**Methods Chapter**

**Introduction**

Prevention has been a topic of great conversation in the medical and public health fields. There has been talk about prevention of diseases such as obesity, diabetes, cardiovascular disease, and cancer. These topics are widely and openly discussed and most people are aware of preventative measures that can be taken to reduce their risk of developing one of these diseases. But what isn’t discussed as frequently or as openly is the prevention of mental health, such as depression and suicide. Suicide is a “serious but preventable public health problem that can have lasting harmful effects on individuals, families, and communities. While its causes are complex, the goals of suicide prevention is simple-reduce factors that increase risk and increase factors that promote resilience or coping,” (1). With a public health approach, prevention occurs at all levels of society and strategies are needed to promote awareness of suicide and promote prevention, resilience, and a commitment to social change (1).

The state of Maryland has been working towards meeting the national goals for suicide prevention. The national goal categories include the following:

* Awareness: goal is to increase and broaden the public’s awareness of suicide and its risk factors and understand it is preventable.
* Intervention: goal is to enhance culturally competent, effective and accessible community based services and programs.
* Methodology: goal is to advance the science of suicide prevention.
* Postvention: assure effective services to those who have attempted suicide and/or others affected. (2)

Maryland’s suicide prevention plan (FY 2008-2012) has proposed to develop a more coordinated prevention, intervention, and postvention services across the State, to include youth and young adults, address core components in youth suicide prevention, create programs by the local school systems and other educational networks, increase funding to the Maryland Youth Crisis Hotline programs, increase the number and quality of trainers in suicide prevention, increase outreach and the number of training to gatekeepers and the public around youth suicide issues, and establish a baseline listing of existing support systems for survivors and attempters (2). This suicide prevention plan is important because according to the Federal Centers for Disease Control and Prevention, suicide continues to be the third leading cause of death for youth in the United States and in Maryland (3). In 2005 Maryland conducted a Youth Risk Behavior Survey and it revealed that more than one in ten Maryland high school students reported making a plan to commit suicide in the past twelve months (3).

Based on this information and the proposed plan Maryland has already set out to meet, the suicide prevention program that is used in this study would be a great model to help reach the goals described earlier. The prevention program in this study had similar goals, which included creating a program in the local school systems, increase the number and quality of trainers in suicide prevention, and help to establish a baseline listing of existing support systems in the local area. The school environment is the best place to implement a primary prevention program designed to improve mental health and increase awareness, but the help and support of schools, local politicians, other stakeholders, teachers, parents, and the students are all needed in order to make this effective (9). These awareness programs are geared toward developing a set of skills and knowledge regarding mental health, including functional knowledge (knowing about mental health), procedural knowledge (knowing how/having the skills), and conditional knowledge (knowing the circumstances in which to use the skills) as a means to prevent suicide within the context of the school setting (9). The ultimate question is, should suicide prevention programs be mandatory in high schools in Maryland as a means to increase awareness of depression and suicide while decreasing risk of suicide? This study evaluated the level of success of the suicide prevention program, which included a LEADS curriculum for students and QPR training for school personnel. The goal was to determine feasibility of the program, if it is well received by school personnel and students, and if there were positive outcomes/results due to the prevention program.

**Population and Sample**

The aim of this study was to obtain information from high school personnel and students in the state of Maryland. The population used for this study were high schools in Maryland from which a stratified random sample was taken. The state of Maryland was stratified into counties (strata) and then a random sample from each strata was taken to produce a well-represented sample of high schools that would be chosen to participate in the study. There were four public high schools that were randomly chosen from each county. Of those four schools each were randomly assigned to either the control group or the intervention group, making sure that two schools are placed in the control group and two are placed in the intervention group. The subsets of the strata were then combined together to form the population sample used for this study design. The entire school personnel and students participated in the study and their exposure would depend on which group their school had been randomly assigned to. During data collection a sample of school personnel, to include teachers, administration, health workers, and coaches were asked to participate in a web-based survey. A sample of students were also asked to complete the web-based survey.

**Research Design**

Primary Questions: Should suicide prevention programs be mandatory in all high schools in the state of Maryland? Will suicide prevention programs in high schools located in Maryland increase awareness of depression and suicide and reduce the risk of suicide? Will suicide prevention programs enhance the ability of school personnel and students to detect the early warning signs of depression and suicide?

Type of research design: an intervention study design will be used to assess the effect of the intervention on health outcomes and mediating factors that influence health outcomes (4). This will help to measure people’s health knowledge, attitudes and social norms on depression and suicide in high school students. The study design will change the school environment (control or intervention design) to determine if there are any changes to health or health behaviors of the students.

Independent variable: suicide prevention program, to include the LEADS curriculum and QPR training.

Dependent variable: increased awareness of depression and suicide and decreased short-term health risks for depression and suicide.

The schools in the control group were provided educational posters and pamphlets, which were handed out to all school personnel and students at the beginning of the school year. The posters and pamphlets included information about the signs and risk factors of depression and suicide, ways in which to help others, and a list of resources in the local community. The schools in the intervention group were exposed to the prevention program which consisted of two components, one for students and one for school personnel. The students participated in Linking Education and Awareness of Depression and Suicide (LEADS) and all school personnel participated in Question, Persuade, and Refer (QPR) training at the beginning of the school year. All high school personnel and students both in the control and intervention groups completed two questionnaires. The first questionnaire was provided through SurveyMonkey during the first week of school and before the start of the study. This questionnaire was conducted in a computer lab or library. All high school students completed a second questionnaire called Youth Risk Behavior Survey in a paper and pencil format during the first week of school, but on a different day than the first questionnaire. This questionnaire was conducted inside the classroom.

LEADS is a curriculum for high school students that is designed to increase knowledge of depression and suicide, modify perceptions, increase knowledge of suicide prevention resources, and improve intentions to engage in help-seeking behaviors (5). Signs and symptoms of depression and suicide, risk and protective factors associated with suicide, the warning signs, seeking help and overcoming barriers to seeking help, and school and community suicide prevention resources will be discussed in the classroom for one hour a day over a five day period (5). These sessions will include lecture, individual and group activities, small group discussions, and homework assignments. Students who were not allowed to participate, per the request of their parents, were placed in a separate classroom to complete unrelated assignments during that hour. At the end of the week each student received a booklet to take home with them summarizing what they learned, important facts, warning signs and risk factors, and a list of local resources.

Question, Persuade, and Refer (QPR) is an emergency response to someone in crisis and can help save lives. This training has been created to teach simple steps that school personnel can take if they think a child is in need of help. The QPR Institute will provide one hour of CE-approved online evidence-based and peer-reviewed training. The goal of QPR is to train individuals to recognize the early warning signs of a suicide crisis and know how to question the individual, persuade them to get help, and refer them to the appropriate help (6). Once an individual has been trained they are considered gatekeepers. Official QPR training outcomes, which have been determined by independent research reviewers of published studies for National Registry of Evidence-based Practice and Policies found that trained gatekeepers have increased knowledge, confidence and gatekeeper skills based on these measures:

* Increased declarative knowledge
* Increased perceived knowledge
* Increased self-efficacy
* Increased diffusion of gatekeeper training information
* Increased gatekeeper skills (ability to engage in active listening, ask clarifying questions, make an appropriate referral) (7).

Three months later all school personnel and students will take the SurveyMonkey questionnaire to determine what knowledge and perceived attitudes had changed because of the program. Then at the end of the year (a week before final exams begin) the same surveys, in the same form and context were given to all school personnel and students who completed the initial questionnaires at the beginning of the school year. The questionnaires asked the exact same questions and in the same setting to ensure that the questionnaires can easily be compared to one another during the analysis. The purpose of the third round of questionnaires is to determine retention statuses for the participants 10 months after the program started. The students will complete the YRBS for a second time to determine if their mental health and behaviors had improved after being exposed to the study design.

**Procedures**

An approval by the IRB was obtained before the start of the study since the study involved human subjects, even though there is minimal risk to the participants. In order to recruit high schools to participate in the study, an email was sent to the school district’s leader, as well as each principle of each high school informing them of the study, the purpose, and ways to contact the investigator with any questions. An investigator from the study set up a meeting with each school to discuss the study’s purpose and goals, what to expect during the study, and how the information will be used. A week later, a follow-up call was made to the school to determine their participation. Once the schools decided on participation, all the schools were stratified based on counties and then four schools per county were randomly chosen. Of those four schools each were randomly assigned to either the control or intervention group. All participants were blinded as to which group they had been assigned to, in order to reduce any potential bias.

An information session was given at the start of the study to inform all school personnel and students of the study and its purpose. During the first week of school all school personnel and students participated in the questionnaires provided during school hours. The schools in the control group received educational posters and pamphlets after the completion of the questionnaires. In the intervention group, the LEADS and QPR training began after the completion of the questionnaires and lasted for one school week. Questionnaires were again given at 3 months and then a week before final exams at the end of the year. All scannable answer sheets were scanned into SurveyMonkey at the conclusion of the study. The two questionnaires were merged together and analyzed to provide final results. The results were used to generalize to the entire population of high schools in the state of Maryland. At the end of the study and after the data was analyzed, the same investigator went back to the school and presented the data to school personnel and students. This was done to inform the participants of what their hard work was able to accomplish and what type of results were determined. Based on the results, a recommendation will be made to the Maryland school board to either require all schools to implement a suicide prevention program or not.

The results were then compared to the executive summary provided by the Wilder Foundation in order to determine if this type of combination prevention program is better than just the LEADS curriculum in schools as a way to improve knowledge and attitudes towards depression and suicide, increase knowledge about resources, and better prepare others to help themselves or others in a time of need.

**Instruments**

The study required the use of a few forms before the questionnaires could be conducted. Since most of the study participants are under the age of 18, permission forms were used. A passive parental permission form required students to take home a permission slip, as well as emailed to parents, explaining the purpose of the study and the topics on the questionnaires. The form was to be returned only if the child could not participate. Each administrator in charge of conducting the questionnaires were required to read over and explicitly follow the survey script, confidentiality form, and survey instructions.

A few types of instruments were used to collect data. Prior to the start of the study each school personnel and student completed a questionnaire to obtain demographic information, current knowledge and perceived attitudes on signs and risk factors for depression and suicide. This survey was conducted by SurveyMonkey during school hours in a setting that ensured privacy. Each participant logged in with their personal identification number and a link was embedded on the site that would take them directly to the questionnaire. The questionnaire consisted of multiple choice, rating scale (how much do you agree), true/false, and open-ended questions. Age, gender, race/ethnicity, and school grade were gathered for the demographic section. Several questions asked about current knowledge about various topics, such as, what are signs of a depressed individual, is depression a disease, and what would they do if they thought someone was contemplating suicide. Questions would also address attitudes such as, are people who commit suicide crazy, are depressed people weak, and what makes someone depressed. An analysis tool will be used to compile the data and analyze it.

A second survey given to the students prior to the start of the study assessed health risk behaviors which could contribute to depression and increased risk of suicide. The Youth Risk Behavior Survey (YRBS), was administered through a cooperative agreement with the Division of Adolescent and School Health, National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention at CDC. This is part of CDC’s Youth Risk Behavior Surveillance System and has been used in 47 states in the United States. The YRBS system was designed so that public health professionals, educators, policy makers, and researchers could describe health-risk behaviors among youths, assess trends in health-risk behaviors over time, and evaluate and improve health-related policies and programs (8). YRBSS was also developed to monitor progress toward achieving national health objectives. The YRBS questionnaire was provided in a paper and pencil format, using scannable answer sheets, in the classroom. The questionnaire was given along with a number 2 pencil, a blank sheet of paper for students to cover their answers and a large box for students to place their completed questionnaire sheets in. The YRBS asked questions about various topics such as, safety, violence-related behaviors, bullying, emotional status, tobacco and alcohol use, drug use, sexual behaviors, feelings about appearance, eating habits, physical activity, and their current medical health status.

Both questionnaires were repeated in the same format using the same identification number at 3 months and at the end of the school year. This was done so that comparisons could be made regarding knowledge, perceived attitudes, and personal health risk factors before and after the yearlong study to see if the program improved the students and school personnel’s knowledge and attitudes about depression and suicide, and determine if they know how to better handle a situation that involves someone at risk for suicide.

**Plans for Data Analysis**

All surveys that were incomplete were discarded before any analysis took place. All data analysis was completed within SurveyMonkey. This required the scannable answer sheets for the YRBS questionnaire to be scanned into SurveyMonkey. Next the program performed an analysis and frequency tables were constructed to better display the results. Comparison tables and charts were also created to display trends and level of success of the program. Comparison tables and charts were created to compare the control group to the intervention group, both before and after the study. This showed any positive correlations between the prevention program, short-term risk factors for depression and suicide risk, and increased knowledge and awareness of depression and suicide. Additional statistical data was calculated through SurveyMonkey to compare variables from pre and post intervention as well to make comparisons between control and intervention groups. P-values were calculated to quantify whether or not the prevention program was able to reach its goals. The goal of the quantitative data was to provide numeric data to be statistically analyzed to measure incidence of various views and opinions. Qualitative data was compiled and analyzed, which provided an understanding of processes, context, and feelings. This data was useful to assess ease of implementation, success of the program, and suggest possible improvements. The results from this study were then compared to another study that only included the LEADS curriculum. This was done to determine if the combination program provided any additional benefit to either the students or personnel.

The long-term goal of the suicide prevention program was to reduce the risk of depression and reduce suicide in high school students. This would take several years of follow-up which means we would not have data to analyze for a long period of time. In order to carry out the study and be able to present data and results in a timely manner, short-term evaluations will be done. The YRBS questionnaire will evaluate changes in risk factors and feelings of depression and suicidal thoughts and behaviors over a course of a year. Through the questionnaire we would be able to evaluate and compare the results before the study and after the study by looking at these factors:

* Suicidal risk factors (attitudes towards suicide and suicidal ideation)
* Severity of depression symptoms (emotional and physical symptoms)
* Feelings of hopelessness and life satisfaction (how happy are you in life, what makes you happy)
* Anxiety levels (physical, emotional, and cognitive signs)
* Anger (tendencies to be easily angered and irritated)
* Drug/alcohol use (frequency of use, types, drug use control problems)
* Sense of personal control (confidence in handling problems, ability to cope/adjust to problems, feeling in control)
* Problem-solving/coping skills (how do you face problems, who do you seek for help) (8)

**Limitations and Delimitations**

There were a few limitations to the study which were attempted to be reduced as much as possible, but could not be eliminated. One limitation was the inability to study all schools in the state of Maryland. This would have taken too much time and money to make this happen. To help reduce this issue, schools were sampled from each county in order to get a population sample that was representative of the entire state. This would help with the ability to generalize the data and results to all schools in Maryland. Since the prevention program was evaluated in schools only in Maryland, the results are not to be generalized to the entire United States high school population. Another limitation was that the SurveyMonkey questionnaire did not go through pilot testing to assure that instrument was clear and unambiguous. This could lead to problems with the data and results. Another issue is the sensitive nature of the topic and the age of the population. This age group has a tendency to report bogus answers which would greatly affect the results of the study. Participants may find it difficult to be honest when answering questions because they are uncomfortable with the topic or they don’t take it seriously and provide inaccurate answers. Since the questionnaires were conducted in the school, participants may be concerned with privacy and confidentiality of their responses.

The investigator set a few delimitations in order to help narrow the scope of the study. A few delimitations included focusing only on high schools and only in the state of Maryland, instead of all high schools throughout the United States or even all schools in the state of Maryland. Another delimitation used was the focus on depression and suicide instead of several other mental health related issues and diseases.

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