



HAL
open science

Characteristics of homicide-suicide offenders: A systematic review

E Rouchy, E Germanaud, M Garcia, Gregory Michel

► **To cite this version:**

E Rouchy, E Germanaud, M Garcia, Gregory Michel. Characteristics of homicide-suicide offenders: A systematic review. *Aggression and Violent Behavior*, 2020, 55, 10.1016/j.avb.2020.101490 . hal-03159034

HAL Id: hal-03159034

<https://hal.science/hal-03159034>

Submitted on 9 Sep 2022

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.



Distributed under a Creative Commons Attribution - NonCommercial 4.0 International License

Characteristics of Homicide-Suicide Offenders: A Systematic Review

Rouchy Emma ^{1,2*}, Germanaud Emma ^{1,2}, Garcia Mathieu ^{1,2}, Michel Gregory ^{1,2}.

1 Institut de Sciences Criminelles et de la Justice (ISCJ), University of Bordeaux, 4 rue du Maréchal Joffre, Bordeaux 33075, France.

2 Department of Psychology, University of Bordeaux, France

*Corresponding author: Institut de Sciences Criminelles et de la Justice (ISCJ), University of Bordeaux, 4 rue du Maréchal Joffre, Bordeaux 33075, France. Mail: emma.rouchy@u-bordeaux.fr

Abstract

Homicide-suicides (HS), the murder of one or several individuals followed by the perpetrator's suicide, are a major public health problem. Despite an abundant literature on predictors of this complex phenomenon, findings have been contradictory. Our aim in this systematic review was to examine the characteristics of HS perpetrators and more globally the risk factors associated with HS. We searched six electronic databases from inception to October 1993 to August 2019 and identified 49 eligible studies. We extracted eight categories of risk factors, structured as follows: sociodemographic characteristics; relationship dynamics and family situation; victimological factors; psychopathological vulnerabilities; legal history; life experiences; motivational factors; and modus operandi. Perpetrators of homicide-suicides were older and more likely to be male, older than homicide or suicide perpetrators. Studies also reveal an early history of adversity during childhood, legal issues in the past, as well as the exposure to stressful and/or traumatic events shortly before the criminal act as risk factors. Most of HS are perpetrated in an intra-familial setting and occur in the context of recent separation, divorce, and domestic conflicts. Finally, the present review shows the significant contribution of psychopathological factors (e.g., depressive disorder, psychotic delusional convictions) in the HS phenomenon.

Keywords: Homicide-Suicide, Murder-Suicide, Homicide, Familicide, Risk Factors, Systematic Review

1. Introduction

Homicide-suicide (HS), is a multifactorial and polymorphic phenomenon which refers to the murder of one or several individuals followed by the perpetrator's suicide. There are numerous terminologies used to define this phenomenon, "extended-suicide", murder-suicide" or "dyadic death" along with an abounding number of definitions. While many authors have established that the suicide act had to occur within 24 hours of the homicide (Barber et al., 2008 ; Logan, 2008), others suggest that the offenders' suicide may take place several days after the homicide (Felthouse & Hampel, 1995), weeks after (Campanelli & Gilson, 2002 ; Chan, Beh, & Broadhurst, 2003 ; Comstock et al., 2005), and some don't even specify the time elapsed between the homicide and the suicide (Hata et al., 2001).

The question of temporality of the suicidal act, whilst sparking debate among researchers, appears to be unanimously considered as an essential modality as it conditions the continuity between two indivisible phenomena: seeing as one comes as an extension of the other. Therefore the articulation between these two acts raises causal questions, given that if we can consider suicide as a potential effect of the homicidal gesture, it can be hypothesized that it is the suicidal intention which leads to the murder as an annihilation of oneself and those around them.

HS is primarily known as an intrafamilial phenomenon: filicide-suicide, infanticide-suicide, parricide-suicide, uxoricide-suicide; however, it is important to note that this form of violence -while very rare- can also be perpetrated on extrafamilial individuals: mass-murders, H-S in professional settings, etc.

Although HS holds strong media coverage, this form of violence remains a rare phenomenon. Epidemiological data indicates that the official HS rate ranges from 0.27 to 0.38/100000 inhabitants in the United States (Liem, 2010), 0.2 to 1.55 in France (Vandevoorde et al, 2019), 0.89 in South Africa (Roberts et al, 2010), 0.44 in the Sapporo region in Japan (Hata et, 2001), 0.07 in Australia (Liem, 2010), 0.05 in England & Wales (Flynn et al, 2009), 0.04 in Italy (Roma et al, 2012) and 0.2 in Finland (Saleva, 2007).

But despite these low incidence rates, this phenomenon should be considered as a major public health issue as the effects of HS on individual, interindividual, familial, and social levels are numerous. It is important to consider the multitude of victims that result to such a crime, precipitating the risks of secondary victimization. However, the literature currently devoted to this phenomenon appears marked by a certain number of limitations which hinder our effective understanding of the psychological, criminological, and situational mechanisms underlying the HS act. These limitations result primarily from the postulate that homicide and suicide are by nature very different, legitimizing the establishment of research that study these two phenomena independently of each other. A second limitation pertains to the disparities in the sources of information as well as the many contradictory findings which emerge from certain studies of HS, making it harder to discriminate the risk factors associated with this rare phenomenon. In addition, other than a few studies which have tried to go beyond the epidemiological approach, most of the articles on HS are based on

sociodemographic descriptive data obtained from criminal, forensic and/or police records. Although valuable, these studies lack the perspective needed with other risk factors in order to draw up a profile that is as complete as possible. In this context, the purpose of this paper is to review and summarize the various characteristics of the HS offender collected thus far. Therefore, highlighting the most universal risk factors associated with the HS act.

2. Method

2.1. Search strategy

We conducted a systematic review of the literature published from October 1993 to August 2019 on homicide-suicide and its associated risk factors. A search of 6 electronic databases was made: PubMed, ScienceDirect, PsychInfo, PsychArticles, Scopus, Psychology and Behavioral Sciences Collection. The following keywords were used to identify the relevant articles: “homicide-suicide”, “murder-suicide”, “filicide-suicide”, “familicide-suicide”, “parricide-suicide”, “mass murder-suicide”, “neonaticide-suicide”, “risk factors” and “predictors”. We also examined reference lists of relevant reviews.

2.2. Study inclusion and exclusion criteria

The inclusion criteria for our review were as follows:

1. All studies that examined the characteristics and backgrounds of perpetrators of homicide-suicide (possibly including studies specifically focused on filicide-suicide, neonaticide-suicide, mass-murder-suicide, parricide-suicide, etc.). We included studies from various countries, and also those with a different methodology and sample size since empirical research on homicide-suicide is very limited.
2. Systematic reviews and/or meta-analyses pertaining to homicide-suicide, with explicit inclusion/exclusion criteria and explicit information about the studies carried out. We excluded meta-analyses who did not specify sample sizes and reports a summary effect size. Systematic reviews that yielded no includable studies – so-called “empty” reviews (e.g. the Campbell Collaboration reviews by Fisher, Montgomery, & Gardner, 2008a, 2008b) – were excluded.

We excluded (1) dissertation theses, congress abstracts or books; (3) studies published in other languages than English or French; (4) studies only focused on suicide or homicide - and not on homicide-suicide; (5) studies only focused on homicidal-suicidal ideation.

These database searches identified 851 reports. Duplicates were excluded and the final literature search included 758 articles. Their titles and abstracts were screened for eligibility. In total, 55 full-text reports were read for further screening, yielding 15 additional articles that were included. A flow-chart exhibiting the study selection process is shown in Fig.1.

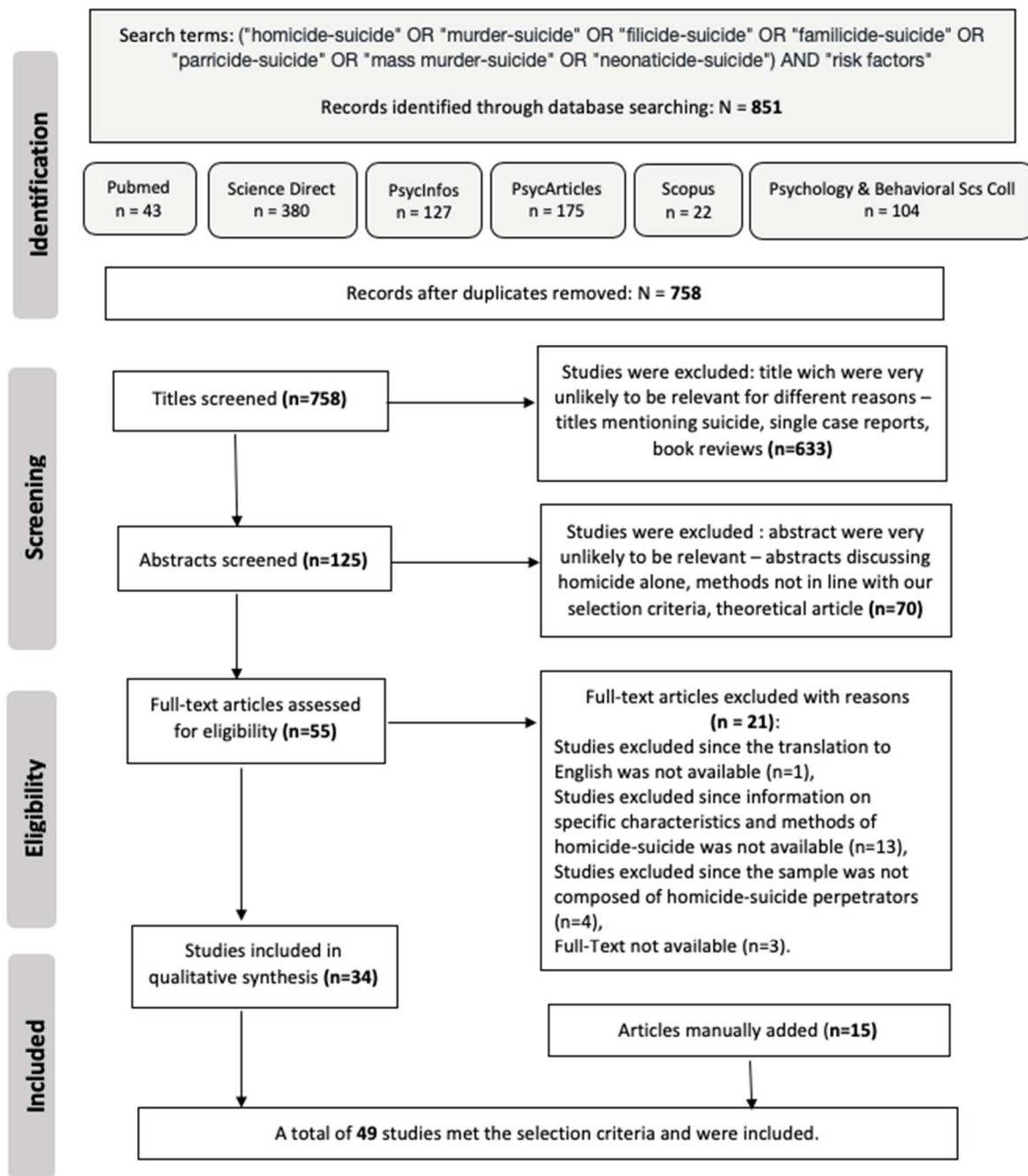


Fig 1. PRISMA flow diagram of selection process of studies

3. Results

3.1 Characteristics of included studies

3.1.1. Study design and setting

A total of 49 articles were included in this paper; 47 empirical studies (see details in Table 1), 2 systematic reviews and one meta-analysis (Table 2). The empirical studies were conducted in 16 different countries, 23 in the USA, 11 in Europe, 4 in Canada, 3 in Australia, 2 in South Africa and one in New Zealand, Taiwan, Chile and New Mexico. All population samples were composed of homicide-suicide perpetrators with N values ranging from 9 to

2048 subjects. The age groups studied are heterogeneous, with individuals ranging from 14 to 90 years old. There are various victims represented in these articles, ranging from young children to the elderly.

Many studies (n=15) focus on the identification of specific characteristics of HS perpetrators as compared to those of single homicide or suicide offenders (Banks et al., 2008 ; Bourget et al., 2010 ; Carretta et al., 2015 ; Cheng and Jaffe, 2019 ; Dawson, 2005 ; Easteal, 1994 ; Fridel and Zimmerman, 2019 ; Galta et al., 2010; Haines et al., 2010; Hedlund et al., 2016 ; Kalesan et al., 2018 ; Malphurs et al., 2001 ; Saleva et al., 2007 ; Panczak et al., 2013 ; Debowska et al., 2015). One study focused on a sample composed exclusively of mothers who committed filicide-suicide (Pan and Lee, 2008), while five other studies focused solely on female victims. Hence current studies on this phenomenon are various and diverge significantly in forms of HS : Intimate partner homicide-suicide (n=10), filicide-suicide (n=7), familicide-suicide (n=2) or even HS perpetrated by law enforcement personnel (police, military; n=2).

The sampling method used in the included articles were based on various databases (data from criminal registers, data through the centers for disease control and prevention, police reports, autopsy, etc.) which recorded the occurrence of the HS phenomenon as well as its associated factors over a period of time ranging from 1870 to 2016. The studies themselves were published between 1993 and 2019.

3.1.2. Types of risk factors

Given the plurality of variables offered in the 47 articles we have reviewed, we divided the risk factors into eight broad categories:

- Sociodemographic characteristics
- Relationship dynamics and family situation
- Victimological factors
- Psychopathological vulnerabilities
- Criminological - Legal history
- Life experiences
- Means and method used for the crime
- Motivational factors

Insert Table 1 & 2

3.2 Factors associated with H-S

3.2.1 Sociodemographic characteristics

One of the most consistent findings among the collected articles has been regarding the gender of the HS perpetrator. Nineteen studies (Bossarte et al., 2006 ; Buteau et al., 1993 ; Bridges and Lester, 2010 ; Eastel, 1994 ; Eliason, 2009 ; Flynn et al., 2009 ; Flynn et al.,

2016 ; Friedman et al., 2005 ; Galta et al., 2010 ; Haines et al., 2010 ; Hedlund et al., 2016 ; Kalesan et al., 2018 ; Kivivuori and Lehti, 2003 ; Liem and Koenraadt, 2007 ; Panczak et al., 2013 ; Panczak et al., 2013 ; Salari and Silito, 2015 ; Saleva et al., 2007 ; Schwab-Reese and Peek-Asa, 2019) have observed that men committed the majority of homicides-suicides. In addition, data suggests that perpetrators of HS are generally much older than perpetrators of homicide or suicide alone (Banks et al., 2018; Eastel, 1994 ; Eliason, 2009 ; Galta et al., 2010 ; Hedlund et al., 2016 ; Logan et al., 2019 ; Shackelford et al., 2005. ; Shackelford et al., 2008 ; Panczak et al., 2013), so much so, that it would appear that as age increases, so does the risk of HS. With regards to socio-economic status, the results are more nuanced, as there are as many studies reporting the perpetrators' financial difficulties (Bossarte et al., 2006; Shiferaw et al., 2009; Sillito et al., 2011) as there are studies reporting the presence of high socio-economic levels among offenders (Benitez et al., 2013 ; Kivivuori and Lehti, 2003). Furthermore, two studies (Shackelford et al., 2008; Sillito et al., 2011) and one review (Debowska et al., 2015) revealed that biological fathers are at greater risk compared to stepfathers or adoptive fathers of committing suicide following a familicide, thereby raising questions about the role of evolutionary factors in the HS act.

3.2.2. Relationship dynamics and family situation

In terms of interpersonal dynamics preceding the HS, studies are pretty unanimous : the HS act occurs in the context of recent separation, divorce or relational conflicts (Buteau et al., 1993 ; Cohen et al., 1998 ; Coorg et al., 2012 ; Flynn et al., 2016 ; Haines et al., 2010 ; Klinoff et al., 2015 ; Saleva et al., 2007 ; Shiferaw et al., 2009 ; Panczak et al., 2013) which tends in most cases to manifest itself through intra- and extra-familial physical and psychological violence (Carretta et al., 2015 ; Flynn et al., 2016 ; Klinoff et al., 2015 ; Sachmann et Johnson, 2014 ; Shiferaw et al., 2009).

3.2.3. Victimological factors

Victims of HS are most likely to be women or children (Bossarte et al., 2006; Bourget et al., 2010; Buteau et al., 1993; Galta et al., 2010; Panczak et al., 2013), as offenders tend to be men (Flynn et al., 2009; Flynn et al., 2016). Furthermore, many studies have observed that the risk of suicide following the homicidal act increases along with the level of proximity between the perpetrator and the victim (Flynn et al., 2016; Galta et al., 2010; Haines et al., 2010 ; Koziol- Mclain et al., 2006 ; Logan et al., 2008 ; Panczak et al., 2013 ; Stack, 1997).

3.2.4. Psychopathological vulnerabilities

Ten studies have reported the presence of diagnosed psychopathology or mental illness as a risk factor for HS (Buteau et al., 1993; Coorg and Tournay, 2012; Debowska et al., 2015 ; Flynn et al., 2016 ; Friedman et al., 2005 ; Kotzé et al., 2003 ; Logan et al., 2008 ; Moskowitz et al., 2006 ; Shiferaw et al., 2009 ; Schwab-Reese and Peek-Asa, 2019), without specifying

the nature of these psychiatric diagnostics. In another ten studies however, authors have identified a high proportion of depressive disorders in HS offenders (Bourget et al., 2010; Buteau et al., 1993; Cheng and Jaffe, 2019 ; Coorg and Tournay, 2012 ; Friedman et al., 2005 ; Kalesan et al., 2018 ; Kotzé et al., 2018 ; Malphurs et al., 2001 ; Saleva et al., 2007). Depression would thus be, according to Debowska and al. (2015) and Eliason (2009) the most predictive mental disorder for the HS phenomenon. Correlatively, the authors' clinical profile appears to be dotted with self-harm, prior suicide attempts and suicidal thoughts (Cheng and Jaffe, 2019; Flynn et al., 2016; Kalesan et al., 2018 ; Koziol-McLain et al., 2006 ; Schwab-Reese and Peek-asa, 2019).

Several studies have also reported the existence of personality disorders (cluster B) in HS offender (Flynn et al., 2009; Kotzé et al., 2018; Sachmann and Johnson, 2014), many of whom present comorbidities with substance use disorders, excessive consumption and sometimes intoxication episodes (Buteau et al., 1993 ; Carreta et al., 2015 ; Kotzé et al., 2018 ; Koziol-McLain et al., 2006 ; Eliason, 2009). Furthermore, while controversial, findings regarding the contributory nature of psychotic disorders suggest that the psychotic functioning in HS perpetrators is quite rare. In fact, only three studies have reported a link between psychosis and HS offenders (Coorg and Tournay, 2012 ; Debowska et al., 2015 ; Friedman et al., 2005) while two others confirmed the exact opposite (voir Kotzé et al., 2018 ; Saleva et al., 2007).

3.2.5. Criminological and legal history

A few studies have revealed that most HS perpetrators have criminal histories, prior arrest for substance use (Bossart et al., 2006; Fridel and Zimmerman, 2019; Kalesan et al., 2018; Logan et al., 2019) or at the least had legal issues in the past (Bossart et al., 2006; Fridel and Zimmerman, 2019; Kalesan et al., 2018; Logan et al., 2019).

3.2.6. Life experiences

Another factor that seems to strongly increase the risk of HS is the presence of early adverse childhood experiences (Cheng and Jaffe, 2019; Sachmann and Johnson, 2014). The fact of having been recently (i.e., before the act) confronted with one or more stressful experiences would serve as a triggering factor, which, added to other factors may facilitate the HS act (Fridel and Zimmerman, 2019 ; Kalesan et al., 2018 ; Schwab-Reese and Peek-Asa, 2019).

3.2.7. Means and method used for the crime

Data on the means used in committing the HS crime concurs that the access and the use of firearms substantially precipitate the risk of HS (Banks and al., 2018 ; Buteau and al., 1993; Carretta and al., 2015 ; Coorg and Tournay, 2012 ; Eastel, 1994 ; Eliason, 2009 ; Galta and al., 2010 ; Kotzé and al., 2018 ; Liem and Koenraad, 2007 ; Salari and silito, 2015;

Shackelford and al., 2008). In fact, the firearm would be the method most often used by perpetrators.

3.2.8. Motivational factors

Motivational factors surrounding the HS act are extremely diverse. This heterogeneity reflects not only the complexity of the psychological mechanisms underlying this phenomenon, but also the several functions of this act, which may vary depending on the situation, and in particular with regards to the clinical profiles of the offenders. The most common motivational factor, however, seems to be amorous jealousy (Cheng and Jaffe, 2019; Liem and Koenraadt, 2007; Shiferaw and al., 2009; Schwab-Reese and Peek-Asa, 2019). Those who possess this profile are described as extremely possessive and inhabited by obsessive convictions and ruminations about their partner's supposed infidelity, thus through the HS act they are finding a way to stay with their partner forever. In other words, the aim would be to provoke an object-subject fusion in death. It is also worth noting that these convictions are often tinged with paranoid elements and invasive suspicions (Lester and al., 2005).

Another most common motivational factor would be psychotic delusional convictions which are the by-product of an altruistic concern to spare a loved one (a child, a wife) from certain aspects of the world. In this sense, the suicide of the offender was preceded by a so-called 'altruistic murder', justified, for example, by the conviction that it is impossible for the wife to survive in this world alone, thus the only solution is to "leave together". This phenomenon is seen frequently in filicide-suicide cases, where the murder of the child is part of a perceived parental obligation not to leave the child alone after a planned suicide (Friedmann and al., 2005).

In light of these key motivational factors, it is easier to understand why there would be more premeditation in HS than in H alone (Dawson, 2005). Nonetheless, in a significant number of cases, the suicidal act isn't necessarily premeditated, it could be the consequence of an uncontrollable anger that eventually leads to homicide, and thus the suicide takes place as the offender realizes what he/she has done (Cheng and Jaffe, 2019; Haines and al., 2010).

4. Discussion

We systematically reviewed studies from around the world that examined social, criminological, and clinical characteristics of HS perpetrators. Although the results from these studies were heterogeneous, a consistent profile emerged: perpetrators of HS are more likely to be male, older than homicide or suicide perpetrators and more likely to have recently gone through a separation (often marital) which has led to significant domestic conflict and violence. In this way, HS acts are generally perpetrated in an intra-familial setting, women (wives) and/or children being most often the victims of this crime. This is why the closer the perpetrator and the victim(s) are to each other the greater the risk of HS is.

The profile of offenders that emerges from this systematic review reveals the significant contribution of psychopathological factors in the HS phenomenon. The perpetrators of this crime were in most cases suffering from a mental disorder, depression being the most common diagnosis along with substance use and recurrent suicidal attempts. The presence of psychotic disorders, however, does not appear to be a risk factor of HS. Furthermore, a perpetrator's criminal career does not generally begin with homicide but is marked by offences (including substance use offences) that have resulted in judicial convictions. Concerning the biographical factors, studies reveal an early history of adversity during childhood, as well as the exposure to stressful and/or traumatic events or situations shortly before the criminal act. Perpetrators, who tend to favor the use of a firearm and to premeditate their act, are guided by motivations that generally oscillate between amorous jealousy (accompanied by suspicion and paranoia) and altruism (melancholia).

One may be surprised to note, on the one hand, that most of the perpetrators are driven by obsessive convictions about the imminent infidelity of their partner, or by delirious nihilistic convictions that may lead them to "save" their loved ones from a hostile world, and on the other hand, that the perpetrators only very rarely suffer from psychosis. One possible explanation for these contradictory results is that certain crime-triggering events such as a break-up or a sudden job loss, would induce a psychotic decompensation leading the individual to committing the criminal act (HS). However, the court records from which the studies are based, rarely mention the presence of a psychotic disorder since these records are based on the psychiatric history of the subjects and not the psychological state in which the individual were at the time of the crime.

In addition, it can be assumed that the lack of precision - resulting from a stronger focus on forensic variables - regarding the clinical forms of depression in HS offenders increases the risk of overlooking important psychotic elements. In view of the melancholic motivations presented in several of the articles, it is expected that many of the offenders' present depressions of a melancholic nature from which arise delusional convictions leading to what Durkheim called "altruistic suicides" (Durkheim, 1897). But a more adjusted - and more recent - terminology is "compassionate suicide" which suggests that the murder is carried out for the benefit of others. However, the analysis of clinical cases reveals emotions of relief, anger, or fear in perpetrators rather than compassion.

More broadly, our analysis of the literature confirms the results from previous studies (Panczak, 2013) that HS offenders tend to be older than homicide offenders. This age gap underlines the idea that depressive symptoms and its morbid effects accompanying them become more prevalent with age (Liem and al. 2011). The elimination of inhibition mechanisms in HS offenders is probably influenced by the use of alcohol or stimulants. The strong motivations (described above) underlying most criminal acts may reflect a greater degree of premeditation and planning on the part of H-S offenders compared to homicide offenders alone. Another interesting (and particularly consistent) finding is that the vast majority of perpetrators of HS were men, with predominantly female victims. Feminist theories interpret this result by presenting the HS phenomenon as a form of hegemonic

masculinity, where the violent act is an extreme way of controlling female sexual partners and descendants, perceived as the only remaining option when relationships break down (Gregory, 2012). This theory is corroborated by the frequency of jealous outbursts observed in many offenders. Conversely, when the perpetrators of HS are women, the victims are most often children, killed, here again, with an altruistic aim, but also in a desire to keep one's child close to themselves even in death.

It is clear that depending on the type of offender and the logic behind their actions, homicide-suicides can be seen as essentially homicidal, with the killer subsequently dying by suicide perhaps out of remorse, or alternatively as a suicide extended to intimate relations (Dawson, 2015). In any case, HS events represent a distinct entity, where homicides and suicides are combined, and whose characteristics differ from those found in homicide or suicide cases. Indeed, HS often result from situations and living conditions associated with intimate partner strain and general psychological stress (Bossarte, 2006; Cohen, 1998). Sociological and criminological theories have repeatedly linked psychological stress and life pressures with violence. In 1938 Merton put forward what has become known as strain theory: by putting strain on some members of society, social structures will make it more likely for some to commit crimes than for others. More recently, Levin and Madfis (2009) proposed a sequential model of cumulative strain where chronic strain combined with acute and stressful events, for example the separation of intimate partners, eventually leads to the catastrophic event. We could extend Levin and Madfis's (2009) sequence model to include both mediating and moderating impact of the subject's psychological functioning, and more specifically, the psychopathological factors whose criminogenic effects are added with those of stress factors (endogenous and exogenous).

Despite these interesting results, this study has several limitations. First of all, the definitions of homicide-suicide, specifically regarding the interval between the homicide and the suicide, differed across studies, although the interval did not go beyond one week. Secondly, while some studies carefully differentiate between the types of HS perpetrated – studying the factors specifically associated with each form of HS act -, some are not as meticulous, and tend to fall into an homogenization of HS perpetrators, when in fact they are heterogeneous. It would thus have been wise to evaluate the different profiles of perpetrators of HS based on the victim's typologies and the context (intra versus extra-familial) in which the crime occurred. Thirdly, data sources used in the studies reviewed in this article were mostly based on HS records many of which were incomplete: as the records only collect information of a sociodemographic or criminological nature, disregarding any other potentially important risk factor. Lastly, we must remain vigilant with regards to the reliability of some of the elements reported in these studies, for instance, the psychiatric diagnostics mentioned in some articles tend to be vague (in some studies they mention mental health problems, without any further details) and thus need to be interpreted with caution.

5. Conclusion

Despite its limitations, this systematic review has the merit of identifying characteristics and risk factors of the HS phenomenon. We have been able to highlight several patterns and a series of vulnerabilities which overlap each other and ultimately lead to this deadly crime. We have also been able to identify the main motivations and the psychological profiles most at risk by reviewing all the available and most recent data on this phenomenon from which we still have much to learn. Future research in this field will need to further explore the psychopathological factors associated with the HS phenomenon in order to clarify their influence in regard to the other factors involved in this act. These findings would provide possible preventive clinical strategies.

Ethics

The authors assert that all procedures contributing to this work comply with the ethical standards laid down in the 1964 Declaration of Helsinki and its later amendments. All participants gave their informed consent prior to their inclusion in the study.

Conflict of interest

The authors declare no conflicts of interest associated with this research study.

Acknowledgments

The authors are indebted to the participants of the i-Share project for their commitment and cooperation and to the entire i-Share staff for their expert contribution and assistance.

Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: This work was funded by a grant of the “Future Investments” program in the framework of the IdEx University of Bordeaux program (HEADS program), Grant ANR-10-IDEX- 03-02. The i-Share project is supported by the French National Research Agency (Agence Nationale de la Recherche, ANR), Grant ANR-10-COHO-05.

References

1. Banks, L., Crandall, C., Sklar, D., & Bauer, M. (2008). A comparison of intimate partner homicide to intimate partner homicide–suicide: one hundred and twenty-four

- New Mexico cases. *Violence Against Women*, 14(9), 1065-1078.
<https://doi.org/10.1177/1077801208321983>
2. Barber, C. W., Azrael, D., Hemenway, D., Olson, L. M., Nie, C., Schaechter, J., et al. (2008). Suicides and suicide attempts following homicide. *Homicide Studies*, 12(3), 285–297. <https://doi.org/10.1521/suli.2010.40.6.609>
 3. Benítez-Borrego, S., Guàrdia-Olmos, J., & Aliaga-Moore, A. (2013). Child homicide by parents in Chile: A gender-based study and analysis of post-filicide attempted suicide. *International journal of law and psychiatry*, 36(1), 55-64. <https://doi.org/10.1016/j.ijlp.2012.11.008>
 4. Bossarte, R. M., Simon, T. R., & Barker, L. (2006). Characteristics of homicide followed by suicide incidents in multiple states, 2003–04. *Injury prevention*, 12(suppl 2), ii33-ii38. <https://doi.org/10.1136/ip.2006.012807>
 5. Bourget, D., Gagné, P., & Whitehurst, L. (2010). Domestic homicide and homicide-suicide: the older offender. *Journal of the American Academy of Psychiatry and the Law Online*, 38(3), 305-311.
 6. Buteau, J., Lesage, A. D., & Kiely, M. C. (1993). Homicide followed by suicide: a Quebec case series, 1988–1990. *The Canadian Journal of Psychiatry*, 38(8), 552-556. <https://doi.org/10.1177/070674379303800805>
 7. Bridges, F. S., & Lester, D. (2011). Homicide–suicide in the United States, 1968–1975. *Forensic science international*, 206(1-3), 185-189. <https://doi.org/10.1016/j.forsciint.2010.08.003>
 8. Carretta, C. M., Burgess, A. W., & Welner, M. (2015). Gaps in crisis mental health: suicide and homicide–suicide. *Archives of psychiatric nursing*, 29(5), 339-345. <https://doi.org/10.1016/j.apnu.2015.06.002>
 9. Cheng, P., & Jaffe, P. (2019). Examining depression among perpetrators of intimate partner homicide. *Journal of interpersonal violence*, 0, 1-22. <https://doi.org/10.1177/0886260519867151>
 10. Cohen, D., Llorente, M., & Eisdorfer, C. (1998). Homicide-suicide in older persons. *American Journal of Psychiatry*, 155(3), 390-396. <https://doi.org/10.1176/ajp.155.3.390>
 11. Coorg, R., & Tournay, A. (2013). Filicide-suicide involving children with disabilities. *Journal of child neurology*, 28(6), 745-751. <https://doi.org/10.1177/0883073812451777>
 12. Dawson, M. (2005). Intimate femicide followed by suicide: Examining the role of premeditation. *Suicide and life-threatening behavior*, 35(1), 76-90. <https://doi.org/10.1521/suli.35.1.76.59261>
 13. Debowska, A., Boduszek, D., & Dhingra, K. (2015). Victim, perpetrator, and offense characteristics in filicide and filicide–suicide. *Aggression and violent behavior*, 21, 113-124. <https://doi.org/10.1016/j.avb.2015.01.011>
 14. Durkheim, E. (1897). *Le suicide*. PUF. Paris : France.
 15. Easteal, P. (1994). Homicide-suicides between adult sexual intimates: an Australian study. *Suicide and Life-Threatening Behavior*, 24(2), 140-151. <https://doi.org/10.1111/j.1943-278X.1994.tb00798.x>

16. Eliason, S. (2009). Murder-suicide: a review of the recent literature. *Journal of the American Academy of Psychiatry and the Law Online*, 37(3), 371-376.
17. Fridel, E. E., & Zimmerman, G. M. (2018). Putting homicide followed by suicide in context: Do macro-environmental characteristics impact the odds of committing suicide after homicide. *Criminology*, 57(1), 34-73. <https://doi-org/10.1111/1745-9125.12195>
18. Fridel, E. E., & Zimmerman, G. M. (2019). Examining Homicide-Suicide as a Current in the Stream Analogy of Lethal Violence. *Social Forces*, 97(3), 1177-1204. <https://doi-org.eres.qnl.qa/10.1093/sf/soy071>
19. Flynn, S., Swinson, N., While, D., Hunt, I. M., Roscoe, A., Rodway, C., & Shaw, J. (2009). Homicide followed by suicide: a cross-sectional study. *The Journal of Forensic Psychiatry & Psychology*, 20(2), 306-321. <https://doi.org/10.1080/14789940802364369>
20. Flynn, S., Gask, L., Appleby, L., & Shaw, J. (2016). Homicide–suicide and the role of mental disorder: a national consecutive case series. *Social psychiatry and psychiatric epidemiology*, 51(6), 877-884. <https://doi.org/10.1007/s00127-016-1209-4>
21. Galta, K., Olsen, S. L., & Wik, G. (2010). Murder followed by suicide: Norwegian data and international literature. *Nordic journal of psychiatry*, 64(6), 397-401. <https://doi.org/10.3109/08039481003759201>
22. Gregory, M. (2012). Masculinity and homicide-suicide. *International journal of law, crime and justice*, 40(3), 133-151. <https://doi.org/10.1016/j.ijlcrj.2011.08.001>
23. Haines, J., Williams, C. L., & Lester, D. (2010). Murder–suicide: A reaction to interpersonal crises. *Forensic science international*, 202(1-3), 93-96. <https://doi.org/10.1016/j.forsciint.2010.04.036>
24. Hata, N., Kominato, Y., Shimada, I., Takizawa, H., Fujikura, T., Morita, M., ... & Misawa, S. (2001). Regional differences in homicide patterns in five areas of Japan. *Legal Medicine*, 3(1), 44-55. [https://doi.org/10.1016/s1344-6223\(01\)00003-7](https://doi.org/10.1016/s1344-6223(01)00003-7)
25. Felthous, A. R., & Hempel, A. G. (1995). Combined homicide–suicides: a review. *Journal of Forensic Sciences*, 40, 846–857.
26. Friedman, S. H., Hrouda, D. R., Holden, C. E., Noffsinger, S. G., & Resnick, P. J. (2005). Filicide-suicide: common factors in parents who kill their children and themselves. *Journal of the American Academy of Psychiatry and the Law Online*, 33(4), 496-504.
27. Hedlund, J., Masterman, T., & Sturup, J. (2016). Intra-and extra-familial child homicide in Sweden 1992–2012: A population-based study. *Journal of forensic and legal medicine*, 39, 91-99. <https://doi.org/10.1016/j.jflm.2016.01.011>
28. Kalesan, B., Mobily, M. E., Vasan, S., Siegel, M., & Galea, S. (2018). The role of interpersonal conflict as a determinant of firearm-related homicide–suicides at different ages. *Journal of interpersonal violence*, 33(15), 2335-2351. <https://doi.org/10.1177/0886260516629387>
29. Klinoff, V. A., Van Hasselt, V. B., & Black, R. A. (2015). Homicide-suicide in police families: an analysis of cases from 2007-2014. *Journal of forensic practice*. <https://doi.org/10.1108/JFP-07-2014-0019>

30. Kivivuori, J., & Lehti, M. (2003). Homicide followed by suicide in Finland: trend and social locus. *Journal of Scandinavian Studies in Criminology and Crime Prevention*, 4(2), 223-236. <https://doi.org/10.1080/14043850310021972>
31. Kotzé, C., Khamker, N., Lippi, G., Naidu, K., Poee, J. M., Sokudela, F. B., & Roos, J. L. (2018). Psychiatric and other contributing factors in homicide-suicide cases, from Northern Gauteng, South Africa over a six-year period. *International journal of forensic mental health*, 17(1), 35-44. <https://doi.org/10.1080/14999013.2017.1416004>
32. Koziol-McLain, J., Webster, D., McFarlane, J., Block, C. R., Ulrich, Y., Glass, N., & Campbell, J. C. (2006). Risk factors for femicide-suicide in abusive relationships: Results from a multisite case control study. *Violence and victims*, 21(1), 3.
33. Levin, J., & Madfis, E. (2009). Mass murder at school and cumulative strain: A sequential model. *American behavioral scientist*, 52(9), 1227-1245. <https://doi.org/10.1177/0002764209332543>
34. Lester, D., Stack, S., Schmidtke, A., Schaller, S., & Müller, I. (2005). Mass homicide and suicide: deadliness and outcome. *Crisis*, 26(4), 184-187. <https://doi.org/10.1027/0227-5910.26.4.184>
35. Liem, M., Barber, C., Markwalder, N., Killias, M., & Nieuwbeerta, P. (2011). Homicide–suicide and other violent deaths: An international comparison. *Forensic Science International*, 207(1-3), 70-76. <https://doi.org/10.1016/j.forsciint.2010.09.003>
36. Liem, M. (2010). Homicide–parasuicide: A qualitative comparison with homicide and parasuicide. *The Journal of Forensic Psychiatry & Psychology*, 21(2), 247-263. <https://doi.org/10.1080/14789940903335144>
37. Liem, M. C. A., & Koenraadt, F. (2007). Homicide-suicide in the Netherlands: A study of newspaper reports, 1992–2005. *The Journal of Forensic Psychiatry & Psychology*, 18(4), 482-493. <https://doi.org/10.1080/14789940701491370>
38. Logan, J., Hill, H. A., Black, M. L., Crosby, A. E., Karch, D. L., Barnes, J. D., & Lubell, K. M. (2008). Characteristics of perpetrators in homicide-followed-by-suicide incidents: National Violent Death Reporting System—17 US States, 2003–2005. *American journal of epidemiology*, 168(9), 1056-1064. <https://doi.org/10.1093/aje/kwn213>
39. Logan, J. E., Ertl, A., & Bossarte, R. (2019). Correlates of intimate partner homicide among male suicide decedents with known intimate partner problems. *Suicide and Life-Threatening Behavior*, 49(6), 1693-1706. <https://doi.org/10.1111/sltb.12567>
40. Malphurs, J. E., Eisdorfer, C., & Cohen, D. (2001). A comparison of antecedents of homicide–suicide and suicide in older married men. *The American Journal of Geriatric Psychiatry*, 9(1), 49-57. <https://doi.org/10.1097/00019442-200102000-00008>
41. Mathews, S., Abrahams, N., Jewkes, R., Martin, L. J., Lombard, C., & Vetten, L. (2008). Intimate femicide-suicide in South Africa: a cross-sectional study. *Bulletin of the World Health Organization*, 86, 542-558. <https://doi.org/10.2471/BLT.07.043786>
42. Moskowitz, A., Simpson, A. I., McKenna, B., Skipworth, J., & Barry-Walsh, J. (2006). The role of mental illness in homicide-suicide in New Zealand, 1991–2000. *The Journal of Forensic Psychiatry & Psychology*, 17(3), 417-430. <https://doi.org/10.1080/14789940600761410>

43. Pan, Y. J., & Lee, M. B. (2008). Charcoal burning and maternal filicide-suicide trends in Taiwan: the impact of accessibility of lethal methods. *Journal of the Formosan Medical Association*, 107(10), 811-815. [https://doi.org/10.1016/S0929-6646\(08\)60195-3](https://doi.org/10.1016/S0929-6646(08)60195-3)
44. Panczak, R., Geissbühler, M., Zwahlen, M., Killias, M., Tal, K., & Egger, M. (2013). Homicide-suicides compared to homicides and suicides: Systematic review and meta-analysis. *Forensic science international*, 233(1-3), 28-36. <https://doi.org/10.1016/j.forsciint.2013.08.017>
45. Panczak, R., Zwahlen, M., Spoerri, A., Tal, K., Killias, M., & Egger, M. (2013). Incidence and risk factors of homicide–suicide in Swiss households: National cohort study. *PloS one*, 8(1). <https://doi.org/10.1371/journal.pone.0053714>
46. Patton, C. L., McNally, M. R., & Fremouw, W. J. (2017). Military versus civilian murder-suicide. *Journal of interpersonal violence*, 32(17), 2566-2590. <https://doi.org/10.1177/0886260515593299>
47. Rice, T. R., & Sher, L. (2016). Preventing plane-assisted suicides through the lessons of research on homicide and suicide–homicide. *Acta neuropsychiatrica*, 28(4), 195-198. <https://doi.org/10.1017/neu.2015.67>
48. Roberts, K., Wassenaar, D., Canetto, S. S., & Pillay, A. (2010). Homicide-suicide in Durban, South Africa. *Journal of interpersonal violence*, 25(5), 877-899. <https://doi.org/10.1177/0886260509336964>
49. Roma, P., Spacca, A., Pompili, M., Lester, D., Tatarelli, R., Girardi, P., & Ferracuti, S. (2012). The epidemiology of homicide–suicide in Italy: A newspaper study from 1985 to 2008. *Forensic science international*, 214(1-3), e1-e5. <https://doi.org/10.1016/j.forsciint.2011.06.022>
50. Sachmann, M., & Harris Johnson, C. M. (2014). The Relevance of Long-Term Antecedents in Assessing the Risk of Familicide-Suicide Following Separation. *Child abuse review*, 23(2), 130-141. <https://doi.org/10.1002/car.2317>
51. Salari, S., & Sillito, C. L. (2016). Intimate partner homicide–suicide: perpetrator primary intent across young, middle, and elder adult age categories. *Aggression and violent behavior*, 26, 26-34. <https://doi.org/10.1016/j.avb.2015.11.004>
52. Saleva, O., Putkonen, H., Kiviruusu, O., & Lönnqvist, J. (2007). Homicide–suicide— an event hard to prevent and separate from homicide or suicide. *Forensic Science International*, 166(2-3), 204-208. <https://doi.org/10.1016/j.forsciint.2006.05.032>
53. Shackelford, T. K., Weekes-Shackelford, V. A., & Beasley, S. L. (2005). An exploratory analysis of the contexts and circumstances of filicide-suicide in Chicago, 1965–1994. *Aggressive Behavior: Official Journal of the International Society for Research on Aggression*, 31(4), 399-406. <https://doi.org/10.1002/ab.20085>
54. Shackelford, T. K., Weekes-Shackelford, V. A., & Beasley, S. L. (2008). Filicide–suicide in Chicago, 1870-1930. *Journal of interpersonal violence*, 23(5), 589-599. <https://doi.org/10.1177/0886260507313527>
55. Shiferaw, K., Burkhardt, S., Lardi, C., Mangin, P., & La Harpe, R. (2010). A half century retrospective study of homicide–suicide in Geneva–Switzerland: 1956–2005.

- Journal of forensic and legal medicine*, 17(2), 62-66.
<https://doi.org/10.1016/j.jflm.2009.09.003>
56. Schwab-Reese, L. M., & Peek-Asa, C. (2019). Factors contributing to homicide-suicide: differences between firearm and non-firearm deaths. *Journal of behavioral medicine*, 42(4), 681-690. <https://doi.org/10.1007/s10865-019-00066-9>
 57. Sillito, C. L., & Salari, S. (2011). Child outcomes and risk factors in US homicide-suicide cases 1999–2004. *Journal of Family Violence*, 26(4), 285-297. <https://doi.org/10.1007/s10896-011-9364-6>
 58. Stack, S. (1997). Homicide followed by suicide: An analysis of Chicago data. *Criminology*, 35(3), 435-453. <https://doi.org/10.1111/j.1745-9125.1997.tb01224.x>
 59. Vandevoorde, J., Estano, N., & Painset, G. (2017). Homicide-suicide: Clinical review and psychological assumptions. *L'Encephale*, 43(4), 382-393. <https://doi.org/10.1016/j.encep.2016.04.014>
 60. Weeke, A., & Oberwittler, D. (2018). A comparison of note writers and no note writers in homicide-suicide cases in Germany. *Archives of suicide research*, 22(1), 11-19. <https://doi.org/10.1080/13811118.2017.1304307>

Table 1. Study characteristics

Authors (Publication year)	Population	Objective(s)	Sources of information	Results	Time period
Banks et al. (2008) USA, New Mexico	N=124 female intimate partner homicide cases (FIPH); separated into two groups: H.S (n=46) and Homicide alone (n=78); M= 39.6 years old, from 17 to 90.	To determine if cases of intimate partner homicide-suicide differed from cases of homicide without suicide and whether differences might suggest specific interventions.	Case reports were obtained from the New Mexico Office of the Medical Investigator.	FIPH was most often perpetrated by middle-aged to older, married (70%), or formerly married men who used a firearm. In cases of H-S, couples tended to be older and the use of firearm more frequent than with cases of homicide without suicide.	1993 - 2002
Benitez-Borrego et al. (2013) Chile	N= 98 filicide-suicide cases; composed of women (n= 66) and men (n= 32); M= 31.71 years old, from 18 to 62.	Analyze the phenomenon of filicide, the differences that exist between male and female perpetrators as well as identifying the variables that come in play to the presence of a	The offenders were all evaluated by the Area of Adult Mental Health of the Legal Medical Service of Chile.	High rates of suicide in filicide perpetrators were found (32-38%), with little to no difference between men and women. Parents with higher socioeconomic status were more likely to have attempted suicide after committing infanticide. Results of this analysis suggest that more years of	1998 - 2009

		suicide attempt following filicide.		schooling or the use of carbon monoxide poisoning or intoxication as the method of murder are risk factors for post-filicide suicide attempts.	
Bossarte et al. (2006) USA	N= 209 H-S cases; 24.9% aged 35 to 44 years old.	To calculate the prevalence of H-S and provide contextual and demographic information about the individuals involved.	The data was obtained through an active state-based surveillance system, the National Violent Death Reporting System, includes information from 7 states in 2003 and 13 in 2004.	58% of the victims were a current or former intimate partner of the perpetrator. 13.7% of victims were the children of the perpetrator. Overall, most victims were female (74%) and most perpetrators were male (91.9%); <ul style="list-style-type: none"> • recent history of legal problems (25.3%) • financial problems (9.3%) 	2003 - 2004
Bourget et al. (2010) Canada	N=19 H-S cases; aged 65 and over; specific to domestic homicide, where the individuals killed were family members or a spouse.	Identify the clinical factors characteristics of older perpetrators of Homicide and H-S.	The data was obtained with the examination of coroners' files on domestic homicide (Quebec Coroner Head Office).	89% homicide victims were female. Age ranges from 12 to 82 years. 85% of victims were the current spouse of the perpetrator. 87% of offenders of H-S suffered from major depression.	1992 - 2007

<p>Bridges and Lester (2010)</p> <p>USA</p>	<p>N= 2215 H-S cases.</p>	<p>The objectives of the present study were to describe homicide-suicide incidents in the United States as a whole, to calculate their rates, and to document age, gender, and racial and ethnic differences and the relationship between the victim and the murderer.</p>	<p>Data was collected from the Supplementary Homicide Reports taken from the FBI's Uniform Crime Reporting Program Data.</p>	<p>H-S events accounted for 1.8% and 1.1% of all reported homicides and suicides.</p> <p>Men were more likely to be offenders,</p> <p>50% of H-S cases were spouses killing partners and then committing suicide.</p> <p>Women were more often killed by their husbands (65% of female victims) than men were killed by their wives (21% of male victims).</p> <p>In cases of filicide-suicide female parents were more likely to kill their children than male parents.</p>	<p>1968 - 1975</p>
<p>Buteau et al. (1993)</p> <p>Canada</p>	<p>N = 39 H-S cases; 56% aged under 40 years old.</p>	<p>To compare the epidemiological, sociodemographic and clinical characteristics of the 39 cases of H-S between 1988 and 1990 (Quebec) with other reported findings on this subject.</p>	<p>The data was obtained through the coroner's files of the 39 cases and was reviewed by a psychologist and a psychiatrist.</p>	<p>Perpetrators were often males (90%; <40 years old).</p> <p>The victims were all known to the perpetrator.</p> <p>Victims were mostly women.</p> <p>Firearms were used in 56% of H-S.</p> <p>A recent separation by the spouse had occurred in 59% of cases.</p> <p>Any mention of mental disorders, psychopathology was noted in 67% of cases including 46% of depression and 23% of substance abuse.</p>	<p>1988 - 1990</p>

<p>Carretta et al. (2015)</p> <p>USA</p>	<p>N=193 H-S cases; composed of male (n=177) and female (n=16); 55.7% aged 20 to 49 years old and 44.6% aged 50 and over.</p>	<p>Comparing suicide cases to homicide-suicide cases and sought to compare toxicology findings on autopsy between the two types of violent deaths.</p>	<p>Autopsy reports for suicide and homicide-suicide deaths were examined at the Orange County (OC) and Los Angeles County (LA) Department of Medical Examiner-Coroner.</p>	<p>Homicide-suicide perpetrators had almost twice the level of stimulants in their system than people who suicide but did not have comparatively elevated levels of drugs or alcohol.</p> <p>Predictors of homicide-suicide included gunshot as the cause of death, female gender, domestic conflict, children living in the home, and prior arrest for substance abuse.</p>	<p>2001 - 2010</p>
<p>Cheng and Jaffe (2019)</p> <p>Canada</p>	<p>N=66 Intimate partner homicide-suicide cases (IPHS); Focused on adult male perpetrators and adult female victims; M= 43.85 years old, from 18 to 89.</p> <p>Two distinct groups: perpetrators with a diagnosis or symptoms of depression (DP) (n=87) and no diagnosis or</p>	<p>Understanding the role that depression plays in perpetrators of Intimate partner homicide (IPH); Comparison of risk factors/demographic information/help-seeking behaviors between depressed and nondepressed IPH (including IPHS) perpetrators.</p>	<p>Data were obtained from the Domestic Violence Death Review Committee in Ontario, Canada (subject - domestic homicide cases in Ontario).</p>	<p>DP were older than NDP; more likely to be in a relationship lasting more than 10y; more likely to commit H-S than homicide alone. (41% of DP have comorbid psychiatric diagnosis).</p> <p>8 risk factors were found to be significantly related to depression: Prior threats to commit suicide, prior suicide attempts, prior hostage-taking and/or forcible confinement, perpetrator was abused and/or witnessed domestic violence as a child, escalation of violence, obsessive behavior displayed by perpetrator, extreme minimization and/or denial of spousal assault history and sexual jealousy.</p> <p>DP exhibited more risk factors than NDP.</p>	<p>2003 - 2012</p>

	symptoms of depression (NDP) (n=47).				
Cohen et al. (1998) USA	N=171 H-S cases; Separated the cases into two groups (according to the area of the crime): West Central Florida (n=64) and Southeastern Florida (n=73); Within these groups, subgroups were created: Old couples (n=48) and Young Couples (n=89). For west central Florida, old couples involved in	The objective of this study was to determine the annual incidence of H-S and to compare patterns and antecedents in old and young spousal/consortial cases.	H-S cases were obtained through four medical examiner districts covering seven entire Florida counties from 1988 to 1994. The districts were chosen to determine rates in 2 regions of Florida, comparable in size of the total population and proportion of older persons.	Annual incidence rates ranged from 0.3 to 0.7 per 100,000 for persons under age 55 and from 0.4 to 0.9 per 100,000 for persons age 55 and older, with higher rates in the older group every year but two. Cases of spousal/consortial homicide-suicide were the most common in both age groups. The younger couples in both regions were comparable, except for racial composition, but the older couples differed. West Central Florida couples were in their seventies, Caucasian, usually married, and both in poor health; and there were indications of depression or alcohol abuse in half the perpetrators. Two-thirds of the southeastern Florida couples were	1988 - 1994

	<p>suicide M = 78.2 and homicide M=74.2 years; young couples involved in suicide M=38.4 and homicide M=32.8 years. For southeastern Florida, old couple involved in suicide M=68.2 and homicide M=49.7 years; young couples involved in suicide M=37.4 and homicide 32.3 years.</p>			<p>Hispanic; there was a mean age difference of 18 years between perpetrators and victims; and verbal discord, physical violence, and separation were prominent antecedents.</p>	
<p>Coorg and Tournay (2012)</p> <p>USA</p>	<p>N = 21 filicide-suicide cases involving 22 disabled child victims; M= 42.7 years old.</p>	<p>To examine known associated factors and newspaper reports to characterize filicide-suicide victims and perpetrators involving children with disabilities.</p>	<p>Newspaper search was conducted using LexisNexis and News Bank: Access World News databases through the University of California, Irvine Library's Website, which identified cases occurring in the USA retrospectively between the years of 1982 and</p>	<p>Most common cause of death in the child was a gunshot wound (38% of cases); medication poisoning (24%) and carbon monoxide or generator poisoning (14%).</p> <p>38% perpetrators had a reported mental illness: the most common being depression, psychosis and bipolar disorder.</p> <p>38% of parents were single, 48% married and 9% married but in the process of divorcing.</p>	<p>1982</p> <p>-</p> <p>2010</p>

			2010. Newspaper articles from all 50 states were included.	The most striking finding involves the predominantly male gender of victims. 50% of all reported cases included victims with autism.	
Dawson (2005) Canada	N= 194 Intimate Femicide-Suicide (IFS); 26% aged 55 and over, 74% aged under 55 years old.	Examine whether premeditation was more evident in cases of intimate femicide followed by suicide (IFS) than in cases of intimate femicide (IF) that do not end in the suicide of the offender	Data were collected by the Office of the Chief Coroner for Ontario and police records.	Cases of IF-S were more likely to involve premeditation than cases of IF. The degree of premeditation depends on the type of suicidal killer. Offenders motivated by sickness or ill health show the most evidence of premeditation.	1974 - 1994
Easteal (1994) Australia	N= 47 H-S cases; Intimate (n= 32) and non-intimate homicide-suicides (n= 15); 40.7% intimate H-S aged under 60 years old, 40.6% aged over 60 and in 18.7% of cases the age was unspecified.	Identify the differences between homicide-suicide of adult sexual intimates and homicide of adult sexual intimates without suicide.	Information was accessed on the sexual intimate homicide subset from the National Homicide Monitoring Project. Data were also collected from coronial, court and the Department of Public prosecutions files (South Wales and Victoria).	Traits leading to a higher risk of suicide by the offender: <ul style="list-style-type: none"> • perpetrator was male • estranged from his partner • killed more people than just his (ex)partner • born outside of Australia • older aged with an ailing wife • used a gun 	1989 - 1991

<p>Flynn et al. (2009)</p> <p>England and Wales</p>	<p>N = 203 H-S cases; composed of male (n=175; M=44) and female perpetrators (n=28; M=35); M=41years old.</p> <p>Two groups of perpetrators: those who committed suicide immediately following homicide (immediate group, n=152), and those who committed suicide more than 3 days after but before conviction (delayed group; n=51).</p>	<p>Describe the social, criminological and clinical characteristics of perpetrators of homicide followed by suicide. Determine the extent of contact with mental health services before the incident. Examine the risk of suicide following homicide.</p>	<p>Cases were obtained through The Home Office via the Homicide Index as well as directly from individual police forces. They provided demographic information on the perpetrator and victims and details about the offence.</p> <p>Records of previous convictions were also obtained from the Police National Computer.</p> <p>The cases were cross checked with data on suicides and open verdicts provided by the Office for National Statistics (ONS).</p> <p>Details on each case were submitted to NHS Trusts to identify if the perpetrator had a history of mental health service</p>	<p>The median age of perpetrators was 41 years (range 18–88 years); most were male.</p> <p>Men more often killed a spouse/partner, whilst women more commonly killed their children.</p> <p>Eighty-four (42%) perpetrators died by suicide on the day of the homicide.</p> <p>The most common method of homicide was sharp instrument (44, 23%). Fifty-nine (29%) used hanging as a method of suicide.</p> <p>Twenty (10%) had previous contact with mental health services, 14 were seen within a year of the offence. The most common diagnoses were personality disorder and affective disorder.</p> <p>The risk of suicide increased the closer the relationship between the perpetrator and the victim.</p>	<p>1996</p> <p>-</p> <p>2005</p>
---	---	---	--	--	----------------------------------

			contact at any time before the offence.		
Flynn et al. (2016)	N = 60 H-S cases; composed of male (n=53) and female perpetrators (n=7); M= 44 years old.	Describe the characteristics of offenders and victims, determine the prevalence of mental disorder and contact with mental health services and examine adverse events prior to the offence.	Mixed-method study based on consecutive case series of offences in England and Wales, between 2006 and 2008. Cases were identified using National Confidential Inquiry into Suicide and Homicide by People with mental Illness (NCISH) database. Data sources included coroner's records, police files, general practice and specialist mental health records and newspaper articles.	The results show that most victims were spouse/partners and/or children. Most perpetrators were male (88 %) and most victims were female (77 %). The incidents were commonly preceded by relationship breakdown and separation. 62 % had mental health problems. A quarter visited a GP for emotional distress within a month of the incident. Few had been in recent contact with mental health services before the incident (12 %). Self-harm (26 %) and domestic violence (39 %) were common.	2006 - 2008
Fridel and Zimmermann (2018)	N = 1,413 H-S cases; M= 41.4 years old.	To examine whether macro-environmental characteristics and contextual influences affect the odds of	Data were obtained from the National Violent Death Reporting System (NVDRS), a pooled, cross-sectional time-series	Results indicated that macro-level concentrated disadvantage decreases the odds of homicide-suicide. Furthermore, concentrated disadvantage attenuates the odds of suicide after the homicide of an intimate	2003 - 2016

USA		<p>suicide after a homicide and whether structural characteristics condition the impact of the victim-offender relationship on the odds of homicide-suicide.</p>	<p>database of US victims across 3,019 cities and 48 U.S. states. This public health surveillance system represents the largest sample of homicide-suicide cases of any existing data set. Contextual data were obtained from the American Community Survey (ACS).</p>	<p>partner, child, family member, or friend, relative to the killing of a stranger. In addition, an analysis of the factors distinguishing homicide only, homicide-suicide, and suicide only provided preliminary evidence that the social context is more relevant to homicide and to homicide-suicide than to suicide only.</p>	
<p>Fridel and Zimmerman (2019)</p> <p>USA</p>	<p>N= 2,048 H-S cases; M= 45.7 years old.</p>	<p>To examine the shared and unique correlates of suicide, homicide-suicide and homicide.</p>	<p>Data come from the NVDRS, a pooled, cross-sectional time-series database of US victims across 3,019 cities and 48 U.S. states.</p>	<p>Results indicated that interpersonal stressors and criminal history increased, while physical and mental health stressors decreased, the odds of homicide-suicide relative to suicide.</p> <p>Five of the six variables considered as potential predictors had the same (significant and) directional effect on homicide-suicide as on homicide, but an inverse effect on suicide, suggesting that the etiology of homicide-suicide more closely resembled homicide than suicide.</p>	<p>2003</p> <p>-</p> <p>2013</p>

Friedman et al. (2005) USA	N = 30 filicide-suicide cases; composed of mothers (n=10) and fathers (n=20); M= 36 years old.	Identifying the commonly occurring factors in filicide-suicide offenders, to understand the phenomenon better as well as enhancing prevention of child murder.	Obtained records of coroners cases of filicide-suicide from 1958 through 2002; various police reports were included, interviews with relatives, neighbors and employers; autopsy results and toxicology results.	<p>Parental motives for filicide-suicide included altruistic (90% mothers and 60% fathers) and acutely psychotic (10% mothers and 20% fathers) motives.</p> <p>Twice as many fathers committed filicide-suicide compared to mothers during the study (fathers significantly older than mother); 70% of mothers and 80% of fathers were married and cohabiting with their spouses.</p> <p>Older children were more often victims than infants.</p> <p>Records also indicated that parents frequently showed evidence of depression (mothers = 70%; fathers = 50%) or psychosis (30% mothers and 25% for fathers) and had prior mental health care.</p>	1958 - 2002
Galta et al. (2010) Scandinavia	N=60 H-S cases	Exploring the predictors of homicide-suicide (especially in comparison to suicide or homicide alone) and comparing collected data to existing international literature.	Data come from criminal registers in Norway.	<p>Most of the murder-suicide perpetrators were males and their victims were mostly females.</p> <p>A vast majority of perpetrators have been intimate partners with their victim.</p> <p>The victim has often indicated an intention to break up from the relationship before the homicide.</p> <p>Compared with isolated homicides, the ages of both</p>	1990- 2007

				<p>the perpetrator and victim are higher.</p> <p>Most perpetrators use firearms and tend to be less socially marginalized.</p>	
<p>Haines et al. (2010)</p> <p>Australia</p>	<p>N= 22 H-S cases; M=39.2 years old.</p>	<p>The aim of this study is to examine the nature of H-S and determine the ways in which they differ from suicides without the perpetration of homicide.</p>	<p>Coroner's inquest files at the Tasmanian Archives Office and the Tasmanian Department of Justice.</p>	<p>Risk factors for suicide after a homicide:</p> <ul style="list-style-type: none"> • male offenders • victim being an intimate partner • interpersonal conflict or loss <p>The H-S group was characterized by escalating conflict, angry and violent behavior that culminated in the homicide and the subsequent suicide.</p> <p>The suicide only group was characterized by quiet withdrawal, social isolation and physical ill health.</p>	<p>1990</p> <p>-</p> <p>2010</p>
<p>Hedlund et al. (2016)</p> <p>Sweden</p>	<p>N = 29 filicide-suicide cases; composed of male (n=21) and female perpetrators (n=8); M= 39.9 years old.</p>	<p>Examining a range of characteristics among perpetrators of filicide, filicide-suicide and extra-familial child homicide.</p>	<p>All individuals below 15 years of age, who were adjudged as victims of homicide upon forensic-pathological examination, were identified in the</p>	<p>Perpetrators of filicide-suicide were, on average, older and more likely to be male than their filicide only counterparts. Previous psychiatric admissions were rare in both groups (rates of about 20%). The filicide only perpetrators were also, on average, more likely to have a criminal record, including prior convictions for</p>	<p>1992-</p> <p>2012</p>

			National Board of Forensic Medicine's in-house autopsy database.	<p>violent offences.</p> <p>Asphyxia was a common method of filicide in both groups, whereas blunt violence was exclusively used in the filicide only group. Aggressive methods of violence were predominately used by fathers.</p> <p>The filicides in both groups usually took place indoors in a mutual home. Multiple victims were more commonly found in the filicide suicide group.</p>	
Kalesan et al. (2018)	N = 1,422 H-S cases; composed of male (n=1,326) and female perpetrators (n=95); 20% aged under 30 years old and 80% aged 30 and over.	The aim was to assess the role of interpersonal conflict (IPC) and recent crises in firearm-related homicide-suicides as compared with firearm-related suicides alone. And whether these differences were consistent across young and old perpetrators.	Data was obtained through the National Violent Death Reporting System (NVDRS) and the Centers for Disease Control and Prevention (CDC).	<p>The perpetrators of homicide–suicide were more likely to be male (93.3% vs. 86.4%), Black (21.4% vs. 6.6%), Hispanic (8.9% vs. 2.9%), previously married (41.4% vs. 29.5%), to have had IPC (21.1% vs. 0.5%), a crisis in the past 2 weeks (78.6% vs. 25.3%), and recent criminal or legal issues (18.9% vs. 7.9%) as compared with suicides only.</p> <p>Perpetrators of homicide– suicide as compared with their victims were more likely to be men, older, previously married, have economic stress, have a history of suicide, have a crisis in the past 2 weeks, job or school issue, recent criminal/legal issues, alcohol dependency, depression, and history of physical health.</p>	2003 - 2011

<p>Kivivuori and Lehti (2003)</p> <p>Finland</p>	<p>N = 166 H-S cases; 35.6% aged 30 to 44 years old, 31.9% aged under 29 years old, 27.6% aged 45 and over and in 4.8% of cases the age was unspecified.</p>	<p>Describe the prevalence and trend of homicide-suicide in Finland and examines the socio-economic correlates of this phenomenon.</p>	<p>Three data blocks corresponding to two data sources. The period 1960–1974 is based on the detailed annual reports of all homicides compiled by the Finnish National Bureau of Investigation. The data from the two later periods, 1988/1996 and 1998–2000, are based on two separate, recently published studies (Kivivuori 2001, Lehti 2002). The main source for these has been the Crime Information System of the Finnish police (RIKI).</p>	<p>Males are more likely to commit H-S.</p> <p>The likelihood of offender suicide is far greater in cases where an intimate partner or a child is the victim than in cases involving other victim-offender relationships.</p> <p>The likelihood of offenders in the other socioeconomic groups killing themselves after committing homicide was more than twice that of blue-collar workers during the whole research period.</p> <p>The period variable suggests that the further back in time we go, the greater the likelihood of offender suicide.</p> <p>Young victim age was associated with increased suicide likelihood, while young offender age was a protective factor against suicide.</p> <p>Low socioeconomic position is associated with a lesser likelihood of HS but a greater likelihood of Homicide. And it is the opposite for high income groups.</p>	<p>1960</p> <p>-</p> <p>2000</p>
<p>Kotzé et al. (2018)</p> <p>South</p>	<p>N = 35 H-S cases; M= 38.6 years old, from 24 to 73.</p>	<p>To identify psychiatric and other contributing factors in homicide-suicide.</p>	<p>Cases of HS included were identified by the Department of Forensic Medicine, University of Pretoria.</p>	<p>The most common method of homicide was shooting.</p> <p>A psychiatric diagnosis was made in 15 (42.9%) of the total 35 cases; a mood disorder-related diagnosis was made in nine (34.6%) of the perpetrators. Comorbid diagnoses were common with the mood disorders and</p>	<p>2009</p> <p>-</p> <p>2014</p>

Africa				included alcohol and substance use disorders, and personality disorders/traits. Only one perpetrator of the sample was diagnosed with a psychotic disorder.	
Koziol-Mclain et al. (2006) USA	N= 67 Femicide-suicide; M=34.6 years old.	The aim of this study is to determine if there are unique femicide-suicide risk factors that should be assessed at a point of contact with either partner violence victims or perpetrators.	- police and medical examiner records - questionnaire was developed in order to determine the demographics, characteristics of the relationship of IPV and the characteristics of the “worse incident” of the victims and perpetrators.	Risk factors for intimate partner femicide-suicide is prior domestic violence against the victim (72%) : <ul style="list-style-type: none"> • access to a gun • prior threats with a weapon • prior threats to kill her • estrangement from the perpetrator • stepchild in the household • marital relationship • prior perpetrator suicide threats • illicit drug use (50% of cases of femicide-suicide) 	1994 - 2000
Klinoff et al. 2015) USA	N= 43 police perpetrated H-S; composed of male (n=42) and female perpetrators (n=1); M=46.6 years old.	The purpose of this paper is to provide an update and expansion of previous work by Violanti (2007) on homicide-suicide in law enforcement families.	Data was collected from an online forum dedicated to topics related to domestic violence in police families.	Domestic violence and divorce/estrangement were salient precursors of H-S	2007 - 2014

<p>Lester et al. (2005)</p> <p>USA</p>	<p>N= 34 H-S cases; composed of male (n=93) and female perpetrators (n=5); M= 34.3 years old.</p>	<p>Exploring two facets of this sample (the outcome and the deadliness) and examining the differences between those rampage killers who completed suicide at the time of the act and those who were captured; and whether any of the characteristics of the rampage killers were associated with the deadliness of the rampage.</p>	<p>Data was collected on each of the 100 rampage homicide incidents using searches of the Internet and the electronic database provided by Lexis-Nexis.</p>	<p>Several variables were associated with two of the measures of deadliness: Killing significant others as well, prior evidence of violence in the killer, paranoia and suspiciousness, and prior service in the military.</p> <p>Suicide as an outcome was less likely if the killers were school pupils or diagnosed as schizophrenic, and more likely if the killer had friction with coworkers or the killings took place at work.</p>	<p>1949</p> <p>-</p> <p>1999</p>
<p>Liem (2010)</p> <p>Netherlands</p>	<p>N= 10 Homicide-parasuicide cases in qualitative sample; composed of male (n=8) and female perpetrators (n=2); 70% aged 31 and</p>	<p>The aim was to qualitatively assess to what extent H-S can be understood as a dichotomous phenomenon, using homicides followed by</p>	<p>Both homicide-parasuicide and homicide cases were collected from the Pieter Baan Centre, a forensic psychiatric observation hospital in the Netherlands with a national function.</p>	<p>There are three ways of understanding the perpetrator's motive in homicide-parasuicide:</p> <ul style="list-style-type: none"> • homicidal (external blame attribution) were interpersonal dependency is a determining factor of H-S, unable to live without the victim they commit suicide. • suicidal (internal blame) were the primary 	<p>1983</p> <p>-</p> <p>2004</p>

	over; N=77 in original cohort; composed of male (n=60) and female perpetrators (n=17); 74% aged 31 and over.	a failed suicide by the perpetrator (homicide–parasuicides). Particular attention is paid to both internal and external blame attribution.	And near lethal parasuicide cases were retrieved from the department of psychiatry of the Erasmus Medical Centre, Rotterdam. Parasuicides were assessed using the Pierce Suicide Intent Scale.	factors are depression, symbiotic relationship and social isolation. <ul style="list-style-type: none"> • homicide-suicide ('total' solution). 	
Liem and Koenraadt (2007) Netherlands	N = 95 H-S cases.	The aim was to describe the nature and incidence of H-S in the Netherlands in the 1992-2005, using cases reported in both national and regional newspapers.	A newspaper analysis was conducted: database LexisNexis and a regional newspaper database the Wegener Archive.	Most of the events were classified as spousal and consortia H-S motivated by amorous jealousy (44%), followed by H-S involving children (27%). The perpetrators of spousal/consortial H-S were primarily male. Those who killed their spouse and their children were exclusively male. Firearms was the most common arm used to commit the homicide, followed by knife and strangulation.	1992 - 2005
Logan et al. (2008) USA	N= 408 H-S cases; composed male (n=373) and female (n=35); M=43 years old.	Describe perpetrators across a full range of H-S incidents, as well as identifying differences and similarities between perpetrators of H-S,	Data from 17 US states participating in the National Violent Death Reporting System (NVDRS).	Risk factors of H-S: <ul style="list-style-type: none"> • white males in middle to late adulthood • firearm • intimate partner conflict (55.8% male perpetrators and 34.3 female perpetrators) • victims being mostly partners / former intimate 	2003 - 2005

		suicide decedents and with other homicide suspects.		<p>partners / children</p> <ul style="list-style-type: none"> • current mental health problem (11% male perpetrators and 42.9% female perpetrators) 	
Logan et al. (2019)	N= 1,504 Intimate Partner homicide-suicide (IPHS) cases; 75.1% aged 35 and over.	To inform prevention efforts, this study identified correlates of IPHS.	Examined IPHS correlates among male suicide decedents aged 18+ years who had known IP problems using National Violent Death Reporting System data.	<p>IPHS perpetrators were mostly older (35+) and a minority versus non-Hispanic White ethnicity.</p> <p>IPHS events were more prevalent in residential areas.</p> <p>Use of firearms in the suicidal act and precipitating civil legal problems are positively correlated with IPHS.</p> <p>All mental health and substance abuse related circumstances were known to be present less often among the IPHS perpetrators compared to the other suicide decedents.</p>	2003 - 2015
Malphurs et al. (2001)	N = 27 spousal H-S cases; M= 78.2 years old.	To compare the characteristics of older perpetrators of spousal homicide-suicide with those of older married men who only committed suicide.	The data were extracted from homicide-suicide cases identified in one of the two Florida regions previously reported for three medical examiner districts covering six complete counties in west-central Florida.	Depression was a prominent premorbid feature of both groups.	1988 - 1994

Mathews et al. (2008) South Africa	N = 261 Intimate femicide-suicide cases; 46.4% aged 14 to 29 years old, 42.2% aged 30 to 39 years old and 11.4% aged 40 and over.	To examine the incidence and patterns of intimate femicide-suicide and to describe the factors associated with an increase in the risk of suicide after intimate femicide.	Data were collected from the mortuary file, autopsy report and a police interview.	Suicide after intimate femicide was more likely if the perpetrator was from a white rather than an African racial background, was employed as a professional or white-collar worker rather than a blue-collar worker and owned a legal gun rather than not owning a legal gun.	1999
Moskowitz et al. (2006) New Zealand	N= 33 H-S cases.	Clarifying the relation between homicide-suicide and mental illness and examining the potential differences regarding types of homicide-suicide incidents.	Cases were identified from the New Zealand Police Homicide Monitoring Database, a detailed schedule of all homicide events in New Zealand since 1988 with information on the circumstances surrounding the event, the victim(s), and the (presumed) perpetrator. Files from the Coronial Services of the New Zealand Ministry of Courts were then sought, for both the victim(s) and perpetrator, and were	Fourteen perpetrators (42.4%) were classified as mental illness; among these were all five of the female perpetrators and 32% of the male; 20% had not previously been in treatment. Most of the mental illness perpetrators killed their children and then themselves. In contrast, only a few of the homicide-suicide perpetrators who killed a current or former partner were mental illness.	1991 - 2000

			reviewed.		
Pan and Lee (2008) Taiwan	N=101 Maternal filicide-suicide (MFS); aged 25 to 44 years old.	The aim is to examine whether the newly available charcoal burning was associated with an increase in MFS.	Using official national mortality data and reports of MFS cases from electronic newspapers archives.	Charcoal burning was the leading method of filicide in reported MFS cases. The increase in MFS incidents paralleled that in charcoal burning-specific suicide rates.	1999 - 2006
Panczak et al. (2013) Sweden	N=73 H-S cases; composed of male (n=68) and female perpetrators (n=5) ; 5.5% aged 20 to 29 years old, 17.8% aged 30 to 39 years old, 23.3% aged 40 to 49 years old, 17.8% aged 50 to 59 years old, 11% aged 60 to 69 years old, 19.2 aged 70 to 79	The aim of this study was to identify H-S events within households in the Swiss National Cohort (SNC), a longitudinal study of the entire Swiss population.	Data was obtained from the SNC. Mortality and emigration records covering the period 1990 to 2008 were therefore linked to the census using probabilistic record linkage. The census consisted of 3 questionnaires: one for the individual, a household questionnaire and a	Most H-S events are related to husbands killing their wife or killing their wife and offspring. 68 of the perpetrators (93.2%) were male and 71 (83.5%) of the victims were female. The age distribution of male perpetrators showed a bimodal pattern, with peaks around 45 years and 75 years. Self-employed and skilled manual workers were more likely to be perpetrators than individuals in other professional categories.	1991 - 2008

	years old, 5.5% aged 80 and over.		questionnaire on the building.		
Patton et al. (2017) USA	N=518 male H-S perpetrators; served in the military (n=259; M=57.05) and never served in the military (n=259; M=41.56).	Determine whether there were meaningful differences between military and civilian murder-suicide perpetrators.	Data were obtained from the National Violent Death Reporting System between 2003 and 2010. Measures included each participant's demographic information, military status, motive for murder, and victim perpetrator relationship. Data were analyzed to examine the differences between the military and civilian murder-suicide perpetrator groups.	Military H-S perpetrators were older and were more likely to be married than civilian perpetrators. Compared to civilian perpetrators, military perpetrators were more likely to commit H-S due to declined health problems but less likely due to amorous jealousy. Besides, military perpetrators were less likely to be intoxicated and less likely to have intimate partner violence problems.	2003 - 2010
Salari and Sillito (2015) USA	N= 718 Intimate partner homicide-suicide (IPHS); young perpetrators aged 18 to 44 years old (n=325), middle aged perpetrators	What are IPHS perpetrators characteristics and primary intentions? Do differences with	Data is collected through media, internet search, news surveillance and archives.	History of intimate partner violence was common in young dyads compared to the two other age groups. Perpetrators were most often men, and firearms are the most common weapons used. Primary intentions differed: <ul style="list-style-type: none"> • young adults: homicidal motive 	1999 - 2005

	aged 45 to 59 years old (n= 178) and elder perpetrators aged 60 and over (n= 215).	regards to intimate partner characteristics and perpetrators primary intentions vary across age categories.		<ul style="list-style-type: none"> • middle: mix of homicidal and suicidal motives but mostly homicidal • elders: suicidal motive 	
Saleva et al. (2007) Finland	N=10 H-S cases; M= 42 years old	To explore whether homicide–suicide in Finland resembles that described in previous studies (from other nations), and whether it form part of the phenomenon of homicide or of suicide (or if it is independent).	<p>All suicides committed in Finland during a 12-month period were recorded and carefully analyzed using the psychological autopsy method.</p> <p>The data concerning the suicide victims were collected from comprehensive interviews of the family members, relatives and attending health care personnel as well as from official policy, social agency and medical records.</p>	<p>The perpetrator was male in all but one case, and all the victims were family, 9/10 being spouses and/or children.</p> <p>The most typical homicide–suicide seemed to be a man shooting a family member during a separation process.</p> <p>No perpetrator was found suffering from a psychotic disorder but three had major depression.</p>	1987 - 1988
Sachmann and Johnson	N= 9 familicide-suicide cases.	This article combines the findings from two studies and then draws	Descriptive data were collected from police reports, coroner’s and	<p>Biopsychosocial risk profile:</p> <ul style="list-style-type: none"> • early adverse childhood experiences 	1986 -

<p>(2014)</p> <p>Australia</p>		<p>from attachment theory, personality dysfunction and the neurobiology of trauma to formulate an understanding of the psychological processes underpinning familicide-suicide following separation.</p>	<p>family court counselling service records, newspapers and electronic media archives.</p> <p>In-depth interviews were also undertaken with four secondary victims and a surviving perpetrator, who also completed the Child Trauma Questionnaire.</p>	<ul style="list-style-type: none"> • significant psychodynamic influences • history of domestic violence • specific diagnostic profiles typically in the form of cluster B personality disorders. 	<p>2005</p>
<p>Schwab-Reese and Peek-Asa (2019)</p> <p>USA</p>	<p>N=954 H-S cases; composed of male (n=849) and female (n=255); M= 47.8 years old.</p>	<p>The aim is to determine the relationship between situational factors, method of death, and homicide-suicide deaths, specifically comparing method of death across these factors.</p>	<p>We accessed data through the Centers for Disease Control and Prevention (CDC) for the National Violent Death Reporting System (NVDRS).</p>	<p>Firearms used 85% of homicides and 90% of suicides.</p> <p>Men were most likely to be the perpetrators (93.5%) of H-S, most of which involved an intimate partner relationship.</p> <p>Risk factors H-S (perpetrators):</p> <ul style="list-style-type: none"> • depression (15%) • current mental health issue (20%) • jealousy (10%) • “mercy killing” (2.6%) • history of suicidal thoughts/behaviors (20%) • interpersonal stressor (ex: family relationship issues) (+50%) 	<p>2013</p> <p>-</p> <p>2016</p>

				Incidents that involved a recent fight, a depressed mood or mental health issue had significantly increased odds of involving a firearm.	
Shackelford et al. (2005) USA	N=28 filicide-suicide cases; Infanticidal mothers M= 22.5 years old and infanticidal fathers M=30.5 years old.	The aim is to replicate and extend research that identifies several key predictors of filicide-suicide (F-S), including the differential likelihood of F-S among genetic parents and stepparents.	Chicago Homicide database provides incident-level information on 22,988 homicides recorded in the murder analysis files of the Chicago Police Department.	Filicidal parents are more likely to commit suicide following a multiple victim filicide than following a single victim filicide. A greater % of filicidal parents of older victims (12.4%) than of younger victims (3.6%) subsequently killed themselves. A greater % of filicidal older parents (10.5%) than filicidal younger parents (1.4%) subsequently killed themselves.	1965 - 1994
Shackelford et al. (2008) USA	N= 83 filicide-suicide; Filicidal genetic parents (n = 73) and Filicides committed by a stepparent (n = 10); Infanticidal fathers who committed suicide M=30.5 years old and infanticidal mothers who committed suicide	To analyze contexts and circumstances surrounding filicide-suicide.	Data come from The Chicago Homicide Record Index, which provides incident-level information on 11,018 homicides recorded in handwritten files by the Chicago Police Department.	Filicidal genetic parents are more likely to commit suicide than are filicidal stepparents. 76.4% of parents who killed multiple victims subsequently killed themselves, whereas just 18.1% of parents who killed a single victim subsequently killed themselves. Parents are more likely to commit suicide following the filicide of an older child than of a younger child; and older parents, relative to younger parents, are more likely to commit suicide following filicide.	1870 - 1930

	M=29.5 years old.				
Shiferaw et al. (2009) Switzerland	N= 23 HS cases; composed of male (n=19 M=43 years old) and female (n=4; M= 38 years old).	The objective of our study was to analyze and better characterize the victims and the perpetrators of all HS cases in Western Switzerland.	Data was collected through case files recorded at the UCLM (University Center of Legal Medicine).	<p>In all cases of H-S the victims knew their aggressor + family tie in most cases.</p> <p>The victims were generally younger than their aggressor.</p> <p>In most cases there is a close temporal proximity between the act of H and the act of suicide.</p> <p>Circumstances that come in play with HS:</p> <ul style="list-style-type: none"> • relationship breakdowns • financial difficulties • psychological or psychiatric disorder (depression and psychosis) aggravated by jealousy, domestic violence, divorce. 	1956 - 2005

Sillito et al. (2011)	N=325 Intimate partner homicide-suicides cases (IPHS); 18 to 44 years old.	To examine outcomes of children in households that experience IPHS.	Cases collected were from all 50 US states and collected using a variety of sources including: obituaries, news media, available police records, state fatality reports (e.g., Iowa and Utah) and internet search engines.	Difficult financial conditions during times of economic downturn may increase the possibility of stress-related suicide, and subsequent familicide. Children are most likely harmed or killed by a primarily suicidal male perpetrator, who is usually their biological father. Firearms were used more than other methods in IPHS events.	1999 - 2004
Stack (1997)	N=265 H-S cases; M= 39.7 years old.	To test the idea that the closer the ties between the offender and victim in a homicide, the greater the ensuing guilt and the greater the likelihood of suicide.	Data were extracted from records of homicides in the murder analysis files of the Chicago Police Department.	Killing an ex-spouse/lover increased the risk of suicide the most 12.68 times. The odds of suicide are increased 10.28 times for killing a child, 8.00 times for killing a spouse, 6.11 times for killing a girlfriend or boyfriend, and 1.88 times for killing a friend.	1965 - 1990
Weeke and Oberwittler (2017)	N=288 Familial Homicide-suicide (FHS); composed of male (n=256) and female (n=32); M=46.8 years old.	The aim is to investigate potential differences between H-S cases in which the perpetrator does or does not write a suicide note.	German Study of FHS which is connected to the European Homicide Suicide Study (EHSS).	Filicide-suicide perpetrators and perpetrators with underage children who do not become victims leave suicide notes significantly more often than other perpetrators.	1996 - 2006

Table 2. Systematic reviews and meta-analysis about H-S

Authors (Publication year)	Objective(s)	Characteristics of included studies	Time period	Results
Panczak et al. (2013)	Provide a systematic review and meta-analysis of studies comparing perpetrators of homicide-suicides with perpetrators of simple homicides and suicides.	All studies consisted of comparisons of case series of homicide– suicide with series of suicides, homicides or both. The sources of information varied across studies but included police reports and forensic medicine files in most studies.	1966 - 2012	<p>Perpetrators of homicide-suicides were older and more likely to be male and married to or separated from their victims than perpetrator of simple homicides or suicides.</p> <p>Influence of alcohol and a history of domestic violence or unemployment were less prevalent in homicide-suicides than in homicides.</p> <p>The proportion of firearm use in homicide-suicides varied across countries.</p>
Debowska et al. (2015)	Provide a systematic review of studies on parental and stepparental filicide and filicide followed by suicide.	All studies contained data on genetic mothers and fathers as well as stepparents who committed filicide (potentially followed by suicide). The total number of cases examined was 10 or greater for each study.	2000 - 2014	Filicide-suicide is most often associated with parental psychopathology (major depressive disorder or psychosis) and genetic fathers are at the greatest risk of death by suicide after the commission of familicide.

Eliason (2009)	Examining the incidence of murder-suicide and its associated risk factors.	Studies having explored risk factors for murder-suicide	1992 - 2009	Identified risk factors for murder-suicide were: substance abuse, access to firearms, being a men, and more precisely an older male caregivers, and having a depression.
-------------------	--	---	----------------	--