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Mixed Methods Secondary Analysis of Older Adult Homicide-Suicides from National Violent Death Reporting System (NVDRS) Data

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ABSTRACT
Although homicide followed by suicide incidents comprise a small proportion of all violent deaths in the U.S., the number of cases involving older adults has increased steadily during the current century. There is no central tracking system for these cases, but restricted access data from the National Violent Death Reporting System (NVDRS) may present a potential source for gaining additional insights into older adult homicide-suicide incidents. The aims of this mixed methods secondary analysis research study included: to qualitatively identify salient themes which characterize intimate partner homicide followed by suicide incidents among older adults and use those themes to describe a prototypical case; to quantitatively identify prevalence and co-occurrence of qualitatively developed themes; to quantitatively compare attributes of NVDRS case data with a previously developed typology of case scenarios based on assessment of media reports. Data for this project included all identified homicide-suicide incidents among older adults which occurred during 2014-2016, the most recent years available. We identified 121 intimate partner homicide-suicide incidents captured in NVDRS records, reflecting results from 32 US states. Results of mixed methods analyses suggested the typical case in these data was characterized by male partner's interpretation of a traditional male role and associated responsibilities, and included prior expressions of intent. These factors, alone and in combination with other developed themes, identify and exemplify risk factors for homicide-suicide in aging couples. Results of this study illustrate the value of secondary mixed methods analysis of unstructured data to explore the of an enduring public health concern.

KEYWORDS: Homicide-suicide, older adults, secondary analysis, mixed methods, NVDRS.

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Homicide followed by suicide, homicide-suicide, and murder-suicide are terms used to refer to violent episodes in which an individual commits one or more murders and soon after commits suicide (Langley, 2018). Familicide, in which an individual kills one or more family members and then dies by suicide is a subcategory of homicide-suicide. The majority of familicides, estimated at 70%, involve intimate partners (Timms, 2018). Although the proportion of homicide-suicide incidents is believed to comprise only 5% of all homicides in the U.S. (Barber et al., 2008), a report published by the Violence Policy Center (Langley, 2020) suggests the proportion of intimate partner homicide-suicide incidents involving adults over 55 has shown ongoing increase during the current century. As of 2019, incidents involving older adults comprise 23% of all intimate partner homicide-suicides.

Popular media reports (e.g., Neumann, 2019) may illustrated compelling descriptions of couples who jointly decide to die by suicide, motivated by desire for death with dignity amid deteriorating health and perceived inability to live independently. However, researchers have asserted that a substantial proportion of homicide-suicide incidents in older adults reflect one of two things: the culmination of an established pattern of intimate partner violence, or a unilateral decision made by a single partner, usually the man, in a long term married partner relationship (Cohen, 2000a; Salari, 2007). Examples of the latter might follow increases in men's caretaking responsibilities which are associated with deteriorating health of the woman partner (Langley, 2018; 2020).

There is no central reporting mechanism or tracking database for these incidents in the US, perhaps due to the relative rarity of intimate partner homicide-suicide as a proportion of all violent deaths. Given potential for prevention suggested by the nature of intimate partner homicide-suicide incidents, researchers' and practitioners' ability to rely on a comprehensive database would provide additional insights in contextual trends and perhaps facilitate identification of at-risk relationships. The semi-annual Violence Policy Center reports (e.g., Langley, 2018; 2020) are based on systematic screening of online news reports, and, as the organization acknowledges, this creates potential for underestimate.

One alternative which might facilitate accurate identification of homicide-suicide case counts and analysis of contextual details is the National Violent Death Reporting System (NVDRS). NVDRS is a federally funded, multi-state data base managed by the US Centers for Disease Control and Prevention, developed to track deaths from violence, including homicide and suicide, through all 50 US States (Paulozzi et al., 2004). General prevalence estimates are available via an open access interface, and restricted access data which incorporate detailed case narratives are available to researchers through an application and proposal review process (Centers for Disease Control and Prevention [CDC], 2019). The number of states participating in NVDRS has increased incrementally from the beginnings of the system back in 2003, when 7 states reported, up to 32 states reflected in 2016 data, with an eventual aim of capturing and reporting nearly all cases from all 50 states. The purpose of this paper is to explore trends among older adult intimate partner homicide followed by suicide, through in-depth mixed methods analysis of NVDRS case narratives for report years 2014-2016.

Intimate Partner Homicide-Suicide

Prior to availability of NVDRS, Cohen published seminal analyses of intimate partner homicide-suicide among aging adults (e.g., Cohen, 1995, 2000a, 2000b; Cohen & Eisendorfer, 1999). Cohen's (1995) analysis of data extracted from Florida newspapers suggested incidents were primarily perpetrated by male partners with their female intimate partners as victims. In subsequent works, Cohen and colleagues (Cohen, 2000a, 2000b; Cohen & Eisdorfer, 1999)

identified three main subtypes of intimate partner homicide-suicide among older adults: 1) aggressive acts with a history of domestic violence; 2) dependent/protective incidents where the male perpetrator has been dominant in a long marriage and one or both partners are ill; 3) symbiotic homicide-suicides involving extremely enmeshed and co-dependent partners.

In contrast with media or anecdotal evidence, as described previously, Cohen (2000a) asserted that homicide-suicide incidents are only infrequently associated with suicide pacts; instead, female intimate partners are not consenting participants who might be killed in their sleep. Cohen also found a substantial number of aggressive homicide-suicide incidents in which victims were shot or stabbed multiple times, giving further support to the suggestion incidents may more often reflect domestic violence rather than suicide pacts.

Cohen (2000a) additionally identified key predisposing and precipitating risk factors. Predisposing factors include advanced age, long marriage, marital/family discord, depression or multiple physical health problems in perpetrators, perpetrators acting as caregivers for a spouse, perpetrators with a controlling nature, and perception of social isolation. Key precipitating factors include an emergent change in health status of perpetrator and/or victim, which may be associated with hospitalization, plans or pressure to move into assisted care facilities, incidents of domestic violence or alcohol use, and decreases in social interaction. In some instances, intimate partner homicide-suicide reflects the culmination of preparation and thought; Malphurs and Cohen (2005) observed that homicide-suicide perpetrators frequently left instructions for family members, wills, insurance documents, and other important information.

Homicide-Suicide Research Reports Based on NVDRS Data

Although none has focused solely on intimate partner incidents among older adults, authors of several NVDRS-informed research reports on homicide followed by suicide identified the proportion of intimate partner incidents and provided age group comparisons. Bossarte et al. (2006) and Liem et al. (2011) based their reports on categorical and quantitative records provided in NVDRS data, while Patton et al. (2017), Logan et al. (2019), Schwab-Reese et al. (2021) and Jordan and MacNeil (2021) supplemented quantitative data with information extracted from unstructured case narratives included in NVDRS restricted access data. The report by Logan et al. was the only identified source using NVDRS data to focus solely on intimate partner homicide followed by suicide. Logan et al. used qualitative analysis of narrative data to supplement the CDC-provided list of contextual circumstances with additional scenario types. In contrast, Patton et al. and Schwab-Reese et al. conducted qualitative content analysis to associate cases with previously existing typologies of case scenarios. Jordan and MacNeil applied machine learning techniques to develop a new, data-driven typology of scenario alternatives.

Authors used varying date ranges for their analyses. Bossarte et al. (2006) used data years 2003-2004, while Liem et al. (2011) used case records from 2004-2006 to compare with similar incident records from Switzerland and the Netherlands. Patton et al. (2017) used records from 2003-2010; Logan et al. (2019) and Jordan and MacNeil (2021) used cases from 2003-2015, and Schwab-Reese et al. (2021) used cases from 2013-2016.

Bossarte et al. (2006), Jordan and MacNeil (2021), Liem et al. (2011), and Schwab-Reese et al. (2021), used any available homicide followed by suicide case records. Logan et al. (2019) used a subsample identified through application of previously described selection criteria. Patton et al. (2017) selected a random sample of 259 cases to serve as a comparison group for their cases of interest which were 259 identified cases involving a perpetrator who was an active or formerly active member of the U.S. military.

Due to differences in data availability and author selection criteria, the number of homicide-suicide incidents analyzed differed across studies, ranging from 209 (Bossarte et al., 2006) to 2,447 (Jordan & MacNeil, 2021). The proportion of intimate partner homicide-suicide incidents included in a given study, compared to all homicide-suicide incidents, ranged from 58% (Bossarte et al., 2006) to 74.5% (Jordan & MacNeil, 2021). When authors stratified cases using additional criteria, the proportions were at times higher: for example, the proportion of military perpetrator intimate partner homicide followed by suicide was 78.4% of all military homicides followed by suicide (203 of 259) (Patton et al., 2017) and the proportion of intimate partner homicide followed by suicide among adults aged 65 +, compared to intimate partner incidents for any age, was 88.3% (179 of 1,157) (Schwab-Reese et al., 2021).

Schwab-Reese et al. (2021) and Logan et al. (2019) were the only authors to report the proportion of intimate partner homicide followed by suicide incidents involving older adults. Schwab-Reese et al. (2021) found 15.5% (n = 179) of intimate partner homicide-suicide perpetrators were age 65 or older, and Logan et al. found 13.2% (n = 199) of intimate partner homicide-suicide perpetrators were age 65 or older. All other authors reported proportions by age and by perpetrator-victim relationship separately.

When authors provided information regarding sex, male perpetrators and female victims featured in more than 90% of intimate partner homicide-suicide incidents (Bossarte et al., 2006; Joshua & MacNeil, 2021; Liem et al., 2011; Logan et al., 2019; Patton et al., 2017; Schwab-Reese et al., 2021). When manner of death was provided, firearms were used in more than 80% of cases (Bossarte et al., 2006; Joshua & MacNeil, 2021; Liem et al., 2011; Logan et al., 2019; Patton et al., 2017). Additional common correlates included: perpetrator was intoxicated during the incident (Bossarte et al., 2006; Joshua & MacNeil, 2021; Logan et al., 2019; Patton et al., 2017), perpetrator had a history of mental illness, including drug or alcohol abuse (Bossarte et al., 2006; Joshua & MacNeil, 2021; Logan et al., 2019; Patton et al., 2017; Schwab-Reese et al., 2021); the incident took place in a residence (Bossarte et al., 2006; Joshua & MacNeil, 2021; Liem et al., 2011; Logan et al., 2019; Patton et al., 2017) and the perpetrator either previously disclosed intent or left a suicide note (Bossarte et al., 2006; Joshua & MacNeil, 2021; Logan et al., 2019; Patton et al., 2017). Although there is occasional overlap in dates of records used to inform the various reports, similar trends in type and proportion of correlates were reported by those focusing on the earliest years of NVDRS data (i.e., Bossarte et al., 2006, reporting on 2003-2005) versus those including or focusing on more recent years (e.g., Schwab-Reese et al., 2021, reporting on 2013-2016).

Logan and colleagues developed case-level scenario descriptors (e.g., jealously, health concerns) and further identified subtypes within older adult health concerns. Within the 13.2% (n = 199) of homicide-suicide perpetrators who were aged 65 or older, one or more health issues, including victim health concerns, perpetrator health concerns, and perpetrator caregiver concerns, were determined to be contributing factors in 43.7% (n = 87) of incidents.

Patton et al. (2017) used a theoretically-informed typology of motives developed by Marzuk et al. (1992 as cited in Patton et al., 2017) to classify each case narrative. Most frequently associated motives for homicide-followed by suicide among both military and the comparison group were "amorous jealousy," "retaliation," and "unknown" (Patton et al., 2017, p. 2573). It might reasonably be assumed that incidents classified as jealousy involve intimate partners although the extent to which the other common motives (i.e., retaliation and unknown) occurred in intimate partner homicide followed by suicide was not reported. Schwab-Reese et al. (2021) additionally used the Marzuk typology as a starting point and used narrative data to add to the categories. These were described as "qualitative patterns" (p. 4) and distinguished from categorical factors, which were also applied at case level. Qualitative patterns were only reported for cases involving perpetrators ages 65 +, and were presented in conjunction with specified relationship

categories (i.e., current, terminated, in process of termination) and with an additional category of spousal caregiver situations. The most frequently occurring categorical factors within older adult homicide followed by suicide incidents, identified by Schwab-Reese et al. (2021) included "financial or social stressors" (p. 4), such as mental illness and interpersonal stressors. Key qualitatively identified patterns of co-occurrence in older adult intimate partner homicide followed by suicide included prior history of intimate partner violence and/or substance misuse, which co-occurred in current, terminated, or terminating relationships, and financial or victim and perpetrator health concerns, which co-occurred in caregiver scenarios.

Jordan and MacNeil (2021) used latent class analysis to identify and validate a typology of homicide-suicide incident scenarios. Categories within the typology, presented in order of frequency, included "relational," (includes cases with identified relationship concerns), "distress," (includes other types of concerns such as mental illness, financial, and legal issues) "physical health," "familicide," (applicable when multiple family members were killed), and "indiscriminate/rage" (includes cases where a current/former partner and their lover/new partner were killed, followed by death by suicide of the perpetrator) (pp. e3-e5).

As described previously, several cited authors used unstructured data from case narratives to identify case level scenario descriptions. However, although there are some precedents in published reports based on NVDRS data related to other research topics (e.g., DeBois et al., 2020; Orlins et al., 2021) no cited authors reported results of an open coding process not reliant on an a priori list of codes or categories (Gibbs, 2007). Open coding, where codes are developed from the data themselves has potential to capture additional nuance within contextual case details. Based on previous experience with NVDRS data, we aimed with this research report to approach qualitative analysis with an inductive, exploratory mindset, while additionally employing a deductive process of comparing cases with a previously developed typology.

Our specific aims with this mixed methods analysis were:

1. To qualitatively identify salient themes which characterize intimate partner homicide followed by suicide incidents among older adults, and to use those themes to depict a typical case.
2. To quantitatively identify prevalence and co-occurrence of qualitatively developed themes.
3. To quantitatively compare NVDRS case data with a previously developed typology of case scenarios and other described attributes.

To address the final aim, we chose to use Cohen's (2000a) data-derived typology based on older adult incidents, as an alternative to Mazruk's theoretically driven typology (as cited in Patton et al., 2017) or Jordan and MacNeil's (2021) typology which reflects cases across the lifespan. Along with this, our review of these and other works suggests some overlap between Cohen's classic scheme and newly developed typologies. In the interest of building on prior scholarly works, we believe assessing this typology and refining as needed, is preferable to creation of a new organizational scheme.

Methods

Research Design

For this mixed qualitative and quantitative research study, we considered the qualitative component of the data as the core component. According to Morse and Niehaus (2009), this is most appropriate as we viewed our exploratory/inductive processes as central to the entire study. For the qualitative portion of the data analysis, we were guided by a descriptive approach to qualitative analysis (Sandelowski, 2000), appropriate when researchers plan to use data analysis to describe a phenomenon. Additionally, according to Sandelowski (2000), descriptive analysis may contribute to initial development of a theory grounded in the data. To address the deductive aim of comparing case scenarios from these data with Cohen's (2000a) typology, we employed χ^2 goodness-of-fit tests. To address our additional, integrated aim of assessing prevalence and co-occurrence of themes, we used the "mixed methods analytical strategy …(of) quantitizing," (Creamer, 2017, p. 107) applied to qualitatively derived themes.

Data Source

Within NVDRS restricted access data, each homicide-suicide partner incident is considered a single case. Law enforcement and medical examiner narrative reports comprise the primary source documents. State level abstractors create summaries of law enforcement and medical examiner report and derive multiple categorical and count data from narrative reports, including demographic information about victims and suspects, possible precipitating factors, and information about incident type. Narrative summaries typically include a general description of the incident, circumstances of discovery of incident, and site details, and may additionally include judicial or legal information, items from media reports, reports from witnesses, relatives or acquaintances, toxicology results, and other current or prior health diagnoses. Regardless of incident specifics, NVDRS categorical variables refer to initial victim as "victim" and the individual who committed the murder followed by his or her own suicide as the "suspect."

For this research, we obtained NVDRS case records for violent deaths among individuals aged 65 and older for report years 2003-2016. We limited our analysis to cases from years 2014-2016 for several reasons. First the increase in number of reporting states (only four states participated in 2003 versus 32[2] in 2016) provides an increasingly credible case pool. Although these cases cannot be considered population-level data, due to not including all states, they are very nearly population data (see note) for the included states. Therefore, quantitative attributes reflect actual, not projected or estimated details. Along with this, based on our screening of older cases and review of the newest CDC-provided abstractor codebook, we determined that consistency, quality, and degree of detail incorporated into cases had Improved as the dataset expanded. We were additionally motivated to use the newest data available and to minimize overlap with prior research reports based on the earliest data years. At the time we conducted this analysis, 2016 was the newest data year available. Based on our review of prior research, only one published report (Schwab-Reese et al., 2021) included cases from 2016.

[2] For 2014, 18 states reported to NVDRS; for 2015, 27 states reported, and for 2016, 32 states reported. Washington, Pennsylvania and Illinois, added in 2016, collected data on 80% or more of all violent deaths in the state per the requirements under which these states were funded.

Case Selection

We first identified all cases NVDRS abstractors identified as reflecting intimate partner violence; these included spouse/partner homicide-suicide and other domestic violence incidents. We also reviewed the narratives of all incidents to identify any potentially misclassified cases. We identified a final sample of 121 cases of partner homicide-suicide with victims aged 65 or older. We applied qualitative and quantitative analysis strategies, detailed in the following sections, to condense, describe, and interpret the data corpus.

Qualitative Methods

We divided cases among the authors and independently conducted first cycle open coding (Saldaña, 2013), a process in which an unrestricted number of codes, or summarizing phrases, are derived from the data themselves. Each code was associated with selected excerpts that address the purpose of the research. We considered relevant meaning units as units of analysis and, also described by Chenail (2012), used the comment function of Microsoft Word to associate codes with excerpts. We followed initial coding with a process of clustering first cycle codes into similar groups (pattern coding, see Saldaña, 2013), and then met as a group to refine patterns into themes and subthemes that described variations within each theme. We additionally considered our interpretations of relationships among themes, with the aim of working to develop one or more prototypical cases.

Quantitative Methods

We compiled descriptive statistics to track attributes including demographic and location details, weapon use and type, and presence of suicide pact. We used Cohen's typology to align each case to one of these three categories: domestic violence; dependent/protective; and the third category which included co-dependent relationships and other scenarios. We additionally identified prevalent subcategories within dependent/protective incidents. We compared actual case counts to Cohen's predicted category breakdown using χ^2 goodness-of-fit tests. All quantitative analyses were conducted with R software (R Core Team, 2018).

Integrating Qualitative and Quantitative Data

We calculated prevalence and co-occurrence of developed themes within and across cases. We additionally extended development of themes into a graphical, process-based presentation of the prototypical cases, emphasizing relationship among key themes and subthemes, which described common and compelling contextual features. Unlike our qualitative and quantitative analyses, which were guided by established procedures and prior theory, respectively, our integrated analysis of prevalence and co-occurrence reflects an emergent process suggested by the processes and results of our qualitative and quantitative analyses.

Results

Table 1
Themes, Subthemes, and Excerpts* with case count**

	Relationship Theme – Subthemes & Representative Excerpts*
Good vs. Bad (n = 40)	[VICTIM] and [PERPETRATOR] decided to end their lives together. They had been married since early adulthood and according to family were always affectionate. [VICTIM] had previously sought assistance for domestic violence. After being threatened by [PERPETRATOR] the victim was concerned about her safety but still preferred to return to her home.
The Traditional Male (n = 52)	"[PERPETRATOR] was frustrated by both his wife's illness and her inability to continue to engage in tasks such as cooking and cleaning. Family members described that the [PERPETRATOR] would not let anyone else care for [VICTIM] although he felt he was increasingly unable to cope with her demands.
Projections & Perceptions (n=33)	[VICTIM] and {PERPETRATOR] had an on-again, off-again relationship. [PERPETRATOR's] former partner insisted that suicide was against [PERPETRATOR'S] religion. According to family members, [PERPETRATOR] was clearly devoted to [VICTIM] and he provided extensive emotional and financial support. His daughter expressed disbelief that [PERPETRATOR] would ever harm [VICTIM]. Family members reported their grandparents were fatally injured during a break in. Further investigation revealed that the incident was actually a homicide-suicide.
	Accumulation of Stressors Theme – Subthemes & Representative Excerpts*
Emergent & Worsening Conditions (n=22)	After many years of marriage, [VICTIM] was diagnosed with dementia. According to a neighbor, [PERPETRATOR] was also beginning to show signs of dementia. Both [PERPETRATOR] and [VICTIM] were taking multiple medications. [VICTIM] recently suffered stroke, had difficulty communicating and was unable to ambulate without personal assistance.
Financial Burdens (n = 11)	In a suicide note, [PERPETRATOR] said he was not able to stay current with financial obligations. He did not want to leave [VICTIM] behind to face financial burdens. [PERPETRATOR] was facing foreclosure of the family home and had complained to friends about his inability to pay for [VICTIM'S] medicine.
Avoiding Institutionalization (n=25)	[PERPETRATOR] left a lengthy suicide note to explain and apologize for his actions. In the note, he asserted that both he and [VICTIM] were facing the inevitability of moving to a nursing home due to worsening health. He described that he did not want to prolong her suffering. [PERPETRATOR] previously told a home health aide that he would rather see [VICTIM] die than be placed in a nursing home.
	Resignation & Preparation Theme – Subthemes & Representative Excerpts*
Expressing Intentions (n=45)	[VICTIM] has previously expressed desire to explore the alternative of physician-assisted suicide for both herself and [PERPETRATOR] although it is not legally available in their state. A close friend noted that [PERPETRATOR] appeared increasingly stressed. Some months ago, he stated that he was going to have to kill himself and [VICTIM] if her health got any worse. [PERPETRATOR] repeated this statement recently so the friend told their daughter-in-law.

	[PERPETRATOR] told his nephew "Sometimes I think we would both be better off dead. I think I need to get a gun."
Obtaining Weapons (n = 16)	[PERPETRATOR] had purchased a handgun on [RECENT DATE] and registered it. ~~“~~A receipt from a gun store was located which indicated the firearm had been purchased two weeks prior.
Completion Theme – Subthemes & Representative Excerpts*	
Guarantee (n=15)	[PERPETRATOR] shot his wife 10 times, using two different firearms. The police searched the house and found [VICTIM] in the basement. [VICTIM] had been beaten with a metal baseball bat and dismembered with a chainsaw.
Mercy (n=35)	The neighbor who made discovery stated that the [VICTIM]’s body was arranged in a "respectful" way, with some possessions, including jewelry, nearby and the couple's wedding photo placed on a nightstand. [PERPETRATOR] left a note stating that the homicide-suicide was discussed and planned a few years ago, when [VICTIM'S] health began to decline. In the note, he stated that he gave [VICTIM] ample medication to ensure she would sleep through the incident.
Cleaning Up Theme– Subthemes & Representative Excerpts*	
Burdens & Responsibilities (n=28)	[PERPETRATOR] was found shot in bed, with [PETS] in bed with him, also shot. The family report that they believe [PERPETRATOR] killed [VICTIM] and [ADULT CHILD WITH DISABILITY~~D~~] due to [VICTIM] experiencing worsening of her cancer, [ADULT CHILD WITH DISABILITY] being incapable of living without fulltime care, and [PERPETRATOR] not wanting to force his children and grandchildren to care for them. A handwritten note was located at the scene in which [PERPETRATOR] stated he “had no more left to give" and left instructions for his niece. Information showing a receipt for a pre-paid funeral was included
Notifying Third Party (n=24)	[PERPETRATOR] called 911 and stated that there had been a homicide. The dispatcher asked for more details. There was no response but there was a loud noise. It appears that [PERPETRATOR] had killed [VICTIM] before the call and killed himself while on the 911 call. On the day of the incident, [PERPETRATOR] texted friends and family members with a request for forgiveness. Shortly prior, he had provided insurance policy and investment information with family. [PERPETRATOR] then told the caretaker he had shot [VICTIM]. While the caretaker went to look, [PERPETRATOR] went outside and shot himself.
Explanations & Apologies (n=21)	[PERPETRATOR] left a suicide note describing the difficulty of caring for [VICTIM], apologized to family, and left directions regarding financial matters A jointly written note stated that the spouses were sorry. It also stated that the wife was too ill to write anything, but cannot continue to live with the pain.

*to protect confidentiality, included excerpts have been modified to reflect composite cases
**counts refer to number of cases which included excerpts contributing to each theme

Qualitative results

The results of our qualitative analysis revealed five main themes which occurred within cases: *Relationship, Accumulation of Stressors, Resignation & Preparation, Completion,* and *Cleaning Up*. Table 1 includes themes, subthemes with count of cases which include relevant excerpts, and representative excerpts. All excerpts reflect composite cases, to protect individuals' confidentiality.

Relationship

The relationship between the victim and the perpetrator was described throughout the data, typically presented as an effort to provide context for the motives of the perpetrator. We identified three sub-themes: *good vs. bad, the traditional male, and projections & perceptions. Good vs. bad* relates to the dichotomous nature of the types of relationships described. In most cases, the victims had long and reportedly happy marriages, while others had both hearsay and documented histories of domestic abuse. The latter is characterized by the homicide-suicide as an escalation of a pattern of abuse and paranoia from the perpetrator. The former is characterized by a perpetrator who has demonstrated compassion and love for his partner but recognizes that he can no longer provide the care she needs.

The next subtheme is *the traditional male,* reflecting a pattern of traditionally masculine values in the narratives that we identified as relevant to the decision-making process surrounding the homicide-suicide. Male caregivers struggled with the shift in roles and were described as overwhelmed. There was a described sense that it is the male's duty to care for his wife, and if he is not capable, he should not place that burden elsewhere. This logically leads to the decision to commit the homicide. Further, the man he must then commit suicide, because in a traditional relationship, the man and woman should "be together."

The subtheme *projections & perceptions* represents the surprise expressed by family and friends following the homicide-suicide. Although some perpetrators had specifically stated that they would commit the homicide-suicide, family and friends were shocked, reporting that they believed the couple to be happy and stable, that the perpetrator would "never" commit homicide-suicide. In some instances, this manifested as disbelief that the homicide-suicide was not in fact a double murder perpetrated by an unknown third party, such as an intruder.

Accumulation of Stressors

The couples described in these narratives experienced a variety of stressors that were often indicated to be the impetus for the homicide-suicide event. In nearly all cases the stressors accumulated over time and were perceived as likely to intensify rather than diminish, which caused a sense of hopelessness and desperation in either the perpetrator, the victim, or both. Within this theme, we identified three sub-themes: *emergent and worsening conditions, financial burdens, and avoiding institutionalization*.

The first subtheme, *emergent and worsening conditions,* is representative of the multiple, chronic, and often unmanageable health conditions suffered by both victims and perpetrators alike. Such conditions were often terminal diagnoses, such as cancer, or those for which there is no effective treatment, such as dementia or chronic pain. *Financial burdens* were commonly the result of these health conditions, wherein the couples had spent their savings to manage the care of one or both parties and were facing increasing financial pressures. In other cases, the financial pressures were non-medical, such as gambling losses, tax-audits, and business losses. The final

sub-theme, *avoiding institutionalization,* in some instances was influenced by *emergent and worsening conditions* and *financial burdens.* The narrative reports indicated that the perpetrators, and occasionally the victims, were aware that they could no longer provide the necessary level of care to their partners but did not want to enter a skilled-nursing facility. This response most often was associated with unwillingness to admit residential care was appropriate although in some instances, financial concerns were also present.

Resignation and Preparation

At some point, the perpetrator makes a decision to carry out the homicide-suicide and begins to make preparations. We identified this decision as illustrating resignation: the perpetrator sees no alternative. In most cases, the perpetrator did not complete the homicide-suicide on impulse, but rather made the necessary arrangements. Included in this theme are two sub-themes: *expressing intentions* and *obtaining weapons.* Throughout the data, family and friends of the couple often reported that the perpetrator had made explicit statements about intent to commit homicide-suicide, in some cases to health care professionals. These statements ranged from off-hand, general comments about ending their lives, to specific remarks about how and why they would complete the homicide-suicide. In addition, *obtaining weapons* refers to the frequent mention of newly purchased, borrowed, or stolen weapons. Perpetrators overwhelmingly used firearms to complete the homicide-suicide, perhaps owing to their relative frailty in limiting their physical capacity to commit homicide-suicide by other means.

Completion

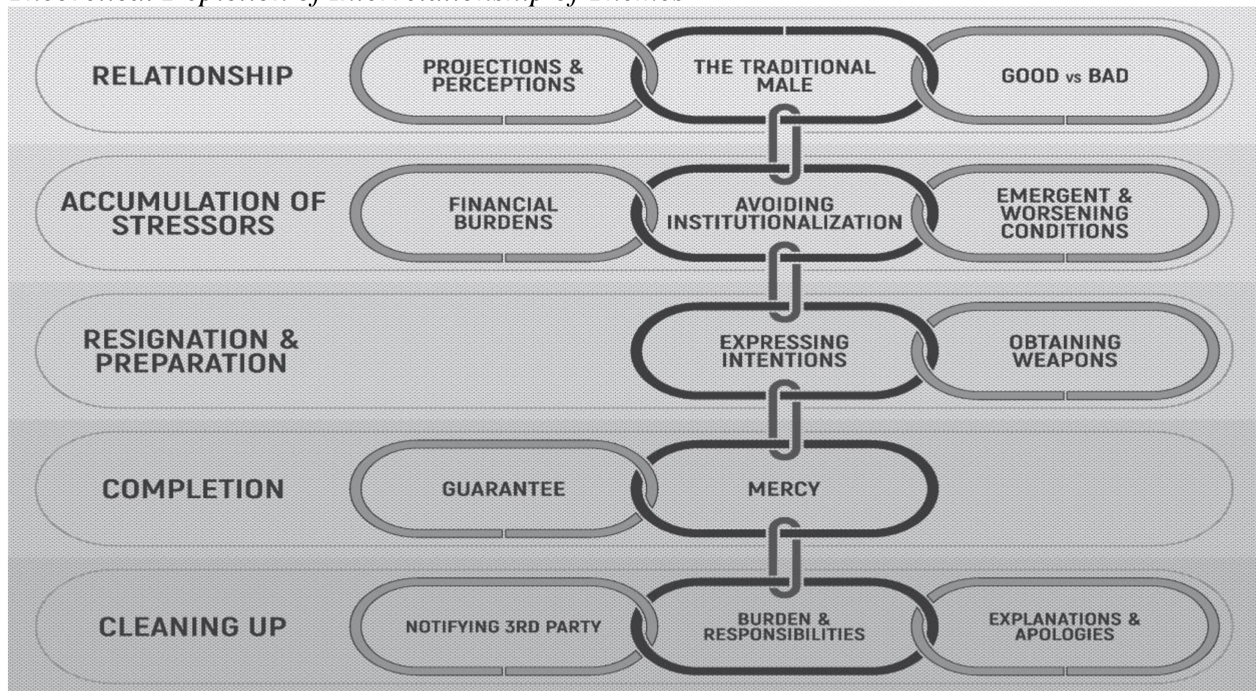
Specific to the completion of the homicide-suicide, we identified two sub-themes: *guarantee* and *mercy.* As stated previously, perpetrators typically used firearms to commit the homicide-suicide, but often took precautions to ensure that it would be successful. This sub-theme, *guarantee,* relates to the nature of the methods used to complete the homicide-suicide, such as multiple gunshots to the head, close-range gunshots, and gunshots to multiple parts of the body. In cases where firearms were not used, "backup" methods were utilized or prepared, such as smothering followed by stabbing or multiple sources of carbon monoxide. *Mercy* describes the care that perpetrators used to ensure quick and painless deaths, and the gentle way that they handled the bodies following the homicides. In several cases, victims were killed in their sleep, occasionally having been drugged prior.

Cleaning Up

Our final theme relates to the steps taken by the perpetrator, and occasionally the victim, to ensure that they are not leaving behind any confusion or additional difficulties. We identified three sub-themes: *burdens & responsibilities, notifying a third party, and explanations & apologies. Burdens & responsibilities* addresses the efforts made by the perpetrator to reduce the burden on their loved ones left behind. In some cases, the perpetrator provided important paperwork, passwords, and instructions. Some, however, went so far as to include pets in the homicide-suicide, and three cases involved the homicide of a dependent child. *Notifying a third-party* addresses the common practice of alerting authorities, family or friends about the homicide-suicide during its completion. Some alerted the third-party prior to both the homicide-suicide, but most waited until after they had committed the homicide and made a phone call stating what they had done and what

they intended to do. It is evident that the perpetrators want to take responsibility for the homicide-suicide. Finally, *explanations & apologies* relates to the various notes, phone calls, and letters that the perpetrators, and sometimes victims, leave behind for family and friends. These messages often explain why they believe homicide-suicide was their only option, and typically included apologies.

Figure 1
Theoretical Depiction of Interrelationship of Themes



Integrating the Themes

We expanded our interpretation of the theme structure to suggest the initial development of a theory to describe these cases, depicted graphically in Figure 1. Based on our analysis and discussions throughout the process, we identified key, prevalent subthemes which represent interrelated factors, which, in turn describe a process. Figure 1 depicts links between the key subthemes in each category which illustrate the aspects of the prototypical case, central to this theory.

To quantitatively triangulate or verify this qualitative interpretation, we re-reviewed the narratives and determined the precise extent to which these five key subthemes from our prototypical case occurred and co-occurred within cases. We found 21 cases in which one key subtheme was presented; 57 in which two to four subthemes occurred; all five occurred in a single case. The most commonly occurring theme across 121 cases was *the traditional male* (52 cases), followed by *Expressing intentions* (45 cases). We next considered how themes co-occurred. The most common co-occurrence was *the traditional male* and *expressing intentions* (31 co-occurrences), followed by *the traditional male* and *mercy* (21 co-occurrences).

In 42 cases, we identified none of the key subthemes. Additional review indicated that these 42 included 17 for which we categorized reason as “intimate partner violence,” and others we categorized reason as "other/unknown," including 16 cases that lacked adequate detail for nuanced qualitative analysis, and nine cases where the incident was associated with mental illness (e.g., diagnosed bi-polar disorder) or cognitive decline (e.g., diagnosed or suggested dementia).

Table 2
Homicide-Suicide Case Attributes

Attribute	# of cases (*%*)
Firearm used (n = 121)	107 (*88.4*)
Type of firearm (n = 107)	
Handgun	53 (49.5)
Shotgun	10 (*9.3*)
Rifle	2 (*1.9*)
Multiple firearms	1 (0.93)
Firearm not described	41 (38.3)
Suicide Pacts (n = 121)	
No Suicide Pact (n = 106)	
Male suspect no pact	99 (81.8)
Female suspect no pact	5 (4.1)
Same sex (male) no pact	2 (1.7)
Suicide Pact (n = 15)	
Male suspect with pact	14 (11.6)
Female suspect with pact	1 (0.8)
Cohen Typology (n = 121)	
Dependent/protective	59 (48.8)
Declining health	26 (21.5)
Caretaker stress	17 (14.1)
Financial concerns	10 (8.3)
Inability to live independently	4 (3.3)
Family concerns or conflicts	2 (1.7)
Intimate partner violence	17 (14.1)
Co-dependent and other	45 (37.2)

Quantitative Results

Homicide-followed-by-suicide incidents almost always occurred in or near the family residence. Men were the perpetrator in 116 of 121 incidents, with only two cases involving male same sex couples. Mean age of victims was 74.4; mean age of suspects was 75.6. Most individuals (110 victims; 107 suspects) were identified as White, non-Hispanic. Incidents occurred in 28 US states. The states with the greatest number of incidents were in the southeastern US and included Georgia and North Carolina, with 9 each, and Virginia with 8. We identified additional descriptors including those often assessed in prior research including: firearm used; type of firearm; suicide pact and sex of suspect. Case attributes and frequencies are contained in Table 2.

As described previously, Cohen (2000) developed a typology and provided estimated proportions of cases by type. Her estimates include that 30% of older adult homicide-suicide incidents were associated with domestic violence and 50% of incidents were associated with dependent/protective incidents also involving illness of one or more partners. According to Cohen, the remaining 20% include a variety of circumstances, including complex co-dependent relationships. To assess typology fit with these data, we used a χ^2 goodness-of-fit test and the proportions 30/50/20. We identified 17 incidents of intimate partner violence, 59 dependent/protective incidents, comprising 5 subcategories (see Table 2) and a remaining 45 cases that we designated as co-dependent or other circumstances.

The expected specific frequencies for a 30/50/20 proportionate split based on 121 cases are 36/61/24, and our actual breakdown was 17/59/45. The results of the χ^2 test were significant (χ^2

=28.176; df = 2; p<0.0001) suggesting our breakdown was not consistent with Cohen's (2000) observations. We identified fewer partner violence incidents although we classified more cases other/unknown. The number of incidents we classified as dependent/protective was very close to Cohen's estimated frequency (59 actual versus 61 expected).

Discussion

For this report, we conduced and presented results from a novel mixed qualitative and quantitative secondary data analysis of a national dataset to provide insights into the important and potentially growing public health concern of homicide-followed-by-suicide among aging adults. The results of our descriptive statistical analysis support prior research that suggests male suspects, female victims, White race, and use of firearms generally characterize homicide-suicide partner incidents among older adults in the US. We found minimal evidence of suicide pacts or agreements and substantial support for unilateral decision-making by the male partner. In multiple instances, the male partner engaged in additional efforts to put things in order including organizing wills and paperwork, documenting funeral preferences, executing pets, and, in a small number of extreme cases, committing homicide of dependents, such as adult children with disabilities.

In this dataset that includes cases that reflect 2014-2016 incidents across 32 states, we found support for Cohen's typology from 2000 that suggested 50% of older adult homicide-suicide incidents occur in dominant protective relationships. While we found a smaller proportion than Cohen asserted of domestic-violence related homicide-suicide (14% versus the predicted 30%), we found a larger than predicted number of cases that we classified as unknown/other, so it is possible that our data did not fully capture partner violence-related issues, especially in instances in which there was no legal history of domestic violence within the couple. Cohen's subtypes, although intended to apply to homicide-suicide, are similar to Johnson's (2008) typology of general intimate partner violence. Johnson categorized "intimate terrorism" – similar to Cohen's first category, "violent resistance," "situational couple violence" and "mutual violent resistance" – similar to Cohen's third category. Johnson incorporates an additional category, "violent resistance," in which partner-initiated violence is countered by both violence and control by the other partner (pg. 6), that has no direct parallel with Cohen's work.

Our findings that were consistent with Cohen's assertion that 50% of cases fall under the dependent/protective category suggest that these incidents continue to be concerning, and may present the most potential for future intervention efforts. Unlike the other categories which describe patterns of partner violence or co-dependent relationships, dependent/protective incidents typically follow emergent circumstances. This is made more complicated by the potential for one circumstance, e.g., sudden injury or diagnosis of serious disease, to be the precipitating event, or men's decisions to commit homicide and die by suicide may reflect a cumulative series of health, personal, financial, and other concerns. What we did identify as an important factor, illustrated by being the most common theme throughout the data, was the notion of "the traditional male." This idea plays a prominent role, supplemented by other prevalent subthemes, in our integration of themes to form a prototypical case.

In our depicted prototypical case, the male partner has expressed or demonstrated the belief that he is responsible for himself and his female spouse (subtheme: *The traditional male*). Among the stressors that occur, long term care may present the greatest threat to the male partner's traditional role because moving to any type of supported living circumstance potentially results in not only sacrificing responsibility for caretaking but also perceived loss of control over the partnership (subtheme: *Avoiding institutionalization*). Facing threat of institutionalization rather than independent living, male partners may begin to speculate regarding preferred alternatives that

include homicide-suicide and share these thoughts (subtheme: *Expressing intentions*). These intentions are often shared with neighbors or family members but not necessarily with partners. After the incident, final signs of respect, that may also be perceived as continuation of efforts to control or take responsibility, include taking care to ensure a less uncomfortable death (subtheme: *Mercy*), and trying to minimize the practical difficulties and assist with decision-making processes of loved ones, such as children, left behind (subtheme: *Burdens & responsibilities*). This final subtheme can also be seen a variant on the traditional male role; i.e., retaining a dominant parental role in addition to the primary partner role.

Our analysis of these data suggests that men's "traditional male" roles in relationships encompassed perceived responsibility for, care-taking of, and decision-making on behalf of female partners, up to and including the decision to end life. We also found support for Calasanti and King's (2007) assertion that men varied in their ability to manage caretaker stress to the extent that we specifically identified *caretaker stress* among reason categories. The conflict between perceived societal role responsibility to be a caretaker, and personal inability to manage the stress may contribute to what eventually is perceived to be an unmanageable situation for some men. Therefore, whether the precipitating event is a single diagnosis or a combination of health and other stressors, our analyses of these data suggest that men who interpret their role in what we define as a traditional way may be at increased risk to the tendency to unilaterally decide on both the course of action, and when to engage in the course of action.

Based on our findings and development of a typical case, we suggest that healthcare providers, programmers, and others who provide care for or interact with aging adults be attuned to the series of contextual features we identified. These include relationships in which the male partner communicates, describes, or refers to perceived responsibility for both partners. When this is followed by potentially precipitating circumstances including health concerns that indicate need for institutionalization, changes in living that may compromise independence (e.g., moving in with younger family members), or financial concerns, this may suggest a high-risk context. The relative frequency with which we identified the theme *expressing intentions* and its regular co-occurrence with the theme *the traditional male,* suggests that men are often talking to someone, in some way about the possibility of partner homicide followed by death by suicide. We suggest providers and family members should be attuned to these remarks, even when offered in an offhand way, as they might signify the beginnings of a planning process. Other warning signs may include frustration with caretaking and recent firearm purchases. While these may seem self-evident, it is clear to us after reading these narratives that family members, friends, neighbors, and caretakers are typically surprised by homicide-suicide in couples who have not exhibited conflict or signs of partner violence. Clearly, although dependent/protective incidents appear to comprise the majority of incidents, obvious, ongoing partner violence, which is present in a minority of cases, is more likely to be recognized as a risk factor.

A primary limitation of this work is a reliance on third-party accounts of the nature of the victim and suspect relationship, their physical and mental health, and other variables pertinent to and preceding the homicide-suicide event. Owing to the nature of the original data sources (law enforcement reports and medical examiner reports) and the incident itself (no survivors), direct accounts of the precipitating circumstances are not typically available. However, given the many commonalities between our findings and the previous literature, we assert that these reports are likely to accurately represent the events as they occurred. Another strength of this data source is relative consistency in level of and type of details gathered.

To our knowledge, this report is the first to describe homicide-suicide events among intimate partners utilizing NVDRS data and illustrates the value of secondary analysis to add

insight and understanding to an issue that is of interest to public health, aging, and violence prevention researchers and programmers. This dataset provides scholars with the ability to access comprehensive presented details of many incidents throughout multiple regions of the US, a particular strength of this work, as homicide-suicide research commonly relies upon partial or incomplete reports of events (Rouchy et al., 2020). We also demonstrated applications of basic analysis strategies, including open coding and descriptive statistical analysis along with a novel integration strategy in which we used outcomes of open coding to develop and quantitatively consider a process that describes a typical case. We believe this shows that secondary mixed methods analyses might result in findings that are both credible and compelling. Inspired researchers may find many additional creative ways to conduct secondary analysis through use of the categorical/quantitative and unstructured/qualitative data.

As states reporting to NVDRS continue to increase, potential for longitudinal analysis of homicide-suicide and other issues of interest also increases. In particular, future research on homicide-suicide among older adults may utilize longitudinal designs to identify the role of contextual factors influenced by then current events. Given the impact of violence on public health, it is our hope that mixed methods researchers continue to use this data source to improve understanding of these complex and challenging issues.

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Disclosure Statement

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