Abstract

Objectives: Worldwide, suicide is one of the leading causes of death among incarcerated people. Previous epidemiological analyses indicated that specific demographic and criminal factors might be associated with suicide attempts during incarceration. However, there is a relative lack of research examining the role of social variables such as perceived social support in the context of suicide amongst incarcerated individuals. *Method*: Data from 943 male inmates enrolled from three correctional facilities in Spain were collected between January and March 2017. Participant anonymously and voluntarily completed self-report measures of demographic, penitentiary and sentence-related, social support and suicide attempts variables. *Results:* Approximately 1 in 11 inmates (8.7%) indicated that they had attempted suicide during incarceration. Logistic regression showed that inmates who were 50 years (OR = 2.49) and who were serving longer sentences (OR = 1.01) were statically more likely to attempt suicide. Inmates with secondary (OR = 0.33) and college (OR = 0.06) educations were less likely to attempt suicide during current incarceration. However, perceived social support was not associated with suicide attempts. *Conclusions:* Current findings demonstrate that specific demographic and criminal factors are associated with suicide attempts. These characteristics might be included in the development of intervention programs for incarcerated individuals.

Keywords: Suicide attempts; social support; male inmates; prisons; Spain.

Introduction

Suicide in prison is a public health problem and is the leading cause of death amongst inmates (Forrester & Slade, 2014; Noonan, Rohloff, & Ginder, 2015; World Health Organization, 2007). Worldwide, the prevalence of suicide and near-lethal suicide is considerably higher amongst prisoners than in community samples (Fazel, Hayes, Bartellas, Clerici, & Trestman, 2016). These findings have been replicated within studies in the United States (Gates, Turney, Ferguson, Walker, & Staples-Horne, 2017; Stoliker, 2018), South America (Arnal et al., 2017) and Europe (Castelpietra et al., 2018; Sánchez, Fearn, & Vaughn, 2018). This is a particular problem in Spain, where suicides in prison have been estimated to be approximately 8 times more likely compared with the general population (43 per 100, 000 and 5.5 per 100, 000, respectively) (Fazel, Ramesh, & Hawton, 2017), and where 9-17% of deaths in prison have been attributed to suicide (Aebi, Tiago, Delgrande, & Burkhardt, 2015). In order to tackle this burden, research must examine the factors that contribute towards suicidal ideation and behaviour amongst inmates and which moderate the burden of confinement.

To date, research which has examined the factors which contribute towards suicide and near-lethal suicide attempts among men and women prison samples have examined the contribution of demographic, mental health, and sentence- or prison- level factors. For example, suicide is particularly common amongst men (Castelpietra et al., 2018), younger people (Castelpietra et al., 2018; Hawton, Linsell, Adeniji, Sariaslan, & Fazel, 2014), single people (Saavedra, & López, 2015) and Caucasians (Rivlin, Hawton, Marzano, & Fazel, 2013). Additionally, people who currently have a mental health problem (Fazel, Cartwright, Norman-Nott, & Hawton, 2008; Fazel et al., 2016) or who have experienced childhood trauma (Sánchez et al., 2018; Clements-Nolle, Wolden, &

Bargmann-Losche, 2009; DeCou, Lynch, DeHart, & Belknap, 2016) are considered to

be at risk of suicide during imprisonment. Also, people who have experienced prior

incarceration (Marzano, Hawton, Rivlin, & Fazel, 2011), are incarcerated for property

offenses (Sánchez et al., 2018), or who have single-cell/segregated housing while

imprisoned (Fazel et al., 2008) are at particular risk of suicide and near-lethal suicide

attempts. Sentence length has also been associated with risk of suicide in prison, such

that a longer length of sentence is associated with increased risk for suicide (Fazel et al.,

2017; Hawton et al., 2014).

Researchers have rarely investigated the role of inter-personal factors such as

social support on suicidal behaviour within prison settings. This is surprising given that

the protective effects of such factors on other incarceration-related variables have been

widely studied, such as the effects of social support on re-incarceration (Lee, Guilamo-

Ramos, Munoz-Laboy, Lotz, & Borrnheimer, 2016), infractions and disciplinary

segregation (Steiner, Ellison, Butler, & Cain, 2017) and suicidal behaviour in

community settings (Bell et al., 2018; Kleiman & Lui, 2013; Kleiman, Riskind, &

Schaefer, 2014; Miller, Esposito-Smythers, & Leichtweis, 2015). A person is said to

perceive themselves as being socially supported if they believe that they are "cared for

and loved, esteemed, and a member of a network of mutual obligations" (Cobb, 1976: p.

300). The few studies that have examined the relations between individual differences

in perceived social support and suicidal behaviour have found that inmates who report

near-lethal self-harm and suicide attempts also report significantly lower social support

(using the Social Support Scale – 7 items) than inmates who do not report such

behaviour (Marzano et al., 2011; Rivlin et al., 2013). Rivlin and colleagues (2013)

found that inmates who reported near lethal suicide attempts in prison also reported

none or few close or good friends outside prison, as well as less phone calls and visits from family and friends during imprisonment.

In community samples, in contrast, there is a substantial amount of research regarding the role of social support as a protective factor on suicide (Bell et al., 2018; Compton, Thompson, & Kaslow, 2005; Heikkinen, Aro, & Lönnqvist, 1993; Kleiman & Riskind, 2013; Miller, Brook, Stomski, Ditchburn, & Morrison, 2019). Overall, research suggests that social support is associated with lower occurrence of suicide and near lethal suicide attempts. Prominent theories suggest that the presence of social support reduces suicide risk by increasing feelings of belongingness (Joiner, 2005). One of the most commonly used measures of perceived social support in community samples is the Medical Outcomes Study Social Support Survey (MOSS-SSS, Sherbourne & Stewart 1991). This measure captures the emotional (both emotional support and guidance or advice), tangible (material aid or assistance), social (availability of individuals with whom to do fun things) and affectionate (the expression of love and affection aspects) of social support. Studies with community samples which have used this measure have found that individuals who reported suicide attempts reported lower social support. Compton, Thompson and Kaslow (2005) found that suicide attempters in the community reported significantly lower MOS total scores compared to non-attempters (59.8 [SD = 20.8] and 75.7 [SD = 17.7], respectively). In line with this, Kaslow and colleagues (2005), also using the MOS total score in a community sample, found that increased perceived social support was associated with a 30% decrease in suicide attempts.

As such, it is important that investigations of suicidality in prison populations move beyond demographic and prison-level predictors and towards a conceptualisation that includes person-level variables that may protect inmates from suicidality. In

particular, research must examine the contribution of social support to suicidality amongst inmates and to examine the interaction between variables such as social support and prison-related variables such as sentence length that have also been implicated in suicide attempts.

Current Research

The present investigation therefore aimed to assess rates of near lethal suicide attempts in Spanish prisons, exploring demographic (e.g., age) and criminal (e.g., sentence length) risk factors associated with near lethal suicide attempts, and examining the role of social support as a protective factor for near lethal suicide attempts. The moderating role of social support on these other criminal variables was also examined. Based on the previous literature, we hypothesed that inmates with higher perceived social support would report lower suicide attempts during incarceration.

Method

Participants and Procedure

Participants were 943 male inmates recruited from three correctional facilities located in Southeast Spain. These included two medium and one minimum-security prisons that together housed 1,800 males at the time of the study. To be eligible for participation in the study, inmates had to meet the following criteria: (1) had been incarcerated for a minimum of three months, (2) subject to a general regime, and (3) fluent in Spanish. Of the 1,150 eligible inmates, 962 volunteered for the study, resulting in an overall participation rate of 83.7%. Nineteen cases were excluded from the sample due to considerable amounts of missing data on the variables of interest.

The youngest participant was 19 and the oldest was 83 years old, with an average age of 37.27 (SD = 12.19). The sample was predominantly Spanish (78.2%)

and approximately one-third of respondents had completed primary education or below (35.4%). The mean length of incarceration was nearly five years (M = 56.62 months, SD = 101.39) and two-thirds of participants were incarcerated for the first time (67.1%).

Data was collected using self-administered, paper-and-pencil surveys between January and March 2017. Informed consent was obtained from all participants and no incentives were offered for taking part in the study. The survey took approximately 60 minutes to complete and was administered by the Principal Investigator (PI) and two research assistants in private rooms made available by the prisons. Participants completed the survey in groups of 15 to 20 inmates, without the presence of prison staff. Approval for the study was obtained from the Spanish Prison System and the University of Murcia.

Measures

Participant characteristics. Background characteristics of respondents included age, nationality, marital status, education level, and alcohol misuse. Age was measured as a continuous variable and later recoded into four groups (19-29, 30-39, 40-49 and 50 years and over). Nationality and marital status were dichotomized, distinguishing between Spanish – non-Spanish and married – non-married. Education level was measured ordinally (less than primary education, primary education, secondary education, tertiary education). Hazardous alcohol use was measured using the Alcohol Use Disorders Identification Test Consumption (AUDIT-C). This screen test comprises three items, each scored on a 5-point scale, with higher scores indicating more severe alcohol disorders. Responses to these items were summed and individuals with values greater or equal to 4 were identified as positive on alcohol misuse (Bush, Kivlahan, McDonell, Fihn, & Bradley, 1998).

Penitentiary and sentence-related measures. Two penitenciary variables were included in the multivariate models: penal status (remand – sentenced) and first time in prison (1 = yes). Sentence length (in months) and relative time in prison were also measured. The latter was created by computing the difference between sentence length and time incarcerated and later distinguishing between individuals who have served less than one-third of their time, those in the middle third, and inmates who have served over two-thirds of their sentence.

Social support. Social support was assessed using the Spanish version of the Medical Outcomes Study Social Support Survey (MOS-SSS, Requena, Salamero, & Gil, 2007) developed by Sherbourne & Stewart (1991). This instrument measures support availability using 20 items (e.g., "Someone you can count on to listen to you when you need to talk", or "someone to have a good time with", or "someone who shows you love and affection"). Similar to Compton et al. (2005), the MOS total score was used as a measure of overall social support in this study. Participants responded to these items using 5-point, unipolar scales ranging from none of the time (1) to all of the time (5). Individual scores were computed by averaging all responses, with higher scores indicating greater levels of social support. Then, scores were transformed to a 0-100 scale. In the current sample, the MOS-SSS overall index showed high internal consistency ($\alpha = .87$).

Suicide attempts. In prison suicide attempt history was measured using the following question: "Since you are in prison, have you ever made an attempt to take your own life?", which was coded 1 for yes and 0 otherwise.

Analytic Strategy

First, the prevalence of suicide attempts and the social support scores were examined using frequencies and descriptive statistics. Differences in personal characteristics, sentence-related variables and social support based on suicide attempting were examined using t-tests for continuous variables and chi-square tests for categorical variables. In addition, effect sizes (Cramer´s V and Cohen´s d) were used to assess the magnitude of the differences. To further explore the effects of social support, participant characteristics, and penitentiary/sentence-related variables on suicide attempts logistic regression models were estimated. The amount of missing data ranged from 0% to 12.4% (sentence length). To address missing data, we created 20 imputed datasets using multiple imputation. Regression coefficients and standard errors were estimated for and averaged across these 20 datasets.

Findings

Descriptive Statistics and Bivariate Results

Table 1 presents the comparisons of personal characteristics, sentence-related indicators, and social support between prisoners who reported suicide attempts and those who did not. Nearly 1 in 11 inmates indicated that they had attempted suicide (8.7%). These inmates were significantly older ($M = 36.98$, $SE = 0.40$ versus $M = 40.41$, $SE = 1.73$) and were serving longer sentences than those who reported no suicide attempts ($M = 50.24$, $SE = 1.83$ versus $M = 125.54$, $SE = 35.86$). These differences were significant and represented small and large effect sizes, respectively ($t = -2.45$, p = .01, Cohen's d = -0.28, and $t = -6.07$, p < .01, Cohen's d = -0.76). In addition, participants with lower levels of education were over-represented among those who have attempted suicide ($X^2 = 9.94, p = .04, Cramer's V = .10$). No differences were found in other personal characteristics (nationality, marital status, and hazardous alcohol use),

sentence-related measures (sentence status, first time incarcerated and relative time in prison), or in social support levels.

[TABLE 1 ABOUT HERE]

Social support was found to be very low among inmates in both groups. In a scale from 0 to 100, the average was 43.87, with no significant differences between prisoners who have attempted suicide and those who have not ($t = 0.80$, $p = 0.42$). None of the respondents scored in the top 25% of the scale (75 points and above).

Multivariate Results

Logistic regression models were estimated to examine risk factors for suicide attempt history while adjusting for potential cofounders. As shown in Table 2, being 50 years or over increased the risk of having attempted suicide. When compared to the youngest group (19 – 29 years of age), older prisoners (50 and over) were more likely to attempting suicide (OR = 2.49, p < .01). In contrast, inmates with secondary and college educations were less likely to have suicide attempt histories (OR = 0.33, p = .01 and OR = 0.06, p < .01, respectively). Consistent with the bivariate findings, it was found that longer sentences increase the probability of attempting suicide (OR = 1.01, p < .01). To test whether the effect of sentence length was moderated by social support, in Model 2, an interaction term between sentence length and MOS-SSS was introduced. This interaction was not significant, indicating that the impact of sentence length on suicide attempts was similar across levels of social support.

[TABLE 2 ABOUT HERE]

Discussion

Although suicide in prisons is an international public health problem with a higher prevalence than is reported in the general population, the literature exploring the variables associated with that behaviour in penitentiary contexts it is still scarce. In order to prevent suicide in inmates, more research is needed which focuses on the variables associated with suicide attempts during incarceration. Acknowledging that suicide is a complex, multi-causal phenomenon that has not been fully examined within the prison context, this work analysed the contribution of a range of personal, penitentiary (criminal) and social variables to inmate suicidality.

Personal Variables

Inmates' age and educational attainment were significantly different between the group of prisoners who declared one or more suicide attempts since they were incarcerated and those who did not declare any suicide attempt while in prison. That is, participants who reported suicide attempts were older and less educated than those inmates who did not report attempts while in prison. More specifically, prisoners who were 50 years old and above were particularly likely to attempt suicide. Although some studies have reported apparently contradictory results regarding age and suicidality, when we distinguish between non-suicidal self-harm and attempted suicide, self-harm is associated with younger age in incarcerated samples while suicide, assessed as the intentional attempt to interrupt one's life, is more frequent in older incarcerated men (Hawton et al., 2014). It is of note that our participants were all male. This result therefore matches with general population data, where older adult men have been found to be especially vulnerable to suicide (e.g. Canetto, 2017). Recent research on the probable causes of increased vulnerability amongst older people has moved beyond more traditional causal variables such the social disconnectedness that is common at this age, to considering the effects of neurocognitive impairment on decision-making or

chronic physical illnesses and their relations with suicidality (Conejero, Olié, Courtet, & Calati, 2018). These same neurocognitive and chronic variables are also likely to play an important role in suicidality in incarcerated older men, especially given the nature of incarceration, and yet no study has explored the effects of these variables on suicidality in incarcerated samples. Thus, as in the general population, older male prisoners seems to be a more vulnerable group for suicide than their younger counterparts. This result is especially relevant taking into consideration that prisoners over 50 years old are the fastest growing group in correctional populations in countries such as the UK (Prison Reform Trust, 2004), USA (Stojkovic, 2007) and Australia (Trotter & Baidawi, 2015).

Regarding education, those inmates with secondary and college educations were less likely to report suicide attempt in prison than those with lower levels of education. Put otherwise, a higher level of education may have acted as a protective factor against suicide attempts in prison. To our knowledge, the association between education and suicidal behaviours has been studied in the general population but not amongst prisoners. Our findings are of note because in the general population the opposite finding has emerged, such that higher educational achievement can increase suicide risk due to its association with the experience of failure or public shame (Pompili et al., 2013). In addition, research amongst community participants has consistently found that the association between education levels and suicide attempts follows a curvilinear U-shaped form with high levels of suicidality amongst people who have the lowest and highest levels of education (e.g. Shah, 2010). This finding was not replicated in the current sample, perhaps because of the difference in the distribution of ages amongst inmates and studies involving the general population. Nevertheless, the findings presented here are of importance given that no study has yet examined the association between education and suicidal behaviour amongst inmates. These findings also suggest

that encouraging educational attainment within prisons may serve to protect inmates from suicidal behaviour, particularly as education levels are frequently lower amongst inmates when compared to the general population.

Criminal Variables

Previous research in this field has suggested that the absence of significant associations between penitentiary (criminal) level variables and suicide in prisoners might be due to their interaction with personal factors (Fazel et al., 2017). In contrast to that suggestion, we did not find significant interactions between any penitentiary and personal level variables but we did find that those participants who were serving longer sentences (e.g., approximately 125 months) reported significantly more suicide attempts than those inmates with shorter sentences (50 months as average). Previous results in this area have shown that a sentence of more than 18 months duration, whether anticipated or actually received, was associated with a greater risk of suicide than a shorter sentence (Topp, 1979). Thus, our results are in agreement with previous comparisons between inmates serving short-term sentences and those who are serving long-term sentences. In particular, there appears to be a profile of older violent offenders who engage in suicidal behaviour after spending an extended period of time incarcerated (Konrad et al., 2007). Future research could explore if long-term sentences promote the acquisition of suicide capability (e.g., increased physical pain tolerance and reduced fear of death), one of the necessary components of engagement in suicidal acts (Van Orden et al., 2010).

Social Support for Prisoners

Participants who reported suicide attempts in prison did not perceive themselves as having lower levels of social support than those who did not attempt

suicide. Traditionally, it has been suggested that the isolating environment of incarceration leads to the loss of social support and contributes to suicide deaths amongst inmates (Hayes, 1999; Konrad et al., 2007). Contrary to that hypothesis, suicide attempts amongst inmates were not associated with social support in our sample as measured with the MOS-SSS. It is of note that perceived social support was reported as very low in prisoners with and without self-reported suicide attempts. The average score for this scale in our sample was 43.87 while in the community sample from the first research carried out with this instrument the mean score for the MOS-SSS was 71.05 (Sherbourne & Stewart, 1991). It may be that participants reported so little social support, across both groups, that there was insufficient variability between participants for any association with suicidal behaviour to emerge. Although the MOS-SSS is frequently used in penitentiary settings, it was not specifically designed for this purpose and may not adequately capture how social support from outside- and within- prison sources might manifest and be perceived. Recent research has shown that family membership had a negligible effect on suicidal risk in incarcerated male offenders (Oyeleke, Tanga, & Ishola, 2018). A lack of perceived social support in prison has also been related to penitentiary variables such as habitation in an isolated prison cell (Van Orden et al., 2010) or relationship problems with inmates and staff (Suto & Arnaut, 2010). Future research might develop a novel prison-centric measure of perceived social support that allows researchers to capture the effects of outside- and within- prison sources of support. Other objectives measures of social support such as the number of family visits or recent inmate-to-inmate conflicts (Konrad et al., 2007) might also be captured in such a measure.

Also, according to recent research exploring trauma history and psychopathology in prisoners (Caravaca-Sánchez, Ignatyev, & Mundt, 2019), past

sexual trauma and crime-related trauma were associated with reduced perceived social support and heightened loneliness (Kao et al., 2014) as well as heightened suicidality (Godet-Mardirossian, Jehel, & Falissard, B, 2011). The low levels of perceived social support observed in the current study could be related to personal history of trauma in our participants and this history might account for some of the suicidal behaviour that was observed amongst participants. Future research into suicidality in inmates should examine the role of past trauma in suicidality and the interaction between previous and ongoing social support in the association between these variables.

It must be noted that the self-report nature of our measure of suicidal attempting limits the conclusions that can be drawn from our study. As self-report suicide risk assessment tools have shown limited capability to predict suicide outcomes (Roos, Sareen, & Bolton, 2013), future research might utilise medical and neuropsychological records in order to obtain a more objective measure of suicidal attempts. Also, although there is a consistent correlation between suicide attempts and completion (Bostwick, Pabbati, Geske, & McKean, 2016), it is not possible for us to draw conclusions on the extent to which our findings explain whether a person completes suicide or not. It could be that a perceived lack of social support is a strong determinant of suicide completion but is less important in the attempting of suicide. In addition, the measure of suicide attempting used here quantified attempting in a categorical manner and did not quantify the number of attempts an inmate made. Future research could examine whether the variables examined here are predictors of the likelihood of suicide attempting, as in the present investigation, or whether they predict the number of attempts that an inmate makes.

Nevertheless, the findings presented here suggest that older male inmates with low levels of education and who are serving long sentences are particularly vulnerable

to suicide attempts. These findings suggest that prison resources should be targeted at these vulnerable inmates to reduce their risk of suicidality. Greater attention should also be given to understanding the mechanisms by which these people come to attempt suicide and how such attempts can be prevented.

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Table 1. Comparison of personal characteristics, penitentiary and sentence-related measures, and social support by suicide attempts

Variables	Suicide attempts		Statistic
	No (n = 861)	Yes (n = 82)	Effect size
Participant characteristics			
Mean age (SE)	36.98 (0.40)	40.41 (1.73)	$t = -2.45*$ $d = -0.28$
Spanish nationality	78.05%	79.27%	$X^2 = 0.07$ $V = .01$
Married	47.74%	50.0%	$X^2 = 0.15$ $V = .01$
Education level			
No formal education	9.06%	17.07%	
Incomplete primary education	24.16%	30.49%	$X^2 = 9.94*$
Primary education	30.31%	29.27%	$V = .10$
Secondary education	28.22%	18.29%	
College education	8.25%	4.88%	
Alcohol misuse	53.31%	46.34%	$X^2 = 1.46$ $V = .04$
Penitentiary and sentence-related measures			
Sentenced	88.85%	87.80%	$X^2 = 0.08$ $V = .01$
First time in prison	67.36%	64.63%	$X^2 = 0.25$ $V = .02$
Mean sentence length (SE)	50.24 (1.83)	125.54 (35.86)	$t = -6.07**$ $d = -0.76$
Relative time in prison			
Less than 1/3 of their sentence	28.38%	30.0%	$X^2 = 3.25$
1/3 to 2/3 of their sentence	32.80%	41.43%	$V = .06$
Over 2/3 of their sentence	38.82%	28.57%	
Social support			
Mean MOS (SE)	43.99 (0.53)	42.55 (1.66)	$t = 0.80$ $d = .09$

*p < .05 **p < .01

Note: Fisher's exact test were conducted for cell counts below five.

Table 2. Logistic regression models predicting suicide attempts (n = 943)

Variables	Model 1		Model 2	
	OR (RES)	95% CI	OR (RES)	95% CI
Intercept	0.28 (0.17)		0.41 (0.27)	
Age (ref. 19-29 years old)				
30-39	0.56 (0.21)	0.27, 1.15	0.56 (0.20)	0.27, 1.14
40-49	0.98 (0.37)	0.47, 2.04	0.95 (0.36)	0.46, 1.99
50+	2.49** (0.87)	1.25, 4.94	2.44* (0.86)	1.22, 4.87
Spanish nationality	1.18 (0.40)	0.61, 2.30	1.15 (0.38)	0.60, 2.21
Married	0.99 (0.25)	0.61, 1.63	1.02 (0.26)	0.62, 1.69
Education level (ref. No formal education)				
Incomplete primary education	0.69 (0.29)	0.31, 1.58	0.67 (0.28)	0.30, 1.52
Primary education	0.52 (0.21)	0.23, 1.16	0.52 (0.21)	0.24, 1.16
Secondary education	0.33* (0.15)	0.14, 0.78	0.32* (0.14)	0.14, 0.76
College education	0.06** (0.07)	0.01, 0.49	0.06** (0.06)	0.01, 0.45
Alcohol misuse	0.87 (0.22)	0.52, 1.44	0.87 (0.22)	0.52, 1.44
Sentenced	0.55 (0.23)	0.24, 1.27	0.56 (0.24)	0.24, 1.31
First time in prison	1.12 (0.32)	0.64, 1.95	1.14 (0.33)	0.65, 2.01
Sentence length (in months)	1.01** (0.00)	1.00, 1.01	1.00 (0.00)	0.99, 1.01
Relative time in prison (ref. Less than 1/3 of their sentence)				
1/3 to 2/3 of their sentence	1.07 (0.36)	0.56, 2.05	1.03 (0.34)	0.54, 1.97
Over 2/3 of their sentence	0.71 (0.24)	0.37, 1.37	0.71 (0.23)	0.37, 1.35
MOS (Social support)	0.99 (0.08)	0.98, 1.01	0.98 (0.01)	0.96, 1.01
MOS x sentence length			1.00 (0.00)	0.99, 1.00
F-test	3.61**		3.37**	
Pseudo R squared	0.11		0.11	

*$p < .05$ **$p < .01$

Note: OR = odds ratio, RSE = robust standard errors; CI = confidence intervals