Title: Web-based Intervention for the Prevention of Suicidal Ideation and Depression in Medical Interns

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Specific Aim

There is a dramatic increase in suicidal ideation and depression found among medical trainees from pre-internship to intern year and very few physicians seek mental health treatment due to barriers-to-care unique to this population (Sen, 2010; Guille, 2010). Physicians are at high risk for suicide (Center, 2003) and depression among training physicians is associated with medical errors, burnout and poor quality of patient care. Yet, to date, no treatment intervention with this population has been conducted.

Aim 1: To evaluate the feasibility and efficacy of a web-based CBT intervention for the prevention of suicidal ideation and depression in medical interns.

We will conduct a randomized controlled trial to test the feasibility and efficacy of an existing web-based CBT intervention against a control group. We hypothesize that interns assigned to the intervention will be less likely to endorse suicidal ideation or depressive symptoms during intern year than interns assigned to the control group. An exploratory aim will be to evaluate the incidence of medical errors in the intervention and control groups.

Background and Significance

Physicians have a Very High Risk of Suicide

Physicians are at high risk for suicide compared to the general population (Center, 2003). A meta-analysis of physician suicide revealed that male physicians are 1.41 times more likely and female physicians are 2.27 times more likely to die by suicide compared to their counterparts in the general population (Schernhammer, 2004). According to the American Foundation for Suicide Prevention, 300 to 400 physicians die by suicide each year equating to approximately one doctor dying by suicide every day (www.afsp.org).

Training Physicians have a Very High Risk of Suicidal ideation

Physicians in training are at high risk for suicide and suicidal ideation. A review of prospective studies conducted during 1982-2002 identified high rates of depression and suicidal ideation among doctors during their first postgraduate year, or internship year (Tyssen, 2002). These findings are consistent with several studies demonstrating elevated rates of depression and suicidal ideation in medical trainees (Bellini 2002; Schneider, 1993; Dyrbye, 2008).

Training Physicians have a Very High Risk of Developing Depression

Depression among residents is elevated (28–49%) compared to graduate students and young adults in the general population (8%-15%) (Center, 2003). Our prospective investigation into the relation between stress and depression during medical internship, the Intern Health Study, found that the proportion of interns who met criteria for depression increases from 3.9% prior to internship to 27.1%, 23.3%, 25.7% and 26.6% at the 3, 6, 9 and 12-month time points of intern year (Sen, 2010). Depression among training physicians has been associated with reduced quality of life and increased burnout (Fahrenkopf, 2008) resulting in poor quality of patient care and decline in the physician work force (Williams, 2007).
Untreated Depression may also Increase Medical Errors

High rates of depression found among training physicians is concerning; data indicate that depression is associated with cognitive dysfunction and work impairment, with increasing severity of depression relating to increasing levels of dysfunction (Adler, 2006; Wang, 2004). Investigators have found a strong association between depression and perceived medical errors (Fahrenkopf, 2008; West, 2006) and that self-reported medical errors, a valid proxy for actual errors (O'Neil, 1993), are of a magnitude relevant to patient safety (West, 2009). Medical errors are costly; 1.5 million people are harmed each year by medical errors, resulting in $3.5 billion in medical costs annually (Studdert, 2006). Our Intern Heath Study revealed a bi-directional relation between medical errors and depression (Sen, 2010). Little research has been done to address mental health needs of young physicians in training and the care of their patients.

Few Physicians Access Services for Depression

Despite the elevated prevalence of suicide, suicidal ideation and depression, physicians are often reluctant to seek mental health treatment (Guille, 2010; Tyssen, 2004). Physicians often seek treatment only when their psychological distress or performance has garnered the attention of third parties such as insurance companies, police, and review boards (Rø, 2007). The most frequently cited barriers to mental health treatment among our interns included limited time (91.5%), preference to manage problems on their own (75.1%), lack of convenient access (61.8%) and concerns about confidentiality (57.3%); these findings underscore the need for a treatment approach that overcomes these barriers (Guille, 2010).

Web Interventions are a Promising Alternative with Potential to Overcome Key Barriers

Recently, investigators have begun to use web interventions to provide mental health treatment to difficult-to-reach populations. The effect size of interventions for a variety of anxiety and mood disorders delivered over the internet is high (Amstadter, 2009). In particular, web-based CBT interventions have shown to be effective for depression in community samples, compared to a control condition (Christensen, 2004). This delivery format has many potential benefits over in-person treatment for medical interns: it enhances confidentiality, is no cost, allows for flexibility in timing of access, obviates travel burden, provides tools for interns to manage problems on their own, and has little association with psychiatry. Interventions with these characteristics are likely to increase service utilization among medical trainees.

CBT Can Prevent Depression in High Risk Populations; It is Ideal for Training Physicians

Prevention programs for depression are effective for high risk groups (Beekman, 2010) and a recent meta-analysis of 19 RCTs found that psychological interventions employing CBT reduced the incidence of depression by 22% (Cuijpers, 2008). Leading experts in treating physician mental illness suggest that physicians are well suited for preventative interventions that use CBT to reduce the incidence of depression and suicide, especially during medical training, where stressors are distinct and predictable (Myers, 2006). Personal vulnerability to depression among physicians is well defined (e.g., perfectionism, self-doubt, feelings of guilt, exaggerated sense of responsibility) (Myers, 2006). The culture of medicine further exacerbates these psychological tendencies, especially during training where perfection is impossible, but expected and
rewarded, and teaching methods can contribute to feelings of shame and humiliation.

CBT helps users to identify personal traits and ways of thinking that lead to maladaptive reactions and teaches evidenced-based strategies that result in more adaptive responses to difficult situations.

**Research Methods**

**PART I – Subject identification and recruitment:**

Subjects for our study will be drawn from incoming interns in the traditional and primary care internal medicine, general surgery, pediatrics, obstetrics/gynecology, neurology and psychiatry residency programs at Yale University and the University of Southern California residency programs. Following the residency match, each respective residency program director will provide the study investigator a list of names and email addresses of incoming interns. Prior to commencing internship, potential subjects will be contacted via email, given a brief description of the study and invited to participate. If subjects are interested in participating they will be directed to a secure website containing the study’s informed consent document. Once informed consent is obtained via the web, participants who agree to enroll in the study, will then be directed to another website to complete online questionnaires (See PART II). Once participants complete the baseline questionnaires they will be randomly assigned to an interactive web-based cognitive behavioral therapy website or control condition (See Part III).

**PART II – Questionnaires:**

In addition to providing general demographic information each participant will complete the following instruments prior to beginning internship; 1) Neuroticism (measured through the NEO-Five Factor Inventory (Costa and McCrae 2000)) 2) Alcohol use (measured through the Alcohol Use Disorders Identification Test (AUDIT) (Saunders, 1993 )) 3) Lifetime history of mental health treatment and Major depression (derived from the DSM-IV criteria) with further evaluation of suicidal ideation if endorsed on the PHQ (measured by The Positive and Negative Suicide Inventory (Osman et al, 2002)) 4) Current depressive symptoms (measured through the Patient Health Questionnaire (PHQ) (Spitzer et al 1999)) 5) Perceived Stress (measured through the Perceived Stress Scale (PSS) (Cohen et al. 1983)) 6) Sleep behavior (measured through the Pittsburgh Sleep Assessment Scale (Buysse et al. 1989 )) 7) Cognitive Styles (measured through the Sociotropy Autonomy Scale (Beck1983)) and 8) Early Family Environment (measured through the Risky Families Questionnaire (Taylor et al 2006). Through the course of internship, participants will be contacted via email at months 3, 6, 9 and 12 of their internship year and asked to complete the PHQ-9 and will be queried regarding interim non-residency life stress, medical errors, mental health service utilization, number of hours of sleep during the prior night and prior seven nights and current rotation. The estimated time to complete the baseline questionnaires is 30 minutes and 10 minutes for the follow-up questionnaires. If participants do not respond to the questionnaires, and have not indicated that they do not wish to participate in the study, a reminder email will be sent. Upon completing each set of questionnaires at baseline, months 3, 6, 9, 12,
participants will be provided with general information about suicidal ideation and depression as well as a list of resources for mental health counseling and treatment.

PART III – Intervention:
Following completion of the baseline questionnaires, subjects will be randomly assigned to participate in to an interactive web-based CBT for the prevention of depression, a program developed by the Center for Mental Health Research at the Australian National University (MoodGYM.com), or control condition. Each subject in the CBT intervention group will be given their unique non-decodable identification number and asked to logon to a website weekly for 4 weeks prior to starting their house staff duties on July 1st. The intervention group will complete four, 20-40 minute web based modules designed to identify problems with anxiety, depression and dysfunctional thoughts. Through participation in cognitive and behavioral exercises, subjects will develop an understanding of the interplay between their thoughts, emotion and behaviors as well as develop coping skills for the future. Completion of the module will be tracked based on subject’s unique non-decodable identification number and recorded by MoodGym.com for verification of completion of the module and subject reimbursement. At three-month intervals throughout intern year, current endorsement of suicidal ideation and depressive symptoms will be assessed via the PHQ-9 (September, December, March and June) (See Part PART II- Questionnaires). Subjects assigned to the CBT intervention will be asked to revisit MoodGym.com at least 6 weeks before completing follow-up assessments (approximately during the months of August, November, February and May) to review one of the four modules to refresh or ‘booster’ their memory of the main CBT concepts and coping skills. Completion of the module will be tracked based on subject’s unique non-decodable identification number and recorded by MoodGym.com for verification of the ‘booster’ session for subject reimbursement.

PART III – Control:
Participants assigned to the control condition will receive weekly emails for four weeks prior to the start of internship year. All emails will include information about the prevalence of depression and suicide among physicians, as well as described symptoms of depression and suicide and encouraged participants to seek treatment locally, if necessary. Contact information for local, confidential, and free mental health services was included in each email. Additional information describing the prevalence and symptoms of anxiety, substance abuse and other mood disorders will be included in the second, third and fourth email, respectively. At three-month intervals throughout intern year, current endorsement of suicidal ideation and depressive symptoms will be assessed via the PHQ-9 (September, December, March and June) (See Part PART II-Questionnaires). Subjects assigned to the control condition will receive an email at least 6 weeks prior to completing the these assessments (approximately during the months of August, November, February and May) which will include information about the prevalence of depression and suicide among physicians, and describe symptoms of depression and suicidal ideation and encouraged participants to seek treatment locally, if necessary. Contact information for local, confidential, and free mental health services will be included in each email.
Number of Subjects
Subjects for our study will be drawn from incoming intern classes in the traditional and primary care internal medicine, general surgery, pediatrics, obstetrics/gynecology and psychiatry residency programs at University and Community residency programs. Assuming a recruitment rate of 60-80%, this population will provide 200 subjects.

Statistical Power
Assuming a 5% type I error rate and an effect size similar to previous studies, a sample size of 200 subjects (100 randomized to control and 100 randomized to the CBT intervention group), we will have 90% power to detect differences between groups of 3 points on the PHQ-9 and 50% reduction in cases of suicidal ideation, at alpha =0.05.

Data Analysis
Aim 1) To evaluate the feasibility and efficacy of an internet based CBT web site for the prevention of suicidal ideation and depression among medical interns:
To investigate whether there is a lower incidence of suicidal ideation in the intervention compared to the control group, we will use a stepwise logistic regression model to identify significant predictors while accounting for collinearity among variables. Intervention assignment was included in the model to determine the impact of the intervention on suicidal ideation during internship year.
To investigate whether there are lower mean depressive symptoms in the intervention compared to the control group, we will use a stepwise linear regression model to identify significant predictors while accounting for collinearity among variables. Intervention assignment will be included in the model to determine the impact of the intervention on mean depressive symptoms during internship year.

Inclusion Criteria
Incoming interns in the traditional and primary care internal medicine, general surgery, pediatrics, obstetrics/gynecology and psychiatry residency programs at two University residency programs.

Exclusion Criteria
Subjects who are not incoming interns will be excluded from the study.
Study personnel will determine participants’ eligibility based on the above criteria. Only participants who meet eligibility will be contacted.

Protection of Human Subjects
Private identifiable information will not be collected or used. Research data will be collected via online questionnaires. Data will be coded with currently available encryption technology will be used to generate a non-trackable code number to maintain the anonymity of subjects. We will employ an honest broker to maintain the ID, name, and email address of the subject, so that subject completion can be verified but not linked to their data. No limits on confidentiality exist. There will be a substantial lag time between data collection and analysis. We will also not be able to identify individuals
based on their questionnaire data. Therefore, we will not be able to act in a timely manner on potentially concerning information provided (e.g., suicidal ideation, depression). Participants will be provided with a list of mental health and counseling centers in their area at the beginning of the study and at 8 other study contact points during the intern year. No external individuals or agencies will have access to this data.

**Subject Reimbursement**

All participants will receive a $60 gift certificate to Amazon prior to the start of intern year for participation in assigned group. Participants will receive a $10 gift certificate to Amazon following completion of the ‘booster’ session or if assigned to control condition.

**References**


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