

# Determinants of suicidal history before assisted versus self-initiated suicide late in life: an observational study

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## Summary

**BACKGROUND:** Older adults are at risk of assisted and self-initiated suicide. The links between prior attempts and assisted suicide in the elderly have not been investigated. Hence, we aimed to investigate and describe the occurrence, timing and determinants of suicide attempts prior to assisted and self-initiated suicide.

**METHODS:** We developed a retrospective study of all assisted and self-initiated suicides among people over 65 years in the canton of Geneva, Switzerland, for a 10-year period (2010–2019). Cases were identified by cross-referencing hospitals' routinely collected electronic data and a forensic report database. Cases were characterised in terms of sociodemographic factors, mental health disorders, main comorbidities, temporal sequence, methods of injury, medical complications and disclosure rates of previous attempts. The study used descriptive statistics.

**RESULTS:** A total of 26 of 497 (5.2%) and 20 of 149 (13.4%) older adults had made previous attempts before assisted and self-initiated suicide, respectively. More than half of them had made a single attempt, mostly by medication poisoning, sometimes more than 10 years before dying. Individuals who made two attempts were significantly more represented among the assisted suicide decedents. One self-initiated suicide decedent and half of the assisted suicide cases had disclosed that they had considered suicide. Individual characteristics were similar, except for assisted suicide decedents, who were eight years older than self-initiated suicide decedents. Almost all the individuals had mental disorders. Depression, anxiety and chronic pain were particularly prevalent among decedents of assisted suicide. The substantial representation of women in both groups may be an indication of their vulnerability, possibly related to chronic pain and life stressors.

**CONCLUSIONS:** Our results show commonalities between older assisted and self-initiated suicide decedents who made an attempt (s) before suicide. Further research is needed to demonstrate the overlap between the determinants of assisted suicide and other forms of suicidality and to support a suicide prevention strategy applicable to both types of suicide.

## Introduction

Older adults comprise a growing proportion of the world's population and are exposed to a range of risk factors that can increase vulnerability to suicide. As late-life attempts have a high mortality rate, older adults are considered a priority population for suicide prevention strategies.

In Switzerland, the elderly represent less than 20% of the population but half of the country's suicide decedents. Twenty-eight percent of people who die by suicide in Switzerland are over 80 years old and nearly 20% are between 65 and 79 years old, according to the latest available data from the Swiss Health Observatory (2018) [1].

In 2016, the Swiss government launched a suicide prevention action plan with ten measures, including having relevant data to develop prevention through monitoring and research, raising public awareness, providing quick and easily accessible help, and disseminating knowledge on the best practices in Switzerland and abroad [2]. The measures aim to reduce the number of self-initiated suicides by 25% by 2030. The action plan focused on self-initiated suicide. Concerning assisted suicide, the Swiss Confederation promotes autonomy and self-determination values, as well as the freedom to choose one's end of life and access to palliative care [2]. A history of previous suicide attempt(s) constitutes the most important risk factor for suicide. Approximately 7% (5–11%) of suicide-attempters treated in hospital will eventually die by suicide, a far higher proportion than the general population, where annual suicide rates are about 1 in 10,000 [3]. The elderly population is at high risk of dying by suicide following their first attempt [4]. A study found that more than 80% of suicide decedents over 60 years of age have made no prior attempt [5].

To the best of our knowledge, the link between prior suicide attempts and assisted suicide in the elderly has not yet been investigated. Data related to potential previous attempts before assisted suicide, the time course between suicide attempts and assisted suicide, and the determinants of such suicidal behaviour remain scarce. We hypothesised that there is an overlap between assisted and self-initiated suicide determinants and that the determinants recognized for self-initiated suicide, such as prior hospital-treated attempts, mental disorders and life stressors, are also present in older populations who die by assisted suicide.

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In this exploratory study, we aimed to describe the characteristics of decedents who made a prior attempt before dying by suicide. We examined all recorded assisted and self-initiated suicide cases aged 65 years and above in a retrospective study spanning 10 years in Swiss canton Geneva. First, we aimed to examine the attempts made prior to death by suicide. Second, we described both groups, especially according to the personal determinants of suicide.

## Materials and methods

### Study design, data sources, setting

We performed a retrospective, observational, descriptive study of all suicide deaths in elderly people (aged 65 years or older at the time of death) that occurred in Geneva between 2010 and 2019.

In Switzerland, all deaths considered unnatural are investigated by a forensic team, including the police, a state attorney, and a medical examiner from the local Institute of Forensic Medicine. Most assisted suicides in Switzerland are conducted with the assistance of volunteers from non-profit organisations, who carry lethal doses of barbiturates prescribed by a physician under conditions that individuals who decide to die will take. After a person has died, volunteers must notify the police. In the case of assisted suicide, forensic teams determine whether Article 115 of the Swiss Criminal Code was violated. Article 115 of the Swiss Penal Code tolerates assisted suicide if the assisting person has no vested interest in the death of the decedent. The cause of death is listed as intoxication by the ingestion of barbiturates. The manner of death is listed as assisted suicide (separate from self-initiated suicide).

In Geneva, all cases of assisted and self-initiated suicide are systematically examined and identified by the University of Geneva Division of Legal Medicine, which prospectively collects cases of suicide in a database, besides keeping forensic records including autopsy results and mandatory medical certificates attesting the patients' known disease(s).

Using name, sex, and dates of birth and death, we individually linked each deceased person in the forensic database to their electronic hospital file, including administrative and medical information. We used data linkage from these medicolegal data with electronic hospital charts and records of Geneva University Hospital to identify and describe cases, time courses, and other determinants of suicidality, such as basic sociodemographic characteristics, mental health diseases, comorbidities, symptoms and hospital use, in our study population.

All suicide cases were successfully linked to their corresponding electronic files. Geneva University Hospital is the largest healthcare provider in the canton, encompassing a large number of inpatient and outpatient facilities in all medical fields (8 hospitals, 2 clinics, 30 places of care, 280,000 people treated each year, and high specialisation level emergency departments for adults, elderly, and children). This is the sole institution in Canton Geneva, offering acute hospital stays in psychiatry. The likelihood of having no electronic files in this institution for our study

population (65+ years) was very low, as the probability of hospital use increases with age.

For deaths classified as suicides, the demographic and administrative data registered from forensic files were age, sex, type and year of suicide. Using patients' medical records, we collected data related to marital status (divorced, single, widowed, married), place of residence before death (home or institution), main diseases and comorbidities. Diagnoses were coded using the International Classification of Diseases, 10th revision (ICD-10).

When mental disorders were coded in discharge letters according to the fourth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) criteria, a referring senior psychiatrist recoded the diagnosis according to ICD-10, relying on reports of multiple consultations or hospitalisations.

Suicide cases were divided into two groups: assisted and self-initiated. After training, two physicians and members of the research team independently coded information for one group and checked the information coded by the other member for the other group. Information was collected in electronic records by searches in all records from the emergency department, psychiatrist consultations and psychiatry division admissions, with an extensive list of search terms, such as "attempt," "psychiatry," "psychiatric consultation," "involuntary admission in psychiatry," "intensive care," "surgery," "oncology," "admission", and "discharge summaries", to identify suicidality course, mental disorders, comorbidities (using ICD-10) and life stressors.

From electronic files and forensic records, we gathered and recorded available information about the following data: (1) basic demographic and administrative information (date of birth, age at death, sex, declared religious affiliation, with whom and where the person lived, marital status [divorced/separated, single / never married, married / in a relationship, widowed], curatorship, prior decision of involuntary placement); (2) year and type of suicide (assisted vs self-initiated); (3) number and time course of attempts prior to death by suicide, means of injury, planning of assisted suicide when disclosed and recorded in medical file; (4) health consequences of attempts (health complications according to ICD-10, related to hospital care: emergency room, psychiatry ward, surgery, intensive care admission); (5) mental health diseases according to ICD-10 (F0 to F6), personality disorders; (6) life stressors (abandonment or placement during childhood, abuse during childhood or adulthood, suicide of a first degree relative or another loved one, presence of a recent or ongoing crisis, conflict with family [children, partner or other family members], financial problems, isolation, separation/divorce, loss of a parent during childhood, loss of a child, bereavement [after violent death or not], mistreatment, trial, imprisonment); and (7) information about health status and chronic diseases (comorbidities, two primary symptoms [pain, stage IV dyspnoea], and frailty criteria [living at or in the process of transitioning/moving to a nursing home, dementia and cachexia]).

Data were complete for administrative and sociodemographic factors, type of suicide (assisted or not), methods of self-initiated suicide and hospital use. Previously, the period of information search in the patients' files was not limited. We searched for data from 2020, allowing a

6-month period for potential additional files or data from both data sources after the last deaths occurred in our sample.

Diagnosis coding of principal diagnoses was available for most cases; we had to complete diagnoses with the primary symptoms (pain and stage IV dyspnoea) when they were reported to be severe, persistent and/or burdensome.

The authors recorded all characteristics relevant to the study on Excel sheets and anonymised the data after collecting and checking the data in electronic files. All personal information, including identity, was blinded after linkage and before data analysis. Alphanumeric codes were used to identify each case.

### Patient and public involvement

Caregivers, patients, the public and other Swiss centres were not involved in the design or analysis of this study.

### Statistical methods

Data handling and quantitative analyses were conducted using Excel and Stata (StataCorp. 2011. The Stata statistical software Release 11. College Station, TX, StataCorp LLC). Patient characteristics were described using mean values and standard deviations for quantitative variables, and frequencies and percentages for categorical variables. Inferential statistics were omitted given the exploratory nature of our research. Indeed, this study was not designed to detect differences.

### Ethical considerations

The study was approved by the Geneva branch of the Swiss Ethics Committee in August 2016 (protocol number 2016–00966). Informed consent from patient relatives was not required by the ethics committee, as this was a retrospective study of routinely collected health and forensic data.

### Results

During the study period, 497 people died in the group aged 65 years and above in Geneva; the majority were assisted suicides ( $n = 497$ , 79%). The highest rate of assisted suicide was observed in 2018.

A total of 26 of 497 (5.2%) and 20 of 149 (13.4%) older adults had made prior attempts before assisted and self-initiated suicide, respectively.

### Decedents characteristics

Table 1 summarises the socio-demographic characteristics of the groups.

Assisted suicide decedents were eight years older than self-initiated suicide decedents.

Women who carried out suicide attempts represented half of assisted suicide and 75% of self-initiated suicide decedents in their age group.

Almost all individuals had a mental illness or disorder(s) (table 2). The most prevalent psychiatric diagnoses in assisted suicide decedents were mood disorders, especially anxiety and depression. Depression-, neurotic- and stress-related, and somatoform disorders were significantly more prevalent in the assisted suicide decedents group. However, personality disorders have scarcely been reported. We found no reports of aggressive or impulsive behaviour, or feelings of hopelessness in either group.

Attempts were made in relation to a cancer announcement in two assisted and one self-initiated suicide decedents. Refusal of care in the context of a recent diagnosis of cancer or chronic disease(s) was found in five cases in the assisted suicide and six cases in the self-initiated suicide groups. In both groups, the most prevalent symptoms were chronic pain and stage IV dyspnoea. Stage IV dyspnoea was related to chronic obstructive pulmonary disease, pulmonary cancer or obstructive sleep apnoea, and continuous positive airway pressure was observed. Chronic pain was significantly more prevalent in assisted suicide decedents. Most of the patients who had a chronic illness were women; it was found in 17 of 19 and 4 of 6 in the assisted suicide and self-initiated suicide groups, respectively. Both groups were quite similar regarding other data related to health status.

### Previous suicide attempt(s)

Table 3 summarises the number of attempts, most prevalent method, and health consequences of suicide attempts reported in the electronic files. More than half of the participants were single attempters.

Individuals who made two attempts were significantly more represented among the assisted suicide decedents. The last attempt had occurred an average of 2 years (minimum less than 1 month; and maximum 18 years) and 9.6 years (minimum less than 1 week; maximum 72 years) before death in the self-initiated and assisted suicide groups, respectively.

The most prevalent suicide attempt method in both groups was poisoning by drugs. The methods most frequently re-

**Table 1:** Sociodemographic characteristics and declared religious affiliation in elderly who did attempt(s) before dying by assisted or self-initiated suicide, Geneva, Switzerland, 2010–2019.

Characteristic	Self-initiated suicide (n = 20)	Assisted suicide (n = 26)
Age at death, mean (SD)	73.5 (1.63)	81.3 (1.69)
Male sex, n (%)	5(25)	13/26 (50)
Marital status, n (%)	Divorced/separated	2
	Single / never married	1
	Widowed	7 (35)
	Married / in a relationship	10 (50)
No religious affiliation, n (%)	5 (25)	14 (53.8)

ported after poisoning were jumping from a high location and wrist cutting.

Health complications of attempts did not differ significantly between the two groups. Most attempters were hospitalised in the psychiatry department. Half of the elderly who died by assisted suicide and one person who finally died by self-initiated suicide were revealed to have considered assisted suicide in interviews with doctors.

### Other determinants of suicidality

Reporting of the data in this section is only descriptive.

In each group, one individual had been placed with relatives after the parents' divorce, and another had experienced foster care. Maltreatment by the father was reported for one woman in each group.

Bereavement was the most prevalent life stressor in both groups (10 cases in the self-initiated suicide group and 12 in the assisted suicide group). In each group, a woman had experienced bereavement after the murder of a relative. Five women (one in the self-initiated suicide group and four in the assisted suicide group) and one man (in the assisted suicide group) had experienced the loss of a child. Two people in the assisted suicide group and three people in the self-initiated suicide group had family members who died by suicide. None of the participants had lost a family member after assisted suicide.

Social isolation was equally and frequently reported (in 13 self-initiated suicide decedents and 9 in the other group). Among self-initiated suicide decedents, 5 had conflicts with relatives, whereas there were 15 in the other group, all of whom were women. Individuals who experienced break-up (separations, divorces) comprised four in the self-

**Table 2:**

Diagnoses, primary symptoms, and frailty criteria collected in elderly who did attempt(s) prior dying by assisted or self-initiated suicide, Geneva, Switzerland, 2010-2019.

Diagnosis/symptom/criteria	Self-initiated suicide (n = 20)	Assisted suicide (n = 26)
Mental and behavioural disorders, n (%)	19 (95)	24 (92.3)
– Organic, including dementia, delirium, disorders due to medical conditions (F00–F09)	1 (F05)	3 (F03)
– Psychoactive substance use (F10–F19)	2	3
– Schizophrenia, schizotypal and delusional disorders (F20–F29)	1	1
– Mood disorders (F30–F39)	17 (85)	21 (80.7)
– F30	4 (20)	0
– F31	4 (20)	0
– F32+F33	9 (45)	20 (76.9)
– F34	6 (30)	7 (26.9)
– Neurotic, stress-related and somatoform disorders (F40–F48)	1 (5)	10 (38.4)
– F41	0	1 (3.8)
– F43	1 (5)	7 (26.9)
– F45	0	2 (7.69)
– Disorders of adult personality and behaviour (F60–F69)	2	0
Neoplasms, n (%)	2	7
Stage 4 dyspnoea, n (%)	1 (5)	5 (19.2)
Sensory loss, n (%)	0	3 (11.5)
Chronic pain -no. (%)	6 (27)	19 (70)
– Musculoskeletal	2 (10)	11 (42.3)
– Oncological	1	3
– Vascular	2	0
– Neuropathic	1	5
Nervous system disease, n (%)	1 (5)	6 (23)
Obesity, n (%)	0	3 (11.5)
Frailty criteria, n (%)		
– Long-term care facility living	1 (5)	4 (15.3)
– Transitioning to nursing-home	3	5
– Dementia	1	4
– Cachexia	2 (12.5)	7 (30.4)

**Table 3:**

Characteristics of attempts, in assisted and unassisted suicide decedents, Geneva, Switzerland, 2010–2019.

Number, most prevalent method, and health complications of attempts	Self-initiated suicide (n = 20)	Assisted suicide (n = 26)
1 attempt	14 (70)	15 (57.7)
2 attempts	1 (5)	8 (30.7)
3 or more attempts	5 (25)	3 (11.5)
Drug poisoning	17 (85)	18 (69)
Emergency department admission	15 (75)	20 (76.9)
Admission in psychiatry ward	15 (75)	18 (69)
Admission in intensive care unit	6 (30)	2 (7.7)
Sutures of the tendons of the hand/wrist	0	3 (11.5)
Bronchopneumonia	4	1
Circulatory complications	1	1

initiated suicide decedents group and nine in the other group. We found a woman in each group who had experienced domestic violence from husband or son.

In each group, four patients had caregiver experience, and only one of them was a man who died by self-initiated suicide.

In each group, one individual completed each trial. None of the participants in the group deceased by assisted suicide experienced imprisonment. Two persons were in jail when they took their lives.

## Discussion

Individuals in both groups most often made a single attempt, sometimes many years before the fatal act, mostly through medication poisoning. Indeed, the risk of suicide after an attempt may persist for up to 32 years after the index attempt [6]. Most first nonfatal suicide attempts occur before the age of 35. Suicide attempts before 18 years are linked to childhood maltreatment, whereas attempts occurring from 35 years and older are strongly linked to a prior history of substance abuse and mood disorders (mania/hypomania and dysthymic disorders between 35–49 years and major depressive episodes after 50 years of age) [7].

The shortest interval between the last attempt and death by suicide was less than 1 month in both groups. Previous studies have described suicide rates to be the highest within 3 months from discharge in patients admitted with suicidal ideas and behaviour, remaining high for more than 10 years [8].

Overall, the high prevalence of mental illness, especially depressive and anxious disorders, found in both groups suggests the need to enable access to support and long-term care for all elderly patients admitted for suicide attempts.

In the assisted suicide group, individuals were eight years older than the other group. Nearly half of them had informed their next of kin or a doctor of the risk of suicide, whereas only a single case in the other group did. However, Choi showed that the older the decedents were the more likely they were to have disclosed suicidal intent and that comorbidities largely explained the odds of disclosure [9]. Older adults are known to carry out less impulsive and more carefully planned attempts than younger groups, often without warning [10].

The substantial representation of older women among self-initiated and assisted suicide decedents with a history of suicide attempts may be a clue to their vulnerability, as previously hypothesised by Canetto et al. [11]. Women's vulnerability is also illustrated by the fact that most women who had experienced the loss of a child or a loved one from violent death, had broken off relationships with their families, suffered from chronic pain or had a caregiver experience. However, experience as a healthcare proxy has been proven to increase positive assisted suicide attitudes and behaviour [12].

Chronic pain was significantly more prevalent among individuals who died by assisted suicide. We did not find that individuals who suffered from chronic pain had easy access to lethal means (e.g., opioid medications). Severe dyspnoea, sensory loss and cancer were the most frequent somatic symptoms and comorbidities in both groups. An

elevated risk of suicide in patients with sensory impairment [13] and some cancers, especially in the first 6 months after diagnosis of malignancy, is well documented [14]. Furthermore, the prevalence of distress and impairment of quality of life have been highlighted in many types of cancer [15]. In Oregon and Washington, most patients who used assisted suicide had cancer or terminal illnesses leading to loss of autonomy, dignity and quality of life [16]. Somatic diseases such as cancer [17], non-malignant chronic diseases [18] and hospitalisation itself [19], all putting the elderly at risk of quality of life alteration, are more frequently associated with assisted suicide than self-initiated suicide.

It has been shown that some elderly individuals with a persistent death wish qualify themselves as “not very ill” although having considerable health problems; while some of them reported having had a death wish their whole lives [20], or have already decided to consider assisted suicide prior their illness [21].

Some suicide decedents in both groups exhibited frailty criteria, including cachexia and cognitive impairment, and some of them required long-term care facilities. A recent cross-sectional study estimated that 2.2% of suicides among older American adults were associated with living or transitioning into or out of long-term care facilities. This study suggested that residential transitions may be an important point of engagement before the suicide crisis and that more can be done to support the mental health of older adults living in these settings [22]. Couillet et al. demonstrated that barriers to preventing suicide in nursing homes lie in caregivers' suicide representation, seen as an expression of residents' autonomy, a response to the suffering associated with aging and the living conditions imposed on older adults in our society [23].

Social isolation and legal problems may be more prevalent in the self-initiated suicide group compared with the other group, in which we found more frequent experiences of divorce/separation from partners/spouses, loss of a child, familial conflicts and absence of religious affiliation. A Swiss study showed that trust in religious institutions had a negative association with assisted suicide and positive attitudes and behaviours [12].

Social support, palliative care and integrative medicine could help enhance quality of life by reducing the burden of isolation, symptoms, and care, by supporting advanced care planning and enabling better healthcare utilisation.

## Limitations

This study relied on police and forensic suicide records linked to individual hospital medical files, which is a strength in terms of quality and reliability, and offers the possibility of collecting life events and comorbidities, as well as the time course and determinants of previous attempts.

This study focused on suicide cases following attempts leading to hospital care because these data are comprehensive. As death wishes, suicidal ideation and suicide attempts are potentially underreported, we decided to study only those attempts leading to hospital admission, which are more reliable and consistent outcomes.

The outcomes of suicide attempters treated in hospital (chronology of reattempts or death by suicide) are important to describe because they reflect not only the impact of the care received – almost all of them received psychiatric care in the hospital – but also the needs in terms of support for short- and long-term prevention.

Our sample was limited in size; this study was exploratory and we aimed only to generate hypotheses.

The associations between some potential determinants and suicide attempts suggested in our results should be considered with caution owing to the local low number of cases identified and the resulting uncertainty in terms of statistical significance and generalisability.

### Comparison with other studies

To our knowledge, this is the first study to investigate the personal history and determinants of suicidality among elderly individuals aged 65 years and older who died by assisted or self-initiated suicide. The findings are relatively consistent in that in countries where assisted dying is not allowed, the most frequently cited factors that could be responsible for the currently observed increased frequency of suicide attempts among older adults include poverty, poor housing conditions, family conflicts and bereavement. In contrast, for countries authorising assisted suicide, research has linked suicide to higher education, socioeconomic levels, feelings of loneliness and social disconnectedness. Socioeconomic conditions were not available in our medical charts; however, these factors have been explored in other Swiss studies [18]. The increasing prevalence of chronic somatic diseases, physical pain, neurodegenerative disorders, psychiatric conditions, and disabilities could also explain the increase in assisted suicides [24-26].

### Perspectives, clinical implications

Limited attention has been given to elderly suicidality prior to assisted suicide. Nevertheless, the present study found that the methods chosen for attempts preceding suicide were equally violent, reflecting a comparable determination of the individuals who died by assisted and self-initiated suicide. There may be a potential overlap between the profiles of assisted and self-initiated suicide decedents in old age, which would justify global prevention strategies encompassing both outcomes. There is a risk that older adults who would like to die by suicide may opt for assisted suicide, if this method is simple and accessible. It is important to consider this in order to prevent suicide at a community and societal level, and local epidemics of suicide and unsafe media portrayals of suicide while fighting against barriers or lack of access to mental health services.

### Conclusion

Assisted and self-initiated suicides have been viewed as different in terms of their determinants and affected populations. However, our study found commonalities between those who had made attempts before dying by assisted or self-initiated suicide. Older patients' anamneses should include a history of suicidal ideation and attempts when an assisted suicide intention is disclosed. Conversely, patients admitted for suicide attempts should be asked if they con-

sider assisted suicide as an option. The complex links between assisted suicide and other forms of suicidality are arguments for recommending larger studies to support the development of a suicide prevention strategy applicable to both assisted and self-initiated suicide cases in the elderly population of Switzerland.

### Data sharing

The datasets analysed during the current study are available from the corresponding author on reasonable request.

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All authors have completed and submitted the International Committee of Medical Journal Editors form for disclosure of potential conflicts of interest. No potential conflict of interest was disclosed.

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