Resident Wellness Behaviors:

Relationship to Stress, Depression, and Burnout

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BACKGROUND AND OBJECTIVES: Stress in medical education has been well documented, often with the primary focus on negative factors such as depression and burnout. Few studies have attempted to assess well-being mediating behaviors. This study describes the relationship between wellness behaviors and measures of well-being at the start of family medicine residency.

METHODS: Using an online questionnaire, first-year family medicine residents (n=168) completed standardized measures exploring perceived stress, depression, satisfaction with life, and burnout. A lifestyle wellness behavior measure was developed for the study.

RESULTS: Average reported perceived stress levels were consistent with ranges found for medical students and residents. Twenty-three percent of residents scored in a range consistent with depression risk. In terms of burnout risk, 13.7% scored in the high emotional exhaustion range and 23.8% in the high depersonalization range. Two thirds reported high life satisfaction. Higher depersonalization and less time in nurturing relationships were associated with greater likelihood of medication use for sleep, mood, and anxiety in females. Higher alcohol use was associated with increased levels of perceived stress, burnout, and depression. The two wellness behaviors most associated with higher well-being were restful sleep and exercise.

CONCLUSIONS: At the start of residency, well-being measures are consistent with findings in medical school. Restful sleep and exercise were associated with more positive well-being. Future longitudinal data analysis will help clarify the effect of residency training in well-being and lifestyle behaviors. Identification of protective factors and coping mechanisms could guide residencies in incorporating support services for residents.

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Long hours, little sleep, and inadequate personal time have traditionally been the *sine qua non* of graduate medical education. Family medicine was among the first medical specialties to embrace the biopsychosocial model[1] in its effort to reform a traditionally physician-centered system and focus on the patient-physician relationship with the patient viewed in the context of the family and community. "It is the extent to which this relationship is valued, developed, nurtured, and maintained that distinguishes family medicine from all other specialties."[2] Unfortunately, the demands placed on family physicians in training too often result in stress, depression, and burnout, eroding physician empathy, compassion, and presence for their patients.

Burnout, an occupationally related syndrome of emotional exhaustion, depersonalization, and low sense of professional accomplishment,[3] as well as depression, are common among physicians.[4] For specialists in oncology, surgery, and neonatology, burnout ranges between 28% and 38%.[5-8] Among practicing family physicians, high levels of emotional exhaustion (47.9%) and depersonalization are reported.(46.3%).[9]

Much is known about the stress of medical education and its negative effects on resident well-being, depression, and burnout. Studies suggest these problems can originate in medical school and continue during residency and beyond. Depression in residents may be as high as 25%,[10] with burnout reported in up to 76%.[11] Studies suggest a temporal pattern in resident burnout and depression. First-year residents entering with high levels of well-being often experience high levels of burnout and depression by the end of internship.[12] One study of recently

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graduated family physicians early in practice showed moderate emotional exhaustion and depersonalization, only slightly less than a comparable sample of family medicine residents.[13] Of the early practitioners, 48% indicated they were not highly likely to choose a medical career again. Studies suggest gender differences in residents' experience of distress; female residents have higher levels of anxiety and depression[14] while males experience higher levels of depersonalization.[15]

Various factors contribute to depression and burnout in medical trainees, including job stressors (eg, frequent on-call duties and clinical workload), dynamics in the culture of physician education (eg, trainee criticism and cynical attitudes), patient demands, behavior modeled by clinical supervisors, and personal characteristics or negative life events.[12,16-19] Sleep deprivation may also be a major contributor. Residents are especially susceptible to fatigue and chronic sleep deprivation despite Accreditation Council for Graduate Medical Education (ACGME) implemented duty hour limits in 2003. One study found that sleep deprivation increased from 9% at the beginning of intern year to 43% by year end, and chronic sleep deprivation was associated with depression.[20] Psychological factors such as withdrawal coping style[15] and personality[9] may also be contributing factors.

Stress and burnout have serious consequences on resident behaviors. A recent study found that across a single long haul shift, resident stress and burnout increased while empathy decreased.[21] In response to stressors, residents may use maladaptive coping strategies such as alcohol abuse.[20] Conservative estimates suggest between 8%–12% of physicians develop a substance abuse problem during their career.[22] While not necessarily maladaptive, prescription medications for stress, sleep, or mood are frequently used, and studies show many physicians self-treat with these medications.[23]

Wellness can be defined as an active process of making choices in multiple dimensions of body, mind, and spirit that lead toward healthier ways of living.[24] Residency is a time when future work habits and self-care behaviors can be strongly influenced. If residents are provided opportunities to develop self-care practices to help cope with the stress of the medical profession, it may mitigate more severe mental dysfunction and burnout later. Wellness health behaviors that buffer stress reactivity include physical activity/exercise,[25] a nutritious diet low in sugars,[26] mind-body activities such as yoga,[27-29] prayer,[30] seeking social support,[31,32] being outdoors in natural surroundings,[32,33] and getting restful sleep. Increased wellness may also reduce high-risk behaviors such as smoking, alcohol, and substance abuse.

In this article, we present baseline findings from a longitudinal study on the associations between commonly used indicators of well-being (perceived stress, depression, burnout, and satisfaction with life) and wellness behaviors among a group of first-year family medicine residents from 12 residencies nationwide. Eight of these residencies were recruited to implement and evaluate a novel integrative medicine curriculum. The other four residencies did not participate in the curriculum innovation and were recruited to serve as controls.

Methods

Sample

All PGY-1 residents (n=219) from the 2012 and 2013 graduating classes of the 12 family medicine residency programs were asked to participate in the study; of these, 168 completed the survey (77% response rate). Respondents and nonrespondents were compared on available demographic data, and no significant differences were found. Residents completed online surveys at the beginning of PGY-1. Of the 168 residents in the sample, 124 residents were from the family medicine residencies participating in the integrative medicine curriculum, and 44 were residents at the control sites. There were no demographic differences between the two groups. Our sample of residents was compared with national data from the American Academy of Family Physicians (AAFP) database for 2012 PGY-1 residents[34] (Table 1). None of the comparisons to the national database were statistically significant. Approval for the study was granted by the University of Arizona Institutional Review Board (IRB) and the IRBs of participating institutions if required.

Measures

The assessment battery was comprised of five measures (Table 2). Four were established measures that assess dimensions of well-being: perceived stress, depression symptoms, burnout (emotional exhaustion, depersonalization), and life satisfaction. One measure, specifically developed for this study, assessed various wellness behaviors known to mediate the relationships between stress reactivity and health/mental health. Among these are moderate-intensity physical activity/exercise for at least 150 minutes a week,[25] a nutritious diet[26] (as measured by daily fruit and vegetable consumption), mind-body activities (eg, meditation, yoga, relaxation training),[27-29] engagement in spiritual practices such as prayer,[30] nurturing social relationships that have supportive and sustaining qualities,[31,32] being outdoors in natural surroundings that have restorative effects on mental focus,[33,35] and gaining restful sleep, as an inhibitor of hypothalamic-pituitary-adrenal (HPA) axis arousal.[36] The 14-item questionnaire asked residents to rate how many days in a typical week they engaged in a specific wellness behavior. Additional items asked about tobacco use and use of prescription medication for mood, anxiety, stress, or sleep (yes/no), and about the number of

Table 1: Participant and Program Characteristics—Comparison to National Sample

Characteristic	Study Sample (n=167)	AAFP National Sample* (n=3494)
Participant		
Female	59.9%	55.3%
Caucasian	59.1%	62.9%
Married/cohabitating	55.5%	Not available
Age—median	29.0	Not available
Program type	(n=12)	(n=454)
Community-based and medical school affiliated	66.7%	58.8%
Community-based and medical school administered	16.7%	19.8%
Medical school based	16.7%	12.1%
Community-based hospital	0%	5.9%
Military programs	0%	3.3%

* None of the comparisons were statistically significant.
AAFP—American Academy of Family Physicians

Table 2: Measures Table

Dimension	Measure	Description
Perceived stress	Perceived Stress Scale (PSS)[a]	10 items, scores 0–40
Depression symptoms	Center for Epidemiologic Studies–Depression Scale (CES-D)[b]	20 items, scores range from 0–60, score of 16 or higher indicates risk of clinical depression
Burnout	Maslach Burnout Inventory (MBI)[c]	22 items, three subscales: emotional exhaustion, depersonalization, personal accomplishment
Life satisfaction	Satisfaction with Life Scale (SWLS)[d]	Five items, higher total scores indicate greater life satisfaction
Wellness lifestyle behaviors	Wellness behavior survey	14 items: tap diet/nutrition, physical activity/exercise, mind-body activities, nurturing relationships, sleep, prayer, being outdoors in nature, tobacco and alcohol use, prescription medication for mood or sleep

[a] Cohen S, Kamarck T, Mermelstein R. A global measure of perceived stress. J Health Soc Behav 1983;24:385-96.
[b] Radloff LS. The CES-D Scale: A self-report depression scale for research in the general population. Applied Psychological Measurement 1977;1:385-401.
[c] Maslach C, Jackson SE, Leiter MP. Maslach Burnout Inventory, third edition. Palo Alto, CA: Consulting Psychologists Press, 1996.
[d] Pavot W, Diener E. Review of the Satisfaction With Life Scale. Psychol Assess 1993;2:164-72.

alcoholic drinks consumed in a typical week (none, 1–3, 4–7, 8–14, and 14 or more).

Data Collection and Analysis

Data were collected directly from the residents online using an individualized link to an Internet-based survey website (Survey Monkey) in the first trimester of the first year of residency. Prior to accessing the assessments, residents completed an online Informed Consent form. Statistical analyses were conducted using SPSS v. 18.0.

Descriptive statistics are presented for the demographic characteristics, wellness behaviors, and well-being measures. Due to a lower frequency of occurrence, the four mind-body behaviors were coded as to whether the behavior was practiced at least 1–2 days per week or not at all. The dichotomously coded items were then summed to yield a total score for mind-body behaviors. Demographic (gender, age, marital status) differences on the well-being measures, and wellness behaviors were analyzed with *t* tests, chi-squares, or Pearson's correlation. Multiple regression analyses were performed to examine the relationship between individual wellness behaviors and each well-being measure. Demographic variables that had significant relationships with well-being measures were included in regression models. A logistic

regression was performed to identify well-being and wellness behavior predictors of prescription medication use for females only. A burnout risk-level group variable was created as follows: high burnout at-risk group consists of individuals scoring in the high burnout group on both emotional exhaustion and depersonalization; low burnout risk group includes individuals scoring in the low burnout group on both scales. Remaining individuals were categorized as moderate burnout risk. One-way ANOVAs with posthoc Tukey tests were conducted to compare wellness behaviors and well-being measures among burnout risk level groups.

Results

Well-being Measures

1. Perceived Stress. The average perceived stress score (16.1) for this resident sample was slightly higher than normed sample data (11.9–14.7) but consistent with ranges for health care students.[37]

Depression. Twenty-three percent of residents scored in a range consistent with being at risk for clinical depression.

Burnout. Burnout risk level was met by 13.7% of residents scoring in the high emotional exhaustion range and 23.8% scoring in the high depersonalization range.

Life satisfaction. The average life satisfaction score was 26.5 (satisfied) with 67.3% scoring in the satisfied to extremely satisfied range.

Demographic variables. There were no statistically significant gender differences on the well-being measures. Life satisfaction was significantly lower (t (124.3)=3.85, P<.001) for single residents than residents who were married/cohabitating (mean±SD single: 24.6±6.8 versus married/cohabitating: 28.4±5.3). Age was not significantly correlated with any well-being measure. The results are presented in Table 3. Intercorrelations between the well-being measures are presented in Table 4. The well-being measures were significantly intercorrelated with correlations ranging from r=-0.225 (life satisfaction and Maslach Burnout Inventory [MBI] depersonalization)

Table 3: Measures of Well-Being

Well-Being Measures	Total N	n	Mean (SD) Range/ % Yes
Perceived stress	167		16.10 (5.6) 4–33
Satisfaction with Life Scale	168		26.45 (6.5) 5–35
CES-D[1]*	165		10.35 (7.7) 0–38
Non-depressed		127	77.0%
Mildly depressed		22	13.3%
Moderately depressed		12	7.3%
Very depressed		4	2.4%
MBI**–Emotional exhaustion			
Mean (SD) range	168		17.1 (9.5) 0–48
Low emotional exhaustion		98	58.3%
Average emotional exhaustion		47	28.0%
High emotional exhaustion		23	13.7%
MBI—Depersonalization			
Mean (SD) range	168		6.38 (4.7) 0–20
Low depersonalization		85	50.6%
Average depersonalization		43	25.6%
High depersonalization		40	23.8%

* CES-D scoring: non-depressed < 16, mildly depressed scores 16–20, moderately depressed 21–30, very depressed > 30
** MBI scale scores were also coded into low, moderate, or high burnout based on normative data for medical workers
Maslach C, Jackson SE, Leiter MP. Maslach Burnout Inventory, third edition. Palo Alto, CA: Consulting Psychologists Press, 1996
CES-D—Center for Epidemiologic Studies Depression Scale
MBI—Maslach Burnout Inventory

Table 4: Pearson Correlation (r) Between Well-Being Measures

	Perceived Stress	CESD-D Total	Satisfaction With Life	MBI Emotional Exhaustion
CESD-D Total	.722**			
Satisfaction With Life	-.392**	-.487**		
MBI Emotional Exhaustion	.492**	.548**	-.271**	
MBI Depersonalization	.388**	.519**	-.225*	.682**

CES-D—Center for Epidemiologic Studies Depression Scale
MBI—Maslach Burnout Inventory
* P=.003
** P<.001

to r=0.722 (perceived stress and depression).

2. Wellness Lifestyle Behaviors. The most frequent (at least 5 days per week) wellness behavior reported was spending time in a nurturing relationship, with 55.2% of the sample reporting this behavior (see Figure 1). The least frequent daily behavior was spending time outdoors in nature (18.6%), followed by physical activity (19.7%), and reporting restful sleep (20.9%). Only 25.2% reported eating five servings of fruits and vegetables at least 5 days per week. Fifty-three percent engaged in at least one mind-body behavior during the week. The most frequent mind-body behavior was meditation (27.5%), followed by yoga, tai chi, or qi gong (25%), relaxation (25%), and massage (15.7%). Alcohol consumption was low, with 81% reporting none or less than three drinks per week. Three residents reported smoking cigarettes (1.8%). Ten percent reported medication use for anxiety, mood, or sleep. Statistically significant gender differences were found for spending time in a nurturing relationship (t (163)=-1.99, P=.048) and use of medications for anxiety, mood, or sleep ($\chi^2(1)$=9.4; P=.002). Females spent more time in nurturing relationships (mean 2.79 versus 2.38 days). Females comprised 94% of the residents reporting medication use (16 of 17). Married/cohabitating residents reported more days per week eating 5 servings of fruits and vegetables (t (150)=2.04, P=.043, mean 1.93 versus 1.52 days) and spending time in nurturing relationships (t (148)=5.49, P<.001, mean 3.14 versus 2.08 days). Older residents reported spending more time in nature (r=0.232, P=.008).

3. Relationship Between Wellness Behaviors and Well-being Measures. As seen in Table 5, the various combinations of wellness behaviors contributed 12% to 26% of the variance in the tested models, depending on the well-being measure examined. Sleep was a significant predictor in all models for well-being measures, associated with less perceived stress, emotional exhaustion, depersonalization, depression, and greater satisfaction with life. Greater physical activity was

Figure 1: Frequency of Daily Wellness Behaviors

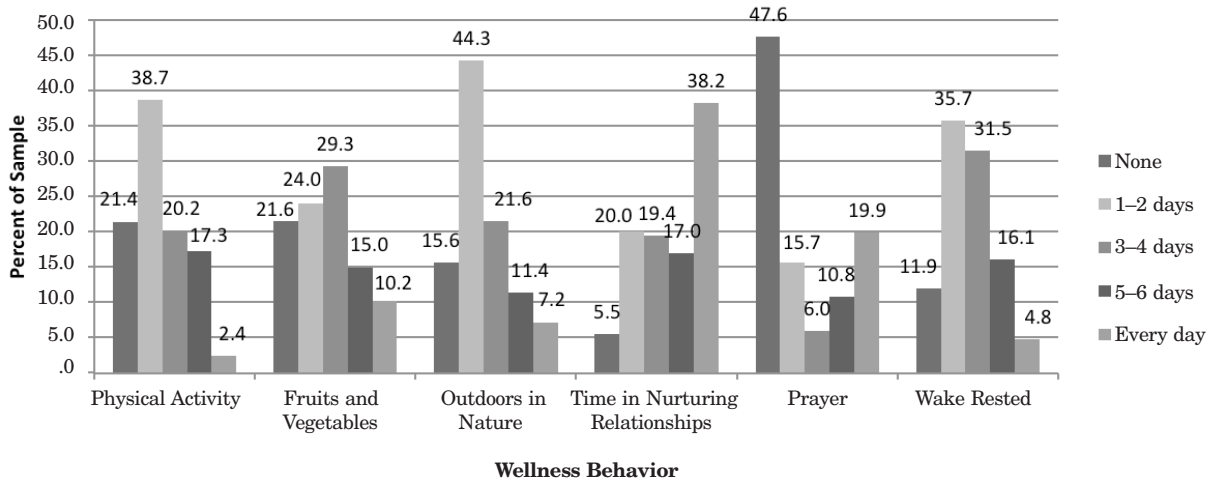

Table 5: Wellness Behavior Predictors, R^2 and Betas on Measures of Well-Being*

Well-Being Measure	Model Adjusted R^2	Model Sig	Beta	*t*	Sig
Perceived Stress	0.125	<0.001			
Wake rested			-0.357	-4.60	<0.001
Alcoholic drinks			0.170	2.16	0.032
Satisfaction With Life	0.258	<0.001			
Wake rested			0.305	4.07	<0.001
Marital status**			-0.203	-2.56	0.012
Physical activity			0.164	1.76	0.081
Nurturing relationships			0.152	1.79	0.076
CES-D Total	0.180	<0.001			
Wake rested			-0.374	-4.94	<0.001
Alcoholic drinks			0.170	2.22	0.028
Physical activity			-0.195	-2.03	0.044
MBI Emotional Exhaustion	0.243	<0.001			
Wake rested			-0.363	-5.04	<0.001
Alcoholic drinks			0.352	4.82	<0.001
Physical activity			-0.229	-2.57	0.011
Outdoors in nature			0.196	2.29	0.023
MBI Depersonalization	0.153	<0.001			
Alcoholic drinks			0.312	4.04	<0.001
Wake rested			-0.245	-3.21	0.002
Outdoors in nature			0.233	2.57	0.011
Physical activity			-0.230	-2.44	0.016

* Only statistically significant ($P<.05$) or marginally significant ($P<.10$) predictors are presented.
** Due to the difference in life satisfaction by marital status, marital status was included in this model. Married/cohabitating is coded as 1; single as 2.
CES-D—Center for Epidemiologic Studies Depression Scale
MBI—Maslach Burnout Inventory

a salient predictor for both burnout measures (less emotional exhaustion, depersonalization) and depression and a trend for higher life satisfaction. Spending time in nature also contributed to the prediction of the two burnout dimensions, being associated with greater emotional exhaustion and depersonalization. Greater alcohol use was associated with higher stress, emotional exhaustion, depersonalization, and depression. Greater satisfaction with life was also associated with being married or cohabitating. Mind-body behaviors, prayer, and fruit and vegetable consumption were nonsignificant contributors in all of the models.

Greater depersonalization and less time in nurturing relationships were associated with prescription medication use in females ($\chi^2(2)=11.63$, $P=.003$). Female residents with higher depersonalization scores had 1.2 times higher odds (95% CI=1.05–1.36) of taking prescription medication for sleep, anxiety, mood. Females who report spending more time in nurturing relationships had 0.55 times lower odds (95% CI=0.34–0.91) of taking prescription medication.

4. Differences Between Burnout Risk Level Groups on Wellness Behaviors and Well-being. Perceived stress, depression, satisfaction with life, restful sleep, and number of alcoholic drinks consumed in a typical week significantly differentiated among burnout groups, (see Table 6). In the perceived stress and depression analyses, all posthoc group comparisons were statistically significant, indicating that increased levels of stress or depression increased with each risk-level group. The low-risk group reported significantly more days of restful sleep than both the moderate and at-risk groups. Similarly, the low-risk group reported significantly lower consumption of alcoholic drinks than the higher at-risk group. There was a trend for increased satisfaction with life in the low-risk group in contrast to the moderate or at-risk groups.

Table 6: Results of One Way ANOVA for Burnout Risk-Level Group and Wellness Behaviors and Well-Being

Wellness and Well-Being Measure	Low Risk n=69* Mean (SD)	Moderate Risk n=84** Mean (SD)	At Risk n=15 Mean (SD)	Sig.
Perceived Stress	13.97 (4.9)a	17.02 (5.2)b,c	20.60 (7.1)b,d	< 0.001
Satisfaction With Life	27.93 (5.9)a	25.73 (6.6)b	23.73 (7.6)b	0.027
CES-D total	7.16 (5.4)a	11.10 (7.1)b,c	20.47 (10.3)b,d	< 0.001
Physical activity	1.59 (1.2)	1.32 (1.0)	1.0 (0.8)	0.093
Fruits and vegetables	1.77 (1.4)	1.65 (1.2)	1.47 (1.2)	0.665
Outdoors in nature	1.43 (1.1)	1.60 (1.1)	1.33 (1.0)	0.536
Nurturing relationships	2.49 (1.4)	2.81 (1.3)	2.15 (1.4)	0.139
Prayer	1.57 (1.6)	1.20 (1.6)	1.73 (1.8)	0.264
Wake rested	3.03 (1.1)a	2.42 (0.9)b	2.33 (1.2)c	< 0.001
Mind-body behaviors	0.90 (1.0)	0.88 (1.1)	1.27 (1.4)	0.447
Alcoholic drinks	1.65 (0.7)a	1.90 (0.8)	2.20 (1.0)b	0.029

CES-D—Center for Epidemiologic Studies Depression Scale
* n=68 for perceived stress and outdoors in nature; n=67 for CES-D
** n=83 for CES-D, fruits and vegetables, and nurturing relationships; n=82 for prayer

Posthoc Tukey tests:
Perceived stress: a<b, P<.002; c<d, P=.045; satisfaction with life a>b, P<0.1; CES-D a<b P<.002; c<d, P<.002; wake rested a>b, P=.001; a>c, P=.04; alcoholic drinks a<b, P=.048

Discussion

These findings indicate a clear subset of first-year residents who are very distressed. Twenty-three percent exceeded the cut point on the CES-D for risk of depression, nearly 14% were highly emotionally exhausted, and about 24% felt very detached from their patients and their job. Prior research demonstrates that high scores on either emotional exhaustion or depersonalization are indicative of clinically significant burnout.[38]

These findings of burnout and depression in residents corroborate those in previous research on medical trainees.[17] Still inadequately researched are the factors that may promote resident well-being and protect from depression and burnout. We found that restful sleep was associated with less stress, depression, burnout, and greater satisfaction with life. Interestingly, only one fifth of the sample reported at least 5 days of restful sleep. Also, those with higher levels of physical activity had lower levels of depression, depersonalization, and emotional exhaustion and a tendency toward increased satisfaction with life. Inclusion of these two wellness behaviors, coupled with time spent outdoors and frequency of alcohol consumption, accounted for close to 25% of the variance on these measures.

We found relatively low levels of alcohol use among first-year residents (81% no or less than three drinks per week). However, even minor alcohol consumption was associated with increased stress, depression, and burnout dimensions.

Despite no statistically significant gender differences on depression or perceived stress, the use of prescription medication was reported primarily by females (94.4% of medication users). Higher depersonalization and less time in nurturing relationships were associated with a greater likelihood of medication use for stress in females, which is consistent with research indicating that women tend to cope with stress through nurturing relationships;[39] thus their absence may result in greater medication usage. In our literature review, no other studies of physician and/or resident burnout reported findings about the use of prescription medications to manage stress, mood, or sleep. It is unknown whether there are gender differences in medication use or whether women are more comfortable in reporting such use. However, given reports of the prevalence of depression, sleep deprivation, and suicidality among physicians, use of prescription medications would be expected. Further exploration of this dimension is warranted, for both females and males, practicing physicians, and physicians-in-training.

More than half of the residents reported engaging in a mind-body technique at least 1 day per week with no significant association with any of the measures of well-being.

It is possible that these practices were not done with sufficient frequency or duration to make a difference or that residents who engaged in these activities had more

severe distress that prompted their use of these. We did not find any significant associations of well-being with fruit and vegetable consumption. A multi-dimensional assessment of eating behaviors may be a better measure of diet-related stress mediation.

Depression and burnout among residents affect not only their own life quality but also the care they bring to others. Burnout is related to low job satisfaction and high rates of absenteeism and job turnover.[3] Further, residents with burnout are more likely to commit medical errors[40] and provide sub-optimal care.[11] Yet there has been little research to guide residency programs in preventing or treating burnout, stress, and depression among residents. We highlight some health behaviors that show an association with levels of resident distress and well-being and may serve a mediating, protective function. Family medicine, with its values of relationship-centered care and family support can lead in developing curricular models that support wellness behaviors, creating a culture of training where residents "thrive" rather than just "survive."

Proactive strategies to encourage and support adoption of wellness behaviors by residents may improve their ability to cope with postgraduate training demands and promote a lifelong commitment to self-care. Attention to self-care may translate to improved patient care through emphasis on health promotion as well as reduced medical errors.

Limitations

Because this study was conducted online using self-administered instruments, recall bias and the inability to confirm self-reported behaviors with objective measures are potential limitations to the validity of the data. While the response rate was excellent, and most residents completed the assessment battery early in the first trimester of PGY-1, due to variations in their schedules, some did not complete the surveys until second trimester. These differential timings might impact resident self-perceptions and reporting of self-care behaviors. A second limitation involves generalizability of the findings. The 12 residency sites were not randomly selected. However, comparisons between our sample and the AAFP family residency database found no significant differences, thus providing some evidence for the representativeness of our sample and increasing the generalizability of our findings. It is possible that our sample differed on other unmeasured dimensions, so the results should be interpreted with this in mind. The newly developed wellness instrument used in this study may not have fully captured the behaviors most critical to wellness. We are refining it to more fully reflect multiple wellness dimensions. Another limitation was that the well-being measures were highly inter-correlated, which may explain the consistency of some predictors across the models. However, unique predictors also emerged. In addition, because the first trimester of residency does not adequately reflect the accumulation of residency stressors, to better understand the impact of wellness behaviors on well-being during graduate medical education, these relationships would need to be assessed longitudinally. The current report describes baseline findings while a longitudinal study will evaluate moderators of resident burnout throughout training. Finally, even though psychological factors such as cognitive appraisals,[41] coping styles and strategies,[42,43] self-efficacy expectations[44] and personality traits such as hardiness[45] and optimism[46] can mediate and moderate perceived stress, we limited our investigation in this exploratory descriptive study to resident wellness behaviors.

Conclusions

Innovative curriculum and activities that focus on wellness behaviors and healthy lifestyle choices for physicians in training are needed. The ACGME mandate on implementation of duty hours for residents may show a positive effect in future generations of physicians. Family medicine programs can lead in creating additional institutional methodologies to support a culture of wellness for residents, faculty, and staff, thus promoting a lifelong commitment to self-care and an emphasis on prevention and health promotion for our patients.

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References

1. Engel GL. The need for a new medical model: a challenge for biomedicine. Science 1977;196:129-36.
2. www.aafp.org. Accessed February 14, 2012.
3. Maslach C, Jackson SE, Leiter MP. Maslach Burnout Inventory, third edition. Palo Alto, CA: Consulting Psychologists Press, 1996.
4. Eckleberry-Hunt J, Van Dyke A, Lick D, Tucciarone J. Changing the conversation from burnout to wellness: physician well-being in residency training programs. Journal of Graduate Medical Education 2009;1(2):225-30.
5. Shanafelt T, Dyrbye L. Oncologist burnout: causes, consequences, and responses. J Clin Oncol 2012;30(11):1235-41.
6. Bertges Yost W, Eshelman A, Raoufi M, Abouljoud MS. (2005). A national study of burnout among American transplant surgeons. Transplant Proceedings 2005;37:1399-1401.
7. Kuerer HM, Eberlein TJ, Pollock RE, et al. Career satisfaction, practice patterns and burnout among surgical oncologists: report on the quality of life of members of the Society of Surgical Oncology. Ann Surg Oncol 2007;14:3043-53.
8. Bellieni CV, Righetti P, Ciampa R, Iacoponi F, Coviello C, Buinocore G. Assessing burnout among neonatologists. J Matern Fetal Neonatal Med 2012;10. Epub ahead of print.

9. Lee FJ, Stewart M, Brown JB. Stress, burnout, and strategies for reducing them. Can Fam Physician 2008;54(2):234-5.
10. Yi MS, Luckhaupt SE, Mrus JM, et al. Religion, spirituality, and depressive symptoms in primary care house officers. Ambul Pediatr 2006;6:84-90.
11. Shanafelt TD, Bradley KA, Wiph JE, Back AL. Burnout and self-reported patient care in an internal medicine residency program. Ann Intern Med 2002;136:358-67.
12. Richman JA, Flaherty JA, Rospenda KM, Christensen ML. Mental health consequences and correlates of reported medical student abuse. JAMA 1992;267:692-4.
13. Lemkau J, Rafferty J, Gordon R Jr. Burnout and career-choice regret among family practice physicians in early practice. Fam Pract Res J 1994;14(3):213-22.
14. Peterlini M, Tiberio IFLC, Saadeh A, Pereira JCR, Martins MA. Anxiety and depression in the first year of medical residency training. Med Educ 2002;36(1):66-72.
15. Michels PJ, Probst JC, Godenick MT, Palesch Y. Anxiety and anger among family practice residents: a South Carolina family practice research consortium study. Acad Med 2003;78:69-79.
16. Whippen DA, Canellos GP. Burnout syndrome in the practice of oncology: results of a random survey of oncologists. J Clin Oncol 1991;9:1916-20.
17. Dyrbye LN, Thomas MR, Harper W, et al. The learning environment and medical student burnout: a multicentre study. Med Educ 2009;43(19):274-82.
18. Hafferty FW. Beyond curriculum reform: confronting medicine's hidden curriculum. Acad Med 1998;129:734-7.
19. MacLeod R, Parkin C, Pullon S, Robertson G. Early clinical exposure to people who are dying: learning to care at the end of life. Med Educ 2003;37:51-8.
20. Rosen IM, Gimotty PA, Shea JA, Bellini LM. Evolution of sleep quality, sleep deprivation, mood disturbances, empathy, and burnout among interns. Acad Med 2006;81:82-5.
21. Passalaqua SA, Segrin C. The effect of resident physician stress, burnout, and empathy on patient-centered communication during the long-call shift. Health Commun 2011;10:1-8.
22. Cicala RS. Substance abuse among physicians: what you need to know. Hosp Physician 2003;6:39-46.
23. Hughes PH, Brandenberg N, Daldwin DC, et al. Prevalence of substance use among US physicians. JAMA 1992;17:2333-9.
24. www.nationalwellness.org/index.php?id_2&id_c=26. Accessed February 25, 2011.
25. www.cdc.gov/healthyweight/physical_activity/index.html. Accessed March 21, 2011.
26. Kuo LE, Czamecka M, Kitlinska JB, Tilan JU, Kvethansky R, Zukowska Z. Chronic stress, combined with a high-fat/high-sugar diet, shifts sympathetic signaling toward neuropeptide Y and leads to obesity and the metabolic syndrome. Ann N Y Acad Sci 2008;1148:232-7.
27. Walsh R, Shapiro S. The meeting of meditative disciplines and western psychology. Am Psychol 2006;61:227-39.
28. Kiecolt-Glaser JK, Christian L, Preston H, et al. Stress, inflammation, and yoga practice. Psychosom Med 2010;72:113-21.
29. Pawlow LA, Jones GE. The impact of abbreviated progressive muscle relaxation on salivary cortisol. Biol Psychiatry 2002;60:1-16.
30. Ironson G, Solomon GF, Balbin EG, et al. The Ironson-Woods Spirituality/Religiousness Index is associated with long survival, health behaviors, less distress, and low cortisol in people with HIV/AIDS. Ann Behav Med 2002;24:34-48.
31. Cohen S. Social relationships and health. Am Psychol 2004;59:676-84.
32. Uchino BN. Social support and health: a review of physiological processes potentially underlying links to disease outcomes. J Behav Med 2006;29:377-87.
33. Kaplan S. The restorative benefits of nature: toward an integrative framework. Journal of Environmental Psychology 1995;15:169-82.
34. www.aafp.org. Accessed August 8, 2012.
35. Herzog TR, Strevey SJ. Contact with nature, sense of humor, and psychological well-being. Environment and Behavior 2008;40:747-6.
36. Vgontzas AN, Chrousos GP. Sleep, the hypothalamic-pituitary-adrenal axis, and cytokines: multiple interactions and disturbances in sleep disorders. Endocrinology and Metabolism Clinics of North America 2002;31:15-36.
37. Birks Y, McKendree J, Watt I. Emotional intelligence and perceived stress in healthcare students: a multi-institutional, multi-professional study. BMC Med Educ 2009;9(61).
38. Rafferty JP, Lemkau JP, Purdy RR, Rudisill JR. Validity of the Maslach Burnout Inventory for family practice physicians. J Clin Psychol 1986;42:488-92.
39. Taylor SE, Klein LC, Lewis BP, Gruenewald TL, Gurung RAR, Updegraff JA. Biobehavioral responses to stress in females: tend-and-befriend, not fight-or-flight. Psychol Rev 2000;107(3):411-29.
40. West CP, Huschka MM, Novotny MS, et al. Association of perceived medical errors with resident distress and empathy. JAMA 2006;307(17):1775-1877.
41. Lazarus RS, Folkman S. Stress, appraisal, and coping. New York: Springer, 1984.
42. Folkman S, Lazarus RS. Ways of Coping Questionnaire Research Edition. Palo Alto, CA: Consulting Psychologists Press, 1988.
43. Carver CS, Scheier MF, Weintraub JK. Assessing coping strategies: a theoretically based approach. J Pers Soc Psychol 1989;56:267-83.
44. Bandura A. Self-efficacy: toward a unifying theory of behavioral change. Psychol Rev 1977;84:191-215.
45. Kobassa C. Stressful life events, personality, and health: an inquiry into hardiness. J Pers Soc Psychol 1979;37:1–11.
46. Scheier MF, Carver CS. Effects of optimism on psychological and physical well-being: theoretical overview and empirical update. Cognitive Therapy and Research 1992;16:201-28.