



PREVALENCE OF SUICIDAL IDEATION AND ITS LIFESTYLE CORRELATES AMONG ADOLESCENTS IN FLORIANÓPOLIS, BRAZIL

(Prevalencia de ideación suicida y su estilo de vida se correlaciona entre adolescentes en Florianópolis, Brasil)

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Abstract

Objective: The present study aims to assess the prevalence of suicidal ideation and identify associations with lifestyle. **Methods:** This is a cross-sectional study conducted on 971 adolescents (14 to 18 years), of both sexes, attending public schools in Florianópolis, Brazil. Suicidal ideation was the outcome variable, assessed by the question "During the last 12 months, have you, at any time, seriously considered committing suicide (taking your own life)?" The response options were "yes" and "no." Lifestyle was assessed using the Fantastic Lifestyle questionnaire. Total and domain scores were treated as independent variables. **Results:** The overall prevalence of suicidal ideation was 22.1% (girls = 30.1%, boys = 15.0%, $p < 0.05$). In both boys and girls, the domains Family and Friends (OR: 0.86; IC95%=0.76-0.97; and OR: 0.75; IC95%=0.68-0.84), Tobacco and Toxics (OR: 0.80; IC95%=0.72-0.90; and OR: 0.71; IC95%=0.64-0.79), Sleep, Seatbelt, Stress, and Safe Sex (OR: 0.87; IC95%=0.81-0.94; and OR: 0.87; IC95%=0.82-0.92), Type of Behavior (OR=0.72; IC95%=0.62-0.84; and OR: 0.74; IC95%=0.66-0.83), Insight (OR: 0.65; IC95%=0.58-0.72; and OR: 0.63; IC95%=0.57-0.69), and the overall lifestyle score were negatively associated with suicidal ideation (OR: 0.1; IC95%=0.84-0.94; and OR: 0.92; IC95%=0.90-0.94). Furthermore, in girls, there was a negative association of the Alcohol domain (OR: 0.85; IC95%=0.76-0.96) with suicidal ideation. **Conclusion:** The prevalence of suicidal ideation is alarming, affecting 2 out of 10 adolescents. Adolescents with lower lifestyle scores, as well as those with poorer scores in behavioral, psychological, and social domains, had the highest likelihood of experiencing suicidal ideation.

Keywords: Students, Mental health, Risk behaviors, Public health.

Resumen

Objetivo: El presente estudio tiene como objetivo evaluar la prevalencia de la ideación suicida e identificar asociaciones con el estilo de vida. **Métodos:** Se trata de un estudio transversal realizado en 971 adolescentes (de 14 a 18 años), de ambos sexos, que asisten a escuelas públicas en Florianópolis, Santa Catarina, Brasil. La ideación suicida fue la variable de resultado, evaluada mediante la pregunta "Durante los últimos 12 meses, ¿alguna vez has considerado seriamente cometer suicidio (quitarte la vida)?" Las opciones de respuesta fueron "sí" y "no". El estilo de vida se evaluó utilizando el cuestionario Fantastic Lifestyle. Las puntuaciones totales y por dominio se trataron como variables independientes. **Resultados:** La prevalencia general de ideación suicida fue del 22,1% (niñas = 30,1%, niños = 15,0%, $p < 0,05$). Tanto en niños como en niñas, los dominios de Familia y Amigos (OR: 0,86; IC95% = 0,76-0,97; y OR: 0,75; IC95% = 0,68-0,84), Tabaco y Tóxicos (OR: 0,80; IC95% = 0,72-0,90; y OR: 0,71; IC95% = 0,64-0,79), Sueño, Cinturón de seguridad, Estrés y Sexo seguro (OR: 0,87; IC95% = 0,81-0,94; y OR: 0,87; IC95% = 0,82-0,92), Tipo de Comportamiento (OR = 0,72; IC95% = 0,62-0,84; y OR: 0,74; IC95% = 0,66-0,83), Percepción (OR: 0,65; IC95% = 0,58-0,72; y OR: 0,63; IC95% = 0,57-0,69), y la puntuación total de estilo de vida estuvieron asociados negativamente con la ideación suicida (OR: 0,1; IC95% = 0,84-0,94; y OR: 0,92; IC95% = 0,90-0,94). Además, en las niñas, hubo una asociación negativa del dominio Alcohol (OR: 0,85; IC95% = 0,76-0,96) con la ideación suicida. **Conclusión:** La prevalencia de la ideación suicida es alarmante, afectando a 2 de cada 10 adolescentes. Los adolescentes con puntuaciones de estilo de vida más bajas, así como aquellos con puntuaciones más bajas en los dominios de comportamiento, psicológicos y sociales, tuvieron la mayor probabilidad de experimentar ideación suicida.

Palabras clave: Estudiantes, Salud mental, Comportamientos de riesgo, Salud pública.

1. INTRODUCTION

In 2019, approximately 703,000 people died by suicide worldwide, demonstrating the gravity of this public health problem on a global scale (WHO, 2021). Between 2010 and 2019, 112,230 suicide deaths were recorded in Brazil, with a 43% increase in the annual number of suicides over this period. Data on the adolescent population are even more alarming, as evidence points to a greater increase in suicide mortality in this age group, with an 81% increase between 2010 and 2019 (Brasil, 2021).

Adolescence is a period marked by important biological and psychosocial transformations (Alsaker & Flammer, 2020). During this life stage, individuals have a greater tendency to react to conflict situations by committing suicide (Cicogna et al., 2019). The causes of suicide are complex and multifactorial (Shain et al., 2016). Some examples of fixed factors that increase the chances of suicide include a family history of suicide, parental mental health problems, a history of adoption, physical or sexual abuse, and non-normative sexual orientation (Shain et al., 2016). Additionally, personal mental health problems, excessive exposure to digital media, and socioenvironmental problems

are also associated with an increased risk of suicide among adolescents (Shain et al., 2016).

Suicidal behavior encompasses three distinct components: suicidal ideation, referring to a person's contemplation of committing suicide; suicide planning, involving the consideration of different manners to carry out the act; and suicide attempt, which is the concrete action of trying to take one's life, irrespective of the outcome (Araújo et al., 2010; Werlang et al., 2005). Suicidal ideation is considerably more frequent than actual suicide attempts, and it remains a challenge to understand how these two elements influence each other (Harmer et al., 2023; Shain et al., 2016).

Health risk behaviors are commonly associated with higher rates of suicidal ideation, such as smoking, alcohol consumption, drug use (Im et al., 2017; Kang et al., 2015; Lima et al., 2021), insufficient physical activity and sedentary behavior (Lyanda et al., 2022; Mahumud et al., 2022), lack of parental and peer support (Aboagye et al., 2022; Mahumud et al., 2022), and insight impairments (Im et al., 2017; Kang et al., 2015; Lima et al., 2021). Although risk behaviors are known to have a direct impact on lifestyle, there is limited literature regarding the effect of lifestyle on suicidal ideation in adolescents (Hwang & Nam, 2022). Moreover, the studies that investigated this relationship did not use specific questionnaires for a comprehensive assessment of adolescent lifestyles; rather, they addressed lifestyle by analyzing risk behaviors that could affect it.

Given the above, it is believed that lifestyle factors can contribute to the risk of suicidal ideation. However, there is a notable lack of studies assessing the extent to which lifestyle can predict suicidal ideation. In view of the foregoing, this study aimed to investigate the prevalence of suicidal ideation and assess associations with lifestyle in adolescents.

2. METHODS

This is a cross-sectional study with a school-based, epidemiological approach. The experimental protocol was approved by the Human Research Ethics Committee at [name deleted to maintain the integrity of the review process] (protocol No. 2,172,699/2017).

At the time of data collection, a total of 10,192 adolescents aged 14 to 19 years were enrolled in public schools in Florianópolis, according to data from the Santa Catarina State Secretariat. The sample size was calculated as recommended by Luiz and Magnanini (2000), using a confidence interval of 95%, tolerable error of four percentage points, unknown prevalence of 50%, design effect of 1.5, and 10% addition to account for potential losses. The minimum sample size for a representative assessment of Florianópolis was 935 adolescents. Geographical and population differences were accounted for by dividing the municipality into five regions (Center, East, North, South, and Mainland) and selecting the school with the highest number of high school students enrolled from each region.

Suicidal ideation (dependent variable) was measured using a question from the Youth Risk Behavior Survey (YRBS), validated by Guedes and Lopes (2010) for the Brazilian

population. The question was presented as follows: "During the past 12 months, have you, at any time, seriously considered committing suicide (taking your own life)?" The response options were "yes" and "no."

Total and domain scores of the Brazilian version of the Fantastic Lifestyle questionnaire, validated by Rodríguez-Añez, Reis, and Petroski (2008), were treated as independent variables. The questionnaire consists of 25 questions divided into 9 domains. Responses are scored on a Likert scale. Of the total number of questions, 23 have five answer choices and 2 questions are dichotomous. The higher the total/domain score, the better the adolescent's lifestyle. Here, in addition to the general score, seven domain scores were analyzed, namely (1) Family and Friends, (2) Physical Activity, (3) Tobacco and Toxics, (4) Alcohol, (5) Sleep, Seatbelt, Stress, and Safe Sex, (6) Type of Behavior, and (7) Insight.

Age (complete years) and economic level were used as adjustment variables. Economic level was determined using the Brazilian Criteria of Economic Classification (ABEP, 2016), based on the score obtained by summing consumer goods reported by adolescents.

The data were analyzed using IBM SPSS Statistics software version 20.0. The normality of data distribution was verified by the Kolmogorov–Smirnov test. The Mann–Whitney *U*-test was used to compare variables between sexes. Results are presented as mean and standard deviation. Differences between sexes were assessed by the independent *t*-test. Age- and economic level-adjusted logistic regression (Cheah et al., 2018) was used to examine associations of total and domain-specific lifestyle scores with suicidal ideation stratified by sex. For all analyses, the level of significance was set at $p < 0.05$.

3. RESULTS

As groups of classes were used for data collection, the initial sample included 1026 adolescents (525 boys and 499 girls). Of this total, 47 adolescents were excluded before data analysis (34 for being older than 18 years, 9 for providing incomplete responses in the economic level questionnaire, 9 for providing incomplete responses in the lifestyle questionnaire, and 3 for providing incomplete responses regarding physical activity). Thus, 979 adolescents (51.3% boys) with a mean age of 16.43 (0.98) years were considered eligible to participate in the study.

When variables were compared between sexes, it was found that boys were older, had higher economic level, and scored higher on Physical Activity; Sleep, Seatbelt, Stress, and Safe Sex; Type of Behavior; Insight, and general lifestyle (Table 1). The prevalence of suicidal ideation was 22.3% in the total sample, being higher in girls (30.0%) than in boys (15.1%) ($p < 0.001$).

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Table 1 – General characteristics of adolescents according to gender.

Variables	Male	Female	p-value†
	n = 498	n = 473	
	\bar{x} (SD)	\bar{x} (SD)	
Age (years)	16,53 (1,00)	16,34 (0,95)	0,003*
Economic level (score)	40,20 (11,23)	38,03 (10,62)	0,002*
Family & Friends	6,08 (1,91)	6,32 (1,84)	0,052
Activity	4,24 (2,57)	3,01 (2,37)	<0,001*
Tobacco & toxics	10,65 (2,02)	10,48 (2,03)	0,206
Alcohol	7,53 (1,71)	7,52 (1,71)	0,972
Sleep, seatbelt, stress & safe sex	14,21 (3,11)	12,80 (3,66)	<0,001*
Type of behavior	4,75 (1,71)	4,11 (1,85)	<0,001*
Insight	8,08 (2,58)	7,03 (2,94)	<0,001*
Lifestyle	65,12 (9,79)	60,31 (11,49)	<0,001*

†: Independent t-test

*: p<0,05

\bar{x} : mean; SD: standard deviation

In boys, it was observed that a one-point reduction in the lifestyle domains Family and Friends, Tobacco and Toxics, Sleep, Seatbelt, Stress, and Safe Sex, Type of Behavior, and Insight resulted in an increase of 14%, 20%, 13%, 28%, and 35%, respectively, in the likelihood of experiencing suicidal ideation, regardless of age or economic level. A one-point decrease in the total lifestyle score was associated with a 9% increase in the likelihood of suicidal ideation.

When analyzing suicidal ideation in girls, negative associations were observed with the following domains: Family and Friends, Tobacco and Toxics, Alcohol, Sleep, Seatbelt, Stress, and Safe Sex, Type of Behavior, and Insight. Each one-point decrease in these scores produced an increase of 25%, 29%, 15%, 13% 26%, and 37%, respectively, in the odds of suicidal ideation. As for total lifestyle scores, each one-point decrease resulted in an 8% increase in the odds of girls having suicidal ideation.

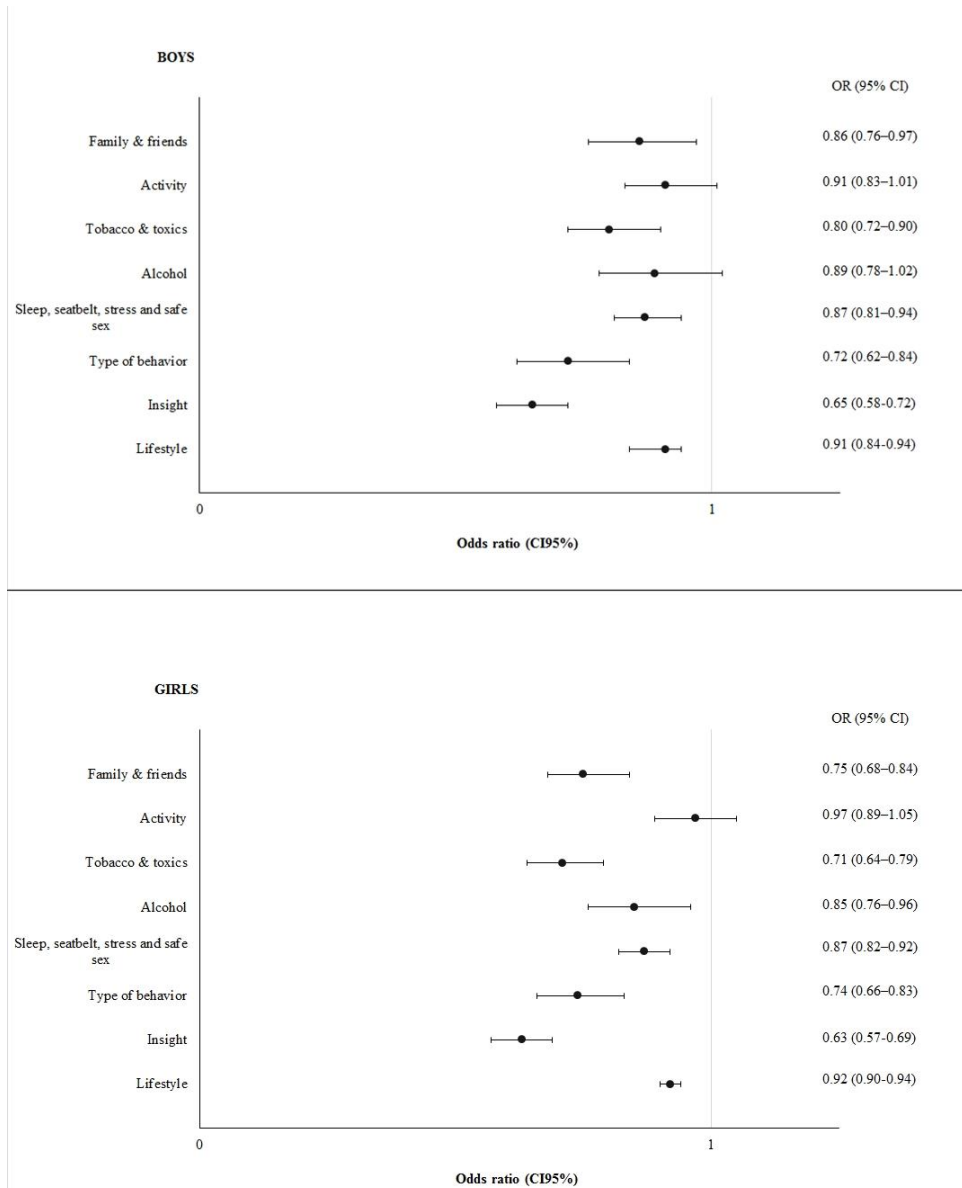


Figure 1. Associations of domains and general lifestyle in suicidal ideation, according to sex, adjusted for age and economic level.

4. DISCUSSION

The results revealed a prevalence of suicidal ideation of 22.3% among adolescents in Florianópolis, with a higher occurrence in girls (30.0%). Furthermore, there was a similar trend in both sexes: adolescents with reduced scores on lifestyle domains and total lifestyle were more prone to suicidal ideation.

There was a worrisome prevalence of suicidal ideation (22.4%), which was higher in girls (30.0%) than in boys (15.1%). These rates are higher than those reported in a national (11.6%) (Lima et al., 2021) and international (15.8%) study (Xiao et al., 2021). Studies on secular trends revealed a decrease in the prevalence of suicidal ideation in the United States from 1991 to 2009 (Xiao et al., 2021) and in South Korea from 2005 to 2020 (Kim et al., 2023). However, Xiao et al. (2021) observed an inflection in 2009, with increasing trends up to 2019. Several factors may be associated with the high prevalence of suicidal ideation, particularly in the mentioned periods, characterized by significant technological advances. Over the years, adolescents have become more exposed to the digital world, which could have contributed to increased social pressure (O’Keeffe & Clarke-Pearson, 2011) and episodes of cyberbullying (Gohal et al., 2023; Shain et al., 2016), possibly intensifying depressive symptoms (Keyes et al., 2019; Shain et al., 2016).

Negative associations between lifestyle and suicidal ideation were observed in both sexes. The results shed light on the association of lifestyle with suicidal ideation. Previous studies have focused on specific domains of behaviors that may have adverse effects on lifestyle (Cheah et al., 2018; Kang et al., 2015; Mahumud et al., 2022). However, it is known that the simultaneous occurrence of several lifestyle risk behaviors is positively associated with anxiety, depressive symptoms, and suicidal ideation (Hwang & Nam, 2022). It is relevant to emphasize that anxiety and depression are associated with a greater propensity for suicidal ideation (Harmer et al., 2023; Pramananda & Keliat, 2019; Shain et al., 2016). Therefore, in this context, it becomes crucial to implement behavioral changes that stimulate improvements in the lifestyle of adolescents. These changes have the potential to mitigate the risks of depression, anxiety, and suicidal ideation in young populations.

The domain Family and Friends had a negative association with suicidal ideation. As described in the literature, family ties, school interactions, and friendships act as protective factors against suicidal ideation (Aboagye et al., 2022; Shain et al., 2016). By contrast, those who experience loneliness or engage in socially isolating behaviors are more likely to have suicidal ideation (Aboagye et al., 2022; Harmer et al., 2023). The feeling of loneliness can accentuate the risk of suicidal behavior, as lacking someone to share personal concerns can amplify this distressing situation (Pandey et al., 2019). The findings underscore the importance of peer support in the context of suicidal ideation, highlighting the need for interventions in the family, school, and even digital environments to facilitate communication and interaction with today’s adolescents (Harmer et al., 2023). Providing digital means of communication is a valid strategy, as adolescents with suicidal ideation often feel more comfortable expressing themselves and discussing their emotions through text messages. This channel allows discussing

feelings, encourages dialogue, and promotes demonstrations of empathy to young people under evaluation (Harmer et al., 2023).

The domain Insight, which addresses aspects related to optimism and feelings of sadness, was negatively associated with suicidal ideation. Such lifestyle domains may be interrelated, given that insight is related to positive thoughts, sadness, and tension. With regard to positive thoughts, it was found that adolescents with lower levels of positive thinking were more prone to suicidal ideation (Kirtley et al., 2022). In adults, a higher degree of pessimism (lower optimism) was associated with marked depressive symptoms and suicidal behaviors (Chang et al., 2013). It is theorized that negative and pessimistic thinking can hinder the search for improvements in the emotional state or condition that is affecting a person with suicidal ideation, which, in turn, can aggravate feelings of sadness, thus representing another risk factor for suicidal thinking (Jeong et al., 2020; KIM et al., 2020; Moreira & Bastos, 2015; Shain et al., 2016). Such aspects of humor generate depressive and hopelessness symptoms, making the individual more prone to develop several other risk behaviors (KIM et al., 2020).

These risk behaviors may involve the use of substances, whether licit or illicit. In the present study, the domains Tobacco and Toxics and Alcohol were associated with an increased risk of suicidal ideation. Substance use, in general, contributes significantly to increased suicide risks (Ahmed & Stanciu, 2017; Kalk et al., 2019). Alcohol dependence, for example, accounts for about 13% of suicide cases in the general population, second only to depression (Kalk et al., 2019). It is crucial to not only analyze alcohol consumption but also consider acute intoxication (Ahmed & Stanciu, 2017; Kalk et al., 2019). The latter is associated with an increased risk of suicidal behavior. Acute intoxication can lead to disinhibition, impulsivity, aggressiveness, and psychological distress; it may also impair cognitive function and cause brain changes that result in negative mood states, impairing social relationships (Ahmed & Stanciu, 2017). Drugs exert influence through immediate effects that distort discernment, impair impulse control, and interfere with neurotransmitter pathways (Ahmed & Stanciu, 2017). With chronic use, drugs cause cognitive and behavioral damage, leading to increased impulsive and aggressive behaviors. Additionally, they induce a state of physiological and metabolic stress, resulting in neurotoxic lesions (Ahmed & Stanciu, 2017).

The domain Sleep, Seatbelt, Stress, and Safe Sex also showed a negative association with suicidal ideation. Sleep disorders seem to be related to the risk of suicidal ideation in adolescents (Liu et al., 2019). Staying awake at night creates a window of vulnerability to suicide (Nguyen et al., 2023). This can be explained in part by increased hypofrontality, which increases theta and delta activity in the frontal cortex and decreases beta and gamma activity. Hypofrontality is influenced by the interaction between homeostatic and circadian factors (Perlis et al., 2016). The frontal regions of the brain are especially vulnerable to the effects of sleep deprivation, leading to prefrontal fatigue. Nonetheless, sleep deprivation also promotes a decrease in executive functions (Perlis et al., 2016) and an increase in affective reactivity (Hamilton et al., 2023), factors that contribute to ideation and perpetuation of suicidal behaviors. By contrast, each additional hour of sleep results in an 11% decrease in the risk of suicidal plans (Chiu et al., 2018). Given that sleep is a modifiable risk factor (Nguyen et al., 2023), it is necessary to develop interventions, preferably non-drug, to improve sleep quality in the

adolescent population. Regarding safe sex, it is speculated that unprotected sexual practices may expose adolescents to sexually transmitted diseases, leading to alcohol consumption and psychological disorders (Lyanda et al., 2022).

Negative associations were identified between Type of Behavior and suicidal ideation. Stress and anger are perceived as risk factors for suicidal ideation (Primananda & Keliat, 2019; Shain et al., 2016). It is important to remember that, during adolescence, individuals undergo several changes, being subject to both internal and external pressures to achieve good results in school (Jeong et al., 2020). Daily stress can be expressed through angry and hostile behaviors, which are also correlated with increased chances of suicidal ideation (Lima et al., 2021; Nock et al., 2013). Thus, it becomes evident the need for interventions aimed at preparing and supporting adolescents, providing them with tools to effectively face everyday stress and manage these behaviors. At the same time, it is crucial that they feel supported and not helpless during times of stress.

This study has some limitations. The study did not collect information related to psychological comorbidities, which are important determinants of suicidal ideation. Furthermore, the representativeness of the sample was limited, as it did not include adolescents attending private schools. Attention should be given to these facts when extrapolating the results. Data were collected via a self-administered questionnaire in a school environment, creating the possibility of memory bias and social desirability. The data should be analyzed with caution, as the cross-sectional design of the study does not allow determination of causality between the investigated variables. Nevertheless, the study contributes to the identification of the prevalence of suicidal ideation in adolescents and its association with different lifestyle domains and overall lifestyle. The analyses were controlled by variables that are known to positively or negatively influence the probability of suicidal ideation. Future studies should adopt a longitudinal and experimental design, with the aim of monitoring and carrying out interventions to improve lifestyle and prevent suicidal ideation. Additionally, efforts should be made to gain a better understanding of the reverse causality between lifestyle and suicidal ideation.

5. CONCLUSION

This study observed that 2 out of every 10 adolescents experience suicidal ideation. The chances of suicidal ideation are higher in adolescents with low lifestyle scores. Young individuals of both sexes with low scores in the domains Family and Friends, Tobacco and Toxics, Sleep, Seatbelt, Stress, and Safe Sex, Type of Behavior, and Insight were more likely to experience suicidal ideation. In girls, the Alcohol domain was also negatively associated with suicidal ideation.

This evidence provides valuable insight into how different aspects of adolescents' lifestyle may relate to suicidal ideation, underscoring the importance of preventive approaches and targeted interventions to promote a healthy lifestyle and improve mental health among young people.

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