The gender and age of the sample were based on the review of literature that indicated that women are twice as likely to have UI than men and studies

that indicate that 26% to 53% of women aged 30 to 59 have experienced at least one episode of UI in the past year (McCormick, Kaschak, Colling, & Pearson, 1992). Other studies strongly suggest that 30% of women age 60 and older report experiencing UI (Burgio et al., 1991; Diokno, 1995). The scale, demographic questionnaires, educational materials, and presentations are in English; therefore, the participant needed to understand and read the English language.

Recruitment

The community sample was recruited from a population of urban and suburban women 50 years of age and older living in Northeastern Ohio. Subjects were recruited from multiple urban and suburban community groups (n=40), labor (n=44), and church sites (n=31) to increase the generalizability of the research results. Access to potential participants was obtained by the researcher contacting community leaders and program directors of the various groups for assistance and permission to recruit subjects.

Selection sites were three sites of the Senior Citizen Organization for Personal Enhancement (SCOPE), three different General Motors Retiree union groups, health related events at African-American and Caucasian churches and at senior citizens' complexes. Permission was given to the researcher to recruit subjects at the aforementioned sites. SCOPE and General Motors publicized the event in a newsletter.

The Churches and senior citizen complexes announced the events during meetings prior to the event. Once approval was received, flyers announcing the program (Appendix G) were also placed on bulletin boards in meeting rooms.

Clinic sample

Subject recruitment for the small comparative portion of the study were recruited from the The Benedum Geriatric Center Continence Clinic at the University of Pittsburgh and a urology group practice in Northeastern Ohio. The inclusion criteria were the same as the larger study previously discussed. Patients were referred by the practitioner at each site. Representation of Caucasian and African-American women in this study was promoted by selecting community sites for recruitment which have large African-American or Caucasian populations. The sample size anticipated from each site was based on the reported UI prevalence rate of 26% to 53% in community dwelling middle aged (M=50) women (AHCPR, 1996).

Informed Consent

Informed consent was obtained from all subjects. All participants received a copy of the written consent form that clearly informed the potential subject of the intent of the research, her role in the research, and the amount of time involved. The participant was informed of the voluntary nature of taking part in the study, the right to withdraw from the study at any time without penalty, and that the benefits of the research will add to the understanding of the treatment of incontinence.

Data Collection Procedures

The procedures for the data collection are outlined below.

1. Community leaders and directors of community organizations were approached for approval to recruit potential subjects at the site. The community leaders and directors of community organizations were informed that the purpose of the program was to collect information about UI in women over age 50 and about women's experience

with UI and their belief about PME as a treatment for UI. Education about UI and its treatment was provided to the participants.

2. After obtaining approval to conduct the program, flyers announcing the program (Appendix G) that explained the UI program were placed on meeting room bulletin boards of the various sites. The recruitment sites that had newsletters distributed them to members of the organization prior to the event.
3. On the day of the planned presentation, the physical set up of the meeting room was arranged in a semicircle to promote subject and researcher interaction. The researcher used a script to present the educational program (Appendix H) regarding UI. The script was developed after researching common health issues of women age 50 and older. The script was then prepared from a variety of resource materials. The U.S. Department of Health and Human Services patient guide Understanding Incontinence (AHCPR, 1996; Appendix I) was distributed to subjects after the presentation. Following the educational presentation, questions were entertained.
4. All subjects were encouraged to participate in the study. The researcher asked those subjects willing to participate in the study to remain in the meeting room. Those that did not wish to participate in the study were thanked for attending and permitted to leave. The subjects that remained were given the coded research packet containing instruments to measure depression (The Geriatric Depression Scale; Appendix J), quality of life (The Incontinence Impact Questionnaire-short form; Appendix K), self-efficacy expectation for the performance of pelvic muscle exercises (Broome Pelvic Muscle Self-efficacy Scale; Appendix E), and cognitive status (The Clock Test;

Appendix F). Demographic data (Appendix L) and subject consent forms (Appendix M) completed the packet.

5. Participants were asked to open the packet and follow along as the researcher read the informed consent for the community sample (Appendix M) to the subjects. After informed consent was obtained, participants were given The Clock Test as a measure of cognition (Tuokko, Hadjistavropoulos & Beattie, 1995). They were asked to draw a circle, place numbers in the circle as they would appear on the face of a clock, and to draw in the hands to make the time twenty minutes before 4 o'clock (Appendix F). After all participants had completed The Clock Test, they were asked to turn the page. Directions appeared at the beginning of each new section of the questionnaire. However, the researcher provided an explanation of each section. It was explained to the participants that the information obtained from the demographic section of the questionnaire provided the researcher with information about the individual characteristics of those participating in the study (Appendix L). The remaining sections of the questionnaire asked questions about how incontinence impacts your life (Appendix K), mood over the past 2 weeks (Appendix J), information about their belief in ability to perform PME, and belief that the PME can decrease or eliminate unwanted urine loss (Appendix E). The researcher remained in the room to answer questions. Completion of the packet took 20 to 30 minutes. As each participant completed the questionnaire, the researcher validated that all sections were complete.
6. Although all subjects were invited to complete the packet of instruments, only those with self-reported UI were included in the data analysis.

7. A test-retest sample (N=49) was randomly generated from each community site. Envelopes were placed in 75% of the packets randomly distributed at each site. All subjects with envelopes in their packets were informed of the need to complete the questionnaires a second time within the next two weeks. All subjects were requested to refrain from practicing the pelvic muscle exercises discussed during the educational program prior to completing the second packet. The subjects were asked to address the postage paid envelope to themselves and to give it to the researcher with the completed packet of instruments.
8. The Broome PMSES was sent to those subjects with self-reported UI in 10-14 days. A letter (Appendix N) was sent to the subject asking them to complete the questionnaire and to return it in the postage paid envelope.

Comparative Study for Criterion Validity

The data procedures for the comparative validity study are outlined below.

1. Participants were patients diagnosed with incontinence being evaluated for treatment for urge, stress, and mixed UI at a continence or urology clinic.
2. Participants were evaluated for urge, stress, or mixed incontinence and met the clinic criteria for treatment as well as the study inclusion criteria discussed earlier. Each participant received information about pelvic muscle exercises, the current research study, and were asked if they would be willing to participate. Those willing to participate were referred by the health care provider to the researcher. No individuals refused to participate in the study.
3. The researcher explained the purpose of the research to the participant before obtaining informed consent for the clinic sample (Appendix O). The participants were

then asked to complete the Broome PMSES. The researcher remained in the room to answer any questions of the participants and to ensure completion of the demographic questionnaire and the Broome PMSES.

4. Following completion of the questionnaire, the participants completed 5 continence clinic visits. At the final visit, subjects were asked to provide a dichotomous response to the evaluative question: Do you believe that you have been successful in decreasing accidental urine loss using pelvic muscle exercise? This response was recorded by the researcher as a part of the data analysis (Appendix P).
5. Based on the response of success or no success in reducing accidental urine loss using pelvic muscle exercise, the participants were separated into success (n=8) and no success (n=12) groups for data analysis.
6. All participants were included in the analysis. Inclusion of all participants enabled the researcher to examine and compare data between participants who perceived pelvic muscle exercises as successful and those who perceived pelvic muscle exercises as not successful.

Instrumentation

Cognitive Status

Cognitive status was a screening variable measured by the Clock Test (Appendix F). The Clock Test is a rapid and easily administered screening tool. Scores range from 1 to 10 with the higher numbers indicating more impairment. The Clock Test has good sensitivity (86.7%) and specificity (92.7%) (Tuokko, Hadjistavropoulos, & Beattie, 1995). It correlates with other cognitive screening instruments such as MMSE (Smith, Breitbart, & Platt, 1994). In a study by Shulman, Shedletsky, and Silver (1986), clock

scores were correlated significantly with the MMSE (-0.65) and the Short Mental Status Questionnaire (-0.66). The correlation is negative because the higher the score on The Clock Test, the more severe the impairment, while the reverse is true for the other cognitive questionnaires. The scoring system for The Clock Test was developed by Tuokko, Hadjistavropoulous, & Beattie (1995) and was used in this study. Subjects were asked to draw the face of a clock, write in the numbers in the appropriate place on the clock face, and to place the hands at a specific time given by the researcher. The Clock Test was used rather than the MMSE because the Clock Test is less threatening and can be administered in a group situation (telephone conversation Multi Health Systems, May 1995).

Depression

Depression was measured by the Geriatric Depression Scale (GDS; Appendix J; Yesavage, et al., 1983). The GDS is a 15 item dichotomous response format, developed in 1983 by Yesavage to measure depression in nursing home and community elderly. Scores range from 0 to 15. The scoring for the GDS was 0-4 (mild depression), 5-9 (mild depression) and 10-15 (severe depression). The GDS has been validated for community, well-elderly, and hospitalized elderly (Hamilton, 1967; Steuer, Mintz, & Hammen, 1984). Reliability measured by alpha coefficient ($r = .94$), split half reliability ($r = .94$) and test-retest reliability ($r = .85$) have been established. Convergent validity was determined by positive correlations with The Zung Self-Rating Depression Scale ($r = .84$) and the Hamilton Rating Scale for Depression ($r = .83$) (Yesavage, et al., 1983).

Quality of Life

Quality of life was measured by The Incontinence Impact Questionnaire -Short Form (IIQ-SF; Appendix K; Uebersax, et al., 1995). The IIQ-SF form consists of items that reflect symptoms associated with UI and the way that UI interferes with different aspects of daily living (Shumaker, et al., 1994). Responses range from 0 (not at all) to 3 (greatly). The average score of items is multiplied by 33.3, so that scores are on a scale of 0 - 100 (Uebersax, et al., 1995). The IIQ-SF correlation with the long form total was .97. The correlation of the short form subscales with the long form was .99 to .94 (M=.91; Uebersax, et al., 1995). Test-retest ($r = .71$), subscale ranges for Cronbach's Alpha ($r = .48$ to $.90$), criterion ($r = .84$), and convergent ($r = .37$ to $.52$) validity of the scale with Urogenital Distress Inventory for measures of validity have been reported (Uebersax, et al., 1995).

Demographics

Demographics information about race, marital status, and age were collected using a form developed for this study by the researcher (Appendix L). To better understand any variables that may impact behavior, educational and employment data were collected. General information about the participants experience with UI and any past treatment were also obtained.

Data Management

1. Data was collected by the researcher at each testing site. Specification for acceptable responses were developed to facilitate data entry and cleaning (Feigal, Black, Grady, Hearst, Fox and Newman, 1988). A pre-numbered and coded packet that contained all the instruments was completed by each subject.

2. Missing data were minimized by the researcher assessing each packet for completion prior to the subject leaving the testing site. The researcher attempted to collect all missing data by questioning the subject. The researcher did not include participants who did not answer 3 or more applicable questions.
3. All data were entered into SPSS-PC.
4. Measures to maintain the confidentiality of the data was ensured by placing the data in a locked file when not in use. The subject's name did not appear on any of the data. The completed instrument packets were identifiable only by a code number.

Data Analysis

The plan for analysis was that indices of reliability and validity would be calculated in addition to descriptive statistics. Demographic information and estimates of reliability and validity are reported in the next chapter.

IV. Results

This chapter describes the samples and presents the psychometric analysis of The Broome Pelvic Muscle Self-efficacy Scale. Reliability and validity were examined using women in a community sample (N=115) and a clinic sample (N=20).

Description of Community Sample

The sample for this study was comprised of 115 ambulatory, cognitively-intact, community-dwelling women recruited from social and religious community organizations. Prior to completing the survey instruments, participants were asked to complete the Clock Drawing, an instrument to assess cognitive status (Appendix F). Those subjects who were found to be cognitively intact according to criteria described by Tuokko, Hadjistavropoulous, & Beattie (1995) for the Clock Test were eligible for inclusion in the study. A ten point grading system is used with scores of 8 and above as being acceptable as a measure of cognitive intactness. Based on this criteria, none were eliminated. The other eligibility criteria was that women self-reported experiencing UI. Six women were excluded because they did not report incontinence. All women included in the study reported experiencing UI.

The race of the women were Caucasian (65.2%), African American (27%), Hispanic (.9%), American Indian (1.7%), Asian (.9%) and Bi-racial (4.3%). The majority of the women were married (50.4%), between the ages of 50 and 60 (65.2%) and lived with a spouse (52.2%).

Almost two-thirds (64.3%) of the women in the study sample are currently employed. Sixty-nine (60%) reported an educational level within grades 9 through 12 and

thirty-eight (33%) reported some college education. Other characteristics of the community sample are shown in Table 1.

Table 1
Demographic Characteristics of Women in Community Sample (N=115)

Characteristic	N	%
Race		
African American	31	27.0
Caucasian	75	65.2
Hispanic	1	.9
American Indian	2	1.7
Other	6	5.2
Marital Status		
Single	10	8.7
Married	58	50.4
Widowed	17	14.8
Divorced	27	23.5
Separated	3	2.6
Age		
50-60	75	65.2
61-71	29	25.2
72-81	11	9.6
Living Arrangements		
Spouse	60	52.2
Alone	32	27.8
Children	14	12.2
Other	9	7.8

The women were queried regarding events that precipitated their UI. Structured and open ended questions were used to help establish cause and type of UI experienced by the women (Table 2). More women reported loss of urine with activities that were indicative of stress UI. Ninety-three (80.9%) of the women reported a loss of urine associated with sneezing, coughing, or lifting. In comparison, 74 (64.3%) affirmed urine loss with activities associated with urge incontinence, such as experiencing a loss of urine while on the way to the toilet. The questions about the occurrence of urine loss and the

women's responses appear in Table 2. Note the responses to the events are not mutually exclusive.

Table 2
Events Precipitating Urinary Incontinence in Ambulatory Community Dwelling Women (N=115)

	Yes	
	N	%
Does urine leakage occur:		
1. When sneezing, coughing or lifting? *	93	80.9
2. On the way to the toilet? **	74	64.39
3. When running water? **	30	26.1
4. When getting up from a chair? *	30	26.1
5. Arriving home after being out? **	62	53.9
6. Getting up during the night to urinate? **	50	43.5
7. Do you wake and find yourself wet? **	16	13.9
8. Do you feel that you do not empty your bladder completely when you urinate? **	45	39.1
9. Do you get a strong urge to urinate and need to run to the toilet, but leak urine on the way? **	61	53.0

Note. * stress incontinence; ** urge incontinence

An open ended question was added so that participants could give information about other times that leakage occurred in addition to those specified in Table 2. Thirty-three (28.7%) of the participants reported other times when leakage occurred. The other precipitating events of leakage are noted in Table 3.

Table 3
Other Activities Precipitating Urine Leakage

Activity	N	%
Sitting up, running jumping, riding in a car, aerobics *	10	8.6
Sitting still**	6	5.2
Not able to get to bathroom on time, wait too long before going to bathroom, getting clothes undone when in a hurry**	5	4.3
Diet (eg caffeinated beverage, alcohol)**	3	2.6
Menstruation**	1	1.0
Holding urine too long, being on feet too long**	3	2.6
Lifting*	5	4.3

Note. * stress incontinence, ** urge incontinence

The mean length of time the women had been incontinent was 2.9 years (SD=1.3).

The survey questions regarding treatment of incontinence asked: 1) Have you ever (been evaluated) seen a doctor or nurse and had an examination for this problem? 2) Have you had treatment for the problem of leaking urine? If the women had treatment, the next questions asked were: 1) What type of treatment have you had for the problem of leaking urine? 2) Was this treatment effective? The final question asked the women if they are still using the treatment.

Of the total sample, 35 (30.4%) of the 115 women completing the survey reported being evaluated for incontinence by their health care provider. Thirty-one (27%) women had treatment initiated by a health care provider, while nine (8%) women started self treatment using pelvic muscle exercises. Of the 31 subjects who reported treatment for UI by a health care provider, 14 (45%) were prescribed pelvic muscle exercises, 10 (32%) had surgery, and 7 (23%) were treated with medication. Eleven (36%) of the women who had received treatment for UI evaluated the treatment as being very effective, 14 (45%)

reported the treatment as somewhat effective, and 6 (19%) found the treatment to be not at all effective. Of the 21 women who received pelvic muscle exercises or medication as treatment, 14 (66%) women continued the prescribed treatment. Table 4 summarizes type of treatment, level of effectiveness and continued use of treatment.

Table 4
Previous Treatment for Urinary Incontinence in Community Dwelling Women (N=31)

Type	N	%	Effectiveness	N	%	Continuation	N	%
Pelvic Muscle Exercise	14	45	Very	6	43	Yes	12	86
			Somewhat	6	43	No	02	14
			Not at all	2	14			
Surgery	10	32	Very	3	30	N/A		
			Somewhat	6	60	N/A		
			Not at all	1	10			
Medication	7	23	Very	2	29	Yes	2	29
			Somewhat	2	29	No	5	71
			Not at all	3	43			

The women completed the Broome PMSES (Appendix E), the GDS (Appendix J), and the IIQ-SF (Appendix K). Scores on the 23 item scale that were above 70 were considered to have high self-efficacy, scores between 34 and 70 had moderate self-efficacy and scores below 34 were considered to be indicative of low self-efficacy. Based on the Broome PMSES scores, 68 (59%; M=45.21; SD=10.43) had high self-efficacy for the performance of pelvic muscle exercise, 42 (37%; M=54.09; SD=9.75) had moderate self-efficacy and, 5 (4%; M=22.86; SD=9.2) of the women had perceived low self-efficacy.

The scores on the GDS indicated that 92 (80%; M=1.43; SD=1.31) of the women scored within the normal range (scores between 0 to 5) and not considered depressed, 17 (15%; M=6.33; SD=1.84) were moderately depressed (scores between 6 to 10) and 6

(5%; $M=11.16$; $SD=1.69$) were severely depressed (scores greater than 10). The criteria identified by Yesavage and colleagues (1983) was used for scoring the depression scale.

The responses of the women to the IIQ-SF indicated that 88 (77%; $M=10.23$; $SD=9.52$) of the women perceived that UI did not or only slightly impacted their quality of life. Nineteen (17%; $M=48.13$; $SD=5.79$) women reported that UI moderately impacted their quality of life, and 8 women (6%; $M=78.23$; $SD=13.47$) reported UI had a severe impact on their quality of life. These data provide an overview of the sample's perceived self-efficacy, quality of life, and feelings of depression.

Psychometric Analysis of the Broome Pelvic Muscle

Self-efficacy Scale Reliability

The Broome Pelvic Muscle Self-efficacy Scale is a rating scale with responses ranging from 0 to 100 in increments of 10. Internal consistency reliability was estimated by Cronbach's Alpha for the total scale and the subscales of efficacy expectations (Part A) and outcome expectations (Part B). Table 5 reports these coefficients for the sample of 115 women. The Alphas for all scales are high and meet the criterion for acceptable reliability indicated by Nunnally and Bernstein (1994). The Alpha for all the scales remained stable (between .967 to .969) even if each item were to be individually deleted.

The stability of the scale was estimated by the test-retest method. Eighty-six (75%) of the total sample randomly received the scale to complete 14 days after the initial evaluation. The instruments were mailed to the participants with a letter asking them to complete the instrument and to return it in the stamped envelope. Forty-nine (56%) returned the completed instruments. There were no follow-up measures to increase return of the instrument. Results of correlating scores across the two administrations are

presented in Table 5. The moderate stability of the scale may be related to the construct being measured. Self-efficacy is a state and may change over time based on a person's performance of an activity and the outcome of that activity. In this case, perception of ability to perform pelvic muscle exercises may be influenced by practice. Participants had listened to a brief lecture regarding UI and pelvic muscle exercise prior to completing the questionnaires. They were requested not to perform the exercises; however, this could not be monitored. Another factor that may impact stability is the presentation that was given before completion of the scale. Information presented in the presentation may impact response at time one and performance of pelvic exercise may impact stability at time 2. Because of the personal and sensitive nature of this study, it was decided to offer the presentation first to encourage subject participation.

Table 5
Evaluation of Reliability for the Broome PMSES

Scale	M	(SD)	Alpha	Test-Retest (n=47)
Efficacy (Part A)	70.98	(19.65)	.97	.64
Outcome (Part B)	62.17	(22.14)	.96	.69
Total Scale	67.57	(18.73)	.97	.72

Reliability by Subgroup

The reliability estimates were compared by subgroups of the community sample to determine whether the scale retains its internal consistency and test-retest reliability for these groups. Although these subgroups are quite small, the data provide some preliminary results.

Reliability estimates were calculated for African-American and Caucasian women separately. It was also calculated for those women who reported having had treatment for UI and those who had not. There were 9 women identified as other. The race of these

women were: Hispanic (1), American Indian (2), Asian (1), and bi-racial (5). These 9 women not identified as African American or Caucasian were not included in the subsample analysis of treatment by race. Tables 6 and 7 report those coefficients.

Table 6
Reliability Estimates by Race

	Coefficient			
	n	Alpha	n	Test-retest
Efficacy expectations (Part A)				
African-American	31	.98	12	.49
Caucasian	75	.97	35	.68
Outcome expectations (Part B)				
African-American	31	.96	12	.56
Caucasian	75	.96	35	.77
Total Scale				
African-American	31	.98	12	.55
Caucasian	75	.97	35	.80

The Alpha reliability estimates in the subsamples of African American and Caucasian women are comparable to those found for the total group. The test-retest estimates for Caucasian women were higher than those for the African American women. Reasons for the lower estimates in the subsample of African Americans may be the small sample size and that self-efficacy is a state that changes over time.

Table 7
Reliability Estimates by Prior Treatment

	Coefficient			
	n	Alpha	n	Test-retest
Efficacy Expectations (Part A)				
Treatment	31	.94	17	.55
No Treatment	84	.98	32	.68
Outcome Expectations (Part B)				
Treatment	31	.98	17	.78
No Treatment	84	.95	32	.56
Total Scale				
Treatment	31	.96	17	.75
No Treatment	84	.97	32	.65

Internal consistency was also compared in women who had and did not have previous treatment for UI. Again, the Alpha estimates were high for both treatment and no treatment groups. The stability estimate for the treated group was lower for efficacy expectations, but higher for the outcome expectations section of the scale. It must be remembered that the treatment occurred before any data collection and the higher stability estimate for outcome may reflect the knowledge gained from treatment, although not all treatment involved pelvic muscle exercise. Another factor that may impact stability is self-efficacy may change over time because it is state. Stability of the total scale was .65 or greater for the treatment and no treatment groups.

Item-Scale Correlations

For the total sample of 115 women, items were correlated with the corresponding corrected scale total to examine whether any items did not relate well enough to be retained. Results are reported in Table 8. Based on these moderate to high correlations, it was decided that there is not a need to delete any items.

Inter-item Correlations

To examine the relationship of items within each of the two scales (efficacy expectations and outcome expectations), the items were correlated and are presented in Tables 9 and 10. The correlations in these two tables provide further evidence that item scores can be averaged to form an efficacy and a outcome scale score. They also help to explain the high internal consistency reliability estimate.

The only two items that appear to be highly correlated and also conceptually overlapping are items 4 and 5 in Part B. However, since there are fewer items in Part B and the other statistics provide evidence of their contributions, it was decided to retain both items.

Table 8

Item- Scale Correlations

Item	Efficacy	Outcome	Correlations with Scale Total
1	.83		.78
2	.84		.74
3	.81		.79
4	.90		.81
5	.79		.71
6	.78		.72
7	.80		.77
8	.79		.75
9	.87		.78
10	.87		.76
11	.83		.77
12	.73		.77
13	.85		.85
14	.67		.67
15		.73	.68
16		.78	.60
17		.83	.71
18		.89	.79
19		.88	.78
20		.86	.76
21		.88	.79
22		.85	.69
23		.86	.86

The correlation between efficacy expectation scores and outcome expectation scores was also computed. A moderately positive correlation between efficacy and outcome scales was expected and a correlation of .65 was obtained. This results in a shared variance of 42% which empirically supports the theory of two components of self-efficacy on which this scale was based. The higher variance for efficacy expectations occurred because all 14 items developed for efficacy expectations loaded on factor one compared to the 9 items for outcome expectations which loaded on the second factor.

Table 9

Efficacy Scale Intercorrelation (Part A)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1														
2	.86													
3	.65	.67												
4	.85	.87	.75											
5	.83	.83	.68	.81										
6	.73	.71	.61	.74	.72									
7	.62	.60	.75	.71	.57	.66								
8	.61	.61	.69	.68	.57	.61	.74							
9	.80	.81	.67	.87	.73	.72	.71	.73						
10	.74	.76	.68	.84	.70	.74	.72	.73	.82					
11	.69	.72	.77	.76	.68	.63	.69	.77	.74	.73				
12	.56	.55	.63	.58	.49	.58	.65	.61	.62	.61	.64			
13	.66	.66	.75	.71	.60	.61	.71	.76	.72	.74	.82	.83		
14	.59	.57	.50	.62	.53	.56	.60	.50	.55	.65	.47	.59	.63	

Table 10
Outcome Scale Intercorrelations (Part B)

	1	2	3	4	5	6	7	8	9
1									
2	.61								
3	.64	.74							
4	.68	.65	.78						
5	.66	.65	.73	.94					
6	.62	.67	.72	.80	.80				
7	.66	.77	.72	.79	.78	.81			
8	.61	.81	.71	.71	.71	.80	.86		
9	.70	.62	.75	.85	.85	.78	.77	.71	

Validity

Content validity of the Broome PMSES was established by having experts (Appendix D) in the fields of self-efficacy or urinary incontinence evaluate the instrument for sampling adequacy. The experts in the area of UI were all doctorally-prepared nurse educators and active clinicians in UI evaluation and treatment. The experts in self-efficacy theory had doctorates in psychology. The Broome PMSES was sent to the experts with a cover letter (Appendix Q) asking for their evaluation of the adequacy of the content for the domain of self-efficacy or UI. Comments received from the experts were used to modify the instrument prior to administration.

Data were also collected to examine the construct validity of the Broome PMSES. After an exhaustive search of the literature, no other instruments with reported reliability and validity that examine self-efficacy and pelvic muscle exercise were found. However, the literature does report a relationship between quality of life, depression and self-efficacy. The higher the perceived self-efficacy, the better the quality of life (Carroll, 1995; Ewart, et al., 1986; Grembowski, et al., 1990). Reported depression is also lower (Bandura, 1982; 1986; Grembowski, et al., 1993; Yusuf & Kavanagh, 1990) when self-efficacy is high.

The Broome PMSES (Appendix E) was examined with respect to these reported relationships using The Geriatric Depression Scale (GDS; Appendix J; Yesavage, et al., 1983), as a measure of depression and the Incontinence Impact Questionnaire-Short Form (IIQ-SF; Appendix K; Shumaker, Wyman, Uebersax, McClish, & Fantl, 1994), as a measure of quality of life. For this community sample the Coefficient Alpha reliability estimates for the GDS was .71 and for the IIQ-SF was .90.

The GDS identifies the responses that are most likely to be indicative of a mood disorder and one point is assigned each response. Thus, the higher the sum, the greater the depression. The lower the score on the IIQ-SF, the better the quality of life. On the Broome PMSES, the higher the score, the greater the perceived self-efficacy. Therefore, the Broome PMSES would be expected to correlate negatively with the GDS and IIQ-SF. Correlations between the Broome PMSES and the depression and quality of life scales are presented in Table 11.

Table 11
Correlation of the Broome PMSES with a Measure of Depression and a Measure of Quality of Life

Scale	r
Geriatric Depression Scale	-.25*
Incontinence Impact Questionnaire	-.36*

Note. * $p < .01$

The correlations of the Broome PMSES with the GDS and IIQ-SF were moderate and in the anticipated direction, providing some initial evidence for the construct validity of the instrument. The correlations for construct validity have not been examined in other studies; therefore, other studies examining self-efficacy, depression, and quality of life are encouraged.

Construct Validity

A principal components factor analysis was conducted to examine the factor structure of the Broome PMSES. The scale was developed to yield two scores, efficacy expectation and outcome expectation. Factors were extracted using the Kaiser criterion of retaining factors with eigenvalues greater than 1.00. The first factor had an eigenvalue of 13.98 (60.8%) and the second factor an eigenvalue of 3.10 (13.5%). A varimax

rotation was done and yielded the factor loadings presented in Table 12. Questions 1 through 14 in (Part A) load highly on factor 1 (efficacy expectations) and questions 1 through 9 (Part B) load on the second factor (outcome expectations). Therefore, the factor structure that was designed in the Broome PMSES was confirmed.

Table 12
Rotated Factor Loading

Item	Factor	
	1	2
Efficacy Expectations (Part A)		
Question 1	.83	.28
2	.87	.18
3	.74	.40
4	.90	.24
5	.83	.18
6	.79	.23
7	.74	.35
8	.74	.34
9	.88	.22
10	.88	.19
11	.81	.28
12	.59	.51
13	.73	.48
14	.59	.37
Outcome Expectations (Part B)		
Question 1	.34	.68
2	.09	.85
3	.27	.81
4	.33	.85
5	.33	.84
6	.29	.85
7	.31	.86
8	.18	.88
9	.48	.77

The construct validity of the scale was further examined in a clinic setting comparing the self-efficacy scores of women who reported success and those who perceived themselves as not being successful in eliminating unwanted urine loss following

treatment using pelvic muscle exercise. It was hypothesized that self-efficacy would be greater in those women who were successful in decreasing or eliminating unwanted urine loss than those who were not successful.

Description of Clinic Sample

The clinic sample consisted of 20 women treated for UI at a continence clinic.

Characteristics of the sample are shown in Table 13.

Table 13
Demographic Characteristics of Women in Clinic Sample (N=20)

Characteristic	N	%
Race		
African American	2	10.0
Caucasian	18	90.0
Marital Status		
Married	12	60.0
Widowed	5	25.0
Divorced	3	15.0
Age		
50-60	8	40.0
61-71	6	30.0
>72	6	30.0
Living Arrangements		
Spouse	11	55.0
Alone	4	20.0
Children	2	10.0
Other	3	15.0

The majority of the women were Caucasian (90%), married (60%), between the ages of 50 and 60 (40%), and lived with a spouse (55%). Twelve (55%) of the subjects were over age 60. The women in the clinic sample almost equally reported loss of urine with activities that were indicative of stress and urge incontinence. For example, 19 (95%) reported a loss of urine when sneezing, coughing, or lifting and 17 (85%) of the

women leaked urine on the way to the toilet. The women's response to questions about events that precipitated their UI appear in Table 14.

Table 14
Events Precipitating Urinary Incontinence in Clinic Sample of Women (N=20)

	Yes	
	N	%
Does urine leakage occur:		
1. When sneezing, coughing or lifting? *	19	95.0
2. On the way to the toilet? **	17	85.0
3. When running water? **	11	55.0
4. When getting up from a chair? *	10	50.0
5. Arriving home after being out? **	15	75.0
6. Getting up during the night to urinate? **	17	85.0
7. Do you wake and find yourself wet? **	10	50.0
8. Do you feel that you do not empty your bladder completely when you urinate? **	11	55.0
9. Do you get a strong urge to urinate and need to run to the toilet, but leak urine on the way? **	16	80.0

Note. * stress incontinence; ** urge incontinence

Six women (30%) of the participants reported other situations in which leakage occurred. Three (15%) women reported walking caused leakage. Waiting too long before going to the bathroom (5%), driving (5%), and stressful times in life (5%) were reported independently by the remaining three women.

The mean length of time the women were incontinent was 3.2 years (SD=.95). Of the clinic sample women, 12 (60%) reported being previously evaluated by their health care provider for UI. Six (30%) had prior treatment initiated by a health care provider, while 1 (5%) woman started treatment on her own. Of the six women who received prior treatment by a health care provider, 3 (50%) had surgery, 2 (33%) used medication and 1 (17%) used pelvic muscle exercises. Of the six subjects who reported treatment, 2 (33%) reported the treatment as very effective, 2 (33%) reported the treatment as somewhat

effective, and 2 (33%) reported the treatment as not effective at all. Only one (17%) woman continued to use the treatment. These results are summarized in Table 15.

Table 15
Previous Treatment for Urinary Incontinence in Clinic Sample of Community Women (N=6)

Type	N	%	Effectiveness	N	%	Continuation	N	%
Pelvic Muscle Exercise	1	17	Very	0	0	Yes	0	0
			Somewhat	1	17	No	1	100
			Not at all	0	0			
Surgery	3	50	Very	2	33	N/A		
			Somewhat	0	0	N/A		
			Not at all	1	17			
Medication	2	33	Very	0	0	Yes	1	50
			Somewhat	1	17	No	1	50
			Not at all	1	17			

The women completed the Broome PMSES (Appendix E). Scores on the 23 item scale that were above 70 were considered to have high self-efficacy, scores between 34 and 70 were moderate self-efficacy, and scores below 34 were considered to be indicative of low self-efficacy. Based on the Broome PMSES scores, 8 (40%, M=84.0; SD=11.3) women had high self-efficacy for the performance of pelvic muscle exercise, 11 (55%; M=58.09; SD=10.95) had moderate self-efficacy, and 1 (5%, M=34.4, SD=0) had low self-efficacy for pelvic muscle exercise. The clinic had a lower percentage of women with high self-efficacy and a higher percentage with moderate self-efficacy when compared to the community group. Rates were similar between the groups for low self-efficacy.

The women were instructed in the performance of pelvic muscle exercise by the continence clinic practitioner. Following completion of treatment, a self-report dichotomous scale was used in the clinic sample to identify women who perceived they

were successful or not successful in preventing or decreasing urinary accidents. Of the twenty women in the clinic sample, 12 women reported fewer urinary accidents and 8 reported no fewer urinary accidents on a dichotomous response scale. The psychometric analysis of the findings of the two groups identified in the clinic sample provide preliminary evidence for construct validity of the Broome PMSES (See Table 16).

Table 16
Means, Standard Deviations and One-Tailed Tests on Broome Self-efficacy Scale by Outcome Category

Scale	No Fewer Accidents (No Improvement) (N=8)		Fewer Accidents (Improvement) (N=12)		t	p
	M	SD	M	SD		
Efficacy	56.61	13.63	76.25	16.84	2.75	.006
Outcome	56.53	15.22	68.89	16.66	1.68	.055
Total	56.58	12.53	73.37	16.36	2.46	.012

In the clinic sample, those women who reported they had been successful in decreasing accidental urine loss on the evaluation questionnaire after treatment (N=12) had a significantly higher ($p=.006$) self-efficacy expectation subscale mean than those who reported no fewer accidents (N=8) on the Broome PMSES that was completed prior to treatment. In addition, the total scale mean was significantly higher ($p=.012$) for those women who reported fewer accidents after treatment (N=12) than those who reported no fewer accidents (N=8). There was no significant difference in the outcome expectancy subscale means at the .05 level although the difference of 12.36 points was in the hypothesized direction and yielded a p value of .055. The effect size for outcome was .77, indicating that this test lacked sufficient power because of the small sample size. Further research with larger sample sizes is needed.

Summary of Results

The psychometric properties of the Broome PMSES were examined in a group of cognitively intact community dwelling women age 50 and older. The Broome PMSES was further examined in a clinic sample of women age 50 and older before pelvic muscle exercise intervention for UI.

In the community group, internal consistency for the total scale was .97. The coefficient for the subscales of Efficacy (Part A) and Outcome (Part B) was .97 and .96, respectively. Subgroup reliabilities for African American and Caucasian women for the total scale and subscales remained in the 90's.

Alpha coefficients between women in the community group who did and did not undergo previous treatment were in the 90's for all subgroups. The alpha coefficients for Caucasian and African American women also remained high. The Medical Outcomes Study (MOS) and The State-Trait Anxiety Inventory (STAI) did not report findings for subgroups in their respective studies (Stewart & Ware, 1992). Stewart and colleagues (1992) stress the need to test reliability across groups with diverse characteristics to ensure minimum standards among the groups. The findings for the subgroups are preliminary findings and should be interpreted with caution. The subgroups were small and more powerful studies are needed.

The inter-item correlations for the subscales were high. Efficacy expectation inter-item correlations ranged from .50 to .65 (See Table 9) and outcome expectation ranged from .61 to .94 (See Table 10). This high inter-item correlation suggest high homogeneity of the scale as well as redundancy across items. Correlations between .3 and .7 are considered acceptable for inter-item correlations for multi-test items. Each item

makes a contribution to the scale (Nunnally, 1994), correlates with the other items on the scale but with minimal redundancy. Items that have very high correlations may be measuring the same thing and one item would provide sufficient information about the area being measured.

In the case of the Broome PMSES, the high inter-item correlation among the items suggest redundancy and a case for brevity can be made (DeVellis, 1991). However, shortening the scale may pose a risk of losing some of the true meaning of the scores (DeVellis, 1991). The risk of losing the true meaning of self-efficacy as it relates to the performance of pelvic muscle exercises should be considered when taking into account that self-efficacy is not global but domain specific (Bandura, 1977a; 1977b; 1986). Maddux (1995) stressed that scales that fail to examine self-efficacy relative to a specific behavior result in very little beneficial research related behavioral change. Thus, brevity may decrease redundancy but may result in inadequate or minimal data from the area under investigation.

When the decision is made for scale reduction, consideration for the dimensions of self-efficacy is important. Self-efficacy is proposed to vary along the three dimensions of magnitude, strength, and generality and caution must be exercised in eliminating items that provide salient information about the subject in these important areas (Bandura, 1977a, 1986).

The magnitude of self-efficacy is the level of difficulty of a task being measured (Mailbach & Murphy, 1995; Bandura 1977a). The Broome PMSES (Appendix E) measured the magnitude by assessing individual belief in ability to perform pelvic muscle exercise in a variety of positions and situations. For example, performing pelvic muscle

exercises while lying down ($M=76.4$; $SD=22$), standing ($M=76$; $SD=22$), and sitting ($M=80.2$; $SD=19$). As expected, the mean for standing is lower on the summated scale for the most difficult position.

The strength of self-efficacy is the degree to which people believe they can succeed at a given level or magnitude of an activity (Bandura, 1977a). For example, two questions on the scale concern confidence that pelvic muscle contractions will prevent unwanted urine loss while waiting 2 minutes for a restroom ($M=66.4$; $SD=25.2$) or waiting 5 minutes for a restroom ($M=59.4$; $SD=26$). The findings were that the women had greater confidence waiting 2 minutes for restroom when compared to waiting 5 minutes.

Generality is the degree that self-efficacy for one activity can be transferred to another behavior (Bandura, 1977a). In this research, contracting pelvic muscles ($M=77.7$, $SD=22$) has a higher mean than contracting pelvic muscles when one coughs (57.3 ; $SD=26$). The mean for transferring the behavior of pelvic contraction to another activity was lower. So, although women were confident in their ability to contract their pelvic muscle, the women perceived themselves as less confident in their ability to contract the pelvic muscle when transferring the activity to when they were coughing. The dimensions of self-efficacy were measured in this scale and tap important components of the domain of interest. However, redundancy is suspected because of the high inter-item correlations.

Redundancy in scales that measure attitude is common, thus these scales tend to have higher reliability and inter-item correlations because of the homogeneity of the scale and the measurement of a common attribute (A. Bandura, personal communication, Nov. 7, 1997; Nunnally, 1978; 1970; Waltz, Strickland, & Lenz, 1984). The Alpha reliability of summated scales such as the Broome PMSES tend to be higher because the items

correlate highly with one another (Nunnally, 1978; Stewart, Hayes & Ware, 1992). This is consistent with other self-efficacy measures. The Epilepsy Self-efficacy Scale, a 25 item scale with a response range of 0-100 (ESES; Dilorio, Faherty & Manteuffel) had internal consistency coefficient of $-.01$ to $.89$. ($r = .93$). The Reynolds Adolescent Depression Scale consists of 30 items using a likert scale for responses. Alpha estimations are $.92$ and internal consistency reliability coefficients range from $.92$ to $.96$ (Reynolds, 1986).

Alpha reliabilities above $.70$ are considered satisfactory for group comparison and may need to be above $.80$ when making decisions about individuals (Nunnally, 1978; Nunnally & Bernstein, 1994). The Broome PMSES meet these criteria. In the final decision of whether to shorten the scale to decrease redundancy, it is important to weigh the negative and positive outcomes of scale reduction relative to reliability and the domain of interest.

The Broome PMSES is an immature scale. Wording of some of the items should be changed. For example: How confident are you that you can contract your pelvic muscle while washing fruits and vegetables under running water? is conceptually uniform with the question How confident are you that you can contract your pelvic muscle while standing at the sink brushing your teeth? Both involve running water and touching the water in some way which may be the impetus for an episode of urge incontinence. Careful re-examination of each item is proposed in the future to examine its usefulness to the total subscale as well as the construct under investigation.

All items were retained on the Broome PMSES based on the item to scale correlations. The efficacy expectations subscale correlations ranged from $.67$ to $.90$. Item 14 correlated with the other items of the subscale at $.67$. This item asked for the person

to perform a potentially more difficult behavior. The items asked: How confident are you that you can contract your pelvic muscle when you awaken at night with a strong urge to urinate? None of the other items asked for performance at night nor during specific times of the day. It was also noted that item 14 correlated lower (.67) than other items (range .73 to .90) to the total scale. This item should be deleted or reworded to reflect only one behavior. The subscale of outcome expectations ranged .73 to .88.

The interval time for stability measures of the Broome PMSES was 2 weeks. This time frame was selected because temporal stability becomes lower the longer the interval between testing (Nunnally & Bernstein, 1994). However, if the time period between testing was too short, recall is a concern (Green & Lewis, 1986).

The stability findings were .72 for the total scale and .64 and .68 respectively for the subscales of efficacy expectation and outcome expectation. Stability measures were examined in the subgroups of race and prior treatment. Again, stability was moderate for the total scale. The stability for African Americans was .55 (n=12) and .80 (n=35) for Caucasians. The stability by prior treatment was .75 for persons with previous treatment (n=17) and .65 for persons with no previous treatment (n=32). Stability scores may be lower because the construct of self efficacy may have changed and the scale has accurately tracked this change. Attitudes, behaviors, moods, knowledge, and physical condition can be modified by experiences between the two testing periods (Polit & Hungler, 1987). Stability or instability of measures may not be a reflection of the qualities of the scale, but of inconsistent or unstable behavior (Silva, 1993). The moderate indication of stability of the Broome PMSES should be interpreted with caution since self-efficacy is a state that may change over time.

Other reasons for the stability scores may be because the scripted education presentation presented to the community sample was prior to data collection. The self-efficacy scores may reflect confidence in ability to perform the pelvic muscle exercise and confidence in outcome relative to information obtained from the presentation. An additional reason for the stability scores may be that although the subjects were requested not to perform the pelvic exercise before taking the test a second time, this could not be monitored. Any efforts of the participants to perform the exercises and the subsequent outcomes, negative or positive may impact the stability measure.

A potentially significant reason for the stability measurement scores was the return rate. Only 56% returned the survey and no follow-up was done to encourage the second completion of the Broome PMSES. The low return rate may decrease the stability scores. Thus, interpretation of the scores may give unreliable information about the construct of self-efficacy. Future studies are necessary incorporating measures to encourage return of the survey a second time for evaluation are needed.

Content validity was determined by experts in the field of self-efficacy of urinary incontinence. Construct validity was examined by correlating the measures of quality of life and depression with the Broome PMSES. The correlation among the measures were moderate and in the expected direction, providing some initial evidence of the construct validity of the Broome PMSES. A confirmatory principal component factor analysis using a varimax rotation provided further evidence of the construct validity of the scale. The two factors identified were the theoretical components of self-efficacy. Subscale A factors ranged from .59 to .90. These factors identified efficacy expectation or a person's conviction that one can successfully execute a behavior (Bandura, 1986). Scale B factor

loadings ranged from .68 to .88 which made up the outcome expectation component of self-efficacy or the likely consequences the behavior will produce (Bandura, 1986). Item 12 in the efficacy section loaded on both factor one (.59) and factor two (.51). Almost certainly this occurred because this item asks about belief in prevention abilities which is a component of outcome expectation. Some respondents may have answered from the efficacy expectation perspective, while others answered from the outcome perspective. Although this question must be evaluated, it does provide the researcher with a sense of the thoughtfulness that the respondents used in answering the questionnaire. This question will be reworded with the words “to prevent urine loss”.

Predictive validity was examined in a clinic sample of 20 women before being treated for UI. Preliminary support for the hypothesis that self-efficacy would be greater in those women who considered themselves successful was found, consistent with self-efficacy theory that behavior is determined by expectations (Bandura, 1977a). The women who were successful had a significantly higher ($p=.012$) mean total self-efficacy score ($M=73.37$, $SD=16.36$) than the women that were not successful ($M=56.58$, $SD=12.53$). The groups were constructed based on the women’s perception rather than actual clinical data. Future studies should incorporate clinic evaluation of change in continence status as well as participant perception.

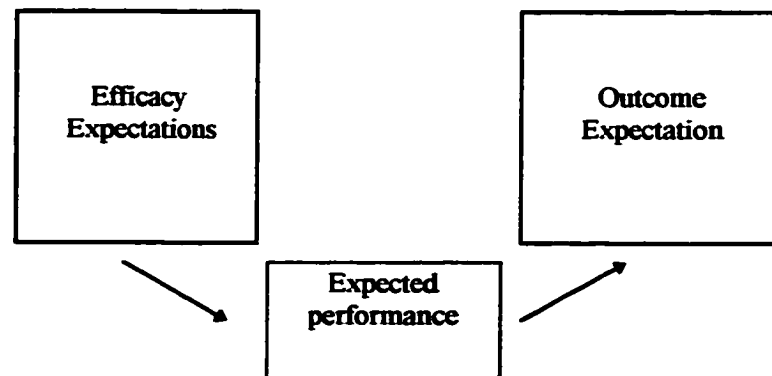
The theory of self-efficacy has been used as a framework for the Broome PMSES scale development. Efficacy expectation and outcome expectation were examined and evaluated as separate components of self-efficacy. This concurs with Bandura’s suggestion that one’s belief in personal ability to perform a behavior does not infer the same level of belief in the outcomes of a behavior (Bandura, 1977a; 1986).

The data collected for data analysis of the scale found a moderate positive correlation (.65) between the subscales of self-efficacy expectation and outcome expectation. The shared variance of 42% empirically supports the theory of two components of self-efficacy theory as it relates to this scale development.

These findings support the theory of self-efficacy (Bandura, 1977a; 1977b; 1986; 1989; Maddux, 1995). Self-efficacy expectations and outcome expectations are conceptually distinct, but the types of outcomes people anticipate are determined by their expected performance (figure 3). Both components play a role and are important predictors of behavior (Maddux, 1995).

Figure 3

Diagrammatic Representation of Self-efficacy



Discussion

The predictive validity of the Broome PMSES is similar to other studies. The higher the initial self-efficacy, the more likely that the outcomes will be positive. Because there are no other instruments that measure self-efficacy for the performance of pelvic

muscle exercise, criterion validity or measure against a "gold standard" can not be evaluated.

The predictive ability of self-efficacy was noted in several studies of instrument development (Colletti, Supnick, & Payne, 1985; Reece, 1992). Colletti, et al. (1985) developed the Smoking Self-efficacy Questionnaire to measure self-efficacy for resisting the urge to smoke. The subjects abstinent at the post treatment evaluation had significantly higher ($F[1,108]=23.35, p<.0001$) self-efficacy scores than those subjects that continued to smoke at post treatment evaluation. The Parent Expectations Survey was administered to new mothers at 1 and 3 months postpartum (Reece, 1992). Those mothers with higher perceived self-efficacy for parenting early in the transition were associated with greater confidence in parenting and less stress one year after delivery ($r=-.28; p<.05$). Ewart and colleagues (1986) administered an exercise self-efficacy scale to coronary artery disease patients. Patients with high pretest self-efficacy scores were more likely exercise longer and at higher levels than those with low pretest self-efficacy scores. The stronger one's self-efficacy, the more likely they are to exert greater effort to master the challenge. People with strong self-efficacy use their energy to surmount obstacles (Bandura, 1986). Even when efforts fall short of goals, individuals with high self-efficacy intensify their efforts.

Strong self-efficacy is developed through repeated successes is unlikely to impact judgments of capability when occasional failures occur. Sources of information about ability are through the positive experiences of others. By seeing others, perceptions of personal ability increase (Bandura, 1986). Verbal persuasion can mobilize the person to increase the effort expended at tasks. However, verbal persuasion is the most effective in

those individuals that already have reason to believe they can produce desired outcomes through their actions. Self-efficacy can be further enhanced by decreasing negative physiological states. Increased somatic arousal may be interpreted as ominous signs of personal vulnerability (Bandura, 1986). Using techniques to enhance efficacy-expectations should be incorporated in clinical practice. For example, introducing new behaviors that are simplistic and easily performed before the introduction of more complex behaviors. In the treatment of UI, clinicians can instruct patients to perform half of the normal assignment of pelvic exercises and to hold the contraction for a shorter period of time. When this skill has been mastered then move on to more difficult behaviors. The success of the person with the first set of instructions will increase efficacy expectations for the subsequent behaviors.

The psychometric analysis of the Broome PMSES provides preliminary reliability and validity. The Broome PMSES suggests preliminary evidence of reliability and validity, however, continued evaluation of its psychometric properties in other groups with urinary incontinence is necessary before being used to predict self-efficacy for pelvic muscle exercise. Additional studies using equivalent groups to determine the reliability and validity will increase knowledge about the use of the Broome PMSES in these populations.

Further evaluation of post treatment outcomes in the clinic sample should be objectively evaluated through the use of bladder diaries to get a more precise picture of decreases in urinary accidents. However, it is important to add a component of subjective appraisal of improvement, since self-efficacy expectation is impacted the most by performance appraisal (Bandura, 1977a).

In summary, the psychometric analysis of the Broome PMSES provides an initial estimate of reliability and validity in a community and clinic sample of women. This sample was limited to women age 50 and older, ambulatory, and cognitively intact. Any psychometric analysis is a snapshot of the scale's properties in a specific population. Use in populations that have different characteristics and of different races should always involve a pilot study to examine the properties of the scale when used in different samples. Removing items from a previously developed scale change the psychometric properties of the scale (Green & Lewis, 1986). For this reason, any changes in a scale require re-evaluation of psychometric properties. Based on the psychometric evaluation, the Broome PMSES will be evaluated and refined for future use by clinicians in persons with incontinence.

V. Recommendations

This chapter offers recommendations for application to practice and future research.

Application to Practice

The Urinary Incontinence Guideline Panel recommend that the least invasive intervention for UI be used first (AHCPR, 1996). Pelvic muscle exercises meet this criteria. The success of behavioral interventions, such as pelvic muscle exercises require patients that are motivated (AHCPR, 1996). One factor that may impact motivation is self-efficacy. Prior to the Broome PMSES, there was no instrument with evaluated psychometric properties to measure self-efficacy for the performance of pelvic muscle exercises. This study has provided evidence that self-efficacy can be reliably measured for the performance of pelvic muscle exercise. Some preliminary evidence of construct validity was also provided in this study.

The Broome PMSES may be a useful way to measure the self-efficacy of a person for the performance of pelvic muscle exercises. The Broome PMSES can provide the clinician with knowledge about a person's belief in personal performance and outcome expectations for pelvic muscle exercises to prevent unwanted urine loss. This knowledge may be useful in developing individualized patient intervention strategies to enhance self-efficacy.

As part of the psychometric analysis of the instrument, a small clinic sample was examined. Women who reported improvement after treatment had significantly higher total self-efficacy expectation mean scores than those that did not report improvement. These findings suggest that those women entering treatment with low self-efficacy scores

may have improved outcomes from interventions that are tailored to enhance individual skill levels. Because self-efficacy is a state, appraisals of efficacy are influenced by performance, vicarious experiences, verbal, and physiological feedback (Bandura, (1986; 1982; 1977a; 1977b).

Using the appraisals of self-efficacy as a guide, the clinician can address performance accomplishment by structuring the performance of pelvic muscle exercise and strategies to prevent unwanted urine loss into small manageable tasks in increasing levels of difficulty. By meeting with the patient more frequently, offering explanations to urinary incontinence interventions as they relate to real life experiences, and adding new tasks only as old ones are accomplished, the clinician promotes the most powerful source of efficacy expectations, performance accomplishment.

Opportunities to observe others master the skills necessary for continence may enhance self-efficacy through vicarious experiences or modeling. Providing opportunities for shared successful experiences between patients with similar problems of UI may provide opportunities for modeling as well as enforcing belief in personal self-efficacy.

The last two sources of self-efficacy are verbal persuasion and physiological feedback. The clinicians are in a prime position to influence patient beliefs, since they are seen as the experts. One way the clinician can influence the patient is through persuasion. Persuasion can be accomplished by the clinician verbalizing belief in the skills of the patient to perform pelvic muscle exercises and strategies. This can bolster the patient's confidence in self-efficacy expectations. The clinician's expression of confidence in pelvic muscle exercise to the patient as an effective intervention for UI may also positively impact the outcome expectation of the patient.

Physiological feedback can be accomplished using a variety of sources. Teaching the patient to interpret the sensations associated with pelvic muscle exercises (eg., a lifting or drawing in of the vagina while the abdomen remains relaxed) can improve performance through understanding of what one should experience during a properly performed exercise. Biofeedback using vaginal or rectal sensors and surface electromyography can also provide the patient with information about the correct performance of pelvic muscle exercise and strategies. The clinician can use verbal feedback to inform the patient about the correct performance of pelvic muscle exercise while palpating the abdominal muscles when the patient contracts the pubococcygeal muscle around the clinician's two fingers. Finally, a clinician that is patient, supportive, and nonpunitive can also be an important component in individual patient success.

Future Psychometric Research

The current psychometric study evaluated an scale that was designed to measure the self-efficacy for the performance of pelvic muscle exercise in ambulatory, active community dwelling women. Because the sample was primarily Caucasian, age 50 and older, it is suggested that before the Broome PMSES is used in clinical studies, additional research to evaluate the technical and psychometric properties of the Broome PMSES in other samples be conducted.

Suggested areas of additional psychometric evaluation of the Broome PMSES include:

1. Large samples of minority women age 50 and older with UI;
2. Women age 49 and younger with emphasis on samples of Caucasian and large samples of minority women;

3. Women who have not been treated for UI by a health care professional;
4. Validity studies of larger clinic samples using a known groups comparison;
5. The incontinent homebound, age 50 and older;
6. The incontinent homebound, age 49 and younger; and,
7. Men who are incontinent following prostate surgery.

Research and validity of any instrument is an ongoing process. Continued reliability and validity analysis of the Broome PMSES will add to the body of knowledge in the provision of care for persons with urinary incontinence.

APPENDICES

APPENDIX A
Sample of Studies That Have Tested Self-efficacy Theory

APPENDIX A

Sample of Studies That Have Tested Self-efficacy Theory

Authors	Subjects and Purpose	Design Instrumentation	Findings
Bandura, A. & Schunk, D. 1981	<ul style="list-style-type: none"> • Children with gross deficits in arithmetic. • To examine self-directed learning using proximal, distal or no learning goals. 	<ul style="list-style-type: none"> • Three group experimental design. • Self-efficacy scale. 	<ul style="list-style-type: none"> • The children with proximal goals experienced the greatest increase in self-efficacy.
Ozer, E. & Bandura, 1990	<ul style="list-style-type: none"> • Women (N=43) enrolled in a self-defense program. • To examine the effects of empowerment on self-efficacy. 	<ul style="list-style-type: none"> • Intragroup control design • Interpersonal self-efficacy, activities self-efficacy and self-defense self-efficacy, cognitive control self-efficacy. 	<ul style="list-style-type: none"> • Mastery modeling enhanced the subjects perceived coping self-efficacy.
Bandura, A & Cervone, D. (1983)	<ul style="list-style-type: none"> • Students (N=90) enrolled in an science course. • To test the notion that self-evaluative and self-efficacy mechanisms operate differently in performance motivation. 	<ul style="list-style-type: none"> • Self-efficacy scale for goal performance. 	<ul style="list-style-type: none"> • Goals and performance feedback enhanced motivational level.

APPENDIX B
Sample of Predictive Studies of Self-efficacy Theory

APPENDIX B

Sample of Predictive Studies of Self-efficacy Theory

	Subject/Purpose	Design/Instrumentation	Findings
Robertson & Keller (1992)	<ul style="list-style-type: none"> • A convenience sample of men (N=51) post CABG or PTCA • To determine of perceived severity of disease and medical intervention impacted exercise adherence. 	<ul style="list-style-type: none"> • Nonexperimental • Benefits Scale, Barriers Scale, a Severity Scale, Jenkins Self-efficacy Scale and an Activity Scale. 	<ul style="list-style-type: none"> • Perceived severity of disease • Increased exercise adherence, • patients with higher self-efficacy were more adherent to an exercise regime.
Carroll (1995)	<ul style="list-style-type: none"> • Adults (N=133) post coronary artery bypass. • To describe an test a model of recovery for the elderly post coronary artery bypass. 	<ul style="list-style-type: none"> • Prospective repeated measures. • Exercise of Self-care Agency, Jenkins Self-efficacy Expectation Scale, Jenkins Activity Checklist. 	<ul style="list-style-type: none"> • Self-care agency and self-care recovery behaviors were mediated by self-efficacy. The recovery for elderly is protracted.
Ewart, Taylor, Reese, DeBusk (1983)	<ul style="list-style-type: none"> • Men (N=40) 3 weeks post myocardial infarction • To determine the correspondence between pretreadmill self-efficacy and performance; to measure changes in self-efficacy and to determine if physical activity is more closely related to exercise performance or self-efficacy. 	<ul style="list-style-type: none"> • Nonexperimental descriptive • Beck Depression Scale; Self-efficacy scale for walking, running, stair climbing, sexual intercourse, lifting and ability to tolerate physical exertion. 	<ul style="list-style-type: none"> • Increases in confidence for those activities most similar to treadmill testing were increased, judgment regarding capacity for physical effort became more congruent after treadmill testing, and treadmill performance impacted self-efficacy expectations.

APPENDIX C
Sample of Studies of Various Methods of Instruction
Pelvic Muscle Exercise

APPENDIX C

**Sample of Studies of Various Methods of Instruction
for Pelvic Muscle Exercise**

Authors	Sample/Design	Feedback method	Results
Bump, Hurt, Fantl, & Wyman (1991)	<ul style="list-style-type: none"> • Women (N=47) with a mean age of 53.6 yrs. • Non-experimental /descriptive 	<ul style="list-style-type: none"> • Verbal 	<ul style="list-style-type: none"> • subjects (n=23) had an effective Kegel effort, (n=5) had increases in abdominal and vaginal pressure, (n=19) had an ineffective Kegel effort.
Burgio, Courtland-Robinson & Engel (1986)	<ul style="list-style-type: none"> • Women (N=27) with involuntary loss of urine with physical activity. • Experimental: 2 group design. 	<ul style="list-style-type: none"> • Verbal biofeedback (n=11) • Intra-abdominal biofeedback (visual) and verbal biofeedback (n=13) 	<ul style="list-style-type: none"> • Biofeedback group demonstrated 60 % increase in ability to maintain sphincter contractions and reduced episodes of UI 75.9% when compared to the verbal feedback group UI reduction of 51%.
Burns, Prantikoff, Nochajski, Hadley, Levy & Ory (1993)	<ul style="list-style-type: none"> • Women (123) who responded to a newspaper and poster campaign for women with stress UI. • 2 experimental groups and 1 control group. 	<ul style="list-style-type: none"> • Group 1: pelvic muscle exercises without biofeedback • group 2: pelvic muscle exercises with biofeedback • control group: no treatment 	<ul style="list-style-type: none"> • The biofeedback and verbal group experienced 61% improvement, pelvic muscle exercises without biofeedback experienced a 54% improvement and control 6% improvement.

APPENDIX D
Results of Content Validation

APPENDIX D**Results of Content Validation****Self-efficacy**

Dr. Albert Bandura
Stanford University Department of Psychology

Dr. Craig Ewart
John Hopkins University - School of Public Health

Urinary Incontinence

Dr. B. Joan McDowell
University of Pittsburgh School of Nursing

Dr. Sandra Engberg
University of Pittsburgh School of Nursing

Dr. Jean Wyman
Virginia Commonwealth University School of Nursing

Item Pool Before Revisions

1. **My level of confidence in the ability of pelvic muscle contractions to decrease involuntary urine loss is:**
2. **My level of confidence in the ability of pelvic muscle contractions to decrease involuntary urine loss when I experience a strong urge to urinate is:**
3. **My level of confidence in the ability of pelvic muscle contractions to decrease involuntary urine loss when coughing:**
4. **My level of confidence in the ability of pelvic muscle contractions to decrease involuntary urine loss when sneezing is:**
5. **My level of confidence in the ability of pelvic muscle contractions to decrease involuntary urine loss when laughing is:**
6. **My level of confidence in the ability of pelvic muscle contractions to decrease involuntary urine loss when I have a strong urge to urinate when I return home after being out is:**
7. **My level of confidence in the ability of pelvic muscle contractions to decrease involuntary urine loss while waiting 2 minutes for a restroom is:**
8. **My level of confidence in the ability of pelvic muscle contractions to decrease involuntary urine loss when waiting 5 minutes for a restroom is:**
9. **My level of confidence in the ability of pelvic muscle contractions to decrease involuntary urine loss when lifting a package is:**
10. **My level of confidence in the ability of pelvic muscle contractions to decrease involuntary urine loss if I wake up at night with a strong urge to urinate is:**
11. **My level of confidence in the ability of pelvic muscle contractions to decrease involuntary urine loss when I cough is:**
12. **My level of confidence in the ability of pelvic muscle contractions to decrease involuntary urine loss when I return home from shopping and I have a strong urge to urinate:**
13. **My level of confidence in the ability of pelvic muscle contractions to decrease involuntary urine loss when I pick up a bag of groceries is:**
14. **You are lying in bed. How certain are you that you can exercise your pelvic muscles 15 times as instructed?**

15. How confident are you that you can contract your pelvic muscles?
16. How confident are you that you can perform pelvic muscle exercises while lying down?
17. How confident are you that you can perform pelvic muscle exercises while standing?
18. How confident are you that you can perform pelvic muscle exercises while sitting?
19. How confident are you that you can perform pelvic muscle exercises without contracting your abdominal muscles?
20. You are sitting on the sofa watching TV. How confident are you that you can perform pelvic muscle exercises while watching TV?
21. You are picking up a bag of groceries from the floor to the table. How confident are you that you can contract your pelvic muscle to prevent unwanted urine loss while lifting this object?
22. You are standing at the sink brushing your teeth. How confident are you that you can contract your pelvic muscle exercises while brushing your teeth?
23. How confident are you that you can use your pelvic muscle to prevent urine loss while waiting in line for a restroom?
24. Someone else is using the bathroom. You feel a strong urge to urinate. How confident are you that you can contract your pelvic muscles rapidly to suppress the feeling of urgency?
25. You are feeling lonely? How confident are you that you can perform pelvic muscle exercises when your are feeling lonely?
26. You are feeling sad. How confident are you that you can perform pelvic muscle exercises when you are depressed?
27. You are tired? How confident are you that you can perform pelvic muscle exercises when you are tired?
28. You have a busy day. How confident are you that you can perform pelvic muscle exercises when you are tired?
29. How confident are you that you can perform pelvic muscle exercises when you are sleepy?

30. You are sitting outside and the pollen is high. You begin to sneeze. How confident are you that you can contract pelvic muscle exercises to prevent unwanted urine loss when you sneeze?
31. You have just finished dinner with friends. You are getting ready to stand. How confident are you that you can contract your pelvic muscles when you stand?
32. How confident are you that you can perform pelvic muscle exercises when you don't feel well?
33. How confident are you that you can perform pelvic muscle exercises if you are in a crowded room with others?
34. How confident are you that you can contract your pelvic muscle exercises when you have a cold and need to cough?
35. How confident are you that you can perform pelvic muscle exercises when you sneeze several times in a row?
36. How confident are you that you can perform pelvic muscle exercises several times a day?
37. How confident are you that you can perform pelvic muscle exercises 3 times a day?
38. You are taking a shower after a busy and tiring day. You experience an urge to urinate. How confident are you that you can contract your perform pelvic muscle to prevent unwanted loss?
39. You are washing fruits and vegetables under running water at the skin. How confident are you that you can contract your pelvic muscle to prevent urine loss?
40. The store delivers a package to your front door. How confident are you that you can use your pelvic muscle as you pick the package up from the floor?
41. The weather is very hot and you are drinking additional water. How confident are you that you can tighten your pelvic muscle rapidly to diminish the urgency?
42. You have just returned home from a busy day of shopping. How confident are you that you can perform pelvic muscle exercises when you are tired?
43. You are taking a warm bath. You experience a sudden urge to urinate. How confident are you that you can contract you pelvic muscle rapidly to suppress the urgency?

44. You are helping a friend move into a new home. How confident are you that you can contract your pelvic muscle as you stoop and lift to put things away?
45. My belief in the ability of pelvic muscle contraction to decrease involuntary urine loss is?
46. My belief in the ability of pelvic muscle contractions to decrease involuntary urine loss when I experience a strong urge to urinate is:
47. My belief in the ability of pelvic muscle contraction to prevent unwanted urine loss is:
48. My belief in the ability of pelvic muscle contraction to decrease involuntary urine loss when I sneeze is:
49. My belief in the ability of pelvic muscle contraction to decrease involuntary urine loss when I laugh is:
50. My belief in the ability of pelvic muscle contraction to decrease involuntary urine loss when I have a strong urge to urinate is:
51. My belief in the ability of pelvic muscle contraction to decrease involuntary urine loss while waiting two minutes for a restroom is:
52. My belief in the ability of pelvic muscle contraction to decrease involuntary urine loss while waiting 5 minutes for a restroom is:
53. My belief in the ability of pelvic muscle contraction to decrease involuntary urine loss when I wake up at night with a strong urge to urinate is:
54. My belief in the ability of pelvic muscle contraction to decrease involuntary urine loss when I lift a heavy package is:
55. My belief in the ability of pelvic muscle contraction to decrease involuntary urine loss when I cough is when I have a strong urge to urinate:
56. My belief in the ability of pelvic muscle contraction to decrease involuntary urine loss when I have a strong urge to urinate while in the shower is:
57. My belief in the ability of pelvic muscle contraction to decrease involuntary urine loss when I drink lots of liquid is:
58. My belief in the ability of pelvic muscle contraction to prevent involuntary urine loss when I cough is:

59. My belief in the ability of pelvic muscle contraction to prevent involuntary urine loss when I sneeze is:
60. My belief in the ability of pelvic muscle contraction to prevent involuntary urine loss when I laugh is:

APPENDIX E
Broome Pelvic Muscle Self-Efficacy Scale

Broome Pelvic Muscle Exercise Self-Efficacy Scale

Instructions:

This survey contains two parts that describe different situations related to unwanted urine loss (incontinence). After each statement in Section A, indicate your level of confidence in your ability to perform the activity. In Section B, indicate your level of confidence that the activity will prevent unwanted urine loss.

Examples

Please read each statement and think about the situation. Circle the number from the scale at the side of the page that best indicates how confident you are that you can perform each of the following activities.

On the scale a zero (0) means that you do not feel confident at all in performing the activity, a 100 means that you feel very confident that you can perform the activity (a 100% chance that you can perform the behavior)

Example 1 (Part A)

How confident are you that you can contract your pelvic muscles 15 times as instructed? Let's say you are 80% confident you can perform the pelvic muscle contractions. Therefore, your answer would be 80 and you would circle 80.

Level of Confidence										
0	10	20	30	40	50	60	70	80	90	100

Part A: For each statement below, please indicate your level of confidence in performing pelvic muscle contractions to prevent unwanted urine loss.

Select a number from the scale that best indicates your level of confidence.

How confident are you that you can:

1. contract your pelvic muscles?
2. perform pelvic muscle contractions three times a day?
3. perform pelvic muscle contractions while lying down?
4. perform pelvic muscle contractions while standing?
5. perform pelvic muscle contractions while sitting?
6. contract your pelvic muscles without contracting your abdominal muscles?
7. contract your pelvic muscles while washing fruits and vegetables under running water?

		Level of Confidence										
		0	10	20	30	40	50	60	70	80	90	100
1.	contract your pelvic muscles?	0	10	20	30	40	50	60	70	80	90	100
2.	perform pelvic muscle contractions three times a day?	0	10	20	30	40	50	60	70	80	90	100
3.	perform pelvic muscle contractions while lying down?	0	10	20	30	40	50	60	70	80	90	100
4.	perform pelvic muscle contractions while standing?	0	10	20	30	40	50	60	70	80	90	100
5.	perform pelvic muscle contractions while sitting?	0	10	20	30	40	50	60	70	80	90	100
6.	contract your pelvic muscles without contracting your abdominal muscles?	0	10	20	30	40	50	60	70	80	90	100
7.	contract your pelvic muscles while washing fruits and vegetables under running water?	0	10	20	30	40	50	60	70	80	90	100

How confident are you that you can:

8. contract your pelvic muscles when lifting a bag of groceries?

9. contract your pelvic muscle while standing at the sink brushing your teeth?

10. contract your pelvic muscle rapidly?

11. perform pelvic muscle contractions when you are sad?

12. contract your pelvic muscle to prevent urine loss while showering after a busy and tiring day?

13. perform pelvic muscle contractions when you are tired?

14. contract your pelvic muscle when you awaken at night with a strong urge to urinate?

	Level of Confidence										
	0	10	20	30	40	50	60	70	80	90	100
8. contract your pelvic muscles when lifting a bag of groceries?	0	10	20	30	40	50	60	70	80	90	100
9. contract your pelvic muscle while standing at the sink brushing your teeth?	0	10	20	30	40	50	60	70	80	90	100
10. contract your pelvic muscle rapidly?	0	10	20	30	40	50	60	70	80	90	100
11. perform pelvic muscle contractions when you are sad?	0	10	20	30	40	50	60	70	80	90	100
12. contract your pelvic muscle to prevent urine loss while showering after a busy and tiring day?	0	10	20	30	40	50	60	70	80	90	100
13. perform pelvic muscle contractions when you are tired?	0	10	20	30	40	50	60	70	80	90	100
14. contract your pelvic muscle when you awaken at night with a strong urge to urinate?	0	10	20	30	40	50	60	70	80	90	100

Part B: Examples

Please read each statement and think about the situation. Circle the number from the scale at the side of the page that best indicates your confidence that the activity will eliminate unwanted urine loss.

On the scale a zero (0) means that you do not feel confident at all that the activity will prevent unwanted urine loss, a 100 means that you feel very confident that the activity will prevent unwanted urine loss.

Example 1

How confident are you that you that pelvic muscle contractions can prevent unwanted urine loss?

Lets say you are 50% confident you could prevent unwanted urine loss. Therefore, your answer would be 50 and you would circle 50.

Level of Confidence

0 10 20 30 40 50 60 70 80 90 100

Part B: Read each statement and think about the situation. Assume that you have mastered pelvic muscle contractions when you answer each question.

How confident are you that pelvic muscle contractions will prevent unwanted urine loss:

1. when you experience a strong urge to urinate?
2. when you sneeze?
3. when you laugh?
4. while waiting 2 minutes for a restroom?
5. while waiting 5 minutes for a restroom?
6. when you wake up at night with a strong urge to urinate?
7. when you lift a heavy package?
8. when you cough?
9. when washing fruits and vegetables?

A zero (0) means that you do not feel confident in pelvic muscle contractions to prevent unwanted urine loss, a 100 means you feel very confident in pelvic muscle contractions to prevent unwanted urine loss.

	Level of Confidence									
0	10	20	30	40	50	60	70	80	90	100
0	10	20	30	40	50	60	70	80	90	100
0	10	20	30	40	50	60	70	80	90	100
0	10	20	30	40	50	60	70	80	90	100
0	10	20	30	40	50	60	70	80	90	100
0	10	20	30	40	50	60	70	80	90	100
0	10	20	30	40	50	60	70	80	90	100
0	10	20	30	40	50	60	70	80	90	100
0	10	20	30	40	50	60	70	80	90	100
0	10	20	30	40	50	60	70	80	90	100
0	10	20	30	40	50	60	70	80	90	100
0	10	20	30	40	50	60	70	80	90	100
0	10	20	30	40	50	60	70	80	90	100

APPENDIX F
The Clock Test

APPENDIX F

Clock Drawing

1) Draw the face of the clock. 2) Draw in the numbers. 3) Now draw the hands so the time is twenty minutes until four o'clock.

sample ID

Date

APPENDIX F

Date: _____

Sample ID: _____

Place a standard unlined letter size piece of paper and pencil in front of the patient and say: "I want you to draw the face of a clock with all the numbers on it. Make it large." After completion of the clock-face, instruct as follows: "Now, draw the hands, pointing to 20 to 4". Instructions may be repeated or rephrased if the patient does not understand, but no other help should be given. The time taken to complete the task may be noted.

Scoring

A 10-point grading system is used as follows:

- 10 Normal drawing, numbers and hands in approximately correct positions, hour hand distinctly different from minute hand and approaching 4 o'clock.
- 9 Slight errors in placement of hands (not exactly on 8 and 4, but not on the adjoining numbers) or one missing number on the clock face.
- 8 More noticeable errors in placement of hour and minute hand (off by one number); number spacing shows a gap.
- 7 Placement of hands significantly off course (more than one number); very inappropriate spacing of numbers (e.g., all one side).
- 6 Inappropriate use of clock hands (use of digital display or circling of numbers despite repeated instructions); crowding of numbers at one end of the clock or reversal of numbers.
- 5 Preservation or otherwise inappropriate arrangement of numbers (e.g., numbers indicated by dots). Hands may be represented, but do not clearly point at a number.
- 4 Numbers absent, written outside the clock or in distorted sequence. Integrity of the clock face missing. Hands not clearly represented.
- 3 Numbers and clock face no longer connected in the drawing. Hands not recognizably present.
- 2 Drawing reveals some evidence of instructions received, but representation of clock is only vague; inappropriate arrangement of numbers.
- 1 Irrelevant, uninterpretable figure or no attempt.

SCORE: _____

Rev. 10/12/93 (c:\homecare\procedure\clock.scr)

APPENDIX E
Flyer Announcing the Program

Healthy Living

Barbara Broome, RN, MSN, a Doctoral student at the University of Pittsburgh School of Nursing will present a seminar on activities to promote health and prevent disease and disability.

WHEN:

WHERE:

Questions Call: 

APPENDIX H
Script Used to Present the Educational Program

APPENDIX H

Script

Preventative health care has received a great deal of attention in the medical community in the past 15 to 20 years; however, little of this attention has been directed toward the elderly. Health promotion for the elderly is important since the average person age 65 will live another 16 years and remain functionally independent. The goal of health care is to prevent avoidable declines in health and promote the maintenance of independence. Many changes within the body occur relative to aging. These changes include decreased muscle mass, increased fat, changes in skin, decreased amounts of body water and changes in elimination.

Muscle

There may be a loss of muscle mass with aging. Inactivity may cause increased muscle weakness and a muscle loss. However, loss of muscle mass can be prevented to a great extent by regular exercise. An excellent way to exercise, build endurance and feel more energized is through walking. One should start a walking program after receiving a medical examination to assure that this type of exercise is safe for you. It is recommended that older individuals exercise at lower intensities and to increase the duration or length of exercise slowly. Another form of exercise is called isometrics. Isometric exercises are a way to maintain and increase muscle mass without placing stress on painful joints. The alternate tightening and relaxing of the upper arms, abdomen, buttocks and thighs can decrease muscle loss and increase strength. Older persons need instruction by a

professional before participating in these exercises. Ask your Doctor or Nurse about exercises that will be good for you.

Skin

Although skin cancer does not account for a lot of the cancerous deaths, without treatment, skin cancer can be fatal. This is especially important for those persons with a family history of skin cancer or who are exposed to high levels of sunlight. Sunlight is responsible for many of the changes associated with aging skin such as dryness and wrinkles. The loss of fat pads make the skin thinner and the veins become visible under the skin. The skin of the elderly is often more dry and fragile. Drying may also cause the skin to become itchy and irritated. Use of bubble baths and detergent additives can also dry the skin. Care should be given to moisturize the skin with skin creams and oils and to avoid excessive bathing since bathing dries the skin.

Specific Health Problems of Elimination

Water Loss

Sixty-five percent of body weight is water. Perspiration, urination, and decrease dietary or liquid intake can all change the amount of water in the body. The kidneys usually work to conserve water; however, as one ages, the kidneys may not function as effectively. Signs of inadequate body hydration include dry skin, dry mouth and chapped lips, sunken eyes, decreased urination and constipation. Unless your Doctor or Nurse tell you to restrict your fluid intake, it is important to drink at least six to eight 8 ounce glasses of water of other non-caffeinated fluids per day to maintain adequate body water.

Constipation

Constipation may become more common as one ages. This is due in part to a slowing of bowel function, inadequate fluid intake, low dietary fiber intake as well as a lack of exercise. Adequate dietary intake of high fiber foods such as cereals, fruits and vegetables and liquids in addition to exercise is usually sufficient to ensure adequate bowel function. However, if these measures are not sufficient, laxatives and stool softeners may help. Always talk to your health care provider before taking any laxatives or other medications.

Urinary Incontinence

Urinary Incontinence is involuntary loss of urine. Persons with incontinence are not able to control the urine leakage and thus has urinary accidents. Urinary incontinence is a common health problem among older adults. Approximately 30% of women over the age of 60 suffer from this problem (AHCPR, 1996; National Institutes of Health Consensus Conference, 1989).

The loss of urine may happen during a variety of circumstances such as coughing, sneezing, laughing, lifting something, bending over, running water or while attempting to get to the bathroom. The amount of urine loss may vary from a few drops to a large amount that soaks undergarments and outer clothing. This can be embarrassing. The fear of leaking urine in public and the fear of unpleasant odors may result in a person staying at home to avoid embarrassing situations. Incontinence is also expensive. More than 11.2 billion dollars is spent on skin care, pads, and undergarments for the persons with incontinence. Additional cost is related to the need for health care secondary to UI for such things as urinary tract infections and skin breakdown.

Types of incontinence

Incontinence can be an acute or chronic problem. Acute incontinence usually has a sudden onset that may be associated with illness, such as diabetes mellitus, urinary tract infections or medications. This type of incontinence can most often be easily treated by curing the underlying problem. Incontinence is considered chronic if it has lasted at least three months and is not due to acute causes.

There are several types of chronic incontinence. The most common are stress, urge, and mixed stress and urge and accounts for more than 80% of all incontinence.

Stress

Stress incontinence is the involuntary loss of urine that occurs during coughing, sneezing, laughing or other physical activity that increases the pressure within the abdomen. The increased abdominal pressure is sometimes greater than the pelvic muscle strength resulting in spurts of urine leakage.

Urge

Urge incontinence is the loss of urine associated with an sudden strong urge to urinate. The loss of urine may occur while trying to rush to the bathroom. Also urgency and incontinence may occur when a person with urge UI hears the sound of running water, or places their hands in water, for example to wash fruits and vegetables, or when stepping into a shower. Some people leak urine upon arriving home from shopping or other outing. Before they can open the door to the house or soon after entering the house they experience a strong urge and leak urine. We all have had this problem occasionally when we over extend our bladders, but people with urge incontinence have it almost all of

the time. The person with this type of incontinence may also lose large volumes of urine soaking their pad or clothing.

Mixed

Mixed incontinence is a when a person experiences symptoms of both stress and urge incontinence. The person with mixed incontinence experiences urinary accidents associated with urgency to void and also while coughing, sneezing or laughing.

Evaluation

The person with incontinence should undergo an evaluation to determine the severity, type and cause of the urine leakage. The evaluation is conducted by a Physician and/or a specially trained Nurse. The examination includes a medical history, continence history, an a physical examination that includes a pelvic examination. Laboratory studies such as a urinalysis may also be performed.

Treatment

Common treatments for UI include surgery for stress UI, medications for urge and behavioral treatment for stress, urge and mixed UI. However experts recommend that behavioral therapies be first choice for treatment of incontinence. Behavioral interventions do not require the person to take medications or to have special procedures performed on the body and they are free from side effects.

Behavioral treatment for the most common types of UI, urge and stress and mixed incontinence, include pelvic muscle exercises and strategies to prevent unwanted urine loss. Pelvic muscle exercises are known as Kegel exercises. Kegel exercises are the tightening (or contracting) and relaxation of the pelvic muscles. This is the muscle that you squeeze when you attempt to prevent expelling gas or from having a bowel

movement. The Continence Research Team at the University of Pittsburgh and others have investigated behavioral treatment and the use of pelvic muscle exercises as an intervention for UI. The recommendation is a regime of 15 pelvic muscle contractions for 3-5 seconds 3 times a day, 15 standing, 15 sitting and 15 lying down. Researchers have reported that PME are effective and reduce urinary accidents by 60% to 80%. Some even achieved a 100% reduction in accidents after learning to use pelvic floor muscles.

A factor that may impact performance of pelvic muscle contractions is self-efficacy or one's belief in their ability to perform pelvic muscle exercises and the belief that pelvic muscle exercises will eliminate or reduce unwanted urine leakage. Measuring a person's self-efficacy or beliefs about treatments and their ability to do the exercise is important because it provides the health care provider with information that can be used to assist the patient in overcoming negative beliefs about their capabilities to learn to prevent urine loss; thus increasing their chances of achieving success.

I would like to invite all of you to stay and participate in the second half of this program. During this portion of the program I will ask you to fill out some questionnaires. Each one of you who agree to stay will receive a packet of six short questionnaires to fill out. The entire process should take no longer than 20-30 minutes (wait for people to leave).

The first item in the packet is the consent form. I will read this to you while you read along and answer any questions you may have prior to your signing and agreeing to participate in this study. (read consent form, wait for questions and assure the woman that they may leave and not participate without any penalty, wait for persons to leave. Each item in the packet has instructions that you should read prior to completing the form. Let's

do the first one together. The clock drawing is used to determine your ability to follow directions and to identify relationships of one item to another. First draw the face of a clock. Now place the numbers on the clock (wait). Now draw the hands of the clock so that the time is twenty minutes until 4 o'clock.

The next instruments ask questions about your age, marital status, and other demographic information, your emotions, your experience with urinary incontinence and your belief in your ability to perform pelvic muscle exercises and that pelvic muscle exercises will impact unwanted urine loss. Please follow the directions and complete the remaining instruments. Should you have any questions, please raise your hand and I will assist you.

Some of you will notice that your packet contains a plain envelope. If you agree to participate in the retest please write your name and address on the envelope and return it with your packet before you leave. The envelope will be used to sent you a second set of questionnaires. When you have completed the entire packet, return them to me. After everyone has finished, you will be given a brochure regarding incontinence and can stay for a film about pelvic muscle exercises.

Please remember that all information is confidential and will not be shared with anyone other than my research advisor. Thank you very much for your participation and time. Your participation this study provides a great deal of information about your experience with UI. and will be helpful in increasing our understanding. The wealth of knowledge obtained from your participation will help many other women who are experiencing UI and are not sure how to approach this embarrassing problem.

If you should need any additional information, please feel free to contact me at my home [REDACTED]. Once again, thank you.

APPENDIX E
Understanding Incontinence

Understanding Incontinence



... Clinical Practice Guideline Update



U.S. Department of Health and Human Services
Public Health Service
Agency for Health Care Policy and Research
Executive Office Center, Suite 501
2101 East Jefferson Street
Rockville, MD 20852

AHCPR Publication No. 96-0684
March 1996

**Consumer Version
Clinical Practice Guideline
Number 2, 1996 Update**

How Your Body Makes, Stores, and Releases Urine

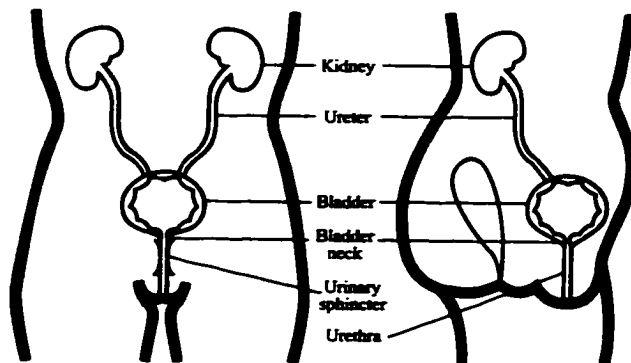
When you eat and drink, your body absorbs the liquid. The kidneys filter out waste products from the body fluids and make urine.

Urine travels down tubes called ureters into a muscular sac called the urinary bladder, which stores the urine.

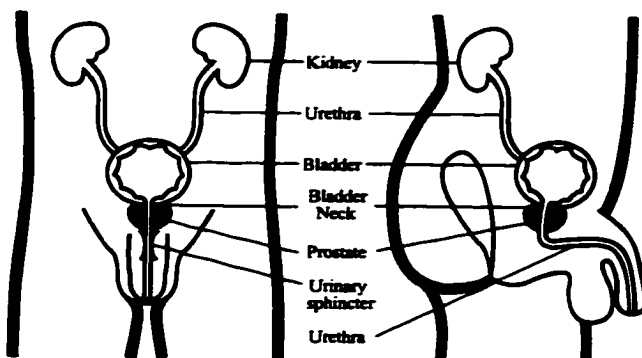
When you are ready to go to the bathroom, your brain tells your system to relax.

Urine travels out of your bladder through a tube called the urethra. You release urine by relaxing the urethral sphincter and contracting the bladder muscles. The urethral sphincter is a group of muscles that tightens to hold urine in and loosens to let it out.

Woman



Man



Understanding Incontinence

Purpose of this Booklet

Many people lose urine when they don't want to. When this happens enough to be a problem, it is called urinary incontinence.

Urinary incontinence is very common. But some people are too embarrassed to get help. The good news is that millions of men and women are being successfully treated and cured.

Reading this booklet will help you. But it is important to tell your health care provider (such as a doctor or nurse) about the problem. You may even want to bring this booklet with you to help you talk about your incontinence.

Causes of Urinary Incontinence

Urinary incontinence is not a natural part of aging. It can happen at any age, and can be caused by many physical conditions. Many causes of incontinence are temporary and can be managed with simple treatment. Some causes of temporary incontinence are:

- Urinary tract infection
- Vaginal infection or irritation
- Constipation
- Effects of medicine

Incontinence can be caused by other conditions that are not temporary. Other causes of incontinence are:

- Weakness of muscles that hold the bladder in place
- Weakness of the bladder itself
- Weakness of the urethral sphincter muscles

- Overactive bladder muscles
- Blocked urethra (can be from prostate enlargement)
- Hormone imbalance in women
- Neurologic disorders
- Immobility (not being able to move around)

In almost every case, these conditions can be treated. Your health care provider will help to find the exact cause of your incontinence.

Types of Incontinence

There are also many different types of incontinence. Some people have more than one type of incontinence. You should be able to identify the type of incontinence you have by comparing it to the list below.

Urge incontinence:

People with urge incontinence lose urine as soon as they feel a strong need to go to the bathroom. If you have urge incontinence you may leak urine:

- When you can't get to the bathroom quickly enough
- When you drink even a small amount of liquid, or when you hear or touch running water

You may also . . .

- Go to the bathroom very often; for example, every two hours during the day and night.
You may even wet the bed

Stress incontinence:

People with stress incontinence lose urine when they exercise or move in a certain way. If you have stress incontinence, you may leak urine:

- When you sneeze, cough, or laugh
- When you get up from a chair or get out of bed

- When you walk or do other exercise

You may also . . .

- Go to the bathroom often during the day to avoid accidents

Overflow incontinence:

People with overflow incontinence may feel that they never completely empty their bladder. If you have overflow incontinence, you may:

- Often lose small amounts of urine during the day and night
- Get up often during the night to go to the bathroom
- Often feel as if you have to empty your bladder but can't
- Pass only a small amount of urine but feel as if your bladder is still partly full
- Spend a long time at the toilet, but produce only a weak, dribbling stream of urine

Some people with overflow incontinence do not have the feeling of fullness, but they lose urine day and night.

Finding the Cause of Urinary Incontinence

Once you tell your health care provider about the problem, finding the cause of your urinary incontinence is the next step.

Your health care provider will talk with you about your medical history and urinary habits. You may be asked to keep a record of your usual habits in a bladder record (see Sample Bladder Record at end of booklet). You probably will have a physical examination and urine tests. You may have other tests, as well. These tests will help find the exact cause of your incontinence and the best treatment for you. The table at the end of this booklet lists some of the tests you may be asked to take.

Treating Urinary Incontinence

Once the type and cause of your urinary incontinence are known, treatment can begin. Urinary incontinence is treated in one or more of three ways: behavioral techniques, medication, and surgery.

Behavioral techniques:

Behavioral techniques teach you ways to control your own bladder and sphincter muscles (see drawing at beginning of booklet). They are very simple and work well for certain types of urinary incontinence. Two types of behavioral techniques are commonly used—*bladder training* and *pelvic muscle exercises*. You may also be asked to change the amount of liquid that you drink. You may be asked to drink more or less water depending on your bladder problem.

Bladder training is used for urge incontinence, and may also be used for stress incontinence. Both men and women can benefit from bladder training. People learn different ways to control the urge to urinate. Distraction (thinking about other things) is just one example. A technique called prompted voiding—urinating on a schedule—is also used. This technique has been quite successful in controlling incontinence in nursing home patients.

Pelvic muscle exercises called Kegel exercises are used for stress incontinence. The Kegel exercises help to strengthen weak muscles around the bladder.

Medication:

Some people need to take medicine to treat conditions that cause urinary incontinence. The most common types of medicine treat infection, replace hormones, stop abnormal bladder muscle contractions, or tighten sphincter muscles. Your health care provider may recommend medication for your condition. You will be taught how and when to take it.

Surgery:

Surgery is sometimes needed to help treat the cause of incontinence. Surgery can be used to:

- Return the bladder neck to its proper position in women with stress incontinence
- Remove tissue that is causing a blockage
- Correct severely weakened pelvic muscles
- Enlarge a small bladder to hold more urine

There are many different surgical procedures that may be used to treat incontinence. The type of operation you may need depends on the type and cause of your incontinence. Your doctor will discuss the specific procedure you might need.

Be sure to ask questions so that you fully understand the procedure.

Other Measures and Supportive Devices

Some other products can be used to help manage incontinence. These include pads and catheters. Catheters are used when a person cannot urinate. A catheter is a tube that is placed in the bladder to drain urine into a bag outside the body. The catheter usually is left inside the bladder, but some catheters are not left in. They are put in and taken out of the bladder as needed to empty it every few hours. Condom catheters (mostly used in men) attach to the outside of the body and are not placed directly in the bladder. Specially designed pads are available to help men and women with incontinence.

Catheters and pads are not the first and only treatment for incontinence. They should only be used to make other treatments more effective or when other treatments have failed.

What To Do Next

Your health care provider will tell you about the type of incontinence you have and will

recommend a treatment. While you are being treated, be sure to:

- Ask questions
- Follow instructions
- Take all of your medicine
- Report side effects of your medicine, if any
- Report any changes, good and bad, to your health care provider

... and remember, incontinence is not a natural part of aging. In most cases, it can be successfully treated and reversed.

Risks and Benefits of Treatment

Three types of treatment are recommended for urinary incontinence:

- Behavioral techniques
- Medicine
- Surgery

How well each of these treatments works depends on the cause of the incontinence and, in some cases, patient effort. The risks and benefits described below are based on current medical knowledge and expert opinion. How well a treatment works may also depend on the individual patient. A treatment that works for one patient may not be as effective for another patient. Therefore, it is important to talk with a health care provider about treatment choices.

Behavioral techniques. There are no risks for this type of treatment.

Medicine. As with most drugs, there is a risk of having a side effect. If you are taking medicine for other conditions, the drugs could react with each other. Therefore, it is important to work with the health care provider and report all of your medicines and any side effects as soon as they happen.

Surgery. With any surgery there is a possibility of a risk or complication. It is important to discuss these risks with your surgeon.

Common Tests Used To Diagnose Urinary Incontinence

Name of test	Purpose
Blood tests	Examines blood for levels of various chemicals.
Cystoscopy	Looks for abnormalities in bladder and lower urinary tract. It works by inserting a small tube into the bladder* that has a telescope for the doctor to look through.
Post-void residual (PVR) measurement	Measures how much urine is left in the bladder after urinating by placing a small soft tube into the bladder or by using ultrasound (sound waves).
Stress test	Looks for urine loss when stress is put on bladder muscles usually by coughing, lifting, or exercise.
Urinalysis	Examines urine for signs of infection, blood, or other abnormality.
Urodynamic testing	Examines bladder and urethral sphincter function (may involve inserting a small tube into the bladder; x-rays also can be used to see the bladder).

* Because you may be uncomfortable during this part of the test, you may be given some medication to help relax you.

Sample Bladder Record

NAME: _____

INSTRUCTIONS: Place a check in the appropriate column next to the time you urinated in the toilet or when you had an incontinence episode. Note the

DATE: _____

reason for the incontinence and describe your liquid intake (for example, coffee, water) and estimate the amount (for example, one cup).

Time interval	Urinated in toilet	Had a small incontinence episode	Had a large incontinence episode	Reason for incontinence episode	Type/amount of liquid intake
6-8 a.m.					
8-10 a.m.					
10-noon					
noon-2 p.m.					
2-4 p.m.					
4-6 p.m.					
6-8 p.m.					
8-10 p.m.					
10-midnight					
Overnight					

No. of pads used today: _____

No. of episodes: _____

Comments: _____

Coping with Incontinence

Several national organizations help people with urinary incontinence. They may be able to put you in touch with local groups that can give you more information, ideas, and emotional support in coping with urinary incontinence.

Alliance for Aging Research
(Information on bladder training program)
2021 K Street, N.W.
Suite 305
Washington, DC 20006
(202) 293-2856

Bladder Health Council
c/o American Foundation
for Urologic Disease
300 West Pratt Street, Suite 401
Baltimore, MD 21201
(800) 242-2383
(410) 727-2908

National Association For Continence
(formerly Help for Incontinent People)
P.O. Box 8310
Spartanburg, SC 29305
(800) BLADDER or
(800) 252-3337

International Continence Society
The Continence Foundation
2 Doughty Street
London WC1N 2PH
44-714046875

Simon Foundation for Continence
Box 835
Wilmette, IL 60091
(800) 23-SIMON
(800) 237-4666

For Further Information

The information in this booklet was taken from the *Clinical Practice Guideline Update on Urinary Incontinence in Adults: Acute and Chronic Management*. The guideline was developed by an expert panel of doctors, nurses, other health care providers, and consumers sponsored by the Agency for Health Care Policy and Research. Other guidelines on common health problems are being developed and will be released in the near future. For more information about the guidelines or to receive additional copies of this booklet, contact:

**Agency for Health Care Policy
and Research**
Publications Clearinghouse
Post Office Box 8547
Silver Spring, MD 20907
(800) 358-9295

APPENDIX J
Geriatric Depression Scale

APPENDIX J

Geriatric Depression Scale

Directions: Choose the best answer for how you felt over the past few weeks.

- | | | | |
|-----|--|---------------------------------|--------------------------------|
| 1. | Are you basically satisfied with your life? | <input type="checkbox"/> 1. Yes | <input type="checkbox"/> 0. No |
| 2. | Have you dropped many of your activities and interests? | <input type="checkbox"/> 1. Yes | <input type="checkbox"/> 0. No |
| 3. | Do you feel that your life is empty? | <input type="checkbox"/> 1. Yes | <input type="checkbox"/> 0. No |
| 4. | Do you often get bored? | <input type="checkbox"/> 1. Yes | <input type="checkbox"/> 0. No |
| 5. | Are you in good spirits most of the time? | <input type="checkbox"/> 1. Yes | <input type="checkbox"/> 0. No |
| 6. | Are you afraid that something bad is going to happen to you? | <input type="checkbox"/> 1. Yes | <input type="checkbox"/> 0. No |
| 7. | Do you feel happy most of the time? | <input type="checkbox"/> 1. Yes | <input type="checkbox"/> 0. No |
| 8. | Do you often feel helpless? | <input type="checkbox"/> 1. Yes | <input type="checkbox"/> 0. No |
| 9. | Do you prefer to stay at home, rather than going out and doing things? | <input type="checkbox"/> 1. Yes | <input type="checkbox"/> 0. No |
| 10. | Do you feel that you have more problems with memories than most? | <input type="checkbox"/> 1. Yes | <input type="checkbox"/> 0. No |
| 11. | Do you think that its wonderful to be alive? | <input type="checkbox"/> 1. Yes | <input type="checkbox"/> 0. No |
| 12. | Do you feel pretty worthless the way you are? | <input type="checkbox"/> 1. Yes | <input type="checkbox"/> 0. No |
| 13. | Do you feel full of energy? | <input type="checkbox"/> 1. Yes | <input type="checkbox"/> 0. No |
| 14. | Do you feel your situation is hopeless? | <input type="checkbox"/> 1. Yes | <input type="checkbox"/> 0. No |

15. Do you think that most people are better off than you are?

 1. Yes 0. No

APPENDIX K
Incontinence Impact Questionnaire

Directions: Please circle the answer that best describes your experience with urine leakage.

- Has urine leakage affected:**
- | | | | | |
|---|------------|----------|------------|---------|
| 1. Ability to perform household chores | not at all | slightly | moderately | greatly |
| 2. Participate in physical recreation | not at all | slightly | moderately | greatly |
| 3. Participate in entertainment activities | not at all | slightly | moderately | greatly |
| 4. Travel greater than 30 minutes away from home | not at all | slightly | moderately | greatly |
| 5. Take part in social activities | not at all | slightly | moderately | greatly |
| 6. Your emotional health
(nervousness, depression, etc.) | not at all | slightly | moderately | greatly |
| 7. Your feeling frustrated | not at all | slightly | moderately | greatly |

APPENDIX L
Demographic Questionnaire

APPENDIX L

Demographic Questionnaire

Please answer the following by checking the correct response:

What is your race:

- African-American
- Asian
- Caucasian
- Hispanic
- American Indian
- Other

What is your Marital Status:

- Married
- Widowed
- Never Married
- Divorced.
- Separated

Your Age:

- 50-60
- 61-71
- 71-81
- 81 or older

Education completed.

- Elementary (1-6)
- Junior High (7-8)
- High School (9-12)
- Some College
- Degree obtained _____

Employment:

Are you currently employed: ___ Yes ___ No

With whom do you live?

- ___ With Spouse
 ___ Live Alone
 ___ Live with Children
 ___ Other

Do you have accidental urine leakage? ___ Yes ___ No
If yes please continue answering questions in the packet.
If no, thank you for your participation.

Does involuntary urine accidents occur:

1. When sneezing, coughing, or lifting? ___ Yes ___ No
2. On the way to the toilet? ___ Yes ___ No
3. When running water? ___ Yes ___ No
4. When getting up from chair? ___ Yes ___ No
5. Do you leak urine arriving home after
being out? ___ Yes ___ No
6. Do you leak urine when getting up during
the night to urinate? ___ Yes ___ No
7. Do you wake up and find yourself wet? ___ Yes ___ No
8. Do you feel that you do not empty your
bladder completely when you urinate? ___ Yes ___ No

9. Do you get a strong urge to urinate and need to run to the toilet, but leak urine on the way? Yes No

10. Describe other times you may experience urinary accidents:

Please answer the next two questions by checking the most correct response that best describes your experience with leaking urine.

Approximately how long have you had problems holding your urine:

- 1-6 months
 6 months-23 months
 2-5 years
 6-9 years
 10-20 years
 20 years or more

Have you ever (been evaluated) seen a Doctor or nurse and had an exam for this problem? Yes No

Have you ever had treatment for the problem of leaking urine? Yes No

If Yes, What type of treatment?

- Surgery
 Medication
 Exercises
 Pessary
 Voiding on a Schedule
 Other
Please describe: _____

Was it effective?

- Very**
- Somewhat**
- Not at all**

Are you still using the treatment?

- Yes**
- No**

APPENDIX M
Informed Consent for Community Sample



Appendix M

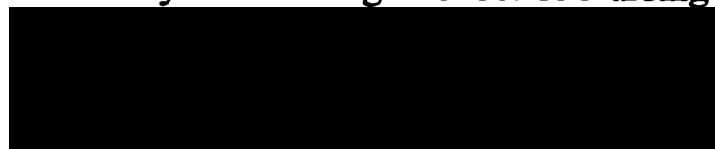
Approved: 01/27/97
Institutional Review Board
University of Pittsburgh
IRB Number 970187

CONSENT TO ACT AS A SUBJECT IN A CLINICAL STUDY

Title: Development and Testing of a Scale to Measure Self-efficacy for Pelvic Muscle Exercises in Women with Urinary Incontinence

Investigator:

Barbara Broome, RN, MSN, CNS
Doctoral Student
University of Pittsburgh School of Nursing



Dissertation Advisor:

B. Joan McDowell, Ph.D., C.R.N.P., F.A.A.N
Associate Professor of Nursing
Research Assistant Professor of Medicine
University of Pittsburgh School of Nursing
462 Victoria Building
Pittsburgh, PA.



Source of Support: National Institute of Nursing Research

Subject's Initials _____

Transforming the Present — Discovering the Future

Description: I understand that I been asked to participate in a research study to test an instrument to examine women's belief in their ability to perform pelvic muscle exercise as well as their belief that pelvic muscle exercises can prevent accidental urine loss. If you agree to participate in the study you will be given several questionnaires to complete before treatment for urinary incontinence. The questionnaires ask you to provide information about your experience with urinary incontinence, how urinary incontinence has impacted your life and your mood, as well as your beliefs about pelvic muscle exercises and your ability to follow pelvic muscle exercise instructions. You will be asked to visualize (to see in your mind) and draw an object. The test will help you and the researcher to understand how you see things in space and your ability to follow instructions. Completion of the instruments should take approximately 20 to 30 minutes. Approximately 7 days after completion of the packet of instruments, some of you may be contacted by the researcher to complete the instruments a second time as a part of testing of the instrument.

Risks and Benefits: Risk is limited to possible mild psychological discomfort related to completing the questionnaires.

You will receive no direct benefit from your participation in this research study other than education about urinary incontinence. The information obtained from this study may aid treatment and research in urinary incontinence.

Cost and Payments: I understand I will not receive any monetary reimbursement for participation in this study.

Confidentiality: I understand that all information about me will be kept confidential and no one other than the researcher and the researcher's advisors at the University of Pittsburgh will have access to this information. My only identity on these records will be indicated by a case number. All information will be kept in a locked file in the University of Pittsburgh School of Nursing Urinary Incontinence research office. I understand that any information about me will be handled in a confidential way. I will not be specifically identified in any publication of research results. However, in

Subject's Initials _____

unusual cases, your research records may be inspected by appropriate government agencies or be released in response to an order from a court of law.

Right to refuse or end participation: I understand that I do not have to take part in this research study and, should I change my mind, I am free to withdraw from the study at any time.

Voluntary Consent: Barbara Broome, Doctoral Student has explained all of the above to me and has answered questions I have regarding my participation in this study. I also understand that any future questions I have about this research will be answered by Barbara Broome whom I may call at [REDACTED]. Any questions I have about my rights as a research subject will be answered by the Office of Senior Vice Chancellor for Health Science, University of Pittsburgh [REDACTED]. By signing this form, I agree to participate in this study.

Participant's signature

Date

Investigator's Certification: I certify that I have explained to the above individual the nature and purpose, the potential benefits, and possible risks associated with participating in this research study, have answered questions that have been raised, and I have witnessed the above signature.

Researcher's Signature

Date

Participant's Signature

Date

APPENDIX N
Letter for Test-Retest



APPENDIX N

Thank you for participating in the study “Development and Testing of a Scale to Measure Self-efficacy for the Performance of Pelvic Muscle Exercises in Women with Urinary Incontinence.” It was a pleasure meeting you and sharing information about urinary incontinence. Your participation is very valuable in increasing our knowledge about urinary incontinence and behavioral interventions for the treatment of urinary incontinence.

At our previous meeting, I explained I would be contacting you to complete the questionnaires a second time. Please complete the questionnaires and return them in the postage paid envelope provided. Should you experience any difficulty in completing the questions, please do not hesitate to contact me at [REDACTED].

Thank you.

[REDACTED]
Barbara Broome, RN, MSN

APPENDIX O
Informed Consent of Clinic Sample



APPENDIX O

Approved: 01/27/97
Institutional Review Board
University of Pittsburgh
IRB Number 970187

CONSENT TO ACT AS A SUBJECT IN A CLINICAL STUDY

Title: **Development and Testing of a Scale to Measure Self-efficacy for Pelvic Muscle Exercises in Women with Urinary Incontinence**

Investigator:

**Barbara Broome, RN, MSN, CNS
Doctoral Student
University of Pittsburgh School of Nursing**



Dissertation Advisor:

**B. Joan McDowell, Ph.D., C.R.N.P., F.A.A.N
Associate Professor of Nursing
Research Assistant Professor of Medicine
University of Pittsburgh School of Nursing
462 Victoria Building
Pittsburgh, PA.**



Source of Support: National Institute of Nursing Research

Subject's Initials _____

Transforming the Present — Discovering the Future

Description: I understand that I been asked to participate in a research study to test an instrument to examine women's belief in their ability to perform pelvic muscle exercise as well as their belief that pelvic muscle exercises can prevent accidental urine loss. If you agree to participate in the study you will be given several questionnaires to complete before treatment for urinary incontinence. The questionnaires ask you to provide information about your experience with urinary incontinence, your beliefs about pelvic muscle exercises and your ability to follow pelvic muscle exercise instructions. You will be asked to visualize (to see in your mind) and draw an object. The test will help you and the researcher to understand how you see things in space and your ability to follow instructions. Completion of the instruments should take approximately 20 to 30 minutes.

Risks and Benefits: Risk is limited to possible mild psychological discomfort related to completing the questionnaires.

You will receive no direct benefit from your participation in this research study other than education about urinary incontinence. The information obtained from this study may aid treatment and research in urinary incontinence.

Cost and Payments: I understand I will not receive any monetary reimbursement for participation in this study.

Confidentiality: I understand that all information about me will be kept confidential and no one other than the researcher and the researcher's advisors at the University of Pittsburgh will have access to this information. My only identity on these records will be indicated by a case number. All information will be kept in a locked file in the University of Pittsburgh School of Nursing Urinary Incontinence research office. I understand that any information about me will be handled in a confidential way. I will not be specifically identified in any publication of research results. However, in

Subject's Initials _____

unusual cases, your research records may be inspected by appropriate government agencies or be released in response to an order from a court of law.

Right to refuse or end participation: I understand that I do not have to take part in this research study and, should I change my mind, I am free to withdraw from the study at any time.

Voluntary Consent: Barbara Broome, Doctoral Student has explained all of the above to me and has answered questions I have regarding my participation in this study. I also understand that any future questions I have about this research will be answered by Barbara Broome whom I may call at [REDACTED]. Any questions I have about my rights as a research subject will be answered by the Office of Senior Vice Chancellor for Health Science, University of Pittsburgh [REDACTED]. By signing this form, I agree to participate in this study.

Participant's signature

Date

Investigator's Certification: I certify that I have explained to the above individual the nature and purpose, the potential benefits, and possible risks associated with participating in this research study, have answered questions that have been raised, and I have witnessed the above signature.

Researcher's Signature

Date

Participant's Signature

Date

APPENDIX P
Evaluative Statement

APPENDIX P

EVALUATIVE STATEMENT

ID _____

Do you believe that you have been successful in decreasing accidental urine loss using pelvic muscle exercise?

____ **Yes** ____ **No**

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