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## Factors Associated With Physical and Psychological Health Outcomes Among Inmate Women in Portugal

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### ABSTRACT

This study aims to identify the variables associated with self-reported physical and psychological symptoms and the perceived health status of inmate women in Portugal. Data collection took place in two female Portuguese prisons and participated in the study 232 women. Physical symptomatology was associated with having children, physical abuse in childhood, a higher number of chronic diseases, and anxiety. Older women, the experience of sexual abuse, and chronic diseases were associated with a worse perception of physical health. Psychological symptoms were higher in women that reported substance abuse before prison, chronic diseases, anxiety, and depression. Finally, a combination of the prior variables (sexual abuse, anxiety, and depression) and three additional variables (lower education level, not having contact with mental health services before prison, and being already sentenced) was associated with worse perceptions of mental health conditions. These findings can be used as a platform for future research, as well as a tool for prison policy regarding the particular gender health needs of inmate women.

### KEYWORDS

Chronic disease; juridical status; health status; inmate women; prison; symptoms

The poor health of incarcerated women is highlighted in the literature, but mainly focused on specific diseases, and less is known about their perceptions of general health status. Furthermore, when compared with women in the community or with detained men, inmate women report poorer health (Alves, 2018). As a result of these specificities, prison should be a place of opportunities for positive, carefully planned health interventions (Møller et al., 2007) and adequate/congruent with the specific needs of this population (Proctor, 2009). In this sense, despite the recognition that there is a need to understand the factors influencing the health of inmate women, to guide planned interventions (Harner & Riley, 2013), few studies have explored the inmates' perceptions about their physical and psychological health and, consequently, their own health needs (Iversen et al., 2014).

According to the European main prison indicators (Aebi & Tiago, 2021), the prison population rate per 100,000 inhabitants was 103.2, with a percentage of female inmates in the prison population being 4.9. Data from the World Female Imprisonment List (Walmsley, 2017) shows that the number of inmate women continues to increase across the five continents, particularly in Europe, with a total of 714,000 women in prison around the world. This represents a challenge for prison services, once women have gender-specific health needs, with higher rates of physical and mental health problems, when compared to incarcerated men (Bronson & Berzofsky, 2017).

## HEALTH CONDITIONS OF INMATE WOMEN

People in prison have been characterized by a risky lifestyle and a high prevalence of many different diseases (Rutherford & Duggan, 2009; Wilper et al., 2009). The research has moved toward contextualizing and describing this high morbidity but has also examined health risk behaviors, infectious diseases, mental illness, and, more recently, chronic diseases. However, the majority of these studies are focused predominantly on specific diseases and do not consider the general self-reported health status of the inmate population (e.g., Plugge & Fitzpatrick, 2005), an important aspect of individual's health, reflecting a more holistic view of a person, including their biological, psychological and social dimensions, inaccessible to the outside observer (Idler & Benyamini, 1997). Besides that, the vast majority of studies in this field are based on male samples, almost ignoring the importance of gender as a predictor of health (e.g., Moschetti et al., 2015). Inmate women are a vulnerable group as regards mental and physical health before incarceration, resulting from a variety of factors, such as poor access to health services, the experience of physical and sexual abuse, substance misuse, among others (Braithwaite et al., 2005; Messina & Grella, 2006). Therefore, the effect of imprisonment on inmates' health may have multiple outcomes, and literature suggests that, once in prison, some women improve their health condition while others get worse (Douglas et al., 2009; Harner & Riley, 2013; Proctor, 2009). For example, a study with female inmates in Greece concluded that 60.4% mentioned a moderate or poor health status, while the respective percentage before detention was 32.7%. Health status deterioration and poor mental health were reported by more than half of the respondents, with the majority expressing raised feelings such as sadness, anxiety, or discomfort which affected negatively their everyday life while in prison (Geitona & Milioni, 2016).

Women in prison often come from deprived backgrounds, presenting structural vulnerabilities (e.g., low socioeconomic level, from minority ethnic groups), individual vulnerabilities (e.g., experienced physical or sexual abuse; Messina & Grella, 2006; Proctor, 2009; van den Bergh et al., 2014), risk behaviors (e.g., alcohol or drug use, sexual risk behaviors; Bradley & Davino, 2002; Geitona & Milioni, 2016; Shah et al., 2011) and poor physical and mental health (e.g., van den Bergh et al., 2014). For example, compared with men, inmate women are more likely to be homeless, use illicit drugs, report drug charges at index arrest and have health problems (e.g., Freudenberg et al., 2007). Drug use is often higher among female inmates, being estimated that around 75% of women arriving in prison have some sort of drug-related problem (van den Bergh et al., 2014). This behavior is often associated with other structural conditions, namely lower education levels, unemployment and lower income (e.g., van den Bergh et al., 2014), alcohol consumption, higher rates of trauma (e.g., adverse childhood experiences, physical and sexual abuse; Messina & Grella, 2006; Proctor, 2009; van den Bergh et al., 2014), mental disorders (e.g., post-traumatic stress disorder, depressive and anxiety disorders), and sexually transmitted diseases, like HIV, hepatitis B and/or hepatitis C (e.g., UNODC, 2014).

Also, some factors arise in the prison environment, for instance, juridical variables (Lindquist & Lindquist, 1999), crowded living conditions, psychological stress (Bradley & Davino, 2002), anxiety, stress, depression, altered sleep patterns, misuse of psychotropic medication, sexual abstinence, interruption of family relationships (Santos et al., 2017) namely being separated from their children and families (Frye & Dawe, 2008), contributing as an additional stressor that can further exacerbate existing psychiatric problems (Ferszt & Clarke, 2012). Also, one of the main challenges for inmate women is pregnancy and motherhood in prison (Sufrin et al., 2019).

According to Mignon (2016) mental illness, substance abuse, a trauma history, and sexual victimization while incarcerated can predict a more difficult adjustment to a correctional environment. Some studies suggest that inmates present more health needs (e.g., Vandergrift & Christopher, 2021) and higher levels of health problems result in increased demand for mental and physical healthcare services in prison (e.g., Kouyoumdjian et al., 2018).

## INMATE WOMEN IN PORTUGAL

There are 49 prisons in the penitentiary system in Portugal, three of them are for women. From the total number of inmates in Portugal in 2020 ( $n=11,412$ ) the women represented 7% ( $n=796$ ), mostly between 30 and 39 years ( $n=224$ ); 5.5% were Portuguese women and 1.5% immigrant women (DGPJ, 2020). From the total number of women sentenced to effective prison terms ( $n=587$ ), the greatest number of crimes committed were related to drugs ( $n=215$ ), specifically the crime of drug trafficking ( $n=193$ ; DGRPS, 2020).

Two of the prisons for women in Portugal allow inmates women with children, and the prisons have available clinical services for inmates inside and/or outside the prison facilities (Matos et al., 2017). According to the Portuguese Penal Code, specifically the Law 115/2009 of 12 October, the inmate population has the right to have access to the same healthcare conditions as general populations, through the national healthcare services (Matos et al., 2017). The clinical services provided assume a gender perspective, to answer to the specific health needs of women. Upon admission to prison, all persons are referred to clinical services and evaluated and a health plan is established, using all the diagnostic services necessary for this purpose. They are also accompanied by a multidisciplinary mental health team in prisons (Matos et al., 2017).

Few studies have focused their attention on the health outcomes of inmates in Portugal. From those carried out in this context, a study carried out with 60 inmate men, to describe patterns of and associations between psychoactive substance use and perception of mental health status, concluded that the majority of the inmates reported using a psychoactive substance during the current detention period. A minority of men perceived their mental health as good. Lower educational levels were associated with moderate and severe mental health impairment, while less severe impairment was perceived by smokers and alcohol users (Marinho & Vitoria, 2018).

Another study, performed with 394 women, 211 inmates, and 183 from the community, analyzed the association between adverse childhood experiences, depression, and suicide attempts. Inmate women reported higher levels of sexual abuse, family substance abuse, imprisonment of a family member and parents' divorce, depression, and suicidal attempts (Pinto, 2013). Also with inmate women, a qualitative study carried out with 15 participants concluded that women's health backgrounds varied concerning their level of health concerns, contact with health services, and health behaviors. A positive influence of incarceration was described by patients with chronic illness, patients with drug addiction, and victims of interpersonal violence. The imprisonment did not show improvements in mental health for women with mental illnesses or those without previous health problems (Alves et al., 2016).

## OBJECTIVES

This study is part of a larger investigation that aims to characterize the general health of inmate women in Portugal. In the present paper, we propose to explore the factors associated with physical and psychological self-reported symptoms, as well as inmate women's perception of physical and psychological health status. To achieve these objectives, we will consider sociodemographic (e.g., age, level of education, having children), childhood adversity (e.g., physical abuse and sexual abuse), behavioral (e.g., alcohol abuse and drug use), clinical (e.g., contact with health services before prison, number of chronic diseases, depression, anxiety), and juridical (e.g., time of prison and judicial status) variables.

## METHODOLOGY

### *Participants*

The present sample was composed of 232 inmate women, with a mean age of 36.86 ( $SD=10.72$ ), mostly with lower levels of education ( $n=130$ ; 56.3%) and employed before

**Table 1.** Description of participants.

Sociodemographic variables	<i>n</i>	%
Nationality		
Portuguese	177	76.2
Other	55	23.7
Level of education		
Less than ninth grade	130	56.3
Completed ninth grade or more	101	43.7
Employment Status before Prison		
Employed	138	59.5
Unemployed	94	40.5
Children	191	82.3
Number of children ( <i>M; SD</i> )	2.86	1.81
Adverse Childhood Experiences		
Yes	193	83.5
No	39	16.5
Number of childhood adverse experiences ( <i>M: SD</i> )	3.10	2.41
Types of ACE		
Physical Abuse	97	42.0
Sexual Abuse	40	17.2
Alcohol abuse	26	14
Drug use	80	34.5
<b>Clinical variables</b>		
Health Vigilance (6 months before prison)		
Contact with primary health care center	156	67.2
Contact with hospital emergency room	108	46.6
Contact with psychiatrist	44	19.6
Contact a private practice	62	27.6
<b>During imprisonment</b>		
Chronic diseases		
Yes	208	89.7
No	24	10.3
Number of chronic diseases ( <i>M: SD</i> )	3.84	2.86
Depression ( <i>M: SD</i> )	1.52	1.02
Anxiety ( <i>M: SD</i> )	1.24	0.99
Judicial variables		
Duration of imprisonment (in months) ( <i>M: SD</i> )	20.95	22.02
Type of Crime		
Drug Trafficking	131	57.5
Crimes Against Persons	46	20.2
Property Crimes	40	17.5
Other Crimes	11	4.8
Juridical status		
Pretrial detention	80	34.8
Sentenced	150	65.2

prison ( $n = 138$ ; 59.5%). A higher number of women had children ( $n = 191$ ; 82.3%). A higher number of inmate women ( $n = 193$ ; 83.5) reported had experienced some type of Adverse Childhood Experiences, namely physical abuse ( $n = 97$ ; 42%) and sexual abuse ( $n = 40$ ; 17.2%). The inmate women were in prison for a mean of 20.96 ( $SD = 20.02$ ) months, mostly due to drug trafficking ( $n = 131$ ; 57.5%) and were already sentenced ( $n = 150$ ; 65.2%). Table 1 describes the participants in detail.

### Measures

For this study, there were selected a set of questionnaires taking into account the objectives of the study, the constructs that they allow to measure, and their psychometric properties for the Portuguese population.

### ***Risk Behavior and Health History Assessment Survey***

This questionnaire was developed within this study and assesses information from several domains: (a) Socio-demographic information (i.e., age, country of birth, academic qualification, and number of children); (b) Clinical information (i.e., contact with health care services in the 6 months previous to imprisonment, number of chronic diseases, such as asthma, diabetes, depression, anxiety); and (c) Juridical information (i.e., duration of imprisonment and whether they had been sentenced or were on pretrial detention).

### ***Adverse Childhood Experiences (ACE) Questionnaire (Felitti et al., 1998; Silva & Maia, 2008).***

ACE Questionnaire evaluates ten different categories of adverse experiences that occurred before the age of 18, which are organized into two areas: (a) Childhood abuse (e.g., psychological, physical, and sexual abuse); and (b) Household dysfunction (e.g., a household member with mental illness, household member with substance misuse, mother treated violently, and criminal behavior in a household). ACE's total score varied from 0 (i.e., no adverse childhood experiences) to 10 (i.e., a victim of all adverse childhood experiences considered). Kappa statistics revealed the reliability of this questionnaire, both on the original (ranging between 0.46 and 0.86; Dube et al., 2004) and the Portuguese version (ranging between 0.65 and 0.86; Pinto et al., 2014).

### ***Rotterdam Symptom Checklist (RSCL) (Haes et al., 1990)***

RSCL evaluates recent health complaints on a list of 29 distress symptoms divided into two categories: (a) physical; and (b) psychological symptoms. Responses are given on a Likert 4-point scale: "not at all," "a few times," "sometimes" and "very often". The Portuguese version of RSCL presented a very good internal consistency coefficient (Cronbach's alpha) in the original validation ( $\alpha = .91$ ) (Maia et al., 2011), and good internal consistency in the present study ( $\alpha = .89$ ).

### ***Short-Form Health Survey (SF-12) (Ware et al., 1996)***

SF-12 assesses the perception of health status. There are two components: (a) Physical Component Summary (PCS), which includes subscales of physical function, physical performance, pain, and general health; and (b) Mental Component Summary (MCS), which includes subscales of vitality, social function, emotional performance, and mental health. The SF-12 scores (ranging from 0 to 100) were calculated using the Health Outcomes Scoring Software 4.0 (Quality Metric Incorporated, New York), where higher scores correspond to better perceptions of the health status. Portuguese version obtained acceptable scores of internal consistency for PCS ( $\alpha = .79$ ) and good scores for the MCS ( $\alpha = .81$ ; Pais-Ribeiro, 2005). In the present study, PCS showed acceptable scores ( $\alpha = .72$ ), whereas the MCS showed lower, but still acceptable (Field, 2013), scores of internal consistency ( $\alpha = .65$ ).

### ***Procedure***

The study took place in two of the three prisons for women in Portugal and was approved by the Ethics Committee of the General Directorate of Prison Services. From the total of 596 inmate women in the two prisons that accepted to collaborate in this study, during the recruitment period, four were released before research staff could approach them, and 71 were excluded for not meeting the inclusion criteria: (a) ability to communicate in Portuguese; (b) not hospitalized. From the remaining 521, 250 (48%) women were randomly selected, and 18 (7.2%) declined or decided to interrupt their participation during data collection. The response rate was 92.8%. Data were collected in the prison spaces, individually, in an environment of complete confidentiality, in a single moment of contact. The data was collected during the year of 2017, by two trained

psychologists, with experience in justice and forensic psychology and research. At the beginning of the meeting for data collection, the researchers explained the objectives of the study and the instructions for participation. The inmate women that agreed to participate signed the informed consent, and then the measures were applied to the participants. All ethical principles were guaranteed, namely the voluntary nature of their participation in the study and the confidentiality of the data.

### **Analysis Strategy Plan**

Data analysis was conducted using the statistical software IBM SPSS version 20 (IBM SPSS, Chicago, IL). First, descriptive analysis was performed for all variables. Secondly, linear hierarchical regression analysis, using enter method, was used to assess whether health outcomes (can be associated with sociodemographic, individual, clinical, and judicial variables. Socio-demographic variables (e.g., age, nationality, ethnicity, academic qualifications), childhood adversity, and contact with medical services before imprisonment (e.g., contact with emergency rooms and with psychiatric treatment 6 months before the imprisonment, variables were entered in the first block; clinical variables at the moment of data collection (e.g., number of chronic diseases, anxiety, and depression); judicial variables (e.g., judicial situation and duration of imprisonment) were entered in the third block. The post hoc power analysis, performed by G\*Power software (Faul et al., 2007), revealed that the sample size was satisfactory to detect medium effects on the results of the linear regression (model's effect size  $f^2 = 0.15$ ,  $p < .05$ ,  $n = 232$ , number of predictors = 15, power = .99). All statistical analyses were conducted considering a level of significance of  $\alpha = .05$ .

## **RESULTS**

In this study, we considered four health outcomes. The two components of physical health (i.e., physical distress symptoms and perception of physical health status) showed a low negative correlation ( $r = -.34$ ,  $p < .001$ ). The two measures of psychological health (i.e., psychological distress symptoms and perception of psychological health status) were modestly correlated ( $r = -.65$ ,  $p < .001$ ). Moreover, physical distress symptoms and psychological distress symptoms did not correlate significantly. As for the perceived health status, physical and psychological health perceptions presented a positive correlation ( $r = .64$ ,  $p < .001$ ).

### **Variables Associated with Physical Health Outcomes**

Table 2 presents de hierarchical linear regression model to predict physical symptoms. The final model, with the contributes of all variables, was significant and explained 60% of the variance,  $F_{(15,202)} = 14.89$ ,  $p < .001$ ,  $R^2 = .599$ . Having children,  $B = 4.23$ , 95%CI [1.38, 7.08], had experienced physical abuse during childhood,  $B = 0.89$ , 95%CI [0.18, 1.60] a higher number of self-reported chronic diseases,  $B = 1.43$ , 95%CI [1.00, 1.45] and higher levels of anxiety,  $B = 3.67$ , 95%CI [2.25, 5.09] were significantly associated with higher levels of physical symptoms.

Regarding the variables associated with self-perception of physical health status (Table 3), the final model was significant,  $F_{(1,202)} = 3.69$ ,  $p < .001$ , explaining 27% of the variance. Being younger,  $B = -0.20$ , 95%CI [-0.36, -0.04], not have experienced sexual abuse,  $B = -1.45$ , 95%CI [-2.81, -0.10], a lower number of chronic diseases,  $B = -1.21$ , 95%CI [-1.84, -0.58], were significant predictors of better self-perception of physical health status.

**Table 2.** Linear Hierarchical regression to test variables associated with physical Symptoms (RSCL).

	95%CI					95%CI					95%CI							
	B	SE	Beta	t	LL	UL	B	SE	Beta	t	LL	UL	B	SE	Beta	t	LL	UL
(Constant)	23.78	4.55		5.22**	14.78	32.77	15.17	3.38		4.49***	8.49	21.84	13.73	3.74		3.68***	6.35	21.12
Age	0.17	0.07	0.19	2.38*	0.03	0.31	0.02	0.06	0.02	0.32	-0.09	0.13	0.02	0.06	0.02	0.29	-0.10	0.13
Portuguese	2.04	1.79	0.09	1.14	-1.49	5.57	2.33	1.29	0.10	1.80	-0.22	4.88	2.12	1.32	0.09	1.61	-0.48	4.72
> Nine grade or higher	-3.15	1.52	-0.16	-2.08	-6.14	-0.15	-2.13	1.10	-0.11	-1.94	-4.29	0.04	-2.09	1.10	-0.11	-1.90	-4.27	0.08
Have Children	2.81	2.00	0.11	1.40	-1.14	6.76	4.19	1.44	0.16	2.92*	1.35	7.02	4.23	1.44	0.16	2.93*	1.38	7.08
Physical Abuse	0.25	0.49	0.04	0.50	0.72	1.22	0.90	0.36	0.14	2.49*	0.19	1.60	0.89	0.36	0.14	2.47*	0.18	1.60
Sexual Abuse	1.92	0.62	0.23	3.11**	0.70	3.14	0.66	0.46	0.08	1.42	-0.26	1.58	0.60	0.47	0.07	1.27	-0.33	1.53
Drug use	-0.10	1.54	-0.01	-0.06	-3.14	2.95	2.27	1.17	0.12	1.94	-0.04	4.58	2.26	1.20	0.12	1.89	-0.11	4.63
Alcohol consumption	1.06	2.08	0.04	0.51	-3.05	5.17	1.21	1.49	0.05	0.81	-1.73	4.16	1.17	1.50	0.04	0.78	-1.80	4.13
Contact emergency services	2.70	1.43	0.14	1.89	-0.12	5.53	0.12	1.05	0.01	0.11	-1.95	2.19	0.14	1.05	0.01	0.13	-1.94	2.22
Contact with psychiatric services	0.00	0.00	-0.02	-0.28	0.00	0.00	0.00	0.00	0.07	1.28	0.00	0.00	0.00	0.00	0.07	1.30	0.00	0.00
Number of chronic diseases							1.41	0.22	0.41	6.59***	0.99	1.84	1.43	0.22	0.42	6.57***	1.00	1.85
Depression							1.10	0.70	0.12	1.58	-0.27	2.48	1.13	0.71	0.12	1.60	-0.27	2.54
Anxiety							3.77	0.71	0.38	5.34***	2.37	5.16	3.67	0.72	0.37	5.10***	2.25	5.09
Sentenced													1.09	1.21	0.05	0.91	-1.29	3.48
Duration of imprisonment													0.01	0.03	0.03	0.50	-0.04	0.06
F (df)													17.08 (13,204)***			14.89 (15,202)***		
R <sup>2</sup> (ΔR <sup>2</sup> )													.598 (.409***)			.60 (.002)		

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





### **Variables Associated With Psychological Health Outcomes**

Regarding to psychological distress symptoms, the final model is significant,  $F_{(15,202)} = 20.65$ ,  $p < .001$ , explaining 67% of the variance. Drug use prior incarceration,  $B = 2.28$ , 95%CI [0.46, 4.10], higher number of chronic diseases,  $B = 0.59$ , 95%CI [0.26, 0.92], higher levels of depression,  $B = 2.32$ , 95%CI [1.25, 3.40], higher levels of anxiety,  $B = 4.23$ , 95%CI [3.14, 5.32], were independently associated with higher levels of psychological distress symptoms (Table 4).

Regarding perception of mental/psychological health status, the final model is significant,  $F_{(15,202)} = 11.10$ ,  $p < .001$  and explained 53% of the variance. Higher levels of academic qualifications,  $B = 3.90$ , 95%CI [0.70, 7.10], not had experienced sexual abuse,  $B = -1.35$ , 95%CI [-2.72; -0.01], contact with psychiatric services,  $B = 0.01$ , 95%CI [0.00, 0.01], lower levels of anxiety,  $B = -5.60$ , 95%CI [-7.69, -3.51], lower levels of depression,  $B = -4.74$ , 95%CI [-6.80, -2.68], and being already sentenced,  $B = 3.43$ , 95%CI [0.07, 6.94] were significantly associated with better perception of mental/psychological health status (Table 5).

## **DISCUSSION**

The main objective of this study was to understand the variables associated with the health status of inmate women in Portugal. To achieve this goal, we assessed objective symptoms (physical and psychological) and health perceptions of inmate women. The results allowed us to conclude that there is a set of different combinations of individual, behavioral, clinical, and judicial variables that contribute either to the symptomatology or to their health perceptions.

Regarding physical symptoms, having children, a higher number of chronic diseases and anxiety added a significant contribution to the prediction of physical symptoms. In our sample, motherhood was related to higher scores of physical symptoms. Considering that the majority of these mothers also used to be the primary caregivers of their children, the separation of mother-child during incarceration might result in critical consequences for the family dynamic (World Health Organization Regional Office for Europe, 2009) and very stressful for these women (Moloney et al., 2009). Furthermore, also the experience of physical abuse and a higher number of chronic diseases were, in a predictable way related to more physical symptoms. Effectively, prior studies had already concluded about the higher odds of chronic diseases in inmate women compared with the general population (Binswanger et al., 2009; Swartz, 2011). Some studies have shown that the experience of physical abuse results in physiological changes that likely contribute to increased risk of health, being associated with pain-related dysfunction, chronic pain, and many medical conditions and mental health problems (Kolko & Berkout, 2017). The development of chronic diseases may be related to pre-prison conditions, namely related to a possible structural vulnerability related to poverty, risk behaviors, and difficulty in accessing health services. Also, the anxiety related to the prison context and the removal of children could contribute to the exacerbation of chronic diseases.

Concerning the self-perception of physical health status, similar to previous research, older participants presented the worst perceptions of physical health status (Lindquist & Lindquist, 1999; Williams et al., 2006), as well as chronic diseases, as discussed previously. An important result of this study is related to the impact of sexual victimization in childhood as a predictor of health perception. The association between exposure to adversity and trauma and physical health has been studied from several potential health indicators, namely health complaints, health risk behaviors, use of health services, morbidity, and mortality (e.g., Schnurr, 2017).

Regarding psychological symptoms, drug use, the number of chronic diseases, anxiety, and depression added significant independent contributions. Drug use is a frequent risk behavior reported by inmate women (e.g., van den Bergh et al., 2014). The association between drug use and psychological symptoms may be related to a set of other factors, namely a response to

**Table 4.** Linear Hierarchical regression to test variables associated with psychological symptoms (RSCL).

	95%CI				95%CI				95%CI									
	B	SE	Beta	t	LL	UL	B	SE	Beta	t	LL	UL	B	SE	Beta	t	LL	UL
(Constant)	26.72	4.10		6.52***	18.62	34.82	15.98	2.60		6.14***	10.84	21.11	16.06	2.87		5.60***	10.40	21.73
Age	0.07	0.07	0.09	1.11	-0.06	0.20	0.01	0.04	0.01	0.16	-0.08	0.09	0.01	0.04	0.02	0.32	-0.07	0.10
Portuguese	0.61	1.61	0.03	0.38	-2.57	3.79	1.29	0.99	0.06	1.29	-0.68	3.25	1.27	1.01	0.06	1.26	-0.73	3.26
Nine grade or higher	-1.31	1.36	-0.08	-0.96	-4.01	1.38	-0.63	0.84	-0.04	-0.75	-2.30	1.04	-0.60	0.85	-0.04	-0.71	-2.27	1.07
Have Children	0.64	1.80	0.03	0.36	-2.92	4.20	1.74	1.11	0.08	1.58	-0.44	3.93	1.69	1.11	0.08	1.53	-0.50	3.88
Physical Abuse	-0.02	0.44	0.00	-0.06	-0.90	0.85	-0.45	0.28	-0.08	-1.63	-1.00	0.10	-0.46	0.28	-0.08	-1.66	-1.01	0.09
Sexual Abuse	0.97	0.56	0.14	1.74	-0.13	2.07	-0.49	0.36	-0.07	-1.36	-1.19	0.22	-0.48	0.36	-0.07	-1.32	-1.19	0.24
Drug use	-0.21	1.39	-0.01	-0.15	-2.95	2.53	2.54	0.90	0.15	2.82**	0.76	4.31	2.28	0.92	0.14	2.48**	0.46	4.10
Alcohol consumption	-1.09	1.88	-0.05	-0.58	-4.79	2.62	-1.01	1.15	-0.04	-0.88	-3.28	1.26	-0.92	1.15	-0.04	-0.80	-3.20	1.35
Contact with emergency services	2.99	1.29	0.18	2.32*	0.45	5.53	0.21	0.81	0.01	0.26	-1.38	1.81	0.19	0.81	0.01	0.23	-1.41	1.79
Contact with psychiatric services	0.00	0.00	-0.09	-1.20	-0.01	0.00	0.00	0.00	-0.02	-0.46	0.00	0.00	0.00	0.00	-0.02	-0.42	0.00	0.00
Number of chronic diseases					0.57	0.17	0.20	0.17	0.20	3.44***	0.24	0.90	0.59	0.17	0.20	3.55***	0.26	0.92
Depression					2.45	0.54	0.30	0.54	0.30	4.58***	1.39	3.51	2.32	0.55	0.29	4.27***	1.25	3.40
Anxiety					4.17	0.54	0.50	0.54	0.50	7.67***	3.10	5.24	4.23	0.55	0.51	7.67***	3.14	5.32
Sentenced													0.19	0.93	0.01	0.21	-1.64	2.02
Duration of imprisonment													-0.02	0.02	-0.06	-1.12	-0.06	0.02
F (df)			1.53	(10,207)						23.39	(13,204)***					20.65	(15,202)***	
R <sup>2</sup> (ΔR <sup>2</sup> )			.09							.67	(.58***)					.674	(.004)	

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



traumatic experiences during life. A higher number of inmate women in this report had experienced adverse childhood experiences (more than three on average). The scientific knowledge in the area of trauma has shown the existence of high comorbidity between symptoms of anxiety, depression, and substance use after exposure to trauma (Najavits et al., 2017).

The model that explains psychological well-being perception is more complex, with the contribution of several variables, namely individual variables (lower levels of education and having experienced sexual abuse), clinical variables (not had access to mental health services, anxiety, and depression) and judicial variables (being sentenced). As suggested in previous studies, the inmate female population is characterized by a high prevalence of victimization experiences and mental health problems. Also, the distress that imprisonment causes to women, may lead to mental health problems or exacerbate existing mental disabilities (UNODC, 2014). Being sentenced could be related to better perceptions once there is a sense of predictability in life. The process of waiting for the sentence could generate uncertainty about the future is highly distressing for the inmates and has an impact on their mental wellbeing (Moreira, 2008; Pinheiro & Cardoso, 2012).

Whether on physical or psychological health outcomes, data shows that self-reported distress symptoms and perception of health status have different predictors, which shows the importance of studying them separately, and planning interventions for these two distinct factors. Our results showed that traumatic experiences during childhood, chronic diseases, anxiety, and depression present an important role in almost all outcomes. The relationship between trauma, chronic diseases and psychological symptoms is well established in the literature, with results suggesting a bidirectional association between chronic diseases and psychopathological factors, that might lead to an exacerbation of both conditions (e.g., Conversano, 2019). Also, the studies have documented the high prevalence of mental health disorders in prisons (e.g., Zabala-Banos et al., 2016), with women reporting a higher prevalence (e.g., Tyler et al., 2019). Our results reinforce the need for an integrated approach in prison between physical symptoms, psychological symptoms, and psychopathology, as suggested by Conversano (2019) which takes into account the subjective experience of single women from a lifetime perspective.

Therefore, albeit the regression models were statistically significant, the predictors of inmates' perception of health status should be further explored, namely through more integrative structural equation modeling (SEM). This study aimed to understand which variables contribute to the health status of inmate women. Although the models explained a significant percentage of the health outcomes' variance, there is still a large variance that remains unexplained, especially in the perception of health status. Accordingly, we suggest that future studies focus on variables related to psychological health and well-being. On the other hand, cross-sectional designs do not allow for to conclusion of cause-and-effect relationships, and longitudinal designs should be used in future studies to further explore these relationships. Qualitative studies could help to analyze deeply the experiences of inmate women and their health status.

Finally, our understanding of how juridical variables affects women prisoners' health is scarce. Our data showed only that being sentenced revealed itself as a significant predictor of psychological self-perception of health status. These findings demonstrate the importance of considering juridical variables in prison policy and raise the necessity of studying this topic in future research on the health of inmate women.

Due to issues concerning the internal functioning of the prison establishments involved in the study, we were granted access to only about 50% of the population of inmate women in Portugal. Thus, the reduced number of participants represents a limitation of our study. However, given the high response rate (92.8%) we obtained a sufficient sample size to carry out the regression analyses. Another limitation due to restrictions imposed by prisons was the fact that we did not have access to the sociodemographic characteristics of women who did not participate in the study to verify the representativeness of our sample. However, the sociodemographic characteristics of the participants in this study are equivalent to the characteristics of the female prison

population in Portugal, according to the data of the General Directorate of Prison Services (2020). Finally, it is important to note the limitation of the use of self-report measures and the lack of other measures to validate the answers obtained, though there is no evidence to show that women prisoners have less reliable reports than the general population (Plugge et al., 2009).

## CONCLUSIONS AND PRACTICAL IMPLICATIONS

The results of this study point out inmate women with a history of trauma, comorbid diagnoses of chronic diseases as a subpopulation to which greater attention should be given in terms of health care since they tend to present more physical and emotional symptoms, namely anxiety and depression, and present a worse perception of their general health status. Khavjou et al. (2007) emphasize the importance of implementing programs to promote health and prevent chronic diseases in prisons, taking advantage of the moment of imprisonment for the diagnosis and implementation of appropriate treatments, and the need for continuity of health monitoring after release.

The essential focus of prison health policies was, for several decades, directed toward infectious diseases, however, the prevalence of chronic diseases has increased substantially (Maruschak et al., 2015), essentially due to the aging of the prison population (Wahidin, 2011), requiring a change in the approach to health (Wang et al. 2014). Thus, given the high prevalence of chronic diseases in prisons and their impact in terms of increased symptoms and a worse general perception of health, there is a need for interventions in the health field to adjust to this reality, allowing for adequate treatment plans, the creation of strategies to deal with the disease and its impact on daily life. This will allow an effective adaptation to the state of health, successful management of the pathology and the consequent quality of life, and enhancement of posterior social reintegration.

## DISCLOSURE STATEMENT

No potential conflict of interest was reported by the author(s).

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