Journal of
Geriatric Medicine and Gerontology

RESEARCH ARTICLE

Predicting Suicide Attempt Risk in Older Adults

David Sánchez-Teruel[1*] and María Auxiliadora Robles-Bello[2]

[1]Lecturer, Department of Psychology, Area of Personality, Assessment and Treatment, Faculty of Education Sciences, University of Córdoba (Spain)

[2]Lecturer, Department of Psychology, Area of Developmental Psychology and Education, Faculty of Humanities and Education Sciences, University of Jaén, Spain

*Corresponding author: David Sánchez-Teruel, Lecturer, Department of Psychology, Area of Personality, Assessment and Treatment, Faculty of Education Sciences, University of Córdoba (Spain)

Abstract

Introduction: Suicide attempts double death by suicide rates. To date it remains the only behavior that predicts more harmful future reattempts or deaths from suicide. However, few studies have analyzed the sociodemographic and clinical profiles of older adults who have suffered self-inflicted injuries or attempted suicide.

Objective: To assess which sociodemographic and clinical variables are more predictive of a high-lethality or definitive future suicide reattempt in older adults who have suffered self-inflicted injuries or previous suicide attempts.

Method: Digital data logged by emergency departments on people aged 50 and overadmitted for self-inflicted injuries or suicide attempt were collected.

Results: The binary logistic regression analysis revealed the group of variables most predictive of suicide attempt as being female (OR = 2.70; 95% CI), aged between 61 and 90 years (OR = 6.99; 95% CI), widowed (OR = 3.12; 95% CI), with a pre-existing depressive condition (OR = 3.95; 95% CI) and physical pathologies (OR = 4.98; 95% CI), resorting to single methods (OR = 4.72; 95% CI), and usually discharged from emergency departments (OR = 6.89; 95% CI).

Conclusions: There is an urgent need for specific healthcare protocols designed to prevent suicide attempts, adapted to the psychosocial characteristics of this age group. Improvements to social and healthcare warning actions for older adults exhibiting suicide risk profiles also need to be made.

Keywords

Suicide attempt, Emergency department, Epidemiology, Healthcare protocols

Introduction

Suicide has become a real public health problem at a country and worldwide level [1]. Suicide research has mainly focused on suicidal ideation and completed suicide, yet there are few studies on suicide attempts. However, data indicate that suicide attempts double death by suicide rates [2], and to date it has been identified as the only risk behavior that predicts high-lethality future reattempts and death from suicide [3]. Furthermore, sociodemographic factors including gender and age are determinants for self-inflicted injuries and passive or silent suicide attempt[1]. Both forms of suicide attempt are highly frequent in old age, where the individual voluntarily enters into a state of apathy, exhibits active negativism, neglects their personal hygiene habits, and refuses medication and food [4].

The literature on suicide has shown that completed male suicide rates are markedly higher among older people than in other age groups, whereas completed female suicide tends not to vary much throughout the life cycle [5,6]. What is more, there are other sociodemographic factors that appear to modulate the risk (greater or lesser) for suicide attempt in older adults or the elderly. These include marital status and clinical factors such as the method used, pre-existing physical pathologies, and suffering from some form of mental disorder [1,4]. Suicide methods are also key to drawing up a risk profile [7].

Some studies have identified self-poisoning and

Sánchez-Teruel and Robles-Bello. J Geriatr Med Gerontol 2019, 5:066

• Page 1 of 5 •

firearms as the most commonly used completed suicide methods among older adults [8-10]. It also appears that this stage of life brings a wide range of multiple physical pathologies, physical functioning problems, non-specific anxiogenic and depressive symptomatology, and a loss of purchasing power resulting from retirement [11-14]. The sum of these changes can carry over into a declining availability of care homes for elderly family members, increased cross-generational friction, and the reduced status of older family members [12]. From this perspective, more structural aspects such as a lack of public social and healthcare policies at a regional and countrywide level can also affect the older adult's perception of themselves and of how their closest relatives see them (as a burden or blessing). These aspects have the potential to modulate how self-inflicted injuries and suicide attempts are made [13].

As can be observed, much of the literature on suicide attempts offers diverse and heterogeneous data, some of which are contradictory (for example, results referring to sex, marital status ormethod of suicide attempt), thus making it hard to study this behavior in older adults.In addition, few studies have analyzed the profile of suicide vulnerability for suicide reattempt among the aging population. Therefore, this study aimed to assess which sociodemographic and clinical variables are more predictive of a high-lethality or definitive future suicide reattempt in older adults who have suffered self-inflicted injuries or previous suicide attempts.The hypothesis will be that women, widows, elderly, with previous pathologies (physical and depressed) and who have used a unique method of suicide, where they have been discharged from the emergency services in the first attempt will be the variables more predictive of future retries.

Methods

Participants

The total sample comprised 215 individuals (n = 119, 55.3% female), selected from the total pool of patients

Table 1: Description of the sample's sociodemographic and clinical data.

	n (%)	Test statistic	p
Gender			
Female	119 (55.3)	11.12**	0.02***
Male	96 (44.7)		
Age			
50-60 years	76 (35.3)	3.17*	0.52ns
61-70 years	91 (42.3)		
71-80 years	28 (13.0)		
81-90 years	13 (6.1)		
91 years and over	7 (3.3)		
Marital status			
Single	46 (21.2)	1.16**	0.97ns
Married	58 (27.1)		
Separated/divorced	44 (20.5)		
Widowed	67 (31.2)		
Methods of injury or attempt			
Single active method	105 (48.8)	2.12**	0.74ns
Mixed active method	110 (51.2)		
Pre-existing conditions			
Depression	47 (16.5)	7.22**	0.09ns
Anxiety	36 (17.6)		
Psychotic disorders	28 (7.7)		
Personality disorders	23 (13.4)		
Physical disorders	49 (11.0)		
No previous diagnosis	32 (18.3)		
Post-attempt health care action			
Discharge	114 (53)	1.3**	0.36ns
Admission	101 (47)		
TOTAL	215		

Example of single active method = poisoning; example of mixed active method = poisoning + cutting on dolls* ANOVA statistic(F); **χ^2 statistic; ***$p < 0.05$; ****$p < 0.01$; ns = not significant.

Sánchez-Teruel and Robles-Bello. J Geriatr Med Gerontol 2019, 5:066

• Page 2 of 5 •

admittedby the emergency department of several hospitals located in a southern province of Spain. The inclusion criteria were: aged 50 or over; a principal diagnosis of "self-inflicted injury", "suicide attempt" or "suicidal behavior"; and being admitted by the emergency department between 1 January 2013 and 31 December 2017. The sociodemographic and clinical variables of the sample are described in Table 1.

Instruments and procedure

Data were collected by hospital healthcare personnel using the DIRAYA program (Diraya means knowledge in Arabic. It is the Integrated Information System of the Public Health System of Andalusia-Spain. It allows digital access to the clinical history of each Andalusian citizen). The necessary permissions were obtained for gathering digital information from the emergency departments of several healthcare districts through their referral hospitals. The collaborating healthcare staff recorded the sociodemographic and clinical data of those patients who fulfilled the inclusion criteria outlined in the Participants section. This was done over a 3-month period and depending on their availability. The total sample was then divided into two subsamples: those who had made a single suicide attempt and those who had attempted suicide on more than one occasion.

Data analysis

The chi-square was computed and an analysis of variance (ANOVA) was used. The binary logistic regression method (reattempt/no reattempt) was applied to measure the most predictive sociodemographic and clinical variables of suicide reattempt, with the minimum significance level set at $p < 0.05$. Data analysis was performed using the SPSS (v.22) statistics software.

Results

A binary regression analysis using the intro method was performed. To assess the independence of errors and no-multicollinearity assumptions, the dependent variable was transformed into a metric variable using the SPSS (v.22) statistics software. The results relative to the independence of errors assumption using the

Durbin-Watson test indicate that this assumption was met across all independent variables (IV) used as criteria (d = 0.38 and 0.76). The no-multicollinearity assumption was met for all IV, given that its value fell below 10 (VIF = between 2.12 and 9.14). The result obtained by Rao's Score Test (χ^2) statistical efficiency score indicate a significant improvement in predicting the probability of occurrence for the DV dichotomous categories (attempt or reattempt) in people admitted to hospital by the respective emergency department. The results derived from the analysis of predicting the independent variables (sociodemographic and clinical) on the dichotomous dependent variable (attempt and no reattempt) reveal that some sociodemographic aspects (gender, age, marital status) and clinical aspects (attempt method, pre-existing condition, healthcare action) predict a greater probability of occurrence for suicide reattempt (see Table 2). The results obtained show a positive beta (β) coefficient for each IV (gender, age, marital status, pre-existing condition, healthcare action) on the dependent variable (from 0.23 to 0.98), which informs that they are all risk factors. The standard error was adequate, not exceeding 1 (SEfrom 0.11 to 0.78). Specifically, the beta values and the odds ratio (95% CI) indicate that the variables being female, aged between 61 and 90 years, widowed, a pre-existing depressive condition and physical pathologies, single suicide methods used, and usually discharged by the emergency department are the sociodemographic and clinical variables that give an increased likelihood of suicide reattempt among older adults.

Discussion

The present study sought to detect and describe which sociodemographic and clinical variables are more predictive of future suicide reattempts in older adults.

The results of this research coincide with earlier studies where it is suggested that completed suicide rates increase with age [14] although women make a greater number of suicide attempts than men [1]. However, there are few studies that explore suicide reattempt risk profiles in older adults who have made

Table 2: Regression equation values for the independent variables (sociodemographic and clinical) in older adults (N = 215).

IV	β	SE	Wald	OR	95% CI OR	
					LL	UL
Gender (female)	1.16	1.07	4.51*	2.70	1.13	3.18
Age (61-90 years)	0.34	0.11	5.28*	6.99	5.22	8.18
Marital status (widowed)	0.56	0.78	2.71**	3.12	2.27	3.82
Pre-existing condition (depression)	0.13	0.09	3.18**	3.95	2.22	4.71
Pre-existing condition (physical)	0.98	0.02	1.45**	4.98	3.13	5.12
Suicide attempt method (single)	0.39	0.19	7.83*	4.72	2.12	6.15
Health care action (discharge)	1.03	0.34	6.91**	6.89	5.56	7.34

β = beta coefficient; SE = standard error; Wald = statistical power of test; *p* = significance level; *p < 0.05 **p < 0.01; ns = not significant; LL = Lower limit; UL = Upper limit; OR = odds ratio or regression equation Exp(β) result.

a previous attempt. This study sheds some light on how being female and of advanced age (between 61 and 94 years) can be considered high-vulnerability sociodemographic variables for subsequent suicide, by predicting possible future suicide reattempts, which in turn could increase death by suicide rates. The results of this study show that age does appear to exert an influence on the direction and strength of marital status for undertaking a suicide reattempt as posed in earlier studies [15]. Specifically, being widowed is a variable that can increase the risk of suicide reattempt in older adults who have attempted suicide previously. These results support earlier studies where marital status coupled with age is observed as a risk variable for suicide, although other sociocultural aspects such as social support and loneliness should also be considered [16]. This marital status-related modulating or non-modulating influence can be explained because being widowed may impact on future suicide reattempts if other summative variables enter into play that multiply the risk; for example, gender (being female), age (60 or over), loneliness and not engaging in group or social community-support activities (limited active aging).

The results obtained confirm what previous studies have postulated with regards to the method of suicide attempt: Availability is key when it comes to using one method or another [7] and this availability varies depending on the part of the world under study [9,15]. Therefore, restricting access to suicide means is more urgent and technically more viable than ever as one of the simplest ways to prevent this type of behavior.

Depression in older adults has become one of the mood disorders most associated with suicide attempts and self-inflicted injuries [2]. However, depression among the elderly population remains underdiagnosed and undertreated, given the widespread belief that feelings of sadness, inability, and social isolation are normal and likely to be greater in this group of people [17]. Yet this also represents a handicap for social and healthcare professionals, as depressive symptomatology in this group of patients is highly heterogeneous in nature (diffuse complaints, poor hygiene habits, and feeding difficulties), which can complicate its detection by social community and primary and specialist healthcare services [11], thus going unnoticed by family members and professionals. On the one hand, the results of this study confirm the findings of earlier research on this issue [18]; and on the other hand, they also inform about how suffering from depression, alongside physical pathologies, predicts future suicide reattempt in people who have attempted suicide once before. As such, prevention and intervention initiatives that address depressive symptomatology and physical pathologies in older adults who exhibit previous suicide vulnerability is of particular social and healthcare interest, given that these aspects can encourage suicide planning. What is more, if this makes them feel better, it is highly likely that older adults will make a new, more lethal suicide reattempt that often goes unnoticed. A surprising finding to emerge from this study is that the most frequent healthcare actioninvolving these patients is to discharge them from specialized emergency departments. This situation warns of the pressing need to take into account specific sociodemographic and clinical profiles in this group, which encompasses individuals that show significant differences compared to other younger, clinical subgroups exhibiting suicide vulnerability.

There are several limitations of this study that could serve as future research perspectives. Specifically, the availability of the methods of attempts were not evaluated and neither were severity, duration of psychiatric and physical illnesses, more specific information on mixed vs. single method, treatment history, mainly due to the study method used (DIRAYA program). The digital histories are filled out by emergency physicians and the very dynamics of this service implements speed and effectiveness of health care, and not so much to complete all the clinical data of the patients. However, recent studies have suggested that medical records (digital or paper) are adequate tools to assess mental health and suicide risk [19].

Conclusions

What should make managers think about public health policies on the risk and protective variables that modulate the retry of suicide in elderly people [20-22]. There is a clear and urgent need for specific healthcare protocols designed to prevent high-lethality suicide reattempts, adapted to the psychosocial characteristics of this age group, where no suicide verbalizations or obvious depressive symptomatology occur. Taking into account other pre-existing risk behaviors, including previous attempt, would be high priority in order to conduct an appropriate healthcare follow-up and to improve social and healthcare warning actions for older adults with previous suicide risk profiles, where we find some sociodemographic and clinical variables that may predict the risk for high-lethality future suicide reattempt.

References

1. World Health Organization - WHO (2014) Preventing suicide: a global imperative (Spanish version). Washington, DC, Panamerican Health Organization, 2014.

2. (2018) Organización Mundial de la Salud. Suicidio. Ginebra, Suiza, WHO.

3. Ayuso-Mateos José Luis, Baca-García Enrique, Bobes Julio, Giner José, Giner Lucas, et al. (2012) Recomendaciones preventivas y manejo del comportamiento suicida en España. Revista de Psiquiatría y Salud Mental 5: 8-23.

4. De Souza-Minayo Maria Celia, Gonçalves Fátima (2015) Suicide attempts among the elderly: a review of the literature (2002/2013). Cien Saude Colet 20: 1751-1762.

5. Nock Matthew, Borges Guilherme, Bromet Evelyn, Alonso

Sánchez-Teruel and Robles-Bello. J Geriatr Med Gerontol 2019, 5:066

• Page 4 of 5 •

Jordi, Angermeyer Matthias, et al. (2008) Cross-National Prevalence and Risk Factors for Suicidal Ideation, Plans, and Attempts. Br J Psychiatry 192: 98-105.

6. Méndez-Bustos Pablo, López-Castroman Jorge, Baca-García Enrique, Ceverino Antonio (2013) Life Cycle and Suicidal Behavior among Women. The Scientific World Journal 9: 485851.

7. Ajdacic-Gross Vladeta, Weiss Mitchell, Ring Mariann, Hepp Urs, Bopp Matthias, et al. (2008) Methods of suicide: international suicide patterns derived from the WHO mortality database. Bulletin World Health Organization 86: 726-732.

8. Karch Debra (2011) Sex differences in suicide incident characteristics and circumstances among older adults: surveillance data from the national violent death reporting system-17 U.S. states, 2007–2009. Int J Environ Res Public Health 8: 3479-3495.

9. Shah Ajit, Buckley Laura (2011) The current status of methods used by the elderly for suicides in England and Wales. J Inj Violence Res 3: 68-73.

10. Manthorpe Jill, Iliffe, Steve (2010) Suicide in later life: public health and practitioner perspectives. International Journal of Geriatric Psychiatry 25: 1230-1238.

11. Britton Petter, Duberstein Paul, Conner Kenneth, Heisel Marnin, Hirsch Jameson, et al. (2008) Reasons for living, hopelessness, and suicide ideation among depressed adults 50 years or older. Am J Geriatr Psychiatry 16: 736-741.

12. Park Subin, Lee Hochang, Lee Su Yeon, Lee Go Eun, Ahn Myung Hee, et al. (2016) Trends in Suicide Methods and Rates among Older Adults in South Korea: A Comparison with Japan. Psychiatry Investig 13: 184-189.

13. World Health Organization - WHO (2016) Preventing suicide: a community engagement toolkit. Pilot version 1.0. World Health Organization, Geneva, 2016.

14. Zeppegno Patrizia, Manzetti Elena, Valsesia Roberta, Siliquini Roberta, Ammirata Gianluca, et al. (2005) Differences in suicide behaviour in the elderly: a study in two provinces of Northern Italy. Int J Geriatr Psychiatry 20: 769-775.

15. Sánchez-Teruel, David (2012) Variables sociodemográficas y biopsicosociales relacionadas con la conducta suicida. In: Muela Jose Antonio, García Ana, y Medina, Andres, Perspectivas en psicología aplicada. Jaén: Centro Asociado Andrés de Vandelvira de la U.N.E.D.

16. Masocco Maria, Pompili Maurizio, Vanacore Nicola, Innamorati Marco, Lester David, et al. (2010) Completed Suicide and Marital Status According to the Italian Region of Origin. Psychiatric 81: 57-71.

17. Turvey Carolyn, Conwell Yeates, Jones Michael, Phillips Caroline, Simonsick Eleanor, et al. (2002) Risk factors for late-life suicide: A prospective, community-based study. Am J Geriatr Psychiatry 10: 398-406.

18. Lopez-Castroman Jorge, Baca-Garcia Enrique, Woreca Authors, Courtet Philippe, Oquendo María (2015) A Cross-National Tool for Assessing and Studying Suicidal Behaviors. Archives of Suicide Research 19: 335-349.

19. Miret Marta, Nuevo Roberto, Morant Consuelo, Sainz-Corton Enrique, Jimenez-Arriero Miguel Ángel, et al. (2010) Differences between younger and older adults in the structure of suicidal intent and its correlates. Am J Geriatr Psychiatry 18: 839-847.

20. Peterson, Gregory (2017) Aged care: Suicide in elderly people. Australian Pharmacist 36: 34-35.

21. Zeppegno Patrizia, Eleonora Gattoni, Martina Mastrangelo, Carla Gramaglia, Marco Sarchiapone (2019) Psychosocial Suicide Prevention Interventions in the Elderly: A Mini-Review of the Literature. Frontiers in Psychology.

22. Gustavo Turecki, David A Brent (2016) Suicide and suicidal behavior. Lancet 387: 1227-1239.