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Recreational Music-making: An Integrative Group Intervention for Reducing Burnout and Improving Mood States in First Year Associate Degree Nursing Students: Insights and Economic Impact*

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Abstract

The challenges of providing exemplary undergraduate nursing education cannot be underestimated in an era when burnout and negative mood states predictably lead to alarming rates of academic as well as career attrition. While the multi-dimensional nature of this complex issue has been extensively elucidated, few rational strategies exist to reverse a disheartening trend recognizable early in the educational process that subsequently threatens to undermine the future viability of quality healthcare. This controlled prospective crossover study examined the impact of a 6-session Recreational Music-making (RMM) protocol on burnout and mood dimensions as well as Total Mood Disturbance (TMD) in first year associate level nursing students. A total of 75 first year associate degree nursing students from Allegany College of Maryland (ACM) participated in a 6-session RMM protocol focusing on group support and stress reduction utilizing a specific group drumming protocol. Burnout and mood dimensions were assessed with the Maslach Burnout Inventory and the Profile of Mood States respectively. Statistically significant reductions of multiple burnout and mood dimensions as well as TMD scores were noted.

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Potential annual cost savings for the typical associate degree nursing program ($16,800) and acute care hospital ($322,000) were projected by an independent economic analysis firm. A cost-effective 6-session RMM protocol reduces burnout and mood dimensions as well as TMD in associate degree nursing students.

KEYWORDS: Recreational Music-making, burnout, mood states, nursing students

The challenges of providing exemplary undergraduate nursing education cannot be underestimated in an era when burnout and negative mood states predictably lead to alarming rates of academic as well as career attrition. While the multidimensional nature of this complex issue has been extensively elucidated, few rational strategies exist to reverse a disheartening trend recognizable early in the educational process that subsequently threatens to undermine the future viability of quality healthcare.

The purpose of this study is to explore the psychosocial impact of a unique group-based active music-making protocol offered to first year nursing students with the goals of reducing burnout, improving mood states and projecting potential cost savings to educational institutions and the healthcare industry.

As the global nursing shortage continues to escalate, nursing schools are under increasing pressure to admit, retain and graduate nurses who will enter the profession. Although enrollments have increased in American baccalaureate programs over the past three years (16.6% in 2003), a 19% decline occurred during the 6-year period from 1995-2000 (American Association of Colleges of Nursing (AACN), 2003) along with 26% fewer graduates taking the national licensure exam during the period of 1995-2002 (AACN, 2003). The net result was a reduced number of nurses entering the profession to address what had evolved into a critical national shortage.

Students currently enrolled in US nursing programs present a different profile compared to nurses of prior generations. These individuals are less likely to be recent high school graduates, and are more typically older, living independently, and educationally unprepared. They are struggling with the challenges of a rigorous nursing program while simultaneously attempting to meet family and personal demands (Wells, 2003). Numerous studies document multiple sources of stress for the current cohort of nursing students: lack of skills and knowledge in clinical education (Sheu, Lin & Hwang, 2002), reentry into school (for older students) (Patton & Goldenberg, 1999), personal and family challenges, financial concerns, academic demands (Brown, 1987), health problems, lack of time for friends and family, the emotional demands of nursing, disillusionment with the profession, transportation issues and a sense of disconnection from other students and faculty (Brennan, 1995**;** Deary, Jones & Johnston, 2000; Kinsella, Williams & Green, 1999; Lo, 2002; Thyer & Bazeley, 1993; Timmons, 2002; Timmons & Kaliszer, 2002; Watson, & Hogston, 2003; White, Williams, & Green, 1999).

For this new population of nursing students, nonacademic variables and relationships with faculty appear to have far more influence on student attrition than academic variables (Braithewaite, Elzubeir, & Stark, 1994; Farrington, 1997; Glossop, 2002). These factors along with the changing nature of the student population negatively impact the future supply of nurses and present substantial challenges for nursing faculty (Wells, 2003). It has also been suggested that these nursing students may be at high risk for career drop-out and ill health when they eventually enter the workforce (Basson & Van der Merwe, 1994; Elliot, 2002; Jones & Johnston, 2000; Thyer & Bazeley, 1993). Despite these challenges, a review of the nursing literature discloses minimal research to support new models or strategies for addressing the problem of attrition in this changing nursing student population (Wells, 2003).

In addition to reducing the number of employable nurses, attrition also results in other serious consequences. Students who leave nursing school typically experience feelings of failure. They are also often overburdened with the prospect of paying back substantial loans. Furthermore, faculty morale tends to decline while educational institutions experience losses estimated at $30-72 million each year (Harvey & MacMurray, 1997; McSherry & Marland, 1999; Wells, 2003).

Challenges for nursing students do not end with matriculation. While new nurses typically begin their careers with high levels of job satisfaction, attrition develops at faster rates than noted for their predecessors (Sochalski, 2002). Faced with increasingly older and sicker patients, high patient/nurse care ratios, mandatory overtime and loss of connection with their patients, burnout rapidly sets in. "Burnout" is defined primarily in terms of emotional and physical depletion or deterioration in response to excessive work demands (Basson & Van der Merve , 1994). Presently, 7.5% of male nurses and 4.1 % of female nurses in the US leave the profession within four years of graduation, compared to only 2% of men and 2.7% of women 10 years ago. Forty percent of hospital nurses have burnout levels that exceed the norms for healthcare workers, while job dissatisfaction is four times greater than the average for all US workers. One in 3 hospital nurses under the age of 30 reports plans to leave a current job in the next year (Aiken, Clarke, Sloane, Sochalski, & Silber, 2002). As a result, nearly 20% of all licensed registered nurses (RNs) have left active nursing (Health Resources and Services Administration, 2002).

With 1 in 7 US hospitals presently reporting a severe shortage of nurses (more than 20% of nursing positions vacant) (First Consulting Group, 2001) and a shortfall of 126,000 nurses nationally (1 of every 8 positions) (Joint Commission

on Accreditation of Healthcare Organizations, 2002), increased pressure is placed on those nurses who remain employed. Over half (59%) of hospitals report that RNs feel it is more difficult to provide quality care due to workforce shortages (First Consulting Group, 2001). The impact of this growing deficit is threatening the future viability of US healthcare, as 78 million aging baby boomers are beginning to utilize an already overburdened healthcare system (U.S. General Accounting Office, 2001). By the year 2020, the number of RNs per capita will fall 20% below requirements, in part due to the fact that young people are not entering the nursing profession in the numbers they once were (American Hospital Association Commission on Workforce for Hospitals and Health Systems, 2002; American Nurses Association, 2001).

The declining number of nursing school graduates also impacts patients, with many studies pointing to the connection between the nursing shortage and unsafe standards of care. In 2002, a study published in the *Journal of the American Medical Association* reviewed 232,000 patients at 168 hospitals and determined that the overall risk of death rose roughly 7% for each additional surgical patient above 4 assigned to a nurse. Patients undergoing routine surgeries in hospitals with high nurse/patient ratios, experience up to a 31% increase chance of dying. Not surprisingly, nurses reported greater job dissatisfaction and emotional exhaustion when they were responsible for more patients than they could safely handle (Aiken et al., 2002).

In another study, researchers from the Harvard School of Public Health examining records of more than 6 million patients found that patients in hospitals with lower staffing levels of nurses were more likely to suffer from such complications as urinary tract infections and pneumonia, and more likely to die from treatable conditions such as gastrointestinal bleeding (Needleman, Buerhaus, Mattke, Stewart, & Zelevinsky, 2002). Ultimately the failure to train, graduate, and retain nurses contributes to avoidable patient deaths.

The economic impact of high nursing turnover rates must also be considered. The *Voluntary Hospital Association* found that US institutions with turnover rates of 21% or more experienced 36% higher costs per discharge than those with turnover rates of 12% or less. The cost of filling a vacated nursing position was estimated at approximately 100% of a nurse's salary, or on average, $46,000 (Kosel & Olivo, 2002). Based upon 2001 survey data, 41% of hospitals pay sign-on bonuses. Assuming a 13% nursing vacancy rate, the cost of sign-on bonuses alone, for all vacant RN positions across the US, has been estimated at $80,774,083 (First Consulting Group, 2001).

This critical shortage of nurses and high burnout rate in the workforce coupled with changing demographics, an increasingly technological focus, and dramatic changes in the healthcare system have stimulated the call for significant changes in nursing curricula (Henderson, 1990; Tanner, 1990; Tanner, 1995). For some, this crisis is perceived as an opportunity rather than an obstacle— a chance to recreate a culture of caring and personal fulfillment (Clark, 2002). The Nurse Manifesto, a document developed to reawaken the holistic ideals that are deeply embedded in nursing history, supports this perspective. Their call for action includes the reformulation of nursing education. The *Manifesto* states: "We believe that it is time to attend to inherent wholeness and natural healing tendencies that are often educated out of nurses as students" (Cowling, Chinn, & Hagedorn, 2000).

In 1993, the *Pew Health Professions Commission Report* joined forces with the *National League of Nursing* (NLN) and the *American Association of Colleges of Nursing* to urge educators to reshape curricula on relationship-centered care, health promotion, and self-care (Mawn & Reece, 2000). The *American Holistic Nurses Association* included the practice and application of self-care throughout their educational program as one of its five core values (Frisch, 2003). Another study of 169 undergraduate nurses concluded, "Only when healthy behaviors are urged and practiced as a habit, can we be sure that these students' potential health careers can keep their health at a satisfactory standard... despite future challenges and commitments. If in good health... [they] would require fewer sick leaves... and become a strong workforce in the health service" (Hui, 2002).

Data suggest that a renewed emphasis on the practice of healthy self-care techniques may not only benefit students personally by enhancing their ability to cope with the stresses of clinical practice, but may also improve the overall quality of care they are able to provide (Basson & Van der Merve, 1994). Students who role model healthy lifestyles may increase their capacity for emotional investment and therapeutic interaction that, in turn, is likely to result in increased patient compliance with treatment (Basson & Van der Mervwe; Hui, 2002). Once students withdraw emotional energy and investment from their patients as a compensatory means for coping with burnout, patient care will predictably suffer. Feelings of guilt and job dissatisfaction tend to surface based upon the fact that "caring" was one of the primary reasons for initially choosing the field (Basson & Van der Merve).

To date, the majority of retention initiatives at US nursing schools have been centered on academic issues, supports for addressing deficiencies, or the

provision of additional financial resources. A limited number of projects (most of which were offered individually rather than to groups) have been specifically focused on reducing the intense stress experienced by student nurses (Jones & Johnston, 2000).

Incorporating caring attitudes and stress reduction strategies into nursing training programs has also been suggested (Jones & Johnston, 2000; Patton & Goldenberg, 1999; Thyer & Bazeley, 1993). A growing body of research now indicates that social support and relationships reduce or buffer the adverse effects of stress exposure (Brown, 1987; Domar & Dreher, 1996; Dossey, 2001; Gordon, 1996; Koenig, 1999; Martin, 1998; Lo, 2002; Ornish, 1998; Siegel, 1999). Some nursing programs have offered students support groups, gatherings and focus groups with the goal of improving academic success, increasing group cohesiveness and enhancing retention (Brown, 1987; Farrington, 1997; Stokes, 2003).

Based upon these considerations, the following working hypothesis was proposed: a 6-session, cost-effective group-based Recreational Music-making (RMM) protocol provided to nursing students at the beginning of their clinical education will result in diminished burnout and Total Mood disturbance (TMD). "Burnout," is a syndrome comprised of three well-documented variables: emotional exhaustion (EE), depersonalization (DP) and reduced personal accomplishment (PA) that occurs among individuals who work with people in some capacity (Maslach, Jackson, & Leiter, 1996. Burnout is assessed by the *Maslach Burnout Inventory* (MBI) that measures EE, DP and PA (Maslach, Jackson & Leiter, 1996). Defined as a conscious state of mind or predominant emotion, mood is typically considered a prevailing attitude predisposing to action. Six extensively studied mood factors include tension/anxiety (T/A), depression/dejection (D/D), anger/hostility (A/H), vigor/activity (V/A), fatigue/inertia (F/I) and confusion/bewilderment (C/B) (McNair, Lorr, & Droppleman, 1992). Total Mood disturbance is determined by summing all *Profile of Mood States* (POMS) dimensions (T/A, D/D, A/H, V/A, F/I and C/B) and weighing V/A negatively (McNair, Lorr, & Droppleman, 1992).

RECREATIONAL MUSIC-MAKING

While music listening is globally acknowledged as a favorite pastime, active engagement in RMM activities is associated with a host of individual and group benefits (Bittman, 2001; Bittman et al., 2001; Bittman et al., 2003). RMM is defined as "enjoyable, accessible and fulfilling group music-based activities that unite people of all ages regardless of their challenges, backgrounds, ethnicity,

culture, ability or prior experience. From exercise, nurturing, social support, bonding and spirituality, to intellectual stimulation, heightened understanding and enhanced capacity to cope with life's challenges, the benefits of RMM extend far beyond music. Recreational Music-making ultimately affords unparalleled creative expression that unites our bodies, minds and spirits (Bittman, 2001; Bittman et al., 2003)." It should be noted that RMM sessions, utilizing music as a universal language for enhancing interpersonal bonding, are facilitated by caring supportive guides who focus on enabling participants to achieve non-musical outcomes. According to the *Merriam Webster Dictionary*, the term, "recreational" is derived from the Latin root, "recreatio," which means "restoration to health."

Extensive research has documented numerous benefits associated with various strategies that reduce stress perception, increase sense of control and improve mood states. The proposed RMM benefits (as noted in the above definition) have considerable bio-psycho-social impact on diverse populations (Bittman, 2001; Bittman et al., 2001; Bittman et al., 2003; Bittman, Stevens, & Bruhn, 2001; Blumenthal, Jiang, & Babyak, 1997; Cohen, Doyle, & Skoner, 1997; Domar & Dreher, 1999; Fawzy et al., 1993; Hu et al., 2000; Koenig, 1999; Medalie, & Goldbourt, 1976; Russek, Schwartz, Bell, & Baldwin, 1997; Seeman, & Syme, 1987; Thune, Brenn, Lund, & Gaard, 1997; Williams, Barefoot, & Califf, 1992).

Group Empowerment Drumming, a comprehensive, well-established, multi-faceted RMM protocol, with substantial potential for bridging cross-cultural differences, was utilized for this study. The decision to test this RMM protocol was based upon a number of factors including ease of use and access, documented impact on cell-mediated biological stress pathways, and a recent comprehensive study documenting reductions of multiple burnout and mood parameters in long-term care workers with concomitant cost savings (Bittman et al., 2001; Bittman et al., 2003).

METHODS

Subject Selection and Exclusionary Criteria

All subjects signed informed consents, and the Institutional Review Board for Human Studies of the Medical Center and the President and Vice-Presidents for Finance and Academic Affairs at the College approved the protocol. A total of 79 first year college nursing students enrolled in clinical phase coursework (Fundamentals of Nursing and Nursing II – Medical Surgical Nursing) entered the

study. Of these, 75 students (11 men and 64 women, ages 18 to 50, mean age 27.5 years) completed the intervention. The 4 subjects who did not complete the study withdrew from the clinical phase of the nursing program for reasons including academic failure, health problems, and personal issues.

Participation in the protocol was presented as a clinical requirement, and as an opportunity to better cope with the stresses of clinical coursework. Although students were given the option not to participate in the data collection portion of the project, they were required to attend all sessions as part of their clinical coursework. Only one student refused to complete the surveys.

Subjects were assigned to Group A or Group B, in accordance with the crossover design (Table 1). More than 95% of students attended all six sessions.

Table 1
Crossover Design

Weeks 1-6	Weeks 7-12
Group A Intervention	Group A No Intervention
Group B No Intervention	Group B Intervention

Absolute confidentiality was maintained in order to enhance the validity of subject responses. Each subject chose personal codes without divulging these to the research team. In this manner, a subject who did not complete all three sets of surveys could be eliminated from the data pool.

EXPERIMENTAL PROTOCOL

Two 6-week interventions (1 session/week) were carried out during the 2003 fall semester. The first intervention included 38 students and began one week after the start of semester classes and ended prior to mid-terms. The second intervention included the remaining 37 students and commenced after mid-terms and concluded the week prior to the end of the semester. Students in non-intervention groups continued their normal academic routines and attended scheduled classes.

Three MBI and the POMS data points were included for all subjects in the study: immediately prior to the first intervention on day 1, at the end of the first intervention, and at the end of the second intervention.

Groups met with a trained facilitator at a designated time for a total of 6 one-hour consecutive weekly sessions. Two facilitators, faculty from the Therapeutic Massage curriculum and the Physical Education department, followed the *Health*RHYTHMS® Group Empowerment Drumming® Protocol (Bittman, Stevens, & Bruhn, 2001). Instruments included hand drums, SoundShapes®, and a variety of auxiliary percussion instruments (bells, maracas, etc.).

Each session began with a brief welcome, introduction and overview followed by a 5-minute Yamaha Mind-Body Wellness Exercise® focusing on 4 primary elements: breathing, movement, imagery and awareness. Subjects then participated in an "ice-breaker" activity designed to establish an initial lighthearted sense of teamwork and camaraderie. Shakers (plastic fruit-shaped objects containing sand or gravel) were passed hand to hand from individual to individual. As the speed of transfer progressively and rhythmically accelerated to the point at which participants could not maintain the pace, shakers were subsequently dropped and laughter ensued (Bittman et al., 2003).

Subjects were then asked to select a drum, and the facilitator presented a brief cursory explanation of rudimentary drumming techniques. Rhythmic naming, the process of tapping out the syllables of one's name was then carried out followed by a short series of entrainment building exercises utilized to foster focus, confidence and group cohesiveness. Rather than attempting to learn complex rhythms, subjects then proceeded to play drums and percussion instruments in an expressive, non-performance based manner designed to ensure a relaxing, enjoyable musical experience (Bittman et al., 2003).

At this stage, approximately half-way through the protocol, subjects were asked to non-verbally express themselves (playing their drum) in direct response to a series of 12 questions (2 questions/session) developed by the research team and facilitators to inspire a sense of nurturing, support and interpersonal respect (Table 2). Each subject was subsequently given the option to discuss his or her non-verbal response. Individual comments often catalyzed group discussions that were moderated by the facilitator in accordance with prior training. Students were encouraged to put into practice insights gained from group discussions during the following week.

Table 2
Inspirational Beats
(each session included 2 questions presented in the following order)

1. What do you bring to this group today from your personal life, and how does it sound?
2. What is one of the unique gifts (that most people do not realize) that you bring to this experience and ultimately to your profession?
3. What do you find particularly challenging or stressful about your classes, fellow students, or teachers?
4. What do you find particularly rewarding about your classes, fellow students, or teachers?
5. Can you recall something a fellow student or teacher did recently that was admirable? What was the result, and how did it make you feel?
6. What does your own personal pressure sound like, and where does it originate? Can you change it (your) tune?
7. Do you ever have doubts about succeeding in your chosen profession? If so, why? How do these doubts make you feel?
8. When you are under pressure, do you sense the need to reach out to other students? How does working together as a team make you feel, and how does it sound?
9. Can you share how you felt the last time you were at the end of your rope?
10. What does it feel and sound like when the atmosphere is perfect for you to do your best?
11. Where would you be (in terms of your career) if you weren't here, and why?
12. If you could change anything in your educational program, what would it be?

Sessions concluded by repeating the initial Yamaha Mind-Body Wellness Exercise, followed by a discussion promoting the awareness of any physical or emotional changes experienced during and/or after the session.

Statistical Analysis

Statistical analysis was carried out to test the effect of the RMM protocol on 3 MBI dimensions, 6 POMS dimensions and a derived Total Mood Disturbance (TMD) score calculated by summing all POMS dimensions and weighing V/A negatively in the sample of 75 subjects. For parametric statistical comparisons it was necessary to establish an appropriate common scale (normal deviates) for all burnout/mood dimensions measured while maintaining the relative magnitudes of the effects induced by the RMM intervention. Therefore the frequency distributions of the results from each dimension were checked for significant deviations in shape from a Gaussian distribution (i.e. skew and kurtosis). When adjustments were required, the scores were raised to a power (i.e. exponent) that transformed the distribution to a more Gaussian shape.

Addressing each dimension separately, the now normally distributed data was subsequently standardized (converted to Z-scores) with a mean of zero and a standard deviation equal to one. For each dimension, the differences between the post and pre Z-scores was calculated and summarized by computing their means and standard deviations. Each dimension's mean was then tested for significance against zero utilizing a one-tailed paired t-test and charted on a distress-eustress continuum using the same scale (see Figure 1).

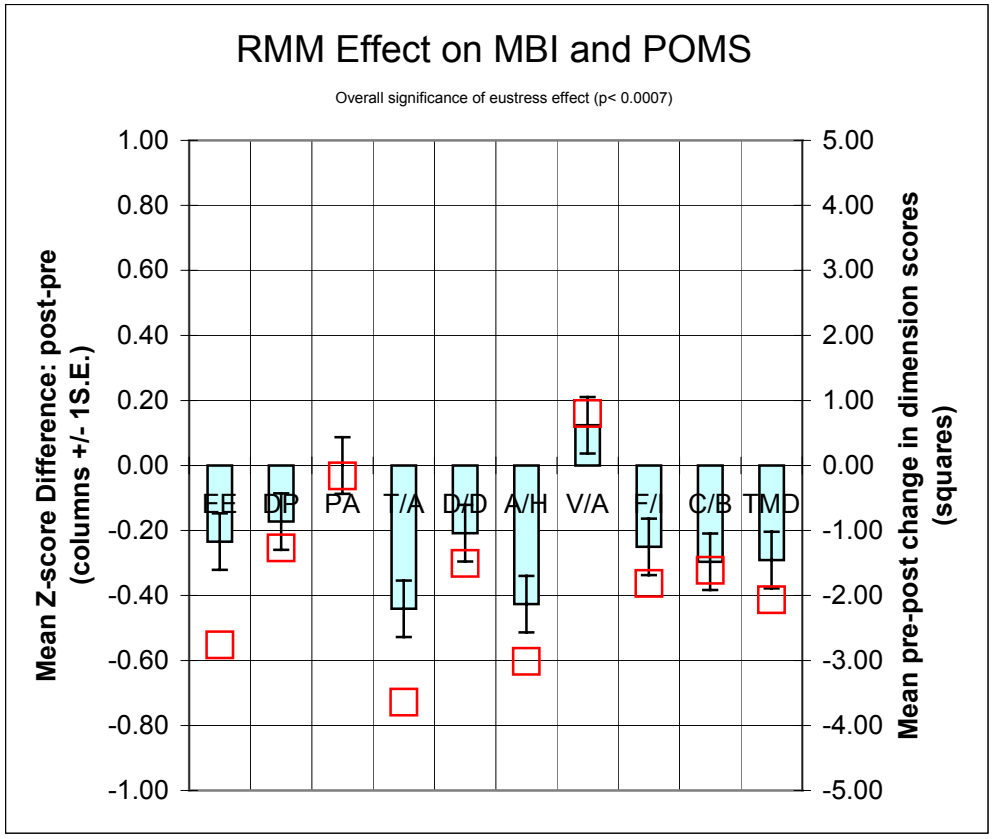
An overall eustress effect (counter to the known stress effect) was calculated by taking the mean of all 9 mean Z-score differences (inverting PA and V/A, excluding the composite TMD score, and testing for a negative (eustress) difference from zero using a one-sample t-test (see Figure 1). Since the TMD score is a linear composite of the other POM scores, it was not included in the analysis of an overall eustress effect. It should however be considered as a confirmation of the other findings.

To control for any baseline trends over time (6 weeks), a subset of the subject sample (Group B: n=37, see Table 1) was repeatedly tested before the RMM intervention. Changes across the 6-week interval for the 9 dimensions were tested using a paired t-test on the transformed and standardized data as utilized in testing the pre-post RMM effect (see Figure 2).

Additionally, the persistence of the RMM effect was analyzed on a subset of the sample (Group A: n=38, see Table 1 in comparison to the baseline for both groups) where the 9 dimensions were tested once again 6 weeks after completion of the RMM intervention. Z-score means were compared for each dimension using independent t-tests. Additionally, the mean and standard deviation of the Z-

score differences were computed (inverting PA and V/A and excluding the composite TMD score) to assess the overall continuation of the eustress effect using a one-sample t-test against zero (see Figure 3).

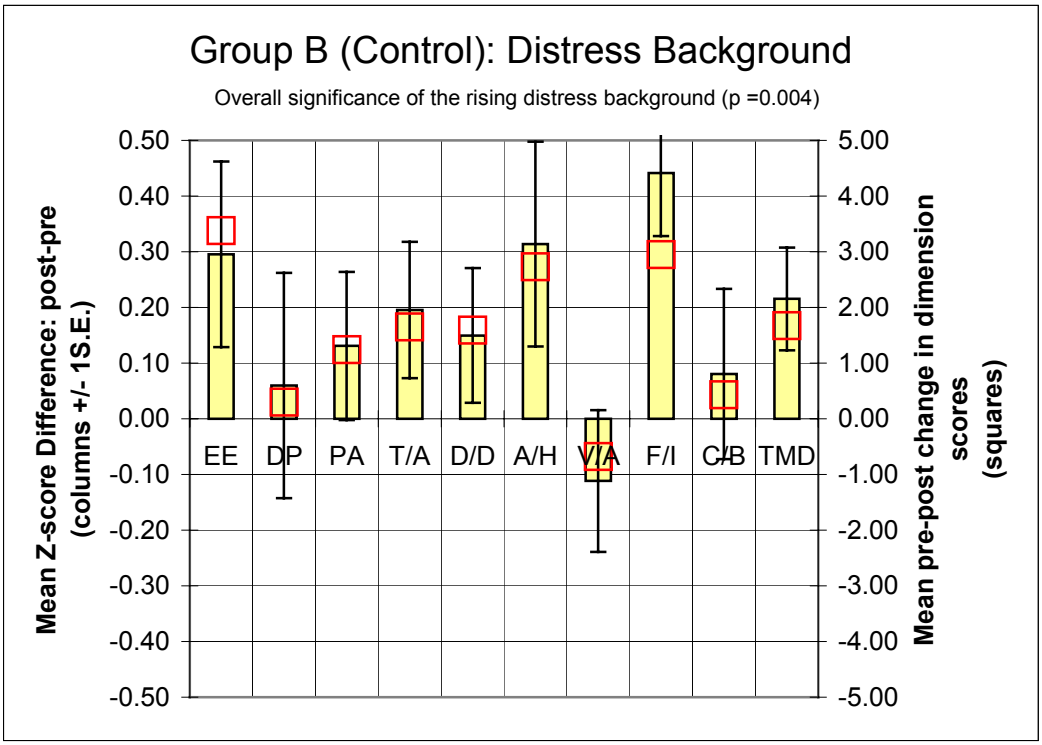
Figure 1



The Maslach Burnout Inventory (MBI) includes EE - Emotional Exhaustion (p=0.01); DP - Depersonalization (p=0.06); and PA - Personal Accomplishment (p=0.35*). The Profile of Mood States (POMS) includes T/A - Tension/Anxiety (p=0.00006); D/D - Depression/Dejection (p=0.03); A/H - Anger/Hostility (p=0.00003); V/A - Vigor/Activity (p=0.11); F/I - Fatigue/Inertia (p=0.01), C/B - Confusion/Bewilderment (p=0.002) and TMD - Total Mood Disturbance (p=0.0006). EE, T/A, D/D, A/H, F/I, C/B and TMD indicated significantly increasing eustress changes (p<0.05; one-tailed, dependent t-tests). To ascertain trends in eustress over time (6 weeks) an overall eustress effect was calculated by taking the mean of all 9 mean Z-score differences (inverting PA and VI and excluding TMD as it represents a linear combination of the individual POMS scores) and testing for a one-tailed difference from zero as in a one sample t-test (p<0.0007). Test score differences based on unmodified test results are indicated by the squares. n = 75 subjects.

*The one-tailed difference from zero for PA is statistically insignificant and invalid as the parameter moved in the direction opposite to that predicted.

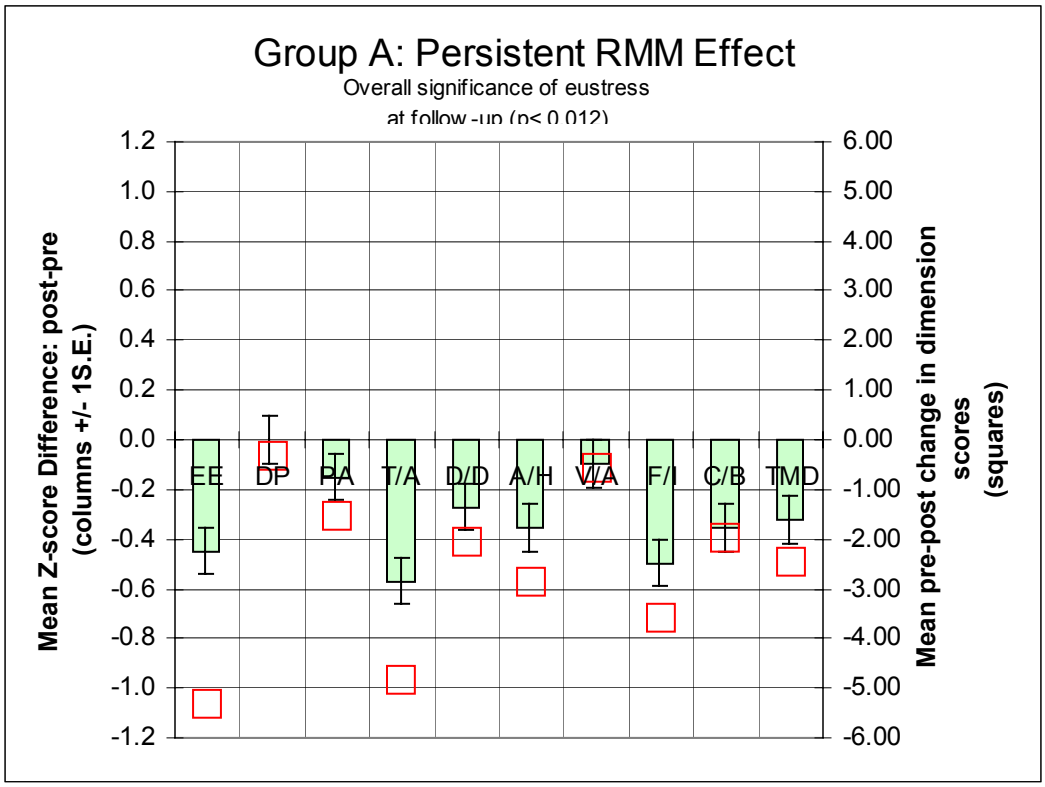
Figure 2



The Maslach Burnout Inventory (MBI) includes EE - Emotional Exhaustion (p=0.04); DP - Depersonalization (p=0.38); and PA - Personal Accomplishment (p=0.17*). The Profile of Mood States (POMS) includes T/A - Tension/Anxiety (p=0.06); D/D - Depression/Dejection (p=0.11); A/H - Anger/Hostility (p=0.048); V/A - Vigor/Activity (p=0.19); F/I - Fatigue/Inertia (p=0.0002), C/B - Confusion/Bewilderment (p=0.30) and TMD - Total Mood Disturbance (p=0.01). EE, A/H, F/I and TMD scores indicated significantly increasing distress changes ($p<0.05$; one-tailed, dependent t-tests). To ascertain trends in distress over time (6 weeks), a subset of the subject sample (n=37) was repeatedly tested before the RMM intervention. An overall distress effect (p=0.004) was calculated by taking the mean of all 9 mean Z-score differences (inverting PA and VI and excluding TMD as it represents a linear combination of the individual POMS scores) and testing for a one-tailed difference from zero as in a one sample t-test. Test score differences based on unmodified test results are indicated by the squares. n = 37 subject.

*The one-tailed difference from zero for PA is statistically insignificant and invalid as the parameter moved in the direction opposite to that predicted.

Figure 3



The Maslach Burnout Inventory (MBI) includes EE - Emotional Exhaustion (p=0.01); DP - Depersonalization (p=0.45); and PA - Personal Accomplishment (p=0.23*). The Profile of Mood States (POMS) includes T/A - Tension/Anxiety (p=0.0019); D/D - Depression/Dejection (p=0.09); A/H - Anger/Hostility(p=0.04); V/A - Vigor/Activity (p=0.31*); F/I - Fatigue/Inertia (p=0.01); C/B - Confusion/Bewilderment (p=0.04) and TMD - Total Mood Disturbance (p=0.03). Persistence of the RMM effect was analyzed on a subset of the sample (Group A - n=38) where the 9 dimensions were tested once again 6 weeks after completion of the RMM intervention. EE, T/A, A/H, F/I, C/B and TMD indicated significantly increased eustress changes ($p<0.05$; one-tailed, independent t-tests) as compared to the initial common baseline (n=75). An overall persistent eustress effect (p=0.012) 6 weeks after completion of the intervention was calculated by taking the mean of the 9 differences in mean Z-scores between the common baseline and Group A for each dimension (inverting PA and VI and excluding TMD as it represents a linear combination of the individual POMS scores) and testing for a one-tailed difference from zero. Test score differences based on unmodified test results are indicated by the squares.

*The one-tailed difference from zero for PA and V/A is statistically insignificant and invalid as these parameters moved in the direction opposite to that predicted.

RESULTS

For the RMM intervention (N=75 subjects), the following dimensions: EE (p=0.01); T/A (p=0.00006); D/D (p=0.03); A/H (p=0.00003); F/I (p=0.01), C/B (p=0.002) and TMD (p=0.0006) with the exception of PA (p=0.35); DP (p=0.06) and V/A (p=0.11) showed a significant pre-post change ($p<0.05$) (see Figure 1, Table 3). An overall multivariate eustress effect for the data set was determined to be significant ($p<0.0007$) (see Figure 1).

Table 3
RMM Effect on MBI and POMS

Pre-Post Intervention

Dimensions (n=75)	Pre Mean (SD)	Post Mean (SD)	% Change
MBI			
Emotional Exhaustion (EE)	25.9 (11.7)	23.2 (11.8)	-10.4%
Depersonalization (DP)	6.4 (6.6)	5.1 (5.3)	-20.3%
Personal Accomplishment (PA)	34.4 (7.6)	34.3 (7.2)	-0.3%
POMS			
Tension/Anxiety (T/A)	17.4 (8.6)	13.8 (9.6)	-20.7%
Depression/Dejection (D/D)	12.7 (12.3)	11.2 (13.0)	-11.8%
Anger/Hostility (A/H)	12.8 (10.0)	9.7 (11.1)	-24.2%
Vigor/Activity (V/A)	13.1 (6.1)	13.9 (6.8)	6.1%
Fatigue/Inertia (F/I)	13.0 (7.0)	11.2 (7.4)	-13.8%
Confusion/Bewilderment (C/B)	10.7 (5.6)	9.0 (5.8)	-15.9%
Total Mood Disturbance (TMD)	8.9 (21.1)	6.8 (22.8)	-23.6%

Control group (37 subjects) data analysis (Group B: 2 data points prior to the RMM intervention) demonstrated a significant multivariate overall distress trend (p=0.004) that augments rather than diminishes the RMM effect (see Table 1, Figure 2). All of the 9 dimensions (with the exception of V/A) including the derived TMD score demonstrated increasing scores (PA would have been expected to show decreases to indicate a trend toward distress). Of importance and in support of the distress trend, is the fact that TMD increased significantly (p=0.01).

The persistence of the RMM effect was analyzed on a subset of the sample (Group A: n=38) where the 9 dimensions and the derived TMD score were tested once again 6 weeks after completion of the RMM intervention (see Figure 3, Table 4) and compared with the initial common baseline (n=75). The following dimensions including EE (p=0.01); T/A (p=0.0019); A/H (p=0.04); F/I (p=0.01); C/B (p=0.04) and TMD (p=0.03) with the exception of DP (p=0.45); PA (p=0.23); D/D (p=0.09) and V/A (p=0.31) showed a significant pre-post change ($p<0.05$, see Figure 3, Table 4). An overall persistent eustress effect was noted (p=0.012) 6 weeks after completion of the intervention. Consistent with the increasing eustress trend, the persistence of the TMD score represents a 28.1% reduction from baseline (p=0.03, see Table 4).

Table 4
RMM Persistent Effect on MBI and POMS
Baseline to 6 Weeks Post Intervention (Group A)

Dimensions (n=38)	Pre Mean Common Baseline (SD) (n=75)		Post Mean (SD) (n=38)		% Change
MBI					
Emotional Exhaustion (EE)	25.9	(11.7)	20.6	(11.4)	-20.5%
Depersonalization (DP)	6.4	(6.6)	6.0	(4.8)	-6.3%
Personal Accomplishment (PA)	34.5	(7.6)	33.0	(9.2)	-4.1%
POMS					
Tension/Anxiety (T/A)	17.4	(8.6)	12.6	(8.2)	-27.6%
Depression/Dejection (D/D)	12.7	(12.3)	10.6	(13.4)	-16.5%
Anger/Hostility (A/H)	12.8	(10.0)	9.9	(10.5)	-22.7%
Vigor/Activity (V/A)	13.1	(6.1)	12.6	(4.9)	-3.8%
Fatigue/Inertia (F/I)	13.0	(7.0)	9.4	(7.0)	-27.7%
Confusion/Bewilderment (C/B)	10.7	(5.6)	8.7	(6.2)	-18.7%
Total Mood Disturbance (TMD)	8.9	(21.1)	6.4	(21.6)	-28.1%

ECONOMIC ANALYSIS

In addition to the above findings, a comprehensive independent economic impact analysis was subsequently performed by Tripp Umbach Healthcare

Consulting, Inc. to ascertain potential savings in the context of reducing student dropouts and professional nurse attrition. While reports documenting student dropout rates are sparse, recent data from the state of Pennsylvania indicate that nearly one-fourth of nursing school students will be lost through attrition (PHEAA, 2002). In addition, a retrospective analysis performed at the College (2002 – 2004), revealed actual nursing student dropout rates ranging from 25-30% coupled with mean tuition fees of $5,600 per year (Tripp Umbach Healthcare Consulting, Inc., 2004), the current attrition cost to a typical nursing education program with 60 first-year students is projected at $84,000 annually (25% x 60 x $5600). In consideration of these data and based on an estimated 1,735 nursing programs in the US, the total dropout cost for nursing programs is projected at approximately $146 million annually.

A recently published detailed economic impact analysis performed on a similar RMM program for an interdisciplinary long-term workforce (Bittman et al., 2003), documented a key connectivity cluster variable related to interdisciplinary employee retention at long-term care facilities and acute care hospitals. The "connectivity" cluster variable, which has been documented to be the most significant predictor of loyalty and the likelihood to remain employed for more than 3 years ($r=0.83574$, $p=0.05$), includes: respect shown to employees by supervisors, respect shown to employees by co-workers, supervisors caring about employees as persons, and ease of communication between the employee and supervisor (Tripp Umbach Healthcare Consulting, Inc., 2001).

In consideration of lack of prior data associating burnout to retention and cost, Total Mood Disturbance scores were subsequently correlated with connectivity cluster variable scores ($r=0.78923$, $p=0.05$) (Bittman et al., 2003). It was assumed (for the purposes of this student analysis) that a parallel degree of connectivity between faculty and fellow students could apply to a nursing education program.

Considering a potential 25% drop-out rate, the average nursing program with 60 first year students could lose 15 students. While connectivity cluster variable scores have been estimated to be responsible for 50% of retention (Tripp Umbach Healthcare Consulting, Inc., 2001), it is important to note that conservative retention projections based upon this estimate have actually been exceeded in a recent study of long-term health professionals (Bittman et al., 2003).

Overall student retention projections cannot be based exclusively on this RMM protocol. Therefore, persistence data demonstrating a 28.1% drop in Total

Mood Disturbance was factored into attrition projections. This suggests that 2 first-year nursing students (50% x 28.1% x 15 students) may be influenced to remain in a nursing program due to increases in connectivity as a result of this RMM intervention.

Assuming 1.5 years of lost revenues to a nursing program for each associate degree student who drops out after the first semester, the total annual savings for the typical 105-student program are estimated at $16,800 (2 students x 1.5 x $5600), with savings of $29.1 million ($16,800 x 1,735 nursing programs) to US nursing schools. With an estimated cost of this RMM program of approximately $571 per year (instruments and training = $4,000 amortized over 7 years), the return on investment for each nursing program is calculated at $29.42 saved for every dollar invested.

Extending this analysis to the healthcare arena, turnover of registered nurses at acute care hospitals costs the US national healthcare industry $21.6 billion annually (approximately 1.4% of the total cost of healthcare in the United States) (American Organization of Nurse Executives and the HSM Group, Inc., 2002). Assuming an annual turnover rate of 21.3% for registered nurses working at acute care hospitals (AACN, 2003), and a cost per vacant position of $46,000 (Kosel & Olivo, 2002; Missouri Hospital Association, 2003), the nursing turnover cost for the average acute care hospital with 280 nurses is $3.8 million annually.

With 13.8% of the variance subtracted for individuals who turnover for purely economic reasons (Tripp Umbach Healthcare Consulting Inc., 2001), it is estimated that 52 out of every 60 US nurses who leave their jobs each year, do so for non-financial reasons. Since connectivity cluster variable scores account for 50% of 3-year retention, and persistence data revealed a 28.1% drop in Total Mood Disturbance, it is projected that 7 nurses (50% x 28.1% x 52) likely to leave for non-economic reasons, may be influenced to stay an additional year due to increases in connectivity as a result of this RMM intervention.

These projected retention improvements could therefore result in cost savings of $322,000 (7 x $46,000) for the typical acute care hospital, and more than $1.5 billion ($322,000 x 4,900 hospitals) for the US healthcare industry. With a program cost (instruments and training) of approximately $571 per year (as noted previously), the return on investment is projected at approximately $564 saved for every dollar invested by the typical acute care hospital with 280 employed nurses.

DISCUSSION

As demonstrated in the prior section, this crossover, controlled RMM intervention for first year associate degree nursing students revealed statistically significant improvements for multiple parameters associated with burnout, mood states and TMD. Multivariate eustress trends coupled with marked TMD score reductions and the statistically significant control group distress baseline support the underlying hypothesis. These data demonstrate correlations worthy of further consideration.

While a detailed analysis of most burnout and mood parameters revealed statistically significant improvements following the RMM intervention, it should be noted that two Maslach burnout measures (PA and DP) and one POMS measure (V/A) were not statistically valid. While DP ($p= 0.06$) and PA ($p=0.11$) could have potentially been validated with a larger sample size, such is unlikely the case for PA ($p=0.35$) which predictably correlates with the lack of a sense of personal accomplishment at such an early stage of training.

The fact that these data demonstrate an emerging distress baseline in the first educational year must be considered an alarming sign for nursing educators and institutions. Compared to a similar study of interdisciplinary long-term care workers, this baseline distress trend has greater significance (Bittman et al., 2003).

The persistence data revealing significant changes 6 weeks after the intervention must be considered an important ongoing effect. In addition to the prior measures noted to be insignificant immediately after the intervention, D/D ($p=0.09$) was found to be no longer significant 6 weeks post intervention. However, it should be emphasized that the overall persistent eustress effect was statistically validated ($p=0.012$).

While these data strongly support the eustress hypothesis, it is important to note that from a student perspective, this RMM protocol initially generated various levels of skepticism and resistance. Participants repeatedly articulated how incredibly stressed they were by their studies and outside commitments: work, family and personal relationships. A number of students openly stated that their time would be better spent studying or practicing skills. Some argued that if the purpose of the program was to relax or de-stress, they would prefer to be with friends and family whom they felt were being neglected.

While some students continued to express various levels of resistance, others consistently looked forward to the sessions. When facilitators asked each group to notice how they felt at the conclusion of each session, most acknowledged a clear-cut mood improvement. Multiple comments surfaced about how good it felt to laugh and how much closer they felt to fellow classmates.

Despite the fact that this RMM program will not influence every student to remain in a nursing program, the projected retention of just 2 individuals each year per program could result in 3,470 additional graduates (2 students x 1735 programs) entering the US workforce annually. In addition, the retention of 34,300 additional nurses per year (7 nurses x 4,900 hospitals) could help reduce the overall impact of the nursing shortage. From a practical perspective, potential annual cost savings for the average associate degree nursing program ($16,800) and acute care community hospital ($322,000) should be considered conservative estimates based upon real-world findings that exceeded projections for a similar RMM program conducted for long-term care workers (Bittman et al., 2003). Ultimately the process of building cross-cultural and interpersonal bonds, such as those demonstrated through RMM, should be considered an integral facet of enhancing the educational experiences of individuals entrusted with providing quality healthcare in diverse psychosocial environments.

LIMITATIONS

The authors recognize a number of important limitations that must be considered in the context of this unique RMM strategy. Foremost, is the specificity of the RMM components utilized in this protocol that is considered essential for the established outcomes.

To ensure confidentiality and trust, data documenting personal factors such as socioeconomic challenges, underlying depression or medication/alcohol use were not collected. Without this information, attrition cannot be precisely correlated with burnout and TMD. The authors consider this factor important, yet fully realize that in an academic setting, the prospect of such disclosure could have served to limit participation or undermine ongoing student/teacher relationships.

The authors acknowledge that variations in teaching and group leadership experience as well as RMM training should be considered critical components necessary for successful ongoing replication. The same individual, with the exception of one substitution due to illness, facilitated all 6 consecutive sessions for each group.

It should be emphasized that prior to beginning the study, both facilitators (a massage therapist and a physical educator) were enrolled in a *Health*RHYTHMS (Bittman et. al., 2001) training program as part of the College's ongoing commitment to incorporating integrative health concepts into its curriculum. Each facilitator also received extensive supervised research protocol training prior to initiation of the study. In addition, as part of their regular teaching responsibilities, both facilitators were experienced in utilizing group-based stress-reduction approaches. The semester prior to the investigation, each conducted student stress-reduction groups for the Allied Health programs. Of particular importance is the fact that these facilitators were selected, in part, for this project, based upon the fact that they were not professional drummers or musicians. Drumming experience was not considered an important predictor of success.

While the RMM strategy utilized for this intervention is derived from a protocol published in a recent study of long-term care workers (Bittman et al., 2003), 3 notable differences exist. A Clavinova keyboard instrument was not used in this study. Instead Mind-Body Wellness Exercises were performed with CD recordings, and subjects did not drum to familiar tunes played on a Clavinova. The second pertains to the respective cohorts. In contrast to the long-term study that evaluated the protocol in an interdisciplinary workforce, this study focused exclusively on first year nursing students. The third issue is based on the utilization of specific facilitators for each study. While one might speculate that these factors could have accounted for some of the outcome differences (i.e. larger TMD reductions in long-term care workers), further testing is required to assess these factors.

In addition, the actual time spent in an educational program must be considered a potential variable that could affect attrition rates. As students progressively become more comfortable within a learning environment, stress perception could be reduced. However, as each student advances, increasing academic burden, exposure to the clinical environment and ongoing fatigue could potentially lead to increased burnout and attrition. Therefore, outcomes should be compared based upon offering this protocol at various stages of the educational process.

The use of rhythm-based events in a variety of government, health care, community and corporate settings, meetings and retreats is expanding world-wide (Hull, 1998; Stevens, 2003; Stevens, 2003). Ultimately, however, it must be emphasized that the defining philosophy of this unique RMM intervention emphasizes support and personal/group expression rather than mastery. The

researchers contend that generalizations should not be extended to community drum circles or other music-making activities based upon the highly specific nature of this protocol. Further testing in diverse cultural environments worldwide is warranted to support this underlying hypothesis.

Future studies will be performed in a host of educational settings utilizing large student sample sizes. Long-term follow-up is warranted to replicate these initial findings cross-culturally and to determine the extent and impact of enduring effects in the global healthcare workforce.

CONCLUSION

While several factors impact the current nursing shortage and escalating rates of academic and career attrition, the critical importance of developing rational strategies that address high burnout levels and negative mood states of nursing students should not be underestimated. The RMM group drumming protocol investigated in this study extends beyond individually-based stress-reduction training to promote the development of career-relevant self-care skills within the context of group support, self-expression and enhanced interpersonal communications. It serves as a cost-effective prototype for initiatives that ultimately must be included within our educational system in order to meet the ongoing challenges of 21st century healthcare.

The process of restructuring healthcare and its educational system through a relationship-based, whole person care paradigm is a formidable task that requires a dedicated sense of partnership among professionals who will ultimately serve as role models for promoting exemplary self-care and team building worldwide. While this shift may be considered challenging in the short run, the inclusion of cost-effective RMM group support opportunities will ultimately help promote quality patient care along with improved economic stability.

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