







Article

Suicidal Behaviour and Stressful Life Events: The Mediating Role of the Impulsivity-Aggression-Hostility Triad Through Psychological Autopsy

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ABSTRACT

Background: Stressful life events (SLEs), impulsivity, aggression, and hostility are known risk factors for suicide. The existence of an “I-A-H Triad” (composed of impulsiveness, aggressiveness and hostility) is proposed as a mediating factor between SLEs and suicide. **Method:** Data on 399 deceased people (274 from suicide, 125 from other causes) were collected through psychological autopsy. The Paul Ramsey Life Experience Scale (to collect SLE history), the Barrat Impulsivity Scale (BIS-11) and the Buss-Durkee Hostility Inventory (BDHI) were applied, using versions adapted for psychological autopsy. **Results:** Comparative analysis of the two groups showed significant differences in the variables of interest (SLE: $t = 7.280$; BDHI: $t = 4.201$; BIS-11: $t = 3.812$; I-A-H Triad: $t = 4.84$). Mediation analysis confirmed the role of the I-A-H Triad in mediation of the presence of SLEs and the type of death. **Conclusions:** High levels of impulsivity, aggression, and hostility increase the risk of suicide when a person is faced with SLEs.

Conducta Suicida y Acontecimientos Vitales Estresantes: el Papel Mediador de la Tríada Impulsividad-Agresividad-Hostilidad Mediante Autopsia Psicológica

RESUMEN

Antecedentes: Los acontecimientos vitales estresantes (AVE), la impulsividad, agresividad y hostilidad son conocidos factores de riesgo para el suicidio. Se propone la existencia de una “Tríada I-A-H” (compuesta por impulsividad, agresividad y hostilidad) como factor mediador entre los AVE y la muerte por suicidio. **Método:** datos de 399 personas fallecidas (274 por suicidio, 125 por otras causas) fueron recogidos mediante autopsia psicológica. Se aplicaron versiones adaptadas para autopsia psicológica de las escalas Paul Ramsey Life Experience Scale para recoger historia de AVE, la Escala de impulsividad de Barrat (BIS-11) y la Buss-Durkee Hostility Inventory (BDHI). **Resultados:** Los análisis de comparación entre los dos grupos mostraron diferencias significativas en las variables de interés (AVE: $t = 7,280$; BDHI: $t = 4,201$; BIS-11: $t = 3,812$; Tríada I-A-H: $t = 4,84$). Los análisis de mediación confirmaron el papel mediador de la “tríada I-A-H” entre la presencia de AVE y el tipo de fallecimiento. **Conclusiones:** Elevados niveles de impulsividad, agresividad y hostilidad aumentan el riesgo de suicidio ante AVE.

Palabras clave:

Suicidio
Hostilidad
Agresividad
Impulsividad
Autopsia psicológica

Suicidal behaviour is a serious social and public health problem. However, political, social and healthcare responses are often hampered by stigma and a reluctance to address the problem (Al-Halabi & Fonseca-Pedrero, 2021). The World Health Organization (WHO) warns that each year approximately 700,000 people around the world take their own lives intentionally (World Health Organization, 2023). In Spain, the National Institute of Statistics recorded 4,227 deaths by suicide in 2022 (Instituto Nacional de Estadística, [National Institute of Statistics], January 31, 2024). Added to this alarming data are other manifestations of suicidal behaviour, such as suicidal ideation or attempting suicide, which are much more frequent in the population and also generate suffering (Jobes & Joiner, 2019). Consequently, the different aspects of suicidal behaviour have long been a subject of academic study (Franklin et al., 2017). However, the existential and social nature of suicide makes it difficult to reduce it to discrete elements (Rudd, 2006). For this reason, new approaches to the study of suicide propose a change of focus, namely a shift from searching for the causes of suicide to understanding the reasons for it, in order to develop effective prevention strategies (Al-Halabi & Fonseca-Pedrero, 2023).

From this perspective, Joiner's Interpersonal Theory of Suicide (2007) identifies a series of dynamic variables of an interpersonal-contextual nature that can make a person more likely to manifest suicidal behaviour (Ma et al., 2016). One of these variables is the individual's acquired capacity for suicidal behaviour, which determines the transition from suicidal ideation to attempting suicide (Joiner, 2007). The term acquired capacity refers to the habituation of a person to pain (either physical or psychological), fear, and death, which takes place through the person's exposure to painful and provocative life experiences (Klonsky & May, 2015). Thus, stressful life events (SLEs), together with certain individual variables, clearly play a fundamental role in the acquisition of the capacity for suicide. As Joiner (2007) explains, variables such as impulsivity, aggressiveness, and hostility are associated with greater probability that a person will engage in harmful and provocative behaviours throughout their life (such as physical fights, drug use, etc.), which can facilitate the acquisition of greater capacity for suicidal behaviour.

The constructs of impulsivity, aggressiveness, and hostility are usually studied jointly or interchangeably when considering their relationship with suicide, since they share common aspects and are highly correlated (Gvion & Levi-Belz, 2018). Impulsivity is usually related to difficulties with self-regulation (Linehan, 1993; O'Connor & Kirtley, 2018), while aggression and hostility are interpreted as manifestations of anger, which is given a more externalized shape by aggressiveness and a more internalized shape by hostility. The relationship of impulsivity, aggression, and hostility with suicidal behaviour is well documented (e.g., Gvion & Apter, 2011; Kaurin et al., 2023; Martin et al., 2020; Mathes et al., 2020; Yang et al., 2022). The findings of existing research point to the presence of higher levels of hostility and aggression among people who have made more dangerous suicide attempts than among people with suicidal ideation (Brokke et al., 2022). The results of research involving people who have made high-lethality suicide attempts (Gvion et al., 2014) further indicate that although these constructs do not necessarily explain the severity of the original attempt, they do increase the likelihood that the person will attempt a more lethal form of suicide in the future. In the study of these variables and their relationship with SLEs, the

data suggest that impulsivity, aggressiveness, and hostility play a role in suicidal behaviour (Gvion & Levi-Belz, 2018); exploring what type of relationship exists between these factors, and what its role is, could improve suicide prevention.

Research on people who died by suicide provides information that complements the information found by studying people who attempted suicide. Consequently, the use of psychological autopsy (PA) is expanding as it is a valuable tool for the study of suicide in cases for which first-person information is not available (Bhushan et al., 2023; Favril et al., 2022). PA involves the systematic and exhaustive exploration of a deceased person's life to determine the psychological, social, and environmental factors that contributed to their suicide (Isometsä, 2001).

In view of the state of the art, and as part of a broader research project using PA to examine cases of deaths by suicide, the main objective of this paper is to explore the role of impulsivity, aggressiveness, and hostility (the I-A-H Triad) in the already clearly-established relationship between SLEs and suicide (Al-Halabi & Fonseca-Pedrero, 2023). Furthermore, as a secondary objective, we aim to determine the predictive capacity of the I-A-H Triad for death by suicide. Based on the review of relevant literature, we hypothesize that the I-A-H Triad plays a mediating role in the relationship between SLE and suicide, providing evidence for the mechanisms on which the acquired capacity for suicide could be built. On the other hand, the predictive power of the I-A-H Triad in terms of suicide is expected to be significant, although not very high.

Method

Participants

From 2006 to 2019, data on 662 deceased people were collected (487 people who died by suicide and 175 people who died from sudden non-suicidal deaths, both natural and accidental) from the province of Seville, the population of which was 1,942,389 on January 1, 2023 (Instituto Nacional de Estadística, [National Institute of Statistics], June 20, 2023). At the time of each medico-legal autopsy, permission was requested from the families present to involve the deceased in the investigation. Deaths that occurred in prison or police custody were excluded. From the total sample, the 399 cases for which all the information on the variables of interest for the present study had been gathered were selected. When comparing this group with the excluded cases, no significant differences were found in any socio-demographic variables, except for marital status. There were more married individuals in the group included in the study than in the group excluded from the study due to incomplete information.

The final sample comprised 399 people (290 men, 72.7%) aged between 15 and 94 years ($M = 54.7$, $SD = 19.2$). They were classified into two groups: 274 people (68.7%) who had died by suicide, and 125 people (31.3%) who had died by sudden non-suicidal deaths (natural or accidental).

Instruments

Framed within a broader interview (Giner et al., 2013), the following scales were used, employing versions adapted for PA:

- The Paul Ramsey Life Experiences Scale (Lumry, 1978). This is a semi-structured interview technique that facilitates the collection of information on six categories of SLE (marital, interpersonal, work, vital, health and other types). For each category, it is recorded whether the event happened throughout the individual's life and how many times, and the level of severity is quantified from 1 (*none*) to 7 (*catastrophic*). This scale allows us to extract a final composite measure of the severity of the stressors. It has been previously used with a Spanish-speaking population (Oquendo et al., 2014). In this study, Cronbach's alpha was .663, indicating internal consistency.
- The Barrat Impulsivity Scale (BIS-11) (Barratt, 1965). This is a questionnaire with 30 response items on a 4-point Likert-type scale (from 0, "*rarely or never*", to 3, "*always or almost always*") composed of three subscales that evaluate cognitive impulsivity, motor impulsivity and lack of planning. Adaptation to a Spanish population shows that the scale retains adequate psychometric properties (Salinas et al., 2018). In the present study, the internal consistency coefficient was found to be adequate ($\alpha = .896$).
- The Buss-Durkee Hostility Inventory (BDHI) (Buss and Perry, 1992): an inventory of 29 response items on a 5-point Likert-type scale (from 1, "*totally disagree*", to 5, "*totally agree*") that evaluates, through four subscales, physical aggression, verbal aggression, anger, and hostility. The Spanish version of the inventory has shown good psychometric properties (Andreu et al., 2002). In this study, the internal consistency coefficient was found to be satisfactory ($\alpha = .955$).

Data were collected on sex, age, marital status, race/ethnicity, educational level, number of children, mental health history, suicide history, type of death (suicide vs. other causes) and method of suicide used.

Procedure

The PAs were carried out approximately one year after death ($M = 350.8$ days; $SD = 19.8$ days), prioritizing a time when the family was willing to conduct the interview. The interviews took place in person in an office at the Medicine School of the University of Seville or in the family's home, according to their wishes. As many interviews as necessary were planned to complete the PA of each case ($M = 1.65$; $SD = 0.83$). All interviews were followed by an interdisciplinary consensus meeting. The interviewers were two psychiatrists and two psychologists trained by the main researcher. The training consisted of participating as a listener in five interviews directed by the main researcher, followed by carrying out another five interviews under supervision (de la Vega Sánchez et al., 2020).

This study was approved by the ethics committee of the University of Seville on January 5, 2008 (ESP 20080105) and was carried out in accordance with the recommendations of the Declaration of Helsinki.

Data Analysis

First, a descriptive analysis of the sample and the measures used was carried out, and a comparative analysis of types of death was performed using χ^2 and Student's *t*-tests. The tests were complemented by a study of typed residuals in cases where χ^2 was

significant. The variable type of death was dichotomized according to the following: 1 (death by suicide) and 2 (sudden non-suicidal death). No imputation of values was performed, since the final sample was composed of cases for which complete information was available.

The I-A-H Triad index was then composed. The Pearson correlation matrix between the candidate variables was analysed, to compose the I-A-H Triad; that is, the index was based on the scores of the BDHI and BIS-11 subscales and built using principal components analysis (PCA). To this end, it was proven that the number of cases (399) and the number of variables (four) were both appropriate (Ferrando & Anguiano-Carrasco, 2010). PCA was chosen since it is the recommended method when the aim is to reduce the number of variables and all the variance in the observed data is to be analysed (Ferrando & Anguiano-Carrasco, 2010). It was found that the data were adequate to perform the PCA: Bartlett's analysis of sphericity was significant ($\chi^2_{(3)} = 616.365$; $p < .001$), while the Kaiser-Meyer-Olkin (KMO) sampling adequacy index was 0.788. This value indicates an acceptable correlation matrix according to Kaiser (1970) criteria.

In order to determine the dimensionality of the set of variables, a parallel analysis was carried out. This showed that the measures were grouped into a single component explaining 66.7% of the accumulated variance. The subscales of the BDHI (anger, physical aggression and hostility) and the BIS (motor impulsivity) presented loadings of .728, .842, .846, and .776, respectively, with very satisfactory evidence of total internal consistency ($\alpha = .827$) and the consistency of each subscale (BDHI-anger, $\alpha = .918$; BDHI-physical aggression, $\alpha = .954$; BDHI-hostility, $\alpha = .838$; and BIS-motor impulsivity, $\alpha = .841$). The obtained one-component solution was subjected to confirmatory factor analysis (CFA). To this end, we worked with the unweighted least squares (ULS) estimation method, which allows matrices to be factored without the need to make distributional assumptions (Ferrando & Lorenzo-Seva, 2017). The results showed a very satisfactory fit ($\chi^2 = 4.584$, $p = .101$; RMSEA = 0.057 [95% CI: 0.00–0.128], CFI = 0.996, TLI = 0.987). Finally, factor scores were obtained using the regression method, and were used as a summary measure of the I-A-H Triad. To check the goodness of fit, the following indices were obtained: Comparative Fit Index (CFI), Tucker-Lewis Index (TLI), Root Mean Square Error of Approximation (RMSEA) and Standardized Root Mean-Square (SRMR). The values of $CFI \geq 0.95$, $TLI \geq 0.95$, $RMSEA \leq 0.06$ and $SRMR \leq 0.08$ can be considered indicators of good model fit according to Hu and Bentler (1999).

Once the I-A-H Triad variable was constructed, mediation analysis was carried out using bootstrapping, in which the dependent variable (DV) was the type of death, the independent variable (IV) was the presence of SLEs, and the I-A-H Triad was proposed as a mediating variable. Standard methods that require the fulfilment of four criteria (Baron and Kenny, 1986) were followed: (1) the IV must correlate with the DV; (2) the IV must correlate with the proposed mediator; (3) the proposed mediator should correlate with the DV, controlling for the IV, and (4) once all three conditions are met, the correlation between the IV and the DV should decrease with the inclusion of the mediator in the model. Bootstrapping is a non-parametric approach used to test hypotheses, estimate effect sizes and construct confidence intervals without making assumptions about the shape of the distribution (normality, for example), which is necessary in classical parametric methods (Ledesma, 2008). It is

conducted by taking a large number of samples with replacement of size N (where N is the size of the original sample) (Preacher & Hayes, 2004). This model was tested with a study of indirect effects and, likewise, a mediation index moderated by age and sex was calculated (Hayes, 2015).

Finally, Pearson and point-biserial correlation analysis, when applicable, were carried out between the variables of interest. Regression analysis of the I-A-H Triad variable on the type of death was also carried out.

Cohen's (1992) criteria were followed during analysis of the effect size of the correlations and analysis of differences. All analyses were carried out using the SPSS 20 statistical package, into which the PROCESS macro for SPSS was installed to study the mediation model through bootstrapping, with 5,000 iterations of the sample (Hayes, 2015). This model was tested by studying indirect effects through the same macro. The JAMOVI program (Elosua Oliden & Egaña, 2020) was used for confirmatory factor analysis. The significance value for all analyses was set to $p < .05$.

Results

Descriptives

Descriptions of the socio-demographic variables are shown in Table 1. Amongst the final sample, 99.5% of the people were classified as "Caucasian", and it was reported that 42.9% were married, 43.1% had two or three children, and 64.1% had completed primary or secondary education.

The most frequently reported SLEs were those related to health (72.5%), followed by marital problems (35.2%) and other interpersonal problems (38.9%). For 59.3% of the participants, antecedents of mental health problems were reported; the most frequent were depression (26.7%) and substance abuse (11.4%). For 59.7% of the participants, a history of suicide attempts was reported. The most frequently reported method of suicide was hanging (50%), followed by falling from a height (19.3%).

Table 1
Sociodemographic Characteristics of the Sample, Categorized by Type of Death

	Dead by Suicide <i>n</i> (%)	Non-Suicidal Death <i>n</i> (%)	Total <i>N</i> (%)	<i>t</i>	DF	<i>p</i> -value of <i>t</i> Student's test	X^2	<i>p</i> -value of X^2 Test
Sample	274 (68.7)	125 (31.3)	399 (100%)					
Average Age (<i>SD</i>)(Range: 15-94 Years)	52.9(19.15)	58.9(18.77)	54.8 (19.2)	-2.910	397	.004*		
Number of children				-1.119	396	.264		
0	84 (30.76)	31 (24.8)	115 (28.9)					
1	34 (12.45)	14 (11.2)	48 (12.1)					
2	66 (24.17)	37 (29.6)	103 (25.9)					
3	48 (17.58)	21 (16.8)	69 (17.3)					
4	24 (8.69)	12 (9.6)	36 (9.0)					
5	11 (4.02)	7 (5.6)	18 (4.5)					
>5	6 (2.19)	3 (2.4)	9 (2.3)					
Gender					1		0.201	.654
Male	201 (73.35)	89 (71.2)	290 (72.7)					
Female	73 (26.64)	36 (28.8)	109 (27.3)					
Ethnicity/Race					2		0.917	.632
Caucasian	272 (99.3)	125 (100)	397 (99.5)					
Latin	1 (0.3)	0 (0)	1 (0.3)					
Asian	0 (0)	0 (0)	0 (0)					
Roma	1 (0.3)	0 (0)	1 (0.3)					
Black	0 (0)	0 (0)	1 (0)					
Other	0 (0)	0 (0)	0 (0)					
Civil Status					8		12.265	.140
Single	77 (28.1)	31 (24.8)	108 (27.1)					
Married	115 (41.97)	56 (44.8)	171 (42.9)					
Separate	26 (9.48)	8 (6.4)	34 (8.5)					
Divorced	14 (5.1)	3 (2.4)	17 (4.3)					
Widower	33 (12.04)	27 (21.6)	60 (15)					
Single with partner	2 (0.7)	0	2 (0.5)					
Married but not co-habiting	2 (0.7)	0	2 (0.5)					
Separated, living with partner	4 (1.4)	0	4 (1)					
Widower, living with partner	1 (0.3)	0	1(0.3)					
Educational Level					10		6.389	.782
Illiterate	14 (5.14)	5 (4.03)	19 (4.8)					
Can read and write	60 (22.05)	34 (27.41)	94 (27.7)					

Table 1
Sociodemographic Characteristics of the Sample, Categorized by Type of Death (Continued)

Schooling up to 10 years	103 (37.86)	38 (30.64)	141 (35.6)			
Schooling up to 16 years	26 (9.55)	13 (10.48)	39 (9.8)			
Schooling up to 18 years	12 (4.41)	6 (4.83)	18 (4.5)			
Higher National Diploma	26 (9.55)	9 (7.25)	35 (8.8)			
Bachelor's Degree	10 (3.67)	5 (4.03)	15 (3.8)			
University Degree	15 (5.51)	10 (8.06)	25 (6.3)			
PhD	1 (0.3)	2 (1.61)	3 (0.8)			
Not available	4 (1.4)	1 (0.8)	5 (1.3)			
Not applicable	1 (0.3)	1 (0.8)	2 (0.5)			
Mental Health History				13	47.219	<.001**
Dementia	2 (0.7)	2 (1.6)	4 (1)			
Drug use	37 (13.5)	7 (5)	44 (11.4)			
Psychosis	3 (0.1)	0 (0)	3 (0.8)			
Schizophrenia	10 (3.6)	6 (4.8)	16 (4.1)			
Mania	2 (0.7)	2 (1.6)	4 (1)			
Depression	85 (31)	18 (14.4)	103 (26.7)			
Panic attack	2 (0.7)	0 (0)	2 (0.5)			
Anxiety disorder	12 (4.3)	5 (4)	17 (4.4)			
Personality disorder	1 (0.3)	1 (0.8)	2 (0.5)			
Other	11 (0.4)	4 (3.2)	15 (3.9)			
Not applicable	83 (30)	62 (49.6)	145 (36.3)			
Suicide History				3	104.998	<.001**
No	62 (22.6)	94 (75.2)	156 (39.3)			
Yes	209 (76.2)	28 (22.4)	237 (59.7)			
Lost	3 (1)	3 (2)	6 (1.5)			
SLE (presence)						
Spousal	112 (40.8)	24 (19.2)	136 (35.2)	1	13.176	<.001**
Interpersonal	112 (40.8)	39 (31.2)	151 (38.9)	1	1.505	0.220
Labour	77 (28.1)	18 (14.4)	95 (24.7)	1	6.005	0.014*
Vital	170 (62)	101 (80.8)	115 (29.8)	1	28.080	<.001**
Health	64 (23.3)	39 (31.2)	271 (72.5)	1	3.380	0.066
Others	206 (75.1)	103 (82.4)	51 (14.2)	1	9.647	0.002*
Suicide Method						
Hanging	138 (50)					
Cutting	5 (1.8)					
Stabbing	3 (1)					
Medication intake	24 (8.7)					
Poison intake	11 (4)					
Gas inhalation	4 (1.4)					
Firearm	14 (5.1)					
Run over	3 (1)					
Falling from a height	53 (19.3)					
Immersion	8 (2.9)					
Immolation	4 (1.4)					
Suffocation	5 (1.8)					
Mixed (medication&other)	1 (0.3)					
Other	1 (0.3)					

Note. SD (Standard Deviation); DF (Degrees of Freedom); SLE (Stressful Life Events)

* Significant for $p < 0.05$, ** Significant for $p < 0.001$

Comparative Analysis

Comparison by sex, race, marital status, number of children and educational level did not show significant differences according to the type of death. There were significant differences depending on age ($t = -2.910$, $p = .004$); in the score on the SLE scale ($t = 7.280$,

$p < .001$, with a greater presence of marital, work-related, and vital SLE in the group of people who died by suicide); in type of mental health history (with a higher prevalence of previous diagnoses of depression and substance abuse in the group of people who died by suicide); and in history of previous suicide attempts (which were more prevalent in the group of people who died by suicide).

Regarding the variables under study, Table 2 provides the descriptive data for BDHI in the Physical Aggression (BDHI-PA), Anger (BDHI-A) and Hostility (BDHI-H) subscales, and the motor-impulsivity subscale, BIS-11-MI. The mean scores were moderate for all variables for both groups, with the exceptions of BDHI-PA and BIS-11-MI in the group of those who died by suicide, for which the mean scores were high. All cases showed significant intergroup differences (BDHI-PA: $t(397) = 3.728, p = .001, d = 0.402, 95\% \text{ CI } [0.188 - 0.616]$; BDHI-A: $t(397) = 3.416, p = .001, d = 0.369, 95\% \text{ CI } [0.15 - 0.582]$; BDHI-H: $t(397) = 4.481, p = .001, d = 0.484, 95\% \text{ CI } [0.268 - 0.699]$; BIS-11-MI: $t(397) = 4.115, p = .001, d = 0.444, 95\% \text{ CI } [0.229 - 0.659]$). Likewise, both SLEs and the I-A-H Triad showed significant differences (SLEs: $t(390) = 7.280, p = .001, d = 0.798, 95\% \text{ CI } [0.572 - 1.022]$; I-A-H Triad: $t(397) = 4.840, p = .001, d = 0.522, 95\% \text{ CI } [0.306 - 0.738]$). As can be seen from the figures, the effect sizes ranged from small to moderate, with the most important being those linked to the I-A-H Triad and SLEs.

Mediation Analysis

Once the four necessary assumptions described were verified, mediation analysis confirmed the mediating role of the I-A-H Triad between SLEs and type of death (Figure 1). The indirect effects study confirmed the model, since it was significantly different from zero

with $p < .05$ (-0.020 [95% CI: -0.040 - -0.005]). When testing the possible moderating effect of age and sex in the mediation model, a moderated mediation by sex was ruled out since the confidence interval of the moderated mediation index contained zero (-0.002 [95%CI: -0.022- 0.014]). However, the mediation model moderated by age was significant (-0.0005 [95%CI: -0.001 - -0.0001]).

Correlation and Regression Analyses

Regarding the correlation analysis (Table 3), all the variables studied, with their total measurements and their subscales, showed significant correlations with each other, with the I-A-H Triad, with SLEs, and with the type of death. Furthermore, the BDHI hostility subscale and SLE showed significant correlations with gender.

A two-step regression analysis was performed in which the type of death was considered the DV and the I-A-H Triad and SLE were included as IVs in two models using the Enter method. The first model, in which only the I-A-H Triad was included, was significant ($F = 22.125, p < .001$), with a low percentage of variance explained ($R^2 = .05$). When including the SLE variable in the second model, the result remained significant ($F = 30.491, p > .001$) with a greater percentage of explained variance ($R^2 = .13$). When controlling for the effect of the SLE variable in the regression between the I-A-H Triad and type of death, the relationship remained significant.

Table 2
Descriptive, Mean Difference, and Effect Size of the BDHI and BIS Scales and the I-A-H Triad

Scale	Dead by Suicide, n =274			Non-Suicidal Death, n =125			t(397)	p	Cohen's d
	M (SD)	LL	SL	M (SD)	LL	SL			
BDHI-PA	17.32 (10.91)	16.02	18.61	13.24 (8.18)	11.79	14.69	3.728	.001	0.402
BDHI-A	21.08 (10.04)	19.88	22.27	17.51 (8.83)	15.94	19.07	3.416	.001	0.369
BDHI-H	16.91 (8.65)	15.89	17.94	13.04 (6.40)	11.90	14.17	4.481	.001	0.484
BIS-MI	19.06 (11.9)	17.64	20.48	13.95 (10.51)	12.09	15.81	4.115	.001	0.444
SLE	9.51 (5.40)	8.86	10.15	5.46 (4.19)	4.70	6.22	7.280	.001	0.798
I-A-H Triad	0.15 (1.08)	0.03	0.28	-0.34 (0.84)	-0.49	-0.20	4.840	.001	0.522

Note: M (Mean); SD (Standard Deviation); CI (Confidence Intervale); LL (Lower Limit); SL (Superior Limit); BDHI-PA (Buss-Durkee Hostility Inventory Physical Aggression Subscale); BDHI-A (Buss-Durkee Hostility Inventory Anger Subscale); BDHI-H (Buss-Durkee Hostility Inventory Hostility Subscale); BIS-MI (Barrat Impulsivity Scale Motor Impulsivity Subscale); SLE (Stressful Life Events)

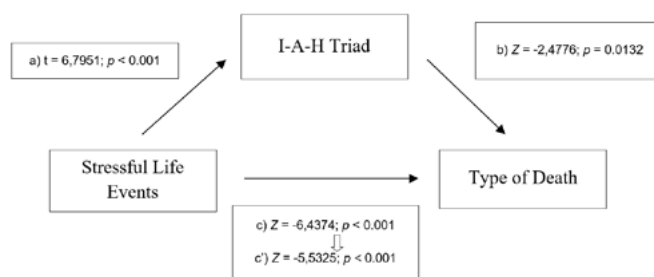
Table 3
Pearson Correlation Matrix Between Variables of Interest

Variable	1	2	3	4	5	6	7	8
1. Type of Death	-							
2. Gender	.022	-						
3. Age	.145*	.155**	-					
4. SLE	-.346**	-.116*	-.240**	-				
5. BDHI-PA	-.184**	-.063	-.186**	.252**	-			
6. BDHI-A	-.169**	.048	-.078	.275**	.586**	-		
7. BDHI-H	-.219**	.164**	-.044	.197**	.493**	.587**	-	
8. BIS-MI	-.202**	-.005	-.193**	.335**	.479**	.681**	.496**	-

Note: Type of death dichotomized according to: 1 "suicide", 2 "sudden non-suicidal death (natural or accidental)". SLE (Stressful Life Events); BDHI-PA (Buss-Durkee Hostility Inventory-Physical Aggression Subscale); BDHI-A (Buss-Durkee Hostility Inventory-Anger Subscale); BDHI-H (Buss-Durkee Hostility Inventory-Hostility Subscale); BIS-MI (Barrat Impulsivity Scale-Motor Impulsivity Subscale)

* Significant for $p < 0.05$, ** Significant for $p < 0$.

Figure 1
The I-A-H Triad Mediates the Relationship Between Stressful Life Events and Type of Death



Note: (a) = Correlation between the independent variable (stressful life events) and the proposed mediator (I-A-H Triad); (b) = effect of the proposed mediator (I-A-H Triad) on the dependent variable (of death dichotomized according to: 1 "suicide", 2 "sudden non-suicidal death"), controlling for the independent variable (stressful life events); (c) = total effect of the independent variable (stressful life events) on the dependent variable (of death dichotomized according to: 1 "suicide", 2 "sudden non-suicidal death") without controlling for the mediator effect (I-A-H Triad); (c') = effect of the independent variable (stressful life events) on the dependent variable (of death dichotomized according to: 1 "suicide", 2 "sudden non-suicidal death") controlling for the effect of the proposed mediator (I-A-H Triad).

Discussion

Suicide is a complex and dynamic phenomenon that is difficult to understand (Al-Halabi & Fonseca-Pedrero, 2021; Hawton et al., 2022). Models such as Joiner's (2007) provide comprehensive explanations which are useful in clinical practice by focusing on interpersonal variables such as the acquired capacity for suicide, which explains the transition from suicidal ideation to the act of suicide (Ma et al., 2016). In this framework, a research approach using PA was developed to compare a sample of people who died by suicide with one of people who died suddenly from other causes.

The results show a differentiated profile between the two groups. In line with the accumulated knowledge (WHO, 2023), people who died by suicide in the study sample were characterized by a greater presence of SLEs, especially marital and work-related SLEs; a greater presence of histories of poor mental health (mainly depression and substance use); and greater presence of previous histories of suicide attempts.

On the other hand, people who died by suicide also showed higher levels of aggressiveness, hostility, and impulsivity. These findings are in line with those of previous research highlighting the association between suicidal behaviour and higher levels of impulsivity, aggressiveness, and hostility (Brokke et al., 2022; Gvion & Apter, 2011; Gvion & Levi-Belz, 2018; Kaurin et al., 2023; Yang et al., 2022), both independently and in interaction with SLEs. As stated by the WHO (2023), many suicides occur impulsively in moments of crisis as failures in the ability to deal with the stresses of life, while at the same time they are associated with difficulty in finding meaning in life (Al-Halabí & Fonseca-Pedrero, 2023). In the attempt to understand the factors which can contribute to a person becoming suicidal and moving from suicidal ideation to suicide, attention must be paid to both, SLEs and such individual variables, as well as the interactions between them.

In this regard, the results of this work support the conclusion that the I-A-H Triad can play a key mediating role in the relationship between a history of SLEs and suicide, without this relationship being moderated by sex. This finding is highly relevant for the development of universal, selective, and indicated prevention strategies, especially if we take into account previous evidence defending the notion that the development of traits such as impulsivity, aggressiveness or hostility is more likely when a

person grows up in invalidating, abusive environments and with arbitrary or ambivalent parenting criteria (Linehan, 1993). That is, in certain contexts which are more prone to the appearance of SLEs it becomes difficult to develop adequate emotional regulation skills. In the long run, these regulatory difficulties, manifested in the joint presence of high levels of aggression, hostility and impulsivity, seem to contribute to the acquisition of a greater capacity for suicide in people with a history of SLEs.

On the other hand, this study found a high correlation between impulsivity, aggression, and hostility, contributing to the idea that they are closely related (Gvion & Levi-Belz, 2018), while the good adjustment indicators of the I-A-H Triad support its construction. The results also confirm that the I-A-H Triad clearly had a more prominent presence among those people who died by suicide than among those who died suddenly from other causes. Furthermore, this variable is closely related to the type of death, regardless of SLEs. In line with our expectations, the predictive power of this variable is not very high, although its power increases if it is combined with the effect of SLEs.

Despite its contributions, this work has some limitations that must be taken into account. Firstly, certain limitations are inherent to the practice of PA: the data are taken from third parties and not directly from the person under study, with the result that this practice may entail possible biases (Giner et al., 2013; Hawton et al., 1998). Specifically, it has been noted that PA should not be used for the diagnosis of psychopathology (Hjelmeland et al., 2012), although this was not the objective of the present study. On the other hand, the limitations associated with PA can only be overcome with extensive longitudinal studies; this is why, at present, it is the most efficient option for the study of completed suicide. In line with this first limitation, it should be noted that we did not calculate an inter-rater reliability index for data collection, so there may have been sources of error in the administration of the tests, which were only controlled for by the prior training of the interviewers. Secondly, the origin of the sample is very specific, with a very homogeneous socio-demographic profile, which could affect the generalizability of the results. Finally, it should be noted that mediation studies are always confirmatory, so the results obtained must be interpreted with caution and always under a prior solid theoretical model. In this sense, the relationship between SLEs and suicidal behaviour has been widely studied and confirmed (Al-Halabí & Fonseca-Pedrero, 2023). On

the other hand, the way in which SLEs are collected, which refers to their appearance throughout the subject's life, in addition to the results of the regression study (according to which SLEs have a greater predictive capacity for suicidal behaviour), seem to allow us to propose that aggression, hostility, and impulsivity function as mediators in this relationship.

In future research, it would be convenient to replicate the data obtained in this study amongst larger and more heterogeneous samples in order to validate the mediating role of the I-A-H Triad in the relationship between SLEs and suicide. Likewise, longitudinal studies would allow stronger causal relationships to be established.

In conclusion, it is important to study cases of death by suicide, as well as high-lethality suicide attempts, in order to more accurately identify those aspects which can lead to suicide and contribute to the acquisition of suicidal capacity; this complements existing knowledge about the variables related to the appearance of other types of suicidal behaviours. In this sense, with a view to prevention, it is essential to pay attention first of all to the effects that SLEs can have on the development of coping skills throughout a person's life, as well as their impact on the appearance of suicidal behaviours. Secondly, we must also consider the role that impulsivity, aggressiveness, and hostility can play in the acquisition of suicidal capacity, and especially how they can mediate the type of coping strategies that people develop in the face of different life events.

Author Contributions

Irene Caro-Cañizares: Conceptualization, Methodology, Formal Analysis, Writing – (Original Draft, Review & Editing, Supervision, Approval of Final Manuscript). **María Elena Brenlla:** Conceptualization, Methodology, Formal Analysis, Writing – (Original Draft, Review & Editing, Supervision, Approval of Final Manuscript). Irene Caro Cañizares and María Elena Brenlla are both first authors at equal level of contribution. **Juan J. Carballo:** Writing – (Review & Editing, Supervision, Approval of Final Manuscript). **María Santos Rodríguez:** Investigation, Funding and Data Acquisition, Review, Approval of Final Manuscript. **Julio Antonio Guija:** Investigation, Funding and Data Acquisition, Review, Approval of Final Manuscript. **Lucas Giner Jiménez:** Investigation, Funding and Data Acquisition, Review, Approval of Final Manuscript.

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Declaration of Interests

The authors declare that they have no conflict of interest.

Data Availability Statement

Data available upon reasonable request.

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