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## The Youth Aware of Mental Health (YAM) Intervention: Impact on Help-Seeking, Mental Health Knowledge, and Stigma in US Adolescents

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### Abstract

**Purpose**—Suicide is a leading cause of death among US youth aged 12-18 years. Youth Aware of Mental Health (YAM), a promising, universal, school-based mental health promotion/suicide primary prevention intervention for adolescents, was evaluated in Europe but not in the US. The current study used an uncontrolled, pretest-posttest design to document the potential for YAM to reduce suicidal ideation, attempt, and suicide. A demonstration that help-seeking behaviors, mental health literacy, and mental health stigmatizing attitudes improve after the intervention

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#### Conflicts of Interest

Dr. Lindow, Dr. South, Dr. Minhajuddin, Ms. Bannister, and Dr. Byerly have no biomedical financial interests or potential conflicts of interest. Dr. Hughes and Mr. Gutierrez have served as Youth Aware of Mental Health (YAM) trainers and consultants/advisory board members for Mental Health in Mind International. Dr. Hughes receives royalties from Guilford Press. Dr. Trivedi serves or has served as a consultant/advisory board member for Alkeremes Inc., Akili Interactive, Allergan Pharmaceuticals, ACADIA Pharmaceuticals Inc., Ontario Brain Institute Canada, Brintellix Global, Global Medical Education, Healthcare Global Village, Lundbeck Research USA, Medscape LLC, MSI Methylation Sciences Inc., Nestle Health Science – Pamlab Inc., Naurex Inc., Navitor, One Carbon Therapeutics, Otsuka America Pharmaceutical Inc., Saatchi, and Takeda Global Research in the past two years, and performs research activities for the National Institute of Mental Health, the National Institute of Drug Abuse, Johnson and Johnson, and Janssen Research and Development LLC.

would suggest that the program is promising in the US, as well as in Europe, and that further investigation is merited.

**Methods**—YAM was delivered to 1878 students in 11 schools as part of regular school curricula. A subset of these students (n=436) completed surveys before and 3-months post-delivery. Surveys included five questions about help-seeking behaviors, a measure of intent to seek help (General Help Seeking Questionnaire), two mental health literacy scales, and two mental illness stigma scales (Reported and Intended Behavior Scale and Personal Stigma and Social Distance Scale). Both McNemar's test and repeated measures linear models were used to determine whether the survey outcomes changed after YAM delivery.

**Results**—Among the 436 adolescents (286 and 150 respectively in Montana and Texas), significant increases were found pre- to post-intervention in three of five help-seeking behaviors, along with improved mental health literacy, and decreased mental health-related stigma. Intent to seek help was unchanged.

**Conclusions**—Several help-seeking behavioral factors, mental health knowledge, and stigma improved post-YAM intervention. All three domains are likely protective against suicide. A randomized controlled trial testing the efficacy of YAM in preventing suicidal behaviors is warranted.

### Keywords

Youth Aware of Mental Health; YAM; suicide prevention intervention; adolescents; suicide; help-seeking behaviors; stigma; mental health literacy

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Despite persistent attention to suicide prevention worldwide, suicide remains a growing public health problem. Since 2010, more US adolescents aged 12-18 years died by suicide than from any other cause except accidents (5.9/100,000) (1). In 2017, 7.4% of high school-aged students reported they had attempted suicide in the year prior, and 2.4% required medical attention for a suicide attempt (2).

Suicide risk is highest in youth least likely to seek help (3). For example, fewer adolescents with a recent suicide attempt would seek help from a counselor or other school staff compared to those without a recent attempt (18% vs. 38%) (4). Among adolescents who reported past-year suicidal ideation, a plan, or an attempt, only 28% had sought mental health services during that time (5). Therefore, there is a need to provide effective suicide prevention programming to all members of vulnerable populations (e.g., adolescents) to complement selected approaches to suicide prevention (6).

In adolescents, a high risk of dying by suicide or developing chronic mental disorders is associated with help-negation, which is the refusal to use or avoidance of available resources (7). In several studies, this phenomenon included avoidance of social support, such as friends and family, and declining or avoiding medical assistance (8). Furthermore, both depressive symptoms and more severe suicidal ideation exacerbate help-negation behaviors of individuals with suicidal ideation (9, 10). As most youth do not seek help for suicidal thoughts or behaviors, actively/interactively educating and training adolescents to develop

skills needed to seek help and acquire knowledge about social support and mental health resources may be more direct and key components for effective suicide prevention (6, 11).

Mental health literacy is the “knowledge and beliefs about mental disorders which aid their recognition, management or prevention” (12). Improved mental health literacy has enhanced adolescents’ awareness of resources (13), decreased stigma (13), and fostered helpseeking intent (14). However, effective suicide prevention for adolescents likely requires guidance on skill development that changes behaviors, like coping with stress or seeking appropriate help, in addition to improvements in mental health literacy (6).

Mental health-related stigma stems from a lack of knowledge about mental illnesses and the help needed for those suffering from them. Self-directed, peer, and societal stigma are significant hindrances to help-seeking in youth struggling with mental illness (15). In addition to negatively affecting attitudes and behaviors related to asking for help (16), stigma can lead to school truancy, decreased scholastic performance, and increased social isolation in youth with mental illness (17). Thus, stigma reduction is likely another important component, in addition to skill building, help-seeking, and mental health literacy, for effective suicide prevention among youth.

The Youth Aware of Mental Health (YAM) intervention is a universal, school-based mental health promotion and suicide primary prevention intervention for adolescents. YAM was designed to raise mental health awareness about common suicide risk and protective factors, such as depression, anxiety, and social support (18). Importantly, it uses highly engaging methods (e.g. youth-driven role plays) to promote learning and the development of skills, knowledge, and emotional awareness needed to face stressful life events associated with suicidal thoughts and behaviors (18). YAM is delivered during adolescence before or early in mental disorder development, potentially improving long-term health and function outcomes should youth seek help earlier. YAM was tested in a randomized, controlled trial (RCT) of ~11,000 9<sup>th</sup> graders in 10 European countries and compared with two other school-based suicide prevention intervention methods, Professional Screening (Prof Screen), and, Question, Persuade, and Refer (QPR), and a control group (19). Of the three interventions, only YAM was found to be superior to control, resulting in 55% fewer suicide attempts and 50% fewer cases of severe suicidal ideation over one year, making it a leading suicide prevention intervention for adolescents (6, 19). In comparison, QPR, one of the most commonly used interventions in the US, produced non-significant decreases in both suicide attempts and severe suicidal thoughts of 23% and 6%, respectively, while Prof Screen yielded non-significant reductions of 41% and 26%, in suicide attempts and suicidal thoughts, respectively (19). In a prior report, YAM, adapted for US adolescents, was shown to be feasible to deliver to adolescents in US schools and participants reported high satisfaction with the program (20). While the impact of the YAM intervention on suicidality outcomes in European adolescents has been published, this is the first report of its effect on help-seeking behaviors, mental health literacy, and stigmatizing attitudes, which were secondary outcomes of the feasibility and acceptability trial (20).

## Methods

### Participants and settings

This study used an uncontrolled, pre-test/post-test design to determine the feasibility and acceptability of the universal suicide prevention and mental health promotion intervention, YAM adapted for US youth, the design of which is detailed as reported in a prior publication (Appendix A; Figure A1) (20). Pre/Post-intervention changes in help-seeking behaviors, mental health literacy, and mental health-related stigmatizing attitudes are the focus of this report. Briefly, we recruited and delivered the YAM intervention to students from 11 public or charter schools (5 in Montana and 6 in Texas) that ranged in size from 36-1574 students per school. Schools were recruited based on a convenience sample. Prior to implementation and evaluation of YAM, principals from participating schools agreed to allow implementation of YAM in entire classrooms. Students wanting to participate in the research surveys provided written assent and written parental informed consent prior to administration of the pre-YAM survey. All students in participating classes received YAM as part of the regular school curriculum (N=1878 in 78 total classes); survey data were collected only from consented/assented students (n=436). YAM was delivered primarily to students in 9<sup>th</sup> grade; however, some classes contained students in multiple grades and some smaller schools requested delivery to multiple grades (7<sup>th</sup>-12<sup>th</sup>) (20). Among consented students, 399 (91.9%) were in 9<sup>th</sup> grade, and 3 (0.7%), 1 (0.2%), 14 (3.2%), 15 (3.5%), and 2 (0.5%) were in 7<sup>th</sup>, 8<sup>th</sup>, 10<sup>th</sup>, 11<sup>th</sup>, and 12<sup>th</sup> grades, respectively. Students in participating classes were 51% female, predominantly white (49%) or Hispanic (32%), and 91% were proficient in English (20). Eighty-five percent of consented students received >4 of the 5 YAM sessions. Among consented students, 93% (n=484) and 84% (n=436) participated in a baseline or follow-up survey, respectively. Those participating in research surveys were predominantly in 9<sup>th</sup> grade (91.9%), 14.5 ± 0.65 years old, female (61.3%), living with both parents (63.8%), and native English speakers (86.2%) (20).

**Ethical considerations**—All procedures were approved by and in accordance with the ethical standards of the participating institutional review boards of Montana State University (MB052516-FC) and the University of Texas Southwestern Medical Center (STU 062016-041).

### Intervention

The YAM intervention has been described previously (18, 19). Briefly, YAM consists of five 50-minute sessions with supporting materials: three role-play sessions, two mental health interactive lectures, an information booklet for students, and six posters. Key themes of the program include awareness of mental health; self-help advice, stress and crisis, depression and suicidal thoughts, helping a troubled friend, and information about mental health resources/help-seeking. The format of the YAM intervention empowers youth to think, verbalize, and discuss important mental health issues, such as suicide, in a context that is meaningful to them. As YAM was developed in Europe, linguistic and US cultural adaptations of the program were performed prior to study initiation (20).

**Delivery**—Certified facilitators and helpers (non-school personnel) delivered YAM to individual classes over the course of 3 or 5 weeks, according to a detailed manual (modified as described previously) (18, 20). In the first session, YAM-trained facilitators informed students they were not school staff and created a “safe place” in which students could openly discuss mental health topics such as suicidality in their own words without fear of information being shared with teachers or other school staff. Facilitators only shared information with school personnel if a student voiced a safety concern for her/himself or others. YAM delivery occurred between Oct. 2016 and May 2017.

## Measures

The study measured the following: help-seeking behaviors (described below), help-seeking intent (GHSQ, Table A1), mental health and resources knowledge (mental health literacy; Tables A2 and A3), and stigma (RIBS [Table A4] and Table A5).

**Help-seeking behaviors**—Four questions on help-seeking *behaviors* related to depression and suicidal ideation were adapted from the ongoing RCT of YAM being conducted by the YAM originators in Sweden (C. Wasserman and V. Carli, personal communication) and one from the General Help Seeking Questionnaire (see below) (21). The questions were similar to those evaluated in 3 studies of the Signs of Suicide intervention (22–24) and were worded as follows (responses: yes, no, don’t know/remember): Have you ever talked with your friends about the following things: 1) mental health problems or 2) depression; 3) Have you ever talked to or discussed with a teacher or other school staff about what to do when one is depressed; 4) Have you talked to or discussed with a teacher or other school staff about what to do when someone has suicidal thoughts; and 5) Have you ever seen a school counselor/counselor, psychologist, psychiatrist or other health professional to get help with personal problems? Possible responses were No, Yes, and I do not know/remember. Higher proportions of affirmative responses at the follow-up survey indicate students reported seeking out the type of help specified since the baseline survey (3 months).

**Help-seeking intent**—The General Help Seeking Questionnaire (GHSQ; 10 items, 7-point Likert scale, Table A1) (21) measures help-seeking *intent* from different sources when a student is experiencing a personal or emotional problem. The GHSQ for personal-emotional problems has a high test-retest reliability (0.86 over at least a 3-week period) and good internal consistency (Cronbach’s alpha = 0.70) (21). Higher scores indicate greater likelihood of *intending to* find help for a problem (range = 10-70). The following question related to help-seeking from mental health professionals (adapted from the current YAM RCT in Sweden) also was asked: 1) Have you ever seen a school counselor/counselor, psychologist, psychiatrist, or other health professional to get help with personal problems.

**Mental health and resources knowledge**—Data from two measures of mental health literacy used in an ongoing Swedish RCT of YAM were collected. The scales were selected to maintain comparability and consistency across YAM-related studies in the US and Europe. Additionally, most mental health literacy instruments use vignettes and ask students to identify a specific problem. Prior research shows that most students easily recognize

topics like depression prior to an intervention (25), and these types of tests emphasize memorization of educational material rather than knowledge related to the core themes of mental health promotion that YAM seeks to improve in students (26).

To provide comparability, two mental health literacy scales, with 17 total items, were adapted from a randomized controlled trial of YAM currently being conducted in Stockholm Sweden, (personal communication, C. Wasserman and V. Carli). The first scale (10 true/false items) included questions related to general mental health knowledge listed in Table A2. The score was the sum of all items, with correct answers assigned a value of “1” and incorrect, “0” (range = 0-10, with higher scores indicating greater knowledge). The second mental health literacy scale (7-items using a 4-point Likert-like scale: Completely Disagree [1], Disagree somewhat [2], Agree somewhat [3], and Completely agree [4]) evaluated students’ awareness of their emotions and available resources should they need help or advice. Questions are listed in Table A3. The score is the sum of all items (range = 7-28), with higher scores indicating greater awareness of mental health resources and skills related to stress or crisis.

**Stigma**—To measure mental health-related stigma, separate scales were used in Montana and Texas. Montana sites used the first 4 items from the Reported and Intended Behavior Scale (RIBS; 5-point Likert scale ranging from Strongly Agree to Strongly Disagree, and “I don’t know” scored neutrally; Table A4), which measure the prevalence of behavior (27). A higher score (summed items; range = 4-20) indicates more stigma. This scale has high test-retest reliability (0.75) and acceptable to good internal consistency (Cronbach’s alpha = 0.72-0.81) (27). In Texas, students were asked to respond to 7 questions (Table A5) based on a vignette depicting an adolescent, “John,” experiencing depression with suicidal ideation described in (28). Each item was rated on a 5-point Likert scale ranging from Strongly Disagree to Strongly Agree, with higher values (summed; range = 7-35) relating to more stigma.

## Outcomes

The outcomes for this report include measures of help-seeking behaviors and intent, mental health knowledge, and stigma. The main co-outcomes for this pilot study, the feasibility and acceptability of the intervention, were reported previously (20).

## Data analysis

Analyses were performed among the modified intent-to-treat population, which consisted of all students who completed 80% of items on all survey scales for both pre- and post-surveys. The sample of interest was defined as those 436 students (286 from Montana, 150 from Texas) who participated in both surveys (i.e. completed 80% of the questions on 1 of the scales at each time point). Sample sizes varied depending on the scale. If a student completed >80% of the items on a scale, missing values were imputed with the mean of his/her answered. For the help seeking behavior questions, McNemar’s test was used to test whether the proportion of people agreeing with the statements changed pre- to post-YAM. For analyses of state differences, the proportion of those moving from “Yes” to “No” or “No” to “Yes” for each state was compared. Students who responded “I don’t know” at

either timepoint on these questions were not included. For the GHSQ, mental health and resources knowledge, and stigma measures, separate repeated measures models were fit with time as the primary covariate of interest but also controlling for fixed effects of state and the time by state interaction. Because only 2 repeated measures were collected, a full random effects model (i.e. random slopes and intercepts) was not used. Instead, an AR(1) covariance structure was chosen, as it resulted in the best model fit amongst few competing alternatives. F-statistics and p-values (unadjusted for multiple comparisons) are reported from the Type III fixed effects in SAS software (version 9.4). Cohen's *d* is reported from the raw data to supplement the results from the repeated measures models.

## Results

### Help-Seeking Behaviors

There was moderate evidence of an increase in students stating they had spoken with friends about mental health problems for the entire group over time (11.8% increase;  $p=.073$ ). Significantly more students reported speaking to friends about depression (Table 1, 12.5% increase;  $p=.021$ ) and to a teacher or other school staff member about depression or suicidal thoughts (Table 1, 58.0% increase;  $p<.001$ ] and 24.7% increase;  $p<.001$ , respectively) at the 3-month follow-up compared to pre-intervention. There was a trend in state differences for the question related to a student reporting s/he had spoken with school staff about suicidal thoughts, with a greater proportion in Montana ( $p=.055$ ): 22.4% and 16.4% went from a “No” to a “Yes” in Montana and Texas, respectively. In Montana, there also was an upward trend in the number of students who had sought help from a health professional ( $p=.059$ ), but there was no difference for the whole group ( $p=.195$ ).

### Help-Seeking Intent

No significant changes were observed over time or between states in responses when students were asked about the likelihood of their seeking help from nine diverse sources if they were facing an emotional problem (Table 2). Proportions of students that responded they would not seek help from any source also did not change. However, a small, but statistically significant state by time interaction was found (fixed effects estimate =3.26;  $p=0.004$ ) due to differences in the direction of change for each state (Montana increased [greater intent] while Texas decreased) (Figure A2).

### Mental Health Help-Seeking and Resource Knowledge

Students in both states had increased general knowledge related to mental health over time (Table 2), with those in Montana starting and ending higher than those in Texas ( $p=0.002$ ). No significant state by time interactions were observed ( $p=0.100$ ). Similar to general knowledge, students in Montana and Texas had small, statistically significant increases over time in literacy related to mental health self-awareness and resource knowledge (Table 1), with no significant differences between states.

## Mental Health-Related Stigma

Different scales measuring stigma levels were used in Texas and Montana. Regardless of the scale used, stigma levels in students significantly improved 3-months post-intervention (Table 3).

## Discussion

This report describes secondary analyses of changes over time in several outcomes that were part of a study primarily designed to evaluate the feasibility and acceptability of the school-based YAM intervention. In an uncontrolled, pre-post design, the effects of the intervention were determined for adolescent help-seeking, mental health literacy, and stigma. Results from the 436-participating youth in Montana and Texas indicate that the YAM intervention significantly increased help-seeking behaviors, improved mental health literacy, and decreased stigma at 3-month follow-up. It did not affect help-seeking intent.

Because most youth do not seek help for suicidal thoughts or behaviors (29), particularly those with depressive symptoms, (3) the promotion of help-seeking behaviors is likely an important component for effective suicide prevention (11). In the present study, students who participated in YAM and both surveys (pre and post-intervention) reported significantly greater help-seeking behaviors 3 months after the intervention for 3 of the 5 help-seeking behaviors (students talking with peers, and students talking to school personnel) measured. To date, no universal, school-based, mental health promotion and suicide prevention intervention has found significant effects on help-seeking behaviors (4, 19, 22–24, 28–32). For example, Signs of Suicide (SOS), a universal suicide prevention intervention, asked questions 3-months post-intervention related to seeking help from parents, friends, or other adults, and found no significant difference between the treatment and control groups in 3 RCTs (22–24). In the only RCT of SOS that collected pre- and post-measures, help-seeking behaviors non-significantly worsened within the intervention group (22). Despite the lack of change in help-seeking behaviors, SOS did have modest decreases in suicide attempts (23, 24, 33). In Sources of Strength (4), student leaders (3.9% of the student population) led the selective intervention and showed greater support behaviors to peers along with increased perceived connection of distressed students to adults, which was also found at the school population level ( $d = .58-.63$ ). Teen Mental Health First Aid improved help-seeking attitudes (intention to help others [ $d = .50-.58$ ], the number of adults perceived as being helpful [ $d = .45-.46$ ]) compared with control, but no help-seeking behaviors were measured (28). Lastly, an RCT of Question Refer and Persuade (QPR), a gatekeeper intervention, showed 1.5 - 2.1-fold less help-seeking among students with suicidality (29).

In contrast to improvements in help-seeking behaviors with peers and school personnel, YAM was not associated with significant changes in help-seeking behavior with mental health professionals over time. The YAM intervention is intended to increase students' knowledge of available resources, but does not provide support activities for referrals, and therefore is unlikely to have substantial impact on help-seeking with professionals. While voluntary, universal mental health screening in schools linked to support for referrals could facilitate youths' access to professional care (34, 35), there is currently no controlled trial data supporting this strategy.



Early intervention for youth with mental disorders is thought to slow the progression of disease and may also improve quality of life outcomes (36, 37). As half of individuals who develop mental illness have their first episode by age 18 (38), many will either need or be asked for help related to mental issues during adolescence. Arming youth with better knowledge about mental health, and improving knowledge of and willingness to seek out resources may improve mental health outcomes for struggling youth, including reducing suicidal behaviors (26). Increasing mental health literacy has therefore been a common strategy in suicide prevention interventions (26). To date, only two similar universal, adolescent, school-based interventions have significantly increased mental health literacy (22–24, 32, 33). RCTs of SOS found post-intervention increases in the intervention group compared to the control groups for “knowledge about depression and suicide” and “favorable attitudes toward obtaining help for depression and suicidal thoughts” with effect sizes similar or smaller than reported here ( $d = .25-.40$ , SOS;  $d = .194, .611$ , current study) (22–24, 32, 33), while an RCT of Adolescent Depression Awareness Program (ADAP) increased knowledge of depression (no effect size reported) (32). For teen Mental Health First Aid (tMHFA) (28), pre-post comparisons within the intervention group showed increased recognition of mental disorders. Gatekeeper/selective interventions such as QPR (29) or Sources of Strength (4) train adults or selected peers to recognize signs of suicide and how to link individuals to care; therefore, these types of interventions would likely not alter mental health literacy within student populations.

Stigma is a barrier to mental health help-seeking in youth (39). Delivery of universal stigma reducing programming during adolescence can prevent the development of negative stereotypes and reduce social isolation of affected youth (40). Using two different measures, this study found significantly reduced stigma in students from both states over time. tMHFA is the only other school-based adolescent mental health promotion/suicide prevention intervention that evaluated stigma and found a reduction in adolescent stigma levels ( $d = .11-.4$ ) (28, 32) similar in size to the current study ( $d = -.251- -.356$ ). Related to stigma, the RCTs of SOS measured attitudes toward suicidality and depression and reported small but significant reductions in 3 of the 4 RCTs (23, 24, 33).

While this report indicates YAM may be a promising mental health promotion intervention for US adolescents, the study design had several important limitations. There was no control group or random assignment and the study was not powered for the secondary outcomes reported. The lack of control group makes elimination of the possibility that the reported secondary outcomes may represent regression to the mean over time rather than intervention effects difficult to determine. Missing data was imputed which also could have affected outcomes, though the study used the most accurate method for dealing with missing data (multiple imputation) (41). However, not all measures changed pre- to post-intervention suggesting that the positive signal reported for the suicide protective/risk factors may be a true effect. The study design did not account for clustering of students within schools. A next-step study with a larger sample of students would better support an analytic model which could account for school clustering. Distal outcomes of suicide (suicide attempts and suicidal ideation) should also be included in future clinical trials of YAM in the US. It is also possible that study participants were those students with a greater interest/experience with mental health than nonparticipants creating selection bias. Study enrollment was relatively

low (27.8%) and there were also proportionally more female participants. Finally, none of the p-values were adjusted for multiple comparisons, leading to a risk of type 1 error because of the numerous tests performed. A next step RCT of YAM in the US is needed to address limitations related to randomization and comparison to a control group. Recruitment strategies, such as use of incentives and opt-out consent, should be considered to reduce sampling bias; and more distal measures of suicidality, including attempts and thoughts, should be evaluated in a future RCT.

In summary, the current study indicates that YAM is a promising mental health promoting intervention that targets factors believed to be protective against suicidality: help-seeking behaviors, mental health literacy, and stigma. While the magnitude of change for the reported outcomes was small to moderate, they are likely meaningful on a population scale. Future research should evaluate the efficacy of YAM in reducing suicidality, and related risk factors, in US adolescent populations. If future findings from RCTs replicate suicidality reductions observed in Europe, then YAM would be a leading candidate for reducing the second leading cause of death in US youth.

## Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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## Abbreviations

<b>YAM</b>	Youth Aware of Mental Health
<b>RCT</b>	randomized controlled trial
<b>GHSQ</b>	General Help Seeking Questionnaire
<b>RIBS</b>	Reported and Intended Behavior Scale
<b>SOS</b>	Signs of Suicide
<b>QPR</b>	Question, Persuade, Refer
<b>ADAP</b>	Adolescent Depression Awareness Program
<b>tMHFA</b>	teen Mental Health First Aid

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### Implications and Contributions

Suicide is the second leading cause of death among adolescents in the US. In an uncontrolled trial, factors believed to be protective against suicidality in US adolescents - help-seeking behaviors, mental health literacy, and stigma – improved 3-months post-delivery of YAM, a promising universal, school-based, mental health promotion/suicide prevention intervention.

Table 1.

Changes in actual help seeking behaviors over time

Help-seeking topic <sup>a</sup>	Person with whom student spoke <sup>b</sup>	N <sup>c</sup>	n (%) students with behavior at pre-test <sup>d</sup>	n (%) students with behavior at post-test <sup>e</sup>	% Change (Pre- Post)	P-value
Mental health problems	Friend	324	127 (39.2)	142 (43.8)	11.8	.073
Depression	Friend	344	160 (46.5)	180 (52.3)	12.5	.021
Depression	School staff	320	100 (31.3)	158 (49.4)	58.0	<.001
Suicidal thoughts	School staff	340	154 (45.3)	192 (56.5)	24.7	<.001
Personal problems	Mental health professional	400	163 (40.8)	175 (43.8)	7.4	.195

<sup>a</sup>Students were asked pre and post-intervention if they had done or not done each of the 5 help-seeking behaviors: 1) spoken with a friend about mental health problems, 2) spoken with a friend about depression; 3) spoken to school staff about depression; 4) spoken to school staff about what to do when someone has suicidal thoughts; and seen a school counselor, psychologist, psychiatrist, or other health professional for personal problems.

<sup>b</sup>Person with whom the student reported they had spoken about each of the 5 mental health topics.

<sup>c</sup>Number of students responding "no" or "yes" to each of the 5 items. Numbers of students who responded "I don't know" at 1 timepoint for each question were: 108 (24.7%), 84 (19.3%), 111 (25.4%), 87 (20.0%), and 150 (34.4%).

<sup>d</sup>Number and percent of students who reported they had done the described behavior pre-intervention

<sup>e</sup>Number and percent of students who reported they had done the described behavior post-intervention

<sup>f</sup>Percent increase in proportion of students who reported they had done the described behavior over time

**Table 2.**

## Help seeking intent and mental health literacy

Outcome	N	Mean (Pre-test) <sup>b</sup>	SD (Pre-test)	Mean (Post-test) <sup>c</sup>	SD (Post-test) <sup>d</sup>	Mean Change (Pre-Post)	SD (Change)	F	Pr>F	Effect Size <sup>e</sup>
Help-seeking intent <sup>a</sup>	426	30.93	9.38	31.31	9.14	0.38	9.07	0.09	0.7594	0.04
Mental health knowledge <sup>a</sup>	432	7.99	1.48	8.9	1.31	0.92	1.5	158.8	<0.001	0.611
Mental health literacy <sup>a</sup>	431	21.36	3.89	22.04	3.83	0.68	3.51	11.3	0.0008	0.194

<sup>a</sup>The maximum percentage of missing data on any 1 item of the scales was as follows: 6.2% (baseline) to 7.8% (exit) (help-seeking intent); 2.1-1.6% (mental health knowledge); and 1.6-2.8% (literacy).

<sup>b</sup>Mean and standard deviation for pre-test scores among students who completed 80% of items

<sup>c</sup>Mean and standard deviation for post-test scores among students who completed 80% of items

<sup>d</sup>Mean and standard deviation for change (post-test minus pre-test scores) among students who completed 80% of items

<sup>e</sup>Cohen's *d* using the raw change scores.



**Table 3.**

Mental health-related stigma reduction

Stigma Reduction	N	Mean (Pre-test) <sup>c</sup>	SD (Pre-test)	Mean (Post-test) <sup>d</sup>	SD (Post-test)	Mean Change (Pre-Post) <sup>e</sup>	SD (Change)	F	Pr>F	Effect Size <sup>f</sup>
Montana <sup>a</sup>	236	9.09	4.79	7.94	4.3	-1.16	4.6	14.90	0.001	-0.251
Texas <sup>b</sup>	143	16.59	4.06	15.26	4.24	-1.33	3.74	18.13	<0.001	-0.356

<sup>a</sup>RIBS scale: each item had ~13.6% of values missing at baseline, and 2% at follow-up.

<sup>b</sup>Personal Stigma scale: each item had ~4.7% of values missing at baseline, and 2% at follow-up.

<sup>c</sup>Mean and standard deviation for pre-test scores among students who completed 80% of items

<sup>d</sup>Mean and standard deviation for post-test scores among students who completed 80% of items

<sup>e</sup>Mean and standard deviation for change (post-test minus pre-test scores) among students who completed > 80% of items

<sup>f</sup>Cohen's *d* using the raw change scores.