INT'L. J. SELF HELP & SELF CARE, Vol. 2(2) 155-168, 2003-2004

THE IMPACT OF A BRIEF MINDFULNESS-BASED STRESS REDUCTION PROGRAM ON PERCEIVED QUALITY OF LIFE

BRUCE JACOBS
New Mexico State University, Las Cruces

LIZA NAGEL
University of New Mexico, Albuquerque

ABSTRACT

The purpose of this study was to determine if a five-week Mindfulness-Based Stress Reduction (MBSR) program, that incorporated mindfulness meditation and yoga, positively influenced perceived quality of life as defined and described by the World Health Organization (WHO). A quasi-experimental, nonequivalent control group, 2 × 2 repeated measures (pre/post) factorial design was used to examine an employee wellness program at a southwestern university. A total of 51 university employees participated in the study: 21 employees who were enrolled in the MBSR program (intervention group) and 30 randomly selected employees (comparison group). Fifty-two questions from the World Health Organization's Quality of Life (QOL) questionnaire—the WHOQOL-100—tested the research hypotheses. The findings of this study indicate that the MBSR program has a positive influence on perceived quality of life specific to four domains measured in this study, i.e., physical, psychological, social, and spiritual.

The biomedical model definition of health is currently the most widely used in medical research and simply conceptualizes health as the absence of disease or infirmity. However, the World Health Organization's (World Health Organization, 2001a) most recent definition of health is based on a biopsychosocial model of medicine that considers the absence of disease or infirmity as well as a person's physical, mental, and social well-being. The WHO's model has gained increased popularity over the past 20 years (Larson, 1999). As a component of this

© 2003, Baywood Publishing Co., Inc.

definition, WHO considers it critical to assess health in terms of changes in the incidence and prevalence of disease as well as the improvement of the quality of life (World Health Organization, 2001b). Furthermore, they defined *quality of life* as, ". . . an individual's perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards, and concerns" (World Health Organization, 2001b, p. 1) and described it as, "a broad ranging concept affected in a complex way by the person's physical health, psychological state, personal beliefs, social relationships and their relationship to salient features of their environment" (World Health Organization, 2001b, p. 1).

A program that positively influences health would necessarily include components that would optimally address perceived quality of life as related to some of these domains. One such health promotion program, the Mindfulness-Based Stress Reduction (MBSR) program (Kabat-Zinn, 1990), uniquely integrates the practice of mindfulness meditation and hatha yoga. The MBSR program has shown promising results affecting improvement on health-related conditions such as chronic pain (Kabat-Zinn, 1982, 1984; Kabat-Zinn, Lipworth, & Burney, 1985), anxiety and panic (Kabat-Zinn, 1982, 1984; Kabat-Zinn, Lipworth, & Burney, 1985), psoriasis (Salmon, Santorelli, & Kabat-Zinn, 1998), fibromyalgia (Kaplan, Goldenberg, & Galvin-Nadeau, 1993), mood disorders (Teasdale, Segal, & Williams, 1995), stress and psychological distress (Williams, Kolar, Reger, & Pearson, 2001), quality of life (Reibel, Greeson, Brainard, & Rosenzweig, 2001), and increased physiological levels of melatonin among women (Massion, Teas, Hebert, Wertheimer, & Kabat-Zinn, 1995).

The aforementioned MBSR studies were based on 6- to 10-week programs; only one assessed quality of life. Reibel et al. (2001) collected pre and post measures for 121 MBSR study participants from a patient population on health related quality of life and physical and psychological symptomatology. They used the Short Form Health Survey (SF-36) for their quality of life measures and reported significant improvement across all subscales, including physical, social, emotional, psychological, and general health measures. However, a One Group Pretest-Posttest design was used that rarely permits any reasonable causal inference compared to a Pretest-Posttest Comparative Group design (Cook & Campbell, 1979).

The purpose of the study described in this article was to investigate the MBSR program within two specific variations from previous MBSR studies: 1) to evaluate a *5-week* MBSR program which is of shorter duration compared to previous MBSR program studies; and 2) to assess the impact of an MBSR program on perceived quality of life as measured by the WHOQOL, while incorporating a comparison group in the study design. If a five-week program is as effective as a 6- to 10-week program, the shorter program would be more efficient and most likely more convenient for certain populations. The WHOQOL adds a spiritual domain, which is not found in the SF-36, a domain frequently considered part and parcel to quality of life (Haas, 1999; Raphael, Brown, Renwick, & Rootman,

1997). The addition of a comparison group in an MBSR quality of life study adds rigor to design, consequently enhancing decisiveness regarding causal inferences.

Five hypotheses were tested in this study: there would be a statistically significant difference on the X_a domain gain scores between groups (whereas X_a represents $X_{1\text{-}5}$ and X_1 = physical, X_2 = psychological, X_3 = social, X_4 = spiritual, X_5 = general health; constituting hypotheses 1-5, respectively).

METHOD

A quasi-experimental, nonequivalent control group, 2 × 2 repeated measures (pre/post) factorial design was used to test the five hypotheses. The study questionnaire was administered two times—$Time_1$: pre-intervention period; and $Time_2$: immediate post-intervention period. There were two independent variables in the study in regard to the research design: a) treatment with two levels—the MBSR program and the comparison group; and b) time—pre-intervention and post-intervention. The dependent variables were domain gain scores (post-intervention minus pre-intervention) related to Quality of Life.

This study sampled employees at a southwestern university. The university had a final total of 47 MBSR program registrants. The first 50 persons who responded to register for the university's MBSR program were scheduled for a pre-program interview to determine program participation eligibility. The interviewing consisted of participation screening, i.e., medical clearance from their physician for program, psychological screening aimed at excluding those with current suicidal ideation or intent as well as current substance abuse, and an assessment of low motivation.

The intervention group consisted of 21 volunteers from the MBSR registrants who: 1) elected to participate in the research study; 2) completed the MBSR program; and 3) completed pre- and post-intervention questionnaires. The comparison group consisted of 30 volunteers solicited from randomly selected university employees.

Study participants completed 52 questions from the World Health Organization's Quality of Life questionnaire—the WHOQOL-100 (U.S. Version)—that constitute an overall quality of life and general health domain and four other domains (physical, psychological, social, and spiritual). The WHOQOL-100's Environmental and Independence domains were not incorporated into the study. Although other well-validated quality of life instruments are in use (Ware, Snow, Kosinski, & Gandek, 1992; Gerin, Dazord, Boissel, & Chifflet, 1992), the WHOQOL-100 questionnaire was selected to assess perceived quality of life because it embraces the biopsychosocial model of health while incorporating a spiritual domain. Therefore, it includes questions that uniquely address *all* five QOL domains directly related to the five hypotheses of this study, i.e., perceived quality of life as related to the following domains: 1) physical (energy and fatigue; pain and discomfort; sleep and rest); 2) psychological (bodily image

and appearance; negative feelings; positive feelings; self-esteem; thinking, learning, memory, and concentration); 3) social relations (personal relationships; social support; sexual activity); 4) spirituality/religion/personal beliefs; and 5) overall quality of life and general health (heretofore called the "general health" domain). The WHOQOL-100, U.S. version, has been shown to display good construct validity (convergent and discriminant) and test-retest reliability (Bonomi & Patrick, 1997).

Upon approval of the university's Institutional Review Board, all research study participants signed an informed consent form for participation in the study. A monetary incentive was provided to increase response rate: a raffle drawing from the names of all study participants who completed both pre- and post-test questionnaires was held after data collection for the entire study had been completed; the first 10 names drawn received $50.00 each.

Two weeks before the start of the program, a mailing went out to the 47 MBSR program registrants and to 50 randomly selected employees whose names were obtained from the university employee directory. The mailing packet included a cover letter which invited participation in the research study, stated the purpose of the study, and mentioned that there would be a raffle for study participants worth $50.00 for the first 10 names drawn. It also included a study participation consent form and a 52-question subset of the WHOQOL-100 questionnaire to complete if they chose to participate in the research study; information about completing and returning the questionnaire; and an enclosed stamped, addressed envelope to return the questionnaire. Due to an insufficient number of responses for study participation from the randomly selected UNM employees (for the comparison group), a second mailing went out approximately three weeks after the first mailing to a second cohort of randomly selected employees to establish a comparison group.

A post-intervention mailing occurred: 1) the last day of the MBSR program to the intervention group and to the first cohort of randomly selected university employees who were comparison group participants; and 2) approximately three weeks after the last day of the MBSR program to the second cohort of randomly selected university employees who were comparison group participants. The duration between pre-intervention mailing and post-intervention mailing was the same for all study participants, i.e., approximately seven weeks. For the post-intervention mailing, the questionnaire also included an additional question containing four sub-questions for the intervention group to assess their level of participation in the MBSR program.

For the treatment group, the MBSR program was facilitated by the university's wellness program clinical staff that had previously undergone formal MBSR training. The MBSR program consisted of four, three-hour weekly sessions held over four consecutive weeks (one per week) and a one-day retreat held on the Saturday of the fifth week of the program. Therefore, the MBSR program was completed within five weeks. Sessions consisted of instruction and concepts of

activities and a combination of mindfulness practice during sitting meditation, walking, breathing, body scanning awareness, yoga postures, and eating (see Figure 1). MBSR program participants were also asked to independently practice daily throughout the week: a) approximately one hour of the various program activities in different combinations; and b) mindfulness on a chosen daily 5-15 minute activity, e.g., shaving, showering, dressing, eating, cooking. At-home practice tapes were also given to participants to enhance their mindfulness practice. There was no intervention with the comparison group.

Analyses

SPSS (PC version) was used for descriptive data of the sample and to compute: 1) gain scores (post-domain scores minus pre-domain scores); 2) internal consistency reliability tests; 3) normality of distribution and homogeneity of variance tests; and 4) parametric and nonparametric tests (as applicable to data profiles) for analyses of group differences, i.e., *t*-tests and a Mann-Whitney test. A Bonferroni adjustment was used to adjust for experiment-wise error. Therefore, an alpha level of .01 (.05 divided by five for the five analyses performed) was used to test statistical significance. Cohen's *d* and r^2 were used to calculate effect size. Power was calculated for statistically non-significant results.

The WHO's U.S. Version WHOQOL-100 Instrument includes an SPSS syntax to process the inputted data from the questionnaire. Since this study only uses four of the original six domains (plus "general health" score), and uses both pre- and post-intervention scores, it was necessary to modify the syntax to adapt it to

Week 2, Session 2

1) Review homework, body scan, meditation, mindfulness (30 minutes)
2) Sitting meditation (30 minutes)
3) Connectedness & Health lecture (15 minutes)
4) Walking meditation (20 minutes)
5) Break
6) Yoga (35 minutes)
7) Introduction to Stress Reactivity (30 minutes)

Homework: Alternate days for yoga and body scan; sitting meditation—increase to 20 minutes, practice mindfulness daily; note stress reactions over next week.

Figure 1. Sample MBSR lesson plan.

the present study. Also, although the WHO's syntax does not transform scores for the "general health" domain, the syntax was modified to do so in order to maintain consistency of data transformation for this study.

RESULTS

A total of 51 pre/post sets of questionnaires (35%) were returned with 45% (n = 21) and 30% (n = 30) response rates from the MBSR registrants and the randomly selected university employees, respectively. For the inferential statistical analyses, if a response was missing for a question, that question's associated domain score was not calculated for that respondent. Therefore, sample size varied for each domain score analysis.

There were 21 individuals in the MBSR group, consisting primarily of females (76%) (Table 1). Ages ranged from 31 to 59 years with the majority of participants (48%) falling in the 41-50 year age bracket. Seventy-one percent of participants self-identified (within the given "ethnicity" categories) as White (non-Hispanic); 19% as Hispanic/Latino; 5% (n = 1) as Asian Pacific Islander; and 5% (n = 1) as "mixed American Indian and White." "Married or Living as Married" had the highest reported frequency at 67%. Eighty-six percent had "university or non-university higher education" of which 56% reported a "post-graduate degree." Annual income fell within all categorized ranges, i.e., from $15,000 to $75,000 and over with the highest frequency percentage reported within the $75,000 and over range (48%).

Of the 30 individuals participating in the comparison group, most were female (83%) and primarily between the ages of 41-50 years (47 %) (Table 1). Sixty-seven percent of participants self-identified as White (non-Hispanic); 30% as Hispanic/Latino; and 3% (n = 1) as American Indian/Alaskan Native. "Married or Living as Married" had the highest frequency at 67%. Eighty-three percent had "university or non-university higher education" of which 24% reported a "post-graduate degree." Annual income fell within all categorized ranges, i.e., from $15,000 to $75,000 and over with the highest frequency reported within the $35,000-$49,999 range (30%).

Fidelity of exposure was measured in terms of the assigned readings (33.3% completed more than 75% of the readings), class participation (90.5% completed the four classes), 71 % reported completing the one-day retreat, and 61.9% reported completed four to seven days per week of homework.

Internal consistency reliability on study participant responses was tested using Cronbach's alpha for all five domains for both the pre- and post-intervention scores (General Health, .91 and .92; Physical Health, .83 and .89; Psychological Health, .95 and .96; Social Health, .90 and .81; Spiritual Health, .94 and .95). Overall, the alpha coefficient exceeded .80 for all domains across pre- and post-intervention scores, meeting commonly accepted minimal standards (.70) for reliability coefficients (Bonomi & Patrick, 1997).

Table 1. Descriptive Data of the Sample

Variable	MBSR group *f*	MBSR group %	Comparison group *f*	Comparison group %
Gender				
Female	16	76.2	25	83.3
Male	5	23.8	5	16.7
Age				
21-30	0	0	3	10.0
31-40	5	23.8	5	16.7
41-50	10	47.6	14	46.7
51-60	6	28.6	8	26.7
Ethnicity				
White (non-Hispanic)	15	71.4	20	66.7
Black/African American	0	0	0	0
American Indian/Alaskan Native	0	0	1	3.3
Asian Pacific Islander	1	4.8	0	0
Hispanic/Latino	4	19.0	9	30.0
Other (mixed American Indian & White)	1	4.8	0	0
Marital status				
Married or living as married	14	66.7	20	66.7
Widowed	0	0	0	0
Separated	1	4.8	0	0
Divorced	4	19.0	4	13.3
Never married	2	9.5	6	20.0
Level of education				
Secondary or high school	2	9.5	4	13.3
Apprenticeship	1	4.8	1	3.3
University or non-university	8	38.1	19	63.3
Higher education				
Postgraduate degree	10	47.6	6	20.0
Income				
$15,000-$24,999	1	4.8	2	6.7
$25,000-$34,999	1	4.8	4	13.3
$35,000-$49,999	5	23.8	9	30.0
$50,000-$74,999	4	19	7	23.3
$75,000 and over	10	47.6	8	26.7

The Shapiro-Wilk test was used to test for normality of distribution for domain gain scores. For the comparison group, two of the gain scores, i.e., spiritual and general health, tested significant for non-normality ($p \leq .05$). Levene's Test for Equality of Variances was used to test for Homogeneity of Variance. The null hypothesis for homogeneity of variance was rejected for three of the domain gain scores, i.e., physical, psychological, and general health ($p \leq .05$).

The *t*-test and Mann-Whitney test were used, as applicable (Zimmerman, 1985), based on: 1) the study's small sample sizes and unequal *n* across all domain measures; 2) homogeneity or heterogeneity of variance; and 3) the direction of variance difference between groups within each domain gain score (i.e., larger vs. smaller) for the physical, psychological, and general health domains.

Table 2. Descriptive Statistics for All Domain Gain Scores

Group	*N*	Mean	Standard deviation
Physical Domain Gain			
MBSR	15	10.14	10.74
Comparison	24	.09	6.96
		10.05 mean difference	
Psychological Domain Gain			
MBSR	19	6.90	12.30
		30.11 (mean rank)	
		572.00 (sum of ranks)	
Comparison	28	–0.31	5.73
		19.86 (mean rank)	
		556.00 (sum of ranks)	
Social Domain			
MBSR	21	9.62	17.92
Comparison	29	–.65	12.07
		10.27 mean difference	
Spiritual Domain			
MBSR	21	9.23	13.64
Comparison	30	–2.08	14.52
		11.31 mean difference	
General Health Domain			
MBSR	20	6.25	18.36
Comparison	30	–0.21	10.18
		6.46 mean difference	

Having multiple dependent measures, a Bonferroni adjustment was used to maintain the experiment-wise alpha level at .05. In order to test hypotheses 1 and 3-5, two-tailed independent *t*-tests were calculated for domain gain scores (using unequal variance estimates for hypotheses 1 and 5, and equal variance estimates for hypotheses 3 and 4). For hypotheses 1 (physical) and 4 (spiritual), those in the intervention group reported a statistically significant gain on the domain measures compared to those in the comparison group, t (21.43) = 3.28, $p \leq .01$ and t (49) = 2.80, $p \leq .01$, respectively, with corresponding mean differences of 10.05 and 11.31. Using Cohen's d to calculate effect size, regarding hypotheses 1 (physical) and 4 (spiritual), there were large effect sizes, d = 2.08 and 0.80, respectively. Corresponding r squares were also calculated showing that 52% of the variance in the physical domain gain measure and 14% of the variance in the spiritual domain gain measure was accounted for by group membership.

For hypotheses 3 (social) and 5 (general health), no statistically significant differences were found between groups. Again, using Cohen's d to calculate effect size, there was a medium effect size (Cohen, 1988) (d = 0.67) for hypothesis 3 and a small effect size (Cohen, 1988) (d = 0.44) for hypothesis 5. Corresponding r squares were also calculated showing that 10% of the variance in the social domain gain measure and 5% of the variance in the general health domain gain measure was accounted for by group membership. Power was also calculated for hypotheses 3 and 5, at 0.39 and 0.14, respectively.

In order to test hypothesis 2 (psychological), a Mann-Whitney U test was calculated on the domain gain scores to test whether the intervention group and the comparison group differed on average (median mean rank) gain scores. A statistically significant difference was observed between groups on gain scores for the psychological domain measure, U = 150, $p \leq .01$. There was a mean (average) rank difference of 10.25 with the intervention group gain scores ranking higher. Cohen's d was calculated for effect size, d = 0.75, which is considered a medium effect size (Cohen, 1988). Correspondingly, in computing r^2 from Cohen's d, the results showed that 12% of the variance in the psychological domain gain measure was accounted for by group membership.

CONCLUSIONS

The purpose of this study was to investigate the MBSR program within two specific variations from previous MBSR studies: 1) to evaluate a *5-week* MBSR program which is of shorter duration compared to previous MBSR program studies (6-10 weeks); and 2) to assess the impact of an MBSR program on perceived quality of life as measured by the WHOQOL, while incorporating a comparison group in the study design.

The study used a quasi-experimental, nonequivalent control group, 2 × 2 repeated measures (pre/post) factorial design, with domain gain measures (the

difference between pre-intervention and post-intervention scores per domain) as dependent variables. A hypothesis was generated for each domain used in the study. In incorporating a non-equivalent group design, this study does not assume equivalency between groups on pretest measures. The data profiles for all hypotheses are essentially the same: the data profiles show a lower pre-intervention average score for the MBSR group and an increase on the post-intervention score for the MBSR group, while the comparison group's pre- and post-intervention scores essentially remain the same. This study's research design, in conjunction with the data profiles for each specific hypothesis, is associated with specific threats to internal validity (Cook & Campbell, 1979).

Threats to internal validity for the data profiles (again, which are similar) can include selection-instrumentation (e.g., ceiling and floor effects) and selection-history (Cook & Campbell, 1979). Additionally, the *Hawthorne effect* cannot be ruled out. Ceiling and floor effects can be ruled out since the highest possible transformed score was 100 and the lowest possible score was 0 for each domain. That is, there was "room" for greater disparity both ways (i.e., lower scores for the pretests and higher scores for the posttests) in terms of the mean gain scores across the domains. Selection-maturation is ruled out (Cook & Campbell, 1979). If selection-maturation was a factor, one would expect persons scoring lower at the pretest to be even further behind at the posttest. Furthermore, if this threat was operative, the data profile would suggest that the treatment had an effect despite the lower expected pretest-posttest change for the MBSR group (Cook & Campbell, 1979).

Conclusions about the five hypotheses are discussed in light of the study design and the results of the statistical analyses. The key interrelated components considered in drawing a conclusion about each hypothesis are the reliability of responses, the statistical significance level of the test result, the alpha level set for statistical significance, sample size (which is small for all hypotheses and therefore negatively effecting power), effect size, r^2, power (i.e., for statistically non-significant results), and the research design.

The set alpha level for statistical significance, the reliability of responses, and the research design remain constant across the five hypotheses, that is, respectively: 0.01 (the Bonferroni adjusted experiment-wise .05 alpha); a Cronbach alpha coefficient exceeding 0.80 for all domains across pre- and post-intervention scores (suggesting a high level of reliability); and a non-equivalent group, 2 × 2 repeated measures design (with unequal *N*s). In general, for all five hypotheses, essentially three possible conclusions need to be considered. They are: #1: the data support the research hypothesis; #2: the null hypothesis is true; or #3: although the data appear to support the research hypothesis, due to the potential of the internal threats to validity discussed above, other factors (instead of the MBSR program) may be associated with the differences between group means, i.e., the *Hawthorne effect* and/or a selection X history interaction.

In regard to the inferential analyses, the most decisive conclusion was that the MBSR program was not associated with any difference on perceived quality of life for the general health domain, that is, Hypothesis #5 *was not* supported. This may be due to the fact that changes in perceived quality of life as related to general health may be more difficult to detect (and report) than changes regarding specific health domains. One may be more sensitive to the specific vs. the general.

Research hypotheses (1-4) *were* supported, *to varying degrees* among the hypotheses, excepting "threats to internal validity" alternative hypotheses. Hypotheses #1 (physical), #2 (psychological), and #4 (spiritual) were strongly supported by the "ratio" of effect size to sampling error probability, i.e., they were statistically significant. Hypothesis #3 (social) was supported to a lesser degree compared to Hypotheses #1, #2, and #4, but still supported in considering the "ratio" of effect size to sampling error probability. A greater definitude and decisiveness of conclusion regarding a prevailing hypothesis, i.e., the research hypothesis vs. the null hypotheses, could be accomplished through further studies (i.e., through replication or non-replication), especially with increasing sample size for increasing the power of the statistical test used. This increase of power could give greater confidence in the rejection of the null hypothesis (if it is indeed false) and therefore greater confidence in the research hypothesis (excepting, of course, any other competing hypotheses due to threats to internal validity).

Therefore, in considering and interpreting the interplay between statistical significance, effect size, and power (when applicable), on average, participants in the MBSR group had an increase in their perceived quality of life on four of the five measured health domains, i.e., in regards to the physical, the psychological, the social, and the spiritual—all of which are integral to health. If internal threats of the *Hawthorne effect* and selection-history were not operative, the results of the analyses support the research hypotheses related to these four domains (Hypotheses 1-4).

It would be beneficial for future studies to evaluate the duration of influence that the MBSR program (and/or its component parts) has on perceived quality of life and/or other measures of health and well-being. Would the individual need to continue with practicing the components of the MBSR program, i.e., meditation, yoga, and mindfulness in daily life, to maintain positive changes? Also, would mindfulness meditation alone, without the yoga, produce the same results—and visa-versa?

Finally, more studies using the WHOQOL questionnaire are needed to address the hypotheses that the MBSR program can positively influence the various health domains addressed by the questionnaire. Optimally, they will have moderately larger sample sizes to increase statistical power and, if possible, randomization to control for potential selection biases. Good science always involves replication to support preceding hypotheses or non-replication to challenge them. With additional information from future studies, greater clarity and decisiveness can

be brought to evaluating the MBSR program and its potential benefit for those who incorporate it into their lives.

IMPLICATIONS FOR PRACTICE

Health promotion helps people take control over and improve their own health. Furthermore, healthy individuals make up healthy communities—another goal of health promotion. Green (1979) has defined health promotion as "any combination of health education and related organizational, economic, and environmental supports for behaviors of individuals, groups, or communities conducive to health" (p. 168). So how does quality of life and the MBSR program relate and contribute to health promotion? Health, well-being, quality of life, and health promotion are all intertwined. Quality of life measures both subjective and objective well-being, encompassing physical, psychological, social, and spiritual dimensions. A program that enhances perceived quality of life enhances well-being and is, therefore, important in the field of health promotion.

This study, as well as other MBSR studies, potentially supports the positive influence that the MBSR program has on health and various health measures. Therefore, the program appears to be health promoting, i.e., it "supports . . . behaviors of individuals, groups, or communities conducive to health." The MBSR program offers a tool—a medium—to enhance quality of life by enhancing the functioning and integration of mind and body. Its aims are to reduce stress and to increase awareness of mental and physical processes through mindfulness meditation, yoga, and daily activities, which in turn develops an understanding of others and ourselves. These aims, when accomplished, can create a healthier individual, healthier relationships, and therefore healthier communities. The MBSR program can be implemented in various settings, among various populations, and for different timelines.

An individual's state of well-being is important and essential for a healthy individual, healthy communities, and ultimately a healthy society. Quality of life or a life with quality is a life worth living. Life with quality offers an essential degree of peace, joy, happiness, connection with oneself, connection with one's environment (which includes others), hope, contentment, meaning and purpose, and a sense of participation in the flow of life. This has vast implications for health promotion in various fields, including, for example, in the prevention and intervention of violence, drug and alcohol abuse, and suicide—for both youth and adults. Of course, quality of life depends on a multitude of factors, including an equitable society where basic needs are met for all. Additionally, this study has indicated that the MBSR program may be a viable program for enhancing quality of life through a workplace program, which would have implications for enhanced employee satisfaction in the work environment. All in all, among various populations and within a variety of settings, the MBSR program can be useful for enhancing quality of life.

REFERENCES

Bonomi, A., & Patrick, D. (1997). *User's Manual and Interpretation Guide for the United States Version of the World Health Organization Quality of Life (WHOQOL) Instrument.* Seattle: U.S. WHOQOL Center.

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences.* Hillsdale, NJ: Lawrence Erlbaum Associates.

Cook, T. D., & Campbell, D. T. (1979). *Quasi-experimentation: Design & analysis issues for field settings.* Boston, MA: Houghton Mifflin Company.

Gerin, P., Dazord, A., Boissel, J., & Chifflet, R. (1992). Quality of life assessment in therapeutic trials: Rationale and presentation of a more appropriate instrument. *Fundamentals and Clinical Pharmacology, 6*(6), 263-276.

Green, L. (1979). National policy in the promotion of health. *International Journal of Health Education, 22,* 161-168.

Haas, B. K. (1999). A multidisciplinary concept analysis of quality of life. *World Journal of Nursing Research, 21*(6), 728-742.

Kabat-Zinn, J. (1982). An outpatient program in behavioral medicine for chronic pain patients based on the practice of mindfulness meditation: Theoretical considerations and preliminary results. *General Hospital Psychiatry, 4*(1), 33-47.

Kabat-Zinn, J. (1984). An outpatient program in behavioral medicine for chronic pain patients based on the practice of mindfulness meditation: Theoretical considerations and preliminary results. *ReVIS, 7*(1), 71-72.

Kabat-Zinn, J. (1990). *Full catastrophe living: Using the wisdom of your body and Mind to Face Stress, Pain, and Illness.* New York: Dell Publishing.

Kabat-Zinn, J., Lipworth, L., & Burney, R. (1985). The clinical use of mindfulness meditation for the self-regulation of chronic pain. *Journal of Behavioral Medicine, 8*(2), 163-190.

Kaplan, K. H., Goldenberg, D. L., & Galvin-Nadeau, M. (1993). The impact of a meditation-based stress reduction program on fibromyalgia. *General Hospital Psychiatry, 15*(5), 284-289.

Larson, J. S. (1999). The conceptualization of health. *Medical Care Research & Review, 56*(2), 123-136.

Massion, A. O., Teas, J., Hebert, J. R., Wertheimer, M. D., & Kabat-Zinn, J. (1995). Meditation, melatonin and breast/prostate cancer: Hypothesis and preliminary data. *Medical Hypotheses, 44*(1), 39-46.

Raphael, D., Brown, I., Renwick, R., & Rootman, I. (1997). Quality of life: What are the implications for health promotion? *American Journal of Health Behavior, 21*(2), 118-128.

Reibel, D., Greeson, J., Brainard, G., & Rosenzweig, S. (2001). Mindfulness-based stress reduction and health related quality of life in a heterogeneous patient population. *General Hospital Psychiatry, 23*(4), 183-192.

Salmon, P., Santorelli, S., & Kabat-Zinn, J. (1998). Intervention elements promoting adherence to mindfulness-based stress reduction programs in the clinical behavioral medicine setting. In S. A. Schumaker, J. K. Ockene, & W. L. McBee (Eds.), *The handbook of health behavior change* (2nd ed.). New York: Springer.

Teasdale, J. D., Segal, Z., & Williams, J. M. (1995). How does cognitive therapy prevent depressive relapse and why should attentional control (mindfulness) training help? *Behavioral Research & Therapy, 33*(1), 25-39.

Ware, J. E., Snow, K. K., Kosinski, M., & Gandek, B. (1992). *SF36 Health survey manual and interpretation guide.* Boston: New England Medical Center, Health Institute.

Williams, K., Kolar, M., Reger, B., & Pearson, J. (2001). Evaluation of a well-based mindfulness stress reduction intervention: A controlled study. *American Journal of Health Promotion, 15*(6), 422-432.

World Health Organization (2001a, December 19). Definition of health. Web site: http://www.who.int/aboutwho/en/definition.html.

World Health Organization (2001b, December 19). Introducing the WHOQOL instruments. Web site: http://www.who.int/msa/qol/qll.htm.

Zimmerman, D. W. (1985). Power functions of the *t*-test and Mann-Whitney U test under violations of parametric assumptions. *Perception & Motor Skills, 61,* 467-470.

Direct reprint requests to.

Bruce Jacobs, Ph.D.
Health Specialist
New Mexico State University
Cooperative Extension Service
Box 30003, Dept. 3AE
Las Cruces, NM 88003-0003
e-mail: bjacobs@nmsu.edu