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**Mental health, substance abuse, prison victimisation and suicide attempts
amongst incarcerated women**

Abstract

Worldwide, incarcerated women are known to suffer adverse experiences that might increase the risk of suicide attempts during incarceration. The present investigation examines the prevalence of suicide attempts among incarcerated women in Spain and the factors associated with this. Between January and March of 2017 a total of 174 women, enrolled from two prisons in the southeast of Spain, completed anonymous self-report measures of demographic variables, penitentiary and sentence-related variables, mental distress (including depression, anxiety and stress), perceived social support, substance use (including alcohol, cannabis, cocaine, amphetamine, heroin, and hallucinogens), prison victimisation (property, verbal, physical and sexual victimisation) and suicide attempts. Overall, 15.5% of women reported attempted suicide during their current incarceration. Compared with women who did not report suicide attempts, multivariate analysis showed that women reporting suicide attempts were more likely to report lower education levels, in-prison substance use, victimisation, and higher levels of mental distress. In order to prevent suicide among incarcerated women, victimisation in all its forms, emotional distress and drug abuse in women with lower education levels, should be considered highly targetable variables.

Keywords: Prison; women; suicide attempts; victimisation; substance abuse

Introduction

According to the most recent research conducted by the International Centre for Prison Studies (2018), almost 11 million people are incarcerated worldwide. Among the whole prison population, there are approximately 700,000 incarcerated women (International Centre for Prison Studies, 2017). Although there is some variability between geographical areas in the percentage of prisoners within a given area that are female, this ratio ranges between 6% and 9%, and in Spain incarcerated women represent 7.4% of the entire prison population (Spanish Prison System, 2020).

Recent studies among the general population indicate that there are important differences between males and females in the factors that predict suicidality (Callanan and Davis, 2012; Freeman et al., 2017; Fresán et al., 2015) and yet few studies have examined these issues in female-only populations. The present investigation examines the factors that contribute to, or protect against, suicidality amongst incarcerated women.

Three theories explain and contextualise why suicide is a leading cause of mortality in prisons (Rabe, 2012). First, the interpersonal theory of suicide has left an indelible impression on the research and clinical fields of suicide prevention since its initial articulation (Joiner, 2007). According to this theory, suicide behaviour is caused by the interaction of two psychological states: thwarted belongingness and perceived burdensomeness (Van Orden et al., 2010). Mandracchia and Smith (2015) tested the interpersonal theory of suicide in a sample of prisoners and found support for it, with thwarted belongingness and perceived burdensomeness being associated with suicidal ideation. A second model is the importation model, which states that pre-existing vulnerabilities, such as socioeconomically disadvantaged backgrounds or psychosocial adversity, which are brought with the individual as they enter prison, primarily account for the high suicide rate among people in prison (Favril et al., 2017). Finally, the deprivation model posits that prisoners may experience

additional strains due to the specific context of confinement (Liebling and Ludlow, 2016). In this context, the increased risk of suicide might be attributable to the depriving nature of the prison environment and its inherent stressors (Favril et al., 2017).

During the past two decades research focusing on incarcerated women has increased, although the literature remains limited (Favril et al., 2020; Zhong et al., 2021). This research shows that suicide is so prevalent amongst incarcerated women that it represents the most common preventable cause of death in this population (Favril et al., 2020; Fazel et al., 2017; Hayes, 2010). Indeed, rates of suicide and near lethal suicide attempts among women during incarceration are similar to (Dye, 2011; Fazel, Ramesh, et al., 2017), **or even higher, than those amongst men (Favril and O'Connor, 2021; Jenkins et al., 2005)**. And yet, much of the research into the factors that explain suicidality has traditionally explored suicidality amongst men and has neglected incarcerated women. Although it is unclear why exactly women in prison are at higher risk of suicide, compared to men, one possibility is that women are at greater risk of other factors that are typically associated with suicidality, such as mental ill-health (Fazel and Seewald, 2012) and substance abuse (Fazel, Yoon, et al., 2017; Tripodi and Pettus-Davis, 2013) as well as histories of childhood and prison physical and sexual victimisation (Caravaca-Sánchez and Wolff, 2016; Wolff et al., 2009). Recently, Favril and colleagues (2020) conducted a systematic review and a meta-analysis, including a total of 35 studies, exploring the prevalence and risk factors associated with self-harm during incarceration (including studies exploring near lethal suicide attempts), finding an increased risk of self-harm among female prisoners. Several additional risk factors were identified among incarcerated women, including being single, violent offending, prior incarceration, psychiatric treatment and victimisation. Of the 35 studies included in the review (Favril et al., 2020), only five focused exclusively on women, 15 on men, and the remaining 15 included both incarcerated men and women. Thus, there is a need in the literature to explore the

prevalence and factors associated with suicidal behaviours among incarcerated women. One study that explored past suicide attempts interviewed 247 imprisoned women in Las Vegas, and found that approximately one in four reported suicide attempts during their lifetime (Clements-Nolle et al., 2009). More recently, DeCou and colleagues (2017) using a sample of 224 treatment-seeking incarcerated women at a US correctional facility found that 49% and 62% reported past suicide attempts and suicidal thoughts, respectively.

In countries outside of the United States, such as Germany, official data between the years 2000 and 2013 suggests that for every 100,000 incarcerated women, 54 have attempted suicide (Opitz-Welke et al., 2016), while in the general population it is estimated at 13.6 (Federal Statistical Office of Germany, 2020). In England and Wales, Jenkins and colleagues (2005) using a nationally representative sample of incarcerated women, found that 37% of sentenced women had attempted suicide in their lifetime and 16% had attempted it during the past year. More recently, also in England and Wales, suicide rates among imprisoned women have been estimated to be 20 times higher when compared to the general population (Fazel and Benning, 2009). A recent study (Favril and O'Connor, 2021) conducted among 123 incarcerated women in Belgium explored lifetime suicidal ideation and suicide attempts, finding a prevalence of 58% and 37%, respectively. Studies also suggest that suicide continues to be a significant issue for previously incarcerated men and women after release from prison (Haglund et al., 2014; Zlodre and Fazel, 2012).

To date several studies have examined the reasons behind the high prevalence of suicide attempts among imprisoned men and women. Some have suggested that psychiatric morbidities, histories of suicidality pre-incarceration and stressful events during incarceration can increase one's risk of attempting suicide (Favril et al., 2020; Fazel et al., 2008; Shaw et al., 2004). Criminological studies suggest that prison suicide is strongly associated with social and environmental factors within prisons such as those related to overcrowding, being

held in solitary confinement and the presence of infractions or victimisation during incarceration (Leese et al., 2006; Sánchez et al., 2018a). Although these studies involve samples of men and women (Sánchez et al., 2018a; Shaw et al., 2004) or exclusively men (Leese et al., 2006), one study that recruited only female participants from ten prisons in England and Wales found that being on remand, incarcerated in a single cell, negative experiences during imprisonment and childhood abuse were each strongly associated with near lethal self-harm during incarceration (Marzano et al., 2011a). Additionally, physical and sexual victimisation have been associated with suicide behaviours during incarceration (DeCou et al., 2017; Sánchez et al., 2018b).

Previous studies have also examined the aggravating and mitigating factors that may be proximally linked to suicide attempts among incarcerated women. Regarding aggravating factors, suicide research in general shows that mental health and substance use disorders are strong risk factors for suicidal ideation and suicide and that mental illness (Baranyi et al., 2019; Fazel and Seewald, 2012; Gottfried and Christopher, 2017) and substance use disorders (Fazel et al., 2016; Fazel, Ramesh, et al., 2017; Sánchez et al., 2018b) are significant health problems among incarcerated women worldwide. A study with 60 women incarcerated in England found that depression during incarceration and the presence of two or more diagnoses and history of psychiatric in-patient treatment were the strongest risk factors associated with near lethal self-harm (Marzano et al., 2010) as well as hopelessness or intrusive imagery regarding past traumas (Marzano, Hawton, et al., 2011). Notably, in this study, substance use disorders were not associated with self-harm risk. In another study with 125 women prisoners in the United States, prisoners with psychiatric diagnoses and in particular, substance use disorders, were more likely to have attempted suicide in their lifetime than people without such diagnoses (Tripodi and Pettus-Davis, 2013).

Several mitigating factors have also been identified. Community studies conducted with males and females suggest that social support can protect people from suicide (Bell et al., 2018; Miller et al., 2019). Similarly, higher social support, measured using the Social Support Scale (Marzano, Hawton, et al., 2011), the Multidimensional Scale of Perceived Social Support (Richie et al., 2021) or in terms of the number of phone calls and visits from family and friends during imprisonment (Rivlin et al., 2013) have been found to be associated with lower likelihood of suicide, suicide attempts and suicidal ideation among mixed gender samples (Richie et al., 2019) or samples of only males (Rivlin et al., 2013). Similar findings have been found amongst incarcerated women, however, to our knowledge only one study has been conducted with a specific focus on this population (Marzano et al., 2011a). Social support has also been associated with other incarceration-related outcomes such as lower likelihood of re-incarceration (Lee et al., 2016), prison infractions (Steiner et al., 2017) and substance use (Caravaca-Sánchez and Wolff, 2020).

In overview, to date the majority of studies among samples of imprisoned people that investigate protective and risk factors associated with suicidality have conducted analyses involving males and females collapsed into one group (Favril and O'Connor, 2021; Richie et al., 2021; Sánchez et al., 2018a; Shaw et al., 2004) or using male samples only (Leese et al., 2006; Rivlin et al., 2013). Far fewer studies have examined these issues amongst incarcerated women exclusively (with some exceptions e.g., Marzano, Fazel, et al., 2011; Marzano, Hawton, et al., 2011; Tripodi and Pettus-Davis, 2013) despite suggestions from recent studies in the general population that there are important gender differences in the variables that predict suicidal behaviour/thoughts (Callanan and Davis, 2012; Freeman et al., 2017; Fresán et al., 2015). In addition, the few studies that have involved female prisoners and which have provided assessments of the occurrence of suicide attempts, or that have examined demographic, criminological and psychological protective and risk factors associated with

suicidality, are confined to specific Anglo-centric geographical areas such as England and Wales (Marzano et al., 2010; Marzano, Fazel, et al., 2011; Marzano, Hawton, et al., 2011), or the United States (Clements-Nolle et al., 2009; Tripodi and Pettus-Davis, 2013).

Thus, the present study aimed to provide a comprehensive analysis of suicidality, and the variables associated with it, amongst incarcerated women in Spain. In particular, the present study 1) assesses occurrence of suicide attempts; 2) explores demographic and criminal variables linked with suicide attempts; and 3) examines aggravating (mental health and substance use disorders) and mitigating (social support) factors associated with suicide attempts.

Method

Sample and procedure

Participants were selected from two adult prisons (including one minimum and one medium security) in the southeast of Spain that together housed approximately 300 women at the time of data collection. These two prisons were selected for their geographical proximity to the university where the principal investigator was located. Participants were included if they were: 1) incarcerated for a minimum of three months, (2) subject to a general regime (not subject to disciplinary or psychiatric segregation), (3) fluent in Spanish (the language of the questionnaire and survey materials), and (4) identified as women. Participants were excluded if they were residing in a specialised psychiatric section of the prison given the vulnerable status of these individuals and the care being given to them. Of the approximately 240 eligible individuals, 181 volunteered for the study, resulting in an overall participation rate of 75.4%. Seven cases were excluded from the sample because they did not complete any items on the questionnaire. Thus, the final sample was composed by 174 women that ranged in age from 19 to 58 ($M = 37.69$; $SD = 10.31$) and who were predominantly Spanish (74.7%; $n = 130$).

Between January and March of 2017 each prison was visited by the research team (composed of the first author and two research assistants from the University of Murcia). Approximately two weeks prior to the administration of the survey at each prison, prison staff sent demographic information of the current female population to the study's Principal investigator (PI). Prison staff (social workers and psychologists) put up posters in the common areas and delivered recruitment letters to eligible individuals stating the study purpose, dates of data collection, and stressing the voluntary nature of participation.

Self-report measures were administered using paper and pencil surveys in a common room for prisoners in groups of approximately 15 to 20 participants. The session lasted approximately 60 minutes per group, without the presence of prison staff. Participants were instructed to return completed questionnaires directly to the research staff. Prior to the start of the session the consent forms and main aims of the research were read aloud by the research staff and written informed consent was obtained from all study participants (attached to the first page of the questionnaire). The research was approved by the University of Murcia Ethics Committee and prison access was authorized by the Spanish Prison System (authorization number 18903). Participants did not receive compensation for their time.

Measures

Suicide attempts. Participants were asked "Since you have been in prison, have you made an attempt to take your own life?". This question was taken from previous research conducted with incarcerated samples in Spain and elsewhere (Caravaca Sánchez et al., 2020; Rivlin et al., 2013; Sánchez et al., 2018b). Responses were coded as no = 0 and yes = 1.

Mental distress. The symptoms of mental health problems during incarceration were assessed using the translated and validated Spanish version (Daza et al., 2002) of the shortened 21-item Depression Anxiety Stress Scale (DASS-21) developed by Lovibond and Lovibond (1995). Compared with the DASS-42, DASS-21 has reported several advantages as a more

interpretable factor solution with smaller inter-factor correlations and higher mean loadings (Antony et al., 1998). This instrument includes three subscales for depression (DASS-D), anxiety (DASS-A) and stress (DASS-S). Each subscale includes seven items each assessed using 4-point scales measuring the extent to which each symptom applied to them in the past week (0 = did not apply to me at all; 1 = applied to me to some degree, or some of the time; 2 = applied to me to a considerable degree, or a good part of the time, and 3 = applied to me very much or most of the time). Total scores for each of the subscales and the overall scale were computed, with higher scores indicating worse symptoms. The DASS-21 has shown good internal consistency and validity among criminally-involved samples (Grennan and Woodhams, 2007). In the current research, the DASS-21 overall index showed excellent internal consistency ($\alpha = .97$), as well as for depression ($\alpha = .92$), anxiety ($\alpha = .92$) and stress ($\alpha = .93$) subscales.

Social support. Social support among participants was assessed using the Medical Outcomes Study Social Support Survey (MOS-SSS, Sherbourne & Stewart, 1991) - Spanish version (Requena et al., 2007). This instrument is a 19-item measure of current social support availability. Prior to the questions, a brief introduction was presented to the participants, which read “*people sometimes look to others for companionship, assistance, or other types of support. How often is each of the following kinds of support available to you if you need it?*”. Example items include “*Someone you can count on to listen to you when you need to talk*”. Participants responded using 5-point scales regarding the extent to which they perceived themselves as receiving different kinds of social support from others (1 = none of the time; 2 = a little of the time; 3 = some of the time; 4 = most of the time; and 5 = all of the time). Scores range from 19 to 95, with higher scores indicating greater levels of social support. This instrument has previously been found to have strong psychometric properties among

incarcerated samples (Rodríguez-Martínez et al., 2010) and it showed high internal consistency in the current sample ($\alpha = .80$).

Alcohol misuse and drug use. Alcohol and drug use during the past three months while incarcerated were measured using the Alcohol Use Disorders Identification Test Consumption (AUDIT-C) developed by the World Health Organization (1990). The AUDIT-C is composed of three items each using a 5-point Likert response scale, with higher scores indicating more severe alcohol disorders. According to García-Carretero and colleagues (2016) items were summed with values greater or equal to four points indicating that a woman is misusing alcohol. Additionally, participants were asked about drug use within the last three months, answering yes or no to each of the following drugs: cannabis, cocaine, amphetamine, heroin, and hallucinogens. Participants who endorsed any of these drugs were coded as users.

Prison victimisation. Participants' experience of prison victimisation in the previous three months was measured in terms of four types of experiences: (1) victim of property theft; (2) victim of verbal insults/intimidation; (3) victim of physical abuse; and (4) victim of sexual abuse. The number of acts that participants were exposed to was summed to create an indicator of the number of recent victimisation experiences ranging from zero (no victimisation) to four (theft, verbal abuse, physical abuse, and sexual abuse).

Demographic and penitentiary variables. Three demographic and two penitentiary variables were collected. Demographic variables were age (measured as a continuous variable), marital status (married = 1; not married = 0) and highest level of education (0 = less than secondary; 1 = Secondary and above). Penitentiary variables were prison re-conviction (first time in prison, yes = 1; no = 0) and sentence length (in months).

Data analysis procedure

First, the prevalence of suicide attempts among incarcerated women was examined using frequencies. Differences between women who reported suicide attempts and those who did not were assessed using t-tests and chi-square analyses. Correlational analyses were then used to examine the associations between the study variables. Finally, binary logistic regression was used to examine whether social support, substance use, victimisation, and mood disorder symptoms were associated with attempting suicide, while controlling for demographic information and sentence-related variables. These models controlled for the prison facility by including a fixed effect for the prison where women were incarcerated. In addition, robust standard errors that are adjusted for individuals clustered within prisons were used. Multicollinearity was examined through variance inflation factors (VIFs), assuming multicollinearity issues for variables with associated VIFs > 5. The DASS-21 subscales of depression, anxiety, and stress did not meet this standard and were removed from the equation, and the overall score was used instead. Only one variable had missing information (sentence length = 25.9%). Data for this variable were imputed using multiple imputation procedures. As a result, 20 imputed data sets were generated and pooled for the multivariate analysis.

Results

Suicide attempt history

Approximately one in seven women (15.5%) indicated that they had attempted suicide during their time in prison. A number of differences were found in terms of substance use, victimisation experiences, and mood disorders between participants who reported that they had attempted suicide and those that had not. The results of the chi-square analyses and t-tests can be found in Table 1. Alcohol misuse was approximately twice as frequent among women reporting suicide attempts (55.6% versus 25.9%, $X^2 = 9.50$, $p = .002$), and drug consumption was four times higher among them when compared to those who have not

attempted suicide (55.6% versus 13.6%, $X^2 = 24.98$, $p < .001$). Victimization experiences were significantly different between the groups for every single type, with women who have attempted suicide reporting higher rates of threats (85.2% versus 62.6%, $X^2 = 5.20$, $p = .023$), theft (70.4% versus 36.1%, $X^2 = 11.07$, $p = .001$), physical and sexual abuse (51.9% versus 20.4%, and 37.0% versus 6.8%). As a result, the average number of victimization experiences for women with a history of suicide attempts was approximately double that of women with no such history ($M = 2.44$ versus $M = 1.26$). In addition, women reporting suicide attempts had higher levels of depression ($M = 29.85$ versus $M = 12.57$), anxiety ($M = 29.41$ versus $M = 12.86$) and stress ($M = 30.07$ versus $M = 15.48$). The size of the difference between the groups was moderate for substance use and for each victimization experience, and large for mood disorders and the count of victimization types (see Table 1).

Other characteristics, however, were comparable between the groups, including their age, marital status, level of education, levels of social support, sentence length, and whether they had been in prison prior to their current imprisonment.

TABLE 1 ABOUT HERE

Table 2 presents bivariate correlations for the study variables. Mental distress, as measured by DASS-21, had the strongest correlation with attempting suicide ($r = .46$, $p < .001$). Attempting suicide was positively and moderately correlated with drug use ($r = .38$, $p < .001$) and alcohol misuse, although the latter association was weaker ($r = .23$, $p = .002$). The association between suicide attempts and victimization experiences was positive and significant in all cases, ranging in magnitude from $r = .17$ for verbal abuse ($p = .023$) to $r = .34$ for sexual abuse ($p < .001$). Beyond suicidality, victimization experiences showed positive correlations with drug use ($.22 \leq r \leq .47$) and mental distress ($.29 \leq r \leq .45$), and negative correlations with social support ($-.19 \leq r \leq -.22$). Mental distress was associated with alcohol ($r = .16$, $p = .041$) and drug use ($r = .35$, $p < .001$).

TABLE 2 AROUND HERE

Multivariate analysis

Table 3 provides the results of the logistic regressions, with suicide attempts being regressed on sociodemographic and sentence-related characteristics, substance use, social support, victimisation experiences, and mental distress. Model 1 assesses the influence of each type of victimisation, while Model 2 evaluates their cumulative effect. In the first model lower education levels (OR = 0.18, $p = .001$), drug use (OR = 4.44, $p = .039$), higher social support (OR = 1.01, $p = .049$), physical abuse (OR = 17.55, $p = .015$), and mental distress (OR = 1.02, $p = .011$) increased the odds of attempting suicide.

In the second model two additional variables emerged as significant predictors, including being married (OR = 2.75, $p < .001$), and incarcerated by first time (OR = 3.39, $p = .034$). Consistent with Model 1, lower levels of education (OR = 0.47, $p = .024$), drug use (OR = 2.45, $p < .001$), in-prison victimisation (OR = 2.20, $p < .001$) and mental distress (OR = 1.01, $p = .022$) increased the odds of attempting suicide.

TABLE 3 AROUND HERE

Discussion

In some countries, women are entering prisons at nearly double the rate of men (e.g., Tripodi and Pettus-Davis, 2013) with Spain having one of the highest proportions of incarcerated women in Europe (Cerezo, 2017). Suicide rates are higher among incarcerated women than among men (Favril and O'Connor, 2021) and these rates are higher than same-gender non-incarcerated samples (Fazel, Ramesh, et al., 2017; Zhong et al., 2021). However, compared to studies with incarcerated men, there is considerably less research examining the prevalence of suicidality amongst women in prison and the factors that contribute towards suicidality (Favril et al., 2020). The present investigation contributes to fill this gap in the literature.

Alcohol misuse and drug consumption were higher amongst those participants who reported suicide attempts in prison compared to those who did not report those attempts (two and four times, respectively). However, only drug use remained significant in the multivariate models, suggesting potential interactions with other analysed variables. Previous epidemiological studies have documented that drug use is a risk factor associated with suicide behaviours among incarcerated samples (Favril et al., 2020; Fazel, Ramesh, et al., 2017; Sánchez et al., 2018b). In addition, substance use disorders are highly prevalent among women in prison (Sánchez et al., 2018a; Tripodi and Pettus-Davis, 2013). More studies are needed to further explore the association between different types of substances and suicide. From an applied perspective, these findings point to the potential benefits of including drug use in the development of prevention strategies for reducing suicide attempts in prison.

As noted in earlier research, substance misuse is a risk factor for suicide and more women are entering prison because of drug-related crimes (Fazel and Benning, 2009) achieving a 28% in the case of Spain (Spanish Prison System, 2019). Thus, women in prison at risk of suicide may present a previous history of drug consumption. The causes of that abuse of drugs have been found to be related to a history of childhood physical and sexual victimisation. That is, incarcerated women sexually and physically victimised at childhood are more likely to have a substance use disorder and to attempt suicide (Tripodi and Pettus-Davis, 2013). These results might suggest that the association between drug abuse and suicide in prisons may be linked to a previously developed maladaptive coping strategy in response to childhood experiences of trauma. Nevertheless, research also indicates that childhood trauma is an independent risk factor for attempted suicide amongst women in prison that persists into adulthood and which cannot fully be attributed to other variables such as psychological distress, illicit drug use or incarceration duration (Clements-Nolle et al., 2009).

Although childhood victimisation has been clearly associated with adult suicide attempts in prison, the effects of victimisation experiences in prison are less frequently reported. In the current research we found that women who had attempted suicide in prison reported higher rates of victimisation (i.e., theft, verbal, physical and sexual abuse). This result is consistent with previous studies conducted with incarcerated male samples in Spain supporting the link between prison physical victimisation and suicide attempts (Sánchez et al., 2018b). Victimisation in prison can also have future negative consequences as prisoners who are physically assaulted or threatened when incarcerated are then more likely to engage in substance abuse and violent criminal behaviour (Zweig et al., 2015). Accordingly, in our sample, there was a positive link between victimisation and drug use. The association between different forms of childhood maltreatment and prison sexual coercion has also been observed in a sample of incarcerated women (Walsh et al., 2012) suggesting a form of double victimisation (before entering prison and during incarceration). Our results could support this hypothesis of *double victimisation* among incarcerated women which further increases suicide risk. Future research could examine this possibility by measuring both current and past experiences of victimisation whilst examining their shared contribution to suicide risk. These problems would be further exacerbated by the experience of emotional distress. Indeed, in the present investigation, those who attempted suicide also reported more severe symptoms of depression, anxiety, and stress than those who did not attempt suicide during incarceration. This finding is consistent with Favril and colleagues (2020) who reported that psychiatric treatment was associated with self-harm during incarceration among women. Victimisation history and the presence of emotional distress and drug consumption should be accounted for in women when entering prison such that specific programs can be offered to them in order to prevent subsequent re-victimisation when in prison and suicidality.

In the current investigation social support was linked to suicide attempting among incarcerated women in the first model. This finding is inconsistent with previous research identifying social support as a protective factor for suicidality. Although the lack of social support and suicide has been previously observed amongst non-incarcerated samples, the results amongst prisoners are less consistent and suggest that social support is a secondary variable on suicide in these samples but strongly related to other variables more directly implicated in suicide attempt. For instance, perceived social support is negatively correlated with incarcerated women's severity of substance use (Staton-Tindall et al., 2007) which was found to be higher among those suicide attempters compared to non-suicide attempters in our sample of inmate women. In the case of the current research, perceived social support was negatively correlated with victimisation which emerged as one of the main variables involved in suicide attempts. Social support is considered a key protective element in trauma response (Callahan et al., 2013). However, other research did not find an association between the extent to which a person seeks social support and disclosure of experiences of lifetime interpersonal trauma among incarcerated women (Bazan, 2016) and other studies have found no association between social support and level of change in traumatic stress symptoms in a sample of female ex-offenders (Tugnoli, 2016). In incarcerated men, social support, as measured by the MOS-SSS, was not relevant in predicting suicide attempts occurring in prison (Caravaca Sánchez et al., 2020). Future studies should further explore whether these results are specific of MOS-SSS or replicate with other measures of social support among incarcerated individuals.

Among the sociodemographic characteristics, three variables emerged as significant, including having lower education levels, being married (only Model 2), and incarcerated by first time (only Model 2). These results are similar to those found for suicide behaviours among male and female prison samples (Caravaca Sánchez et al., 2020; Fazel et al., 2008;

Zhong et al., 2021). They suggest that encouraging educational attainment during incarceration may contribute to protect inmates from suicidal behaviour, especially when levels of education are often low among prisoners when compared to the general population (Coates, 2016). In addition, married women and incarcerated by first time might require more targeted interventions of maladaptive self-behaviour to imprisonment.

It is important to note the cross-sectional nature of the current research as a main limitation that precludes us from making conclusions regarding the sequence and order of the association between the study variables. For example, the negative association between perceived social support and victimisation could be a consequence of experiences of maltreatment and abuse received from peers during incarceration. Future research in this area should consider the possibility of developing longitudinal studies. Furthermore, our study relies upon self-reports of suicide attempting and does not measure the actual incidence of suicide attempts. These data were not available in the current investigation, but future research should seek to replicate the findings observed here using medical records of suicide attempts. Unlike previous studies (Marzano, Fazel, et al., 2011) conducted among incarcerated women using standardised tools for measuring suicide attempts such as the Beck Suicide Intent Scale (Beck et al., 1974), in the current research, one question adapted from Kresnow and colleagues (2001) was used to measure suicide attempts, which warrants caution when making comparisons with other studies. Finally, our sample size was small and our models may have failed to detect certain smaller effects. Without clear a priori indications as to the prevalence of suicidal behaviours amongst incarcerated women or the factors that contribute to this, it was not possible to make an accurate estimate of sample size. Future studies could collect additional data from samples of incarcerated women or oversampling women in studies of the prison population. This is particularly relevant when

examining low prevalence events such as suicide, in order to achieve more accurate estimates and being able to conduct subgroup analyses based on variables of interest.

Conclusions and implications

The results from the current research highlight the need of developing structured mental health screening and treatment activities in correctional settings for the prevention of suicide risk amongst incarcerated women. Substance use and victimisation (past and current) should be screened regularly during incarceration to prevent suicide ideation and suicide attempts. Thus, the role of prison health services should be emphasised regarding secondary prevention of suicide among incarcerated women (Friestad et al., 2014) due to the elevated risk for suicidal behaviours among women with histories of substance use and trauma exposure (Resko et al., 2018). Our results also emphasise the need for strategies to prevent in-prison victimisation as it was frequent and related to suicide attempting in our research. This is in line with previous studies (Favril et al., 2020), and it is still an underreported phenomenon in prison. For example, sexual assault persists in prisons but it is estimated that only 8% of prisoners who experience sexual assault report their victimisation (Kubiak et al., 2018).

Regarding the treatment for mental health and suicide prevention in prison, our results are in agreement with previous trauma-focused initiatives for incarcerated women. Although PTSD-cognitive processing (Gradus et al., 2013) and manualised cognitive-behavioural suicide prevention therapy for suicidal prisoners (Pratt et al., 2015) reduce suicidal ideation, trauma-informed care increases offender responsivity to evidence-based cognitive behavioural interventions (Miller and Najavits, 2012). Taking into consideration the higher presence of victimisation and trauma experiences among incarcerated women compared to men, trauma-informed care should create a welcoming environment which includes personal space for privacy, methods for tackling exposure to violent/sexual abuses and the monitoring

of intrusive or harassing behaviours from others (Bateman et al., 2013; Elliott et al., 2005). Our findings support the importance of a continuing care treatment model for incarcerated women exposed to multiple and repeated forms of traumatic events. Addressing and monitoring the emotional impact of traumatic experiences among women in prison may increase the effectiveness of correctional suicide prevention efforts.

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Table 1
Descriptive characteristics by suicide attempts

Variables	Suicide attempts		Statistic; p-value	Effect size
	No (n = 147)	Yes (n = 27)		
<i>Participant characteristics</i>				
Mean age (SE)	37.84 (0.88)	36.85 (1.65)	t = 0.53; p = .599	d = 0.10
Married	52.4% (77)	70.4% (19)	X ² = 2.98; p = .084	V = 0.13
Education level				
Less than secondary school	38.1% (56)	48.2% (13)		
Secondary education and above	61.9% (91)	51.9% (14)	X ² = 0.96; p = .326	V = 0.07
<i>Penitentiary and sentence-related measures</i>				
First time in prison	79.6% (117)	81.5% (22)	X ² = 0.05; p = .822	V = 0.02
Mean sentence length (SE)	65.45 (6.85)	48.00 (6.17)	t = 1.89; p = .063	d = 0.26
<i>Substance use</i>				
Alcohol misuse	25.9% (38)	55.6% (15)	X ² = 9.50; p = .002	V = 0.23
Drug use	13.6% (20)	55.6% (15)	X ² = 24.98; p < .001	V = 0.38
<i>Social support</i>				
Mean MOS (SE)	43.14 (1.16)	40.30 (2.89)	t = 0.91; p = .368	d = 0.20
<i>Victimisation</i>				
Theft	36.1% (53)	70.4% (19)	X ² = 11.07; p = .001	V = 0.25
Verbal abuse	62.6% (92)	85.2% (23)	X ² = 5.20; p = .023	V = 0.17
Physical abuse	20.4% (30)	51.9% (14)	X ² = 11.94; p = .001	V = 0.26
Sexual abuse	6.8% (10)	37.0% (10)	X ² = 20.50; p < .001	V = 0.34
Mean # victimisation experiences	1.26 (0.09)	2.44 (0.22)	t = -4.95; p < .001	d = -1.08
<i>Mood disorders</i>				
Depression	12.57 (0.96)	29.85 (3.17)	t = -5.21; p < .001	d = -1.38
Anxiety	12.86 (0.92)	29.41 (2.86)	t = -5.51; p < .001	d = -1.40
Stress	15.48 (0.91)	30.07 (2.74)	t = -5.05; p < .001	d = -1.26
DASS-21 score	81.82 (5.20)	178.67 (17.49)	t = -5.31; p < .001	d = -1.42

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

Table 2
Correlations among study variables

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Suicide	1												
2. Age (in years)	-0.01	1											
3. Married	0.13	-0.09	1										
4. Education level	-0.07	-0.09	-0.12	1									
5. First time in prison	0.02	-0.14	-0.05	0.21**	1								
6. Sentence length	-0.09	0.09	0.29***	0.00	-0.03	1							
7. Alcohol misuse	0.23**	0.07	0.19*	-0.01	0.04	-0.24**	1						
8. Drug use	0.38***	-0.14	0.14	-0.03	-0.21**	-0.15	0.35***	1					
9. Social support	-0.07	0.01	0.11	0.08	0.26***	0.02	-0.02	-0.12	1				
10. Theft	0.25***	-0.19*	-0.13	0.04	-0.31***	-0.09	-0.04	0.22**	-0.22**	1			
11. Verbal abuse	0.17*	0.14	-0.35***	0.16*	-0.18*	-0.21*	0.22**	0.36***	-0.19*	0.45***	1		
12. Physical abuse	0.26***	-0.08	-0.25**	0.28***	-0.17*	-0.19*	-0.01	0.47***	-0.19*	0.53***	0.42***	1	
13. Sexual abuse	0.34***	-0.13	0.07	-0.11	0.18*	-0.04	0.25**	0.22**	-0.20**	-0.08	-0.01	0.16*	1
14. DASS-21	0.46***	-0.18*	0.00	0.06	-0.06	-0.10	0.16*	0.35***	-0.14†	0.34***	0.36***	0.29***	0.45***

*p < .05; ** p < .01; ***p < .001

Table 3

Logistic regression models predicting suicide attempts

Variables	Model 1		Model 2	
	OR (SE)	95% CI	OR (SE)	95% CI
Intercept	0.00 (0.00)		0.00 (0.00)	
<i>Participant characteristics</i>				
Age (in years)	1.12 (0.10)	0.94, 1.33	1.06 (0.08)	0.92, 1.23
Married	0.82 (0.67)	0.16, 4.06	2.75*** (0.49)	1.92, 3.94
Education (secondary or above)	0.18** (0.09)	0.07, 0.49	0.47* (0.16)	0.24, 0.91
<i>Penitentiary and sentence-related measures</i>				
First time in prison	7.07 (8.12)	0.74, 67.19	3.39* (1.95)	1.10, 10.48
Sentence length (in months)	1.01 (0.01)	1.00, 1.02	1.00 (0.01)	0.99, 1.01
<i>Substance use</i>				
Alcohol misuse	8.61 (10.21)	0.83, 89.47	1.15 (0.22)	0.79, 1.66
Drug use	4.44* (3.18)	1.08, 18.23	2.45*** (0.61)	1.50, 4.00
<i>Social support</i>				
MOS	1.01* (0.00)	1.00, 1.01	1.00 (0.01)	0.99, 1.02
<i>Victimisation</i>				
Victimisation (scale)			2.20*** (0.40)	1.54, 3.13
Theft	6.69 (7.34)	0.78, 57.49		
Verbal abuse	0.09 (0.17)	0.00, 3.03		
Physical abuse	17.55* (20.59)	1.74, 177.32		
Sexual abuse	0.83 (0.58)	0.20, 3.38		
<i>Mood disorders</i>				
DASS-21	1.02* (0.01)	1.00, 1.03	1.01* (0.01)	1.00-1.03
Prison 2	0.63 (0.28)	0.26, 1.50	0.53 (0.29)	0.18, 1.57
F	299.31***		535.68***	
Pseudo R squared	0.45		0.39	
Observations	174		174	

*p < .05; ** p < .01; ***p < .001

Note: OR = odds ratio; SE = standard error; CI = confidence interval. VIF < 3.