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Original article

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Psychotic-like experiences interaction with common risk factors for suicidal ideation

Summary

Suicide is a significant global health issue. A number of risk and protective factors have been associated with suicidal ideation, including resilience, social connectedness, adverse childhood experiences and psychotic-like experiences (PLEs).

In this study we aimed at measuring the impact of PLEs on suicidality and at exploring how the presence of PLEs moderates the effect of resilience, social connectedness and adverse childhood experiences on suicidal ideation in a sample of 500 undergraduate students using an on-line survey.

PLEs were strong predictors of suicidality in the whole sample (OR= 5.45, 95%CI [2.62, 11.30]). The effect of resilience, social connectedness and adverse childhood experiences on suicidality was assessed separately for individuals with and without psychotic experience. In individuals without PLEs adverse childhood experiences, poor social connectedness and poor resilience were strongly associated with suicide (OR = 1.87 [1.25, 2.80], OR = 3.68 [2.18, 6.21] and OR = 4.06 [2.37, 6.94] respectively). These associations were weaker in subjects with PLEs (OR = 1.28 [0.76, 2.06], OR = 2.12 [1.13, 3.99] and OR = 2.50 [1.26, 4.94] respectively).

The effect of interpersonal and environmental risk factors for suicide was hampered in presence of PLEs. Psychological implications are discussed.

Key words

Psychotic experiences • Resilience • Suicide • Social connectedness • Adverse childhood experiences

Introduction

Suicide is a significant social and public health problem. According the World Health Organization (WHO), about 800,000 persons die from suicide every year. Deaths from suicide are the highest between 15 and 29 years of age, and suicide is the third most common cause of death, up to the age of 34 years thereafter [1].

The study of risk factors for suicide is a central topic in current mental health research, with the aim of improving the accuracy of the existing predictive models of suicide. Suicidal ideation and suicidal behaviors result from the interplay of distal or predisposing factors (i.e. childhood trauma, genetic factors), developmental or intermediate factors (i.e. coping skills, cognitive biases, subclinical psychopathology, social isolation) and proximal or precipitating risk factors (subclinical psychopathology, full-blown mental illness) [2]. However, no universal model has reached satisfactory predictive power, leaving the question unresolved. A reason for this could be that different risk factors could act through different pathways in different sub-populations.

Mental Illness accounts for the vast majority of suicides and suicide attempts, with approximately 90% of individuals who die by suicide having an identifiable psychiatric disorder prior to death [3]. Psychotic disorders account for a consistent proportion of suicide attempts and deaths by suicide. Schizophrenia is the second most frequent diagnosis preceding inpatient suicide (20%), with a rate twice as high in comparison to outpa-

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tients [4]. Adults with schizophrenia and other psychotic disorders are at heightened risk of suicide. The estimated prevalence of suicides in schizophrenia is 5-14% [5 6], with suicide attempts occurring during the first years of illness in about 10% of patients [7]. The main clinical predictors of suicide include depressive and hallucinatory symptoms [8 9], male sex, high premorbid IQ, feelings of guilt or anxiety, substance abuse, duration of untreated psychosis, number of psychiatric admissions, history of suicide attempts or non-suicidal self-harm [10-13].

Suicidality extends to those with subclinical phenotypes as well, including Psychotic-like Experiences (PLE).

PLEs are hallucinations and delusional ideas associated with a minor interference with global functioning and are most frequently associated with partially intact reality testing. PLEs are relatively common in the general population, with a prevalence of around 7% [14-17], and were initially thought as a specific risk factor for transitioning to a full-blown psychotic disorder. However, in recent years it has become clearer that PLEs represent a risk factor for a wide range of mental disorders and poor mental health outcomes beyond psychotic disorders [18 19]. The early idea that PLEs could be specific risk factors for subsequent psychotic disorders was supported by the communality of genetic [20 21], environmental and also cognitive [22-24] risk factors observed for PLEs and psychotic disorders. Not just psychotic disorders, but also highly prevalent PLEs are strong predictors of suicidality: recent meta-analytic evidence have estimated a pooled OR of 2.4 for suicidal ideation, 3.15 for subsequent suicide attempt and 4.4 for death by suicide [25]. The impact of PLEs on suicidality is robust to adjustment for general psychopathology [26 27], suggesting that PLEs convey a specific risk on suicide, possibly independent of other common risk factors for suicide, such early childhood adversity and poor social connectedness.

Among others, stressful life events and social connectedness are often called into question as potent risk factors for suicide.

The association between suicidality and stressful life events, especially when occurring early in life, has been well established [28]. Certain types of early adversity, including sexual abuse, physical abuse, harsh domestic environment, have been shown to directly increase the risk of suicide attempts for both men and women [29].

Research has also identified loneliness and lack of social connectedness [30 31] as key predictors of suicide. Social connectedness is often included as a sub-construct of the widely-defined "resilience" construct. It is debated if social connectedness is related to the objective features of one's social network readily available in case of need, or rather to one's abilities to mobilize those social resources.

Social Connectedness is included in the wider construct of resilience [32]. As a whole, resilience has been shown to be a very strong protective factor against suicidal ideation [33].

The aim of the present study is to evaluate the association between PLEs as assessed by a self-report instrument and suicidal ideation. Furthermore, the effect that PLEs have in shaping the response to common risk factors for suicidal ideation will be taken into account.

Methods

Sample

For this study, a sample of 500 university students from central Italy was recruited. Students were contacted via e-mail and invited to participate to an online questionnaire. Two-thousand-six-hundred sixty-nine students visited the survey website. Data collection was automatically closed when 500 subjects had completed the questionnaire.

Measures

Prodromal Questionnaire-16, Italian version

The Italian version of the Prodromal Questionnaire-16 (iPQ-16) [34] was used to assess the presence of PLEs. iPQ-16 is a 16-itmes self-report instrument that explores the presence/absence of 16 PLEs, including perceptual aberrations/hallucinations, unusual thought content/delusions, and two negative symptoms, and their associated psychological distress score on a 4-point Likert scale ranging from 0 to 48. Although the iPQ-16 was originally designed as a screening tool for individuals at ultra-high risk (UHR) for psychosis in help-seeking populations, several studies have used this instrument in the general population as a measure of PLEs [35-38]. We used the distress scale as recommended for non-help-seeking populations by Savill et al. [39], using a cut-off of ≥ 11 as recommended by Pelizza et al. [40] according to the Italian field test.

Social Connectedness Scale – revised

Social connectedness was assessed using the Italian version of the Social Connectedness Scale – revised (SCS-R) [41]. The SCS-R is a 20-item questionnaire on a 6-point Likert scale (1 = strongly disagree to 6 = strongly agree) assessing experiences of closeness in interpersonal contexts, as well as problems establishing and maintaining a sense of closeness. Sample items include "I don't feel I participate with anyone or any group" and "I am in tune with the world." Authors consider a mean item score equal or greater than 3.5 (slightly agree to strongly agree) as indicating a greater tendency to feel socially connected. SCS-R has good psychometric properties, with average interitem correlation of 0.66 and alpha = 0.92 in our sample.

Risky Family Questionnaire

Childhood Adversity was assessed using the Risky Family Questionnaire (RFQ), a 13-items retrospective self-report questionnaire on a 5-point Likert scale derived from the Adverse Childhood Experiences questionnaire (ACE-q) by Felitti et al. [28]. RFQ investigates the exposure to harsh parenting during childhood. RFQ shows an average interitem correlation of 0,39 and an alpha = 0.88 in our sample. For simplicity of exposure, RFQ scores were standardized in the following analysis.

Suicidal ideation

Suicidal ideation was assessed using the four items relative to suicide included in the Clinical Outcomes in Routine Evaluation-Outcome Measure, Italian version (CORE-OM) [42]. The CORE-OM in its original formulation included 6 risk items, of which two items refer to risk of violence and aggression and four items refer to suicidal ideation, on a 6-point Likert scale. For this study, we averaged the score on the 4 suicide items. Suicidal ideation was coded as present in a binary variable if mean score of CORE-OM suicide items was ≥ 1.

Potential confounders

Confounders included in the analysis were gender, age, self-report substance use, self-report socio-economic status, family history of mental illness.

Analysis

The association between PLEs and Suicidal ideation was assessed using a logistic regression model in two steps: first, the unadjusted Odd Ratios (ORs) between the presence of PLEs and suicidal ideation were estimated, using both the endorsed and the distress scores modeled as continues standardized variable and a categorical variable based on the distress score with cut-off ≥ 11. In a second model, adjustment for selected potential confounders was introduced.

The association of RFQ and SCS-R with suicidal ideation was assessed using logistic regression. In a first wave of analysis, separate regression models were performed separately for RFQ and SCS-R, introducing in a second model the potential confounders. In a second wave on analysis, the regression models were repeated separately for individuals with and without PLEs.

Results

Descriptives

Characteristics of the sample are reported in Table I. Of the total sample, 6 participants were excluded from the analysis because of missing data on one of the variables of interest. Of the 494 individuals included in subsequent analysis, 352 (71.26%) were female. Mean age was 25.52 years (SD = 4.86). Twenty-four participants (4.86%) disclosed alcohol or substance abuse, 143 (28.74%), 343 (68.42%) and 14 (2.83%) participants disclosed respectively low, mid and high family income. Seventy-five (15.18%) participants reported family history of mental disorders.

TABLE I. *Characteristics of the sample.*

Variable	Total sample N (%) / mean (SD)
N	494
Gender	
Female	352 (71.26%)
Male	142 (28.74%)
Age	25.52 (5.85)
Alcohol/drug abuse	24 (4.86%)
Income	
Low	143 (28.60)
Mid	343 (68.60)
High	14 (2.80)
Family history of mental illness	75 (15.18%)
iPQ-16	
Mean Endorsed Score	4.02 (3.06)
Mean Distress Score	5.01 (5.24)
N ≥ 11 Distress Score	73 (14.78%)

iPQ-16: Prodromal questionnaire, Italian version.

Association between PLEs and suicidal ideation

Results from logisitc regression of different PQ scores on Suicidal Ideation are reported in Table II. In our sample, all of the three different PQ scores were strongly associated with suicidal ideation, with the Endorsed standardized score having OR = 1.92 [1.41, 2.60], Distress standardized score OR = 2.10 [1.59, 2.77] and Categorical score OR = 5.45 [2.62, 11.30]. Adjustment for selected confounders did not alter these results substantially, with Endorsed standardized, Distress Standardized and categorical score having respectively OR = 2.02 [1.45, 2.82], OR =2.29 [1.69, 3.12] and OR = 5.95 [2.68, 13.22].

Association between risk factors and suicidal ideation

Results from the second wave of analysis are reported in Table III and in Figure 1. RFQ, SCS-R and RSA displayed moderate to strong association with suicidal ideation in the total sample, respectively OR = 1.84 [1.37,2.47], OR = 3.41, [2.30,5.04] and OR = 3.83 [2.54, 5.78]. These association did not vary substantially after adjusting for potential confounders. In the subsample without PLEs (n = 426), association of RFQ, SCS-R

TABLE II. *Logistic regression results for different PQ scores on suicidal ideation.*

	Unadjusted (n = 500) OR [95% CI]	Adjusted [a] (n = 498) OR [95% CI]
PQ16-symptom	1.92*** [1.41, 2.60]	2.02*** [1.45, 2.82]
PQ16-distress	2.10*** [1.59, 2.77]	2.29*** [1.69, 3.12]
PQ16 distress ≥ 11	5.45*** [2.62, 11.30]	5.95*** [2.68, 13.22]

*[a] Adjusted by age, gender drug abuse family history of mental illness, familial income. PQ: Prodromal Questionnaire; OR: Odd Ratio; 95% CI: 95% Confidence Interval. *p < 0.05; **p < 0.005; ***p < 0.001.*

TABLE III. *Results from Logistic Regression of RFQ, SCS-R and RSA on suicidal ideation. Values indicate Odd Ratios with 95% confidence intervals.*

	Total sample (n = 498)		PQ16-symptom < 11 (n = 426)		PQ16-symptom ≥ 11 (n = 74)	
	Unadjusted	Adjusted [a]	Unadjusted	Adjusted [a]	Unadjusted	Adjusted [a]
RFQ	1.84*** [1.37,2.47]	1.94*** [1.40, 2.68]	1.87*** [1.25, 2.80]	1.96*** [1.25, 3.08]	1.28 [0.76, 2.06]	1.40 [0.84, 2,36]
SCS-R	3.41*** [2.30,5.04]	3.37*** [2.25, 5.04]	3.68*** [2.18, 6.21]	3.40*** [2.01, 5.76]	2.12* [1.13, 3.99]	2.42* [1.16, 5.11]
RSA	3.83*** [2.54, 5.78]	4.37*** [2.79, 6.85]	4.06*** [2.37, 6.94]	4.42*** [2.48, 7.89]	2.50** [1.26, 4.94]	3.28** [1.43, 7.51]

*[a] Adjusted by age, gender drug abuse family history of mental illness, familial income. PQ: Prodromal Questionnaire; RFQ: Risky Family Questionnaire; SCS-R Social connectedness scale revised; RSA: Resilience Scale for Adults. RFQ score is standardized; RSA and SCS-R scores are standardized and reversed. *p < 0.05; **p < 0.005; ***p < 0.001.*

and RSA with suicidal ideation did not vary significantly compared to the total sample, with unadjusted OR respectively 1.87 [1.25, 2.80] and 3.68 [2.18, 6.21]. In the subsample displaying PLEs (n = 74) no significant association was detected between RFQ and suicidal ideation (OR = 1,25, [0.76, 2.06]), while SCS-R effect on suicidality was conserved (OR=2.12 [1.13, 3.99]).

Discussion

In this paper we assess the relationship between self-reported PLEs and suicidal ideation in a relatively large sample of university students. Furthermore, we assessed the role of resilience, social connectedness and early life adversities on suicidal ideation separately for individuals with and without PLEs.

The main finding is that PLEs (as assessed using both symptom and distress score of the PQ-16, as well as using a categorical classification based on the symptom score with a cut-off of ≥ 11) are strong predictors of suicidal ideation. This result is in line with a large body of evidence on the role of PLEs in predicting suicidality in both clinical and non-clinical populations [25,26,43].

The second finding of this study is that, while a history of adverse childhood experiences displays a very strong risk effect on suicidal ideation in the subsample without PLEs, this effect is significantly reduced in individuals with PLEs. Similarly, although to a lesser extent, poor social connectedness and poor resilience display a smaller effect on suicidal ideation in individuals with PLEs compared to individuals without PLEs. As high resilience and social connectedness are frequently considered protective factors against suicide, our results need to be confirmed as resilience and social connectedness are less protective against suicidal ideation in individuals with PLEs.

Taken together, these results suggest that PLEs represent a strong risk factor for suicidal ideation in a non-help-seeking population. Furthermore, the presence of PLEs hampers the effects psychological and environmental risk and protective factors for suicide. In other words, PLEs moderate the effect of resilience, social connectedness and early life adversity on suicidal ideation. This could sound counterintuitive, considering previous reports of a strong association for example of resilience with depression in patients with schizophrenia [44]. However, further studies are needed in order to assess social anhedonia in individuals with and without PLEs and its relationship with resilience.

The moderation of PLEs on early life adversities in conveying risk for suicidal ideation could be explained in the light of the vulnerability-stress model. This model assumes that the presence of PLEs represents the behavioral manifestation of a genetic and/or environmental liability to psychosis [45]. The progression through the psychotic continuum is promoted by stress exposure striking an already genetically vulnerable individual. It

could be speculated that individuals with PLEs in our sample have a higher vulnerability that would account for a minor intensity of stressful events required to activate suicidal ideation.

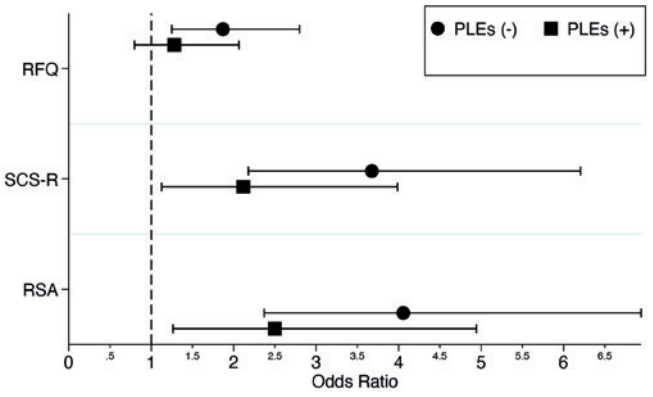
Concerning protective factors, both resilience and social connectedness are considered strong protective factors for suicidal ideation [30 31 33 46]. Although the mechanisms by which resilience and social connectedness would protect against suicidal ideation are still debated, a buffering-hypothesis is the most credited in the literature so far [46].

In our study, we observed an attenuation of the protective effect against suicidal ideation of resilience and social connectedness in individuals with PLEs. Both Social connectedness and resilience encompass an interpersonal dimension. The reduction of their protective effect may be due to a reduced sensitivity to social and interpersonal cues in individuals with PLEs. One reason for this could be Schizoid and Schizotypal traits, common in individuals with PLEs [47 48]. Schizotypy is typically associated with deficits in interpersonal functioning, and with a certain degree of indifference towards interpersonal cues, as captured by constructs like Asociality and Social Anhedonia. Asociality and Social Anhedonia are two constructs that belong to the negative symptoms of psychoses [49], although they are more often considered transdiagnostic features [50] and common traits in the general population. Social anhedonia has been associated with theory of mind and social functioning deficits in individuals with schizophrenia [51].

Under this perspective, we could speculate that for individuals along the psychotic spectrum, putatively showing a diminished interest in socially salient stimuli, the presence of social protective factors could play a limited role in defending from the effects of stressful events on suicidal ideation.

Limitations

This study presents some limitations. Firstly, all psychometric measures were self-report questionnaires, conveying a risk of overestimation of both early life adversities and PLEs. In fact, the prevalence of individuals displaying PLEs in our sample is considerably larger than expected. Secondly, an on-line data collection on a voluntary basis may involve self-selection bias. Thirdly, the present study has been carried out of a student population, that could hamper the generalizability of the results.



Relative Odd Ratios (with 95% Confidence Intervals) of common risk factors for Suicidal Ideation separately for individuals without (round markers) and with (square markers) PLEs, respectively "PLEs (-)" and "PLEs (+)". PLEs: Psychotic Like Experiences; RFQ: Risky Family Questionnaire; SCS-R: Social Connectedness Scale – Revised; RSA: Resilience scale for Adults. RFQ score is standardized; RSA and SCS-R scores are standardized and reversed.

FIGURE 1. *Odd Ratios with 95% confidence intervals for suicidal ideation.*

Conclusions

Individuals experiencing PLEs are at heightened risk for suicide. Our results suggest, however, that common risk factors for suicide, such as poor social connectedness, lower resilience and childhood adversities, have a weaker association with suicidality in individuals with PLEs compared to individuals without PLEs.

Conflicts of interest

The Authors declare to have no conflict of interest.

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