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COMPLEX MEDICAL-PSYCHIATRIC ISSUES (MB RIBA, SECTION EDITOR)

Intern Mental Health Interventions

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Abstract

Purpose of Review Intern year is a uniquely stressful transition with interns facing higher rates of major depression compared with the general population. While burnout and depression during intern year are well documented, we aimed to examine which interventions have been implemented to prevent these issues and to consider the effectiveness of these interventions.

Recent Findings Based on a review of recent literature, we located very few studies focusing on interventions for resident mental health and even fewer focusing on interns specifically. We found that such studies vary in design with most using online or app-based tools and others incorporating in-person workshops. There is significant variation among the scales used and the primary outcomes in each study.

Summary While most studies demonstrate a modest reduction in depression and burnout with implementation of some form of mindfulness practice, many were unable to reach a significant level of statistical power. More research is needed to determine generalizable findings.

Keywords Intern · Burnout · Wellness · Intervention · Physician mental health

Introduction

The first year of residency is recognized as a uniquely stressful transition due to new challenges including acclimating to demanding schedules and workloads, navigating emotionally charged situations, and learning one's role on a new team during each successive rotation. As a result of several of these factors, various studies have acknowledged that a significantly higher number of interns versus members of the general population develop major depressive episodes and experience burnout. More physicians die by suicide than members of any other profession, and one large-scale study found that suicidal ideation increased by 370% during the first 3 months of internship [1]. While certain predisposing factors including female sex, US medical education, early life adversity, and a history of major depressive disorder have been shown to contribute to burnout and depression, there is also compelling evidence that characteristics of internship significantly alter the course of symptoms throughout intern year [1]. In addition, burnout is known to lead to poorer patient care including higher rates of errors and more subjective issues such as depersonalization of patients [2].

With such evident complications presenting during medical training, several institutions have begun to consider ways in which they may lessen emotional strain during medical school, internship, and residency to improve outcomes for medical trainees. In addition, it has been established that a very small percentage of interns who experience worsening mood symptoms and suicidal ideation seek mental health services due to a variety of barriers including time constraints, lack of access, and concerns regarding confidentiality [3]. To an extent, this places the onus on training programs to acknowledge these stark findings and to provide appropriate resources and programs for trainees who may otherwise have limited access to care.

In a paper written by Baker and Sen in 2016, the authors argue that in fact wellness should be considered part of cultivating one's professional identity [4]. Traditionally, if a trainee has difficulty managing demanding situations, he or she develops a concern of being labeled weak. This often leads to an unattainable expectation of resilience and wellness in trainees

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who seldom receive basic cognitive or mindfulness tools early in their training. It is therefore likely that a multifaceted approach from the top of a health-care system down to an individual trainee is required.

At Michigan Medicine, we are attempting a "bottom-up" approach. Within the past 2 years, our general psychiatry residency program has incorporated a new wellness intervention into didactics during internship year. In a program titled "ProSkills" (process group and mindfulness-based cognitive skills), a senior resident or fellow and faculty member meet with the intern class on a regular basis to discuss the professional and personal difficulties of intern year and teach basic mindfulness and cognitive skills. We are currently in the process of collecting data to determine this program's effectiveness in combating burnout within our cohort. In consideration of improving outcomes at our home institution, we reviewed recent literature regarding such interventions.

Interventions

Reports of interventions are limited as the majority of available literature regarding intern mental health describes and characterizes the concept and prevalence of depression and burnout in this setting rather than offering strategies to prevent or improve these symptoms; however, several small-scale studies have introduced various interventions. Of these studies, very few target interventions specifically for interns.

In one such study conducted by Guille et al., web-based cognitive behavioral therapy was instituted in a randomized controlled trial to determine its effect on suicidal thoughts among medical interns [5]. Investigators successfully sent email invitations to 320 incoming interns with 199 invitees ultimately choosing to participate in the study. These interns were from various specialty programs across two institutions, and investigators used the PHQ-9 to measure severity of depressive symptoms and suicidal ideation 3 months prior to beginning intern year and at 3-month intervals throughout intern year. The decision to utilize web-based tools in this study was based on advantages including low cost (as the website is free to access), easy accessibility, and self-management tools that allow for ease of use compared with more traditional, in-person programs.

After the initial pre-internship PHQ-9, participants were randomly assigned to one of two groups including an attention-control group (ACG, in which they received a weekly email for four weeks containing information about mental illness and information about where to obtain local treatment) or to the web-based CBT (wCBT) group. Of note, there were no significant differences in demographic, clinical characteristics, or previously identified baseline variables shown to predict suicidal ideation in interns between the two groups. Members of the wCBT group received a weekly email for 4 weeks that directed them to the intervention website (MoodGYM, http://moodgym.anu.edu.au) to complete each module. Members of this group were also directed to review a module of their choice at months 2, 5, 8, and 11 of intern year, and at the same intervals members of the ACG group received emails with the same information they had previously received in the beginning of the study.

Results of this study demonstrated that 12 of 100 interns in the wCBT group endorsed suicidal ideation during at least one follow-up assessment versus 21 of 99 interns in the ACG, representing a 60% decrease in the likelihood of suicidal ideation in the wCBT group. This was found to be statistically significant with $p = 0.03$ and NNT of 11. In discussion of these results, this is also considered to be clinically significant given the percentage of interns willing to partake in this intervention (62.2%) versus the significantly smaller percentage seeking more traditional mental health services [3], meaning that this intervention could permit more far-reaching effects if instituted on a larger scale. Limitations of this study include small sample size, self-report of suicidal ideation with no measure of suicidal gestures or attempts, and potential lack of generalizability to other institutions; however, considering the advantages listed above, this method would be fairly simple for programs to institute and may allow for at least a modest improvement in wellness.

In a separate prospective study conducted by Yang et al., researchers considered the possible impact that 10 to 20 min of daily mindfulness meditation could affect over a 30-day span [6•]. This study focused on medical students at USC and used a mobile phone application, Headspace, as well as self-report measures including the Perceived Stress Scale (PSS), Five-Facet Mindfulness Questionnaire (FFMQ), and General Well-Being Scale (GWBS).

In total, 88 medical students from various classes (stratified by year in school) were enrolled in this study with 45 students randomized to intervention and 43 randomized to control. After all participants completed baseline questionnaires as listed above, and the intervention group was asked to download Headspace, offered to them free of charge for 3 months, and to complete the mindfulness training program consisting of 10 min of programming per day for the first 10 days, 15 min for the next 15 days, and 20 min for the remainder of the study's duration. All applicants then completed the same questionnaires at the end of the 30-day period. The intervention group retained access to Headspace after the initial 30 days but were not explicitly asked to use it. All applicants completed a follow-up series of questionnaires at 60 days. No reminders were provided to the participants after the initial email with instructions to download the application.

On the initial questionnaires, 98% of participants answered that they were in a state of stress or distress; however, only 60% ultimately downloaded the app and used it at least one time. Overall, participants in the intervention group used

Headspace for a mean of 11.97 days during the study period, and of those who used the app at any point during the study period, 74% continued to use it beyond the initial 30 days. Results demonstrated significant findings including decreased perceived stress and increased well-being in the intervention group with the FFMQ demonstrating increased "observing" measures. Investigators note a possibility that such objective observations of situations likely contribute to the other positive effects. Limitations of this study are similar to those of the previous study, namely sample size and uncertain generalizability to other medical schools and to medical interns specifically. Another potential barrier to using this method is the cost of the app (ranging from $7.99 to $12.99 per month for non-students), which may be a limiting factor for some medical residents who are also beginning to repay student loans; however, for those willing and able to pay this fee, this may be another fairly simple tool to integrate, though it seems to place more of the burden (in terms of both finances and accountability) on the resident rather than on his or her training program.

A similar study by Wen et al. also used the Headspace application to assess changes in wellness but used a single-arm design focused on residents from various departments including general surgery, anesthesia, and obstetrics and gynecology [2]. Participants used the app on a self-guided basis over the course of 4 weeks, taking surveys at 2-week intervals beginning at enrollment. This study implemented the Positive and Negative Affect Scale (PANAS) to assess mood and the Freiburg Mindfulness Inventory (FMI) to assess mindfulness. Investigators recruited 50 residents from Stanford University Hospital and Clinics in the abovenamed specialties and provided participants with a code to access Headspace, which they chose due to its status as the highest-scoring mindfulness app based on user ratings. Participants were encouraged to use the application as often as possible. In the end, 30 of the 50 participants completed two or more studies and were therefore included in the analysis. Ninety percent of these participants were female.

Results of this study demonstrated significant improvements in positive affect and mindfulness with no correlation between the initial degree of distress and the ultimate benefit. In addition, increased use of the application was associated with an increased use of self-reported mindfulness techniques outside the application. Limitations of this study are similar to those of the previous study and include small sample size with mostly female participants, residents of only one institution, lack of a control group and open-label design, and self-guided participation. Despite this, results suggest that residents can benefit from this type of program regardless of their baseline mental health characteristics, perhaps bolstering wellness and preventing decline.

Very few studies have examined the effectiveness of an in-person intervention. Of these, even fewer target residents in their intern year. One such study by Ireland et al. examines the outcomes of introducing a mindfulness curriculum to medical interns during their emergency medicine rotation in a "major metropolitan hospital" in Australia [7•]. Study participants included 44 interns, of whom 64% were female with ages ranging between 22 and 48 years. Investigators first measured previous exposure to various mindfulness techniques including structured mindfulness programs as well as meditation and exercise, and throughout the study utilized the Perceived Stress Scale (PSS) as well as the Copenhagen Burnout Inventory (CBI), which measures burnout along dimensions including personal, work-related, and client-related burnout; of note, the investigators did not include client-related burnout answers in their analysis. These questionnaires were completed at the beginning of the study and then at 5 and 10 weeks.

Methods included randomizing participants into an intervention group ($n = 23$) and a control group ($n = 21$). Those in the control group received an extra hour of break time per week for 10 weeks, and those in the intervention group attended a weekly hour-long training workshop for 10 weeks consisting of education and practice of mindfulness adapted from Mindfulness-Based Stress Reduction, Mindfulness-Based Cognitive Therapy, and Acceptance and Commitment Therapy. Participants were encouraged to practice techniques between sessions, which was anecdotally reported to have rarely occurred.

Results demonstrated that participants of the control group experienced increasing stress and burnout over time while those in the intervention group perceived decreasing stress and burnout throughout the same duration. Limitations of this study are similar to previous studies described above and include the small sample size and potential lack of generalizability to residents of other hospital systems.

Another study by Chung et al. also examined participants during their emergency medicine clerkship; however, this study focused on medical students in their fourth year of training [8]. It also had a shorter duration of 4 weeks in which participants attended weekly hour-long sessions supplemented by reading assignments, individual meditation practice and journaling, and a wellness plan that was developed in conjunction with a mentor. Participants were expected to complete daily assignments that were reviewed weekly by their mentor. At the end of the course, they also developed individualized wellness plans using techniques they had learned throughout the training. They used surveys to assess self-reported behaviors and attitudes regarding meditation and mindfulness, providing the surveys prior to, immediately following, and 6 months following the course. No objective rating scales were utilized during this study.

In total, 30 participants completed the course, though only 20 were included in the final analysis as 10 participants failed to complete all three sets of questionnaires. Results indicated significant changes in self-reported behaviors and attitudes

regarding mindfulness, noting increased importance of wellness, confidence in explaining concepts to others, confidence to meditate and be mindful, frequency of practicing meditation and mindfulness, and recommendations for meditation and mindfulness to others. Many of these findings were found to be sustained 6 months after completion of the course with 75% of participants reporting use of their individualized plan at least occasionally at that time. Limitations of this study include its small sample size, lack of generalizability to other institutions, self-reported outcomes, and lack of a control group. It also did not measure mood disturbances or burnout, and therefore it is unclear whether this intervention improved these symptoms.

In a study published in *The Journal of General Internal Medicine*, Verweij et al. examined the effect of a structured program, Mindfulness-Based Stress Reduction (MBSR), on resident burnout as measured by the Dutch version of the Maslach Burnout Inventory-Human Service Survey [9]. Investigators recruited 148 residents of various classes from the Radboud University Medical Center Nijmegen in the Netherlands to participate in this randomized controlled study. Participants were self-selected and voluntary as they received education regarding MBSR during orientation and were notified of the option to participate in this study via monthly newsletters. Those requesting to participate first took an online baseline assessment and were then randomized to either the MBSR group or a control group with no intervention other than being placed on a waitlist with the option to enroll in MBSR at the conclusion of the study.

Investigators followed the established MBSR guidelines including eight weekly 2.5-h sessions in the evening and one 6-h silent day during the weekend. This included formal mindfulness exercises such as a body scan, yoga, and sitting and walking meditation as well as education regarding stress and a recommendation to practice independently for 45 min per day. Participants were also required to attend at least four in-person MBSR sessions.

The primary outcome measure was noted to be emotional exhaustion, which did not significantly differ between groups at the conclusion of the study; however, secondary outcomes including personal accomplishment, worry, mindfulness skills, and self-compassion were found to have moderate yet statistically significant improvement in the MBSR group. There were no significant differences noted between groups in terms of depersonalization, work-home interference, positive mental health, or medical errors. On further analysis, it was discovered that residents in the MBSR group with higher baseline emotional exhaustion demonstrated a more significant improvement in emotional exhaustion as well as in personal accomplishment, worry, mindfulness skills, self-compassion, and empathy, suggesting more utility for those who experienced a higher baseline degree of burnout.

While this study utilized a larger sample size than others, its limitations still include generalizability to other institutions as well as to residents of other countries. Further, investigators note poor representation of men and residents of surgical specialties in addition to self-selection to participate in the study. Another possible limitation is the lack of access to this fairly intensive programming and the barriers to completing the stringent requirements such as time constraints.

A novel study by Thimmapuram et al. studied the effect of heartfulness meditation on burnout through a prospective cohort trial in which the investigators implemented a twelve-week program, utilized similar questionnaires as studies above, and analyzed telomere length in leukocytes as shorter lengths have been associated with increased stress [10•]. Participants of this study included residents, faculty physicians, and nurses who chose to participate in either the intervention arm or the control arm. All participants completed the Maslach Burnout Inventory (MBI) and Emotional Wellness Assessment (EWA, developed by the PI) at the beginning and end of the study at week 12. Salivary samples were collected to analyze telomere length at baseline and again at week 12.

In total, 27 residents, 8 faculty physicians, and 12 nurses participated in the study with 18 residents, 12 nurses, and 5 faculty physicians in the intervention group. This group received instruction in heartfulness meditation from the principal investigator of the study and met with a trainer for at least one 30-min session per week. Investigators recommended practicing this technique for 20 min each morning and an additional 15 min each evening. Participants also received a weekly email reminder. The control group did not receive any training or notices throughout the 12-week period.

Based on self-report in the MBI, results demonstrated a significant decrease in emotional exhaustion and depersonalization with increased personal accomplishment scores for the intervention group when compared with the control group. This was also found to be the case when examining scores specifically for residents. Based on EWA findings, a statistically significant change was also demonstrated for several attributes. Telomere length analysis did not demonstrate significant findings overall but did significantly increase in a younger subset of the intervention group aged 24 to 33 years, which the investigators posit is due to telomerase activity declining with age. As the majority of residents (and interns in particular) fit into this age range, this method may be more clinically meaningful when applied in residency programs. Limitations of this study include small sample size, lack of a control group with possible self-selection bias, unclear generalizability beyond one-hospital system, the self-directed nature of this type of meditation with possible lack of uniformity, and an unvalidated questionnaire developed by the PI; however, unlike other studies we have detailed thus far, this study also used an objective measure, telomere length, to reduce observer bias.

Effectiveness of Interventions

Based on findings noted in these studies, several interventions may be considered when attempting to improve intern mental health; however, each study examined in this review had notable limitations. A common limitation among studies is the reliance on self-directed participation of its subjects. While the interventions themselves have been found to be effective in different settings, motivating residents—and in particular interns, who face the additional challenge of adjusting to a more demanding schedule—to regularly practice and apply these interventions may well be a significantly limiting factor in promoting wellness.

As such, the most effective models are those that allow for flexibility in order to fit into the times interns have available throughout the week without causing increased stress of having another structured activity to attend. As programs that emphasize mindfulness have been the most widely studied, perhaps the best example of this model is short, mindfulness-based meditation through self-directed apps with regular reminders to use such an app. It is also worthwhile to note that mindfulness in general, regardless of the method of learning such skills, can be self-directed and noninvasive, thereby improving ease of utilization.

As we have noted when discussing the limitations of each study, country of origin, year in training, and differences in medical specialty cause some confusion as to whether these results may be generalized to interns specifically. Additionally, primary outcomes and study modality varied between studies, and most of these studies were conducted at one institution, further calling into question the ability to generalize to other programs, all of which differ to some extent in their expectations and obligations of residents.

Conclusions

As many studies have suggested, programs that emphasize and instruct residents in mindfulness practices seem to be at least modestly effective in decreasing symptoms of burnout and depression in medical residents in general. While more research is necessary to determine particular effects on interns and to improve generalizability of these results through higher-power studies, training programs should consider implementing similar strategies as a first step toward improving wellness of their trainees as many of the programs described above are easily instituted and may be utilized in a flexible manner. These programs are often inexpensive or free of charge, and the possible benefits far outweigh the nearly nonexistent risks.

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Compliance With Ethical Standards

Conflict of Interest Sarah Bommarito and Matthew Hughes each declare no potential conflicts of interest.

Human and Animal Rights and Informed Consent This article does not contain any studies with human or animal subjects performed by any of the authors.

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