

The Effects of a Structured Resiliency Program on Indicators of Burnout in Medical Residents

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Abstract

Because of the well documented burnout and stress experienced by medical residents, the Accreditation Council for Graduate Education (ACGME) has directed training programs to address these issues in their residents. The current study describes a resiliency enhancement program administered to residents from differing residencies. Method: Residents received group-based sessions focusing on awareness of stress reactions, mindfulness, cognitive coping skills and balancing life and work. All sessions were interactive. The training occurred over a 9-month time span. Residents provided informed consent so that data could be collected. The percentage of burnout was calculated based on one indicator (high emotional exhaustion, high depersonalization, or low personal accomplishment using the Maslach Burnout Scale). Standardized assessment instruments were administered at the beginning (September) and the end of the program (May) to assess the impact of the intervention. Residents were in training at a medium-sized academic medical center. They came from urology, internal medicine, emergency medicine and neurology training programs. Eighteen female and 51 male residents participated. Results: Baseline rates of burnout were as follows: urology residents, 89%; internal medicine, 73%; neurology, 50%; emergency medicine, 22%. There was a significant decrease in perceived stress for the overall group following the intervention. Residents who significantly improved on mindfulness measures also showed significant improvement on resiliency, stress, and personal accomplishment scores. Residents who significantly lowered perceived stress also lowered emotional exhaustion, depersonalization, and increased resiliency and compassion satisfaction. Discussion: This study demonstrated that a resiliency enhancement program and data collection after IRB approval is feasible and effective during medical residency. Based on our analysis, mindfulness, and cognitive skills to reduce perceptions of stress seem to be critical components. Future research is necessary to identify elements of the program most relevant to specific residencies.

Keywords: resiliency, burnout, medical residents, mindfulness, perceived stress.

1. Introduction

“Psychological, emotional, and physical well-being are critical in the development of the competent, caring and resilient physician...Residents ...are at risk for burnout and depression. Programs.... have the same responsibility to address well-being as other aspects of resident competence” (1). By these strong and clear statements, the ACGME has communicated its awareness and concern regarding resident burnout and supporting resident well-being. Documentation of the rate and risks of burnout has emerged from several research reports (2,3,4,5).

A combination of factors contributes to the stress experienced by medical residents. Among the most salient are long workdays, limited time for self-care, unpredictable schedules and the “life or death” consequences of their actions (6,7). The experience and perception of having limited control over their lives further enhances the sense of powerlessness. In combination, these factors increase the likelihood of burnout (8).

Following the leadership of the ACGME (1) in promoting research on resiliency enhancement programs for residents, several studies have been conducted to test the effects of intervention programs (9, 10, 11). Efforts have been applied to identify the most effective and efficient parameters of intervention programs (12). Many programs have focused on stress reduction by teaching various coping mechanisms (e.g., relaxation, slow breathing, self-reflection) (13). Mindfulness has emerged as a promising component in enhancing resiliency (14,15). The minimal length of time for programs to be effective is not clear. Offerings have varied in length from one day workshops to several hours of training spaced over many months (16).

Vercio et al. (17) recommended a focus on resiliency, instead of resident personal wellness. We have taken this approach in our programming. There are many system issues in medicine, so we are in no way blaming residents for their stress

reactions but seeking to build strength under adverse conditions.

The goal of the current study was to evaluate the impact of a year-long resiliency intervention program on residents from different medical residencies. It was hypothesized that there would be positive responses from the whole group and from each group of residents. We also hoped to identify key components of the program based on data from the structured assessments.

2. Methods

During the years 2018-2019 and 2021-2022, residents from multiple disciplines were required to attend didactic sessions on building resiliency and preventing burnout. Didactics constitute protected time when residents do not have clinical responsibilities. However, residents who were on vacation or were post-call were not required to attend.

The protocol and consent form were approved by the IRB at the University of Toledo Medical Center, the approval number is 200284. Residents were invited to provide informed consent and sign the consent form, but this was not required as part of the didactics.

Sessions were one hour long and took place every 4-6 weeks from September to May. Sessions were offered to residents from each discipline separately. The sessions were facilitated by faculty from the Departments of Psychiatry and the Department of Family Medicine. Input was requested from program directors of each specialty, but they did not attend.

The first session had several objectives. First, the program was explained as a series given throughout the academic year designed to help residents build the pillars of resiliency (awareness, balancing life, mindfulness, and cognitive skills to lower reactions to stress). Secondly, the consent forms were offered and explained in detail, highlighting methods to protect confidentiality, and emphasizing that the sessions were

nonclinical. Code numbers were assigned to residents who provided consent and all data was entered into SPSS according to code numbers and not the residents' names. Information on available resources for residents with clinical concerns was provided.

The residents completed a set of assessments (described in the section on Instruments) at the beginning and end of the program (August or September and April or May respectively).

The main themes of the subsequent sessions were building the growth mindset, identifying personal strengths, coping strategies, stress management, dealing with perceptions of failure and learning formal and informal mindfulness. Examples used during the sessions were relevant to that specialty, but the basic content of the program was the same. Each session contained instruction guided by a handout. Discussion and participation by the residents were emphasized. The last 10 minutes were devoted to relaxation or mindfulness practice.

3. Instruments

Residents completed a short demographic form indicating their age, gender, ethnicity, relationship status, and race. Standardized, validated assessments comprised the following: The Maslach Burnout Inventory (MBI) consists of three subscales that measure Emotional Exhaustion, Depersonalization, and Personal Accomplishment (18). Burnout is defined as high scores in Emotional Exhaustion (score >27), Depersonalization (score >13) and/or low scores in Personal Accomplishment score (<31). The Professional Quality of Life (PQoL) Scale also comprises three subscales (Compassion Satisfaction, Burnout, and Secondary Traumatic Stress) to assess the sense of satisfaction in doing a job well, feelings of extreme emotional tiredness due to work, and the impact of exposure to the trauma of others (19). The Mindfulness Attention Awareness Scale (MAAS) captures the experience of mindfulness and mindlessness states by scaling multiple example statements specific to day-to-

day circumstances (14). The average score for the MAAS is 3.93. The Connor-Davidson Resilience Scale is an assessment of a person's ability to bounce back from stressful situations (20). The Perceived Stress Scale (PSS) questionnaire measures the extent to which people consider situations to be stressful (21). Norms for the PSS are male average score is 12.1(5.9) and female average score is 13.7 (6.6). Table 1 indicates normal values for each of the assessment instruments used in the study.

Table 1. Normal values on instruments used in this study.

	Normal values
Connor Davidson Resilience	80.7
Emotional Exhaustion	High: 27 or over
	Average: 17-26
	Low: 0-16
Depersonalization	High: 27 or over
	Average: 17-26
	Low: 0-16
Personal Accomplishment	High: 27 or over
	Average: 17-26
	Low: 0-16
Compassion Satisfaction	High: 42 or over
	Average: 23-41
	Low: 0-22
Burnout	High: 42 or over
	Average: 23-41
	Low: 0-22
Secondary Traumatic Stress	High: 42 or over
	Average: 23-41

	Low: 0-22
Mindful Attention Awareness Scale	4.20
Perceived Stress Scale	Male: 12.1
	Female: 13.7
	Age (18-29): 14.2
	Age (30-44): 13.0

Statistical analyses consisted of descriptive statistics, analysis of variance, and paired t-tests. One tailed t-test significance levels were used.

4. Results

Seventy residents of average age 28.5 years (SD=2.0) gave informed consent. Eighteen were women and 51 were men. There were 12 residents from neurology, 23 from emergency medicine (EM), 26 from internal medicine (IM) and 9 from urology. Table 2 shows the descriptive statistics for the residents who provided data beyond informed consent.

Table 2. Demographic data.

Gender	18 females	51 males
Age	Mean (SD)=28.5(2.0) years	
Relationship status		
Single		22
In a relationship but not living together		13
Living together		2
Married		32
Race		
Caucasian		24
African American		3
Asian		24
American Indian or Alaskan native		1
Biracial		4
Other		12
Ethnicity		
Hispanic or Latino origin		4
Non-Hispanic or Latino origin		61
No answer		2
Discipline		
Neurology		12
Emergency Medicine		23
Internal Medicine		26
Urology		9

First, statistical comparison of the percent of burnout in the residencies was carried out by chi square. Based on meeting at least one indicator of burnout (high emotional exhaustion or depersonalization or low personal accomplishment), the percentage of residents burned out in the entire group was 54%. For the individual residencies, the percentages were neurology 50%, EM 22%, IM 73%, and urology 89%. These differences were significant based on chi square analysis ($p < 0.001$).

Then, statistical comparison of the values of the dependent variables at baseline was conducted using the MANOVA as found in Table 3. The analysis resulted in an overall F score of 3.8; $p < 0.001$. Post hoc testing showed differences between residents in emotional exhaustion (0.002), compassion satisfaction (0.02), and secondary traumatic stress (0.009). Residents from urology and internal medicine had the highest scores in emotional exhaustion; urology the lowest scores in compassion satisfaction; residents from urology and neurology had the highest scores in secondary traumatic stress.

Table 3. Baseline scores (means and standard deviations) for subjects by residency.

	Residency			
	Emergency Med	Internal Med.	Neurology	Urology
N	22	24	11	8
Measures				
Resiliency	75.3 (12.7)	74.0 (16.2)	78.7(11.6)	61.5(11.1)
Emotional exhaustion	21(8.1)	23(8.9)	18(8.9)	34(13)
Depersonalization	11(7)	10(5.1)	8(5.5)	16(7.6)
Personal Accomplishment	35(6.2)	34(5.5)	36(6.7)	33(5.8)
Compassion Satisfaction	37(6.4)	31(7.6)	42(3.1)	31(7.6)
Secondary traumatic Stress	19(4.9)	20(5.3)	23(4.9)	27(7.2)
Mindfulness	3.8(0.7)	4(.9)	3.8(.72)	3.6(.93)
Perceived				

Stress 16(5.1) 16.6(6.5) 16.9(10.5) 22.4(7.6)

Next, the entire group’s baseline and post program scores on the dependent variables were compared using paired t-tests. There was a significant decrease in perceived stress from 18.5 to 16.0 ($p = 0.03$). These results are shown in Table 4.

Table 4. Comparison of pre and post values of the dependent variables in the entire group.

	Pre-intervention mean SD	Post-intervention mean SD	t	p-value
Connor Davidson Resilience	71.81 (n=52)	73.81 (n=52)	-1.218	0.2
Emotional Exhaustion	24.75 (n=53)	24.74 (n=53)	0.015	1
Depersonalization	11.49 (n=53)	10.98 (n=53)	0.599	0.6
Personal Accomplishment	34.08 (n=53)	34.85 (n=53)	-0.772	0.4
Compassion Satisfaction	36.59 (n=51)	37.00 (n=51)	-0.464	0.6
Burnout	24.38 (n=40)	24.40 (n=40)	-0.026	0.980
Secondary Traumatic Stress	21.53 (n=51)	21.58 (n=51)	-0.060	1
Mindful Attention Awareness Scale	3.70 (n=53)	3.68 (n=53)	0.153	0.9
Perceived Stress Scale	18.50 (n=52)	16.00 (n=52)	2.232	0.03

Next, we searched for changes in the dependent variables in the individual residencies. There were no significant changes in the scores from the neurology residents. The internal medicine residents showed an increase in the Connor-Davidson Resiliency Scale from 68.4 to 74.3 ($p = 0.004$), a decrease in perceived stress 19.2 to 15.7 ($p = 0.02$) and an increase in personal accomplishment from 33.8 to 36.6 ($p = 0.05$). The residents from emergency medicine showed a significant decrease in the Emotional Exhaustion scale from the Maslach inventory from 24.2 to 21.7 ($p = 0.009$). Lastly, analysis of the baseline and post program scores of the urology residents

resulted in a decrease in secondary traumatic stress from 24.7 to 18.6 ($p = 0.004$), a decrease in perceived stress from 22.4 to 17.3 ($p = 0.04$) and a decrease in depersonalization from 15.5 to 11.8 ($p = 0.05$).

We then searched for evidence which would indicate the most effective components of the program. As mindfulness has been a theme of many well-being programs, we split the entire group based on whether residents increased or decreased mindfulness post program. The 28 residents who increased mindfulness also improved in personal accomplishment ($p = 0.04$), perceived stress ($p = 0.004$) and resiliency ($p = 0.006$). Those who did not increase mindfulness showed no significant changes. These results are shown in Table 5.

Table 5. Comparison of pre and post values of the dependent variables in residents who increased their mindfulness scores.

	Pre-intervention mean	Post-intervention mean	t	p-value
Connor Davidson Resilience	70.14 (n=28)	76.01 (n=28)	-2.999	0.006
Emotional Exhaustion	26.18 (n=28)	24.68 (n=28)	0.928	0.4
Depersonalization	13.29 (n=28)	11.46 (n=28)	1.637	0.1
Personal Accomplishment	34.30 (n=28)	36.71 (n=28)	-2.166	0.04
Compassion Satisfaction	35.48 (n=27)	37.04 (n=27)	-1.226	0.2
Burnout	24.67 (n=24)	23.79 (n=24)	0.743	0.5
Secondary Traumatic Stress	21.04 (n=27)	20.58 (n=27)	0.361	0.7
Perceived Stress Scale	19.96 (n=28)	14.90 (n=28)	3.180	0.004

Further, we divided the group based on whether residents decreased or increased perceived stress post program. The 30 residents who decreased perceived stress also decreased emotional exhaustion ($p = 0.06$) reduced depersonalization ($p = 0.06$) increased resiliency ($p = 0.05$) and compassion satisfaction ($p = 0.03$). Residents who did not change or increased perceived stress worsened in emotional exhaustion ($p = 0.02$) and

reduced compassion satisfaction ($p = 0.03$). These results are shown in Table 6.

Table 6. Comparison of pre and post values of the dependent variables in residents who decreased their perceived stress scores.

	Pre- intervention mean SD	Post- intervention mean SD	t	p-value
Connor Davidson Resiliency	70.29 (n=29)	74.84 (n=29)	-2.020	0.05
Emotional Exhaustion	27.20 (n=30)	24.00 (n=30)	1.961	0.06
Depersonalization	12.33 (n=30)	10.63 (n=30)	1.957	0.06
Personal Accomplishment	34.45 (n=30)	35.60 (n=30)	-0.872	0.4
Compassion Satisfaction	34.79 (n=28)	37.50 (n=28)	-2.263	0.03
Burnout	25.70 (n=20)	23.80 (n=20)	1.455	0.2
Secondary Traumatic Stress	21.54 (n=28)	20.49 (n=28)	0.849	0.4
Mindfulness Attention Awareness Scale	3.63 (n=30)	3.80 (n=30)	-0.841	0.4

5. Discussion

The results of this study demonstrate that a resiliency enhancement program can decrease perceived stress in a group of medical residents. As anticipated, baseline levels of burnout and stress varied among the various medical specialties, but despite differing starting points, three of the four groups of residents demonstrated improvement.

Residents from the urology program showed the highest number of residents with at least one indicator of burnout (89%). Only 22% of the residents from emergency medicine (EM) showed at least one indicator of burnout. Midway between these 2 extremes, approximately one half of the residents from neurology and internal medicine evidenced at least one burnout

indicator. Variation in burnout rates have been reported by others (22). It could be that urology, as a surgical specialty, is characterized by a unique culture of stress described by various authors (23,24). Emergency medicine, in contrast, incorporates dedicated periods of time off duty. Additionally, the program directors of this specific EM program often verbalized the importance of the well-being of their residents. Food was always available and frequent family activities were held. The greater sense of control over their time and better work/life balance may have inhibited burnout (8).

Future research is needed to develop a more detailed understanding of the stresses unique to each training program so that programs can be tailored to the needs of each residency. The work of O'Shea and colleagues (22) with EM residents provides a useful model for tailoring programs to specific program stressors.

The current program of six sessions was conducted over an entire academic year. Consequently, based on our results, we cannot comment on the minimum length of time needed for an intervention to achieve significant results. However, an examination of Goldhagen et al. (10) suggests that brief interventions are not sufficient to produce measurable findings.

Since the current intervention included mindfulness, cognitive restructuring, and stress reduction components, it is not clear which of these contributed most to the positive changes. Mindfulness-based interventions by themselves have been found to be effective (15) and so it is likely that in our study, mindfulness training contributed to the improvements observed. We found that those who increased their mindfulness scores also increased resiliency and sense of personal accomplishment, while decreasing perceived stress. The extent to which residents perceive stress in their everyday environment also seems to be a key factor. Decreased perceived stress post program compared to preprogram was associated with decreases in emotional exhaustion and depersonalization. This change

was also associated with increases in resiliency and compassion satisfaction.

Several limitations should be considered in reviewing the current study. There were a relatively small number of residents in the study, and they all came from the same institution, thus limiting the generalizability of the findings. Unequal sample sizes in the specific residencies complicate the interpretation of findings. Inclusion of residents from all years of the residency prevented us from identifying any year-to-year differences in burnout or response to the program. Follow-up data were collected at the end of the academic year and so the improved scores may have been influenced by an improved mood associated with that time of the year, particularly in the graduating residents.

Future research should attempt to tease out the most effective components of resiliency interventions. Findings from more focused studies will facilitate the design of future, more effective interventions. In particular, interventions addressing the unique stressors of specific residencies should be evaluated. Until such findings are available, our findings support the use of broad-based interventions to increase resident resiliency.

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