



To Study the Level of Suicide Prevalence in Youth

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Abstract

Background: Numerous studies have investigated the phenomenon of youth suicide and the application of artificial intelligence (AI) within this context. Research has delved into various aspects, including gender-specific suicidal tendencies, causative factors, and methodologies for identifying at-risk individuals to mitigate suicide rates. Prior literature highlights the development of AI-driven tools for suicide detection and prevention among young populations.

Materials and methods: This study was conducted on 80 students of age between 18-24. They were picked on random basis, and they were asked to complete a questionnaire that includes 1. Beck Scale for Suicidal Ideation (BSSI). 2. AI tool – Dr. Mind App (using Columbian Suicide Severity Rating Scale (CSSRS)). Out of 80 students, 40 were males and 40 were females. Then data was analyzed.

Result: According to the results of study of 80 students showed that there is no significant difference in the prevalence of suicidal tendencies between male and female university students based on both Becks scale for suicide ideation and AI tool used in the research. The result of - test showed that there is a significant difference at 0.05 between the outcomes of AI-based testing and manual assessments in identifying suicidal tendencies among the participants.

Conclusion: when comparing the results there is no significant difference in the suicidal tendencies between male and female students and there is significant difference in the outcomes of AI and manual testing.

Keywords: *Suicide Prevention, Artificial Intelligence, Youth Mental Health, Risk Assessment*

Introduction

Suicide is the intentionally taking your own life. On a yearly basis, 703,000 people commit suicide, with many more attempting it. Each suicide is a profoundly tragic occurrence that not only affects families but also has enduring emotional and social repercussions for communities and entire nations. Suicide is not restricted to a particular age group; it spans the entire lifespan. In 2019, it ranked as the fourth major reason for demise worldwide among people of age 16-30 (World Health Organization, 2021).

Suicide is a global concern that extends beyond high-income countries, impacting the whole earth. Notably, over 75% of self-killing happened in nations with less per capita income in 2019. It poses a substantial community wellness challenge, its prevention is achievable. The key to success lies in the implementation of a thorough and multi-sectoral strategy for suicide prevention to enhance the efficacy of national initiatives.

In numerous countries, the suicide rate is at its peak among middle-aged and elderly individuals. However, when looking at the absolute number of suicides, the largest group affected falls within the 15 to 29 age range due to the sheer size of this demographic. On a global scale, the average age at which suicide occurs hovers between 30 and 49 for both men and women. This implies that approximately half of all individuals who died by suicide were around 40 years of age or younger, and the other half were older. While suicidality is relatively rare among children, it tends to increase during the transition to adolescence. A study

conducted by J. Iannucci, B. and Nierenberg (2021) showed that chronic illness increases suicide risk in youth, with varying pathways and risk factors by disease. In a similar study conducted by M. Berk (2022) has found in his study that youth suicide prevention, life problems associated with self-harm, effectiveness of mindfulness in therapy. Multi-component treatments that target a range of life problems and involve families are needed to effectively prevent suicide in youth.

Artificial Intelligence (AI) plays a crucial role in suicide prevention by leveraging data and advanced algorithms to identify individuals at risk and provide timely interventions. One of the key applications of AI in this field is the analysis of large datasets, including social media activity, electronic health records, and other digital footprints, to detect early warning signs of suicidal ideation. AI-driven sentiment analysis and natural language processing can identify concerning language patterns and emotional states, which can trigger alerts to mental health professionals or crisis helplines.

A study conducted by Bhupesh Rawat, A. Bist, Mulyati, Muhammad Fakhrezzy, & Regina Dinda Octavyra (2022). Showed that AI-based applications can help predict and prevent suicide attempts among youngsters, potentially playing a vital role in mental health. AI encompasses two primary tool categories: therapeutic self-killing and sociable self-killing detection. Tools employ AI techniques to scrutinize information from digital records and many different resources, helping in classifying those at high risks. On

the other hand, social tools focus on analyzing online activities, such as social media posts, to discern suicidal behaviors and provide interventions. The efficacy of AI in predicting suicide risk, especially in forecasting suicide attempts with high accuracy, shows promise. However, further research, ethical considerations, and oversight are essential in this evolving field to ensure safety and effectiveness

RATIONALE

Understanding the phenomenon of suicide is of paramount importance due to its profound impact on individuals, families, and communities worldwide. Research on suicide fosters greater awareness, reduces stigma, and promotes empathy and understanding for those struggling with suicidal thoughts or behaviors. By studying the prevalence of suicidal tendencies among male and female university students to understand any gender-based disparities. By examining these differences, This research will contribute to fostering a supportive environment for all students, promoting well-being and reducing the risk of suicide. Research on AI's potential in detecting suicidal tendencies is limited, despite its high promise. Few studies have focused on AI's role in suicide detection and prevention, and even fewer have directly compared AI results to manual testing methods for identifying suicidal behaviors. This gap highlights the need for further investigation into the effectiveness of AI in this critical area of mental health research. Such studies could provide valuable insights into the accuracy and reliability of AI-based approaches and their potential to complement

or enhance existing methods for assessing suicide risk.

OBJECTIVES:

1. To investigate the difference on the Prevalence of Suicidal Tendencies between Male and Female University Students through ai tool.
- 2.To investigate the difference on the prevalence of Suicidal Tendencies between Male and Female University Students through Beck Scale for Suicidal Ideation (BSSI).
- 3.To investigate the difference in the outcomes of AI based testing compared to manual assessments in identifying suicidal tendencies among the participants.

HYPOTHESES:

1. (On the basis of AI Score)-There will be a significant differences on the Prevalence of Suicidal Tendencies between Male and Female University Students.
- 2.(On the Basis of BSSI Score)-There will be a significant differences on the Prevalence of Suicidal Tendencies between Male and Female University Students.
- 3.There will be no Significant difference in the outcomes of AI based testing compared to manual assessments in identifying suicidal tendencies among the participants.

Method

A total of 80 participants took part in the study, all are University students. The sample consists of 40 males and 40 females of 18 – 24 years. All the participants were taken on a random basis and are from different

disciplines. They were instructed to fill both the questionnaires for accurate comparison.

Tools: Two questionnaires were used in the study Beck Scale for Suicidal Ideation (BSSI) and AI tool – Dr. mind app (using Columbia Suicide Severity Rating Scale (C-SSRS).

1.The Beck Scale for Suicide Ideation (BSSI) is a broadly used assessment device designed to measure the intensity and severity of suicidal mind and behaviors in individuals. Advanced with the aid of Dr. Aaron T. Beck and his colleagues, the BSSI includes 21 items that verify diverse components of suicidal ideation, along with the frequency, depth, and specificity of suicidal thoughts, as well as the presence of suicidal plans and intentions. Every object is rated on a scale from 0 to two, with better ratings indicating more severity of suicidal ideation. The BSSI presents clinicians and researchers with a established method for comparing suicide threat and tracking changes in suicidal ideation through the years, thereby aiding in the assessment, remedy, and prevention of suicide.

2.The Columbian Suicide Severity rating Scale is used to evaluate suicidal behavior across numerous populations and settings. Evolved by researchers at Columbia university, the CSSRS assesses the presence, severity, and frequency of suicidal mind and behaviors, in addition to the depth of suicidal urges and the extent of suicide chance. It consists of a series of questions protecting one of a kind elements of suicidality, including ideation, behaviors, and motive, and gives a based framework for assessing

suicide danger and tracking adjustments through the years.

RELIABILITY AND VALIDITY

The validity and reliability of BSSI in English language were often reviewed and nearly usually the Cronbach's alpha coefficient become higher than 0.eighty five, and its rankings had right correlations with the scores of despair, hopelessness, tension, history of suicide attempt and the suicide try within the destiny.

The Columbia Suicide severity score scale has a excessive level of reliability with a Cronbach's alpha of 0.814, and evidence of uni-dimensionality, and assemble validity for suicide chance at 3 hazard stages: low, medium, and high. Evaluation of the objects indicates that they may be steady with the proposed theoretical model. CSSRS has proper concurrent validity, which means that it correlates properly with other set up measures of suicidal ideation and conduct.

Result

Data were analyzed on the basis of norms and t-test using ms excel. The variables were given descriptive statistics, such as mean , standard deviation, mode. T – test was used to find out differences on the Prevalence of Suicidal Tendencies between Male and Female University Students and difference in the outcomes of AI based testing compared to manual assessments in identifying suicidal tendencies among the participants.

Table 1: Descriptive statistics of Ai scores (male and female)

Male		Female	
Mean	1.9	Mean	1.5
Standard error	0.142325016	Standard error	0.124034735
Median	2	Median	1
Mode	1	Mode	2
Standard deviation	0.900142439	Standard deviation	0.784464541
Simple variance	0.81025641	Simple variance	0.615384615
Skewness	0.204275909	Skewness	1.74116335
Kurtosis	-1.773542237	Kurtosis	-0.283739331
Count	40	Count	40

Table 1 shows that the mean for the male participants is 1.9 and standard deviation is 0.900142439 whereas mean for female participants is 1.5 and standard deviation is 0.784464541.

Table 2: T- test AI scores of males and females

	Male	Female
Mean	1.871794872	1.512820513
Variance	0.798920378	0.624831309
Observations	40	40
Pearson Correlation	-0.20246713	

Hypothesized mean difference	0	
df	39	
T stat	1.714417254	
P(T<=t) one-tail	0.04729932	
T Critical one-tail	1.79596441	
P(T<=t) two-tail	0.09459864	
T Critical two-tail	2.035643941	

Table 2 provides the evidence that the differences on the prevalence of suicidal tendencies between male and female students (calculated by AI) is not statistically significant at the level of 0.05.

Table 3: Descriptive statistics of BSSI scores (males and females)

Males		Females	
Mean	1.45	Mean	1.375
Standard error	0.118484014	Standard error	0.111444479
Median	1	Median	2
Mode	2	Mode	1
Standard deviation	0.7493587	Standard deviation	0.70483677

Simple variance	0.561538462	Simple variance	0.496794872
Skewness	1.333512268	skewness	1.143936422
Kurtosis	0.200433122	Kurtosis	1.625922818
Count	40	Count	40

Table 3 shows that the mean for the male participants is 1.45 and standard deviation is 0.7493587 whereas mean for female participants is 1.375 and standard deviation is 0.70483677.

Table 4: T – test BSSI scores of males and females

	Male	Female
Mean	1.41025641	1.384615385
Variance	0.511470985	0.506072874
Observations	41	40
Pearson Correlation	-0.007957672	
Hypothesized Mean Difference	0	
df	38	
T Stat	0.158113883	
P(T<=t) one-tail	0.43760216	
T Critical one-tail	1.685954461	
P(T<=t) two-tail	0.87520432	

t critical two-tail	2.024394147	
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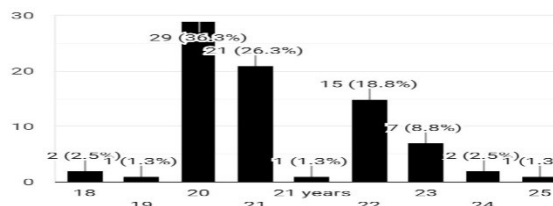
Table 4 provides the evidence that the differences on the prevalence of suicidal tendencies between male and female students (calculated through BSSI) is not significant at .05

Table 5: T – test - Ai and BSSI scores

	AI
Mean	1.683544304
Variance	0.731905226
Observations	81
Pearson Correlation	0.611865983
Hypothesized Mean Difference	0
df	78
T Stat	3.692671508
P(T<=t) one-tail	0.000204827
T Critical one-tail	1.664624645
P(T<=t) two-tail	0.000409655
T Critical two-tail	1.990847036

Table 5 provides the evidence that there is a significant difference in the outcome of artificial intelligence (AI) based testing compared to manual assessment in identifying Suicidal tendencies at the level of 0.05.

Figure 1. Graph showing age and percentage of



participants

Figure shows the age and percentage of participants participated in the study from 18-25.

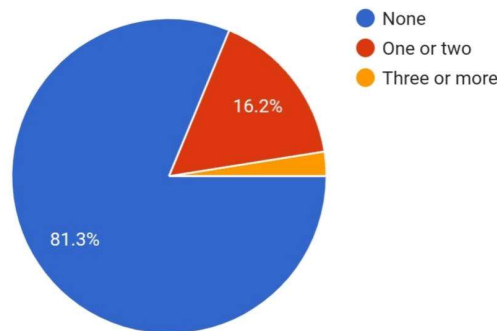
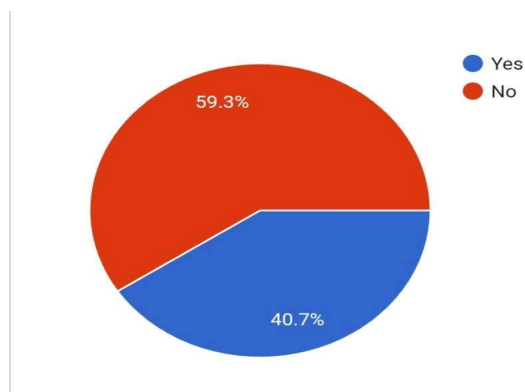


Figure 2. Pie chart of number of participants



having thoughts of killing themselves.

This pie chart shows the percentage of people having thoughts of killing themselves. It shows that 40.7% participants in this study have thought of killing themselves.

Figure 3. Pie of number of suicide attempts by percentage of participants.

The above figure shows that 16.2% participants attempted Suicide one or two times, and 81.3% didn't have any suicide attempt and rest having more than three suicide attempts.

Discussion

This study found that there is a significant difference in the outcomes of AI-based testing and manual assessments in identifying suicidal tendencies among the participants and there is no significant difference in the prevalence of suicidal tendencies between male and female university students.

Based on the results provided in Table 2, the t-test comparing AI scores indicates that the mean AI score for female students is 1.87, compared to 1.51 for male students. However, with a calculated t-statistic of 1.71 and a one-tailed p-value of 0.047, the difference in mean AI scores between male and female students is not significant at level of .05.

Table 4, the t-test comparing BSSI scores reveals that the mean BSSI score for female students is 1.41, slightly higher than the mean score of 1.38 for male students. Yet, with a calculated statistic of 0.16 and a two-tailed p-value of 0.875, there is no significant difference in suicidal tendencies among male and female university students as measured by BSSI scores.

Referring to Table 5, the t-test comparing AI-based testing and manual assessments demonstrates a differences in the mean AI-based testing score of 1.68 and the mean manual assessment score of 1.39, with a calculated t-statistic of 3.69 and a two-tailed p-value of 0.0004. This indicates that the outcomes of AI-based testing and manual assessments in identifying suicidal tendencies significantly differ among participants, contradicting the hypothesis of no significant difference between the two methods. The above findings are in the line with the studies of Rebecca A Bernert, Amanda M Hilberg, Ruth Melia, Jane Paik Kim, Nigam H Shah, & Freddy Abnoui, (2020). AI technologies shows great potential for improving early detection, prevention, and treatment of suicide, especially through analyzing complex data like social media and real-time assessments.

We can now conclude that there is no discernible difference in the prevalence of suicidal tendencies between male and female university students. However, there is a statistically significant disparity in the outcomes related to suicidal tendencies as assessed through automated artificial intelligence (AI) methods compared to manual assessment techniques. This suggests that while gender may not play a significant role in suicidal tendencies among university students, the efficacy of AI-based approaches in detecting these tendencies differs significantly from manual assessments. This underscores the importance of further research and refinement of AI algorithms to improve their accuracy and reliability in identifying and addressing mental health concerns among university populations. The

findings are very much in line with the studies of Alban Lejeune, A. Le Glaz, Pierre-Antoine Perron, (2022). AI shows high potential in identifying patients at risk of suicide, but precise use and ethical issues require further clarification.

The possible reasons for the outcome that we got are inefficiency of AI in suicide detection arises from challenges in data quality, the complexity of suicidal behavior, cultural variations, and ethical considerations, necessitating interdisciplinary efforts for improvement. Conversely, the absence of gender disparities in the prevalence of suicidal tendencies among university students may stem from evolving societal attitudes, improved mental health awareness, and equitable access to support services, influenced by socioeconomic factors and cultural shifts. As efforts to address these multifaceted factors continue, a deeper understanding of gender-specific suicidal behaviors can inform the development of more targeted interventions, fostering healthier and more supportive communities for individuals of all genders.

Conclusion

From the above study it has been found that there exist no significance differences between male and female University students concerning suicidal tendencies. This finding was attributed to the intersection of social norms and access to mental health resources. In addition, addressing such challenges requires the work of multiple disciplines, constant improvements in the algorithms, and moral principles in order to increase the efficiency and reliability of AI-assisted suicide detection mechanisms. Conducted

research had a primarily practical focus, as the goal was to study male and female university students' suicidal tendencies but with the specific addition of AI tools for suicide prevention practices in the future.

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Competing interests

The authors declare no competing interests.

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