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Influence of a Computer Intervention on the Psychological Status of Chronically Ill Rural Women:

Preliminary Results

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Abstract

Background—Adaptation to chronic illness is a lifelong process presenting numerous psychological challenges. It has been shown to be influenced by participating in support groups. Rural women with chronic illness face additional burdens as access to information, healthcare resources, and sources of support are often limited. Developing virtual support groups and testing the effects on psychosocial indicators associated with adaptation to chronic illness may help remove barriers to adaptation.

Objective—To examine the effects of a computer-delivered intervention on measures of psychosocial health in chronically ill rural women including social support, self-esteem, empowerment, self-efficacy, depression, loneliness, and stress.

Methods—An experimental design was used to test a computer-delivered intervention and examine differences in psychosocial health between women who participated in the intervention ($n = 44$) and women in a control group ($n = 56$).

Results—Differences between women who participated in the intervention and controls were found for self-esteem, $F(1,98) = 5.97, p = .016$; social support, $F(1,98) = 4.43, p = .038$; and empowerment, $F(1,98) = 6.06, p = .016$. A comparison of means for depression, loneliness, self-efficacy, and stress suggests that differences for other psychosocial variables are possible.

Discussion—The computer-based intervention tested appears to result in improved self-esteem, social support, and empowerment among rural women with chronic illness. Descriptive but nonsignificant differences were found for other psychosocial variables (depression, loneliness, self-efficacy, and stress); women who participated in the intervention appeared to improve more than women in the control group.

Keywords

chronic illness; computer-based intervention; psychosocial outcomes; rural

Adaptation to chronic disease is a lifelong challenge to persons with long-term health problems. Being diagnosed with a chronic illness, unlike an acute illness, is a profound and life-altering event that can result in alterations in physical functioning, loss of control over life circumstances, and subsequently emotional strain (Emery, 2003). The psychological task imposed on these individuals is that of maintaining an acceptable quality of life while living

with the changes in lifestyle that long-term illness imposes. For chronically ill, middle-aged, rural women who live where there are relatively few healthcare resources and limited access to those that do exist, it is particularly difficult to maintain a semblance of normalcy and balance in their lives. They often must struggle in isolation to meet the psychological challenges of adapting to their chronic illnesses.

Emotional distress often accompanies these challenges, yet not all experience significant emotional problems (Earll, Johnson, & Mitchell, 1993), particularly if they have adequate social support and access to quality health information. Social support has been demonstrated to be a constructive influence on the experience of dealing with illness (Finfgeld-Connett, 2005; Hegyvary, 2004) and positively affects psychosocial adjustment, enhances quality of life, and reduces the incidence of depression. Those with intact psychosocial health can live healthier lives and better manage living with long-term illness (Stuifbergen, Seraphine, & Roberts, 2000). Historically, traditional support groups where participants interact in person are known to influence psychosocial health (Hunter & Hall, 1989; Lin, Simeone, Ensel, & Kuo, 1979; Williams, 1990), although little is known about the effects of virtual support groups.

Background

Social support, based on the work of Weiss (1969), includes the provision of attachment or intimacy, facilitation of social integration, opportunity for nurturant behavior, reassurance of self-worth, and availability of informational and material assistance. Social support can buffer the negative effects of life events on health (Paykel, 1994; Pollachek, 2001; Thomas, 1995) and positively influence psychosocial adjustment and self-management of the chronic illness experience (Gallant, 2003; Symister & Friend, 2003). Inadequate social support can contribute to increased levels of depression and stress (Connell, Davis, Gallant, & Sharpe, 1994; Gray & Cason, 2002). Not all persons with chronic illness suffer from significant emotional problems (Earll et al., 1993), particularly if they have adequate social support and access to quality health information that enable them to live healthy and productive lives while successfully adapting to and managing the many challenges of chronic illness. Social support resources may buffer the consequences of a chronic disease by enhancing recovery, increasing adherence to treatment recommendations, and promoting overall psychological adaptation (Wallston, Alagna, DeVellis, & DeVellis, 1983; Wortman & Conway, 1985). An effective and efficient means of providing support and facilitating the mobilization of support is through self-help groups (Schaefer, 1995). For those who live in geographically isolated areas, distance, travel time, weather, and road conditions often prohibit contact with others like themselves who are attempting to maintain psychosocial health (Sullivan, Weinert, & Cudney, 2003).

Computer-based support systems can be one solution to the problem of isolation. It has been shown that ill individuals using a computer-based health support system had better health outcomes, exerted greater efforts to improve functioning, and demonstrated greater resistance to psychological dysfunction (Gustafson et al., 1999).

The diagnosis of a chronic illness sets in motion a complex process of adaptation that requires balancing the demands of the situation and the individual's ability to respond (Pollock, Christian, & Sands, 1990). Adaptation has been a major theoretical concept guiding nursing practice over the past 20 years as delineated in the Roy Adaptation Model (RAM; Roy & Andrews, 1999). Pollock et al. (Pollock, 1986, 1993; Pollock et al., 1990) used the RAM as the theoretical framework for integrating the major variables of chronicity, stress, hardiness, and adaptive behavior. Their investigation identified and measured selected intervening variables that influenced adaptation. These variables included the ability to tolerate stress, presence of the hardiness characteristic, demographic characteristics, involvement in health promotion activities, and participation in health education programs (which enhance optimal

self-management). The end result or level of adaptation was the individual's functioning as measured in the psychological and physiologic domains (Pollock, 1986). Chen (2005) tested the fit of the RAM as a framework for studying the nutritional health of community-dwelling elders using a conceptual-theoretical-empirical approach for examining factors that influence adaptation level. Stuifbergen et al. (2000) developed a model of health promotion and quality of life (QOL) in chronic disabling conditions that has implications for associating optimal self-management with QOL. The central concept for management of chronic illness throughout the literature has been psychosocial health and represents the key component of interest in this study.

One example of a computer-based intervention designed to support adaptation for chronically ill rural women was the Women to Women Project (WTW; Cudney & Weinert, 2000; Cudney, Winters, Weinert, & Anderson, 2005; Weinert, 2000; Weinert, Cudney, & Winters, 2005). The WTW was an online self-help support group designed to enhance social support and teach women the computer literacy skills necessary to find and evaluate health information available on the World Wide Web (WWW). Indicators of the potential for adaptation used in this project were social support, self-esteem, empowerment, self-efficacy, stress, depression, and loneliness. The purposes of this article are: to (a) examine the relationships among the psychosocial indicators and (b) determine the effect of the intervention on social support, self-esteem, empowerment, self-efficacy, stress, depression, and loneliness.

Method

Design

This research was approved and monitored through the university's institutional review board for protection of human subjects. Women for this study were recruited ($N = 125$) from the Intermountain West using a variety of techniques including mass media, agency and service organization newsletters, and word of mouth (see Figure 1). After eliminating the names of five women who lived in urbanized areas, 120 women were randomized into intervention and control groups (intervention = 61; control = 59). At the completion of the intervention, 17 women from the intervention group dropped out due to declining health, inadequate time for participation, or moving to urban areas. Only two women from the control group dropped from the study due to failing to return the questionnaires. Data analyzed here are based on 43 women that completed the intervention and 57 women in the control group. One woman from the intervention group was dropped due to missing data.

To determine the impact of the intervention on the women's psychological status, measures were administered via a mail questionnaire composed of psychosocial health indicators: social support, self-esteem, empowerment, self-efficacy, stress, depression, and loneliness. Illustrative comments from the women's online conversations were added to illuminate the data related to emotional and informational support. A detailed description of the intervention is provided elsewhere (Weinert et al., 2005); thus, only a limited description of WTW will be repeated here.

The intervention included 22 weeks of participation in an online, asynchronous, peer-led support group and health teaching units. The WebCT (2005) platform was used to deliver the intervention and was available 24 hours a day, 7 days a week, thus allowing women to participate at any convenient time. Women in the intervention group had access to "Koffee Klatch," an asynchronous chat room in which they exchanged feelings, expressed concerns, provided support, and shared life experiences. The e-mail function ("Mailbox") gave the women private access to each other and to the research team. Women also engaged in health teaching unit activities independently, which included accessing health information on the

WWW and participating in expert-facilitated chat room (“Health Roundtable”) discussions related to the health teaching unit activities.

Sample

The sample consisted of 100 chronically ill rural women. Participants were required to be 35–65 years of age and have a chronic illness such as diabetes, rheumatoid condition, heart disease, cancer, or multiple sclerosis. They lived at least 25 miles outside an urbanized area (a city of 12,500 or more) on a ranch, farm, or small town in Montana, Idaho, North Dakota, South Dakota, or Wyoming. On average, women in the sample traveled almost 57 ($SD = 74.2$) miles one-way for routine healthcare. The women were primarily older than 40 years of age (92%), were married or living with someone (80%), and had 13 or more years of education (77%). A majority of the sample were not employed outside of the home (64%) and household income varied from less than \$15,000 (21%) to \$55,000 or greater (16%). The length of chronic illness (time since diagnosis) was 1–51 years with a mean of 13.0 years ($SD = 11.1$). Additional demographic details are presented in Table 1.

Measures

Disease may coexist with health in the same person at any point in the life span; thus, health maintenance is an important part of the quality of life equation for people with chronic illness. Promoting health, even in the presence of chronic illness, includes activities that educate, guide, and motivate the individual to take personal actions which improve the likelihood of sustained good health (Fries, 1997). Factors considered to influence the success of these activities in promoting good health are social support, self-esteem, empowerment, self-efficacy, stress, depression, and loneliness. These factors can be conceptualized as psychosocial health indicators of the individual’s potential to adapt to and manage chronic illness. The instruments used to measure the psychosocial concepts were selected based on the strength of their psychometric properties, prior use in research with chronic illness, conceptual fit, use by the research team, and because there is evidence in earlier work and the literature that they are amenable to change, based on a support and health education intervention. For all instruments used, higher scores indicate higher levels of the measured construct (e.g., higher depression scores indicate more depression symptomatology; higher social support scores indicate a greater degree of social support). See Table 2 for published information on reliability and validity for each instrument along with the alphas obtained in the current study.

Social Support—Social support can be conceptualized as the provision of intimacy, facilitation of social integration, opportunity for nurturant behavior, reassurance of self-worth, and the availability of assistance (Weiss, 1969), and it can buffer the negative effects of life events on health (Pollachek, 2001). Social support can positively influence psychosocial adjustment and management of the chronic illness (Symister & Friend, 2003) and inadequate support can increase depression and stress (Gray & Cason, 2002). Interventions designed to enhance social support can facilitate coping and problem solving (Spiegel, 1993) and encourage the reciprocal aspects of providing comfort and support to others, which is critical to many women’s sense of worth and well-being. The Personal Resource Questionnaire (PRQ) was developed to measure situational support and perceived support (Brandt & Weinert, 1981) and has systematically and consistently undergone psychometric evaluation over the past 20 years resulting in the current 15-item version, the PRQ2000 (Weinert, 2003).

Self-Esteem—Self-esteem is the extent to which people value, approve, or like themselves (Baumeister, Campbell, Krueger, & Vohs, 2003). Self-esteem is considered an indicator, among others, of psychological well-being and can be thought of as one dimension of the potential to manage chronic illness. People who have a positive sense of self-worth, believe in their own control, and are optimistic about the future may be more likely to exhibit better health

behaviors (Taylor, Kemeny, Reed, Bower, & Gruenewald, 2000). The Rosenberg Self-Esteem Scale (SES) was designed originally to measure global feelings of self-worth or self-acceptance for ease of administration, economy of time, and unidimensionality. The 10 items are a self-report of feelings about the self (Robinson, Shaver, & Wrightsman, 1991).

Empowerment—In its most general sense, empowerment refers to the ability of people to gain understanding and control over personal, social, economic, and political forces to take action to improve their life situations. Control over destiny emerges as a disease risk factor and a strategy for health promotion (Wallerstein, 2002); lack of control of destiny enhances susceptibility to illness. These deficits can be overcome through the use of computer-based support systems that have been shown to be extremely valuable in helping participants understand their illness and as a result became a source of empowerment (Gustafson et al., 1993). For this study, the Diabetes Empowerment Scale (Anderson, Funnell, Fitzgerald, & Marrero, 2000) was modified with the permission of the author of the tool. The 10-item Setting and Achieving Goals subscale was used after changing the word “diabetes” in the stem to “chronic illness.”

Self-Efficacy—Self-efficacy is the belief that by personal behavior one may be able to affect health or other futures and is an essential key to subsequent changes in health risk behavior (Fries, Koop, Sokolov, Beadle, & Wright, 1998). One hallmark of a successful information and support program is its power to develop individuals’ skills and confidence in their ability to take responsibility for managing their healthcare and provide access to social support to foster self-efficacy (Gustafson et al., 1999). The Self-Efficacy Scale (Sherer et al., 1982) was designed to measure generalized self-efficacy expectations dependent on past experiences and on tendencies to attribute success to skill as opposed to chance. The items were written to measure general self-efficacy expectancies in areas such as social skills or vocational competence (17 items) and social self-efficacy (6 items).

Stress—Chronic illness and stress are closely aligned. The diagnosis and treatment of a chronic illness affects an individual’s physical, psychological, and social self, and it affects sense of stress and well-being (Pollachek, 2001). Developing the capacity to manage stress is often helpful in managing the additional problems of a chronic illness (Cagle, 2004). The Perceived Stress Scale (PSS; Cohen, Kamarck, & Mermelstein, 1983) measures the degree to which situations in one’s life are perceived as stressful. The PSS is based on the argument that the causal event is the cognitively mediated response to the objective event, not the objective event itself.

Depression—Depression is very common among people who have chronic illness and can impair their ability to cope with their diseases and detract from their quality of life (Davis & Gershtein, 2003). Chronic physical conditions affect depression directly and indirectly by affecting domestic relationships, reducing occupational performance, imposing economic strains, and undermining personal resources (e.g., self-esteem and empowerment; Vilhjalmsson, 1998). The Center for Epidemiological Studies Depression Scale (CES-D) is a 20-item self-report measure of depressive symptomatology that was initially developed for use in epidemiologic surveys of depression within the general population (Devine & Orme, 1985). The CES-D assesses the frequency and duration of cognitive, affective, behavioral, and somatic symptoms associated with depression in the preceding week. Positive affect is also assessed by the instrument.

Loneliness—Loneliness can be defined as a deficit in human intimacy and negative feelings about being alone (Hall & Havens, 1999). The significance of loneliness is that it often results in human suffering, whereas freedom from loneliness contributes to a feeling of well-being

and a positive mental health outlook (Perlman, Gerson, & Spinner, 1977). For chronically ill rural women, the risk for loneliness is compounded by their geographic isolation. The UCLA Loneliness Scale (Version 3), a widely used measure of loneliness, was used in this study (Robinson et al., 1991). It is a Likert-type measure focusing on the quality of a respondent's relationships with others. Advantages of the scale are that the word "loneliness" does not appear in any of the items, which helps reduce response bias, and loneliness is conceptualized as a unidimensional affective state.

Results

For the first aim, bivariate correlations were produced to examine the relationships among the psychosocial variables of interest from data collected at baseline. On Table 3, the correlations among self-efficacy, self-esteem, empowerment, social support, stress, depression, and loneliness are shown. All correlations were statistically significant ($p = .01$, two-tailed) and in the anticipated direction. For example, self-esteem is positively associated with social support ($r = .414$), empowerment ($r = .354$), and self-efficacy ($r = .566$). Alternatively, psychosocial outcomes such as stress, loneliness, and depression were negatively associated with positive outcomes such as self-esteem, social support, empowerment, and self-efficacy. The highest absolute correlations are found between loneliness and stress ($r = .716$), depression and stress ($r = .708$), depression and loneliness ($r = .701$), and social support and loneliness ($r = -.646$).

For the second aim, repeated-measures analysis of variance was conducted to evaluate the effects of the computerized intervention on changes in the seven psychosocial outcomes of interest. The models tested included the dependent variable of scale scores for the SES (self-esteem), the PRQ (social support), Chronic Illness Empowerment Scale (CIES; empowerment), Self-Efficacy Scale (Sherer et al., 1982), CES-D (depression), University of California, Los Angeles (UCLA) Loneliness Scale (version 3), and PSS (stress) (Cohen et al.) scales, one within-subjects factor of time (i.e., baseline measurement to the 3-month measurement, at the conclusion of the computer intervention) and one between-subjects factor of membership in the intervention or control groups. The means and standard deviations for all scale scores found for both time periods are presented in Table 4.

After assurance that ANOVA assumptions were met (e.g., normality, homogeneity of variance), the results for the ANOVAs indicate that significant Time $\times$ Treatment interactions exist for self-esteem, $F(1,98) = 5.97$, $p = .016$, social support, $F(1,98) = 4.43$, $p = .038$, and empowerment, $F(1,98) = 6.06$, $p = .016$, thereby suggesting that the group's scores changed differently across time. An examination of the means and standard deviations in Table 4 shows that for all three psychosocial outcomes the intervention group improved across time; for example, social support increased from 79.05 at baseline to 83.46 at 3 months, whereas the control groups either improved very little or decreased. These results suggest that the intervention had an appreciable effect on self-esteem, social support, and empowerment within the sample.

The results for the other psychosocial outcomes of interest are less clear (see Table 5). ANOVA results for depression, loneliness, and stress show that significant main effects for time only are evident, suggesting that the groups together changed significantly across time, but did not differ statistically. For depression, $F(1,98) = 5.00$, $p = .028$, results of the ANOVA and descriptive statistics indicate that both groups became less depressed over time, although subjects in the treatment group showed a much greater change (i.e., treatment group declined by 3.02; control declined by 1.22). Likewise, both loneliness, $F(1,98) = 6.51$, $p = .012$, and stress, $F(1,98) = 8.44$, $p = .005$, yield main effects for time, but do not indicate statistical differences between groups despite greater improvements made among the participants of the intervention when examining descriptive statistics. These findings suggest that cautious

optimism is warranted in conclusions that the computer intervention had effects on depression, loneliness, and stress.

Discussion

The purpose of this study was to examine the impact of a computer-delivered intervention on measures of psychosocial health (social support, self-esteem, empowerment, self-efficacy, depression, loneliness, and stress) in chronically ill rural women. Although statistically significant differences between intervention and control groups were found only for social support, self-esteem, and empowerment, all psychosocial indicators improved in the intervention group and declined or remained stable among controls.

Social Support

Although the nature and function of social support on various states of health is debated, agreement exists that social support and social networks have important causal influences on health (Finfgeld-Connett, 2005). As expected, the intervention had appreciable effects on social support because women in the intervention group were provided access to others with similar conditions and the means, via computers, to access an asynchronous support environment. Essentially, women created new social networks and provided and received support at will, without regard to time of day or distance between participants.

Self-esteem is thought to mediate the relationships between social support and variables such as depression that have been used to define psychological adjustment to chronic illness (Druley & Townsend, 1998). Although it is unknown whether manipulating self-esteem regulates the relationship between social support and psychological adjustment, or alternatively if persons with high or low self-esteem receive differential support or perceive support differently, recent research supports the idea that social support operates through self-esteem and can influence both optimism and depression (Symister & Friend, 2003). Bivariate relationships from previous studies compare favorably with the findings here, providing further evidence about the connectedness of self-esteem, social support, and depression. Symister and Friend (2003) used a sample of 86 people with end-stage renal disease to study psychosocial response to chronic illness and found correlations of .47 ($p < .001$) between social support and self-esteem, $-.51$ ($p < .001$) between social support and depression, and $-.62$ ($p < .001$) between self-esteem and depression. Our findings for the relationships between social support and self-esteem, social support and depression, and self-esteem and depression were .41 ($p < .01$), $-.45$ ($p < .01$), and $-.60$ ($p < .01$), respectively. Our ability to demonstrate positive effects on self-esteem and social support suggests that Web-based interventions may be an effective tool to assist persons with adjusting to chronic illness.

Paterson (2001) noted that discussions about patient participation in healthcare decisions and self-care are based on a model of empowerment. Findings from the current study suggest that women participating in the intervention improved in their ratings of empowerment more significantly than women in the control group. Professional dominance may delegitimize knowledge and experience of people with chronic illness (Paterson, 2001) and understanding where power resides becomes central to the idea of empowerment (Wallerstein, 2002). In this study, we suggest that the mechanism for empowering women who participated in the intervention includes learning and practicing with a new set of skills that guide them in the use of the WWW to find information and subsequently evaluate that information for credibility and usefulness. As rural residents, many of these women relied solely on healthcare providers and informal networks for health information. By having access to the WWW and the experience provided through participation in the intervention (Hill & Weinert, 2004), the women had a new and valuable source of information with which to make self-care decisions or lessen the maldistribution of power between themselves and their healthcare providers.

Limitations

Despite favorable initial findings from this ongoing study, several limitations are important to note. First, the total anticipated sample was not available for analysis and this decreased our statistical power and may have led to nonsignificant findings for changes in self-efficacy, depression, loneliness, and stress. Further analysis of these data will be necessary in the future as sample size increases and the program continues to evolve. Second, it is unknown whether effects resulting from the intervention will be sustained over time. The posttest measurements on which the analysis was based were performed immediately after participants concluded the intervention when anticipated effects were thought to be greatest. Because psychosocial adjustment to chronic illness is thought to be a dynamic process where individuals must respond to daily challenges, it will be important to examine effects over time to determine whether this intervention provides lasting benefits. Third, because this intervention was tested with rural chronically ill women who were predominantly white, generalization to urban dwellers, men, and communities of color are not possible. Fourth, statistically significant results presented here indicate apparently small differences between the groups on self-esteem and empowerment and moderate differences in social support. For individual psychosocial factors, caution is warranted in interpreting these findings as clinically significant. However, taken together, small changes in many of the psychosocial factors representing adaptation may have a compounding effect on the ability of women to adapt to their chronic illnesses. Future research should examine the effects of similar interventions among more heterogeneous populations.

Strengths

Despite these limitations, this study has a number of strengths. Much of the previous research on adaptation to chronic illness generally uses homogenous samples where single illnesses are selected (Stuifbergen, Seraphine, Harrison, & Adachi, 2005; Symister & Friend, 2003). A particular strength of this study is that psychosocial benefits of participation in a Web-based intervention were tested among women with a variety of chronic illnesses. Thus, external validity is somewhat improved. Second, rural populations that have limited access to health information and resources were targeted. An efficient way to meet the needs of geographically isolated populations was demonstrated through the efficacy of this intervention.

As technology becomes increasingly available among rural populations, strategies for using computers and the WWW to improve health need to be developed and tested. The success of the WTW project in making a difference in women's psychosocial outcomes provides impetus to researchers and clinicians interested in harnessing technology to assist people in adapting to chronic illness.

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FIGURE 1.
Participant progression.

TABLE 1
Sample Characteristics

	Participants (N= 100)	Sample (%)
Age		
30–39	8	8
40–49	27	27
50–59	50	50
60–69	15	15
Ethnicity		
White	93	93
Hispanic or Latina	1	1
American Indian or Alaskan	3	3
Native		
Other	3	3
Marital status		
Married	79	79
Divorced	13	13
Separated	1	1
Widowed/Never married	15	15
Living together	1	1
Education (years of school completed)		
12 or less	23	23
13–15	47	47
16–18	29	29
19 or greater	1	1
Income		
Less than \$15,000	21	21
\$15,000–24,999	14	14
\$25,000–34,999	16	16
\$35,000–44,999	16	16
\$45,000–54,999	17	17
\$55,000–64,999	8	8
\$65,000–74,999	4	4
\$75,000–84,999	4	4
Employment (outside home)		
Yes	36	36
No	64	64

TABLE 2
Psychological Concepts, Indicators, Items, Reliability, Validity

Concepts	Indicators	No. of Items	Reported α	Study α	Validity
Self-efficacy	Self-Efficacy Scale (Sherer et al., 1982)	23	.71–.86	.88	Construct criterion
Self-esteem	Self-Esteem Scale (Rosenberg, 1965)	10	.77–.88	.87	Convergent discriminant
Empowerment	Diabetes Empowerment Scale (Anderson et al., 2000)	10	.91	.96	Concurrent
Social support	PRQ2000 (Weinert, 2003)	15	.87–.92	.90	Construct divergent
Stress	Perceived Stress Scale (Cohen et al., 1983)	14	.84–.86	.90	Convergent discriminant
Depression	CES-D (Devine & Orme, 1985)	20	.84–.90	.90	Convergent discriminant
Loneliness	UCLA Loneliness Scale (Rosenberg, 1965)	20	.94	.94	Convergent discriminant

TABLE 3

Correlations Among Psychosocial Measures

	Self-esteem	Social Support	Empowerment	Self-efficacy	Depression	Loneliness
Social support	.414					
Empowerment	.354	.488				
Self-efficacy	.566	.546	.564			
Depression	-.599	-.447	-.487	-.586		
Loneliness	-.686	-.646	-.390	-.549	.701	
Stress	-.600	-.413	-.380	-.454	.708	.716

Note. Correlation is significant at the .01 level (two-tailed).

TABLE 4
Baseline and 3-month Means for Psychosocial Measures ($N = 100$)

	Baseline Mean (<i>SD</i>)	3-Month Mean (<i>SD</i>)
Self-esteem		
Intervention	29.57 (5.83)	30.83 (5.17)
Control	31.82 (4.82)	31.21 (5.32)
Social support		
Intervention	79.05 (13.40)	83.46 (12.42)
Control	79.91 (14.86)	78.96 (17.15)
Empowerment		
Intervention	36.79 (7.15)	40.30 (4.83)
Control	35.73 (7.24)	36.14 (6.48)
Self-efficacy		
Intervention	110.33 (21.08)	111.26 (18.86)
Control	109.61 (17.32)	106.09 (19.82)
Depression		
Intervention	18.52 (11.64)	15.50 (11.90)
Control	18.13 (10.34)	16.91 (11.82)
Loneliness		
Intervention	45.73 (9.99)	43.15 (8.69)
Control	43.97 (10.53)	43.11 (10.94)
Stress		
Intervention	28.49 (7.51)	26.15 (7.83)
Control	28.46 (7.32)	27.28 (8.80)

TABLE 5
ANOVA Results for Effect of Intervention on Psychosocial Measures

	Sum of Squares	<i>df</i>	Mean Square	<i>F</i>	<i>p</i>
Self-esteem					
Time	5.15	1	5.15	0.733	.394
Time × Treatment	41.92	1	41.92	5.973	.016
Social support					
Time	142.38	1	142.38	1.855	.176
Time × Treatment	340.15	1	340.15	4.432	.038
Empowerment					
Time	187.10	1	187.10	9.699	.002
Time × Treatment	116.94	1	116.94	6.062	.016
Self-efficacy					
Time	81.43	1	81.43	0.90	.346
Time × Treatment	240.62	1	240.62	2.65	.107
Depression					
Time	215.54	1	215.54	5.00	.028
Time × Treatment	39.29	1	39.29	0.91	.342
Loneliness					
Time	141.94	1	141.94	6.51	.012
Time × Treatment	35.29	1	35.29	1.62	.206
Stress					
Time	144.931	1	144.93	8.44	.005
Time × Treatment	15.58	1	15.58	0.91	.343