



Assessing the Epidemiology and Risk Factors of Suicidal Attempts in Children and Adolescents at Assiut University Children's Hospital

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ABSTRACT

Introduction: Suicide attempts among children and adolescents represent a growing public health concern worldwide. Identifying the epidemiological characteristics and associated risk factors for suicidal attempts in this population is essential for developing effective preventive strategies.

Materials and Methods: This cross-sectional observational study was conducted at Assiut University Children's Hospital, Egypt, from January to December 2024, among children and adolescents aged 5–18 years, of both sexes. Data were collected using a structured questionnaire assessing demographic characteristics, socioeconomic status (SES), and risk factors (child abuse, family factors, school-related stressors, bullying, social isolation, and internet/social media use) related to suicidal attempts. Statistical analysis was performed using SPSS version 24.0. **Results:** Among 13,509 admissions, 34 suicide attempt cases were identified, yielding an incidence of 2.5 per 1,000 admissions. The mean age was 15.1 ± 1.4 years; 79.4% were females and 67.6% were of low socioeconomic status. Previous suicidal ideation was reported by 73.5% of participants. The major risk factors included internet addiction (91.2%), poor parent–child communication (88.2%), low parental care (67.6%), social isolation (61.8%), school-related problems and bullying (58.8%), and emotional abuse (50%). The most common method of suicide attempt was aluminum phosphide ingestion (38.2%), which was responsible for all deaths (8.8%) in this study.

Keywords: Suicide attempts, Adolescents, demographic factors, risk factors, bullying, internet addiction, family variables, Egypt.

1. Introduction

Suicidal behavior ranges from suicidal thoughts (ideation) to suicide attempts and completed suicide. A suicide attempt is defined as a self-directed behavior, whether injurious or not, performed with the intention of dying (Kılınc and Şener, 2025). Suicidal thoughts and attempts during childhood and adolescence are associated with adverse outcomes and may increase the risk of mental health disorders and mortality later in life (Copeland *et al.*, 2017).

Globally, approximately two million adolescents attempt suicide annually, with higher rates reported among females (Fonseca-Pedrero *et al.*, 2022). Data from the National Egyptian Center of Toxicological and Environmental Research (NECTR) showed that the children and adolescents (5–18 years) represented 19.4% of suicide attempt cases, and females accounted for 83.6% of these cases (El Mahdy *et al.*, 2010).

Adolescence is characterized by significant psychological, emotional, and physical changes and stress that may increase vulnerability to elevating suicide risk (Ammendola *et al.*, 2023). Social and

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environmental factors which include poor parent-child relationships, social isolation, school difficulties, and stressful life events are factors contribute to childhood and adolescent suicidal behavior. Current stressors, suicidal ideation, and poor physical health are considered Modifiable risk factors, while Non-modifiable risk factors include; family history of suicide, adoption history, parental mental illness, previous suicide attempts, and experiences of abuse (Marzec *et al.*, 2021).

Bullying is found to be another significant risk factor for suicide in school students and increases the likelihood of suicidal thoughts and attempts, particularly among rural secondary school students, in Egypt (Shlenda *et al.*, 2024). Extensive reports contribute social media exposure and addiction to suicide clusters, in youth, particularly in female adolescents (Shaltout, 2025).

Family relationships have equally important influence and neglectful or affectionless parenting styles have been linked to suicide attempts among Egyptian adolescents (Sharaf *et al.*, 2016). Child maltreatment, including physical and sexual abuse, has also been associated with increased suicidality (Duprey *et al.*, 2023), but, physical abuse is the most commonly reported form in Egypt (Abd-Elaziz *et al.*, 2022).

Self-poisoning is the most common suicide method among adolescents (13–18) years aged, especially females. The frequently used substances; include pesticides, such as organophosphates and aluminum phosphide (Dabholkar *et al.*, 2023), as well as analgesics and psychotropic medications (Farah *et al.*, 2023). In Egypt, self-poisoning with readily available household substances is a growing suicidal attempt method, among individuals, from low- and middle-socioeconomic backgrounds (Kasemy *et al.*, 2022).

Identification of the risk factors and understanding the complex interaction of these factors are crucial for developing effective prevention strategies for suicide in younger adolescents, who may represent a particularly vulnerable population (Nielasoff *et al.*, 2023). Therefore, this study aimed to assess demographic characteristics and associated risk factors & circumstances, related to suicidal behavior and attempts, as well as the methods used, among children and adolescents admitted at Assiut University Children's Hospital, Assiut, Egypt.

2. Materials and Methods

2.1. Sample size calculation

A formal sample-size calculation was not performed because this was a hospital-based cross-sectional observational study designed to identify and assess all eligible cases of suicide attempts among children and adolescents admitted to Assiut University Children's Hospital during the predefined study period (1 January–31 December 2024). A total of 34 suicide-attempt cases were identified among 13,509 admissions.

2.2. Ethical consideration

The study was approved by the Ethics Committee of the Faculty of Medicine, Assiut University, Egypt, prior to its conduct.

2.3. Inclusion Criteria

Children aged 5–18 years with a history of at least one suicide attempt.

2.4. Exclusion criteria

Children and adolescents committed suicide by gunshots and falling from height or children with a strong suspicion of domestic violence or accidents.

2.5. Procedures

First, informed written consent was obtained from each participant and their parents. Thirty-four (34) adolescent patients; 27 girls and 7 boys, among 13,509 admissions to Assiut University Children's Hospital were studied upon.

2.6. Measures

The Participants in this study were asked to complete a structured questionnaire consisting of validated measures assessing suicidal ideation and attempts, as well as familial, school-related, and demographic factors, included age, sex, and socioeconomic characteristics (Zhu *et al.*, 2023).

Socioeconomic position and social class, were measured in the present study by 3 variables; parental education, occupation and income. The Socioeconomic status (SES) was classified into; Low; Middle and High SES (DeVill *et al.*, 2020).

2.7. Suicidal behavior variables

Suicidal behaviors were measured by asking questions about; suicidal ideations, plans, and attempts, during the past year. The response of each question was Yes / No (Peng *et al.*, 2022).

2.8. Child abuse variables

They were measured in this study by asking about Physical, Emotional and sexual Abuse. The response to each question was Yes /No (Walsh *et al.*, 2021).

2.9. Life stress variables

The patients were asked questions to evaluate the general attitude towards the school including; school problems and bullying. The response of each question was Yes / No (Kwan *et al.*, 2022).

2.10. Family factor variables

They include questions about family structure; time spent chatting with parents; family relationship; family environment, and parental conflict. The response to each question was Yes / No (Zhu *et al.*, 2023).

2.11. Internet and social media variables

The Participants were asked questions about the average daily hours spent on social media and the content, to assess the influence of internet and social media use (Eirich *et al.*, 2022).

2.12. Romantic break-up and Loss of loved one— the response to each was Yes/ or No.

The questionnaire also included an open-ended question regarding the method used in the participant's most recent suicide attempt.

2.13. Statistical analysis:

Data were verified, coded, and analyzed using IBM-SPSS 24.0 (IBM-SPSS Inc., Chicago, IL, USA).

3. Results

A total of 34 cases of recent suicide attempts were identified in this study, among 13,509 children and adolescents aged 5–18 years admitted at Assiut University Children's Hospital between 1 January and 31 December, 2024. This is corresponding to an incidence of 2.5 per 1,000 admissions per year. The incidence was calculated, using this formula:

$$\text{Incidence Rate} = \frac{\text{Number of new cases during a specific time period}}{\text{Population at risk during the same time period}} \times 1000$$

The mean age of these identified suicide attempts was 15.1 ± 1.4 years, with a median age of 15 years (range: 12–17 years). More than three-quarters (79.4%) of them were females ($n = 27$), while 20.6% were males ($n = 7$). In addition, about two-thirds (67.6%) ($n = 23$) of the participants had low socioeconomic status (SES), whereas 32.4% ($n = 11$) had moderate SES. About (29.4%) ($n = 10$) of the participants, in this result reported a history of previous suicide attempts, while, 73.5% ($n = 25$) reported previous suicidal ideations (Table 1).

As regarding, the risk factors related to suicide attempt cases, our findings of numbers and ratios are illustrated in (Table 1). The current results indicated that the most important risk factor influence on the attempted suicide included; poor parent–child communication (88.2%), internet addiction (91.2%), low parental care (67.6%), social isolation (61.8%), school-related problems and bullying (58.8%), emotional abuse (50%), and family dysfunction (38.2%).

Table 1: Characteristic variables/ risk factors among the studied suicidal attempt sample

Variable	Category	Number/Ratio of attempts
Age/ years	Mean $\pm$ SD	15.12 $\pm$ 1.4
	Median (Range)	15 (12 – 17)
Sex	Male	7 (20.6%)
	Female	27 (79.4%)
SES	Low	23 (67.6%)
	Moderate	11 (32.4%)
Suicidal ideation/Thoughts	Yes	25 (73.5%)
Previous suicidal attempt	Yes	10 (29.4%)
Child abuse	Emotional	17 (50%)
	Physical and Emotional	14 (41.2%)
Life stress	School Problems and Bullying	20 (58.8%)
Family dysfunction	Conflicts and Divorce	13 (38.2%)
Poor communication with parents	Yes	30 (88.2%)
Social isolation	Yes	21 (61.8%)
Perceived low/excessive care	Low Care	23 (67.6%)
	Excessive Control	9 (26.5%)
Internet addiction/ duration (hours/day)	Yes	31 (91.2%)
	Mean $\pm$ SD	7.35 $\pm$ 4.1
	Median (Range)	8 (2 - 16)
Break-up or Losing a loved one	Yes	5 (14.7%)

Table 2: Methods used in the studied Suicidal Attempts

Method of suicidal attempts	Number/ Ratio among attempts
Aluminum phosphide (Rodenticide) Deaths	13 (38.2%)
Zinc phosphide (Rodenticide)	3/13 (23.1%)
Carbamate (Pesticide)	6 (17.6%)
Antipsychotic (Olanzapine)	10 (29.4%)
Anti-epileptic (Carbamazepine)	3 (8.8%)
Paracetamol tablets	1 (2.9%)
Mortality Rate	1 (2.9%)
	3 (8.8%)

Additionally, our results also demonstrated that mean duration of daily internet use was 7.4 hours (range: 2–16 hours) and females were found to have insignificant ($p = 0.421$) long duration of internet usage (8 [2 - 12] hours). Meanwhile, most (80%) of cases reported break-ups or loss of a loved one was associated with low SES category.

The most commonly used methods for the last suicide attempt in our study were reported in (Table 2). The results demonstrated that the most commonly used method was aluminum phosphide

(38.2%, $n = 13$) ingestion, followed by (carbamate) tablets (29.4%, $n = 10$), then antipsychotic tablets (olanzapine) (8.8%, $n = 3$). Moreover, our results indicated that the overall mortality rate in the studied sample of admitted suicide attempts was 8.8% ($n = 3$), and all deaths occurred among aluminum phosphide ingestion cases, representing a ratio of (23.1%).

4. Discussion

The suicidal behaviors are noticeably rising among children and youth and most deaths from suicide occurred in developing countries with low incomes. The prevalence rates were estimated at 22.3% for suicidal thoughts, 6.1% for suicide plans, and 3.2% for suicide attempts (Mortier *et al.*, 2018).

In the current study, the majority of positive suicidal attempt cases, admitted at Assiut University Children's Hospital were teenagers (15–17 years old), with a mean age (15.1) years, reflecting a predominantly mid-adolescent affected population. This is consistent with previous reports of (Gaylor *et al.*, 2023) and (Kılınç and Şener, 2025). A recent study conducted in Cairo, Egypt reported that the mean age of attempt suicide cases was 15.25 years in high school students (Rabie *et al.*, 2025). The increased social pressures and a greater prevalence of mental health disorders, during the later teenage years, as well as incomplete cognitive and emotional maturation, until after the age of eight may explain the observed increase in suicide rates among adolescents (Dilillo *et al.*, 2015). However, (Bridge *et al.*, 2015) found children attempting suicide at age less than 12 years.

A higher prevalence (79.4%) of suicide attempts among female adolescents, observed in this study is consistent with previous studies of (Hua *et al.*, 2024; Rabie *et al.*, 2025). Adolescent girls often experiencing challenges in expressing their emotions and exhibiting greater interpersonal sensitivity during this developmental stage, that appear to be vulnerable (Kılınç and Şener, 2025). Furthermore, suicide rates among adolescent girls are more pronounced in socioeconomically underdeveloped areas (Kafadar *et al.*, 2014). However, in Western societies, the prevalence of suicide is higher among males (Kılınç and Şener, 2025).

This study reported that individuals from lower socioeconomic backgrounds had a 67.6% higher risk of attempting suicide, indicating a significant association between socioeconomic disadvantage and suicidal behavior. Consistent with our findings, a study done by El-Kholy *et al.* (2023) on Egyptian patients at Tanta University emergency hospital for suicide-related problems revealed deficits in education/cultural and economic/occupational domains, in most (72.0%) cases. Moreover, a comprehensive systematic review conducted by Bantjes *et al.* (2016) demonstrated that 75% of suicides occur in low- and middle-income countries, where poverty rates are high. Low socioeconomic status may heighten the anxiety and increases the engaging in high-risk behaviors, in Adolescents (Kasemy *et al.*, 2022).

In contrast, students of high economic status were more likely to attempt suicide, due to stronger academic expectations of their highly educated parents that ultimately increased stress on students to achieve (Lee *et al.*, 2022).

Suicidal behavior among children and adolescents is widely influenced by interplay of biological, psychological, family, and social risk factors (Kılınç and Şener, 2025). A history of suicidal thoughts represents the most significant predictor of subsequent attempts, highlighting the chronic and recurrent course of suicidality among youth (Ammendola *et al.*, 2023). In line with the results of (Marzec *et al.*, 2021), the existing research clarified that 73.5% of attempted suicide cases had a history of suicidal ideation. Therefore, a clear understanding factors related to the increase in suicidal ideation from early to mid-adolescence is an important public health priority (Crethar *et al.*, 2025). Family cohesion and the quality of parent–child relationships play a crucial role on the development of suicidal behaviors during adolescence. In the current study, the familial dysfunction; (Conflict and Divorce) represented about (38.2%); and (poor communication with a parent) represented (88.2%), among suicide attempt cases. This is in concomitance with the findings of (DeVille *et al.*, 2020) who reported more than 85% of children who reported suicidal ideation demonstrated a lack of concordance with their caregivers' reports. Parental relationships are particularly influential during preadolescence, as children at this stage spend more time interacting with their families than with peers and often depend on parents for emotional support (Walsh *et al.*, 2021). Furthermore, the

absence of a supportive family environment can have a direct adverse effect on the mental well-being of young individuals (Kılınç and Şener, 2025).

Parental control is ranging from overprotection and strict regulation to the allowance of autonomy and independence (Sharaf *et al.*, 2016). In this context, the present findings revealed that 67.6% of attempt cases were perceived low parental care, while 26.5% perceived excessive parental control. This is consistent with those reported by Bridge *et al.* (2015) and DeVille *et al.* (2020). In Egypt, the suicidal intent was more pronounced among adolescents who experienced neglectful or overprotective parenting (Sharaf *et al.*, 2016).

The present study emphasized that social isolation (61.8%), bullying and school-related behavioral problems (58.8%), emerged as important risk factors among the studied suicide attempt cases. These results align with those of (Myklestad and Straiton, 2021 ; Zhu *et al.*, 2023). The authors further noted that individuals who simultaneously act as both bullies and victims constitute an especially vulnerable population to risk of suicide. Moreover, (Kasemy *et al.*, 2022) reported that broader social issues, may lead individuals to attempted suicides.

Researchers believe that internet addiction and increased suicidal risk are connected through common underlying vulnerabilities, such as weak family relationships. The internet spaces raise the chances for young people to encounter more freely; suicidal thoughts; behavior and methods or lived experiences (Lin *et al.*, 2014). An almost universal (91.2%), internet addiction was demonstrated among the attempt suicide cases in our study, with an average use of over 7 hours daily. Internet Addiction and Gaming Disorders can cause neurological and psychological complications, social problems and raise the suicidal risk (El Fiky *et al.*, 2022). Additionally, teens with suicidal thoughts may search online and have been connected to completed suicides (Hua *et al.*, 2024).

This study demonstrated that 50% of suicide attempt cases had experienced emotional abuse, while 41.2% reported exposure to both emotional and physical abuse. This finding is consistent with that reported by Peng *et al.* (2022); Bridge *et al.* (2015), who similarly identified a significant association between childhood abuse and suicidal behaviors. In our study, none of the cases reported a history of sexual abuse, this may be due to the cultural and Islamic religious context in Egypt, where sexual abuse is strongly rejected and unacceptable.

Suicide methods tend to vary considerably between different countries and communities (Nevarez-Flores *et al.*, 2025). Increasing trends in intentional poisonings among youth over the past decade and most poisoning attempts occur in mid to late adolescence (13–18 years), with females more likely to use poisoning as a method of self-harm were reported (Shlenda *et al.*, 2024). In this context, the current study showed that self-poisoning by pesticides was the most common method used to attempt suicide, in Assiut. In their systematic review on suicide across Africa, found that pesticide poisoning was one of two most frequently used methods of suicide (Mars *et al.*, 2014). However, in Europe, overdose with pharmaceuticals like analgesics, sedatives, and antidepressants predominates in high-income countries and was one of the leading methods of suicide for 10- to 24-year-olds of all genders (Cairns *et al.*, 2019).

This study with the previous ones reported that the most commonly used substance for suicide attempt was aluminum Phosphide rodenticide, followed by zinc phosphide. The authors attributed the widespread use of pesticides, to their easy accessibility and relatively low cost. Moreover, it was found that aluminum phosphide was the leading cause of suicidal death, in Egypt (Kasemy *et al.*, 2022).

The Egyptian government can address suicide challenge by suicide prevention efforts through school-based education, training for teachers and parents, adequate school support resources, and using evidence-based information about suicide risk factors prevention on social media (Farahat *et al.*, 2022).

5. Conclusions

Suicidal attempts among adolescents in Assiut predominantly affect females from low socioeconomic backgrounds. Suicidal behavior is a multifaceted phenomenon, influenced by interplay of biological, school-related behavioral problems, family, and social risk factors. Ingesting harmful accessible substances is a frequently documented method.

6. Recommendations

Suicide is largely preventable, and many of its contributing factors can be targeted through effective prevention strategies. Early identification of vulnerable youth and application of family-, school-, and community-based preventive interventions for suicide in younger adolescents are urgently needed.

Ethical approval:

This study was conducted in accordance with the principles of the Declaration of Helsinki (WMA, 2008), and approved by the ethical committee of the Faculty of Medicine, Assiut University, Egypt (Approval No IRB Registration Number: 04-2023-200412).

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