



5-2020

Implementation of Mental Health Resources to Decrease Depression and Suicide in Healthcare Professional Students

Matthew Knealing

University of North Dakota, matthew.knealing@und.edu

See accompanying poster for this paper at: [Matthew Knealing;](#)

[Matthew Knealing" >Matthew Knealing;](#)

[Matthew Knealing](#)

Follow this and additional works at: <https://commons.und.edu/pas-grad-papers>



Part of the [Medicine and Health Sciences Commons](#)

Recommended Citation

Knealing, Matthew, "Implementation of Mental Health Resources to Decrease Depression and Suicide in Healthcare Professional Students" (2020). *Physician Assistant Scholarly Project Papers*. 73.
<https://commons.und.edu/pas-grad-papers/73>

This Scholarly Project is brought to you for free and open access by the Department of Physician Studies at UND Scholarly Commons. It has been accepted for inclusion in Physician Assistant Scholarly Project Papers by an authorized administrator of UND Scholarly Commons. For more information, please contact und.common@library.und.edu.

Implementation of Mental Health Resources to Decrease Depression and Suicide in Healthcare
Professional Students

by

Matthew Arthur Knealing, PA-S

Bachelor of Science, University of Minnesota, 2017

Contributing Author: Julie Solberg, MSPAS

A Scholarly Project

Submitted to the Graduate Faculty

of the

University of North Dakota

in partial fulfillment of the requirements

for the degree of

Master of Physician Assistant Studies

Grand Forks, North Dakota

May

2020

Table of Contents

Acknowledgments.....	3
Abstract.....	4
Chapter	
I. Introduction.....	5
Statement of the Problem.....	5
Research Question.....	6
Methodology.....	6
II. Review of Literature.....	6
Depression Prevalence.....	7
Suicidal Ideations.....	11
Compounding Factors.....	14
Cognitive Behavioral Therapy.....	17
Trending Additional Methods.....	22
III. Discussion.....	25
IV. Applicability to Clinical Practice.....	28
References.....	30

Acknowledgments

I would like to thank my advisor Julie Solberg and instructor Daryl Seig for their guidance, patience, and time in helping me through this scholarly project. My thanks are also extended to Doctoral Candidate in Biostatistics Amber Koslucher, for her insight and professional guidance. I would also like to acknowledge my primary care preceptor, Dr. Mitchell Cardwell, in understanding the heavy mental trials of graduate healthcare school. Finally, my mother for always believing in me throughout physician assistant school as well as in life, and my nephews, Rhett and Clark, for the laughs and hugs through some difficult times.

Abstract

The intent of this review of literature is to determine if implementing mental health resources in graduate healthcare programs decreases the rate of depression and suicidal ideations. In this review of literature, five databases were searched. Databases included: PubMed, PsycInfo, CINAHL Complete, Clinical Key, and the Cochrane Library from September 15 to January 3, 2020. Due to the topic being dynamic and receiving more acknowledgment in recent years, articles reviewed were restricted to the last six years within the United States. Works chosen were peer-reviewed, which included meta-analysis, cross-sectional, systemic reviews, longitudinal and, survey method studies. Sources excluded included opinion-based editorials without primary research. The review concluded with 16 articles reviewed, research in this review shows the prevalence of depression and suicidal ideations amongst graduate healthcare professional students. With the topic being brought into light, much of this research shows that cognitive-behavioral therapy can decrease the previously mentioned stressors of graduate healthcare school. Other articles reviewed show methods for effective screening of depression and suicidal ideations along with the implementation of peer reflective groups, pass/fail grading, and the effects of sleep and exercise in this population. The implementation of mental health resources has begun to show promise versus previous methods of as needed services through campus student services. The research indicates that decreasing depression, as well as suicidal ideations, are multifactorial with cognitive-behavioral therapy (CBT) being effective. More research, as well as implementation, is needed to determine which screening method along with what resources prove best.

Keywords: *students medical, depressive disorder therapy, education graduate, ideations suicide, suicide, and students physician assistant.*

Introduction

There are many challenges experienced during a healthcare provider's education, which can negatively impact the status of their mental health. Depression and suicidal ideations are prevalent problems in healthcare professional students. These equate to greater than 25% for depression and 10% for suicidal ideation (Lockwood, 2018). As of recent years, the topic of depression in healthcare professional students has become increasingly more prevalent, which has led schools to offer more resources for students. Supplemental resources have long been available at most universities, but fear of stigma has prevented many students from utilizing these resources. The purpose of this study is to highlight the most effective ways of implementing mental health resources to decrease the prevalence of depression and suicidal ideation in healthcare professional students.

Statement of the Problem

According to the Association of American Medical Colleges, the United States will have a projected shortage of upwards of 120,000 physicians by the year 2032 (Culbertson, 2018). Graduate healthcare professional programs are traditionally known to have low attrition rates; however, it is paramount to attempt to decrease mental health issues among these students. Doing so will help to reduce any projected shortages from failure to complete future graduate and licensing requirements due to mental health complications. Recent data from the American Medical Student Association demonstrates that healthcare professional students are three times more likely to commit suicide than others their age. Also, depression is twice as common in this population (American Medical Student Association, [AMSA], 2019)

Research Question

In healthcare professional students, does the implementation of mental health resources versus supplemental resources decrease the rate of suicide and depression?

Methodology

Studies were limited to the past six years in the United States due to different graduate requirements of other countries and increasing change due to the dynamics of the topic. Databases searched included: CINAHL Complete, PubMed, Clinical Key, PsycINFO, and the Cochrane library. Included MeSH terms: *students medical, depressive disorder therapy, education graduate, ideations suicide, suicide, and students physician assistant*. Meta-Analysis, systematic reviews, cross-sectional, longitudinal, and survey methods of research were incorporated into research methodologies. Opinion articles referencing previous studies were also eliminated due to bias and lacking cross-sectional or meta-analysis in nature.

Review of Literature

A thorough review of the available literature shows that the prevalence of depression and suicide amongst healthcare professional students is significant. (Lockwood, 2018). It also highlights several methods of mental health resource implementation to mitigate these problems. Further data reviewed show substantial amounts of burnout, depression, and suicidal ideations among this population of students. Regarding the mental health of healthcare professional students, one of the more practical and effective approaches includes CBT (Lattie, Duffecy, Mohr, & Kashima, 2017).

Depression Prevalence

There is an inherent excitement about getting accepted and beginning a graduate healthcare program. For many students, it is an accumulation of many difficult years of undergraduate coursework, volunteering, research, and healthcare experience prior to this moment. Many acknowledge the grueling time studying and honing their skills in the years of graduate school, but few are aware of the mental toll it can take. Depression is more than double in this population (American Medical Student Association, [AMSA], 2019).

The study done by Cocke, Klocko, and Kindratt (2019), compared symptoms of depression amongst physician assistant students in three categories: students in didactic (classroom) year, students in a clinical year, and overall student population. The method of administration was a Patient Health Questionnaire, PHQ-2 and a PHQ-9, (a depression screening questionnaire), which were done with two different types of completion. First-year students (didactic phase) completed the survey on paper. Students submitted them to a lockbox in their classrooms, and the second-year students (clinical phase) submitted them via an online emailed questionnaire through Microsoft Forms. The variations of submission of the questionnaire were due to second-year students not being on campus. Screening of the survey was done via the PHQ-2 questionnaire, and if considered a positive questionnaire the questions for all the PHQ-9 were assigned a severity. PHQ-9 was accumulated from all 123 students who completed the survey in addition to the PHQ-2 initial screening.

Based solely on the PHQ-2 screening, ten students (18.13%) were categorized as positive for depression. With the full PHQ-9 questionnaire, 98.37% of students (121 of 123) had the criteria to meet minimal depression, and 47.15% of students (58 of 123) met the criteria of mild

to severe depression. Between didactic and clinical phase students, there was no significant difference in depression symptoms including loss of interest in doing things, appetite issues, feeling down, concentration issues, or feeling of self-harm (all P values > 0.05).

Limitations of this study include small population size (123 students), variations of delivery of questionnaire, and the variations this patient population can experience day to day, which affect the PHQ-9. This study also did not address any previous diagnosis of depression. It did, however, show that screening solely with the PHQ-2 would miss a large population of depressed students. The strength of this study is showing that the utilization of the PHQ-9 questionnaire in this population misses far fewer individuals that do meet the criteria for depression.

Depression prevalence was also addressed in the work done by Thompson, McBride, Hosford, and Halaas (2016). Their work was to assess the prevalence of depression and burnout amongst medical students. In addition to depression and burnout, it was to evaluate the coping mechanisms which students use to combat these issues. The method for screening depression and burnout was done electronically via a voluntary email survey sent out to all students (first through fourth year). This included two separate reminders for the completion of the survey before the study's end date. There was no compensation or incentive to complete this study. Of the 253 students in the cross-sectional study, 161 completed the questionnaires (63.6% response rate). The surveys included the (PHQ-9), a screening tool used for Major Depressive Disorder (MDD), and The Maslach Burnout Inventory 22 questionnaire. In addition to the PHQ-9 and The Maslach Burnout Inventory, demographic information was obtained including, age, gender, race, ethnicity, relationship status, number of children, and year in medical school.

Response to the PHQ-9 questionnaire was completed by 153 students, of which 27.5% had mild depression, and 17.0% had moderate to severe depression. Of the 17.0% (26 total students) who had moderate to severe depression, 21 of these students were not currently diagnosed or previously diagnosed as depressed. The Maslach Burnout Inventory was completed by 132 students (52.2%), which showed 64 students (48.5%) in high range in Emotional Exhaustion (EE) or Depersonalization (DP) classifying them as burned out. Single students showed a higher level of burnout (61.2%) compared to students in committed relationships (41.0%) with a p-value equal to 0.03 and an odds ratio equal to 2.28.

Thompson et al. screened coping mechanisms in evaluating the prevalence of depression and burnout. A total of 161 students completed the questionnaire on approach versus avoidant coping strategies. Approach coping strategies included: exercise, talking to friends, spiritual support, therapist support, and studying more. Avoidant strategies included the use of more tobacco, eating less, consuming more alcohol, the use of illicit drugs, and physical harm. Of the 161 students, 64.6% (n=104) used a combination of approach and avoidant. Students that implemented avoidance strategies had a depression prevalence of 27.5% compared to 13.3% of students that used approach strategies. This resulted in a p-value of 0.051 and an odds ratio of .40.

Limitations of this study were that it only included a single small rural institution limited to medical students. Additional considerations include students who have depression may or may not be more inclined to fill out the questionnaire. This can lead to either an over or an under-representation of depression and burnout. The key strength of this study was showing that students who used approach coping mechanisms versus avoidant coping mechanisms had a lower rate of depression.

A cross-sectional study performed by Wimsatt, Schwenk, and Sen (2015), assessed the prevalence of depression and the stigma associated with it was assessed in medical students. The study addressed attitudes about mental health, depression symptoms, and sources of stigma which prevented students from seeking out mental health resources. A web-based survey was sent out electronically to 769 students at the University of Michigan Medical School. Out of the 769 students who received the survey, 505 completed the 27-item questionnaire. The questionnaire included the following: demographics, previous depression diagnoses, beliefs about the efficacy of treatment, and a standard PHQ-9. Submission rates were highest among didactic year students (55.0%) and female students (58.4%).

Of the 505 students who completed the survey, 14.3% (72 students) met the PHQ-9 requirement score of greater than 10 to fit into the category of moderate to severely depressed. Of the students that fit into the category of moderate to severely depressed, only 12 reported a previous diagnosis of depression, and 11 of the 12 students reported being currently treated for depression. Students currently being treated for depression were less than those having been treated in the past for depression. This equated to a p-value of < 0.001 .

Limitations of this study are that it only includes responses from one school, and response rates were higher during the didactic years than during the clinical phase. Self-reporting of depression symptoms and previous diagnoses of depression may be under-reported as noted due to stigma. The strengths of this study are that it included a more significant number of participants compared to similar studies performed at only individual medical schools (n= 505).

Suicidal Ideations Prevalence

It is difficult to assess the prevalence of suicidal ideations in any population, whether it is the general population or a student population, as there may be bias in reporting. This bias may be fears of admitting to suicidal ideation due to feeling ashamed or seen as weak. The most recent global assessment for suicidal ideation by the World Health Organization was done in 2010. It showed a previous 12-month suicidal ideation of 2.1% in developed countries with a 9% lifetime prevalence of suicidal ideation. (Borges et al., 2010). The meta-analysis study performed by Rotenstein et al. (2016) data showed that in medical students, 11.1% had some thought of suicide during their years in school.

Cheng, Kumar, Nelson, Harris, and Cloverdale (2014) aimed to assess the number of medical school student suicides that occurred from July 2006 to June 2011. Previous studies on the topic (four in total) have been completed but have not happened since the timeframe of 1989-1994. This cross-sectional study sent out an electronic questionnaire to 133 U.S. medical schools excluding Puerto Rico. Of these schools, 90 completed the survey, and three additional schools were eliminated due to accreditation issues and not having a graduating class in all the previous six years. This equated to a response rate of 69.2%. Participation in the survey was voluntary, and reminder emails were sent out every four weeks for the three months during the survey. Schools that did not complete the electronic survey were contacted by telephone after the three months. Topics addressed in the questionnaire included the number of students that died from suicide, methods of suicide, the gender of students who committed suicide, and the previous mental health history of these students. These questions were like that of a most recent national wide survey completed in 1994.

Results showed that six students during the timeframe of July 2006 to June of 2011 died from suicide. Four of these suicides were by men, and all six were between the ages of 22-29. This equates to an average of 4.59 deaths by suicide for every 100,000 medical students. Three of the six suicides reported having a previous documented psychiatric condition while the other three student's psychiatric history was not known. Aside from suicides reported by the 90 medical schools, 40 other deaths were reported. Additional causes of death included a total of 17 from accidental causes that included: drowning, caving, and motor vehicle accidents. It is unknown if there was any suicide component to these other deaths. The rates of female and male suicide in medical school decreased from the previous study performed in 1989-1994 by a total of 6.44 per 100,000 students. Reasons for this decrease are unknown, but speculations are attributed to the increasing resilience of students, more female medical students, and a lower response rate than the previous survey.

The most significant limitation of this study was the fact that 31% of schools did not complete or refused to complete the survey. Without knowing this data, a large portion of underrepresented deaths by suicide may have occurred. Also, this survey did not include all student deaths during 2011 since it ended in June of that year. The strength of this study is that it shows a definitive number of the students that did commit suicide per 100,000 students.

The research done by Downs et al. (2014) was aimed at screening students (medical students, pharmacy students, residents, and fellows) for suicidal ideation and depression symptoms. The overall goal was to identify these individuals with symptoms and refer them to the proper counseling to decrease the overall risk of suicidal behaviors. This research was delivered to 1,008 medical students over four years and was designed to find individuals who had suicidal ideations or depression and to assist them in seeking counseling. This process was

named the Healer Education Assessment and Referral Program (HEAR). During this four-year time frame, students received a PowerPoint on mental health issues, a 15-minute video on suicide prevention, and a question and answer presentation that included the students.

Of the 1,008 students enrolled in this program, 341 completed the online screening questionnaire which identified nearly 8% of respondents as being at risk for suicide. All these students were offered counseling, which 13 obliged. Of those 13 students, only three were currently receiving counseling. Included in this survey was a PHQ-9 with five additional questions about suicidal thoughts or behaviors. An answer of yes to any of those additional questions indicated the student was at high risk for suicide and were subsequently offered counseling and of all the students screened, 72 interacted with a counselor. The limitations of this study are that it was only four years in length and from only one medical school. Strengths included identifying students that were at risk for suicide and offering them counseling.

The objective of Rotenstein et al. (2016) study was to review previously published studies on the prevalence of depression, depression-like symptoms, and suicidal ideations amongst medical students. The goal was to find a more accurate total percentage of students suffering from these conditions. This study included systematic reviews and meta-analysis from five medical databases for previous studies on depression and suicidal ideations in medical students. These databases included: EMBASE, ERIC, MEDLINE, psycARTICLES, and psychINFO. Of these five databases, 2,316 records were identified, 1,603 were excluded from information in their abstract, and an additional 535 were excluded after review of their full text. This left a total of 195 full-text articles and of the reviewed texts, depression symptoms were reviewed in 16 longitudinal studies and 167 cross-sectional studies. Suicidal ideation was noted in 24 cross-sectional studies. The presence of bias in the studies mentioned above was screened

by three individuals using a version of the Newcastle-Ottawa scale. To avoid publication bias, a p-value of less than or equal to 0.001 was needed using the Egger test.

This review included 129,123 medical students in 47 different countries. It concluded that 27.2% of medical students screened positive for depression, and 11.1% of these students (129,123) had suicidal ideations at some point during medical school (P-value < 0.001). The study also showed that of those students who screened positive for depression, only 15.7% sought treatment for their symptoms. Limitations of this study include the fact that not all the 195 studies reviewed had the same process of evaluating depression and suicidal ideations. The strengths of this study include a large pool of individuals (129,123), and that depression did not vary amongst schools inside the U.S. compared to schools outside of the U.S. (26.7% and 27.4% respectively).

Compounding Factors (Drugs and Alcohol)

Self-medication can be problematic in any population, and although studying medicine, graduate healthcare students are of no difference. Self-medication can be any substance, whether prescription, over the counter, or legally/illegally purchasable. Stimulants to help study longer, as well as the use of depressants used as relaxants, have been employed amongst healthcare graduate students. The following research articles show the use of compounding factors (drugs and alcohol) in graduate healthcare students and their ties to depression.

The work done by MacLean, Booza, and Balon (2016) aimed to compile data on the rates of anxiety and depression in medical school as well as the use of marijuana and cocaine. The latter of the two were listed as help-seeking behaviors. The cross-sectional study was performed using a 47-item survey that was used to identify depression, anxiety, marijuana, and cocaine use

amongst medical students at a large urban medical school. The survey was composed of components from the PHQ-4, three questions about suicidal ideations, and an additional six questions screening for current and past use of marijuana and cocaine from the National Survey on Drug Use and Health. The survey was emailed to 1169 students, of which 385 students completed the survey. Reminder emails were sent weekly for three weeks, and students were offered an incentive for the possibility of winning one of five 100\$ gift cards in a drawing if they completed the survey.

The responses showed that 25.7% (99 students) reported anxiety, 8.6% (33 students) reported being depressed, and 11.7% (45 students) admitted to suicidal ideations in the past year. Regarding drug use, 18.2% (70 students) reported marijuana in the past year, and 1.1% (4 students) reported cocaine use within the last year. Limitations to this study are that the survey was confined to only one school, only 33% of students sent the questionnaire responded, and although the authors report no conflict of interest, there was incentive money for completing this survey. Regarding strengths, this is one of the few studies that addresses anxiety as well as marijuana use amongst a group of graduate healthcare professional students.

The intent of this study by Martinez et al. (2016) was to highlight the incidence of alcohol use in medical schools, which has a strong correlation to depression as well as suicidal ideations and suicide attempts. Data collected for this study was from the initial data of the HEAR program at the University of San Diego. Data was analyzed from 2009 to 2014 as part of a questionnaire in part of the HEAR program.

Martinez et al. aimed to determine the prevalence of depression and suicidal ideations amongst medical students, residents, fellows, and faculty. The first part of this survey included

the PHQ-9 as well as additional questions about suicidal ideations, alcohol use, and drug use.

The question component about alcohol in the survey focused on rating the following three questions regarding alcohol use the prior four weeks before taking the survey. These questions were as follows: during the last four weeks, have you experienced any of the following:

“drinking alcohol (including beer and wine) more than usual,” “feeling that your work or school attendance or performance was affected by your drinking,” and “feeling like you were drinking too much.” (Martinez et al., pg. 87). A total of 1,076 individuals completed this survey, with 411 of them being medical students, 267 of them being either residents or fellows, and 398 of them being faculty members. Of the individuals that completed the survey, 23% reported drinking more than usual and, 18% reported drinking too much. Those who reported drinking too much were more likely to have a PHQ-9 score of moderate to severely depressed with a p-value < 0.001. Also, those who reported drinking too much were more likely to have suicidal ideation or have attempted suicide in the past (p-value = 0.001).

Limitations regarding this study are that it only included one school, and it also included residents, fellows, and school faculty in its overall numbers. Graphic representation was provided, which separated the groups. Data revealed that in the categories regarding drinking, medical students had lower levels of distress from drinking than faculty. This could lead to a variation of the interpreted results. The strengths of the Martinez et al. study is that there is a definitive correlation between the use of alcohol and depression as well as suicidal ideations in this population.

The work done by Merlo, Curran, and Watson (2017) showed the prevalence of substance use secondary to mental health distress in medical students. The research was aimed at the use of alcohol, marijuana, stimulants, and several other illicit drugs. A cross-sectional

study was performed for the data collection on the use of alcohol and other drugs in medical students in the state of Florida. A questionnaire was sent to 5,053 students at nine different public and private medical schools, including osteopathic medical schools. The total number of students who received the survey, 1,137 responded to the questionnaire and, 862 completed the 98 items in their entirety.

Of the responses, it was found that the average number of alcoholic drinks consumed per day was 2.24, with a standard deviation (SD) of 1.84 and a p-value < 0.001. The most significant concern to the authors was that 31.3% of students admitted to an increase in the use of alcohol since beginning medical school. Seventy percent also admitted binge drinking after taking a test. Regarding illicit drug use, 22.7% stated that students had used marijuana in medical school, and 18.6% had used prescription stimulants. However, only 44.8% of them had actual prescriptions for stimulants. The study showed that 63.0% of students reported that their physical health decreased, and 60.6% stated that their mental health declined as well. When asked if they would benefit from mental health resources, 70.1% said they would benefit as they were struggling psychologically from school.

The limitations of this study are that the complete response rate was low (n= 862) in a pool of 5,053 students. Bias may or may not have occurred as desirability to complete the survey may differ from student to student. Strengths included responses from nine different schools and a relatively large sample compared to similar research studies.

Cognitive Behavioral Therapy

CBT has long been considered the cornerstone of the treatment of depression, along with medications. Time restraints of graduate healthcare school can limit accessibility, along with

students being afraid of repercussions for reaching out for this therapy. Several schools and university healthcare systems have begun implementing CBT and internet cognitive-behavioral therapy (iCBT) to decrease not only depression but suicide as well.

Research done by Chang, Eddins-Folensbee, Porter, and Coverdale (2013) was aimed at determining the usage of counseling services at a single medical school. This study was not aimed at determining if CBT decreased depression or suicidal ideations but rather the occurrence of students voluntarily using psychological counseling on campus. Chang et al. performed a cross-sectional voluntary research study, which was conducted at one medical school where first through fourth-year students were invited to be enrolled. Fourth-year students were later excluded due to low levels of participation.

The survey was sent out electronically via email to all 526 first through third-year students. A total of 336 students completed the survey in its entirety (69.3% response rate). In addition to the Maslach Burnout Inventory, two additional questions were asked, "Have you ever used Baylor's counseling services at least once?" and "Have you received psychotherapy at Baylor's counseling services for at least 5 sessions." (Change et al., p. 450). A total of 83 students (21%) attended at least one session, and 42 students (10%) had participated in at least five sessions. Of the students that used the psychological services, 75% had depression symptoms, and 65.2% had a high level of burnout reported using the Maslach Burnout Inventory. Overall, 15% (28 students) said that CBT was helpful in the implementation of coping mechanisms, and 34% reported that they believed CBT was helping them. Students that had a high level of burnout and depression reported using psychological services at a higher rate than those who did not, as noted by the authors.

The limitations of this study include that although there was a 70% response rate, there was still 30% who did not complete the questionnaire. This could indicate that those who did complete the survey were biased in some way towards the psychological services at their school. Additionally, there were no previous baselines obtained other than the student's opinions via a PHQ-9 before and at the end of completion of therapy. The key strength of this study is that students who did use CBT stated that they felt it was beneficial to them.

Work done by Lattie, Duffecy, Mohr, and Kashima (2017), evaluated the feasibility and effectiveness of internet-based cognitive behavioral therapy (iCBT) in medical school students through the online program ThinkFeelDo. This study by Lattie et al. was a single-arm pilot study to evaluate if iCBT decreased depression amongst medical students. Outside of the effectiveness, the overall goals were to see if iCBT reduced depression, stress, and improved student's quality of life. The study was composed of a six-week study of 16 voluntary selected individuals at one medical school. Before initiation of iCBT, a questionnaire was completed by the participants with questions from the Perceived Stress Scale (PSS), the Medical Student Wellbeing Index (MSWBI), and the Cognitive and Behavioral Response to Stress Scale (CB-RSS).

The study showed a decrease in stress from $M=32$ to $M=28.75$ on the PSS. Participants noted an increase in the frequency of iCBT coping skills from $M=33.73$ to $M=41.45$, p value=0.007. The study also revealed that iCBT also showed a decrease in the feeling of burnout, with initial reports of 63.64% down to 18.18% post-treatment. The limitations of this study were the minimal sample size of 16 students. The participants were also selected and agreed to complete the study, although no incentive was supplied. A larger-scale duplication of this study is needed to determine if iCBT is helpful in decreasing stress and depression among

healthcare professional students. The strength of this study is that it shows a significant improvement in the quality of life of medical students post CBT treatment as well as a decrease in stress with the increased utilization of CBT tools.

Research done by Mascaro et al. (2108) was aimed at testing whether cognitive-behavioral compassion training (CBCT) decreases depression, improves the daily quality of life, and improves compassion of second-year medical students as well as the feasibility of CBCT. The design of the study was a single-blind, randomized control study of voluntarily enrolled second-year medical students (didactic) from a medical school in the southern United States. After the recruitment of volunteers, the group was divided into two separate groups, one that would receive CBCT and one that would be waitlisted to receive CBCT. A pre-intervention questionnaire was completed by the entire group which consisted of questions from the Compassionate Love for Humanity Scale (CLHS), the UCLA Loneliness Scale (R-UCLA), the Depression Anxiety Stress Scale (DASS), the Substance Use inventory, and two additional questions on the frequency of exercise in the previous month. CBCT intervention consisted of meeting once a week for ten weeks for a total of 90 minutes. Outside of meetings, students were encouraged to meditate as well as listen to guided recordings that were supplied. The meetings and recordings focused on mind stability, compassion for others, self-appreciation, and developing compassion.

A total of 32 students completed the CBCT and reported a decrease in loneliness and depression. Students also reported an increase in compassion towards others. R-UCLA scores dropped from a level of 36 pre-CBCT to 31 post CBCT with $p=0.002$. DASS scores also decreased from 5 to 2.3, with $p=0.008$ pre and post CBCT, respectively. This study has several limitations. The study included only one school and only second-year students having completed

the entire CBCT. Overall, voluntary enrollment was low as the authors suspected due to the significant time restraints of medical students. Of the 132 students in the second-year class, 59 opted to enroll, and only 32 completed CBCT with 27 being waitlisted. It should also be noted that participants that were in the CBCT group, as well as the waitlist group, were entered into a drawing to receive gift cards for Amazon totaling \$50 with a total of 20 gift cards awarded to the group of 59. The work by Mascaro et al. does have its strengths in that it shows that CBT does decrease depression and loneliness as well as an increase in compassion towards others in graduate healthcare students.

Work done by Norcross et al. (2018) provided an update on the previous cross-sectional study performed at the University of San Diego in California. The initial study took place from 2009-2013 and has been ongoing since its inception. The goal of the initial and ongoing study was to enroll medical students, residents' fellows, and faculty into a voluntary screening process to determine if any of these individuals were at risk of suicide. Those who were found to be at risk, mental health resources, including CBT with a psychiatrist were offered to these individuals. Initially, 343 individuals were screened, and 8% of these individuals were deemed to be at a moderate to high risk for suicide.

Since the end of the initial study in 2013, the program has expanded to pharmacists, nurses, and other clinical staff within the University of California San Diego Health System. As of June 2017, an additional 1,194 individuals have been screened with a total of 320 individuals receiving counseling online, in-person, or by phone. The sum of these numbers indicates roughly 20% of screened individuals were at moderate to high risk for suicide. Overall, the data shows that in the years of 2009-2017, suicides decreased by six individuals from the previous numbers in the eight years (same time span) leading up to the program. Limitations of the

updated HEAR study are like the limitations found in its initial release. Data shown is still from only one university, which is now part of the healthcare system as well. The strengths of this study include the increasing number of individuals being screened for suicidal ideations as well as the decrease in suicides since its inception. It is also of value to note that the HEAR program now has been implemented at an additional 20 medical schools/healthcare systems, 125 universities, and several law enforcement agencies.

Trending Additional Methods

Although the most common method of treating depression has been CBT and this has shown to be effective in the general population as well as in graduate healthcare students, there is current research being done to determine if there are additional methods to decrease depression. Peer reflection groups, pass/fail grading, along with modifiable behaviors focusing on exercise and sleep are all currently being studied. This is being done to determine if, in addition to CBT, these additional methods can help.

Work done by Ange, Wood, Thomas, and Wallach (2018), evaluated pass/fail grading of medical students to assess if this method increased overall student well-being as well as academic outcomes. The study focused on two different groups of medical students at one university, the classes of 2015 and 2016, which had standard tiered grading and the classes of 2017 and 2018, which had pass/fail grading. The tiered grading class was composed of the two-year classes (n= 389), and the pass/fail grading method for the following two years (n= 385). Grades, although not given to the pass/fail students, were still logged to compare to the previous tiered grading class.

Results of the study by Ange et al. showed minimal differences in the percentage scores of tiered grading compared to pass/fail grading. In the tiered grading group of their first year, there was an overall grade average of 86.5%, whereas the pass/fail first-year class had an overall grade average of 85.4% (p-value = .013). Concluding the second-year average of grades, the pass/fail class had an overall grade percentage of 89.7%, whereas the tiered grading class had an overall grade average of 88.6% (p-value < .001). Average of USMLE step one scores were shown to be close with the pass/fail classes scoring on average of 230.7, where the tiered classes scoring slightly higher with a score of 231.5. The key strength of this study, which is thought to correlate to overall student wellbeing, is that pass/fail grading showed little change from that of tiered grading regarding overall student performance in class as well as on board exams. Limitations of this study are that, although performance was not significantly decreased in the pass/fail group of students, there was no statistical data on whether wellbeing was increased.

In research done by Gold, Bentzley, Franciscusm Forte, and De Golia (2019), aimed at evaluating the effectiveness of peer reflection groups of first- and second-year medical students at Stanford Medical School. These authors anticipated that peer reflection groups would improve the overall well-being of the students who participated as well as their self-awareness and empathy. Gold et al. researched a total of 30 students composed of first- and second-year medical students (didactic year). These students were placed into reflection groups that met twice monthly, facilitated by psychiatry residents. The groups met for 90 minutes per session over six-months. A total of 66 students enrolled initially, 30 completed the six months of group reflection, and 18 completed both pre and post questionnaires. These questionnaires were comprised of questions from the Emotional Self-Awareness Scale, Interpersonal Fulfillment Index, and UCLA Loneliness Scale. In addition to these questions, the 5-point Likert scale was

administered to the 18 students who completed the program and post-program questionnaire to evaluate if program objectives were met.

The student's well-being was noted to be improved 55.6%, answering that they strongly agreed, and 27.8% agreed. The ability to empathize was also noted to be high as students reported an improvement of 50% with strongly agreed and 27.8% answering agreed. The UCLA loneliness scale also improved with a decrease in score by 20%. Limitations of this study include a small sample group from only one university, unknown ability to assess the benefits due to students previously not being exposed to survey instruments, and student bias regarding skew due to susceptible students being more inclined to join the research groups. Attrition was also noted to be high, with the student's main reasoning being a lack of time due to study restraints. Strengths of the work done by Gold et al. are in showing that peer reflection groups with licensed mental health providers showed an overall improvement in student's well-being. It also showed an increase in empathy towards other students and patients.

The research done by Wolf and Rosenstock (2017), reviewed two modifiable behaviors, sleep, and exercise, to see if lower levels of both lead to an increase in burnout and depression amongst medical students. The research by Wolf and Rosenstock was a cross-sectional web-based study assessing the amount of sleep and exercise medical students got in relation to depression and burnout at the University of Pittsburgh. The questionnaire consisted of a modified Maslach Burnout Inventory-General Survey in which wording was changed from "work" to "studies" and from "job" to "medical school." (Wolf & Rosenstock, pg. 175). In addition to the burnout survey, the Epworth sleepiness scale, the Godin Leisure-Time Exercise Questionnaire, and the PHQ-2 survey were all incorporated into their survey. Questionnaires

were sent out to all students enrolled in the medical school during the fall semester after their first exam and in the middle of winter of that same year.

Fall response rates were 28.7% (190 students), and winter response rates were 22.6% (149 students). Fall students reported a burnout of 58.6%, and winter responses reported burnout at 49.2%. Participants who slept a minimum of 7 hours per night were at a lower risk of exhaustion and personal efficacy, whereas the opposite was reported for those sleeping less than 5 hours per night. Individuals who reported low levels of exercise on the Godin Leisure-Time Questionnaire reported higher levels of exhaustion and lower professional efficacy ($p=0.063$). Regarding depression, there was no difference noted in lower sleep and higher depression, but respondents who exercised less were more likely to screen positive for depression. Limitations of this study included sectional bias of voluntary respondents and a low response rate. An additional limitation was the use of the PHQ-2 questionnaire versus the use of the PHQ-9 questionnaire. The strengths of the study include a correlation to students that exercise and thus having a lower level of depression than students who do not exercise. Wolf and Rosenstock's work also notes that students who did sleep seven hours or more had lower levels of burnout.

Discussion

Current literature shows depression and suicidal ideations in graduate healthcare professionals' students being significantly higher than the general population. The studies included in this review of literature shows that roughly one in four students are considered depressed and that one in ten students contemplate suicide, which are both significant findings. Large and small studies both confirm the significant prevalence of depression. The largest study that confirms this data was done by Rotenstein et al., it was meta-analysis in nature, with 129,123 students of which 27.2% screened positive for depression, and 11.1% screened positive

for suicidal ideations. Concluding the prevalence of depression and suicidal ideation the data does show that both are significant issues that graduate healthcare students deal with.

The research shows that graduate healthcare students do use avoidance coping mechanisms as a way of dealing with the stressors of school. One of the most noted avoidance coping mechanisms used by students was the use of alcohol. The work of Martinez et al. found that 20.9% of graduate healthcare students were using alcohol as an avoidance mechanism. An additional study by MacLean et al. showed that in the past year, 18.2% of students used marijuana, some cited its use as recreational with some using it as a relaxant. Both cross-sectional studies showed that students do use substances to help decrease the stressors of school which is alarming as they can potentiate depression symptoms.

In healthcare professional students, does the implementation of mental health resources versus supplemental resources decrease the rate of suicide and depression? The review of the literature did show significance in the implantation of CBT and the decrease of depression. The work done by Lattie et al. implemented iCBT to medical students and levels of stress and burnout were documented before and after implantation. Lattie et al. suggested a correlation to stress and burnout to that of depression. This work showed a decrease in stress from $M=32$ to $M=28.75$ on the Perceived Stress Scale (PSS). Also noted in this study was a significant decrease in burnout with initial student reports of 63.64%, followed by 18.18% post iCBT treatment.

Implementation of screening for depression and referral to CBT has been shown to decrease suicide in this population as well. This was proven to be true at the University of San Diego Medical School and the University of San Diego Hospital, in the work done by Norcross et al. It was the beginning of a longitudinal study with CBT on medical students, medical residents, and medical staff. This work titled the HEAR project was aimed at screening

individuals in the previously mentioned population for depression and suicidal ideation and then referring them to CBT. Norcross et al. work from 2009-2017 showed that with screening and implementation of CBT that the number of suicides in the medical school and hospital system decreased by six individuals during this time frame compared to the previous eight years.

The intervention of CBT has been shown to work in the general population as well as the graduate healthcare student population. There has been some research into the implementation of methods that do not include CBT to decrease depression. Work done by Gold et al. showed that implantation of peer reflective groups in first- and second-year medical students increased well-being by 55.6% and decreased loneliness by 20% on the UCLA loneliness scale. Additional methods thought to reduce depression as well as anxiety is the implementation of pass/fail grading. The work performed by Ange et al. through a longitudinal study did show that there is promise in this change of grading.

Proper sleep, as well as implantation of exercise, has been a long-standing adjunct in mental health stability. Work done by Wolf and Rosenstock aimed to highlight the effects of sleep and exercise on depression and burnout. This work did show that students who slept more than seven hours a night were less likely to feel burnout than those students who slept less than five hours of sleep. Regarding exercise, there was no correlation to burnout, but in students who exercised regularly, it was noted that they were less likely to screen positive for depression.

Concluding the literature review, the implementation of mental health resources specifically CBT, does show to decrease depression, burnout, anxiety as well as suicidal ideation in graduate healthcare students. Limitations still exist on screening students for depression and suicidal ideations as well as proper program initiation into graduate healthcare schools.

Additional methods such as peer reflective groups, pass/fail grading, and proper school/life balance do show promise. Further longitudinal studies on programs that screen, implement mental health resources, and acknowledge the need for these programs need to occur to solidify the data to show how exactly we can prevent depression as well as suicide in graduate healthcare students.

Applicability to Clinical Practice

The intention of this study was to evaluate if the implementation of mental health resources versus current methods of supplemental resources from locations such as campus services, where the student needs to reach out to obtain them, would decrease the rate of depression as well as suicidal ideations in healthcare professional students. Overall, CBT has been shown to reduce burnout, depression, and suicidal ideations in these students. (Mascaro et al., 2018.; Norcross et al., 2018). The work done specifically by Norcross et al. at the University of San Diego showed implementation of a program that included screening for depression, identifying students, residents, and physicians that were depressed and then referring them to CBT. This longitudinal study of this implemented program shows that with proper screening and referral to CBT, we can decrease the rate of suicide in this population.

Implementation by students in their personal life of proper sleep and exercise does show decreasing rates of burnout as well as depression, as shown in the work by Wolf and Rosenstock. Initiating peer reflective groups shown in the study by Gold et al. can increase well-being and decrease loneliness in this student population. A pass/fail grading system, as demonstrated by Ange et al., shows an increase in student's overall feeling of wellbeing.

With the information obtained from this literature review, healthcare professional students, as well as academic institutions, will be able to identify which resources work best in their institution in decreasing the rate of depression and suicidal ideation in graduate healthcare students. Implementation of these mental health resources will lead to lower attrition of healthcare graduate students and better combat the shortage of healthcare providers.

References

- American Medical Student Association. (2019). Suicide is more common in medical school than in any other school setting. Retrieved from <https://www.amsa.org/2017/06/21/suicide-is-more-common-in-medical-school-than-in-any-other-school-setting/>
- Ange, B., Wood, E., Thomas, A., & Wallach, P. (2018). Differences in medical students' academic performance between a pass/fail and tiered grading system. *Southern Medical Journal*, *111*(11), 683–687. <http://dx.doi.org/10.14423/SMJ.0000000000000884>
- Borges, G., Nock, K., Haro Abad, J., Hwang, I., Sampson, N., Alonso, J., ... Kessler, R. C. (2010). Twelve-month prevalence of and risk factors for suicide attempts in the World Health Organization World Mental Health Surveys. *The Journal of clinical psychiatry*, *71*(12), 1617–1628. <http://dx.doi.org/10.4088/JCP.08m04967blu>
- Chang, E., Eddins-Folensbee, F., Porter, B., & Coverdale, J. (2013). Utilization of counseling services at one medical school. *Southern Medical Journal*, *106*(8), 449–453. <http://dx.doi.org/10.1097/SMJ.0b013e3182a05994>
- Cheng, J., Kumar, S., Nelson, E., Harris, T., & Coverdale, J. (2014). A national survey of medical student suicides. *Academic Psychiatry*, *38*(5), 542–546. <http://dx.doi.org/10.1007/s40596-014-0075-1>
- Cocke, K., Klocko, D., & Kindratt, T. (2019). Screening for undetected depression in physician assistant students. *The Journal of Physician Assistant Education*, *30*(2), 118-121. <http://dx.doi.org/10.1097/JPA.0000000000000247>

- Culbertson, R. (2018). The impending physician shortage: Policy solutions should allow the U.S. to achieve adequate supply. *Healthcare Executive*, 33(6), 44–46. Retrieved from <https://search-ebshost-com.ezproxylr.med.und.edu/login.aspx?direct=true&db=ccm&AN=132751332&site=ehost-live>
- Downs, N., Feng, W., Kirby, B., McGuire, T., Moutier, C., Norcross, W., ... Zisook, S. (2014). Listening to depression and suicide risk in medical students: The Healer Education Assessment and Referral (HEAR) Program. *Academic Psychiatry*, 38(5), 547–553. <http://dx.doi.org/10.1007/s40596-014-0115-x>
- Gold, J., Bentzley, J., Franciscus, A., Forte, C., & De Golia, S. (2019). An intervention in social connection: Medical student reflection groups. *Academic Psychiatry*, 43(4), 375–380. <http://dx.doi.org/10.1007/s40596-019-01058-2>
- Lattie, E., Duffecy, J., Mohr, D., & Kashima, K. (2017). Development and evaluation of an online mental health program for medical students. *Academic Psychiatry*, 41(5), 642–645. <http://dx.doi.org/10.1007/s40596-017-0726-0>
- Lockwood, C. (2018). Burnout and depression in medical students and mentors: Cynicism is contagious, but we can take steps to bring joy back to our specialty. Retrieved from *Contemporary OB/GYN*, 63(4), 5–7. <https://search-ebshost-com.ezproxylr.med.und.edu/login.aspx?direct=true&db=ccm&AN=129035019&site=ehost-live>

- MacLean, L., Booza, J., & Balon, R. (2016). The impact of medical school on student mental health. *Academic Psychiatry, 40*(1), 89–91. <http://dx.doi.org/10.1007/s40596-015-0301-5>
- Martinez, S., Tal, I., Norcross, W., Newton, I., Downs, N., Seay, K., ... Zisook, S. (2016). Alcohol use in an academic medical school environment: A uc san diego healer education assessment and referral (HEAR) report. *Annals of Clinical Psychiatry, 28*(2), 85–94. <http://dx.doi.org/10.1007/s40596-014-0115-x>
- Mascaro, J., Kelley, S., Darcher, A., Negi, L., Worthman, C., Miller, A., & Raison, C. (2018). Meditation buffers medical student compassion from the deleterious effects of depression. *Journal of Positive Psychology, 13*(2), 133–142. <http://dx.doi.org/10.1080/17439760.2016.1233348>
- Merlo, L., Curran, J., & Watson, R. (2017). Gender differences in substance use and psychiatric distress among medical students: A comprehensive statewide evaluation. *Substance Abuse, 38*(4), 401–406. <http://dx.doi.org/10.1080/08897077.2017.1355871>
- Norcross, W., Moutier, C., Tiamson-Kassab, M., Jong, P., Davidson, J., Lee, K., ... & Zisook, S. (2018). Update on the UC San Diego Healer Education Assessment and Referral (HEAR) Program. *Journal of Medical Regulation, 104*(2), 17-26. <https://doi.org/10.30770/2572-1852-104.2.17>
- Rotenstein, L., Ramos, M., Torre, M., Segal, J., Peluso, M., Guille, C., ... Mata, D. (2016). Prevalence of depression, depressive symptoms, and suicidal ideation among medical students: A systematic review and meta-analysis. *Journal of the American Medical Association, 316*(21), 2214–2236. <http://dx.doi.org/10.1001/jama.2016.17324>

- Thompson, G., McBride, R., Hosford, C., & Halaas, G. (2016). Resilience among medical students: The role of coping style and social support. *Teaching & Learning in Medicine*, 28(2), 174–182. <http://dx.doi.org/10.1080/10401334.2016.1146611>
- Wimsatt, L., Schwenk, T., & Sen, A. (2015). Predictors of depression stigma in medical students: Potential targets for prevention and education. *American Journal of Preventive Medicine*, 49(5), 703–714. <http://dx.doi.org/10.1016/j.amepre.2015.03.021>
- Wolf, M., & Rosenstock, J. (2017). Inadequate sleep and exercise associated with burnout and depression among medical students. *Academic Psychiatry*, 41(2), 174–179. <http://dx.doi.org/10.1007/s40596-016-0526-y>