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Online risks related to suicidal thoughts: A cross-sectional study with a sample of Italian students

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Abstract

The aims of the present study were to expand scientific evidence on exposure to online risks (i.e., contact and content risks) as well as to analyse associations between exposure to online risks and suicidal thoughts. The sample comprised 141 adolescent students (58.2% males, $n = 82$) with a mean age of 14.05 years (standard deviation = 1.42). Data were collected using questions adapted from the EU Kids online survey, the Body Investment Scale, the Children Depression Inventory 2 (Short), the Internet Disorder Scale and one item of the Brief Symptom Inventory for suicidal thoughts. Bivariate and multivariable associations were tested to explore the relationships between online risks and the absence/presence of suicidal thoughts.

Sixty-five percent of the sample reported at least one online risk. Online risks, in order of frequency, were the following: hate messages (43%), violent images (42%), drug experiences (22%), ways of hurting oneself (21%), committing suicide (16%) and being very thin (15%). One in ten ($n = 14$) participants experienced suicidal thoughts. Exposure to online content on ways of physically harming oneself, committing suicide, experiences of taking drugs, and increasing number of online risks were associated with suicidal thoughts even when controlling for body investment, symptoms of depression and problematic internet use.

Mental health professionals need to carefully investigate the way in which young patients use the Internet, with the awareness that specific online experiences may be indicative of the presence of suicidal thoughts.

Keywords: internet risks, internet safety, technology, harmful contents, suicidal ideation, suicidality

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Introduction

Children and adolescents may come across and/or participate in several risky behaviors on the Internet. Aboujaoude and Gega (2021) have recently discussed how the focus on technological addictions has diverted attention away from wider online risks “missing the forest for the trees”. The authors concomitantly claimed for broadening the focus of research on online psychopathology to impulsivity, aggression, inattention, narcissism and the psychological meaning of living in a post-privacy world. Behaviors like giving out personal information, using the Internet to send one’s picture/video to someone, chatting and starting relationships with strangers have all been reported (Dowell, Burgess, & Cavanaugh, 2009; Mascheroni & Ólafsson, 2018; Smahel et al., 2020). Other important areas of concern regard online sexual risks, such as unwanted exposure to pornography, harassment and sexual solicitations (Livingstone & Smith, 2014) as well as exposure to violent content (Livingstone et al., 2014).

Risky online situations can be differentiated in risks related to “content” (i.e., exposure to possible harmful content), “contact” (i.e., activities and communications with known or unknown individuals that convey a potential threat) and “commercial” (i.e., situations in which commercial organizations attempt to exploit the user) (Savoia et al., 2021; Schilder, Brusselaers, & Bogaerts, 2016). Recent findings from surveys conducted in 19 European countries with a total of 25,101 internet users aged 9-17 showed that 25% of the sample was bothered by some online experience (Smahel et al., 2020). Exposure to harmful content is interrelated and varied between countries with frequencies ranging from 8% for being exposed at least monthly to ways of committing suicide to 17% for hate messages (Smahel, et al., 2020). The percentage of Italian children and adolescents aged 9-17 years bothered by some online experience was 6% in 2010/13, 13% in 2017 and 11% in 2020 (Mascheroni & Ólafsson, 2018; Smahel et al., 2020). Similarly, the percentage of children and adolescents who met offline online contacts increased from 4% in 2010 to 14% in 2017, and 14% of them felt upset after meeting face to face (Mascheroni & Ólafsson, 2018). Furthermore, adolescents came across harmful online content such as ways to hurt oneself (4%), committing suicide (4%), being very thin (6%), drug experiences (7%), hate messages (10%) and/or violent images (12%) at least monthly (Smahel et al., 2020). When asked about what online content would bother young people of their age, children and adolescents indicated pornography (22%), cyberbullying (19%) and violent content (18%) among the most concerning (Livingstone et al., 2014). Many children expressed shock and disgust in response to violent content, especially those that graphically depicted realistic violence (Livingstone et al., 2014).

It has recently been demonstrated that many discrete types of online risk factors (i.e., cyberbullying, violence, drug-related, hate speech, profanity, sexual content, depression, and low-severity self-harm) are identifiable from online data and associated with subsequent youth suicide-related behaviors with each risk factor carrying a specific association with suicide-related behaviors (Sumner et al., 2021). Rodway et al. (2022) have also highlighted that suicide-related online experiences are common antecedents to suicide in young people. The authors conducted a 3-year case series study of

all young people who died by suicide in the UK retrieving information on the antecedents of 544 suicide deaths from official investigations. Their findings showed that searching for information about method was the most common online experience (13%). Further, self-harm, social isolation, and mental difficulties were more likely in those known to have suicide-related online experiences compared to those who did not (Rodway et al., 2022), confirming previous findings (Harris, McLean, & Sheffield, 2009). The attitude of a person toward the perception of his body is a critical factor to understand suicidal tendencies (Orbach & Mikulincer, 1998). Several studies have shown that emotional investment in the body, with a particular focus on distorted body perceptions, is related to suicidal ideation and behaviors (Brausch, Nichols, Laves, & Clapham, 2021; Cerutti, Presaghi, Manca, & Gratz, 2012; Cipriano, Cella, & Cotrufo, 2020; Osman et al., 2009). Finally, greater time spent on online social networking seems to promote self-harm behavior and suicidal ideation in vulnerable adolescents (Memon et al., 2018) with problematic internet use (PIU) being associated with suicidal ideation and attempts even after controlling for covariates (Cheng et al., 2018).

In light of the above, the present study aimed at expanding scientific evidence on online contact and content risks and their associations with suicidal thoughts. Furthermore, the role of important covariates (i.e., body investment, symptoms of depression, PIU) was also considered.

Methods

Participants

This cross-sectional study included a convenience sample of 145 adolescents attending three secondary schools located in central Italy. Data from four participants were excluded from analysis due to missing responses (at least 50%) for one or more administered questionnaires. The final sample included 141 adolescent students (mean (M) age= 14.05, standard deviation (SD)= 1.42; 58.2% males, n= 82). Exclusion criteria for participation in the study included poor comprehension of written Italian and a history of neurological illness or brain injury.

Procedure

This study was conducted to examine the relationship between the use of technologies, potential online risks, and mental health among young people. The aim of the study was illustrated to the headmasters and teachers of each school. After the headmasters had given formal authorization to recruit the sample, written informed consent to participate in the study was obtained from participants’ parents/guardians and, verbally, from participants themselves. Participants filled in the questionnaires in their classroom during school time with the presence of their teachers. Doctoral and undergraduate students in clinical psychology trained in the use of the questionnaires provided brief instructions and were also present during their completion. Anonymity of

participants was ensured assigning each participant a unique code. This study was approved (protocol code 321/2020) by the Ethics Committee of the Department of Dynamic and Clinical Psychology and Health Studies, Sapienza University of Rome. The protocol for the research project conformed with the provisions of the Declaration of Helsinki.

Measures

Online contact and content risks

Questions from the EU Kids online survey (Smahel et al., 2020), were used to investigate exposure to the following online risks during the previous year: (a) giving personal information (e.g., home address/telephone number) to someone not met face-to-face, (b) sending their own photos and/or videos to someone not met face-to-face, (c) met someone face-to-face they first got to know on the internet and being upset after the meeting, (d) ways of physically harming or hurting oneself, (e) ways of committing suicide, (f) ways to be very thin, (g) hate messages that attack certain groups or individuals, (h) experiences of taking drugs and (i) gory or violent images. The first three may be classified as contact risks whereas the others reflect content risks. These questions were used to constitute different independent variables as follows: (1) using each situation as a risk factor, (2) using the number of situations a student encountered as a factor, (3) using a dichotomous variable (0 = no situations encountered and 1 = at least one situation encountered) for online risk factors.

Body investment

The Body Investment Scale (BIS) (Orbach & Mikulincer, 1998; Osman et al., 2009) was used to assess students' emotional investment in their bodies. It is a 24-item self-report scale that explores distinct domains related to body investment, i.e., body attitudes/feelings, body care, body protection, and comfort with physical touch. Respondents are asked to rate their level of agreement with each statement using a 5-point Likert scale from 1 ("completely disagree") to 5 ("completely agree"). The average value of all items for each factor results in four separate sub-scores. Summing up the total subscale scores yields the overall total score (Cipriano et al., 2020), with higher scores indicating more positive feelings about and investment in the body. In the present study, Cronbach's alpha value was .68.

Symptoms of depression

The Children Depression Inventory 2 Short (CDI 2(S)) (Kovacs, 2015) is a 12-item self-report instrument used to detect the presence and severity of depressive symptoms in youth aged 7-17 years during the past two weeks. For each item, the respondent is presented with three choices that correspond to three levels of symptomatology (0= "absence of symptoms", 1= "mild or probable symptom", 2= "definite or severe symptom"). High total scores (range: 0-24) suggest high depressive symptoms. The CDI 2(S) does not contain an item

on suicide or suicidal thoughts. The questionnaire has been validated in Italy (Camuffo & Cerutti, 2018). It has excellent psychometric properties and yields a total score that is typically very comparable to the one produced by the full-length version (Spensieri, et al., 2021). In the present study, the scale showed good internal consistency (Cronbach's α of .79).

Problematic internet use (PIU)

The Internet Disorder Scale (IDS-15) (Pontes & Griffiths, 2017) is a self-report scale composed of 15 items. It assesses the severity and impact of PIU by focusing upon users' online leisure activity from any device with internet access over the past year. The respondents rate each item on a 5-point Likert scale (from 1 = "strongly disagree" to 5 = "strongly agree"). The total score can range from 15 to 75, with higher scores being an indication of higher degrees of PIU. The Italian version of the IDS-15 demonstrated good psychometric properties (Monacis et al., 2018). In the present study, Cronbach's alpha for the scale was .79.

Suicidal thoughts

One item ("Thoughts of ending your life") of the Brief Symptom Inventory (BSI) (Derogatis, 1975) was used to investigate the presence of suicidal thoughts during the last week. Respondents rate the item on a 5-point Likert scale (from 0 = "not at all" to 4 = "extremely"). Participants' responses were dichotomized as 0 ("not at all") to indicate absence of suicidal thoughts and 1 indicating their presence (original response value from 1= "a little bit" to 4= "extremely").

Statistical analysis

Descriptive statistics were computed to explore the characteristics of the sample as a function of presence/absence of suicidal thoughts. Further, online risks were examined according to sex. Between-group differences were tested using the Chi-square test and student-t statistics for group comparison on categorical and continuous variables, respectively. In accordance, Cramer's V and Cohen's d were used as estimates of effect size. When the assumption on equality of variance (tested using Levene's test) was violated, the Welch homogeneity correction was applied. Subsequently, significant bivariate associations between online risks and suicidal thoughts were further examined using logistic regression models to control for covariates (i.e., symptoms of depression, body investment, PIU). All analyses were performed using the JASP version 0.16.3.0 (JASP Team, 2022) and a p-value < 0.05 was considered to be significant.

Results

Frequencies of online risks across all participants and as a function of presence/absence of suicidal thoughts are reported in Table 1. Two in three participants reported at

least one online risk. The most frequent (approximately 42% of the sample) were exposure to hate messages against certain individuals/groups and violent images. The less frequent online risks reported by participants were being upset after meeting someone known on the internet (2%) and sending photos and/or videos to strangers (8%). One in ten participants reported online exposure to content on ways of physically harming oneself, ways of committing suicide and ways to be very thin.

Table 2 displays frequencies of online risks as a function of sex. No difference between sexes was observed in the

frequency of at least one online risk and the sum of online risks. Regarding the exposure to specific risks, males and females differed significantly in online exposure to ways to be very thin (more likely reported by females) and to violent images (more likely reported by males).

One in ten participants also showed suicidal thoughts during the previous week. Participants with suicidal thoughts were more likely to report the following online risks compared to those without: exposure to content on ways of physically harming oneself, committing suicide, being very thin, drug experiences,

Tab. 1. Frequencies of online risks across all participants and as a function of suicidal thoughts.

	Total (N= 141) n (%)	Absence of suicidal thoughts (n= 127) n (%)	Presence of suicidal thoughts (n= 14) n (%)	t / χ^2 (df)	P	Cohen's d / Cramer's V
Age <i>M(SD)</i>	14.1 (2.8)	14.0 (2.8)	14.4 (3.1)	- 0.43 (139)	0.67	.12
Sex (male)	82 (58.2)	77 (60.6)	5 (35.7)	3.22 (1)	0.07	.15
<i>Online contact risks</i>						
Giving personal information to strangers	21 (14.9)	18 (14.2)	3 (21.4)	0.52 (1)	0.47	.06
Sending photos and/or videos to strangers	11 (7.8)	8 (6.3)	3 (21.4)	4.01 (1)	0.045	.17
Being upset after meeting someone known on the internet	3 (2.1)	3 (2.4)	0	0.34 (1)	0.56	.05
<i>Online content risks</i>						
Ways of physically harming oneself	30 (21.3)	21 (16.5)	9 (64.3)	17.16 (1)	< 0.001	.35
Ways of committing suicide	22 (15.6)	15 (11.8)	7 (50)	13.97 (1)	< 0.001	.32
Ways to be very thin	21 (14.9)	15 (11.8)	6 (42.9)	9.59 (1)	0.002	.26
Hate messages against certain individuals	60 (42.6)	51 (40.2)	9 (64.3)	3.00 (1)	0.08	.15
Drug experiences	31 (22.0)	24 (18.9)	7 (50)	7.11 (1)	0.008	.23
Violent images	59 (41.8)	49 (38.6)	10 (71.4)	5.59 (1)	0.02	.20
<i>Online contact and content risks</i>						
Online risks (sum) <i>M(SD)</i>	1.8 (2.0)	1.6 (1.8)	3.9 (2.4)	- 4.26 (139)	< 0.001	1.20
Online risks (at least one)	92 (65.3)	80 (63.0)	12 (85.7)	2.87 (1)	0.09	.14
<i>Suicidal thoughts</i>						
Not at all	127 (90.1)	--	--	--	--	--
A little bit	7 (5)	--	--	--	--	--
Moderately	2 (1.4)	--	--	--	--	--
Quite a bit	4 (2.8)	--	--	--	--	--
Extremely	1 (0.7)	--	--	--	--	--
Present (at least a little bit)	14 (9.9)	--	--	--	--	--
<i>Psychological symptoms</i>						
Body investment <i>M(SD)</i>	15.1 (1.9)	15.36 (1.8)	13.0 (2.0)	4.67 (139)	< 0.001	1.32
Symptoms of depression <i>M(SD)</i>	5.1 (3.8)	4.6 (3.1)	10.3 (5.5)	- 3.81 (13.91)	0.002 ^a	1.28
Problematic internet use <i>M(SD)</i>	36.5 (8.3)	35.6 (7.6)	44.9 (9.9)	- 4.26 (139)	< 0.001	1.20

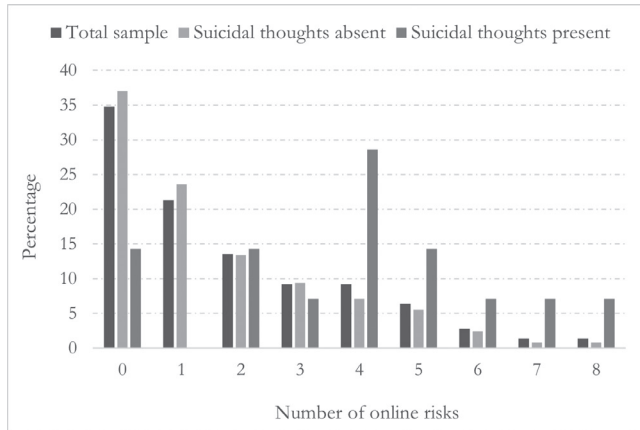
^a Welch homogeneity correction was applied.

Tab. 2. Frequencies of online risks as a function of sex.

	Male n (%)	Female n (%)	t / χ^2 (df)	P	Cohen's d / Cramer's V
<i>Online contact risks</i>					
Giving personal information to strangers	15 (18.3)	6 (10.1)	1.79 (1)	0.18	.11
Sending photos and/or videos to strangers	8 (9.8)	3 (5.1)	1.04 (1)	0.31	.09
Being upset after meeting someone known on the internet	3 (3.7)	0 (0)	2.21 (1)	0.14	.13
<i>Online content risks</i>					
Ways of physically harming oneself	15 (18.3)	15 (25.4)	1.04 (1)	0.31	.09
Ways of committing suicide	13 (15.9)	9 (15.3)	0.01 (1)	0.92	.01
Ways to be very thin	6 (7.3)	15 (25.4)	8.88 (1)	0.003	.25
Hate messages against certain individuals	38 (46.3)	22 (37.3)	1.15 (1)	0.28	.09
Drug experiences	21 (25.6)	10 (17.0)	1.5 (1)	0.22	.10
Violent images	40 (48.8)	19 (32.2)	3.88 (1)	0.049	.17
<i>Online contact and content risks</i>					
Online risks (sum) <i>M(SD)</i>	1.9 (2.0)	1.7 (2.0)	0.77 (139)	0.44	.13
Online risks (at least one)	58 (70.7)	34 (57.6)	2.60 (1)	0.11	.14

violent images and sending photos and/or videos to strangers. The distribution of the number of online risks reported by participants according to suicidal thoughts are reported in Figure 1. Furthermore, students with suicidal ideation showed lower body investment, and higher symptoms of depression and PIU compared to participants without suicidal thoughts.

Fig. 1. Percentage of participants according to number of online risks reported for total sample and absence/presence of suicidal thoughts.



Significant bivariate associations between online risks and suicidal thoughts were further examined using logistic regression models to analyse whether associations persisted after including important covariates such as body investment, symptoms of depression and PIU (Table 3). The analysis showed that exposure to online content on ways of physically harming oneself, committing suicide and experiences of taking drugs were associated with suicidal thoughts even when controlling for covariates. Furthermore, the number of online risks experienced by participants was positively associated with suicidal thoughts. On the contrary, sending photos and/or videos to strangers as well as exposure to content on ways to be very thin and violent content were not associated with suicidal ideation. Finally, the inclusion of sex in the models did not change their results (results not presented in the article).

Discussion

The present study showed that adolescents came across harmful online content such as ways to be very thin (15%), commit

Tab. 3. Results of logistic regression model on associations between online risks and suicidal thoughts while controlling for covariates.

	Dependent variable: presence of suicidal thoughts			
	Standardized estimate	Wald statistic	OR (95% CI)	p
Sending photos and/or videos to strangers	- 0.052	0.03	0.82 (0.07, 9.29)	0.88
Body investment	- 0.884	3.21	0.63 (0.39, 1.04)	0.07
Symptoms of depression	0.665	2.12	1.19 (0.94, 1.51)	0.15
Problematic internet use	0.758	3.61	1.10 (1.00, 1.20)	0.06
Ways of physically harming oneself	0.874	6.45	8.41 (1.63, 43.43)	0.01
Body investment	- 1.190	4.21	0.54 (0.30, 0.97)	0.04
Symptoms of depression	0.544	1.33	1.16 (0.90, 1.48)	0.25
Problematic internet use	0.416	0.89	1.05 (0.95, 1.17)	0.35
Ways of committing suicide	1.054	7.72	18.01 (2.34, 139.05)	0.005
Body investment	- 1.65	6.25	0.43 (0.22, 0.83)	0.01
Symptoms of depression	0.460	1.06	1.13 (0.90, 1.43)	0.30
Problematic internet use	0.399	0.85	1.05 (0.95, 1.16)	0.36
Ways to be very thin	0.286	1.08	2.22 (0.49, 10.01)	0.30
Body investment	- 0.888	3.14	0.63 (0.38, 1.05)	0.08
Symptoms of depression	0.561	1.47	1.16 (0.91, 1.48)	0.23
Problematic internet use	0.728	3.25	1.09 (0.99, 1.20)	0.07
Drug experiences	0.594	3.84	4.17 (1.00, 17.42)	0.05
Body investment	- 0.862	2.63	0.64 (0.38, 1.10)	0.11
Symptoms of depression	0.705	2.35	1.21 (0.95, 1.53)	0.13
Problematic internet use	0.704	3.01	1.09 (0.99, 1.20)	0.08
Violent images	0.686	2.89	4.00 (0.81, 19.77)	0.09
Body investment	- 0.931	3.36	0.62 (0.37, 1.03)	0.07
Symptoms of depression	0.750	2.61	1.22 (0.96, 1.55)	0.11
Problematic internet use	0.631	2.45	1.08 (0.98, 1.19)	0.12
Online risks (sum)	0.810	4.85	1.50 (1.05, 2.16)	0.03
Body investment	- 1.004	3.32	0.60 (0.34, 1.04)	0.07
Symptoms of depression	0.613	1.66	1.18 (0.92, 1.51)	0.20
Problematic internet use	0.448	1.10	1.06 (0.95, 1.17)	0.29

OR: odds ratio. McFadden R² ranged from 0.36 (model including Sending photos and/or videos to strangers) to 0.46 (model including Ways of committing suicide). N= 141.

suicide (16%), hurt oneself (21%), drug experiences (22%), violent images (42%) and/or hate messages (43%) during the last year. Their frequency was higher compared to that reported by Smahel et al. (2020) probably due to the difference in time period considered. Furthermore, adolescents reported that, during the last year, they gave personal information to strangers (15%), they sent their own photos and/or videos to strangers (8%) and they were upset after meeting someone known on the internet (2%). Overall, more than half (65%) of the sample was exposed to online risks confirming that adolescents may come across several risky behaviors on the Internet. This finding raises concerns about the potential negative impact of online exposure to these contents on mental health and well-being of young people, especially considering that they have generally access to and/or receive their own smartphone at an earlier age than that of participants included in the present study (Cerutti et al., 2021). Indeed, young people may be bothered and shocked by online content such as pornography and violence (Livingstone et al., 2014).

Our findings also demonstrated a consistent association between online risks and suicidal thoughts confirming previous studies (Harris et al., 2009; Rodway et al., 2022; Sumner et al., 2021). Exposure to online content on ways of physically harming oneself, committing suicide and experiences of taking drugs was associated with suicidal thoughts even after considering the effect of important covariates such as body investment, depression and PIU that previous research has shown to be associated with suicide and suicidal thoughts (Brausch et al., 2021; Cerutti et al., 2012; Cheng et al., 2018; Cipriano et al., 2020; Osman et al., 2009). In addition, a cumulative effect of online risks on suicidal thoughts was observed, i.e., the higher the number of online risks students were exposed to, the higher the likelihood of reporting suicidal thoughts. The relationship between online risks, suicidal thoughts and suicidality is complex (Memon et al., 2018; Rodway et al., 2022). On the one hand, exposure to content on ways of hurting oneself/committing suicide and participation in online forums on these topics could guarantee some benefits, such as providing online social and emotional support; on the other hand, exposure to this content involves the risk of reinforcing pre-existing behaviours and ideas, for example through the normalization and acceptance of the gesture or with the aim of obtaining the attention of peers (Dyson et al., 2016). The relationship may be better explained by hypothesizing bidirectional longitudinal associations for which suicidal thoughts in vulnerable adolescents with pre-existing mental health difficulties lead to exposure to online risks and, in turn, exposure to online risks may increase psychological distress and suicidal thoughts stimulating suicidal attempts. Our results suggest the potential occurrence of a mediation effect of exposure to online content on ways of physically harming oneself, committing suicide and experiences of taking drugs in the relationship between mental health difficulties and suicidal thoughts. Indeed, the effects of PIU, depression and body investment on suicidal thoughts were attenuated in the adjusted models including online risks. Consequently, exposure to online risks could be a trigger for suicidal thoughts and attempts (e.g., emulating behaviours of others, providing practical knowledge on ways of committing suicide) (Sumner et al., 2021).

The present study is not exempt from limitations that need to be considered when interpreting the findings. First, the cross-sectional design does not allow to shed light on the causal nature of the association between online risks and suicidal thoughts. Second, the small sample size limits the generalizability of the findings. Third, the results are based on data obtained using self-report measures and, thus, may lead to potential bias. Fourth, previous history of suicide was not examined. Previous history of suicide could have influenced both suicidal thoughts and exposure to online content on ways of hurting oneself, despite the role of depressive symptoms and body investment was considered. Longitudinal studies with large sample sizes and clinical populations of adolescents are needed to confirm our findings.

In conclusion, a relevant percentage of the sample reported exposure to online risks. Exposure to online content on ways of physically harming oneself, committing suicide and experiences of taking drugs was associated with suicidal thoughts even after considering the effect of body investment, depression and PIU. Mental health professionals should be aware that specific online experiences are indicative of youth with suicidal thoughts configuring a condition at risk for suicide. If replicated in subsequent longitudinal studies using large samples of participants, these findings may have public health implications for preventing suicide among young people through monitoring exposure to online risks (i.e., ways of physically harming oneself, committing suicide and experiences of taking drugs) and, possibly, a timely implementation of treatment for those exposed to them. The way in which young patients use the Internet needs to be carefully investigated, with the knowledge that online and offline experiences may overlap.

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The authors contributed equally to this manuscript.

Conflict of interest:

The authors declare that they have no competing interests.

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