Int J Burn Trauma 2021;11(6):477-485
www.IJBT.org /ISSN:2160-2026/IJBT0139887

Original Article

Effect of contemplating patient care spiritual flow principles and mindfulness on trauma center nurses' wellbeing: a pilot trial

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Received October 17, 2021; Accepted December 14, 2021; Epub December 15, 2021; Published December 30, 2021

Abstract: Trauma nurses commonly encounter stress and burnout and have increased negative affect states and decreased positive affect traits. This study investigated whether trauma center nurses would have improvements in wellbeing scores after reading and contemplating *Spiritual Flow: Pathways to Proficient Patient Care and Nurse & Physician Wellbeing* (*Spiritual Flow*). Trauma center surgical intensive care unit nurses completed a baseline and follow-up survey before and after reading and contemplating *Spiritual Flow*, which provides insights into spirituality and mindfulness. The survey contained four positive affect (PA) items, each rated 1-very little to 5-extremely, that were summed to create a PA score (PAS). The seven negative affect (NA) survey items were similarly rated and reverse coded, 1-extremely to 5-very little, to create a nonstress score (NSS). The PAS (4-20) and NSS (7-35) were summed to create a wellbeing score (WS). Nurses rated the degree to which they felt more peaceful or inspired after contemplating the book. Thirty-seven of 39 (95%) routine nursing staff members completed both surveys. Follow-up values increased for WS (P = 0.0001) and NSS (P = 0.0001) after reading and contemplating *Spiritual Flow* compared to baseline values. No changes occurred for PAS (P = 0.1606). Because 16% of nurses had a high PAS on the baseline survey, further analyses were performed on the other 84%. Significantly increased values were noted on follow-up for PAS (P = 0.0171), NSS (P = 0.0015), and WS (P = 0.0003) compared to baseline scores. Of 37 nurses, 24 (64.9%) rated feeling more peaceful and/or inspired as moderately or quite a bit. This pilot study suggests that contemplating *Spiritual Flow* was associated with improvements in surgical intensive care trauma center nurse wellbeing. These preliminary findings need to be confirmed in an investigation that includes a control group and randomization.

Keywords: Mindfulness, spirituality, trauma nurses, wellbeing, organizational psychology

Introduction

Our prior manuscript provided evidence that trauma center nurses and physicians had concerning characteristics of decreased positive affect and increased negative affect, both of which were associated with burnout [1]. Hospital-based nurse burnout has also been documented to be a substantial problem mitigating nurse wellbeing [2-5]. In numerous investigations, trauma center nurses have been found to have a substantial risk for burnout [1, 6, 7]. This concern for burnout risk has also been validated in another study of intensive care unit nurses [8]. Methodical research has described that trauma center nurses not only commonly have limitations in positive affect and worrisome proportions of negative affect [1], but also have increased stress [7]. It is clear that these qualitative impediments mandate proactive interventions.

The potential benefits of mindfulness have been demonstrated in multiple studies investigating several cohorts of nurses. Studies of physicians and nurses showed that a high

mindfulness score was correlated with greater wellbeing, less stress, and positive emotional tone among the study participants [9, 10]. Additionally, an investigation of trauma center nurses has shown that meditation is inversely associated with burnout risk [6]. Previous studies have been reported that mindfulness training is associated with decreases in nurse burnout or stress risk [11-14]. A current investigation has shown that neurofeedback training immediately following mindfulness instructions was associated with trauma center nurse improvements in wellbeing [15].

To emphasize the potential value of spirituality in health care professional wellbeing, measures of spirituality have been assessed in nurses [8, 16-18] and medical students [19, 20]. Spiritual wellbeing has been shown to be inversely associated with burnout risk in intensive care unit nurses [8], non-intensive care unit nurses [21], and medical students [19]. Taylor et al. [22] provided evidence that hospital-based registered nurses interacting with chaplains helped to meet nurses' personal and spiritual needs, and facilitated providing patient and family spiritual care. It is concerning that nurses often have had little training in spirituality and providing spiritual patient care [21]. Research has demonstrated that spiritual retreats or training programs are associated with enhancements in wellbeing in critical care nurses [17], palliative care nurses [16], and middle manager nurses [18].

The compendium *Spiritual Flow: Pathways to Proficient Patient Care and Nurse & Physician Wellbeing* (*Spiritual Flow*) [23] contains recommendations, from a spiritual perspective, that relate to multiple facets regarding patient care provision. The compendium also contains guided meditations to help nurses and physicians improve their mindfulness experiences while performing activities related to patient care. We hypothesized that the nursing staff of a local surgical intensive care unit would have improvements in wellbeing scores after reading and contemplating *Spiritual Flow*, and this study aimed to investigate this hypothesis.

Material and methods

Study design and population

This nonrandomized trial was approved by the local institutional review board and registered with ClinicalTrials.gov (NCT04153656). The aim of the study was to investigate whether trauma center nurses would have improvements in wellbeing scores after reading and contemplating *Spiritual Flow*. Routine, surgical intensive care unit, nursing staff of a regional Level I trauma center were welcomed to participate in the current investigation. Study activities included 1) completing a baseline wellbeing survey, 2) reading and contemplating *Spiritual Flow* [23], and 3) completing a follow-up wellbeing survey. Several statements were printed on the same page as the baseline survey and preceded the survey items. These clarifications were as follows: 1) I agree to study *Spiritual Flow* over the next couple of weeks; 2) I understand that the survey results may be used in publications or presentations; however, my identity will remain anonymous; 3) we will ask you to repeat the survey in 2 months; and 4) you may withdraw from participation at any time. Completion of the survey and its return were considered to represent written informed consent.

Baseline wellbeing survey

At the time of study initiation, the participants completed a baseline 11-item wellbeing survey that has been demonstrated to have appropriate psychometric properties in trauma center nurses and physicians [1]. The survey was created to monitor outcomes in trauma center nurses and physicians participating in a previous neurofeedback study [15]. The study participants evaluated their wellbeing over the prior 3 days. Each of the four positive affect items including restful sleep, energetic, alert, and enthusiastic were graded as 1) very slightly or none at all, 2) a little, 3) moderately, 4) quite a bit, or 5) extremely. The positive affect score was defined as the total of the ratings for the four aforementioned items. Each of the seven negative affect items including irritation, nervousness, overreaction, tension, feeling overwhelmed, feeling that people were too demanding, and feeling drained were graded by the participants as 1) very slightly or none at all, 2) a little, 3) moderately, 4) quite a bit, or 5) extremely. The nonstress score was defined as the total of the reverse-scored negative affect ratings for the seven aforementioned items: 1) extremely, 2) quite a bit, 3) moderately, 4) a little, and 5) very slightly or none at all. The wellbeing scores were defined as the totals of the positive affect and nonstress scores. After the

baseline survey was completed, the participants were given a copy of the book *Spiritual Flow* [23] to read and contemplate. Surveys were completed during work duty hours.

Spiritual Flow: pathways to proficient patient care and nurse & physician wellbeing

The content of *Spiritual Flow* [23] was obtained from *Authentic Sports: The 7 Pathways to Peak Performance*, second edition [24]. *Authentic Sports* is a guideline for improving sports performance and increasing joy while participating in sports activities. Spiritual principles and how they affect different sporting activities are described in the guide. A range of sport vignettes are also provided as examples to clarify the principles. The essence of each principle is virtually identical whether one is discussing sports activities, waitressing, machine shop working, or providing patient care. Accordingly, almost all of the statements in *Spiritual Flow* are identical to those printed in *Authentic Sports*. The first author revised a small portion of the text so physicians and nurses reading it would be able tor easily relate to the information and comprehend the principles that were explained in *Authentic Sports*. The first author also deleted the sports vignettes to reduce the text for time-restricted physicians and nurses.

In *Spiritual Flow*, guided meditations are included in chapter 9 to help nurses and physicians improve their mindfulness experiences while performing patient care-related activities. An appendix section regarding self-talk was added to *Spiritual Flow*. Once the manuscript was produced, three nurses, two physicians, and a theologian reviewed and comprehensively critiqued the work. Because the reviews were favorable, no manuscript modifications were made.

Follow-up wellbeing survey

The same 11-items and processes as described for the baseline wellbeing survey were repeated at 2 months following the initial survey. In addition, the participants were queried on the follow-up survey to indicate the amount of *Spiritual Flow* that they had read: 1) < 50% or 2) > 50%. Participants were prompted to rate each of the following: 1) after studying *Spiritual Flow*, I feel more inspired; and 2) after studying *Spiritual Flow*, I feel more peaceful. Each item was rated as 1) very slightly or none at all, 2) a little, 3) moderately, 4) quite a bit, or 5) extremely. Surveys were completed during work duty hours.

Control group

During the validation process of the 11-item Wellbeing Inventory, we had a group of physicians and nurses who were not undergoing any specific wellbeing intervention complete the survey [1]. We used the wellbeing survey results from these subjects to serve as the control group; i.e., we compared baseline and follow-up score results of the current study participants to the control group. The majority of the control group participants were nurses.

Statistical analyses

Results were entered into an Excel 2010 worksheet (Microsoft Corp., Redmond, WA, USA) and imported into the SAS System for Windows, release 9.2 (SAS Institute Inc., Cary, NC, USA). All mean values are accompanied by their standard deviations. For two-group ordinal rank data comparisons among the same participants, the mean and standard deviation, paired t-test result, Cohen d, median, and paired Wilcoxon signed-rank test result were assessed. For ordinal ranked data comparisons between groups with different participants, the Wilcoxon rank-sum test was used. Correlation analyses were assessed in SAS using Spearman rank-order procedures. The level of significance was $P < 0.05$.

Results

Study participants and control group

During the second week of November 2019, all 39 routine, surgical intensive care unit, nursing staff members had completed the baseline wellbeing survey, had received a copy of *Spiritual Flow*, and were expected to start reading and contemplating *Spiritual Flow*. During the second week of January 2020, 37 (94.9%) participants completed the follow-up survey. The control group consisted of 191 nurses/physicians from the same trauma center who had completed the same 11-item wellbeing survey [1].

Study participant wellbeing survey responses

A comparison of the baseline survey and follow-up survey results are displayed in **Table 1**. Compared to the baseline scores, the wellbeing

Table 1. Comparisons of follow-up and baseline wellbeing scores

	Baseline Survey	Follow-up Survey	*P*-value	Cohen d
	Fall 2019	Winter 2020		
	n = 37	n = 37		
Wellbeing Score Mean	35.7 ± 6.7	40.5 ± 6.3	0.0001	0.7
Wellbeing Score Median	37.0	41.0	0.0001	
Nonstress Score Mean	23.6 ± 5.1	27.9 ± 4.4	0.0001	0.9
Nonstress Score Median	24	28	0.0003	
Positive Affect Score Mean	12.0 ± 2.9	12.6 ± 2.9	0.1606	0.2
Positive Affect Score Median	12	13	0.2640	

Table 2. Comparison of baseline survey score results between the study participants and control group

	Control Group	Study Participants	*P*-value
	Fall 2018	Fall 2019	
	n = 191	n = 37	
Wellbeing Score	37.0 ± 7.5	35.7 ± 6.7	0.3062
Nonstress Score	25.1 ± 6.0	23.6 ± 5.1	0.1573
Positive Affect Score	11.9 ± 2.9	12.0 ± 2.9	0.8079

Table 3. Comparison of follow-up survey score results between the study participants and control group

	Control Group	Study Participants	*P*-value
	Fall 2018	Winter 2020	
	n = 191	n = 37	
Wellbeing Score	37.0 ± 7.5	40.5 ± 6.3	0.0095
Nonstress Score	25.1 ± 6.0	27.9 ± 4.4	0.0018
Positive Affect Score	11.9 ± 2.9	12.6 ± 2.9	0.1814

Table 4. Improvements in survey scores for the 83.8% of participants with baseline positive affect scores ≤14

	Baseline Survey	Follow-up Survey	*P*-value	Cohen d
	n = 31	n = 31		
Positive Affect Score Mean	11.2 ± 2.3	12.2 ± 2.8	0.0171	0.5
Positive Affect Score Median	12.0	12.0	0.0411	
Nonstress Score Mean	23.3 ± 5.3	27.3 ± 4.5	0.0015	0.6
Nonstress Score Median	24	27	0.0024	
Wellbeing Score Mean	34.5 ± 6.2	39.5 ± 6.3	0.0003	0.7
Wellbeing Score Median	36.0	40.0	0.0004	

score and nonstress scores were significantly increased on the follow-up surveys. The positive affect scores were not significantly different between the baseline and follow-up surveys. The energetic plus alert positive affect item scores were higher on the follow-up survey (7.0 ± 1.5; median = 7.0) than on the baseline survey (6.4 ± 1.3; median = 6.0; P = 0.0064; Cohen d = 0.5).

Study participants versus the control group

The baseline survey score results were similar between the study participants and the control group (**Table 2**). The follow-up survey wellbeing and nonstress scores were significantly larger in the study participants than in the control group (**Table 3**).

Examination of positive affect score results

On the baseline survey, six (16.2%) participants had positive affect scores ≥15. The positive affect scores were significantly greater for these six (16.3 ± 1.8) than for the other 31 (83.8%) participants (11.2 ± 2.3; P < .0001; Cohen d = 2.5). For these six participants, the follow-up positive affect scores (14.7 ± 2.4) were similar to the baseline scores (16.3 ± 1.8; P = 0.1412).

Analyses of the 31 (83.8%) participants with positive affect scores ≤14 on the baseline survey showed that all scores were increased on the follow-up surveys compared to the baseline surveys (**Table 4**). For these 31 participants, the energetic plus alert positive affect item scores were higher on the follow-up survey (6.8 ± 1.5; median = 7.0) than on the baseline survey (6.1 ± 1.1; median = 6.0; P = 0.0019; Cohen d = 0.6).

Percent of Spiritual Flow read by participants

Of 37 participants who completed the follow-up survey, 28 (75.7%) read > 50% of *Spiritual Flow*

and nine (24.3%) participants read < 50%. Baseline wellbeing, positive affect, and nonstress scores were similar between participants who read > 50% of *Spiritual Flow* and those who read < 50% (P = 0.4992-0.7229). Follow-up wellbeing, positive affect, and nonstress scores were similar according to the amount of *Spiritual Flow* read (P = 0.4012-0.8408). The differences between the baseline and follow-up wellbeing, positive affect, and nonstress scores were similar in relationship to the amount of *Spiritual Flow* read (P = 0.6290-0.8630).

Perceptions of benefits from contemplating Spiritual Flow

Of 37 participants who completed the follow-up survey, 22 (59.5%) rated feeling more inspired after contemplating *Spiritual Flow* as moderately or quite a bit. In regard to feeling more peaceful, 21 (56.8%) participants rated this item as moderately or quite a bit. When rating feeling more inspired and/or feeling more peaceful, 24 (64.9%) participants rated them as moderately or quite a bit. The follow-up wellbeing scores were positively associated with the peaceful ratings (r = 0.34; P = 0.0384), as were the follow-up nonstress scores (r = 0.38; P = 0.0204).

Discussion

Several trauma center studies have shown that nurse wellbeing is commonly impaired according to latent construct analyses describing burnout, positive affect, negative affect, and perceived stress trait ratings [1, 6, 7]. The relationships among burnout, positive affect, negative affect, and perceived stress have been demonstrated in the literature. Two investigations showed that Perceived Stress Scale scores were inversely associated with positive affect scores and positively correlated with negative affect scores [25, 26]. One trauma center nurse study documented that stress scores were associated with burnout scores and job dissatisfaction ratings [7]. In addition, Dunham et al. demonstrated that positive affect and negative affect scores had a significant association with burnout risk in trauma center nurses [1]. These investigations imply that trauma center nurse burnout, stress, mitigated positive affects, and accentuated negative affects represent interrelated latent constructs depicting impaired states of wellbeing.

Spiritual Flow was constructed to provide readers with potential insights into spirituality and mindfulness as they apply to patient care. The purposes of reading and contemplating *Spiritual Flow* were to foster skills and capacities to spiritually and mindfully contextualize patient care experiences. The wellbeing and nonstress scores were significantly improved on the follow-up surveys after participants contemplated *Spiritual Flow* compared to the pre-reading baseline surveys, which confirmed our hypothesis. The effect sizes of the changes were moderate to large according to the Cohen d values. This finding supports the notion that reading and contemplating *Spiritual Flow* enhances and fosters a sense and perception that one is secure and that daily activities are manageable. Although improvements in positive affect were not as apparent, further exploration provided useful insight. Additionally, the energetic plus alert positive affect items did significantly increase on the follow-up survey for all participants.

The validity of the data analyses is supported by the fact that the number of participants is substantial and that nearly all of the routine surgical intensive care unit nurses completed the baseline survey, agreed to read and study *Spiritual Flow*, and completed the follow-up survey. Further, the strength of this study's results is enhanced by comparing the baseline and follow-up survey scores with an external control group; i.e., the baseline scores of participants were similar to those of the control group, whereas the follow-up nonstress and wellbeing scores were significantly greater in study participants than in the control group. These findings, after reading and contemplating *Spiritual Flow*, are in harmony with others who have described enhancements in nurse wellbeing when utilizing spirituality [8, 16-18, 21, 22] and mindfulness [6, 10-15].

Of relevance, a substantial number of participants (nearly 20%) had high positive affect scores on their baseline surveys and thus were unlikely to improve on the follow-up survey. The effect size comparison for this group (Cohen d value), when compared to the others, was extremely large. In fact, analyses of those with

low baseline positive affect scores had significant improvements in positive affect, nonstress, and wellbeing scores after reading and contemplating *Spiritual Flow*. The findings that the positive affect improvements were not as great as the nonstress score increments are consistent with previous observations. During validation of the wellbeing survey, it was found that in the control group without any intervention, the negative affect scores were worrisome, but mitigated positive affect scores were of even greater concern [1]. Further, in an intervention study using Bispectral Index™ neurofeedback following mindfulness instructions, it was found that increments in positive affect scores were not as great in comparison to improvements in wellbeing and nonstress scores [15]. These observations imply that although negative affect prevalence is worrisome in trauma center nurses, positive affect traits, such as feeling energetic, enthusiastic, and inspired, are of even greater concern [1].

The fact that the amount of *Spiritual Flow* read had no apparent associations with baseline or follow-up survey score results appears to be somewhat paradoxical. However, the quality of reading and contemplating *Spiritual Flow* were not investigated, and other factors may have mollified potential influences regarding the amount of the work that was read. These factors include conceptual issues, such as variations in learning styles and reading habits. Other learning dynamics that were likely to be influential were prosocial and mirror behaviors and informal learning.

Nurses have been shown to have varying learning styles that include composites of abstract thinking, active experimentation, concrete or physical experiencing, and reflective observation [27]. Further, learning variances may be related to differences in reading habits. When reading is undertaken to enhance professional knowledge, many nurses and physicians do not read an entire work, but often choose to read only select portions that most interest them [28-31]. Varying personal responsibilities, family obligations, time constraints, and fatigue are commonly cited as reasons for selective reading [28, 32-34]. Although these differences may seem to have the potential to create antagonistic viewpoints, they can propagate multiple insightful opportunities to foster knowledge acquisition when conversing with co-workers.

A factor that may have been responsible for reconciliation of the differences in the amount of *Spiritual Flow* that was read is the notion that prosocial behaviors are common and include sharing resources or space and cooperating in working toward a similar end [35]. Prosocial behaviors are valued by institutional leadership as they contribute to the organization's benefit [36] by fostering cooperation and assistance among its members [37, 38]. Of relevance, prosocial behaviors have been documented to exist for physicians in training [39] and commonly found to be present in hospital-based nurses [40]. Potentially related to prosocial behavioral motivations are mirror cerebral networks that process visual, auditory, and somatosensory information, and influence the coordination of individuals' learning by observing each other. Functionally, this is a process where individuals imitate or mimic another person's physical (motor) activities [41-43], affect demeanors (emotions) [42], behaviors [42], and social interactions [41, 42, 44] and monitor self-awareness [42].

Spontaneous reflective dialogues and conversations among co-workers, independent of mentoring, have been shown to be common mechanisms for informal professional and personal learning in nursing students and practitioners [45-48]. Other health care professionals have also demonstrated that serendipitous, spontaneous interactions foster overall learning [49, 50]. Additional factors were likely to have accounted for a relatively uniform conveyance of information from *Spiritual* Flow among the nursing staff. All of the routine nursing staff of the surgical intensive care unit had 1) received a personal copy of *Spiritual Flow*; 2) agreed to read and study the book; and 3) readily assimilated the book's subject matter by seeing the title printed in a large, bright-yellow bold type on a light-blue background book cover at the time of distribution. These circumstances created a ubiquitous priming foundation that would permeate the working environment and tend to facilitate group learning. Although professional learning styles and interests in specific sections of the compendium likely varied, it is probable that positive social interactions enhanced group learning. It is reasonable to conjecture that informal dialogues and conversations about various sections of *Spiritual Flow* transpired and that prosocial and mirroring motivations and behaviors were at

play. These plausible speculations may account for the reasons why there were no wellbeing score differences in regard to the amount of the compendium that was read; yet, the group, as a whole, had significant improvements in wellbeing.

At the time of the follow-up survey, more than 50% of the nurses provided ratings to indicate that they had favorable perceptions of feeling more peaceful or more inspired. Such findings are consistent with enhancements in positive affect, yet somewhat different latent constructs than those used in the wellbeing surveys. Inspiration is a positive affect item in the Positive and Negative Affect Schedule that was found to be correlated with positive affect during validation of the wellbeing survey that we used in the current study [1]. Peacefulness is also considered to be a positive affect item; additionally, it has a quality of low arousal and is intimately linked harmoniously with an appreciation of the present moment [51]. Thus, these findings are additional suggestions that reading and contemplating *Spiritual Flow* enhanced positive affect wellbeing.

The principal limitation of this study was that it did not have a comparative cohort of intensive care unit or emergency department nurses, without an intervention, who underwent baseline and follow-up wellbeing surveys during the same time as the study participants. Additionally, the small sample size was an inherent limitation of the pilot study design.

The compendium *Spiritual Flow* was created to clarify and promote spiritual principles and recommend mindfulness guidance as they relate to the provision of patient care. The primary purpose for contemplating the contents of *Spiritual Flow* was to foster the acquisition of skills and capacities that may contextualize and influence provider perceptions during patient care activities. The current pilot study results suggest that contemplating the contents of *Spiritual Flow* was associated with improvements in surgical intensive care trauma nurse wellbeing. These preliminary findings need to be confirmed in an investigation that includes a control group and randomization before they can be applied to clinical practice. Our future plans and recommendations for other researchers are to perform similar investigations and include a synchronous control group. More specifically, investigators should consider that the control group has an alternative intervention, e.g., cognitive behavioral therapy. Further, study groups should include nurses working in an intensive care environment and a non-intensive care unit setting. Finally, a randomization process should determine cohort allocation.

Acknowledgements

The authors wish to thank Marina C. Hanes, BA, ELS for copyediting the manuscript. We would like to thank the two physicians, three nurses, and theologian who provided a detailed critique and endorsement of *Spiritual Flow* before its publication. We wish to acknowledge Bill Lefko for developing the primary principles and content contained within *Spiritual Flow*. We would also like to thank Bill and Gayle Lefko for their assistance with the publication of *Spiritual Flow*.

Disclosure of conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest. Although the first author is a co-author of the work *Spiritual Flow*, the first author receives no royalties from the published book.

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