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Changes in the Severity of Fatigue and in the Use of Self Care
Behaviors in Men with Prostate Cancer Undergoing Radiation Therapy

by

Michelle Schaffner Gabriel

THESIS

Submitted in partial satisfaction of the requirements for the degree of

MASTER OF SCIENCE

in

Nursing

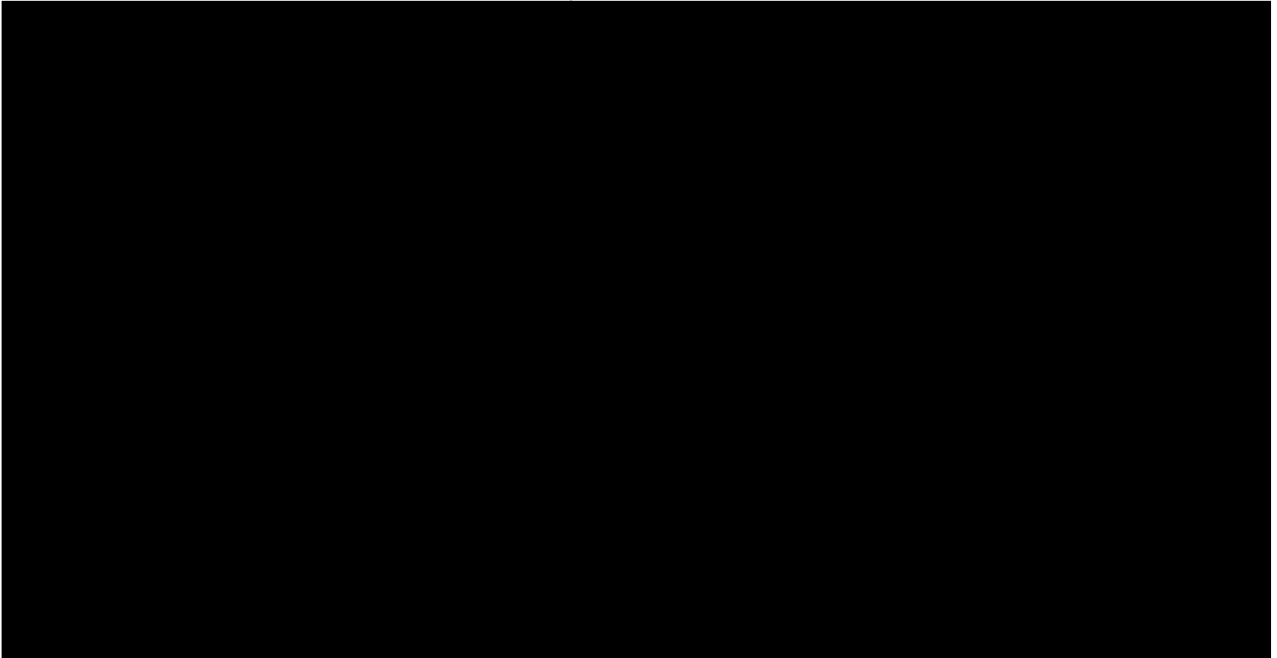
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Abstract

This descriptive, longitudinal study evaluated changes in fatigue and self care behaviors (SCBs) utilized by men with prostate cancer undergoing radiation therapy (RT). Eligible patients completed assessments at baseline, middle, and end of RT. The Lee Fatigue Scale was used to measure fatigue and the Self Care Behavior Checklist was used to evaluate the use and effectiveness of SCBs. Men were assigned to a *fatigued* (n=41) or a *non-fatigued* (n=41) group based on self-reports of fatigue at more than one of the assessment times. Descriptive statistics, t-tests, chi-square analyses, and repeated measures of analyses of variance were used to answer the study aims. Men in the fatigued group reported higher levels of fatigue at all three time points compared to men in the non-fatigued group. Regardless of group, fatigue levels increased significantly over time, with higher levels reported in the evening compared to the morning. Men who reported fatigue used 1 to 18 SCBs in an attempt to alleviate fatigue. The most frequently used SCBs (i.e., watched T.V., took a nap the next day, listened to the radio, and read a book, newspaper, or magazine) were only moderately effective in alleviating fatigue. This study provides preliminary information on the use of SCBs in men with prostate cancer who underwent RT. These data can be used to guide future intervention studies with this patient population.

Fatigue is a significant problem for oncology patients undergoing radiation therapy (RT) with prevalence rates ranging from 65% to 100% (Irvine, Vincent, Bubela, Thompson, & Graydon, 1991; Jereczek-Fossa, Marsiglia, & Orecchia, 2002). While several studies suggest that fatigue severity increases over the course of RT (Greenberg, Gray, Mannix, Eisenthal, & Carey, 1993; Greenberg, Sawicka, Eisenthal, & Ross, 1992; Haylock & Hart, 1979; Irvine, Vincent, Graydon, Bubela, & Thompson, 1994; King, Nail, Kreamer, Strohl, & Johnson, 1985; Kobashi-Schoot, Hanewald, Van Dam, & Bruning, 1985), the majority of these studies were done with heterogeneous patient populations and at limited time points (e.g., only at the beginning and end of RT). Therefore, it is difficult to discern a specific pattern for fatigue in a specific patient population (i.e., men with prostate cancer).

Three studies have evaluated for changes in the severity of fatigue during the course of RT for prostate cancer (Greenberg et al., 1993; Janda et al., 2000; Monga, Kerrigan, Thornby, & Monga, 1999). Sample sizes in these studies ranged from 15 to 43 and measurements were done prior to, in the middle, and at the end of RT. Although these studies used different instruments to measure fatigue (i.e., Visual Analog Scale, Medical Outcomes Study Short Form (SF-36), German version of the European Organization for Research and Treatment of Cancer QOL questionnaire, and Piper Fatigue Scale), all reported that fatigue increased during the course of RT in men with prostate cancer. However, none of these studies evaluated the self-care behaviors (SCBs) that men used to manage fatigue.

Several studies have evaluated SCBs performed by patients with a variety of cancer diagnoses to manage fatigue associated with chemotherapy and RT (Dodd, 1984,

1987, 1988a, & 1988b; Graydon, Bubela, Irvine, & Vincent, 1995). In these studies, the instruments used to measure fatigue included the Pearson Byars Fatigue Feeling Checklist (Graydon et al., 1995) and the Self Care Behavior Log created by Dodd (1984, 1987, 1988a & 1988b). In all five studies, the most commonly used SCBs for fatigue were: lying down, napping/sleeping, sitting, resting, walking and exercising, and decreasing activities. In Dodd's studies (1984, 1987, 1988a & 1988b), patients reported that these interventions were moderately effective. In the Graydon et al. study (1995), the most effective interventions were sleeping and exercise.

Kao and Devine (2000) surveyed prostate cancer patients (N=50) undergoing RT about their use of complementary health practices. The most frequently reported behaviors were use of herbal remedies, old-time remedies, and high-dose vitamins. However, they did not examine the reasons for or symptoms that motivated these patients to utilize these SCBs. Miaskowski and Lee (1999) included an SCB checklist as part of their study of pain, fatigue and sleep disturbances in oncology outpatients receiving RT. The most commonly used SCBs for fatigue were watching television, taking a nap, and reading a book, newspaper or magazine.

While the mechanisms underlying cancer-related fatigue remain unknown, clinicians recommend and patients utilize a variety of strategies to cope with this common symptom. In fact, in the National Comprehensive Cancer Network's (NCCN) guideline on fatigue (2003), a number of SCBs are recommended (i.e., energy conservation, distraction, activity enhancement, restorative therapy, nutrition consultation, sleep therapy, family interaction, psychosocial interventions, and

psychostimulants) even though the evidence for the effectiveness of these SCBs is extremely limited.

To date, few studies have evaluated the SCBs used by patients with prostate cancer to manage fatigue associated with RT and no studies have evaluated their effectiveness. In addition, no studies have evaluated whether SCBs for RT-induced fatigue change over time in terms of their frequency and effectiveness. Therefore, the purposes of this study in a sample of men who underwent RT for prostate cancer were: 1) to determine if there were differences over time in fatigue severity scores in men who did and did not report fatigue of sufficient severity that it warranted the initiation of SCBs; 2) to determine if there was an increase over time in the number of SCBs used to manage fatigue; 3) to determine the most frequently used SCBs for fatigue; and 4) to determine the most effective SCBs for fatigue at baseline, middle, and end of RT.

Methods

Sample and Settings

This descriptive, longitudinal study was designed to determine the pattern of fatigue over the course of RT in men with prostate cancer. Patients were recruited from two RT departments in Northern California. The study was approved by the Human Subjects Committee at the University of California, San Francisco and at each of the study sites.

Eighty-two men were recruited for this study who met the following inclusion criteria: adult oncology outpatient (≥ 18 years); able to read, write, and understand English; agreed to participate and gave written informed consent; had a Karnofsky Performance Status (KPS) score of ≥ 60 (Karnofsky, 1977), and were receiving

primary or adjuvant RT for prostate cancer. Patients were excluded if they were receiving RT for metastatic disease, had more than one cancer diagnosis, or had a diagnosed sleep disorder.

Procedures

At the time of the simulation visit (usually one week prior to RT), patients were approached by a research nurse and invited to participate in the study. After obtaining written informed consent, the patient completed the Patient Information and Health Status Questionnaire and baseline measures of anxiety (i.e., the Spielberger State and Trait Anxiety Questionnaires) and depression (i.e., the Center for Epidemiological Studies – Depression (CES-D) Scale). The Lee Fatigue Scale (LFS) and the SCB checklist for fatigue were completed at baseline (simulation visit), middle of RT (mid-RT), and at the end of RT. At each assessment, patients were asked to complete the LFS prior to going to bed (i.e., evening fatigue) and upon awakening (i.e., morning fatigue) for two consecutive days and nights. The second day's ratings were used in these analyses. The use of SCBs for fatigue and their effectiveness was rated once during each assessment.

Instruments

Patient Information and Health Status Questionnaire. This questionnaire obtained demographic information about the patient (i.e., age, gender, educational level, ethnicity, marital status, living situation, work status, Karnofsky Performance Status (KPS) score, and current and past medical history).

Spielberger State-Trait Anxiety Questionnaires. The trait anxiety questionnaire measures an individual's predisposition to anxiety determined by

his/her personality make up. This questionnaire assesses how patients generally feel. The state anxiety questionnaire measures an individual's transitory emotional response to a stressful situation. This scale evaluates the emotional responses of worry, nervousness, tension, and feelings of apprehension related to how people feel "right now" in a stressful situation (Spielberger, Gorsuch, Suchene, Vagg, & Jacobs, 1983).

The state anxiety questionnaire asks participants to rate their emotional response intensity on a 4-point scale (i.e., not at all, somewhat, moderately so, and very much so). The trait anxiety questionnaire asks participants to rate their general frequency of anxiety on a 4-point scale: (i.e., almost never, sometimes, often, and almost always). The scores for the individual items are summed and total scores can range from 20 to 80. The reliability and validity of both questionnaires have been confirmed in numerous studies (Okun, Stein, Bauman, & Silver, 1996; Shuldham, Cunningham, Hiscock, & Luscombe, 1995; Spielberger et al., 1983).

Center for Epidemiological Studies - Depression Scale (CES-D). This 20-item scale was developed to measure current level of depressive symptoms in community populations (Radloff, 1977). Responses for each item can range from 0 (never or rarely) to 3 (most or all the time). The total score ranges from 0 to 60. Scores ≥ 16 indicate the need for a diagnostic evaluation for major depression. The CES-D has well established concurrent (Meyers & Weissman, 1980) and construct (Lewis, Woods, Hough, & Beasley, 1989) validity. In a study by Lee, Zaffke, McEnany and Hoehler (1993), the CES-D had a high internal consistency (Cronbach's $\alpha > 0.75$) in women who were HIV positive and in midlife women.

In a study by Hann, Winter, & Jacobsen (1999), the CES-D was tested in a cancer patient population compared to a healthy comparison group. The CES-D had a high internal consistency (Cronbach's $\alpha = 0.89$), moderate test-retest reliability coefficients ($0.57, p < 0.001$), and demonstrated construct validity.

Lee Fatigue Scale (LFS). This scale, modified from the original 0 to 100 mm VAS (Lee, Hicks, & Nino-Murcia, 1991), consists of 18 items that evaluate various aspects of fatigue and energy using 0 to 10 numeric rating scales. A fatigue severity score is calculated as the mean of the thirteen items from the fatigue subscale and can range from 0 to 10. The scale has established validity and internal consistency reliability coefficients that range from 0.91 to 0.96 in samples of healthy individuals, in sleep disorder patients, and in women with HIV/AIDS or fibromyalgia (Lee et al., 1991; Lee, Portillo, & Miramontes, 2001; Schaefer, 1995). Content validity was established from descriptions obtained from the literature and from content analysis of interviews with healthy persons as well as sleep clinic inpatients who complained of fatigue. Concurrent/convergent validity of the fatigue subscale was established by correlating scores with the Profile of Mood States and the Stanford Sleepiness Scale ($r = 0.58$ to 0.81).

Self-Care Behavior Checklist for Fatigue. This 29-item questionnaire contained a list of SCBs that individuals could use to manage their fatigue. The initial question on the SCB checklist asked patients to indicate if they felt fatigued in the past week using a yes/no format. This response was used to dichotomize the sample for subsequent analyses.

If the patients responded in the affirmative to being fatigued in the past week,

they indicated which of the SCBs they performed using a yes/no format and rated the effectiveness of the SCB using a 0 (not at all effective) to 10 (completely effective) scale.

Statistical Analysis

Patients were dichotomized into fatigued ($n = 41$) and non-fatigued ($n = 41$) groups based on their responses to the fatigue question on the SCB checklist. If patients indicated the presence of fatigue on the SCB checklist at two or three of the assessment times (i.e., baseline, mid-RT, end of RT), they were categorized into the fatigued group for all subsequent analyses.

Descriptive statistics and frequency distributions were generated for the men's demographic, disease, and treatment characteristics, anxiety and depression scores, as well as the frequency and effectiveness of various SCBs for fatigue. Differences in demographic and disease and treatment characteristics between the fatigued and non-fatigued groups were evaluated using Independent Student *t*-tests and Chi Square analyses. Differences over time in ratings of morning and evening fatigue (using the LFS scores) between the fatigued and non-fatigued groups were evaluated using a two-way, repeated analysis of variance (ANOVA). Subsequent to the analysis of frequency and effectiveness of the individual SCBs, 14 of the 29 SCBs were collapsed into one of five categories of SCBs identified in the NCCN guideline for fatigue (i.e., distraction, activity enhancement, psychostimulant, psychosocial, and sleep therapy). A *p*-value of ≤ 0.05 was considered statistically significant.

Results

Demographic and Disease Characteristics

Differences in demographic and disease and treatment characteristics of patients in the fatigued and non-fatigued groups are listed in Tables 1 and 2, respectively. Patients in the fatigued group reported significantly more years of education ($t = 2.71, p = .008$), had significantly higher baseline CES-D scores ($t = 3.43, p = .001$) and Spielberger Trait and State Anxiety Scores ($t = 3.55, p = .001$ and $t = 2.63, p = .01$, respectively), and were significantly less likely to live alone ($\chi^2 = 5.55; p = .04$).

Differences in Morning and Evening Fatigue

Figure 1 illustrates changes over time in morning (A) and evening (B) LFS scores between the two groups. For morning fatigue, the ANOVA demonstrated a significant main effect of group ($F(1,72) = 18.5, p \leq 0.0001$) and time ($F(2,144) = 3.6, p = 0.03$) indicating that in both groups, morning fatigue scores increased over the course of RT but were always significantly higher in the fatigued group. For evening fatigue, the pattern was similar and the ANOVA demonstrated a significant main effect of group ($F(1,73) = 20.5, p \leq 0.0001$) and time ($F(2,146) = 6.0, p = .003$).

Because the ANOVAs demonstrated significant changes over time, post hoc analyses were done to determine where the significant changes occurred. Bonferroni criterion set significance at 0.0167. The increase in morning fatigue between baseline and end of RT approached significance, but did not meet the criterion ($p = 0.019$). The increase in evening fatigue between baseline and end of RT was

significant ($p = 0.002$) as was the increase between the middle and the end of RT ($p \leq 0.001$).

Individual SCBs and Their Effectiveness

At each time assessment, men were included in the analysis of SCBs if they reported feeling fatigued in the past week on the SCB checklist. At baseline, 34 men of the entire sample of 82 (41.5%) reported using 6.7 SCBs (SD = 4.2; range 1 to 18). At the middle of RT, the number of men increased to 43 (52.4%) and they used an average of 6.3 SCBs (SD = 3.9, range 0 to 16). At the end of RT, 44 men (53.7%) reported using 5.9 SCBs (SD = 3.6; range 1 to 17).

Table 3 lists the SCBs used by at least 40% of the patients and their effectiveness at each assessment time. The most frequently used SCBs across all three assessments were: read a book, newspaper, magazine; watched TV; drank caffeinated liquids; listened to the radio; went for a walk; and took a nap the next day. At baseline and mid-RT, read a book was the most frequently used SCB for fatigue (66% and 58%, respectively). At the end of RT, watched TV was the most frequently used SCB (61%). However, the effectiveness of the various SCBs changed over time.

Categorization of SCBs using NCCN Guideline for Fatigue

The categorization of the various SCBs into NCCN categories is listed in Table 4. Of those men who reported using SCBs, the percentages of patients who used SCBs within a specific NCCN category at the three assessment times are illustrated in Figure 2. SCBs categorized as distraction were used by the largest percentage of patients at all three assessments. The effectiveness of the various

NCCN categories of SCBs for fatigue at each of the three assessment times is illustrated in Figure 3. All of these categories were only moderately effective in managing fatigue.

Discussion

This study is the first to evaluate for changes in fatigue and in the use of SCBs by men with prostate cancer undergoing RT. Whether men were categorized as fatigued or non-fatigued, both groups experienced significant increases in fatigue levels over the duration of RT, with the group who self-identified as fatigued consistently reporting significantly higher fatigue scores.

Men in the fatigued group were more likely to have higher CES-D scores and higher scores on the Spielberger State and Trait Anxiety questionnaires. These findings are consistent with other research that has shown fatigue to be associated with feelings of anxiety and depression (Ahlberg, Ekman, Wallgren, & Gaston-Johansson, 2004; Irvine et al., 1994).

Over time, no significant increase was found in the number of SCBs or in the types used to decrease fatigue. The top six SCBs were consistent over all three assessment times and consistent with other findings. Walking as an individual SCB and the activity enhancement category were found to be the most effective strategies of those most frequently used for fatigue. This finding supports previous research that suggests that exercise is an effective intervention for fatigue (Dimeo, Stieglitz, Novelli-Fischer, Fetscher, & Keul, 1999; Mock et al., 2001; Monga et al., 2003; Turner, Hayes, & Reul-Hirche, 2004). However, the number of patients who used this strategy was relatively small.

Several study limitations are worth noting. We have no information on what prompted men to initiate SCBs for fatigue because this information was not elicited. In addition, no information was obtained on how often or when men performed each of the SCBs (i.e., “dose” of the SCB or concurrent use of SCBs). Likewise, the only information collected was on use of independent SCBs; no information was obtained the use and effectiveness of combined SCBs. These questions should be explored in future research.

This study is a first step in evaluating how men with prostate cancer manage RT-induced fatigue. In order to add to the existing body of knowledge, the next step is to study interventions that have demonstrated positive outcomes, such as walking and exercise, within this group to improve the symptom of fatigue for these individuals.

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Table 1

Differences in Demographic Characteristics at Baseline Between the Fatigued and Non-Fatigued Groups

Demographics Characteristics	Fatigued (n=41) Mean (SD)	Non-Fatigued (n=41) Mean (SD)	Statistic
Age (year)	67.35 (8.37)	66.91 (7.20)	$t = 0.26; p = .80$
Education (years)	16.98 (3.30)	15.12 (2.84)	$t = 2.71; p = .01$
KPS Score	95.75 (5.49)	95.50 (8.15)	$t = 0.16; p = .87$
CESD Score	8.00 (5.79)	3.88 (5.00)	$t = 3.43; p = .001$
Speilberger Trait Anxiety Score	34.23 (7.08)	28.41 (7.76)	$t = 3.55; p = .001$
Speilberger State Anxiety Score	30.04 (7.47)	25.64 (7.60)	$t = 2.63; p = .01$
	%	%	
Lives Alone			
Yes	12.2	34.1	$\chi^2 = 5.55; p = .04$
No	87.8	65.9	
Marital Status			
Partnered	80.5	63.4	$\chi^2 = 2.96; p = .14$
Not Partnered	19.5	36.6	
Ethnicity			
Black/African-American	12.2	24.4	$\chi^2 = 3.14; p = .37$
Caucasian-White	80.5	73.2	
Mixed ethnic background	4.9	2.4	
Other	2.4	0.0	
Work for pay			
Yes	50.0	41.5	$\chi^2 = 0.58; p = .50$
No	50.0	58.5	

Abbreviations: CES-D – Center for Epidemiological Studies – Depression
KPS – Karnofsky Performance Status
RT – Radiation Therapy

Table 2

Differences in Disease and Treatment Characteristics at Baseline Between the Fatigued and Non-Fatigued Groups

Disease and Treatment Characteristics	Fatigued (n=41) Mean (SD)	Non-Fatigued (n=41) Mean (SD)	Statistic
Hemoglobin	14.25 (1.19)	14.57 (1.26)	$t = -1.16; p = .25$
Hematocrit	41.88 (3.51)	42.67 (3.89)	$t = -0.94; p = .35$
	%	%	
Clinical Stage			
T1	51.3	46.3	$\chi^2 = 0.24; p = .89$
T2	41.0	43.9	
T3	7.7	9.8	
Prior Hormonal Therapy			
Yes	61.5	43.9	$\chi^2 = 2.49; p = .13$
No	38.5	56.1	
Prostatectomy Prior to RT			
Yes	12.1	7.3	$\chi^2 = 0.55; p = .71$
No	87.8	92.7	

Table 3

Self Care Behaviors for Fatigue used by at least 40% of the Patients and their Corresponding Effectiveness Scores

Baseline (Number of patients who reported using any SCB = 34):

Behavior	Percentage Reporting Use (<i>n</i>)	Effectiveness (mean +/- SD)
Read a book, newspaper	66% (21)	5.11 (2.42)
Watched TV	63% (20)	4.87 (2.00)
Drank caffeinated liquids	56% (18)	4.86 (2.03)
Listened to the radio	49% (16)	5.69 (2.50)
Went for a walk	49% (16)	6.21 (2.39)
Took a nap the next day	42% (14)	4.56 (1.81)

Mid-RT (Number of patients who reported using any SCB = 43):

Behavior	Percentage Reporting Use (<i>n</i>)	Effectiveness (mean +/- SD)
Read a book, newspaper	58% (25)	4.67 (2.22)
Listened to the radio	56% (24)	5.16 (2.26)
Watched TV	54% (23)	4.43 (2.21)
Took a nap the next day	51% (22)	5.03 (2.27)
Drank caffeinated liquids	47% (20)	3.85 (2.68)

End of RT (Number of patients who reported using any SCB = 46):

Behavior	Percentage Reporting Use (<i>n</i>)	Effectiveness (mean +/- SD)
Watched TV	63% (29)	4.68 (2.34)
Took a nap the next day	59% (27)	5.20 (2.24)
Listened to the radio	57% (26)	5.40 (2.26)
Read a book, newspaper	54% (25)	4.90 (1.92)

Note. Percentages are based on valid percents (i.e., of those individuals who reported feeling fatigued in the past week, what percentage utilized each listed behavior).

Table 4

Categorization of SCBs using NCCN Practice Guidelines in Oncology for Cancer-Related Fatigue

NCCN Category	SCB Checklist Items
Distraction	Read a book, newspaper, magazine Listened to the radio, music Watched TV Spoke to someone on the telephone
Activity Enhancement	Went for a walk Did exercises, jogging, swimming, etc.
Psychostimulant Use	Drank caffeinated liquids Took caffeine pill, herb or other stimulants
Psychosocial Activity	Took a hot bath Had a massage Did hypnosis Did a relaxation exercise, meditated
Sleep therapy	Took a tranquilizer Took a sleeping pill
Other	Took pain medicine Smoked a cigarette Smoked other Had sexual activity Went for acupuncture treatment Drank warm liquids Drank cold liquids Drank beer, wine, or alcohol Had a snack Took a nap the next day Did not nap the next day Wore ear plugs Adjusted temperature of the room Adjusted blankets or clothing Took a vitamin pill or herb

Figure Caption

Figure 1. Changes in morning (i.e., upon awakening) and evening (i.e., prior to bedtime) Lee Fatigue Scale Scores between the fatigued (n = 41) and non-fatigued (n = 41) groups. All values are expressed as means +/- standard deviations.

Figure 2. Percentage of patients who used various self-care behaviors within a specific National Comprehensive Cancer Network category.

Figure 3. Effectiveness of various National Comprehensive Cancer Network categories of self care behaviors. All values are expressed as means +/- standard deviations.

Figure 1

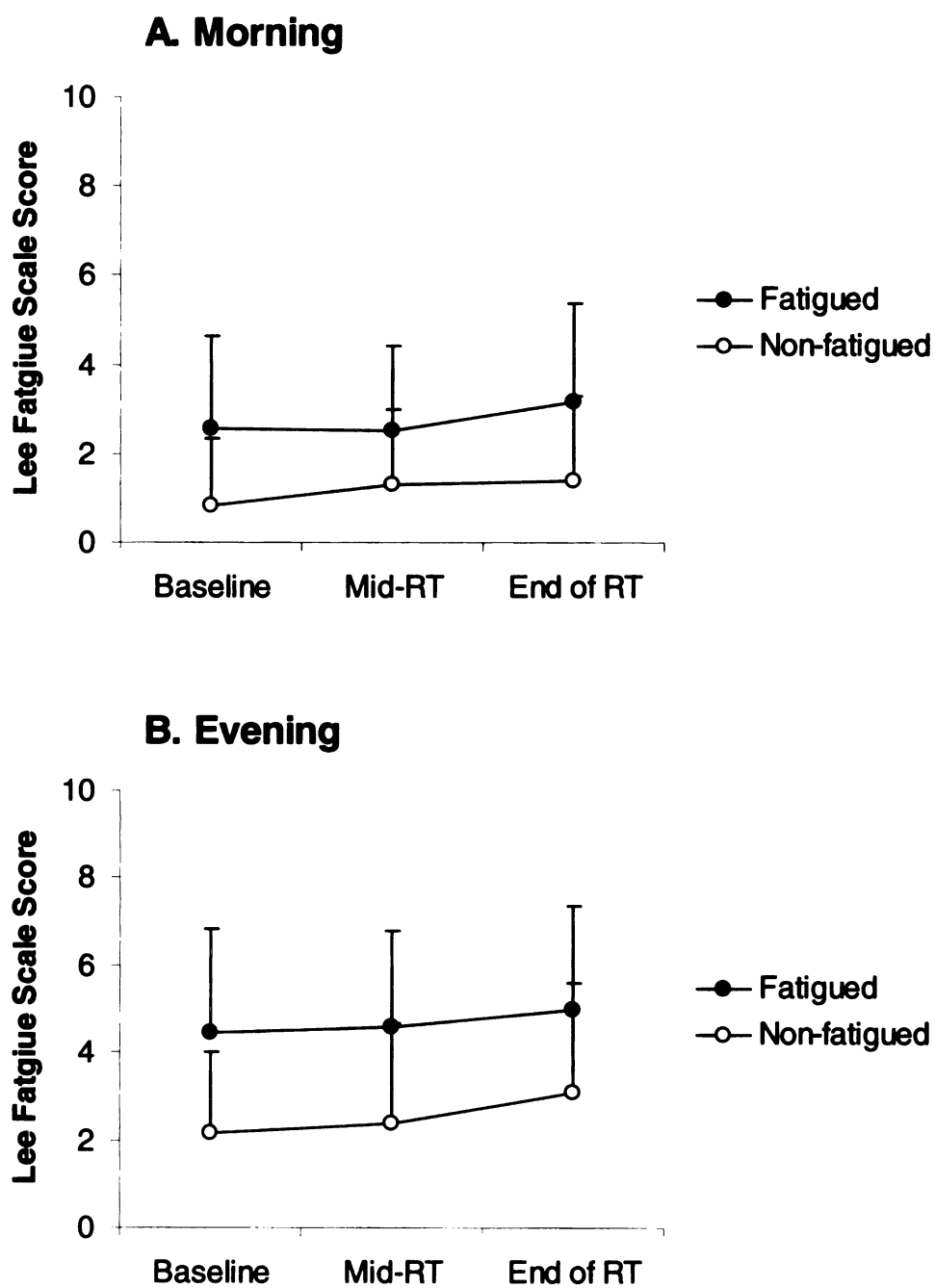


Figure 2

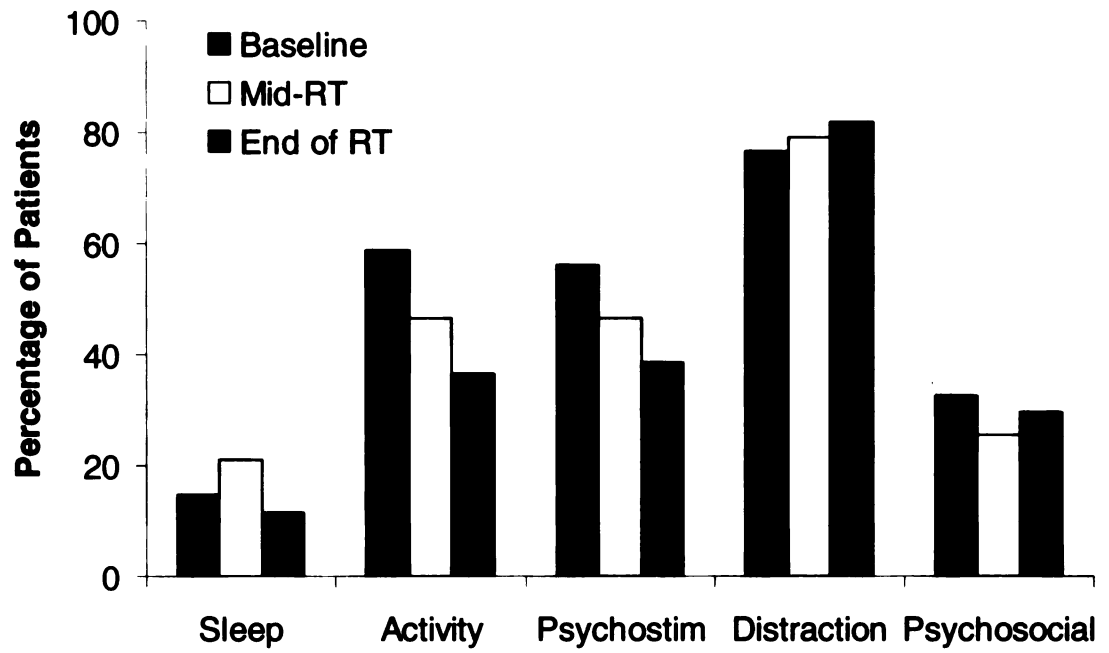
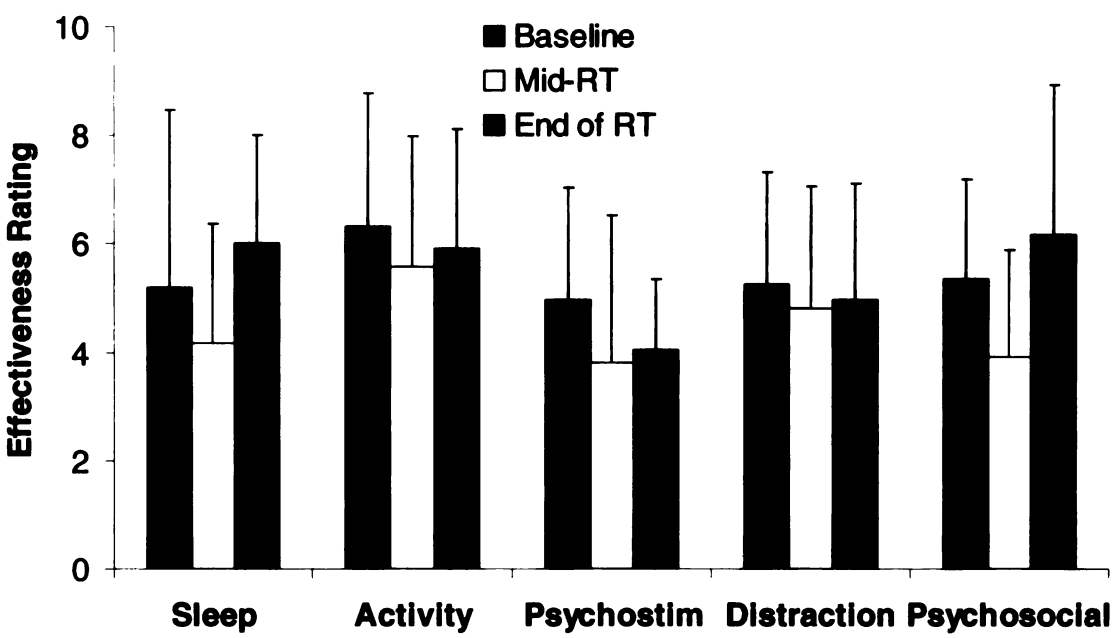
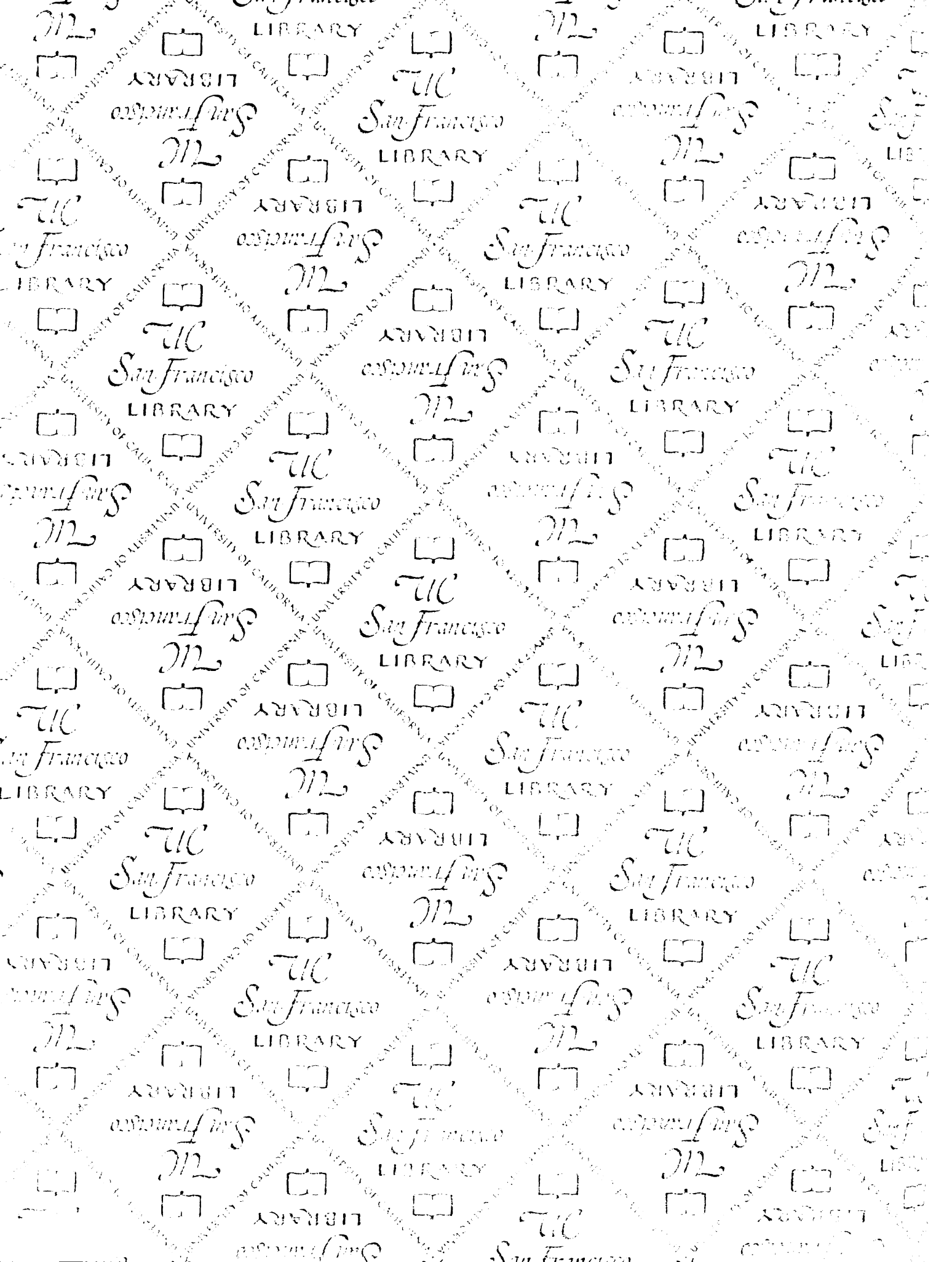


Figure 3





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