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State Level Mental Health Education Compared to Suicide-Related Behavior in Adolescents, 2019

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Undergraduate Honors Thesis of

Sonia Rao

State Level Mental Health Education
Compared to Suicide-Related Behavior in
Adolescents, 2019

Nova Southeastern University
Farquhar Honors College

January 2023

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**State Level Mental Health Education Compared to Suicide-Related
Behavior in Adolescents, 2019**

Honors Thesis

November 2023

Sonia Rao

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Nova Southeastern University

Farquhar Honors College

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Preface

Throughout my life, mental health education was not provided or deemed necessary. Mental health was rarely discussed. Within my high school, there was unfortunately at least one death by suicide attempt per academic year. However, despite these tragic events, the school did not provide enough mental health and suicide prevention education to the students. Witnessing these tragic events with very little education to help young minds understand the importance of mental health and suicide prevention always seemed unsettling to me.

My first opportunity to discuss mental health was during my second year of college in the Mental Health and the Mind course taught by Dr. Christi Navarro. Having access to this class along with 19 other students truly helped me understand the importance of mental health education and how handle various situations. Due to this class, I was inspired to obtain my Mental Health First Aider certification. Without this course, I wouldn't have received the opportunity to further understand the impact and importance of identifying signs and carrying out conversations with others regarding mental health. Unfortunately, not all students have access to this type of class in which they are able to gain a deeper understanding of the meaning of mental health. As a result, this research study was created to further understand how mental health education within schools can impact adolescent students.

Conducting this research has given me the ability to draw connections between the importance of mental health and suicide prevention education training to suicide related behaviors in students. This research is something I wish to be accessible to those

of all ages in order to highlight the importance of discussing these vital topics to prevent another tragedy from occurring.

Abstract

Objective: Determining correlations between state level mental and emotional health (M&E) education and suicide prevention (SP) education to suicide-related behaviors (I.e. feeling sad or hopeless, suicide ideation, making a suicide plan, suicide attempt, suicide attempt treated by medical personnel, and death by suicide) within high school adolescents aged 15-19 within the United States in 2019.

Methods: State level education policies, M&E and SP, were retrieved from the National Association of State Boards of Education (NASBE). Self-reported adolescent suicide related behaviors were retrieved from the 2019 Youth Risk Behavior Surveillance System (YRBSS). Data on deaths by suicide of youth aged 15-19 years was collected by Web-based Injury Statistics Query and Reporting System (WISQARS). Analysis was conducted using the Statistical Package for the Social Sciences (SPSS 28) software. Correlations were run to explore relationships between the five mental health related behaviors, population (overall, sex, and by race/ethnicity), and state level education policies. Independent samples t-test and one-way ANOVA test was computed to compare the mean suicide death rate difference for education policy groups.

Results: An overall downward trend in suicide-related behavior was noticed in all populations studied except for the Native Hawaiian and Other Pacific Islander (NHOPI) population. NHOPI indicated an increase between making a suicide plan and suicide attempt. Males are seen to have lower suicide-related behaviors, however, between the sexes, males have a three times higher rate of death by suicide as compared to females. Within deaths by suicide by race, the American Indian/ Alaskan Native (AI/AN)

population has an alarmingly high rate of death by suicide. States which had M&E or SP education in place had lower rates of deaths by suicide as compared to states which did not have these policies in place. No consistent correlations were found between education policies and their effect on the studied populations.

Conclusion: States with M&E and SP policies have lower deaths by suicide. Providing early intervention, M&E, and SP education to students within schools may help adolescent individuals learn to care for their mental health. Targeted programs to individuals within high-risk groups such as males, AI/AN, and NHOPI individuals, additionally, should be implemented.

Acknowledgements

I would like to offer my sincerest thank you to my research advisor, Dr. Christi Navarro, who has provided me her time, guidance, and support throughout the duration of this project. Without her, I know this project would not have been nearly as successful. I would also like to offer a thank you to the Farquhar Honors College for the opportunity to peruse a research topic that is outside of my current field of study but is within my interests. Additionally, I would like to thank all of my friends and family for their continued support throughout my research process on a topic that is important to us all.

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**State Level Mental Health Education Compared to Suicide-Related
Behavior in Adolescents, 2019**

I. Background

Within recent years, suicide has become the second leading cause of death among high school students (VanOrman, 2016). This is a result of dangerously lethal suicide methods becoming more frequent among the population. From 1999 to 2014, the rate of suicide by suffocation has nearly doubled in rates from 27% to 45% respectively (VanOrman, 2016). 98% of the reported deaths by suffocation within adolescents were the cause of suicide (Cunningham, et al., 2018). As of 2019, 38.6% of deaths by suicide in adolescents aged 15-19 were caused by suffocation (WISQARS, 2020). Additionally, 35% of firearm related deaths amongst adolescents were due to suicide (Cunningham, et al., 2018). Between the years of 2013 to 2016, the suicide by firearms rate increased by 15% (Cunningham, et al., 2018). As of 2019, 45% of the adolescents that have died by suicide were due to the use of firearms (WISQARS, 2020). Females suicide rates have increased by 56% between 1999 and 2014 (VanOrman, 2016). Taking this into account, male suicide rates have remained three times the rate of females that have died by suicide (VanOrman, 2016). This ratio remains the same as of 2019 with 15.80 male deaths by suicide, out of 100,000, as compared to 4.96 female deaths by suicide (WISQARS, 2020)

The increasing rate of suicide amongst the high school aged population is a growing problem that has only shown trends of increasing. This is especially true in rural areas. High school students within rural areas such as South Dakota, North Dakota, Wyoming, and Alaska have suicide rates twice as high as the rates of their urban counterparts in states such as New York, New Jersey, California, and Connecticut (VanOrman, 2016). The firearm suicide rate amongst the urban high school population

has been reported to be 2.1 times higher than that of their suburban counterpart (Cunningham, et al., 2018). Mental health facilities are likely to be difficult to access in rural areas as compared to urban areas, this may contribute to the higher rates of adolescent suicide within the rural population as compared to urban areas.

Mental health of adolescents is greatly affected by several aspects of their lives including school, family, and friends among others. As determined by the Youth Risk Behavioral Surveillance (YRBS) data by the Centers for Disease Control and Prevention (CDC), there was a 40% increase among students who have felt sad or hopeless persistently between 2009 and 2019 (CDC, 2022). This jump in value results in one in three high school students feeling this way (CDC, 2022). 12% to 22% of students within the school system are estimated to have a mental health disorder (School Based Mental Health, n.d.). According to the National Alliance on Mental Illness (NAMI), half of those who experience mental health issues are likely to begin experiencing symptoms by the age of 14 when they typically enter high school (NAMI, n.d.). Having access to resources to help further understand and manage mental health illness at hand can help ensure that the young teenager will be well prepared later in their life as well (NAMI, n.d.).

The rate, intensity, and complexity of student mental health needs has escalated, even in pre pandemic years (U.S. Department of Education, 2021). As identifiable from the CDC's 2020 report, the rates of students who have considered attempting suicide, felt sad or hopeless, created a suicide plan, or attempted suicide has been consistently rising over the past ten years (CDC, 2020). As of 2019, only 15% of students ages 12-17 have

had access to mental health services within schools (NAMI, n.d.). This is an alarming percentage when compared to the increasing trend of declining mental health present in students over the years as well as those estimated to have a mental health disorder.

Evidence shows that suicide prevention education in grade schools may be effective in reducing suicide rates (Katz, et al., 2013). Based off the information collected, mental health education, access to mental health resources, and suicide prevention education may prove to be a valuable resource for grade age students.

II. Methods

The research conducted is a cross sectional study with an ecological approach using secondary 2019 data from adolescent students (ages 15-19) across the United States. The research compares state level education policy to mental health related behaviors including feeling sad or hopeless, suicide ideation, making a suicide plan, suicide attempt, suicide attempt treated by medical personnel, and deaths by suicide. The data collected has been sectioned by gender and race/ ethnicity.

i. State Level Education Policies (National Association of State Boards of Education)

State level education policies from 2019 were obtained from the National Association of State Boards of Education (NASBE). Policies included mental and emotional (M&E) health education as well as suicide prevention (SP) education. NASBE measures the topic was taught as either an individual stand-alone topic or if it is included as a part of health education. Both policies were either addressed, non-codified, or not addressed. For the purposes of this research study, “non-codified” was re-coded as “addressed” in order to evaluate the data. If the education policy was present in some form within a state, that state would be coded as 1. If the education policy was not present in any form, it was coded as 0. The highest number a state would be given was 2 if both policies were present. The lowest number was 0 if no policy was present. Within M&E, 42 states addressed the policy, and 8 states did not address it. Within SP, 33 states addressed the policy, and 17 states did not address it. A total of 33 states had both education policies present and a total of six states reported neither of the two topics being present within policy.

ii. Suicide-Related Behaviors (Youth Risk Behavior Surveillance System)

Data was collected from the 2019 Youth Risk Behavior Surveillance System (YRBSS). Data collected focused on the mental health behaviors of adolescents aged 15-19 years old. Mental health behavior data collected consisted of feeling sad or hopeless (almost every day for 2 or more weeks in a row so that they stopped doing some usual activities, during the 12 months before the survey), seriously considered attempting suicide (during the 12 months before the survey), made a plan about how they would attempt suicide (during the 12 months before the survey), attempted suicide (one or more times during the 12 months before the survey), and a suicide attempt treated by medical personnel (during the 12 months before the survey). Data collected was collected as overall, by sex, and by race: American Indian Alaskan Native (AI/AN), Asian, Black, Hispanic, Native Hawaiian and Other Pacific Islander (NHOPI), White, and Multiple Race. A total of 542,766 students completed the questionnaire. Suppressed state data was present in some variables which prevented certain analysis from being conducted as fewer than 30 cases had been reported.

iii. Deaths by Suicide (Web-based Injury Statistics Query and Reporting System)

Data on deaths by suicide of youth aged 15-19 years from 46 states was collected by Web-based Injury Statistics Query and Reporting System (WISQARS). Data on deaths was divided into sex and race/ ethnicity. Hispanic data regarding deaths by suicide were not reported on within Hispanic only population. Hispanic deaths by suicide data were merged with other races/ethnicities resulting in potentially skewed numbers within deaths by Hispanic adolescents. Suppressed state data was present in some variables

which prevented certain analysis from being conducted as fewer than 10 cases had been reported.

iv. Analysis

Analysis was conducted using the Statistical Package for the Social Sciences (SPSS 28) software. Statistical Significance was set to $p < .05$. Frequencies were reported on states that have M&E, SP, and both policies. Frequencies were additionally computed for the five suicide behavior outcomes between suicide-related behaviors. Correlations were run to explore relationships between the five mental health related behaviors, population, and state level education policies. Independent samples t-test and one-way ANOVA test was employed to compare the mean suicide death rate difference for education policy groups.

III. Results

Table 1. State-level High School Education Policies		
	Policy Addressed	Policy Not Addressed
Mental and Emotional Health Education	42	8
Suicide Prevention Education	33	17
Both Policies	31	6

Table 1 totals the number of states that either have policies addressed or not addressed in regard to states having M&E, SP or both policies. Most states have M&E policy while the least number of states report having both M&E and SP policy.

Figure 1. State Level School Health Policies
Across the United States, 2019

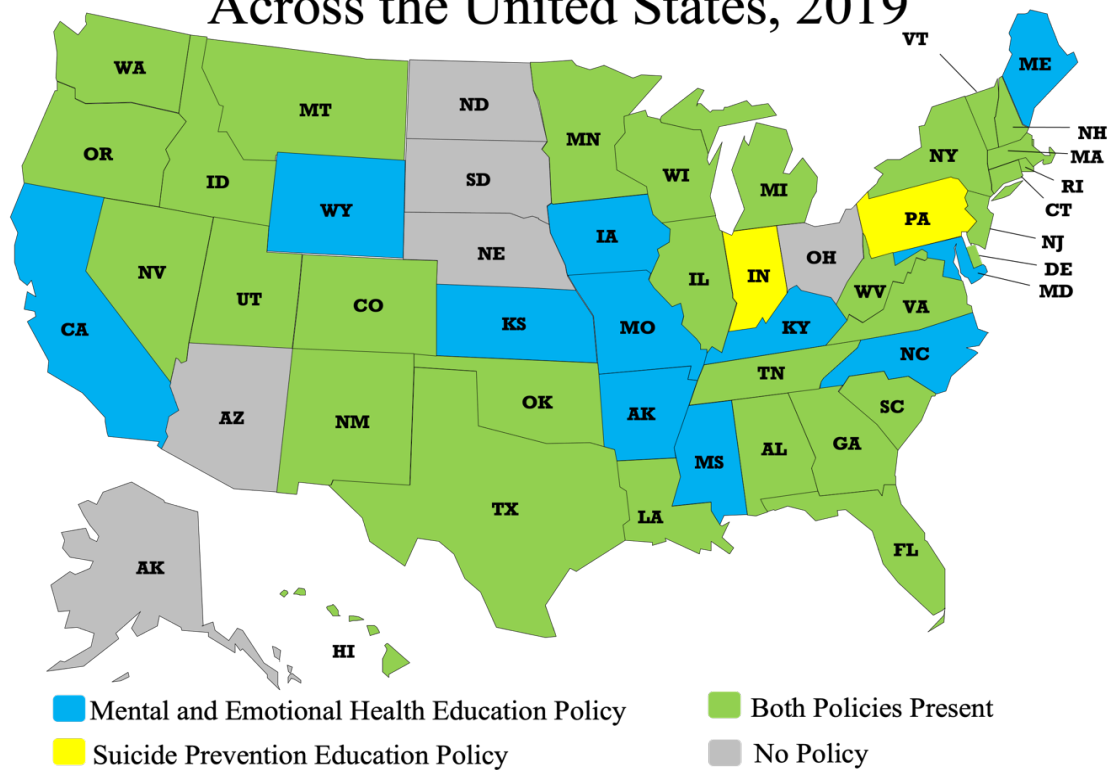


Figure 1. State Level School Health Policies Across the United States, 2019

Figure 1 shows a total of 11 states that only have mental and emotional health education within their policy. A total of two states shows suicide prevention education within their policy. A total of 31 states shows both M&E and SP policy in place. A total of six states do not have either education topics within their state level policy.

Table 2. Suicide Outcome Frequencies		
	Sum of Students Who Responded “Yes” (N)	Mean Percent %
Feeling Sad or Hopeless	181,927 (44)	35.32
Suicide Ideation	162,842 (43)	18.77
Making a Suicide Plan	169,422 (42)	15.25
Suicide Attempt	124,020 (43)	9.74
Suicide Attempts Treated by a Medical Professional	86,777 (35)	3.22

Overall totals of student’s responses from the five questions asked through YRBS are recorded. N number indicates the number of states which asked students the given question. The number of states asking the questions showed a general decrease as the severity of suicide-related behavior increased. The only exception is the suicide attempt question which was asked by 43 states. The mean precents showed a decreasing trend as the severity of the suicide-related behavior increased.

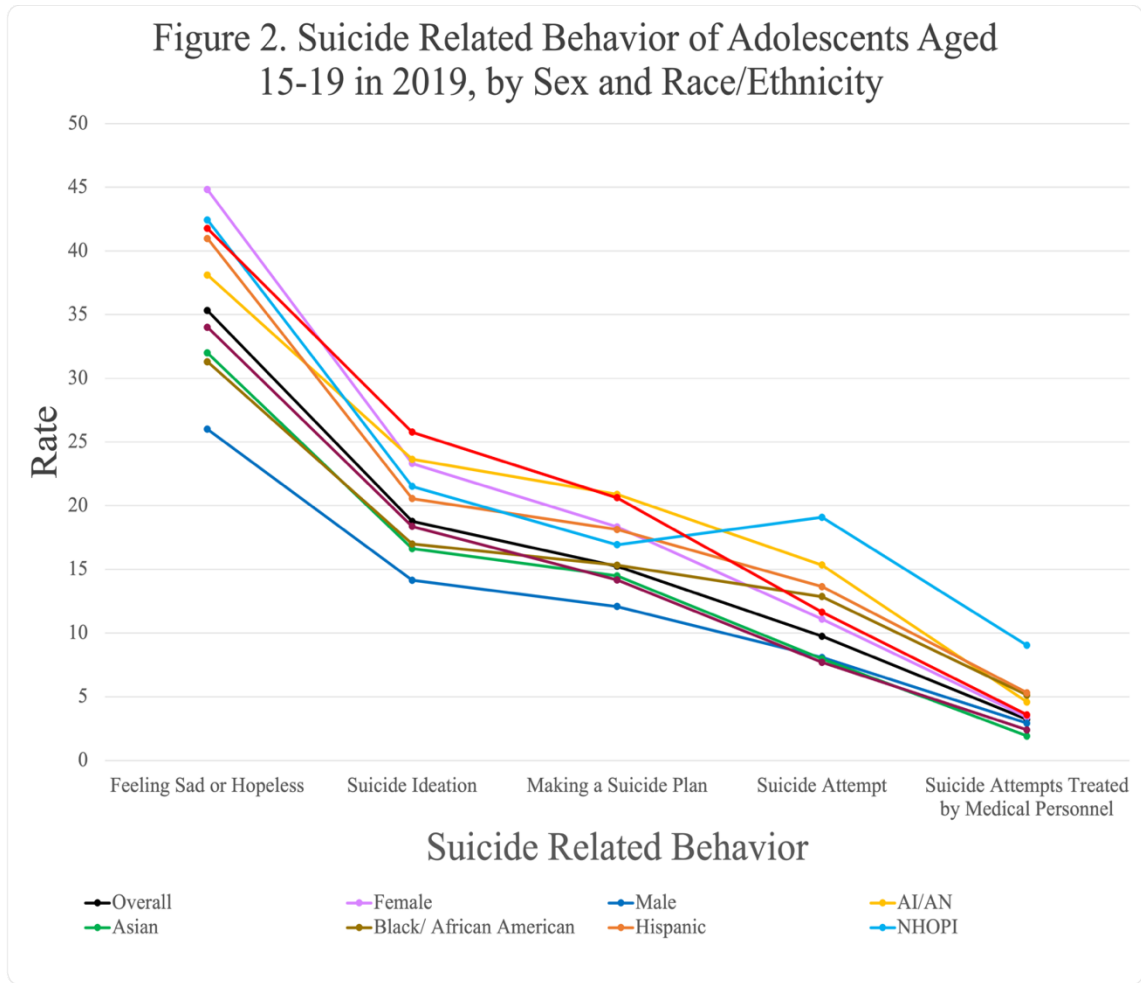


Figure 2. Suicide-Related Behaviors of Adolescents Aged 15-19 in 2019, by Sex and Race/Ethnicity

The trend of the graph is decreasing as the severity of suicide-related behavior increases. Females report the highest rate of feeling sad or hopeless while males report the lowest rate of feeling sad or hopeless. NHOPI has an increase from making a suicide plan to suicide attempt. They are the only population to report an increase. NHOPI has the highest rate of suicide attempts treated by medical personnel.

Table 3. Suicide Deaths of Adolescents Aged 15-19, Sex and Race/ Ethnicity		
	Deaths	Rate
Sex		
Female	511	4.96
Male	1,699	15.80
Race/Ethnicity		
AI/AN	89	23.54
Asian/PI	127	9.38
Black	247	7.18
Hispanic	385	-
White	1,747	10.99

Overall deaths and rates were determined and separated based off of sex and race/ ethnicity. Males reported the highest death rate within sex. AI/AN reported the highest death rate within race/ ethnicity. Due to Hispanic being an ethnicity and not a race, data was not available to determine the suicide death rate for this population.

Table 4. General Correlation Data (Ages 15-19 Years Old)			
	Mental and Emotional Health Policy	Suicide Prevention Policy	Both Policies
Feeling Sad or Hopeless	.051	.040	.053
Suicide Ideation	-.161	-.223	-.230
Making a Suicide Plan	-.100	-.264	-.227
Suicide Attempt Rate	-.249	-.212	-.266
Suicide Attempts Treated by a Medical Professional	-.001	-.295	-.203
Death by Suicide	-.304*	-.271	-.345*
* $p < .05$			

A Pearson correlation analysis was completed to assess the relationship between suicide outcomes among adolescent students aged 15-19 years old. There was a moderate positive correlation between feeling sad or hopeless to suicide ideation ($r = 0.636$, $N = 43$, $p < .001$) and to making a suicide plan ($r = 0.636$, $N = 43$, $p < .001$). There was a weak positive correlation between suicide attempts treated by medical personnel and suicide ideation ($r = 0.392$, $N = 35$, $p < .001$). There was a moderate positive correlation between suicide ideation and suicide attempts ($r = 0.433$, $N = 42$, $p < .004$) as well as to deaths by suicide ($r = 0.529$, $N = 41$, $p < .001$). There was a strong positive correlation between suicide ideation and making a suicide plan ($r = 0.862$, $N = 41$, $p < .001$). Pearson correlation analysis indicated that suicide attempts ($r = 0.497$), suicide attempt treated by medical personnel ($r = 0.461$) and deaths by suicide ($r = 0.478$) were all moderately positively correlated with making a suicide plan (all $p < 0.05$). There was a moderate positive correlation between suicide attempts and deaths by suicide ($r = 0.635$, $N = 40$, $p < .001$). There was a strong positive correlation between suicide attempts and suicide attempts treated by medical personnel ($r = 0.819$, $N = 35$, $p < .001$).

A Pearson correlation analysis was done to assess the relationship between education policies and suicide outcomes among adolescent students aged 15-19 years old. There was a weak negative correlation between deaths by suicide to mental and emotional health policy ($r = -0.304$, $N = 46$, $p = .040$) as well as to both policies ($r = -0.345$, $N = 46$, $p = .019$).

Table 5. Independent t-test and one-way ANOVA for Suicide Rate and Education Policies				
Variables		Mean \pm SD	F	<i>p</i> value
Mental & Emotional Health Education	Yes	13.39 \pm 6.98	20.28	.02
	No	21.76 \pm 19.83		
Suicide Prevention	Yes	12.68 \pm 6.63	7.73	.03
	No	18.54 \pm 14.62		
Both Policies	Yes	13.17 \pm 6.58	6.49	.10
	No	17.22 \pm 14.56		
Total # of Policies (0-2)	0	27.01 \pm 20.40	5.51	.007
	1	12.70 \pm 8.11		
	2	13.17 \pm 10.56		

The independent t-tests showed that there were significant differences between the mean suicide rates and states that had M&E policies and those that did not ($p = .02$) and those that had suicide prevention policies and those that did not ($p = .03$). (Table X). There was no significant difference found for mean suicide rates for states with both policies and those that had one policy or no policy.

One-way ANOVA also revealed there is a mean difference in suicide death rate depending on how many education policies were in place ($p = .007$).

Table 6. Female Correlation Data (Ages 15-19 Years Old)			
	Mental and Emotional Health Policy	Suicide Prevention Policy	Both Policies
Feeling Sad or Hopeless	-.071	-.049	-.069
Suicide Ideation	-.258	-.244	-.293
Making a Suicide Plan	-.146	-.198	-.206
Suicide Attempt	-.249	-.203	-.259
Suicide Attempts Treated by a Medical Professional	-.066	-.254	-.208
Death by Suicide	.046	-.035	.002
* $p < .05$			

A Pearson correlation analysis was completed to assess the relationship between suicide outcomes among females aged 15-19 years old. There was a moderate positive correlation between suicide plan and feeling sad or hopeless ($r = 0.608$, $N = 42$, $p < .001$) and suicide attempt ($r = 0.676$, $N = 41$, $p < .001$). There was a moderate positive correlation between suicide ideation and suicide attempt ($r = 0.633$, $N = 42$, $p < .001$) and suicide attempt treated by medical personnel ($r = 0.526$, $N = 35$, $p = .001$). There was a strong positive correlation between making a suicide plan and suicide ideation ($r = 0.864$, $N = 41$, $p < .001$). There was a strong positive correlation between suicide attempts and suicide attempts treated by medical personnel ($r = 0.736$, $N = 35$, $p < .001$).

A Pearson correlation analysis was done to assess the relationship between education policies and suicide outcomes among females aged 15-19 years old. As shown in Table 6, the relationships were not significant.

Table 7. Male Correlation Data (Ages 15-19 Years Old)			
	Mental and Emotional Health Policy	Suicide Prevention Policy	Both Policies
Feeling Sad or Hopeless	.173	.140	.181
Suicide Ideation	-.031	-.152	-.117
Making a Suicide Plan	-.074	-.344*	-.272
Suicide Attempt	-.230	-.197	-.246
Suicide Attempts Treated by a Medical Professional	.019	-.265	-.172
Death by Suicide	-.250	-.272	-.319*
* $p < .05$			

A Pearson correlation analysis was completed to assess the relationship between suicide-related outcomes among males aged 15-19 years old. There was a moderate positive correlation between feeling sad or hopeless and suicide ideation ($r = 0.622$, $N = 43$, $p < .001$). There was a moderate positive correlation between suicide ideation and death rate ($r = 0.413$, $N = 39$, $p = .009$). A moderate positive correlation was also present between suicide attempts and death rate ($r = 0.680$, $N = 38$, $p < .001$). There was a strong positive correlation to suicide attempts treated by medical personnel and suicide attempts ($r = 0.845$, $N = 35$, $p < .001$).

A Pearson correlation analysis was completed to assess the relationship between suicide outcomes among males aged 15-19 years old and state level education policies. There was a weak negative correlation between death by suicide and both policies being present ($r = -.319$, $N = 44$, $p = .035$).

Table 8. AI/AN Correlation Data (Ages 15-19 Years Old)			
	Mental and Emotional Health Policy	Suicide Prevention Policy	Both Policies
Feeling Sad or Hopeless	-.461	-.240	-.375
Suicide Ideation	-.488*	-.112	-.313
Making a Suicide Plan	-.328	-.286	-.335
Suicide Attempt	-.814**	-.443	-.667**
Suicide Attempts Treated by a Medical Professional	-.672*	-.205	-.450
Death by Suicide	-	-	-
* $p < .05$ ** $p < .01$			

A Pearson correlation analysis was completed to assess the relationship between suicide outcomes among AI/AN individuals aged 15-19 years old and state level education policies. There was a moderate negative correlation between suicide attempts and both policies being present ($r = -0.667$, $N = 14$, $p = .009$). A strong negative correlation was found between suicide attempt and mental and emotional health education policy ($r = -.814$, $N = 14$, $p < .001$). There was a moderate negative correlation found between mental and emotional health education policies and suicide ideation ($r = -0.488$, $N = 17$, $p = .047$) and with suicide attempts treated by medical personnel ($r = -0.672$, $N = 10$, $p = .033$).

A Pearson correlation analysis was completed to assess the relationship between suicide outcomes among AI/AN individuals aged 15-19 years old. There was a strong positive correlation between feeling sad or hopeless and making a suicide plan ($r = 0.760$, $N = 16$, $p < .001$). There was a strong positive correlation between suicide attempts and suicide ideation ($r = 0.763$, $N = 13$, $p = .002$). There was a moderate positive correlation between suicide attempts and making a suicide plan ($r = 0.690$, $N = 13$, $p = .009$). Suicide attempts had a strong positive correlation with suicide attempts treated by medical personnel ($r = 0.803$, $N = 10$, $p = .005$).

Table 9. Asian Correlation Data (Ages 15-19 Years Old)			
	Mental and Emotional Health Policy	Suicide Prevention Policy	Both Policies
Feeling Sad or Hopeless	.033	-.133	-.071
Suicide Ideation	-.048	-.008	-.030
Making a Suicide Plan	-.136	-.380*	-.321
Suicide Attempt	-.077	-.133	-.126
Suicide Attempts Treated by a Medical Professional	.058	.214	.177
Death by Suicide	1.000**	1.000**	1.000**
* $p < .05$ ** $p < .01$			

A Pearson correlation analysis was completed to assess the relationship between suicide outcomes among Asian individuals aged 15-19 years old. There was a moderate positive correlation between feeling sad and hopeless to suicide ideation. ($r = 0.491$, $N = 35$, $p = .003$). There was a moderate positive correlation found between suicide ideation and making a suicide plan ($r = 0.600$, $N = 34$, $p < .001$).

A Pearson correlation analysis was completed to assess the relationship between suicide outcomes among Asian individuals aged 15-19 years old and state level education policies. There was a weak negative correlation between suicide prevention education policy and making a suicide plan ($r = -0.380$, $N = 35$, $p = .024$). There was a perfect positive correlation found between all the policies individually and together with death by suicide ($r = 1.000$, $N = 2$).

Table 10. Black/ African American Correlation Data (Ages 15-19 Years Old)			
	Mental and Emotional Health Policy	Suicide Prevention Policy	Both Policies
Feeling Sad or Hopeless	.034	.087	.075
Suicide Ideation	.045	-.091	-.037
Making a Suicide Plan	-.180	-.260	-.265
Suicide Attempt	.003	-.049	-.030
Suicide Attempts Treated by a Medical Professional	.219	-.062	.069
Death by Suicide	-.435	-.448	-.548
* $p < .05$			

A Pearson correlation analysis was completed to assess the relationship between suicide outcomes among Black/ African American individuals aged 15-19 years old. There was a moderate positive correlation between feeling sad and hopeless to suicide ideation ($r = 0.453$, $N = 41$, $p = .003$). Pearson correlation analysis also indicated that making a suicide plan ($R = 0.580$), attempting suicide ($R = 0.461$) and suicide attempt treated by medical personnel ($R = 0.492$) were all moderately positively correlated with suicide ideation (all $p < 0.05$). There was a strong positive correlation found when comparing suicide attempts to suicide attempts treated by medical personnel ($r = 0.705$, $N = 33$, $p < .001$).

A Pearson correlation analysis was completed to assess the relationship between suicide outcomes among Black/ African American individuals aged 15-19 years old and state level education policies. There were no significant correlations found.

Table 11. Hispanic Correlation Data (Ages 15-19 Years Old)			
	Mental and Emotional Health Policy	Suicide Prevention Policy	Both Policies
Feeling Sad or Hopeless	-.236	-.280	-.306*
Suicide Ideation	-.330*	-.326*	-.385*
Making a Suicide Plan	-.034	-.160	-.123
Suicide Attempt	-.296	-.191	-.276
Suicide Attempts Treated by a Medical Professional	.095	.038	.074
Death by Suicide	.123	.335	.267
* $p < .05$			

A Pearson correlation analysis was completed to assess the relationship between suicide outcomes among Black/ African American individuals aged 15-19 years old. There was a moderate positive correlation between feeling sad or hopeless with suicide ideation ($r = 0.647$, $N = 43$, $p < .001$) and making a suicide plan ($r = 0.454$, $N = 42$, $p = .003$). There was a moderate positive correlation between attempting suicide and suicide ideation ($r = 0.467$, $N = 42$, $p = .002$) and making a suicide plan ($r = 0.465$, $N = 41$, $p = .002$). There was a strong positive correlation between suicide ideation and making a suicide plan ($r = 0.812$, $N = 41$, $p < .001$). There was a strong positive correlation between suicide attempts and suicide attempts treated by medical personnel ($r = 0.836$, $N = 35$, $p < .001$).

As shown in Table 11, Pearson correlation analysis indicated that mental and emotional health policy ($R = -0.330$), suicide prevention policy ($R = -0.326$) and both policies ($R = -0.385$) were all weakly negatively correlated with suicide ideation (all $p < 0.05$). A weak negative correlation was found when comparing feeling sad or hopeless to both education policies ($r = -0.306$, $N = 44$, $p = .043$).

Table 12. NHOPI Correlation Data (Ages 15-19 Years Old)			
	Mental and Emotional Health Policy	Suicide Prevention Policy	Both Policies
Feeling Sad or Hopeless	-.353	-.245	-.330
Suicide Ideation	-.519	-.370	-.492
Making a Suicide Plan	.471	.446	.526
Suicide Attempt	-.106	-.251	-.207
Suicide Attempts Treated by a Medical Professional	-	-.716	-.716
Death by Suicide	-	-	-
* $p < .05$			

A Pearson correlation analysis was completed to assess the relationship between suicide outcomes among NHOPI individuals aged 15-19 years old. There was a perfect negative correlation between making a suicide plan and suicide attempts treated by medical personnel ($r = -1.000$, $N = 2$).

A Pearson correlation analysis was completed to assess the relationship between suicide outcomes among NHOPI individuals aged 15-19 years old and state level education policies. There were no significant correlations found.

Table 13. White Correlation Data (Ages 15-19 Years Old)			
	Mental and Emotional Health Policy	Suicide Prevention Policy	Both Policies
Feeling Sad or Hopeless	.213	.111	.181
Suicide Ideation	.004	-.078	-.050
Making a Suicide Plan	-.067	-.104	-.103
Suicide Attempt	-.205	-.244	-.264
Suicide Attempts Treated by a Medical Professional	.026	-.347*	-.225
Death by Suicide	-.168	-.199	-.226
* $p < .05$			

A Pearson correlation analysis was completed to assess the relationship between suicide outcomes among White individuals aged 15-19 years old. There was a moderate positive correlation between feeling sad or hopeless to suicide ideation ($r = 0.666$, $N = 43$, $p < .001$) and to making a suicide plan ($r = 0.563$, $N = 42$, $p < .001$). There was a moderate positive correlation between suicide attempts to suicide ideation ($r = 0.474$, $N = 42$, $p = .002$) and to making a suicide plan ($r = 0.563$, $N = 41$, $p < .001$). There was a strong positive correlation between suicide ideation and making a suicide plan ($r = 0.790$, $N = 41$, $p < .001$). There was a strong positive correlation between attempting suicide and having a suicide attempt treated by medical personnel ($r = 0.758$, $N = 35$, $p < .001$). There was a moderate significant correlation between suicide attempts to death rates ($r = 0.469$, $N = 36$, $p = .004$).

A Pearson correlation analysis was completed to assess the relationship between suicide outcomes among White individuals aged 15-19 years old and state level education policies. There was a weak negative correlation between suicide prevention policies and suicide attempts treated by medical personnel ($r = -0.347$, $N = 35$, $p = .041$).

Table 14. Multiple Races Correlation Data (Ages 15-19 Years Old)			
	Mental and Emotional Health Policy	Suicide Prevention Policy	Both Policies
Feeling Sad or Hopeless	-.074	-.132	-.126
Suicide Ideation	.136	-.064	.027
Making a Suicide Plan	-.124	-.249	-.229
Suicide Attempt	.027	-.099	-.051
Suicide Attempts Treated by a Medical Professional	-.141	-.181	-.196
Death by Suicide	-	-	-
* $p < .05$			

A Pearson correlation analysis was completed to assess the relationship between suicide outcomes among Multiple Race individuals aged 15-19 years old. There was a moderate positive correlation between suicide ideation and making a suicide plan ($r = 0.583$, $N = 41$, $p < .001$) as well as to suicide attempts ($r = 0.407$, $N = 41$, $p = .008$). Pearson correlation analysis indicated that suicide ideation ($R = 0.602$), making a suicide plan ($R = 0.534$), attempting suicide ($R = 0.411$), and suicide attempts treated by medical personnel ($R = 0.461$) were all moderately positively correlated with feeling sad or hopeless (all $p < 0.05$). There was a moderate significant positive correlation between making a suicide plan and attempting suicide ($r = 0.508$, $N = 40$, $p < .001$). There was a strong positive correlation between attempting suicide and suicide attempts treated by medical personnel ($r = 0.795$, $N = 34$, $p < .001$).

A Pearson correlation analysis was completed to assess the relationship between suicide outcomes among Multiple Races individuals aged 15-19 years old and state level education policies. There were no significant correlations found.

IV. Discussion

Almost all states within the United States have either mental and emotional health education policy, suicide prevention education policy, or both policies. Indiana and Pennsylvania only had SP policies, and there were five states—North Dakota, South Dakota, Nebraska, Ohio, and Alaska—that did not have either of the policies. More than half of the states have both M&E and SP policy. There does not appear to be any geographical patterns within the policies present in each of the states. While it is promising that the majority of states have a policy in place, it is yet to be investigated on the content, duration, and dosage of the education and prevention programs, as this information would provide insight into determining whether the policies have a protective effect on the adolescent population.

The analysis shows that fewer students have reported engaging in suicide-related behaviors as the severity of the behavior increases, however, there were more students that reported making a suicide plan than those that reported suicide ideation within the last year before the survey. These behaviors have increased over time which raises concerns about the number of adolescents who are at a higher risk for suicide (CDC, 2023). Strong positive correlations were found between suicide plan and suicide ideation as well as between suicide attempt and suicide attempt treated by medical personnel. This correlation indicates that adolescents experiencing these behaviors are at a much higher risk to engage in more harmful suicide-related behaviors.

Females had higher rates of reported suicide-related behaviors overall, however, males had higher suicide deaths. Male suicide deaths are reported to be three times higher than females. These findings suggest that males may not report rates of suicide-related

behaviors due to gender-based stigma, Suicide is the second leading cause of death in males ages 15-19 (WISQARS, 2023). This may be the result of more lethal methods taken by male adolescents when attempting suicide, such as firearms (Price & Khubchandani, 2017). Reasons of which are attributed to factors such as social determinants, a lack of mental health literacy, self-stigma, shame, and masculinity (Wells et al., 2003). Males display a disproportionate number between experiencing mental health and seeking out help (Chatmon, 2020). Reducing stigma around mental health for makes and extending services may greatly improve the death by suicide rates.

When examining suicide-related behaviors and outcomes by race, differences were identified within various groups. When examining the races, most had a decline between making a suicide plan and suicide attempt, however, NHOPI showed an upward trend between suicide plan and suicide attempt and displayed the overall highest rate of suicide attempts and suicide attempts treated by medical personnel. It should be noted, however, that because NHOPI is one of the smaller minorities, many states had suppressed data due to low reported responses. Further research among NHOPI youth is warranted to understand the reason behind the high rates reported.

The AI/AN has the highest suicide rate among adolescents. This rate is twice as much as the second highest rates within another race/ ethnicity group (in white individuals). This alarming rate can be due to discrimination, barriers to resources, historical trauma, and the failure of the federal government to help support the AI/AN community (O'Keefe et al., 2021). Additionally, the AI/AN community had a strong positive correlation between feeling sad and hopeless and making a suicide plan. These

findings can inform screening for AI/AN youth for early depressive symptoms and provide them with early intervention services to prevent worsening outcomes.

States with either mental health education or suicide prevention policies in place, regardless of type, showed significantly lower suicide mortality in adolescents compared to states without the policy. The lowest suicide mortality rates were found for states that had suicide prevention policies, which is a promising finding. Previous studies recommend mental health-related education in the school system as well as opportunities for treatment and resources (LeCloux et al., 2017).

No significant correlations were found between policies and suicide-related behaviors for female students. For male students, however, there were weak positive correlations between SP and making a suicide plan as well as between both policies and deaths by suicide. Weak correlations indicate that while there is a common trend between both variables, there is not enough correlation to say the values are strongly related (Akoğlu, 2018). This indicates that the state-level education policies do not have a strong effect on the students when considering gender.

There were moderate to strong negative correlations between mental and emotional health policies and suicide-related behaviors for AI/AN youth. Moderate correlations are found between M&E and suicide ideation, M&E and suicide attempts treated by medical personnel, and both policies and suicide attempts. Moderate correlations indicate that the two values are related to one another, however, are not as closely related as those with strong correlations (Akoğlu, 2018). The negative correlation indicates that the presence of a policy results in a lower rate of behavior which could indicate a protective effect. Strong negative correlations were found between M&E and

suicide ideation. While these findings could signify that policies are beneficial for decreasing suicide-related behaviors, further investigation must be completed to understand whether these policies are effective in decreasing the high rates of suicide in AI/AN youth.

Within the Hispanic community, suicide ideation has weak negative correlations to M&E, SP, and both policies. While this indicates that suicide ideation has decreased due to education, this is not present within any other race/ ethnicity. There were no consistent findings in regard to relationships between education policies and suicide outcomes among different races and ethnicities. Overall, there appears to be no overlap between the education policies and their effects on the student's suicide-related behaviors.

Schools are an ideal place to provide students with mental health education. Early education and intervention within the school system is ideal to equip students with mental health signs and behaviors (Fazel et al., 2014). Previous studies have indicated that mental health promotion programs are effective within the student population (Wells et al., 2003). Continuing such education within schools for long term can help promote healthier mental health related behaviors as opposed to a brief mental health education class program (Wells et al., 2003).

There are various approaches to mental health and suicide prevention programs within schools. Universal intervention programs have been used in many schools as they are the least intrusive and tend to cost less (Fazel et al., 2014). This consists of class wide prevention education strategies that students would learn to use (Suldo et al., 2019). Methods such as cognitive behavioral approaches (CBT) and stress reduction techniques

are typically taught within universal interventions (Burns et al., 1999), which has shown promise of treating depression, anxiety, and aggression (Suldo et al., 2019). CBT focuses on teaching psychoeducation, cognitive restructuring, relaxation training, and problem solving/ social skill training (Suldo et al., 2019). Class-wide strategies, due to the manner of the education, these practices in place tend to be less effective as compared to selective approaches or indicated approaches (Fazel et al., 2014). Selective approaches focus on prevention efforts by promoting self-awareness and coping strategies (Fazel et al., 2014). This approach focuses on risk factors (i.e. substance misuse, depression, etc.) and provides support via classrooms or small groups (Fazel et al., 2014). Indicated approaches show the best results with the reduction of depressive symptoms by providing students with a more one on one approach regarding the mental health challenges they may face (Fazel et al., 2014). This can be carried out by using the motivation, assessment, and planning (MAP) initiative with the students to work collectively on goal setting (Suldo et al., 2019).

Results of this study would suggest that a selective approach would be useful for indicated groups, such as male adolescents. Focusing mental health education that is male centered with better training for education staff can help the males understand their mental health better (Wells et al., 2003). Increasing education policies, reducing stigma, and potential integration within their families can help prevent young adolescent males engaging in risky suicide-related behaviors (Rice et al., 2018). Programs that focus on decreasing the alarming suicide-related behaviors and outcomes among NHOPI and AI/AN adolescents should be culturally appropriate and address the challenges they

individually face. Providing both mental health services and education can greatly benefit these two populations (APA PsycNet, n.d.).

Providing mental health professionals with education methods within schools prior to implementing mental health education is currently scarce (Fazel et al., 2014). Providing professionals with a greater understanding of educating adolescents within a school system may help to provide more effective learning opportunities. Teacher training programs should incorporate education on identifying concerning mental health signs that may be present as well as skills on providing resources to students (Fazel et al., 2014). Providing students with mental health intervention during adolescence can have the largest effect on mental health well-being (Carsley et al., 2017). Previous studies have indicated that within the ages of 15-18, adolescents have responded best to mindfulness training both during and after education (Carsley et al., 2017).

V. Limitations

While this ecological study has provided insightful data regarding the relationship between state-level policies and suicide-related outcomes, there were several limitations. A large barrier faced was the suppression of data for low responses for both YRBS and suicide mortality data. This led to reduced population numbers within groups and thus could have led to potentially effected results. Suppressed data does not give a representative picture for smaller racial and ethnic groups.

The study was also limited in its use of secondary data. This cross-sectional study design captures responses at one point in time, which could change in the future. YRBS asked questions about adolescent personal experiences with suicide-related behaviors. Due to stigma surrounding mental health-related topics, it is possible that self-reported data may not be true to actual values as variables such as bias, stigma, and self-consciousness may have played a role.

Ecological studies also have limitations as the aggregate data in one group may not necessarily represent the aggregate data in the other group (Health Knowledge, n.d.). The association found between these variables (i.e., policies and suicide behaviors) may not necessarily represent the association that exists at the individual level.

VI. Future Directions

Future research studies should aim to understand the content, duration, and dosage of individual education policies to help determine the causal effect on suicide-related outcomes. A trend analysis could also examine suicide-related behaviors and mortality rates before and after education policies were implemented and can give insight into their effectiveness. It would also be helpful to obtain full data sets without suppressed results. Finally, it would be interesting to investigate the 2021 YRBS and mortality data to understand the effects of the COVID-19 pandemic on adolescent suicide-related outcomes.

VII. Conclusion

The suicide mortality rate among adolescents is alarming. States with suicide prevention and mental health education policies have lower deaths by suicide. Providing quality mental health and suicide prevention education as well as early intervention programs to students within schools may help youth care for their mental health. Targeted programs with special attention to at-risk groups such as males, AI/AN, and NHOPI individuals should also be implemented.

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