Effects of Combined Pelvic Floor Muscle Exercise and a Support Group on Urinary Incontinence and Quality of Life of Postprostatectomy Patients

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Purpose/Objectives: To examine the effect of combined pelvic floor muscle exercise (PFME) and a support group on postprostatectomy urinary incontinence and quality of life.

Design: Pilot study of a randomized, controlled clinical trial.

Setting: Two metropolitan hospitals in northeastern Ohio.

Sample: 29 men with postprostatectomy urinary incontinence.

Methods: The participants learned PFME through biofeedback and were randomized to the control group (n = 15) or the support group (n = 14). The control group practiced PFME at home, whereas the support group attended six biweekly group meetings facilitated by a health psychologist. Assessment of urinary incontinence and quality of life was conducted at baseline and three months.

Main Research Variables: Urinary incontinence and disease-specific quality of life.

Findings: Eighty-six percent of the support group participants versus 46% of the control group participants practiced PFME four to seven days per week. The support group had a lower rating of urinary incontinence based on a 0- to 10-point visual analog rating scale than the control group ($\bar{X}$ = 3.2 versus 4.7), and fewer support group participants used pads (50%) than control group participants (85%) at three months. The support group also scored significantly lower on the severity of incontinence problems than the control group at three months, especially in relationship with spouse and social outing, despite no group difference in these areas at baseline.

Conclusions: The study provided promising evidence regarding the effect of the proposed intervention on adherence to PFME, urinary incontinence, and quality of life.

Implications for Nursing: Reports regarding nursing practice are lacking with respect to PFME. This study suggests that practicing PFME in a group with patients with incontinence who have undergone prostatectomy can be a useful nursing intervention.

Key Points . . .

- Practicing pelvic floor muscle exercise (PFME) in a group setting likely increases patients' motivation to maintain PFME on a daily basis as compared to practicing PFME individually.
- Patients who practice PFME in a group setting are likely to experience fewer incontinent symptoms and use fewer pads over time than patients who practice PFME individually after biofeedback PFME training because of increased muscle strength.
- The proposed intervention that combines PFME with a support group significantly improved disease-specific quality of life among patients, perhaps because of enhanced urinary continence and social support.

Urinary incontinence, defined by the International Continence Society as any involuntary leakage of urine (Abrams et al., 2002), is estimated to occur in 25%–70% of patients who have undergone radical prostatectomy (Grise & Thurman, 2001). Although most patients regain urinary continence at least partially a year after surgery, many continue to experience incontinence (Little, Kuban, Levy, Zagars, & Pollack, 2003). Urinary incontinence reduces patients' ability to attend family and social gatherings and makes patients feel burdened, shamed, or even depressed (Broome, 2003). The symptom clearly constitutes a significant source of reduced quality of life (QOL) for patients with prostate cancer (Miller et al., 2005).

Background

Physiology

Men's continence is guarded by internal and external sphincters. When the prostate is resected surgically, the continence mechanism has to rely solely on the external sphincter. An external sphincter weakened by surgery leads to sphincter insufficiency and **stress incontinence**—urinary leakage during stressful events such as coughing or heavy lifting. Furthermore, patients with prostate cancer tend to compensate with more frequent bladder contractions to overcome the obstruction caused by malignant prostatic enlargement. After the prostate is removed surgically, bladder contractions may persist and result in **urge incontinence**—the frequent urge or

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pressure to urinate (Moore & Gray, 2004). Some studies have reported that the extent of nerve preservation or damage to external sphincters in men who have undergone prostatectomy had no significant effect on urinary incontinence, suggesting that the external sphincter muscles can be strengthened to compensate for the loss of internal sphincter control (Harris, 1997).

Performance of Pelvic Floor Muscle Exercise

Evidence is increasing that pelvic floor muscle exercise (PFME) can strengthen the external sphincter and improve urinary continence in men (Hunter, Moore, Cody, & Glazener, 2005; Van Kampen et al., 2000). Despite the International Nursing Summit calling for further research (Moore & Gray, 2004), evidence regarding nursing practice of PFME still is lacking. One published nursing study could not confirm the effects of PFME, in part because of methodologic reasons (Moore, Griffiths, & Hughton, 1999), which indicates the need to promote nursing research and the practice of PFME.

PFME outcomes appear to be affected by patients' compliance and appropriate comprehension of the technique (Hunter et al., 2005; Palmer, 2004). A nursing pilot study reported that men who received a small refrigerator magnet reminding them to perform PFME after prostatectomy had a higher rate of compliance than men who did not (Ip, 2004), implying that interventions enhance patients' adherence to PFME. According to the Social Cognitive Theory (Bandura, 1986), individuals acquire knowledge and skills vicariously through observation of others and cognitively through verbal persuasion or mastery experience. PFME may be better learned through a group process. A body of existing studies has shown that a support group can significantly reduce psychosocial stress in patients with cancer (Penedo et al., 2004), thus increasing their motivation to fight cancer (Blake-Mortimer, Gore-Felton, Kimerling, Turner-Cobb, & Spiegel, 1999). Practicing PFME as a group may give patients greater motivation and better feedback through coaching and interaction, thereby improving urinary continence more effectively than practicing PFME individually. To date, no studies have investigated the effect of combined PFME and a support group on postprostatectomy urinary incontinence; therefore, a pilot study was conducted to investigate the intervention approach.

Urinary incontinence results in significant distress, inconvenience, and restrictions in daily activities (Palmer, Fogarty, Somerfield, & Powel, 2003). Life disruption caused by urinary incontinence is distinct from general health-related QOL and is construed as disease-specific QOL (Eton & Lepore, 2002). For patients with prostate cancer, disease-specific QOL usually is measured by the degree of bother of incontinent symptoms, which reflects the self-perceived severity of urinary incontinence (Litwin et al., 1998). Improved urinary function has been significantly associated with increasing disease-specific QOL (Cooperberg, Master, & Carroll, 2003; Litwin, Pasta, Yu, Stoddard, & Flanders, 2000).

Given the theoretical considerations, the current study's hypotheses were that, over time, patients attending a support group would practice PFME significantly more frequently than the control group, the support group would experience significantly less urinary incontinence than the control group, and the support group would report significantly better disease-specific QOL than the control group.

Methods

The current study was conducted at two major hospitals in Cleveland, OH. Patients were eligible for the study if they had had a prostatectomy and remained incontinent six months after surgery. Based on the hospitals' tumor registry databases, 195 patients who were diagnosed with stage I–III prostate cancer and received prostatectomy more than six months prior were identified and contacted. A single bladder control scale taken from the Barthel Index was used to screen for urinary incontinence (McDowell & Newell, 2006). Fifty-eight patients (30%) were identified as experiencing urinary incontinence during the prior week and, therefore, were eligible for the study; 33 patients (57%) consented to participate. Three patients withdrew because of changes in their work schedules, and one withdrew because of dissatisfaction with assignment to the control group. As a result, 29 eligible men participated in the pilot study.

Intervention

The study intervention included PFME biofeedback and a support group. The participants learned PFME from a licensed physical therapist during a 45-minute biofeedback session. Following instruction, each participant inserted an electric sensor into his rectum while in a restroom and then returned to the examination room to sit in a reclined chair. The sensor was connected to a computer so that the electrical activity of the levator ani musculature could be measured. Participants were instructed in PFME while viewing a computer monitor to learn how to correctly exercise the muscles. Men's understanding and ability to perform PFME were scored on a five-point scale. The physical therapist coached participants until they successfully mastered the technique. Each participant then was given a set of written instructions for progressive home exercises that required practicing PFME two to three times a day for 5–10 minutes at a time.

Procedures

Participants were randomized to the control group (n = 15) or the support group (n = 14). The two groups did not significantly differ in two scores of understanding or performing PFME. The control group participants were instructed to practice PFME at home individually and received routine medical care. The support group participants were instructed to attend six biweekly meetings over a period of three months. Each support group was comprised of four to five participants. The support group meetings lasted 90 minutes each and were facilitated by a licensed health psychologist. At the group meetings, the health psychologist discussed anatomy and physiology of urinary incontinence, used an exercise diary tool to facilitate individual PFME practice, and moderated group discussions regarding personal experience with PFME, struggles with functional difficulties in daily life, family communication about sexual dysfunction, and other psychosocial issues pertaining to urinary incontinence (e.g., stigma, loneliness, social relations).

Instruments

Participants in both groups were interviewed at baseline prior to the biofeedback session and at the three-month follow-up. A research assistant, who was a doctoral candidate in medical anthropology, collected data under supervision.

A **semistructured questionnaire** was used to solicit information about demographics and PFME practice, including self-reported frequency, duration, and effect. The researchers adopted items from the University of California, Los Angeles, Prostate Cancer Index (Litwin et al., 1998) and the American Urological Association Symptom Index (Barry et al., 1992) to assess symptoms of interest, such as the frequency and amount of leakage, the number of voidings during the day or night, ability to empty the bladder or delay voiding, and the number of pads used daily. A visual analog scale (VAS) was used to obtain the self-assessment of urinary incontinence (0 = completely dry to 10 = complete incontinence). The VAS has good validity (≥ 0.70) and reliability (≥ 0.90) in measuring pain (McDowell & Newell, 2006) and has been used in previous studies to measure self-perceived urinary incontinence (Van Kampen et al., 2000). The Illness Intrusiveness Rating Scale (IIRS) was used to measure self-perceived severity of urinary incontinence as disease-specific QOL. The IIRS originally was developed to measure the degree to which illness interferes in daily life. It has good internal consistency ($\alpha \geq 0.80$) and test-retest reliability ($r = 0.79$) (Devins, 1994). The IIRS was used in the current study to assess how much patients were bothered by urinary incontinence in eight domains of life: work, self-care, household chores, relationships with a spouse or partner, relationships with other family members, meeting friends, going out, and recreational activities.

Data Analysis

A total of 27 participants (14 support group participants and 13 control group participants) completed the study. Two participants did not complete the follow-up assessment because they believed that the control group was not helpful. Given the small sample size, the researchers used univariate simple statistics to compare the two groups. That approach can detect a significant group difference better with small sample sizes to shed light on the data but could not count baseline group difference in the calculation of group difference at three months. Furthermore, because the study was exploratory and the primary concern was to examine the presence of intervention effect, adhering to an arbitrary significance level of $p \leq 0.05$ when the power is low could miss important findings; conversely, the risk of reporting false-positive findings is inconsequential in the study. Thus, the level of significance was set at $p \leq 0.10$.

Results

Participants in the control and support groups were aged similarly ($\bar{X} = 61$ and 62 years, respectively (see Table 1). Most of the subjects were married (about 80%). The control group had significantly fewer African American participants (13% versus 43%, $p = 0.075$) and more participants with college education (40%) or annual household income higher than $50,000 (46%) than the support group (21% and 36%), but the group differences in education and income were not significant. Moreover, the two study groups did not differ in the type of surgery they received. The support group also had a longer duration (about three months) of incontinence than the control group. That group difference was not significant and is unlikely to have affected the study outcome because the mean time since diagnosis was more than 18 months.

Table 1. Demographic Characteristics

	Control Group (N = 15)		Support Group (N = 14)	
Characteristic	**$\bar{X}$**	**SD**	**$\bar{X}$**	**SD**
Time since surgery (months)	18.5	12.6	21.9	13.1
Age (years)	60.9	6.9	62.1	5.7
Characteristic	**n**	**%**	**n**	**%**
Race				
White	13	87	8	57
African American	2	13	6	43
Marital status				
Married	12	80	11	79
Single	1	7	1	7
Separated	–	–	2	14
Divorced	2	13	–	–
Education				
High school incomplete	1	7	1	7
High school graduate or GED	5	33	7	50
Some college or an associate degree	4	27	2	14
College degree	2	13	1	7
Other	3	20	3	21
Annual household income ($)				
< 15,000	–	–	2	14
15,000–24,999	6	40	2	14
25,000–49,999	2	13	5	36
50,000–100,000	5	33	3	21
> 100,000	2	13	2	14
Religion				
Christian	14	93	12	86
Other	1	7	2	14
Type of surgery				
Radical prostatectomy	13	87	12	86
Laparoscopic radical prostatectomy	2	13	1	7
Missing	–	–	1	7

Note. Because of rounding, not all percentages total 100.

The support group participants practiced PFME significantly more frequently than the control group participants ($p = 0.077$). Twelve support group participants (86%) practiced four to seven days per week, compared to six control group participants (46%) who did so. However, the two study groups did not significantly differ in the times of exercise and the duration of exercise during a day. When they practiced, most participants followed the instructions to practice PFME about twice a day and for 5–10 minutes at a time. Despite the findings that more control than support group participants practiced PFME previously ($p = 0.044$), the support group reported that PFME made their continence condition significantly better ($p = 0.021$) and rated the PFME effect significantly higher on a scale of 0–10 ($p \leq 0.001$) than the control group (see Table 2).

Regarding urinary incontinence, significantly more members of the control group (85%) than the support group (50%) reported needing to use a pad or brief at three months ($p = 0.057$), although no group difference was found at baseline (73% versus 71%). When bladder function was examined, significantly more support group participants (71%) than control group members (36%) were unable to completely empty

Table 2. Group Differences in Practicing Pelvic Floor Muscle Exercise

Variable	Control (N = 13) n	Control (N = 13) %	Support (N = 14) n	Support (N = 14) %	Value	p
Have you practiced pelvic floor muscle exercise (PFME) previously?						
Yes	11	85	9	64	4.060[a]	0.044
No	–	–	4	29	–	–
Missing data	2	15	1	7	–	–
Variable	**$\bar{X}$**		**$\bar{X}$**		**Value**	**p**
During the past three months, how often have you practiced PFME every week? (1 = none; 6 = six to seven days per week)	4.15		5.00		1.766[b]	0.077
During the past three months, how often have you practiced PFME every day? (1 = none; 4 = five or more times daily)	2.23		2.36		0.357[b]	0.721
During the past three months, how many minutes have you spent on practicing PFME each time? (1 = none; 6 = 8–10 minutes)	3.85		4.50		1.422[b]	0.155
Has PFME made your urinary condition worse, no difference, or better? (1 = worse; 2 = same; 3 = better)	2.50		2.92		2.300[b]	0.021
How would you rate the effect of PFME on your urinary problem on a 0–10 scale? (0 = no effect; 10 = maximal effect)	4.04		6.68		3.220[b]	0.001

[a] Chi-square test

[b] Approximate t value for Somers' d test

the bladder at baseline (p = 0.058), but the group difference disappeared three months later (p = 0.249). Furthermore, significantly more support than control group participants reported that they could control the urge to urinate and prevent leakage at three months (71% versus 39%, p = 0.085), despite no group difference at baseline (36% versus 33%). At three months, the support group reported significantly greater improvement in continence after the biofeedback training (p = 0.011) and rated urinary incontinence at a significantly lower level on a 0- to 10-point VAS (p = 0.057) than the control group, although no group difference existed at baseline (see Table 3).

Regarding disease-specific QOL, those in the support group scored significantly lower at three months than the control group on the total score of the severity of problems in daily life caused by urinary incontinence (p = 0.037), despite no baseline group difference. Specifically, the support group reported significantly fewer problems in relationships with a spouse or partner (p = 0.038) and going out to places such as a church, shopping center, and movie theater (p = 0.022). A significant downward trend was observed for reported problems in job performance (p = 0.082), self-care (e.g., bathing, driving) (p = 0.094), and household chores (e.g., cooking, cleaning, gardening) (p = 0.076) in the support group at three months, yet no group difference was found at baseline (see Table 4).

Discussion

This study is the first intervention to combine PFME and support groups to improve postprostatectomy urinary incontinence and QOL. The pilot study showed that the support group enhanced patients' compliance and improved continence and QOL significantly better than biofeedback training alone.

The findings suggest that the support group enhanced PFME practice primarily by encouraging exercise on a daily basis, because the two study groups significantly differed only in the number of days that PFME was practiced. That finding is encouraging because scientific study and evidence are lacking with regard to patients' compliance. Perhaps the support group reinforced the participants' belief in PFME, thus enhancing their exercise and self-efficacy of PFME.

The data consistently indicated a trend of increasing ability to empty the bladder and control the urge to void or leak by members of the support group at three months compared to the control group. Furthermore, significantly fewer support group participants than control group participants reported needing to use pads for protection at three months. The existing literature suggests that PFME improves continence in men because of improved muscle condition and bladder function (Parekh et al., 2003). Findings from the current study not only lend support to that notion but also confirmed the study hypothesis that combining PFME with a support group would better improve urinary continence.

The intervention's effect on QOL outcomes was significant, especially in areas of social outings and spousal relationships. The support group clearly experienced significantly less negative effect from urinary incontinence on daily living than the control group at three months. The effect may be attributed to a better continence improvement of the support group, the group process during which the participants discussed communications with a spouse or partner and socialization issues, or both. Pinpointing the exact working mechanism requires a more targeted investigation. Overall, the combined PFME and support group intervention resulted in a significant effect on QOL specific to regaining or maintaining urinary continence. Whether and how the observed outcome is associated with health-related QOL in general remains to be answered by future investigations.

The major limitation of the current study is its small sample size, which prohibited the researchers from performing sophisticated statistical tests. Because they compared the two

Table 3. Group Differences in Urinary Incontinence

Variable		Control[a] n	Control[a] %	Support (N = 14) n	Support (N = 14) %	Value	p
Do you feel your bladder has not emptied completely after urinating?							
Baseline:	Yes	5	33	10	71	0.359[b]	0.058
	No	9	60	4	29		
	Missing data	1	6	–	–		
Three-month follow-up:	Yes	5	38	9	64	1.330[b]	0.249
	No	7	54	5	36		
	Missing data	1	8	–	–		
Do you use a pad or brief to protect your clothing?							
Baseline:	Yes	11	73	10	71	0.013[b]	0.909
	No	4	27	4	29		
Three-month follow-up:	Yes	11	85	7	50	3.635[b]	0.057
	No	2	15	7	50		
Can you stop the urge to void and leak?							
Baseline:	Yes	5	33	5	36	0.018[b]	0.893
	No	10	67	9	64		
Three-month follow-up:	Yes	5	39	10	71	2.967[b]	0.085
	No	8	62	4	29		

Variable	Control[a] $\bar{X}$	Support (N = 14) $\bar{X}$	Value	p
How often do you leak now? (1 = less than a week to 5 = constant)				
Baseline	3.40	3.29	–0.188[c]	0.851
Three-month follow-up	3.08	2.43	–1.442[c]	0.149
How much do you usually leak? (1 = a few drips to 4 = large amount)				
Baseline	2.07	2.36	0.576[c]	0.565
Three-month follow-up	1.83	1.93	–0.194[c]	0.846
Number of urinary problems in the past week				
Baseline	14.17	15.89	92.500[d]	0.584
Three-month follow-up	14.12	12.88	76.500[d]	0.672
Number of times toileting during the night in the past week				
Baseline	15.23	14.75	101.500[d]	0.876
Three-month follow-up	15.08	13.00	77.000[d]	0.484
Number of times toileting during a day				
Baseline	14.04	14.96	91.500[d]	0.764
Three-month follow-up	14.04	13.96	90.500[d]	0.981
Number of pad or brief changes during the day				
Baseline	10.82	11.20	53.000[d]	0.876
Three-month follow-up	8.91	10.43	32.000[d]	0.537
How long can you hold urine when your bladder is full? (1 = not able; 4 = as long as desired)				
Baseline	2.40	2.50	0.160[c]	0.873
Three-month follow-up	2.58	2.86	0.728[c]	0.466
Has your urinary problem gotten better or worse? (1 = worse; 3 = better)				
Baseline	2.47	2.64	1.293[c]	0.196
Three-month follow-up	2.31	2.86	2.533[c]	0.011
How would you rate your urinary problem on a 0–10 scale? (0 = complete dry; 10 = complete incontinence)				
Baseline	5.37	4.36	–1.572[c]	0.116
Three-month follow-up	4.65	3.21	–1.902[c]	0.057

[a] The baseline sample size was 15, and three-month follow-up sample size was 13.

[b] Chi-square test

[c] Approximate t value for Somers' d test

[d] Mann-Whitney U

Note. Because of rounding, not all percentages total 100.

Table 4. Group Differences in Quality of Life

Variable[a]	$\bar{x}$ Control	$\bar{x}$ Support	Value	p
Work performance				
Baseline	1.27	1.93	1.334[b]	0.182
Three-month follow-up	1.69	0.79	–1.742[b]	0.082
Self-care (bathing, driving, watching television)				
Baseline	1.30	1.21	–0.161[b]	0.872
Three-month follow-up	1.08	0.50	–1.675[b]	0.094
Household chores (cooking, gardening)				
Baseline	1.83	1.29	–0.786[b]	0.432
Three-month follow-up	1.15	0.50	–1.774[b]	0.076
Relationship with spouse or partner				
Baseline	1.83	1.86	0.232[b]	0.816
Three-month follow-up	1.46	0.57	–2.072[b]	0.038
Relationship with other family members				
Baseline	1.20	1.07	0.192[b]	0.847
Three-month follow-up	0.77	0.36	–1.308[b]	0.191
Meeting friends or other people				
Baseline	1.57	0.93	–0.903[b]	0.366
Three-month follow-up	0.92	0.43	–0.831[b]	0.406
Going out to places (church, shopping, trip)				
Baseline	1.77	1.86	0.315[b]	0.753
Three-month follow-up	1.54	0.71	–2.294[b]	0.022
Recreation (hobbies, entertaining, sports)				
Baseline	2.20	1.79	–0.454[b]	0.650
Three-month follow-up	1.69	1.00	–1.547[b]	0.122
Total score on all items (0–32)				
Baseline	15.27	14.71	101.000[c]	0.861
Three-month follow-up	17.27	10.96	48.500[c]	0.037

[a] Participants rated the severity of problems caused by urinary incontinence from 0 (no problem) to 4 (severe problem).

[b] Approximate t value for Somers' d test

[c] Mann-Whitney U

study groups at baseline and three months separately, some significant group differences seen at three months may have been a result of time; however, a time effect may be small because baseline group differences were assessed and considered in the analyses. Conversely, some group differences that might have been important may not have been detected because of the small sample size and lack of statistical power. When the effect size is medium (0.5), the power to detect a significant group difference at a level of 0.10 for a sample size of 14 in each study group is about 50%. The intervention clearly must be tested in a larger sample in the future.

The other significant limitation of the current study is its exclusive use of subjective measures. The researchers intended to measure urinary incontinence objectively by asking participants to measure fluid intake and voiding for three days and record the data in a diary. Unfortunately, that task was difficult for some participants to perform, resulting in unreliable measurements. However, Donnellan, Duncan, MacGregor, and Russell (1997) reported that patients' subjective evaluation of urinary incontinence is as good as and perhaps more conservative than objective measures of actual leakage (e.g., one-hour pad test). Using objective evidence could provide more specific information on urinary improvement and offset any potential bias of the subjective measures.

Conclusions

The current pilot study provided promising results about a new intervention that combines PFME and a support group to treat postprostatecomy urinary incontinence. Although the study did not directly involve contributions from nurses, its findings have broad implications for nursing practice. Clinical nurses are trained to be skillful in teaching patients how to perform PFME. The findings of the study suggest that adding social supports enhances the outcome of PFME practice. Increasing clinical practice and research in this area will facilitate the inquiry of knowledge and help translate research findings to benefit patients who experience incontinence following surgery for prostate cancer. However, the study findings must be reviewed with caution. Although the trend in the data supports the hypotheses, a study with a larger sample size is needed before a conclusion about the intervention's effect on urinary incontinence can be reached. Testing the intervention in a larger study sample and objectively measuring urinary leakage will strengthen study outcomes in the future.

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References

Abrams, P., Cardozo, L., Fall, M., Griffiths, D., Rosier, P., Ulmsten, U., et al. (2002). The standardisation of terminology of lower urinary tract function: Report from the Standardisation Sub-Committee of the International Continence Society. *Neurourology and Urodynamics, 21,* 167–178.

Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory.* Englewood Cliffs, NJ: Prentice-Hall.

Barry, M.J., Fowler, F.J., O'Leary, M.P., Bruskewitz, R.C., Holtgrewe, H.L., Mebust, W.K., et al. (1992). The American Urological Association Symptom Index for benign prostatic hyperplasia. The Measurement Committee of the American Urological Association. *Journal of Urology, 148,* 1549–1557.

Blake-Mortimer, J., Gore-Felton, C., Kimerling, R., Turner-Cobb, J.M., & Spiegel, D. (1999). Improving the quality and quantity of life among patients with cancer: A review of the effectiveness of group psychotherapy. *European Journal of Cancer, 35,* 1581–1586.

Broome, B.A. (2003, August 22). The impact of urinary incontinence on self-efficacy and quality of life. *Health Quality of Life Outcomes, 1,* 35–39.

Cooperberg, M.R., Master, V.A., & Carroll, P.R. (2003). Health related quality of life significance of single pad urinary incontinence following radical prostatectomy. *Journal of Urology, 170*(2, Pt. 1), 512–515.

Devins, G.M. (1994). Illness intrusiveness and the psychosocial impact of lifestyle disruptions in chronic life-threatening disease. *Advances in Renal Replacement Therapy, 1,* 251–263.

Donnellan, S.M., Duncan, H.J., MacGregor, R.J., & Russell, J.M. (1997). Prospective assessment of incontinence after radical retropubic prostatectomy: Objective and subjective analysis. *Urology, 49,* 225–230.

Eton, D.T., & Lepore, S.J. (2002). Prostate cancer and health-related quality of life: A review of the literature. *Psycho-Oncology, 11,* 307–326.

Grise, P., & Thurman, S. (2001). Urinary incontinence following treatment of localized prostate cancer. *Cancer Control, 8,* 532–539.

Harris, J.L. (1997). Treatment of postprostatectomy urinary incontinence with behavioral methods. *Clinical Nurse Specialist, 11,* 159–166.

Hunter, K.F., Moore, K.N., Cody, D.J., & Glazener, C.M. (2005). Conservative management for postprostatectomy urinary incontinence. *Cochrane Database of Systematic Reviews, 3,* CD001843.

Ip, V. (2004). Evaluation of a patient education tool to reduce the incidence of incontinence post-prostate surgery. *Urologic Nursing, 24,* 401–407.

Little, D.J., Kuban, D.A., Levy, L.B., Zagars, G.K., & Pollack, A. (2003). Quality-of-life questionnaire results 2 and 3 years after radiotherapy for prostate cancer in a randomized dose-escalation study. *Urology, 62,* 707–713.

Litwin, M.S., Hays, R.D., Fink, A., Ganz, P.A., Leake, B., & Brook, R.H. (1998). The UCLA Prostate Cancer Index: Development, reliability, and validity of a health-related quality of life measure. *Medical Care, 36,* 1002–1012.

Litwin, M.S., Pasta, D.J., Yu, J., Stoddard, M.L., & Flanders, S.C. (2000). Urinary function and bother after radical prostatectomy or radiation for prostate cancer: A longitudinal, multivariate quality of life analysis from the Cancer of the Prostate Strategic Urologic Research Endeavor. *Journal of Urology, 164,* 1973–1977.

McDowell, I., & Newell, C. (2006). *Measuring health: A guide to rating scales and questionnaires* (3rd ed.). New York: Oxford University Press.

Miller, D.C., Sandra, M.G., Dunn, R.L., Montie, J.E., Pimentel, H., Sandler, H.M., et al. (2005). Long-term outcomes among localized prostate cancer survivors: Health-related quality-of-life changes after radical prostatectomy, external radiation, and brachytherapy. *Journal of Clinical Oncology, 23,* 2772–2780.

Moore, K.N., & Gray, M. (2004). Urinary incontinence in men: Current status and future directions. *Nursing Research, 53*(6, Suppl.), S36–41.

Moore, K.N., Griffiths, D., & Hughton, A. (1999). Urinary incontinence after radical prostatectomy: A randomized controlled trial comparing pelvic muscle exercises with or without electrical stimulation. *BJU International, 83,* 57–65.

Palmer, M.H. (2004). Use of health behavior change theories to guide urinary incontinence research. *Nursing Research, 53*(6, Suppl.), S49–S55.

Palmer, M.H., Fogarty, L.A., Somerfield, M.R., & Powel, L.L. (2003). Incontinence after prostatectomy: Coping with incontinence after prostate cancer surgery. *Oncology Nursing Forum, 30,* 229–238.

Parekh, A.R., Feng, M.I., Kirages, D., Bremner, H., Kaswick, J., & Aboseif, S. (2003). The role of pelvic floor exercises on post-prostatectomy incontinence. *Journal of Urology, 170,* 130–133.

Penedo, F.J., Dahn, J.R., Molton, I., Gonzalez, J.S., Kinsinger, D., Roos, B.A., et al. (2004). Cognitive-behavioral stress management improves stress-management skills and quality of life in men recovering from treatment of prostate carcinoma. *Cancer, 100,* 192–200.

Van Kampen, M., De Weerdt, W., Van Poppel, H., De Ridder, D., Feys, H., & Baert, L. (2000). Effect of pelvic-floor re-education on duration and degree of incontinence after radical prostatectomy: A randomised controlled trial. *Lancet, 355,* 98–102.