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Sociodemographic Variables Most Associated with Suicidal Behaviour and Suicide Methods in Europe and America. A Systematic Review

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ABSTRACT

This Systematic Review is thought to deepen the relation between sociodemographic variables most associated with suicidal behaviour and suicide methods in Europe and America. A research was made from articles and reviews published between 2005-2015 in PsycINFO, Medline, Web of Science Core Collection, Scopus, and SciELO. Thanks to it, we retrieved 5,222 records which were analysed against the inclusion (e.g., any design of the study, published in English or Spanish) and quality criteria, including 53 studies in the review. In these results it is noticeable how men (36% of the studies) and elderly (28% of the studies) commit suicide more frequently. Women (30% of the studies) and young people (17% of the studies) have more attempts and suicidal behaviour. The most commonly used methods among them include hanging (24% of the studies), firearm (17% of the studies), and precipitation (6% of the studies); unemployment (17% of the studies), rural life (9% of the studies), a marital status other than marriage (15% of the studies), and low education (23% of the studies) are also closely associated with both suicide and suicidal behaviour. Consequently, important connections can be concluded when carrying out psychological autopsies, which should be taken into account due to their clear implications in personal and material damage that must be elucidated judicially, clarifying the specific occurrence as suicide, homicide, or accident.

Las variables sociodemográficas más asociadas con el comportamiento suicida y con los métodos suicidas en Europa y América. Una revisión sistemática

RESUMEN

Esta revisión sistemática tiene por objetivo profundizar en la relación entre las variables sociodemográficas más asociadas con el comportamiento suicida y los métodos suicidas en Europa y América. Se realizó una investigación a partir de artículos y revisiones publicadas entre 2005-2015 en PsycINFO, Medline, Colección Principal de Web of Science, Scopus y SciELO. Se recuperaron 5.222 registros, en los que se analizaron los criterios de inclusión (p. ej., cualquier diseño de estudio, publicado en inglés o español) y de calidad, incluyendo 53 estudios en la revisión. En estos resultados se observa que los hombres (36% de los estudios) y los ancianos (28% de los estudios) presentan unas tasas superiores de suicidio que las mujeres (30% de los estudios) y los jóvenes (17% de los estudios) tienen más intentos y conductas suicidas. Los métodos más utilizados son el ahorcamiento (24% de los estudios), las armas de fuego (17% de los estudios) y la precipitación (6% de los estudios); el desempleo (17% de los estudios), la vida rural (9% de los estudios), un estado civil distinto de matrimonio (15% de los estudios) y un nivel educativo bajo (23% de los estudios) también están estrechamente relacionados con el suicidio y el comportamiento suicida. Se puede concluir la importancia de realizar autopsias psicológicas, las cuales deberán tener en cuenta los factores analizados en este estudio y sus implicaciones judiciales, dilucidando la ocurrencia de suicidio, homicidio o accidente.

Palabras clave:

Comportamientos suicidas
Métodos suicidas
Variables sociodemográficas
Revisión sistemática
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The World Health Organization (WHO) defined suicide in 1986 as “an act with lethal outcome, deliberately initiated and carried out by the subject, knowing or expecting its lethal denouement and through which it pretends to obtain the desired changes” (Ministerio

de Sanidad, Política Social e Igualdad, 2012, p. 43). However, suicide is now considered a continuum, encompassing suicidal behaviours (SB): ideation (thinking about suicide, cognitions), plans (propose methods with which to carry out suicide), and attempts (potentially self-injurious

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conduct with no fatal outcome that may or may not result in injury, with evidence of intentionality of causing death), as well as consummate suicide (self-inflicted death with evidence of intentionality) (Ministerio de Sanidad, Política Social e Igualdad, 2012; WHO, 2014).

Therefore, suicide also supposes both a big economic and a public health problem, being among the first fifteen causes of death in all ages and second and third in the groups of 10-24 and 15-44 years respectively, daily happening many more attempts which have not been consummated according to the Ministerio de Sanidad, Política Social e Igualdad (2012). This report also states that, in the USA, the annual economic cost (both direct and indirect) reaches 25,000 million dollars. In Europe, the (also annual) costs are changeable. For example, in Ireland the cost has been around €835 million, in Scotland the estimated cost has been £1.08 billion (Centre for Suicide Prevention, 2010), and in England the cost has reached £1.45 million (Expert Platform on Mental Health, 2011).

According to WHO (2014), every year the suicide number exceeds 800,000, happening one each 40 seconds and adding around 804,000 suicide deaths around the world in 2012, with an annual worldwide rate of 11.4/100,000, the majority being men (15:8).

Although psychological autopsies show that around 90% of people who commit suicide have mental disorders, the most usual being depression, substance abuse, psychotic disorder, personality disorder, and anxiety, among others (Ministerio de Sanidad, Política Social e Igualdad, 2012). Rodríguez-Carballeira et al. (2015) state that the psychological abuse group considered could lead to extreme behaviour in the so-called collective suicide; there are also other protection and risk factors (see for example, López-Ossorio, González Álvarez, Buquerín Pascual, García, & Buela-Casal, 2017). This paper focuses on some of them.

If we look at suicide rates, countries with high income per inhabitant have a higher suicide rate than countries with lower income (WHO, 2014). Lithuania and Russia are the two countries on top of the list (51.6 and 43.1/100,000 respectively) contrasting with Azerbaijan and Philippines (1.1-2 and 2.1/100,000 respectively), which have the lowest rates. In Europe, where suicide is the tenth cause of death, the highest rates are located in Eastern Europe and in the Nordic countries, where differences according to gender have also been found, and with a rate of 4:1 in the West and 3:1-7.5:1 in the rest of the world, without differences in India or in China (Ministerio de Sanidad, Política Social e Igualdad, 2012). Regarding age, the majority of cases are under the age of 45, a fact that repeats in all continents, with the lowest rates in children under the age of 15 and increasing again in people over 70 years or older (WHO, 2014). Even so, in Europe cases in young people have multiplied by four (Ministerio de Sanidad, Política Social e Igualdad, 2012).

Furthermore, it must not be forgotten that the previous information shows the importance of knowing the risk factors associated with these deaths in order to be able to evaluate and prevent the problem, as well as to promote an effective prevention policy. Therefore, the aim of this study is to analyse sociodemographic variables (sex, age, marital status, employment status, education, and place of residence) which are more closely related to suicidal behaviour (ideation, plans, and suicide attempts) and suicide, as well as the suicide method, in the general population in Europe and America.

Method

Design and Procedure

This work focuses on a Systematic Review (SR) following the criteria by Perestelo-Pérez (2013). From April 19th to May 24th 2016, a bibliographic search of “articles” and “reviews” published between 2005 and 2015 (both years included) was carried out with PsycINFO, Medline, Web of Science Core Collection, Scopus, and

SciELO databases. When we check these databases (and the types of documents) there may be biased publications, which could imply that some studies should be excluded because of their deficient statistic results or because of not being clinically meaningful. These studies will not take part in the databases that will be analysed.

The key concepts which have been used were: <<Attitude* or behaviour* or characterizations* AND suicide* or “death wish” or “suicide attempt” or “suicide behavior” or “suicide risk” or suicidal* or “suicidal ideation” or “attempted suicide” or “suicide hazards” or “method of death” or “method of suicide” AND population* or “general population” or “non-clinical sample” or “general sample” or “community cohort” or “non-psychiatric” or “wider population” or “adult population” AND age* or sex* or “marital status” or single* or unmarried* or alone* or divorced* or divorcee* or married* or “married man” or “married woman” or couple* or partner* or widow* or widower* or separated* or son* or daughter* or child* or children* or paternity* or fatherhood* or “educational level” or “sociodemographic factors” or “gender differences” or spouse* or household* or “socio-economic status” or rural* or urban* or rurality*>>. These terms were either in English or in Spanish, depending on the databases and were also restricted to the files “title, abstract and key words”. Furthermore, the type of documents was limited to “articles or reviews” because of the big amount of studies related to the topic under consideration (see Selecting Criteria section). Moreover, as a complementary way, the information referring to the sample display (*N*) was included as well as the years in which they were analysed in order to know the scope of the studies, although they were not analysed as variables (see both variables in Table 1).

Selecting Criteria

The criteria born in mind to select the studies were:

- General population sample or psychology autopsy of death labelled as “suicide”.
- Carried out in Europe, America (North and South) and published between 2005-2015 (both years included).
- Data about suicide behaviours related to the variables sex, age (no age limit), marital status, employment state (employed or unemployed), education, suicide method, and/or residence area (rural or urban).
- Without restricting the type of the design of the study.
- Published either in English or in Spanish.
- Works that were articles and reviews.
- High (score between 15-23) or medium (score between 9-14) methodological quality (see Study Selection and Methodological Quality section).

Study Selection and Methodological Quality

In the studies, after examining titles and abstracts to check that they meet the selection criteria, we selected those who met some of the criteria. When this was not enough, the entire text was checked and in case of not fulfilling any of the previous criteria, the paper was removed. Finally, in the studies that were finally included, the methodological quality was evaluated through an adaptation of the Meta-analysis of Observational Studies in Epidemiology (MOOSE) by Stroup et al. (2000). This adaptation was created previously to its use so that the checklist was adjusted to the type of work which had been expected and that it was strict to guarantee the quality of the studies included. Moreover, when doubts were considered regarding criteria, there was a discussion in order to reach a conclusion. Studies were classified in three groups according to their quality: high (with a score between 15 and 23), medium (with a score between 9 and 14) or low (with a score between 0 and 8). Both low-quality studies and those medium or high quality

which did not provide the expected data about the variables under study (outcomes procedures) were removed. Furthermore, for data extraction from all the works finally included they used a codification book where works were organized by title, authors, and year of publication along with all the information that was considered important or that could contribute something to the SR.

Results

Search and Study Selection

From the 5,222 articles and reviews, after removing duplicate articles (25), 115 (2.19%) were included once we checked that the “title” and/or “abstract” fulfilled any of the selection criteria. Fifty-three of them (1%) were excluded after a complete reading and once it was found that despite fulfilling some criteria they failed to comply with others (e.g., articles about suicide methods published between 2005–2015 but carried out in Asia). From those, 69% were high-quality, 24% were medium-quality, and 7% were low-quality studies. Once 4 low-quality works were removed along with 5 other studies that did not contribute enough information of the variables (outcomes), the final sample consisted of 53 (1%) articles and reviews (see [Figure 1](#)).

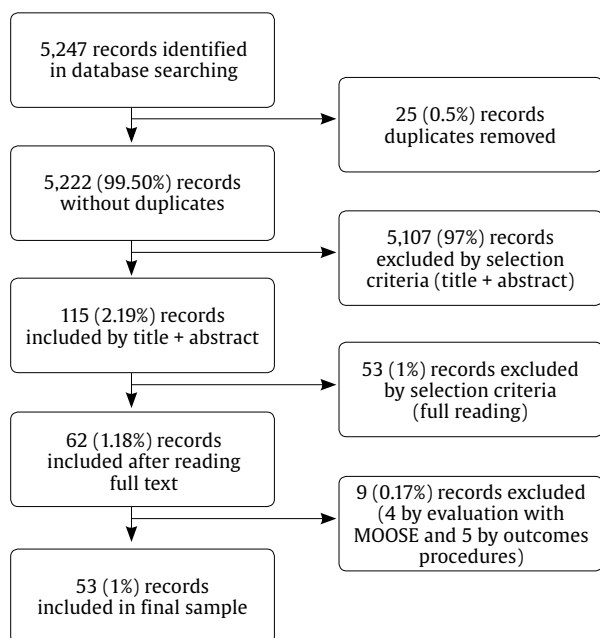


Figure 1. Results of the search and study selection.
Note. MOOSE = Meta-analysis of Observational Studies in Epidemiology.

Characteristics of the Studies

Most relevant characteristics of the articles and reviews included in this SR (references with asterisk) are specified in [Table 1](#) (samples and interval of years analysed in each study) and [Table 2](#) (variables and main results).

Analysis of the Studies

From the 34 studies containing information about sex, 55.8% show a high rate of suicide in men and 47% a high ideation, planning, and attempt rates in women, the most frequent of them being the latter (18%), mainly because of the methods used by each one. As for education, according to the 14 studies, 85.7% indicate higher SB

among those who have low education. Concerning residence area, 71.4% of the 7 studies share the fact that rurality is closely related to suicide (51.7%) and with the rest of SB (14.28%). Regarding marital status, 61.54% of the 13 studies show higher rates above all the SB in those with a marital status other than marriage; related to this and as far as age is concerned, we found that from the 27 works with this information, we can find more suicide (55.5%) than the rest of suicide behaviours (11.1%) in older people, contrasting with 26% and 33.3% that show more suicides and the rest of suicide behaviours respectively in younger people. One of the explanations to take a look at is that in the elderly it is easier to be a widow. Relating to the 12 studies regarding employment situation, the 75% show more suicide (33.3%) and the rest of the SB (41.6%) in those people who are unemployed. Lastly, but not least importantly, the most used methods are hanging (81.3%), firearm (56.3%), poisoning/overdose (43.7%), and jumping from a height (18.7%), according to 16 works with this information. Moreover, the relations between the variables will be commented in greater depth in the following section.

Discussion and Conclusion

The goal of this SR was to analyse the relationships between the sociodemographic variables that are more closely related to the SB, as well as the way that is used to commit suicide among the general population in Europe and America. The outcomes concerning sex show that being a woman is more associated with suicide ideation, planning, and attempt, with a prevalence of the first and third variables (e.g., [Husky, Guignard, Beck, & Michel, 2013](#); [ten Have, van Dorsseleer, & de Graaf, 2013](#)). Nevertheless, [Hunt, Sweeting, Keoghan, and Platt \(2006\)](#) found that in older people the ideation appeared to be the same in both sexes. On the other hand, being a man increased not only the frequency but also the risk of suicide (e.g., [Coope et al., 2014](#); [Gaxiola-Robles, Bitzer-Quintero, García-González, & Celis-de la Rosa, 2009](#)). This distinction is due to the fact that men use suicide methods that are more lethal, such as hanging or firearms, so they manage to achieve suicide, implying 60–70% and 85–90% of these fatalities respectively, in contrast with 2% of psychiatric drugs used by women ([Campa, Cantún, Santana, Cisnero, & García, 2012](#); [Fung & Chan, 2011](#); [Miller, Azrael, & Barber, 2012](#)). In spite of this, autopsies have revealed that both genders use more frequently as suicide methods hanging, poisoning/overdose, and firearms (e.g., [Borges et al., 2009](#); [Paraschakis et al., 2012](#)). There are also differences concerning rural areas and countries with low and medium outcomes, where poisoning/intoxication prevails due to the accessibility to pesticide residues used in farming, whereas in urban environments firearms are preferred. This latter suicide method affects 46% of suicide in USA because firearms are legal; this also applies to 18% of low-income countries, together with 50% of the suicides committed through hanging ([García Valencia et al., 2011](#); [Ministerio de Sanidad, Política Social e Igualdad, 2012](#); [WHO, 2014](#)).

Regarding marital status, we find a greater probability of all SBs in people with a status other than marriage, the most common suicide being in single people, and ideation, planning, and attempts in separated/divorced/widowed people (e.g., [Borges et al., 2009](#); [Gaxiola-Robles et al., 2009](#); [Rodríguez-Escobar, Medina-Pérez, & Cardona-Duque, 2013](#)). Therefore, marriage seems to be a protective factor, with a risk of suicide 3.3 and 18.32 times higher among people who are widowers or separated/divorced, respectively (e.g., [Fung & Chan, 2011](#); [Gaxiola-Robles et al., 2009](#)). These percentages decrease when people live in couple with children to take care of ([Uggla & Mace, 2015](#)). However, [Rodríguez, López, and López \(2012\)](#) found more suicide episodes among people who were married, even if it cannot be concluded that these outcomes were significant since the sample was distorted because of having high rates of married

Table 1. Information to the Sample Display and Years in Which the Studies Were Analysed

Author/s (year of publication)	Interval of years analysed	Sample
Abel et al. (2009)	2002-2006	Age = 5>75
Ali and Maharajh (2005)	--	N = 1,810; Age = 14-20
Beghi, Rosenbaum, Cerri, and Cornaggia (2013)	1991-2009	N = 76; Review
Borges et al. (2009)	2008	N = 22,966; Age = 12-65
Borges, Orozco, Benjet, and Medina-Mora (2010)	1970-2007	N = 2,388; Age = <15 ≥85
Brezo et al. (2007)	1986-1988	n1 = 3,017; Age = 6-12 n2 = 1,715; Age = 15-18 n3 = 1,684; Age = 19-24
Campa, Cantún, Santana, Cisnero, and García (2012)	2010	N = 249; Age = 1≥75
Campi, Barbato, D'Avanzo, Guaiana, and Bonati (2009)	1973-2002	N = 123,679; Age = 10-19
Cano et al. (2012)	2007-2010	N = 32; Age = <26
Cardona, Segura, Espinosa, and Segura (2013)	1998-2008	N = 5,878; Age = 15-24
Christiansen, Agerbo, Larsen, Bilenberg, and Stenager (2015)	2011	N = 355,725; Age = 16-19
Coope et al. (2014)	2001-2011	Age = 15-64
Córdoba-Doña, San Sebastián, Escolar-Pujolar, Martínez-Faure, and Gustafsson (2014)	2003-2012	N = 24,380; Age = 15-64
Crosby, Han, Ortega, Parks, and Gfroerer (2011)	2008-2009	N = 8,360; Age = ≥18
De Oliveira Faria, Gandolfi, and Azevedo Moura (2014)	2010	N = 210; Age = 18-24
Etzersdorfer, Voracek, Kapusta, and Sonneck (2005)	1990-2000	Age = <10 ≥85
Fedorowicz and Fombonne (2007)	1999	N = 1,106; Age = 15-26
Fung and Chan (2011)	--	N = 22
García Valencia et al. (2011)	2006-2007	N = 154
Gaxiola-Robles, Bitzer-Quintero, García-González, and Celis-de la Rosa (2009)	1998-2002	N = 145; Age = 14≥64
Gemmill et al. (2015)	2000-2011	Age = 20≥65
Gisle and Van Oyen (2013)	2004	N = 4,459; Age = 25-64
Haw, Hawton, Gunnell, and Platt (2015)	--	--
Hirsch (2006)	1996-2006	--
Hunt, Sweeting, Keoghan, and Platt (2006)	1930, 1950, 1970	1970 n = 652; Age = 55 1950 n = 753; Age = 35 1930 n = 720; Age = 15
Husky et al. (2013)	2009-2010	N = 27,653; Age = 15-85
Kaess et al. (2011)	2004-2005	N = 5,512; M age = 14.8
Ladwig et al. (2010)	2004-2005	N = 3,079; Age = 35-84
Mejías, García Caro, Schmidt, Quero, and Gorlat (2011)	2008-2009	N = 535; Age = 10-90
Mello-Santos, Bertolote, and Wang (2005)	1980-2000	Age = ≥5
Mendes et al. (2015)	2004-2012	N = 17; Age = <18
Murphy (2014)	2008	N = 10,672; Age = 13-17
Nkansah-Amankra (2013)	1995-2008	N = 9,421; Age = 11-32
Nowotny, Peterson, and Boardman (2015)	1994-2008	N = 13,186; Age = 13-22
Ordóñez Monak, Franco Agudelo, and González Ortiz (2013)	2003-2007	N = 98; Age = >60
Paraschakis et al. (2012)	2007-2009	N = 118; Age = ≥60
Parra Uribe et al. (2013)	2008-2010	N = 398; Age = ≤35 ≥49
Renberg, Hjelmeland, and Kopusov (2008)	--	N = 466; Age = 18-65
Rodríguez, López, and López (2012)	1960-1990	N = 147; Age = 13-86
Rodríguez-Escobar, Medina-Pérez, and Cardona-Duque (2013)	2005-2010	N = 363; Age = 10-86
Rueda-Jaimes, Martínez-Villalba, Castro-Rueda, and Camacho (2010)	--	N = 533
Santana, Costa, Cardoso, Loureiro, and Ferrao (2015)	1989-2012	N = 12,893; Age = 10 ≥ 70
Schneider et al. (2011)	1999-2000	N = 559; Age = ≥18
Schneider et al. (2014)	1984-1995	N = 12,888; Age = 25-74
Shields, Hunsaker, and Hunsaker (2006)	1993-2002	N = 2,864; Age = 11-24
Singh and Lathrop (2008)	1979-2005	N = 433; Age = 9-17
ten Have et al. (2009)	1996, 1997, 1999	1996 n = 7,076 1997 n = 5,618 1999 n = 4,796 Age = 18-64
ten Have et al. (2013)	2007-2009	N = 6,646; Age = 18-64
Thomas and Gunnell (2010)	1861-2007	Age = ≥15
Thompson, Dewa, and Phare (2012)	2009	N = 1,817; Age = 18-80
Torresani, Toffol, Scocco, and Fanolla (2014)	2000-2009	N = 525; Age = 0 ≥ 85
Uggla and Mace (2015)	2001	N = 927,134; Age = 16-59
Vougiouklakis, Tsiligianni, and Boumba (2009)	1998-2004	N = 242; Age = 10-24

Note. Data in alphabetical order by author/s.

people. The suicide related to the marital status can be associated with age: although different studies show different rates, most of them are common in people of older age (e.g., Beghi, Rosenbaum, Cerri, & Cornaggia, 2013; Coope et al., 2014). In this group of people

is more common to be a widower, and also other risk factors, such as chronic diseases (Fairweather-Schmidt, Anstey, Salim, & Rodgers, 2010), appear and they have a higher intentionality using methods which are more lethal (Ministerio de Sanidad, Política Social e

Table 2. Variables and Main Results of the Analysed Studies

Author/s (year of publication)	Objective	Country	Moderating variables	Main finding
Abel et al. (2009)	Suicide prevalence in Jamaica, compare them with international data and composition by age and sex.	Jamaica	Sex, age, suicide.	More suicide in men, with 30-39 years had the higher global rates.
Ali and Maharajh (2005)	Social predictors of the SB and age, sex and family structure influence.	Trinidad and Tobago	Sex, marital status, ideation, attempts.	Women has more ideation and attempts. Intact families were less likely of both behaviours.
Beghi, Rosenbaum, Cerri, and Cornaggia (2013)	Predictors of suicide.	UK, France, Spain, Belgium, Netherlands, USA	Age, suicide, ideation.	Predictors of suicide more strong was: old age, high suicide ideation, history of attempts.
Borges et al. (2009)	Prevalence and sociodemographic profile of the SB in the last year.	Mexico	Sex, age, education, marital status, residence area, method, ideation, planning, attempts.	By age, there is a peak between 15-17 years. Women, people without schooling, divorced people, metropolitan areas and low economic resources are more ideation, planning and attempts prevalence. The most used method was: poisoning/ overdose and firearm.
Borges, Orozco, Benjet, and Medina-Mora (2010)	Epidemiology of consummate suicide, of the current trend and SB.	Mexico	Sex, age, method, suicide.	Male suicide are higher in all the period, increased the rates between 15-34 years, declined to ≥ 65 years, for re-increased; increase in women are in 15-34 years, been constant from that age. In men are a greater proportion to 20-24 years, and women to 14-19 years. Hanging is the method in both sexes.
Brezo et al. (2007)	Natural histories of SB.	Canada	Sex, age, suicide, ideation, planning, attempts.	33% of suicides had ideation and very few had had previous attempts; of these, more than half had been before 18 years. Women had more planning and attempts.
Campa, Cantún, Santana, Cisneros, and García (2012)	Morbidity and mortality by SB.	Cuba	Sex, age, method, suicide, attempts.	More attempts in <19 years, largely in women and of suicide >60 years, majority of men. Regarding methods, women prefer psychiatric drugs and men hanging.
Campi, Barbato, D'Avanzo, Guaiana, and Bonati (2009)	Suicide rates in young by sex.	Italy	Sex, age, suicide.	Suicide rates were higher in men (2.8:1). Unusual in children of 10-14 years, increase rates (regardless of the sex) with age, being 5.9 times greater in 15-19 years and 21.7 times in adults.
Cano et al. (2012)	Related factors with SB contrasting results with scientific literature.	Spain	Sex, age, method, suicide.	Suicide rates man-woman 3:1. La edad media global es de 21 ± 3 años, encontrando un pico entre 20-25 años. En ambos sexos el método más usado fue ahorcamiento y precipitación.
Cardona, Segura, Espinosa, and Segura (2013)	Behaviour of the mortality by homicide and suicide.	Colombia	Sex, education, suicide.	High proportion of suicide in men. When education decrease, the suicide increase.
Christiansen, Agerbo, Larsen, Bilenberg, and Stenager (2015)	Association of attempted suicide-finish secondary education.	Denmark	Age, education, attempts.	Attempts and multiple attempts were more frequent in Young without secondary education.
Coope et al. (2014)	Suicide rates by sex, age and groups with greater suicide risk after economic recession 2008.	UK	Sex, age, residence area, suicide.	Suicide rates increase in 40-46 year old men, being more common in the medium-privates areas.
Córdoba-Doña, San Sebastián, Escolar-Pujolar, Martínez-Faure, and Gustafsson (2014)	Impact of the economic crisis on suicide attempts and their relationship with unemployment, age and sex.	Spain	Sex, age, employment state, suicide.	Women have higher rates of attempts. Regarding age, there is a peak in 40-44 years in both sexes. Every 1% increase in unemployment, increased suicide attempts, especially in women.

Table 2. Variables and Main Results of the Analysed Studies (continued)

Author/s (year of publication)	Objective	Country	Moderating variables	Main finding
Crosby, Han, Ortega, Parks, and Gfroerer (2011)	Data at the state level of SB in adults.	USA	Sex, age, employment state, education, SB.	People between 18-29 years, those with lower secondary education and the unemployed were more likely to have SB (sexcept suicide) in the past year. Women had more often ideation in the last year.
De Oliveira Faria, Gandolfi, and Azevedo Moura (2014)	Risk behaviours prevalence in university students.	Brazil	Sex, education, attempts.	University women have more attempts (12:1)
Etzersdorfer, Voracek, Kapusta and Sonneck (2005)	Austria's suicide rates during decade of the 20.	Austria	Sex, age, suicide.	Women have more reduction of suicide, the oldest group being the most at risk.
Fedorowicz and Fombonne (2007)	SB rates and age and sex effects.	France	Sex, age, ideation, planning, attempts.	Greater risk of ideation, planning and attempts in young women. Age is only significant in suicide ideation (throughout life and last year).
Fung and Chan (2011)	Examine and describe the SB in old age since gender perspective.	Europe, USA, Japan, Australia and China	Sex, age, suicide.	Older men have a higher risk of suicide.
García Valencia et al. (2011)	Differences between rural and urban suicide.	Colombia	Age, marital status, education, residence area, method, suicide.	Rural suicide rates were slightly higher, living alone age and low schooling than urban people. The most frequent method was poisoning in rural people and hanging and firearm in urban people.
Gaxiola-Robles, Bitzer-Quintero, García-González and Celis-de la Rosa (2009)	Suicidal risk according to sex, age, marital status and size of the place of residence.	USA	Sex, marital status, suicide.	Greater proportion of men suicide with a status other than marriage, both in prevalence and suicide risk.
Gemmill et al. (2015)	Suicide after unemployment.	Sweden	Employment state, suicide.	The increase in unemployment raised suicide at 6 months, declining at 8 months.
Gisle and Van Oyen (2013)	Prevalence of SB and its association with household composition.	Belgium	Age, marital status, ideation, planning and attempts.	Live alone or being single parent in adults implies a higher risk of ideation, planning and attempts.
Haw, Hawton, Gunnell, and Platt (2015)	Revision to explore taxpayers and improve the factors associated with economic recession and suicide.	UK and USA	Sex, employment state.	The increase in unemployment is associated with an increase in male suicide.
Hirsch (2006)	Differences between rural and urban suicide.	USA and Europe	Sex, residence area, suicide.	The increase of rurality raise the suicide rates, specially in men, being able to overcome the general rates.
Hunt et al. (2006)	Relation ideation-two gender measures (gender role orientation and attitudes of gender roles).	UK	Sex, age, ideation.	Older people have more ideation, without sexes differences.
Husky et al. (2013)	National rates of ideas and attempts in the last year; demographic correlates of idea and SB; and gender differences.	France	Sex, age, marital status, employment state, education, ideation, attempts.	Being female, low education, separated/divorced people, unemployment/inactive; being 31-65 years increase both ideation and attempts.
Kaess et al. (2011)	Gender differences in prevalence and SB in adolescents.	Germany	Sex, education, ideation, planning, attempts.	Students prevalence was twice as high in women, finding a higher percentage of ideation tan attempts.
Ladwig et al. (2010)	Evaluate sex and age in suicidal ideation.	Germany	Sex, age, employment state, ideation.	Unemployment and old age are associated with a higher ideation risk in men, but not in women.
Mejías, García Caro, Schmidt, Quero, and Gorlat (2011)	Non-fatal SB characteristics.	Spain	Sex, age, attempts.	Greater proportion of attempts in women; both sexes with average age of 41.26 ± 15.10
Mello-Santos, Bertolote, and Wang (2005)	Epidemiology of suicide in Brazil and compared with the internationals.	Brazil	Sex, age, suicide.	Men committed suicide between 2.3-4 times more, and the highest rates were in ≥65 years. People aged 15-24 had the highest rates increase.
Mendes et al. (2015)	Epidemiological, social and forensic aspects of suicide in children.	Portugal	Sex, age, marital status, education, method, suicide.	0.7% were suicide in children between 12-17 years, mainly men, students and single. Methods were: hanging, firearm and train.

Table 2. Variables and Main Results of the Analysed Studies (continued)

Author/s (year of publication)	Objective	Country	Moderating variables	Main finding
Murphy (2014)	Predictors of suicidal ideation in rural/urban areas.	USA	Residence area, ideation.	They are no statistically differences regarding the area of residence.
Nkansah-Amankra (2013)	SB in adolescence and adulthood.	USA	Age, ideation, attempts.	Ideation increased in adulthood, while attempts are more frequent in adolescence, plummeting in young adults.
Nowotny, Peterson, and Boardman (2015)	Influence of normative attitudes of gender on the state rates and the individual level of ideation in the youth.	USA	Sex, SB.	The greater the rigidity of gender normative behaviors and attitudes, the rate of ideation is higher, especially in women. Highly gendered contexts affect the risk of suicide in both sexes, but stronger in women. Those with typical female traits have higher indices of ideation.
Ordóñez Monak, Franco Agudelo, and González Ortiz (2013)	Epidemiological and socio-demographic characteristics of suicides > 60 years.	Colombia	Sex, marital status, employment state, education, method, suicide e.	Suicide ratio men-women 8:1. Women was widowers, married or single, with primary studies, housewives and they used hanging; Men was married or widowers with secondary studies, pensioner and they used firearm.
Paraschakis et al. (2012)	Suicidal elderly; and characteristics of two groups of elderly suicide ("young-old" of 60-74 years and "old-old" >75).	Greece	Sex, age, method.	Suicidal had a mean age of 73.6 years. More than half of this was men that did not live alone. The most used methods were: jumping from heights, hanging and firearm
Parra Uribe et al. (2013)	Suicide and suicide attempts.	Finland	Sex, marital status, employment state, method, suicide, SB.	Attempts are more frequent in women and suicide in men. Greater proportion of widowers and pensioners in overdose attempts and in suicides by hanging.
Renberg, Hjelmeland, and Kuposov (2008)	Model for the relationship between suicidal attitude-SB.	Sweden	Sex, ideation, planning, attempts.	Ideation, planning or previous attempt predicts attitude and acceptance towards suicide in both sexes; The greater the level of education, the greater the acceptance of suicide.
Rodríguez, López, and López (2012)	Epidemiology of suicide mortality.	Spain	Sex, age, marital status, employment state, method, suicide.	Suicide ratio men-women (2.86:1). Predominated those of age 50-59, married, small farmers/housewife, through hanging.
Rodríguez-Escobar, Medina-Pérez, and Cardona-Duque (2013)	Characterize suicide.	Colombia	Sex, marital status, employment state, education, method, suicide.	Greater proportion of suicidal men through hanging, poisoning and firearm; with primary studies, singles and small farmers.
Rueda-Jaimes, Martínez-Villalba, Castro-Rueda, and Camacho (2010)	Differences in ideation/SB in adolescents-adults.	Colombia	Age, method, suicide, SB.	Attempts were more frequent in teenagers; complete suicides in adults. Both use as methods: medications, intoxication and Sharp objects.
Santana, Costa, Cardoso, Loureiro, and Ferrao (2015)	Association between suicide mortality-characteristics of residence area, before and during the economic crisis.	Portugal	Sex, residence area, suicide.	Proportion men-women 3:1 in suicides. The greater the rurality, suicidal risk is greater.
Schneider et al. (2011)	Employment state and factors related to work on the risk of suicide.	Germany	Employment state, education.	Risk factors for suicide: to be unemployment, retired employees, be a housewife and have a low education.
Schneider et al. (2014)	Contributions of sociodemographic factors on the potential risk of suicide.	Germany	Sex, marital status.	Being a man and living alone increases the risk of suicide.
Shields, Hunsaker, and Hunsaker (2006)	Similarities and differences in suicidal results between teenagers and adults groups.	USA	Sex, method, suicide.	The majority of suicides were men; and the most used method in both sexes was: firearm, hanging and drug intoxication.
Singh and Lathrop (2008)	Suicide characteristics by age and sex.	Mexico	Age, method, suicide, SB.	28% of the suicides had had previous attempts; 20% planning. The most used methods were: firearm, hanging and overdose. The younger ones usually opt for hanging, while the older, firearm.

Table 2. Variables and Main Results of the Analysed Studies (continued)

Author/s (year of publication)	Objective	Country	Moderating variables	Main finding
ten Have et al. (2009)	Incidence of ideation and suicide attempt, and predicted factors.	Holland	Employment state, residence area, ideation, attempts.	Unemployment and urban area increase the probability of ideation. In the attempts only affects the unemployment.
ten Have et al. (2013)	Lifetime prevalence rates and mean age of SB onset; contributions of sociodemographic factors.	Netherlands	Sexo, edad, educación, ideación, planificación, tentativa.	Among the risk factors of ideation, planning and attempt are: to be female, young and low education.
Thomas and Gunnell (2010)	Rates according to age, sex and method.	UK	Sex, age, method, suicide.	Male suicide rates were higher; in both sexes there are peaks between 55-64 years and the lowest between 15-24 years. Method in both sexes: hanging.
Thompson, Dewa, and Phare (2012)	Report of the appearance of the 4 stages of the suicide process (death wish, ideation, planning and attempt) and, if the age of onset differed with later stages.	Canada	Age, SB.	The early onset of a SB (death wish) ensure worst problems levels in later life.
Torresani, Toffol, Scocco, and Fanolla (2014)	Characteristics of suicides in old age.	Italy	Sex, age, suicide.	Greater proportion of suicidal men >60 years and women <60 years. In all groups there were more suicidal men.
Ugglá and Mace (2015)	Forms of preventable death if predicted by marital status and dependent children.	Ireland	Sex, marital status, suicide, SB.	In both sexes, the mortality is lower if they cohabit with someone and have dependent children, although it is greater in men. Women have a 70% lower risk of suicide.
Vougiouklakis, Tsiligianni, and Boumba (2009)	SB until age 24.	Greece	Sex, age, method, suicide.	Suicide was the second form of death in both sexes, the majority being men between 12-24 years; women aged 16-22. The majority of suicides were of young adults though firearm, jumping from a height and drowning, followed by teenagers by hanging.

Note. Data in alphabetical order by author/s; SB = Suicidal Behavior; USA = United States of America; UK = United Kingdom.

Igualdad, 2012). Moreover, due to the increase of life expectancy and a greater accessibility to health services, the population seem to grow older showing a higher number of old adults, implying a rise in the rates of this group and making them more noticeable than the ones of the young people (Beautrais, Collings, Ehrhardt, & Henare, 2005). Despite the fact that some studies have shown more ideation, planning, and attempts among young people – especially the latter (e.g., Nkansah-Amankra, 2013; ten Have et al., 2013) –, other studies find higher rates of suicide in these people (e.g., Cano et al., 2012; Vougiouklakis, Tsiligianni, & Boumba, 2009). It seems that suicide ideation and attempts tend to appear in young adults, increasing the risk of suicide after puberty (Beautrais et al., 2005; Gisle & Van Hoye, 2013; Ministerio de Sanidad, Política Social e Igualdad, 2012). The disagreement among studies may be associated to the age of the sample collected and the fact that even if suicide has increased among older people, the rates of young people have been increasing over the last years (Ministerio de Sanidad, Política Social e Igualdad, 2012).

Referring to education, an agreement exists, as it has been found that every SB occurs among people who have a low level of education – the lower the education the higher the suicide rate (e.g., Cardona et al., 2013; Husky et al., 2013). De Oliveira Faria, Gandolfi, and Azevedo Moura (2014) found more attempts among women studying at the university. Considering the employment situation as a matter to be studied, the rates of SBs are higher among unemployed and retirees/pensioners (e.g., Crosby, Han, Ortega, Parks, & Gfroerer, 2011;

Schneider et al., 2011), and this could be associated with the fact that losing an employment or retiring may imply a stressful situation, increasing the risk of suicide by 2-3 times (Ministerio de Sanidad, Política Social e Igualdad, 2012). Finally, rates are higher in all SBs in rural areas, where suicide is more frequent (Borges et al., 2009; Santana, Costa, Cardoso, Loureiro, & Ferrao, 2015) as there is a higher accessibility to tools and methods to commit suicide. However, according to Murphy (2014), when we refer to ideation, there are not differences regarding the area of residence.

In spite of all the information obtained, this SR has the restriction of a possible publication bias, so for future research other journals which do not appear in the databases used should be taken into account. Furthermore, it was decided not to include psychopathological variables because the role of certain mental illnesses (e.g., depression or anxiety) is better known, and the results are more stable and clearer than other types of variables such as those chosen for this SR. Despite of the fact that these variables appear to be unconnected, this SR made the relationship between each of them and the SB clear, including the relationship between several of them. For the aforesaid, it would be advisable to expand the search with variables which, even if not closely associated with SB for future research, at least should provide important information as, for instance, sexual orientation, since different studies show that groups of Lesbians, Gays, Bisexuals, and Transsexuals have a higher risk of SB (Eisenberg & Resnick, 2006; Haas et al., 2010; Harris, 2013; Liu & Mustanski, 2012; Power et al., 2016). In view of all this, intervention and/or prevention plans (with

instruments that detect, for example, psychological abuse; see [Saldaña, Rodríguez-Carballeira, Almendros, & Escartín, 2017](#)) can be set up and targeted at groups that are more frequently associated with SBs. Other aspect to be mentioned is that in the flow chart a number of duplicate studies can be found in lower amount than studies excluded because they did not meet the inclusion criteria. That is the reason why the search was focused, among other databases, on the Web of Science Core Collection, in addition to the use of specific search criteria rather than more generic ones.

To conclude, the results show that men exceed women in consummated suicide, whereas in women the rest of SBs prevail, mainly attempts. In general, in both genders hanging, firearm use, and jumping from heights are more frequently used as a method of suicide. As for age, although consummated suicides are increasing among teenagers, they still prevail in older age (contrasting with ideation, planning, and attempts). Finally, unemployment, rurality, marital status other than marriage, and low education are associated with all SBs. These results should be taken into account when carrying out psychological autopsies, as they help to differentiate between actual suicides and possible homicides or accidents disguised as suicides. Being aware of clinical (characteristics of suicides/homicides), statistical (trends in space and time, related, for example, with the most common methods for committing suicide), and epidemiological (identification of risk factors) aspects is extremely important when carrying out such autopsies ([Morales, 2006](#)). Ruling out that there are no third persons involved (when it is not the case of a suicide) is a key factor in the legal field and during judicial proceedings. Furthermore, if we compare this SR with other recent publications ([Franklin et al., 2017](#); [Huang, Ribeiro, Musacchio, & Franklin, 2017](#); [Ribeiro et al., 2016](#)), we could find that this SR allows us to have relevant information in a single study regarding the variables that are more closely associated to suicidal behaviour (sex, age, marital status, employment status, residence area, education), the most commonly used suicide methods, and the relationship between all variables. In addition, the database used and the year range selected (ten years) allows us to have a very complete, comprehensive, and quality information.

Conflict of Interest

The authors of this article declare no conflict of interest.

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