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Risk of suicide in a prison population of Brazil

Risco de suicídio em uma população prisioneira do Brasil

***Vanusa Belarmino*[1], *Caroline Ribeiro Costa*[2], *Fabiane Aguiar dos Anjos Gatti*[3], *Vanusa Pousada da Hora*[4], *Ivy Bastos Ramis de Souza*[5], *Vinícius de Souza Tímbola*[6], *Talita Rubin Lazzari*[7] e *Carla Vitola Gonçalves*[8]**

Resumo: Objetivo: Identificar a prevalência e os fatores associados ao risco de suicídio em presos do regime fechado. Métodos: Trata-se de um estudo transversal com amostra aleatória estratificada por presídio. O número de presidiários entrevistados foram de 643 em seis presídios da Região Sul do Brasil. Para avaliar o risco de suicídio foi utilizado o *Mini International Neuropsychiatric Interview 5.0* (MINI). E também foram coletadas variáveis sociodemográficas, prisionais e de hábitos de vida. Resultados: A prevalência de risco de suicídio encontrada no estudo foi 21,3% (IC95%: 18,1 – 24,5), sendo 7,9% risco moderado ou alto. Foram identificados como fatores de risco para o suicídio: ser do sexo feminino, ter religião, ter histórico de doença mental pessoal ou familiar, não praticar atividades físicas no presídio e usar drogas. Conclusão: O estudo confirma que os prisioneiros com maior risco de suicídio eram do sexo feminino, tinham histórico pessoal ou familiar de doença mental, usavam drogas e não praticavam atividade física na prisão.

Palavras-chave: Suicídio; Prisioneiros; Epidemiologia.

Abstract: Objective: Identifying the prevalence and associated factors with the risk of suicide in closed prison inmates. Methods: This is a cross-sectional study with a random sample stratified by prison. The number of inmates interviewed was 643 in six prisons in the Southern Region of Brazil. To assess the risk of suicide, the Mini International Neuropsychiatric Interview 5.0 (MINI) was used. And sociodemographic, prison and lifestyle variables were also collected. Results: The prevalence of suicide risk found in the study was 21.3% (95%CI: 18.1 – 24.5), and of these 7.9% moderate or high risk. Risk factors for suicide were identified: being female, having a religion, having a history of personal or family mental illness, not practicing physical activities in prison and using drugs. Conclusion: The study corroborates that prisoners with an upper risk of suicide were female, had a personal or family history of mental illness, used drugs and did not practice physical activity in prison.

Keywords: Suicide; Prisoners; Epidemiology.

[1] Nutricionista. Doutoranda do Programa de Pós-graduação em Ciências da Saúde, da Universidade Federal do Rio Grande (FURG). E-mail: vanusa.cassino@gmail.com

[2] Psicóloga. Doutoranda do Programa de Pós-graduação em Ciências da Saúde, da Universidade Federal do Rio Grande (FURG). E-mail: carolinecosta.psi@gmail.com

[3] Farmacêutica. Doutora pelo Programa de Pós-graduação em Ciências da Saúde, da Universidade Federal do Rio Grande (FURG). E-mail: fafagatti@gmail.com

[4] Bióloga. Professora Associada Universidade Federal do Rio Grande (FURG). E-mail: dahoravp@gmail.com

[5] Farmacêutica. Professora Adjunta Universidade Federal do Rio Grande (FURG). E-mail: ivybramis@gmail.com

[6] Médico. Universidade Federal do Rio Grande (FURG). E-mail: viniciustimbola@hotmail.com

[7] Médica. Universidade Federal do Rio Grande (FURG). E-mail: talita-rubinlazzari@hotmail.com

[8] Médica. Professora Adjunta Universidade Federal do Rio Grande. E-mail: carlavgfurg@gmail.com

Introduction

The health of the deprived of liberty population has been a recurrent subject of study, as more than 10 million people are in prison around the world (Walmsley, 2016). Brazil has the third largest prison population in the world with about 726,000 individuals (Brasil, 2016).

Researches on the mental health of the deprived of liberty population have confirmed a high prevalence of mental disorders in this population, which ranges from 25 to 60% (Andreoli, Santos, Quintana, Ribeiro, & Blay, 2014; Zabala-Baños et al., 2016) but can reach up to 80% (Argimon, 2010). According to the latest report of the World Health Organization (World Health Organization, 2019), in 2016, the suicide rate in global populace was 10.5 per 100,000 inhabitants; for Brazil, this rate was 5.7 per 100,000 inhabitants in 2015 (Brasil, 2017).

Among worldwide prisoners, studies show high rates of attempted suicide, ranging from 13.4% to 33.7% (Encrenaz et al., 2014; Gunter et al., 2008; Larney, Topp, Indig, O'Driscoll, & Greenberg, 2012; Pluck, Brooker, & San, 1949; Rubio et al., 2014). In Brazil, only 10% of prison population presented suicide risk, with the highest risk occurring among men (52%) (Silva et al., 2011). In another Brazilian study carried out with 287 incarcerated women in Porto Alegre, 13.6% of the participants had previous history of attempted suicide and, of them, 4.2% presented it during the imprisonment (Argimon, 2010). The initial incarceration phase (one to five months) is the moment of greatest risk for suicide attempts, with rates of 41.7% (Larrotta-Castillo, Vargas-Cifuentes, & Rangel-Noriega, 2014). Several studies associate self--mutilation in the prison population with suicide, and more than half of the deaths occur within a month of self-mutilation (Hawton, Linsell, Adeniji, Sariaslan, & Fazel, 2014; Pluck et al., 1949).

Other reported risk factors for suicide among prisoners mentioned in the literature are: depression (Encrenaz et al., 2014; Larney et al., 2012; Marzano, Hawton, Rivlin, & Fazel, 2011; Rivlin, Hawton, Marzano, & Fazel, 2013), psychiatric disorders, (Sarchiapone, Carli, Giannantonio, & Roy, 2009), substance abuse (Sarchiapone et al., 2009), family history of suicide (Marzano et al., 2011; Sarchiapone et al., 2009), previous attempted suicide (Encrenaz et al., 2014; Pluck et al., 1949) and history of self-mutilation (Hawton et al., 2014; Pluck et al., 1949). On the other hand, the protective factors in prison population are less explored in scientific literature, with the most mentioned being: receiving visits (Duthé, Hazard, Kensey, & Pan Ké Shon, 2013), higher educational level, having a partner and children (Rubio et al., 2014).

Regarding the Brazilian deprived of liberty population the studies on mental health are scarce, and it is acknowledged the need to state the prospect of mental health in this context so that more effective actions can be articulated, targeting the minimization of the aggravating or triggering factors for mental illness. The present study aimed to identify prevalence and associated factors to the risk of suicide in prison population at state of Rio Grande do Sul, Brazil.

Method

This study is part of a larger project entitled "Prison Health", which aimed to evaluate the health of this population in the following areas: mental health, nutritional health, tuberculosis and knowledge and/or diagnosis of sexually transmitted infections.

This is a cross-sectional study randomly sampled and stratified of the prison. The present study was carried out in the 5th Regional Penitentiary Precinct - South Region (5th RPP), which comprises the State Prisons of Camaquã, Pelotas, Jaguarão, Canguçu, Rio Grande and Santa Vitória do Palmar, from May 2017 to January 2018.

At the time that the survey started, the prison population in the 5th RPP was 1.407 men and 100 women in closed system. The eligible population for the study was all men and women who were serving their sentences in a closed system at the time of the interview, in regional jails of Southern Brazil. Prisoners who had some cognitive limitation that prevented them from understanding the questions were excluded.

Due to wide range of prevalence of mental disorders found among scientific literature, a first sample size calculation was accomplished using all mean values found. Subsequently, there was a new sample calculation based on the prevalence found in the pilot study, which was performed with 35 prisoners from the semi-open system of the Rio Grande Jail. In the calculation a 5% margin of error, a 95% confidence interval and an increase of 10% for losses and refusals were considered. For suicide risk, using a prevalence of 11.4% found in the pilot study, the N found was of 232 inmates.

For calculation of associated factors, the prevalence rates found in the pilot study were also considered, at a 95% confidence level, relative risk of 2.0 and statistical power of 80%, adding 10% for losses and 40% for confounding factors. As the sample number for the associated factors exhibited the need for a larger number of individuals, the highest N for the study was chosen, corresponding to a total of 755 inmates.

According to the population size and logistics of each jail, for men, proportional stratified random sampling was performed. Through the list provided by prisons in each prison unit, the three-step the method used to draw the interviewed inmates. The women, however, were all selected.

A number of 643 prisoners (77%) participated in the study, distributed as follows: Rio Grande (243), Pelotas (233), Camaquã (93), Canguçu (29), Jaguarão (23) and Santa Vitória do Palmar (22). The refusals were 188 (22.5%) and there were four (0.5%) losses during the interviews.

Data collection took place in classrooms, clinics and in the corridor of the galleries, depending on the structure, logistics and security of each prison. Most of them occurred behind bars. In addition, each inmate was individually informed about the research and, at that time, the Informed Consent Form (ICF) was presented.

An interview was conducted using a pre-coded questionnaire containing sociodemographic variables (age, skin color, marital status, education and income), prison situation (time of penalty, type of crime and receiving visitation), mental health (family and personal history of mental health) and life habits (religion, physical activity and use of tobacco, alcohol and other drugs).

For the evaluation of mental disorders, it was employed the Mini International Neuropsychiatric Interview (MINI Plus), module Suicide Risk, validated for Brazilian population (Amorim, 2000). MINI Plus is a standardized diagnostic clinical interview instrument with diagnostic criteria from the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) and the International Statistical Classification of Diseases (ICD-10). All interviewers were trained to apply the data collection instruments.

Data were coded and later typed with double entry of questionnaires,

at a database created in the EPIDATA 3.1 software, and data analysis was performed in the STATA 14.0 software. In bivariate analysis of the sample, Prevalence Ratio (PR), 95% confidence intervals and Pearson's Chi-square test were calculated, assuming a p-value <0.05 of a two-tailed test. Adjusted analysis was performed by Poisson regression according to a 3-level hierarchy model for causal effects. The first level, most distal, comprised demographic and socioeconomic variables. In second level, the prison condition variables were included. At third level, the most proximal, included variables related to the history of mental health and life habits. The variables were selected for final model using the Backward method. Following this method, the variables were placed in the model according to their hierarchical level and those with $p \leq 0.05$ were preserved.

This study was authorized by the 5th RPP-SR and approved by the *Comitê de Ética em Pesquisa na Área da Saúde* (CEPAS) - Health Research Ethics Committee (HREC) - of the *Universidade Federal do Rio Grande* (FURG) under number 05/2017. Participation of the population deprived of liberty was voluntary and all the participants were informed and signed the Informed Consent Form (ICF).

Results

Thus, among the 643 interviewed on the present survey, 90.2% were male, with a mean age of 33.2 years (SD± 9.2 years), 62.3% had no partner, 60.9% were white and 57.5% had a religion, being Catholicism the most prevalent one (48%). The income of 53.9% of the sampled was at least 1.1 minimum wages and the average study-years were 6.3 years (SD ± 2.8 years). The average length of sentence, including all convictions, was 73 months (SD ± 69 months), 66.8% were recidivist prisoners and 61.3% did not work in prison (Table 1).

Table 1: Population description of prevalence and associated factors with suicide risk in prisoners in southern Brazil, 2018 (n = 643).

Characteristics	N	%
Sex		
Male	580	90,2
Female	63	9,8
Age (years)		
≤ 25	140	21,8
26 - 35	281	43,8
≥36	221	34,4
Skin Color		
White	380	60,9
Not White	244	39,1
Marital status		
Single	400	37,7
Married	242	62,3
Remuneration (before arrested)		
≥ 1,1 minimum wage	342	53,9
≤ 1 minimum wage	292	46,1
Study (in years)		
≥ 9	112	17,6
6 - 8	264	41,5
≤ 5	260	40,9
Work in prison		
Yes	247	38,7
No	392	61,3
Crime		
Homicide	97	15,3
Robbery	159	25,0
Drug Traffic	217	34,1
Others*	163	25,6
Time in prison (in months)		
≥ 61	263	42,4
31 - 60	140	22,5
≤ 30	218	35,1

Visits		
Yes	447	69,7
No	194	30,3
Religion		
Yes	368	57,5
No	272	42,5
History of mental illness		
No	577	90,4
Yes	61	9,6
History of mental illness in the Family		
No	520	81,8
Yes	116	18,2
Smoker		
No	254	39,7
Yes	386	60,3
Drank alcohol		
No	358	56,2
Yes	279	43,8
Use of drugs		
No	151	23,6
Yes	490	76,4
Physical Activities		
Yes	386	39,7
No	254	60,3

Subtitles: * Sexual crimes, gun possession, receiving, rustling and bodily injury.

Regarding mental health of interviewees, 9.6% of the sample reported having a history of mental illness and 18.2% reported having a family member with history of mental illness. Smokers were 60.3% of the sample and the average number of cigarettes was of 17.4 cigarettes per day (SD ± 12.5 cigarettes); 56.2% of the sample stated that they did not consume alcohol before arrestment and among those who consumed it, the average frequency was of 2.9 days a week (SD ± 2.1 days); 76.2% said that they have used drugs, with the most prevalent ones: marijuana (80.2%), cocaine (62.8%) and crack (44%).

Among the studied prison population, the risk of suicide was of 21.3% (CI95%: 18.1-24.5), of which 13.4% were at low risk, 2.2% moderate risk and 5.7 % high risk. After the adjusted analysis it was perceived that a history of mental illness (PR: 2.42 CI95%: 1.74 - 3.36) and being a woman (PR: 2.63 CI95%: 1.90-3.63) increased suicide risk by 142 and 163 percent, respectively.

Another identified risk factors for suicide were: not practicing physical activities in prison (PR: 1.59 CI95%: 1.16 - 2.17), increasing the risk of suicide by 59%; having a history of mental illness in the family (PR: 1.59 CI95%: 1.18 - 2.16), which also increased risk of suicide by 59% and previous drug use (PR: 1.96 CI95%: 1.29 - 2.97), increasing the risk of suicide by 96%. The only protective factor was not having a religion (PR: 0.64 CI95%: 0.46 - 0.90), reducing the risk of suicide by 36% (Table 2).

Table 2: Crude and adjusted analysis of factors associated with suicide risk in a prison population in southern Brazil, 2018 (n = 643).

Variable	%	Crude PR	Adjusted PR
Sex		p<0,001	p<0,001
Male	18,6	1,00	1,00
Female	46,8	2,51 (1,83 – 3,45)	2,63 (1,90 – 3,63)
Age (years)		p=0,333	p=0,368
≤ 25	20,1	1,00	1,00
26 - 35	24,0	1,19(0,81 – 1,76)	1,20(0,80 – 1,79)
≥36	18,7	0,93 (0,60 – 1,43)	0,89(0,57 – 1,39)
Skin Color		p=0,032	p=0,107
White	18,9	1,00	1,00
Not White	25,2	1,40 (1,03 – 1,90)	1,28(0,94 – 1,74)

Marital status		p=0,109	p=0,094
Single	18,0	1,00	1,00
Married	23,4	1,30 (0,94 – 1,80)	1,32(0,95 – 1,84)
Remuneration (before arrested)			
≥ 1,1 minimum wage		p=0,686	p=0,422
	20,8	1,00	1,00
≤ 1 minimum wage	22,1	1,06 (0,79 – 1,43)	0,87 (0,63 – 1,20)
Study (in years)			
≥ 9		p=0,228	p= 0,201
	15,2	1,00	1,00
6 - 8	22,5	1,48 (0,91 – 2,43)	1,53 (0,94 – 2,49)
≤ 5	22,5	1,48 (0,90 – 2,42)	1,49(0,92 – 2,41)
Work in prison		p=0,060	p= 0,226
Yes	17,6	1,00	1,00
No	23,8	1,36 (0,98 – 1,88)	1,22(0,88 – 1,70)
Crime		p=0,286	p=0,034
Homicide	17,5	1,00	1,00
Robbery	23,6	1,34 (0,80 – 2,25)	1,46 (0,86 – 2,50)
Drug Traffic	18,1	1,03 (0,61 – 1,73)	0,84(0,49 – 1,41)
Others*	24,7	1,41 (0,85 – 2,34)	1,28 (0,76 – 2,18)
Time in prison (in months)			
≥ 61		p=0,827	p=0,640
	20,7	1,00	1,00
31 - 60	20,1	0,97 (0,56 – 1,46)	0,96(0,64 – 1,46)
≤ 30	22,6	1,09 (0,78 – 1,54)	0,91(0,63 – 1,31
Visits		p=0,206	p=0,653
Yes	20,0	1,00	1,00
No	24,5	1,22 (0,90 – 1,67)	0,91 (0,63 – 1,33)
Religion		p=0,014	p=0,010
Yes	24,8	1,00	1,00
No	16,7	0,67 (0,49 – 0,93)	0,64(0,46 – 0,90)
History of mental illness		p<0,001	p<0,001
No	17,5	1,00	1,00
Yes	57,4	3,29(2,48 – 4,35)	2,42(1,74 – 3,36)
History of mental illness in the Family		p<0,001	p=0,002
No	17,6	1,00	1,00
Yes	36,5	2,07 (1,53 – 2,81)	1,59(1,18 – 2,16)
Smoker		p=0,001	p=0,107
No	15,0	1,00	1,00
Yes	25,7	1,71 (1,22 – 2,41)	1,31 (0,94 – 1,84)
Drank alcohol		p=0,137	p=0,397
No	19,0	1,00	1,00
Yes	23,9	1,26 (0,93 – 1,69)	1,13 (0,84 – 1,51)
Use of drugs		p=0,020	p= 0,001
No	14,6	1,00	1,00
Yes	23,5	1,61 (1,06-2,45)	1,96(1,29-2,97)
Physical Activities		p<0,001	p=0,003
Yes	16,2	1,00	1,00
No	29,1	1,80(1,34 – 2,42)	1,59(1,16 – 2,17)

Discussion

The prevalence of suicide risk found in this study was high (21.3%; CI95%: 18.1 - 24.5). Although, global rates in this population are likewise high, varying from 13,2% e 33,7% (Ayhan et al., 2017; De Smet et al., 2017; Encrenaz et al., 2014; Larney et al., 2012; Pluck et al., 1949; Rubio et al., 2014). In Brazil, a study with 466 men and 91 women, only 10% of the prison population presented suicide risk, with the risk being higher among men (52%) (Silva et al., 2011). One of the factors that may have influenced the higher suicide risk rate in the present study is the fact that it was carried out in the extreme south of Brazil.

According to the Epidemiological Bulletin of the Health Ministry (Brasil,

2018), Rio Grande do Sul has the highest rate of suicide deaths in the country: 10.3 /100,000 inhabitants, while the rate in Brazil is 5.5 /100,000 inhabitants. Thus, it seems logical that the prison population of this state also has a higher risk of suicide, when compared to prisoners from other states.

This study identified as risk factors for suicide being female, having a personal or family history of mental illness, using drugs and not practicing physical activities inside prison.

Being a woman increased the risk of suicide by two and half times (PR: 2.63, CI95%: 1.90 - 3.63). In a study carried out in Australia with 199 women and 797 men, women presented a 26% higher suicide risk than men (Larney et al., 2012). It is believed that women have a greater family bond, often playing the role of caregiver. However, in the context of incarceration there may be a weakening or breaking of these bonds, expressed by the decrease or nonexistence of family visits, which causes suffering and can lead to depressive symptoms, feelings of worthlessness, and suicidal thoughts. Due to their caregiver role, both for their children and for their elderly, woman may suffer more than men with the distancing from the family members. The women in prison are young and it is possible that their children were taken care of by family members or even by the State, as their partners are often also imprisoned as well. In some of the surveyed prisons, male inmates found support networks within the faction itself, while most incarcerated women were not associated with any criminal groups.

Another important risk factor identified in this study was the personal history of mental illness (PR: 2.42 CI95%: 1.18 - 2.16). Trough scientific literature this is frequently related to suicide risk, depression being the main associated disorder. A study conducted in France with 647 male and 60 female prisoners, perceived that depression increased the risk of suicide seven times, followed by panic disorder and anxiety that increased the risk in three and two times, respectively (Ayhan et al., 2017).

The history of prior mental illness, mainly depression, is well documented in scientific publications as a risk factor for suicide in general population and, accordingly, among prisoners. Given that this population has greater difficulty in accessing health services, it is supposed that many may have undiagnosed mental disorders. The lack of proper diagnosis and treatment of mental illness leaves this population more vulnerable to worsening of their symptoms and, consequently, it may lead to suicidal ideation. This is an already well-established fact that should function as a warning to public health and prison managers so that they may take a closer look at this risk group, outlining strategies that may allow rehabilitation and reintegration of these people into society after serving their sentence.

Family history of mental illness (PR: 1.59 CI95%: 1.18 - 2.16) also increased suicide risk by 59%. A case-control study conducted in England with 60 female inmates with a suicide attempt and 60 female inmates with no attempts, confirmed that those with a history of suicide in family were five times more likely to commit suicide (Marzano et al., 2011). Some mental illnesses have a genetic component. However, it is not possible to point out a single cause for the development of mental disorders, which is a biopsychosocial phenomenon. Thus, having a relative with mental illness, depending on the living and bonding situation, may influence mood, behavior and even the personality of an individual, as well as it may affect the family's socioeconomic situation.

Another risk factor identified was the lack of physical activities practice in prison (PR: 1.59 CI95%: 1.16 - 2.17). Reason for increased risk to 59% when compared to those who do exercises. A case-control study carried out with 64 Italian prisoners, who participated in the implementation of a nine-month exercise program, concluded that the exercise significantly reduced depressive symptoms compared with those in the control group, in which symptoms even increased (Battaglia et al., 2015). Physical activity is an important ally in the prevention and promotion of mental health, considering its potential for regulating mood and promoting physical and psychological well-being.

The only protective factor for suicide risk found in this study was not having a religion (PR: 0.64 CI95%: 0.46 - 0.90), which reduced the risk by 36% when compared to those who reported having a religion. Studies linking suicide and religiosity in prisons were not found to confirm our findings. On the contrary, the literature points to religion as a protective factor for mental illnesses (Albertie, Bourey, Stephenson, & Bautista-Arredondo, 2017; Tavares, Scheffer, & de Almeida, 2012). A study carried out with 1573 prisoners in Rio de Janeiro shows that having no religion increases the risk of depression by 79% (Constantino, de Assis, & Pinto, 2016). It is valuable to emphasize that in the present study, the prevalence of prisoners who reported having a religion was 57.2%, considerably lower than those found in literature, ranging from 70.3 to 79.6% (Constantino et al., 2016).

Because they are in the worst conditions of mental health, many people may pursue a religion as a mainstay, in order to survive during the period of incarceration. In light of this, caution in analyzing this data is suggested, as it may be due to a reverse causality effect, where prisoners with suicidal ideation sought more help in religion than those without ideation. Stack (1992) summarizes the findings on the relation between religion and suicide: Rituals and religious beliefs play an important role in their prevention. Some attitudes of religiosity such as attending religious services, belonging to a religious community, and the strength of belief and organization have provided mixed results, but, in general, supporting the idea that religion reduces the suicide rates. Others think that religious commitment is the key aspect of prevention (Santos, Ulisses, Costa, Farias, & Moura, 2016; Stack, 1992, 2015).

Drug usage (PR: 1.96 CI95%: 1.29 - 2.97) also increased suicide risk by 96%. A study carried out in Spain with 511 drug users, 390 men and 121 women, suicidal ideation or suicidal plans were reported by 30.8% of the male and 38.8% of the female participants (Arribas-Ibar, Suelves, Sanchez-Niubò, Domingo-Salvany, & T. Brugal, 2017). Another study with 60 prisoners in Rio Grande do Sul (Tavares et al., 2012), reported a strong correlation between depressive symptoms and drug use. The study also states that the intensity of drug usage is proportional to the intensity of anger feelings, aggressiveness and level of depressive symptoms. During incarceration, the drug user also may be more susceptible to the effects of abstinence crisis, and it may lead to suicidal ideation.

It is worth stating the relevance of the present study, whereas it was carried out in six different cities, in a region where there is still no published research on this topic. It is also worth recognizing the methodology strength employing the MINI Plus, a standardized, validated individual clinical interview instrument based on the DSM-5 diagnostics criteria. Despite being one of the most complete instruments, MINI Plus is rarely used in prison environment due to logistic difficulties.

However, it is crucial to consider some limitations of the present study. Since it presents a cross-sectional design, it prevents the establishment of cause and effect relationships. An example of this is religion, which permits

to conceive a possible case of reverse causality, where people with suicidal ideation would seek religion.

Even with the restrictions, the results support the viability of the employed methodology, since other studies on mental disorders have applied the same instrument.

Finally, it is suggested that prison services, aligned with health services, prioritize the risk groups identified in this study through strategic actions such as reunions to strengthen family bonding, income production, approach and treatment of chemical addiction and qualification of prison structure allowing the practice of physical activities.

Conclusion

The study allows to conclude that there is a high risk of suicide among the prison population (21.3%; 95% CI: 18.1 - 24.5) and points out several risk factors that may support the planning effective strategies for prevention and promotion of mental health in the prison environment.

The prisoners at greatest risk of suicide were female, people with a personal history of mental illness, drug users, non-practitioners of physical activity in prison and who had a family history of mental illness. The Brazilian Health System (Sistema Único de Saúde - SUS) needs to develop a strategy that considers a different perspective on mental health and suicide risk in the group of prisoners described above.

References

Albertie, A., Bourey, C., Stephenson, R., & Bautista-Arredondo, S. (2017). Connectivity, prison environment and mental health among first-time male inmates in Mexico City. *Global Public Health, 12*(2), 170–184. https://doi.org/10.1080/17441692.2015.1091023

Amorim, P. (2000). Mini International Neuropsychiatric Interview (MINI): validação de entrevista breve para diagnóstico de transtornos mentais. *Revista Brasileira de Psiquiatria, 22*(3), 106–115. https://doi.org/10.1590/s1516-44462000000300003

Andreoli, S. B., Santos, M. M., Quintana, M. I., Ribeiro, W. S., & Blay, S. L. (2014). Prevalence of Mental Disorders among Prisoners in the State of Sao Paulo, Brazil. *PLoS ONE, 9*(2), 88836. https://doi.org/10.1371/journal.pone.0088836

Argimon, D. C. I. I. de L. (2010). Características, sintomas depressivos e fatores associados em mulheres encarceradas no Estado do Rio Grande do Sul, Brasil Characteristics, depressive symptoms, and associated factors in incarcerated women in the State of Rio Grande do Sul, Brazil. *Cadernos de Saúde Pública, 26*(7), 1323–1333.

Arribas-Ibar, E., Suelves, J. M., Sanchez-Niubò, A., Domingo-Salvany, A., & T. Brugal, M. (2017). Conductas suicidas en hombres y mujeres consumidores de sustancias ilícitas reclutados en centros de tratamiento para la drogodependencia. *Gaceta Sanitaria, 31*(4), 292–298. https://doi.org/10.1016/j.gaceta.2016.11.011

Ayhan, G., Arnal, R., Basurko, C., About, V., Pastre, A., Pinganaud, E., . . . Nacher, M. (2017). Suicide risk among prisoners in French Guiana: Prevalence and predictive factors. *BMC Psychiatry, 17*(1). https://doi.org/10.1186/s12888-017-1320-4

Battaglia, C., Cagno, A. D. I., Fiorilli, G., Giombini, A., Borrione, P., Baralla, F., & Marchetti, M. (2015). *Participation in a 9-month selected physical exercise programme enhances psychological well-being in a prison population.* *354*(August 2014), 3070. https://doi.org/10.1002/cbm

Brasil. (2016). Ministério da Justiça e Segurança Pública *Levantamento Nacional*. Recuperado de http://depen.gov.br/depen/depen/sisdepen/infopen

Brasil. (2017). Boletim Epidemiológico: Perfil epidemiológico das tentativas e óbitos por suicídio no Brasil e a rede de atenção à saúde. *Boletim Epidemiológico: Suicídio. Saber. Agir e Prevenir., Volume 48*(no 30), 1–15. Recuperado de http://www.who.int/mental_health/media/en/59.pdf

Constantino, P., de Assis, S. G., & Pinto, L. W. (2016). O impacto da prisão na saúde mental dos presos do estado do Rio de Janeiro, Brasil. *Ciencia e Saude Coletiva, 21*(7), 2089–2100. https://doi.org/10.1590/1413-81232015217.01222016

De Smet, S., De Donder, L., Ryan, D., Van Regenmortel, S., Brosens, D., & Vandevelde, S. (2017). Factors related to the quality of life of older prisoners. *Quality of Life Research, 26*(6), 1571–1585. https://doi.org/10.1007/s11136-017-1506-8

Duthé, G., Hazard, A., Kensey, A., & Pan Ké Shon, J. L. (2013). Suicide among male prisoners in France: A prospective population-based study. *Forensic Science International, 233*(1–3), 273–277. https://doi.org/10.1016/j.forsciint.2013.09.014

Encrenaz, G., Miras, A., Contrand, B., Galera, C., Pujos, S., Michel, G., & Lagarde, E. (2014). Inmate-to-inmate violence as a marker of suicide attempt risk during imprisonment. *Journal of Forensic and Legal Medicine, 22*, 20–25. https://doi.org/10.1016/j.jflm.2013.11.009

Gunter, T. D., Arndt, S., Wenman, G., Allen, J., Loveless, P., Sieleni, B., & Black, D. W. (2008). Frequency of mental and addictive disorders among 320 men and women entering the Iowa prison system: Use of the MINI-Plus. *Journal of the American Academy of Psychiatry and the Law, 36*(1), 27–34.

Hawton, K., Linsell, L., Adeniji, T., Sariaslan, A., & Fazel, S. (2014). Self-harm in prisons in England and Wales: an epidemiological study of prevalence, risk factors, clustering, and subsequent suicide. *The Lancet, 383*, 1147–1154. https://doi.org/10.1016/S0140-6736(13)62118-2

Larney, S., Topp, L., Indig, D., O'Driscoll, C., & Greenberg, D. (2012). A cross-sectional survey of prevalence and correlates of suicidal ideation and suicide attempts among prisoners in New South Wales, Australia. BMC *Public Health, 12*(1), 14. https://doi.org/10.1186/1471-2458-12-14

Larrotta-Castillo, R., Vargas-Cifuentes, S., & Rangel-Noriega, K. (2014). Características del comportamiento suicida en cárceles de Colombia. *Revista Criminalidad, 56*(1), 83–95.

Marzano, L., Hawton, K., Rivlin, A., & Fazel, S. (2011). Psychosocial influences on prisoner suicide: A case-control study of near-lethal self-harm in women prisoners. *Social Science and Medicine, 72*(6), 874–883. https://doi.org/10.1016/j.socscimed.2010.12.028

Pluck, G., Brooker, C., & San, U. (1949). Colorado Blvd., *Denver, Colorado. ***. *364*(April), 3070. https://doi.org/10.1002/cbm

Rivlin, A., Hawton, K., Marzano, L., & Fazel, S. (2013). Psychosocial Characteristics and Social Networks of Suicidal Prisoners: Towards a Model of Suicidal Behaviour in Detention. *PLoS ONE, 8*(7), 1–11. https://doi.org/10.1371/journal.pone.0068944

Rubio, L. A., Cardona Duque, D. V., Medina Pérez, Ó. A., Garzón Olivera, L. F., Garzón Borray, H. A., & Rodríguez Hernández, N. S. (2014). Riesgo suicida en población carcelaria del Tolima, Colombia. *Revista de La Facultad de Medicina, 62*(1), 33–39. https://doi.org/10.15446/revfacmed.v62n1.43672

Santos, W. S. dos, Ulisses, S. M., Costa, T. M. da, Farias, M. G., & Moura, D. P. F. de. (2016). A influência de fatores de risco e proteção frente à ideação suicida. *Sociedade Portuguesa de Psicologia Da Saúde, 17*(3), 515–526. Recuperado de http://www.scielo.mec.pt/pdf/psd/v17n3/v17n3a16.pdf

Sarchiapone, M., Carli, V., Giannantonio, M. Di, & Roy, A. (2009). Risk Factors for Attempting Suicide in Prisoners. *Suicide and Life-Threatening Behavior, 39*(3), 343–350. https://doi.org/10.1521/suli.2009.39.3.343

Silva, N. C., Rosa, M. I., Amboni, G., Mina, F., Comim, C. M., & Quevedo, J. (2011). Transtornos psiquiátricos e fatores de risco em uma população

carcerária [Psychiatric disorders and risk factors in a prison population]. *ACM: Arquivos Catarinenses de Medicina, 40*(1), 72–76. Recuperado de http://www.acm.org.br/revista/pdf/artigos/850.pdf

Stack, S. (1992). The impact of the media on suicide. *Suicide from a Global Perspective: Psychosocial Approaches, 22*(2), 115–118.

Stack, S. (2015). Religion and suicide acceptability: A review and extension. *Suicidologi, 18*(1), 3–9. https://doi.org/10.5617/suicidologi.2181

Tavares, G. P., Scheffer, M., & de Almeida, R. M. M. (2012). Drogas, violência e aspectos emocionais em apenados. *Psicologia: Reflexao e Critica, 25*(1), 89–95. https://doi.org/10.1590/S0102-79722012000100011

Walmsley, R. (2016). World Prison Population List. Eleventh Edition. *World Prison Brief*, (November 2014), 1–15. Recuperado de www.prisonstudies.org

World Health Organization. (2019). Suicide in the world: Global Health Estimates. *World Health Organization,Geneva*, 32. Recuperado de https://apps.who.int/iris/bitstream/handle/10665/326948/WHO-MSD-MER--19.3-eng.pdf?sequence=1&isAllowed=y

Zabala-Baños, M. C., Segura, A., Maestre-Miquel, C., Martínez-Lorca, M., Rodríguez-Martín, B., Romero, D., & Rodríguez, M. (2016). Mental disorder prevalence and associated risk factors in three prisons of Spain. In *Rev Esp Sanid Penit* (Vol. 18).