Psicothema

Psicothema 2019, Vol. 31, No. 3, 246-254
doi: 10.7334/psicothema2018.339

ISSN 0214 - 9915 CODEN PSOTEG

www.psicothema.com

Self-esteem and suicidal behaviour in youth: A meta-analysis of longitudinal studies

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Abstract

Background: Previous literature suggests that low self-esteem is a risk factor for suicide attempts, but no meta-analyses have been conducted to assess this association in adolescents/young adults. The present study examined the relationship between low self-esteem and suicide attempts in young people (12-26 years old). **Method:** Meta-analyses were performed using random-effects models (ES) and odds ratio (OR). Heterogeneity and sensitivity analyses were performed. **Results:** From 26,883 initial titles, 22 studies met the inclusion criteria, of which 9 studies had data that could be included in the meta-analysis. The meta-analysis showed that youths with lower self-esteem were more likely to have future suicide attempts, with an effect size (self-esteem as continuous variable) of d = .58 (95% CI = .44 - .73) and, for low self-esteem (categorical variable) an OR = 1.99 (95% CI = 1.39-2.86; p < .001). **Conclusion:** A low level of self-esteem is a risk factor for suicide attempts in adolescents/young adults.

Keywords: Meta-analysis, self-esteem, suicide attempt, adolescents and youth.

Resumen

Autoestima y comportamiento suicida en jóvenes: un metaanálisis de estudios longitudinales. **Antecedentes:** según la literatura, la baja autoestima es un factor de riesgo para los intentos de suicidio, pero no se han realizado metaanálisis para evaluar esta asociación entre los adolescentes/jóvenes. El presente estudio examinó la relación entre la baja autoestima y los intentos de suicidio entre los jóvenes (12-26 años de edad). **Método:** los metaanálisis se realizaron mediante modelos de efectos aleatorios, con tamaños del efecto (TE) y odds-ratio (OR). Se realizaron análisis de heterogeneidad y sensibilidad. **Resultados:** de 2.883 trabajos iniciales, 22 estudios cumplieron con los criterios de inclusión, de los cuales 9 estudios tenían datos que podían incluirse en el meta-análisis. El meta-análisis mostró que los jóvenes con menor autoestima eran más propensos a tener intentos futuros de suicidio, con un tamaño del efecto (autoestima como variable continua) de TE = 0,58 (IC del 95%: 0,44 a 0,73) y para la autoestima baja (variable categórica), un OR = 1,99 (IC del 95%: 1,39 a 2,86; p<0,001). **Conclusión:** el bajo nivel de autoestima es un factor de riesgo para los intentos de suicidio en adolescentes/jóvenes. Se necesitan programas eficaces para aumentar los niveles de autoestima y prevenir futuros comportamientos suicidas.

Palabras clave: metaanálisis, autoestima, intento de suicidio, adolescentes y jóvenes.

Suicide currently accounts for 8.5% of deaths from external causes and is the second leading cause of death (after road traffic accidents) among young people aged 15 to 29 (World Health Organization [WHO], 2014). Furthermore, suicide deaths have increased by 60% over the last 45 years, increasing among the adolescent and young adult population (WHO, 2005). The European Commission and WHO encourage professionals to improve knowledge of this problem in order to prevent it (WHO, 2008, 2014). There is abundant literature on some of the risk factors associated with suicidal behaviour, such as the prior existence of suicidal behaviours (Castellví, Lucas-Romero et al., 2017; Nock et al., 2008); exposure to traumatic stressful events, such as abuse or victimization; the existence of some legal factors (Brent & Mann, 2006; Castellví, Miranda-Mendizábal et al., 2017; Zhang & Ma, 2012); association with certain psychological factors such as hopelessness, impulsiveness (Baca-García et al., 2005; González, Ramos, Caballero, & Wagner, 2003; Wichstrøm, 2009);

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the presence of somatic or disabling problems (Khan, Mahmud, Karim, Zaman, & Prince, 2008; Rueda-Jaimes, Rangel-Martínez-Villalba, & Camacho, 2011); presence of mental disorders or internalizing and externalizing symptoms (Gili et al., 2019; Soto-Sanz et al., 2019).

According to Rosenberg (1965), self-esteem is defined as an attitude, favourable or unfavourable, that people have about themselves. Self-esteem was defined as "an individual's positive or negative evaluation of himself or herself" (Smith, Mackie, & Claypool, 2014). Recently, low self-esteem has been suggested as being associated with suicidal behaviour in male prisoners (22 to 60 years of age) (Gooding et al., 2015), and adolescents and young people belonging to community samples (O'Connor, Dooley, & Fitzgerald, 2015; Portzky, van Heeringen, & Vervaet, 2014).

To our knowledge, only one systematic review and two meta-analyses have been published evaluating the association between self-esteem as a risk factor and suicidal behaviour. In all of them there are studies in which it is significantly related to suicidal behaviour, but others in which it is not (Evans et al., 2004; Hawton, Saunders, & O'Connor, 2012; Raab, 2001). Evans et al. review's (2004) showed that low self-esteem was associated with suicidal ideation. This article included international literature on population-based studies of factors associated with suicidal phenomena in adolescents. However, the data in the systematic review of Evans et al. (2004) were obtained from cross-sectional studies and none of them considered low self-esteem in relation to attempted suicide. Hawton, Saunders and O'Connor (2012) conducted a systematic review for the period 2001 to 2011, showing that low self-esteem is a frequent precipitant for teen suicide. Nevertheless, Hawton et al. review's (2012) includes cross-sectional studies and gives no information on the number of articles found. A previous meta-analysis by Raab (2001) included the study of the direct relationship between self-esteem and suicidal behaviour, as well as the relationship of suicide with sociodemographic, affective mental disorders, family and health's variables. This study consisted of 196 studies with clinical and non-clinical samples (223,569 individuals, aged between 13 and 19 years) published between 1989 and 1998. Of these studies, 82% analysed self-esteem and suicide attempts, showing that there was a significant association between both factors.

According to previous studies with a general adult population, they demonstrate the possibility of developing predictive models of suicide, based on known risk factors with high indices of precision (Area Under the Curve = 0.74-0.85) (Borges et al., 2010). However, there is no equivalent theoretical framework applicable to the young population, a vulnerable group and with differentiated risk factors, so it is not possible to accurately identify those most at risk. Such knowledge would enable the development of indicated or selective prevention actions, also considered in mental health as the most cost-effective (Chesin & Stanley, 2013; Cuijpers et al., 2015).

The present study constitutes a meta-analysis of the literature with the aim of estimating the magnitude of the effect of the relationship between self-esteem and attempted suicide amongst adolescents and young adults between the ages of 12 and 26 years. The hypothesis is that low self-esteem values constitute a significant risk factor for attempted suicide among youth.

Method

Search Strategy

This study stems from a broader systematic review carried out up to January 2017. The search strategy was conducted following the PRISMA recommendations for systematic review and the MOOSE (Meta-Analysis of Observational Studies in Epidemiology) guide (Stroup et al., 2000). The protocol is available at PROSPERO (Reg; CRD42013005775) (Alonso et al., 2013). Our initial search strategy was broad in scope and inclusive. Text words, titles and MeSH terms were used as search terms, including suicide, suicidal behaviour, suicide attempt, suicidality, risk factor, causality, association, protective factor, incidence, longitudinal study, observational study, cohort study, case control study, prospective study, retrospective study, follow-up, and others. The following databases were searched: Cochrane Library, Medline, PsycINFO, EMBASE, Web of Science, the OpenGrey European database, and reference lists from previous reviews and books were examined. Corresponding authors for articles written in languages other than Spanish and English were contacted.

Inclusion Criteria

A broad-scope and inclusive initial search strategy was carried out based on the following inclusion criteria: (a) reporting suicide attempt or suicide as a dependent variable. Suicide attempt and suicide were chosen to ensure higher quality to the study, both are objective and verifiable behavioral outcomes by health services. (b) assessing at least one risk factor for any of these outcomes; (c) study population age range between 12 and 26 years old, both inclusive; (d) population-based longitudinal studies (e.g. non-clinical and non-institutionalized sample cohorts; or case controls where the control group was of the same age range and was both non-clinical and non-institutionalized). Studies focused on institutionalized or clinical samples were excluded. Suicide death was defined as any fatal act done with the intention to take one's own life, and suicide attempt was defined as any act of self-injury with intention to die (Silverman, Berman, Sanddal, O'Carroll, & Joiner, 2007). Other suicide-related behaviours were excluded.

The age of the population of interest was defined according to the terms of the WHO, (1986) as follows: Mid-adolescence from between 14 and 17 years of age; late adolescence from between 17 and 20 years; and young adulthood from between 20 and 24 years. However, as the terms "adolescence" and "young adults" do not have homogenous definitions, and can vary according to country-specific socio-cultural, institutional, economic and political factors, participants aged between 12 and 26 years old were included.

Procedure

Data Extraction

For this review, a data collection form from the Cochrane Collaboration was adapted. Each reviewer looked after 10% of the total number of articles, later included in the full-text review, although a peer review was not performed in this stage. An independent reviewer checked all the data entered into the data collection form.

Quality Assessment

In order to assess the quality of the studies, the Newcastle-Ottawa (NOS) scale was used (Wells et al., 2014). This assessment was performed in order to avoid including biased or methodologically deficient studies that could also bias the results of the present review due to an overall estimate of effect.

Using a star system, the quality of studies was assessed according to the selection of study groups, the comparability of groups, and the verification of exposure or outcome of interest. The quality of the identified studies was assessed by one reviewer, and another reviewer checked each item in the article.

Data analysis

Effect size and statistical analisys

In the present study, Separate meta-analyses were conducted for the study outcomes (self-esteem as categorical variable or continuous variable). All the different effect size estimates (OR, β) were converted into the same metric (Cohen's d). First of all, we calculated the single adjusted effect sizes from each study with a 95% confidence interval (95% *CI*). Afterward, overall effect sizes were calculated by means of the DerSimonian-Laird approach based on random-effect models (Kelley & Kelley, 2012). For calculate ES, we always substituted first average self-esteem in the non-suicidal sample minus average self-esteem in the suicidal sample. The values of those studies that analysed high self-esteem were reversed.

The heterogeneity assessment was performed using the Chi-square test and the Higgins test (I^2) (Higgins, 2008), and was considered significant when the *p*-value of Chi-square test was <.10, and using the I^2 estimator, heterogeneity was defined as low (<30%), moderate (30%-50%) and severe (> 50%) (Higgins & Thompson, 2002). Galbraith's plot was also used to determine heterogeneity. A random-effects models was used to perform the meta-analysis, as we assumed that some differences would occur in the study's characteristics. Publication bias was determined using funnel plots and Egger's regression asymmetry test in the case of the inclusion of ≥ 5 studies (Egger, Davey Smith, Schneider, & Minder, 1997) and Begg's test (Begg & Mazumdar, 1994) when < 5 studies were asses. In the presence of significant asymmetry, we used Duval and Tweedie's Trim and Fill test (Duval & Tweedie, 2000) to reduce the impact of publication bias by imputing potential new unpublished studies, and obtaining a new pooled estimate. Finally, the sensitivity analysis was performed taking into account those variables that a priori could be a source of heterogeneity between studies. The stratified analyses were also taken into account, wherever possible. In the event that the article did not provide sufficient data to perform the meta-analysis, a maximum of three e-mails were sent to the authors.

Selection and inclusion of studies

The database search revealed a total of 26,883 articles, once the duplicates were eliminated. A total of 1,701 references were screened, of which, 1,692 were excluded. Twenty-two articles evaluating self-esteem and suicide attempts in youth were obtained. A total of 13 studies were excluded as they lacked the data needed to perform the meta-analysis. All the exclusions are detailed in Figure 1.

Eight studies assessed the association between low self-esteem and suicide attempt, and one study evaluated high self-esteem (see Table 1).

For case-control studies, in the Garnefski et al.'s study (1992), they eliminate subjects who had already attempted suicide. In the study of Beautrais et al. (1999), researchers contacted emergency department to monitor subjects who enter with a suicide attempt in order to include them as a case. The latest case-control study (Grøholt et al., 2000), compares risk factors for self-harm in two groups: inpatient adolescents who attempted suicide and adolescents who reported suicide attempts in a community survey.

Thirteen comparisons from nine studies were included in the meta-analyses. In four (44.4%) studies, the authors reported their results in a stratified manner. In most cases, the stratification occurred by gender, with the exception of Grøholt et al.'s study (2000), where subjects were stratified according to how the information on suicide attempts was collected, either due to hospitalization after attempted suicide or through self-report.

Results

Data Synthesis

On the one hand, in the meta-analysis of low self-esteem measured as a continuous variable, 5 cohort samples and 2 case-control studies were included. According to a general estimate the adolescents and young adults that had attempted suicide showed significantly lower levels of self-esteem than those who did not attempt suicide, with $d = 0.77$ (95% *CI*, 0.40-1.13). The publication bias obtained through Egger's test was not significant ($p = .69$).

On the other hand, studies that evaluated self-esteem as a categorical variable, 3 samples from case-control and 4 from cohorts studies were included. According to the overall estimate within the meta-analysis, adolescents and young adults who attempted suicide showed a significantly lower level of self-esteem than those who did not attempt suicide (OR = 2.76; *CI* 95%, 1.45-5.24; $p < .001$). Furthermore, the value obtained in Egger's test was not significant ($p = .48$), showing that no publication bias occurred.

In both meta-analyses (self-esteem evaluated as a categorical and continuous variable), the corresponding funnel plots showed that studies were symmetrically distributed, (see Figure 2, Figure 2 and 3, Figure 3) suggesting there was no publication bias. Only Nkansah-Amankra et al.'s study (2012) provided data from multivariate analyses and controlled for possible variables of confusion. A severe heterogeneity was observed, both in the case of self-esteem as a categorical variable ($I^2 = 84.1\%$ $p < .001$) and as a continuous variable ($I^2 = 92.64\%$ $p < .001$).

After performing sensitivity analyses for the meta-analysis of studies with continuous variables, one of the samples from Grøholt et al.'s study (2000) represented in the Galbraith graph differed greatly from the rest of studies. Therefore, after removing such sample, ES size, $d = 0.58$ was obtained (95% $CI = 0.44$-0.73), which was lower than that obtained in the meta-analysis of all samples. However, heterogeneity decreased, becoming non-significant ($I^2 = 39.9\%$ and $p = .14$) and the non-significant value of the Egger test was maintained ($p = .36$), showing in funnel graph that the other samples were distributed symmetrically (see Figure 2). In addition, the Trim and Fill method imputed 3 new comparisons, and no

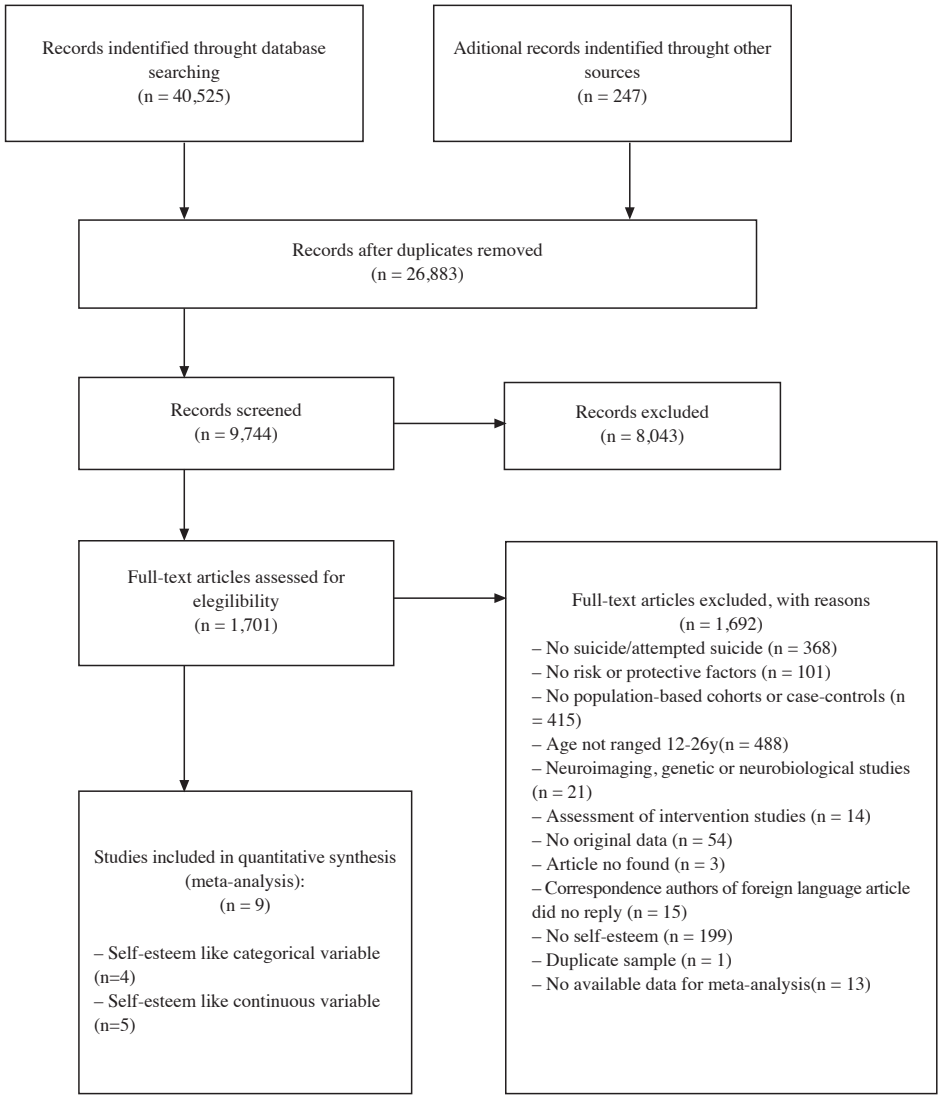

Figure 1. PRISMA Flow Diagram. Moher, Liberati, Tetzlaff & Altman (2009)

significant discrepancy was observed between the originally ES obtained and the imputed by this method.

In the sensitivity analysis for categorical variables, the sample from Beautrais et al.'s study (1999) was extracted, as this study's sample was smaller than that of the rest of studies included in the meta-analysis. Furthermore, it differed from the rest of studies in the Galbraith plot. After this extraction, an OR =1.99 (1.39-2.86) was obtained, which was a significant value (p <.001). Moreover, heterogeneity decreased in relation to the meta-analysis where all samples were included, resulting in being non-significant (I^2 = 45.1% and p =.10). In turn, the Egger test value was non-significant (p =.62), showing a symmetrical funnel graph (see Figure 3).

Quality of studies

The quality of the studies is shown in, Table 2. With the exception of two studies (Wichstrom et al., 2000; Goldney et al., 1991), the majority obtained 6 or more stars (High quality ≥6 stars, the exclusion of an article from the sensitivity analysis is considered when it obtains less than 6 stars). The majority reported that attempted suicide was not present at the beginning of the study. In addition, all cohort studies obtained a star for the representativeness of the exposed (subjects with low self-esteem) and unexposed cohort (subjects with high or normal self-esteem), suggesting that the exposed and unexposed young adults and adolescents represented the studied population.

Discussion

Our study adds new scientific knowledge about the association between low self-esteem and future suicide attempts among adolescents and young adults. There is a significant association between self-esteem and suicidal behaviour. After performing the two forest plots reveal that the several studies are not fully convergent in their conclusions. Once combined the independent estimates on it, the effect does exist, the pooled ES is significant. It was observed that the heterogeneity in the meta-analysis of continuous variables was explained largely by the difference

in one of the samples within Grøholt et al.'s study (2000). This sample had a value of ES distant from other studies, which lead us to believe that it could be influencing the general findings. Possibly differences are due to the fact that the sample included individuals who were still hospitalized. Regarding categorical variables, Beautrais et al.'s study (1999) reflected very extreme values of OR that greatly differed from those of other studies, and also had a very small sample in comparison to the rest.

The quality of all studies may be high because the inclusion and exclusion criteria were very specific. We consider that the lack of studies is due to the lack of studies that answered the specific research question, above all, to the lack of longitudinal studies and with data for meta-analysis.

Based on the meta-analyses performed, low self-esteem in adolescents and young adults is significantly associated with suicide attempt. This has also been reported in studies of suicide

Table 1
Description of identified studies

Author and year	Country	Population	Age range	Study desing	Length of Follow-up	Sample at baseline (%women)	Sample at the end of follow-up (%attrition)	% of suicide attempts during the follow-up	Instrument Used	d (self-esteem measured as a continuous variable)	OR (CI) (self-esteem measured as a categorical variable)
Goldney et al. (1991)	Australia	Students	18-25	Cohort	8 years	1,014 (51.7)	472 (53.4)	2.5	Rosenberg´s Self-Esteem Scale (RSES) (1965)	0.8	*b*
Garnefski et al. (1992)	The Netherlands	Students	13-20	Case-Control	*b*	285 cases and 285 controls (64.9)	*b*	*b*	1 item	*b*	Female: 3.3 (2.0-5.4) Male: 1.6 (0.8-3.4)
Beautrais et al. (1999)	New Zealand	General Population	13-25	Case-Control	*b*	129 (52.5) cases and 153 (49.7) controls	*b*	*b*	Coopersmith Self-Esteem Inventory (CSEI) (1981)	*b*	26.3 (10.7-64.7)
Grøholt et al. (2000)	Norway	Students	13-19	Case-Control	*b*	232 cases; 91 HAS (90) and 141 SRSH (77) and 1736 (52) controls	*b*	*b*	Subscale Self-Perception Profile for Adolescents (SPPA-R) (1988;1995)	HAS; 0.6 SRSH:1.6	*b*
Wichstrøm (2000)	Norway	Students	14-22	Cohort	2 years	9,679 (50.9) 11,918 (41.1)	7,637 (21.1) 9,679 (28.8)	2.7 8.2	Subscale Self-Perception Profile for Adolescents (SPPA-R) (1988;1995)	0.4	*b*
Lewinsohn et al. (2001)	United States	General Population	14-24	Cohort	8 years	1,709 (*b*)	941 (44.9)	13.2	9 items	Female:0.6 Male:0.5	*b*
Larsson and Sund (2008)	Norway	Students	13-16	Cohort	2 years	2,464 (49.4) 2,397 (49.4)	2,360 (0.8) 2,370 (0.8)	3.0	Norway Version of Self-Perception Profile for Adolescents (SPPA-R) (1988;1995)	0.75	*b*
Roberts et al. (2010)	United States	General Population	11-17	Cohort	1 year	4,175 (48.9)	3,134 (30.3)	0.84	8 items of Rosenberg´s Self-Esteem Scale (RSES) (1965)	*b*	2.4 (1.3-4.5)
Nkansah et al. (2012)	United States	Students	12-26	Cohort	7 years	2,0745 (50)	9,412 (54.7)	1.8	6 items scale	*b*	All; 2.47 (0.9-6.2) Female:1.2 (0.7-2.0) Male: 1.5(0.7-3.3)

Note: b: Not applicable; HAS: Hospitalized Attempted Suicide; SRSH=Self-Reported Attempted Suicide

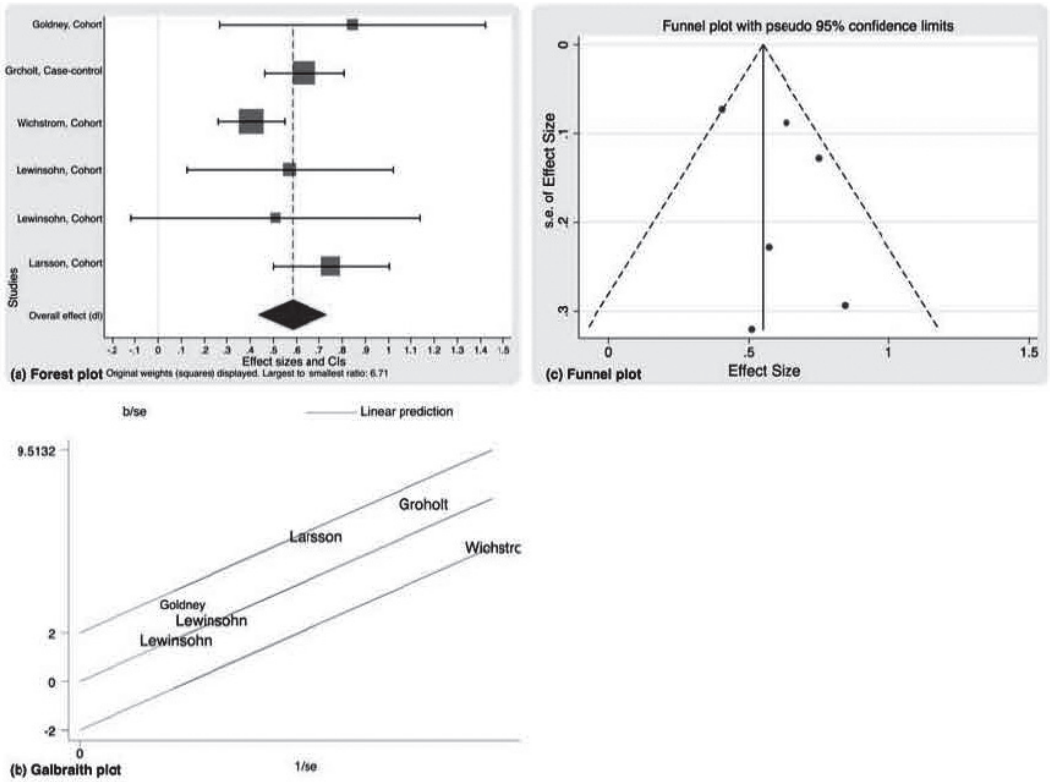

Figure 2. Forest plot (a), Galbraith plot (b) and Funnel plot (c) results of low self-esteem as a continuous variable, excluding the sample located outside range in the Galbraith plot

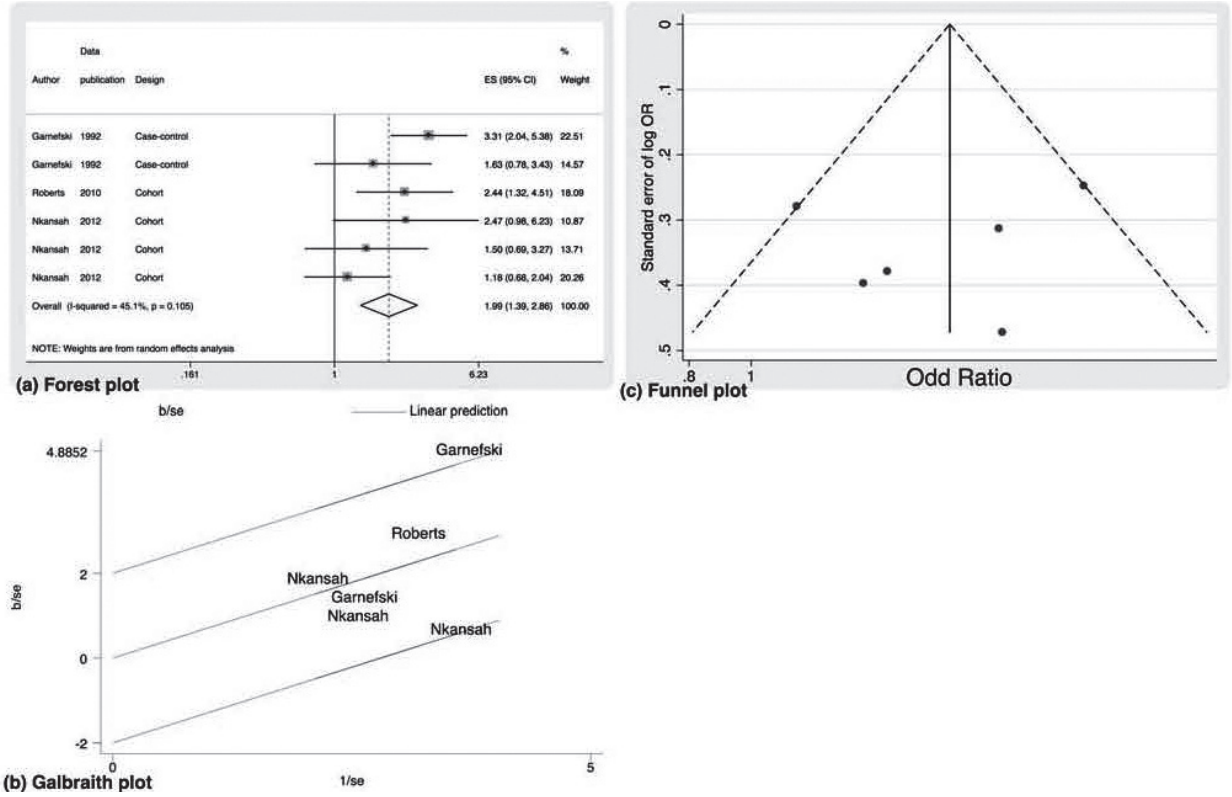

Figure 3. Forest plot (a), Galbraith plot (b) and Funnel plot (c) results of self-esteem as a categorical variable, excluding studies outside the range in the Galbraith plot

Table 2
Quality of assessment of articles included in the meta-analyses[a]

COHORT STUDIES

Author and year	Representativeness of Exposed Cohort[b]	Selection of Non Exposed Cohort[b]	Ascertainment of Exposure[b]	Demonstration Otcome of Interets Not Present at Start of Study[b]	Comparability of Cohorts on the Basis of Design of Analisys[c]	Ascertainment of Outcome[b]	Adequate Length of Follow Up[b]	Adequacy of Follow Up[b]	Total of Stars
Goldney et al. (1991)	*	*	-	*	*	-	*	-	5
Wichstrøm (2000)	*	*	-	-	-	-	*	*	4
Lewinsohn et al. (2001)	*	*	*	*	**	-	-	*	8
Larsson y Sund (2008)	*	*	*	-	**	-	-	*	6
Roberts et al. (2010)	*	*	*	*	**	-	-	*	7
Nkansah et al.(2012)	*	*	-	*	**	-	*	-	6

CASE-CONTROL STUDIES

Author and year	Case Definition[b]	Representativeness of Cases[b]	Selection of Controls[b]	Definition of Controls[b]	Comparability of Cases and Controls[c]	Ascertainment of Exposure[b]	Same Method Ascertainment Both Groups[b]	Non Response Rate[b]	Total of Stars[a]
Garnefsky et al. (1992)	-	*	*	*	**	-	*	*	7
Beautrais et al. (1999)	*	*	*	*	**	-	-	-	6
Grøholt et al. (2000)	*	*	*	*	**	-	*	*	8

Note: [a:] Highest quality studies are awarded up to nine stars; [b] : A maximum of one star can be allotted in this category; [c] : A maximum of two stars can be allotted in this category; -: None star was allotted

in the general teen population (Hawton et al., 2012) and in other thesis in general population (Raab, 2001).

Differences in measures of self-esteem should be taken into account. Furthermore, the categorization of self-esteem variable as high or low depends on the criteria of each author, or of each instrument. In the different studies self-esteem is categorized, according to different criteria, and in some cases this information was not provided. Therefore, there may have been cases in which people may have been included in the low or high self-esteem group in certain studies, and perhaps, under the criteria of another author, they may have been included in a different group.

Althought the meta-analysis involves studies off different countries, all of them allow to western countries. Therefore, it is possible that the relationship studied is typical of some types of cultures, but not all.

It is important to emphasize that in this study, low self-esteem has been treated as a risk factor. In addition, considerable research has also been done on the buffering factors, or protective factors, in suicide (see Johnson, Wood, Gooding, Taylor, & Tarrier, 2011). Damping factors are those that reduce the likelihood of a negative outcome (e.g., suicidal behaviour) (Osman et al., 2004). In this case, self-esteem as a buffering or risk factor is similar in that high levels of this factor may provide protection against a negative outcome, while low levels may confer risk (Chioqueta & Stiles, 2007; Johnson et al., 2011).

Therefore, self-esteem must be measured uniformly using the same definition by expert consensus with a common criterion on which researchers could base their categorizations of high and low self-esteem and to allow comparison between studies. Moreover, the instrument used were all prior to 1995, hence, it might be interesting to develop or revise some of these instruments for this variable.

Suicidal behaviour requires for its prevention the continuous improvement of public health policies (Turecki & Brend, 2016). Recommendations have already been made to homogenize the use of frequency measures in studies in order to better compare their results (Moreno-Küstner, Martín, & Almenara, 2014). According to Lagares-Franco et al. (in press), there is no systematization when it comes to measuring the frequency of presentation of suicidal behaviour, and makes it difficult to make comparisons between studies and to know the true dimension of the problem.

In general, longitudinal and international studies are needed to identify the causal pathways between attempted suicide and psychological factors. Furthermore, population-based studies represent an advantage in the interpretation of our results as it provides more valid estimates of the global magnitude of the impact of low self-esteem, which may guide prevention and early-intervention strategies at the community level.

This meta-analysis highlights the importance of detecting self-esteem problems in young people for suicide prevention. Effective prevention strategies and health policies should be developed and implemented in schools and neighbourhoods to substantially reduce the number of youth suicidal behaviours and deaths and to reduce the lethality of these behaviours among high risk groups (Wasserman et al., 2015).

Some specific limitations of this review are noteworthy. Firstly, studies with different methods and populations were included, which, in our opinion, could have resulted in a higher heterogeneity. Finally, a scale NOS, designed to assess the quality of longitudinal studies, was used, however, the evidence on its validity is still limited (Hartling et al., 2013).

Our meta-analysis has several strengths: (i) a wide scope search of various databases in different languages was carried out, including peer reviews in the selection phase, independent reviews in the data extraction stage and the use of methods to minimize bias; (ii) contact with authors of other studies was established in order to obtain further information; (iii) a manual and grey literature search were also performed; and (iv) to our knowledge, there are no other meta-analyses that assess the relationship between self-esteem and suicide attempts in young adults and adolescents.

Acknowledgements

This study was supported by grants from Instituto de Salud Carlos III FEDER: SCIII-FEDER (PI13/00343) and the DIUE de la Generalitat de Catalunya (2017 SGR 452). Pere Castellví was supported by a grant from the Instituto de Salud Carlos III (ISCIII) (CD1212/00440), María Jesús Blasco by the ISCIII-FIS (CM14/00125), and Victoria Soto by Ministerio de Educación Cultura, y Deporte (ECD/465/2012).

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