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COVID-19 Fears and Preventive Behaviors among Prison Staff

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ABSTRACT

This study focused on COVID-19 preventive behaviors and fears among prison staff members after the first wave of the pandemic. Cross-sectional data from 171 participants were collected in Switzerland. The level of fears (58.5%) and protective behaviors (100%) were high. Correctional officers adhered less to preventive measures than other staff members ($p = .001$). Fears were related to a reduction of social contacts ($p = .006$) and worries about physical health was related to preventive behaviors in general ($p = .006$). There is a need to raise prison staff awareness regarding their vulnerability to the SARS-CoV-2 in order to improve the effectiveness of health campaigns in prison settings. Special attention should be given to correctional officers.

KEYWORDS

COVID-19; prison staff; fears; preventive behaviors; Switzerland

Introduction

Adherence to preventive measures is necessary for the containment of viruses like the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2; Ahmed et al., 2018; Jefferson et al., 2010; J  ni et al., 2020). Although high levels of compliance have been observed among the general population (Kuiper et al., 2020; Sabat et al., 2020; Shahnazi et al., 2020) and workers with direct contact with the public like healthcare providers (Ejeh et al., 2021; Tien et al., 2021), little is known on the prevalence of preventive behaviors among prison staff. However, prisons have been described as SARS-CoV-2 transmission hotspots, because they are environments characterized by overcrowding, poor ventilation, and unsanitary conditions (Montoya-Barthelemy et al., 2020). Furthermore, detained persons are generally at increased risk for severe disease because of their high prevalence of risk factors (e.g., hypertension, cardiovascular, and respiratory disease, obesity) and limited access to

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healthcare (Da Costa et al., 2021; Goncalves et al., 2021; Lemasters et al., 2020; Murdoch, 2020). In the US, by June 2020, the SARS-CoV-2 case rate among prisoners was 5.5 times higher than in the general population (Saloner et al., 2020). Nevertheless, preventive measures can substantially reduce the incidence of new cases in prison settings (Malloy et al., 2020).

To protect people living and working in places of detention, the World Health Organization (2020a) and the Centers for Disease Control Prevention (2020) provided guidelines to prevent SARS-CoV-2 transmission. Recommended policies included reducing the prison population (e.g., pardoning, suspending, or delaying prison sentences, early release on parole), restrictive measures (e.g., suspending visits, leaves, and group activities), sanitary measures (e.g., regular disinfection, protective equipment), physical distancing (e.g., self-isolation, quarantine), testing, and, more recently, vaccination (Braithwaite et al., 2021; Cirlig et al., 2020; Murdoch, 2020; Pandey, 2021). At the same time, the fundamental rights of detained persons during the pandemic had to be respected. For instance, restrictions on contact with the outside world had to be compensated for by increased access to alternative means of communication (e.g., telephone and video calls; European Committee for the Prevention of Torture and Inhuman or Degrading Treatment or Punishment, 2020).

Despite such measures, prison staff are a major threat for the introduction of the SARS-CoV-2 in places of detention because they leave and return to the facility frequently (Da Costa et al., 2021). Indeed, most prisons identified their first COVID-19 case among staff members (Hagan et al., 2020). Therefore, it is important to document preventive behaviors among persons working in prison settings, and identify subgroups of persons who may comply more (or less) with the recommended measures. Prior research evidenced that older persons, women, and persons with preexisting health issues tend to comply more with preventive measures (Bacon & Corr, 2020; Bodas & Peleg, 2020; Brouard et al., 2020; Kuiper et al., 2020; Lauri Korajlija & Jokic-Begic, 2020; Nivette et al., 2021; Norman et al., 2020; Ozdemir et al., 2020; Park et al., 2020; Pollak et al., 2021; Roma et al., 2020; Shahnazi et al., 2020; Tomczyk et al., 2020). Furthermore, healthcare providers seem to adhere more to preventive behaviors than other professionals do, probably because of the conditions they work in (Assefa et al., 2021; Haque et al., 2020; Kabasakal et al., 2021). Although this might be the case of prison staff too, to date, knowledge on preventive behaviors among prison workers is lacking.

In addition to socio-demographic and clinical characteristics, cognitive factors can influence adherence to preventive behaviors. A common reaction during pandemics is fear, namely fear of its impact on one's health, family, safety, relationships, and finances (Lauri Korajlija & Jokic-Begic, 2020; Van Bavel et al., 2020). Many studies worldwide evidenced that fear, perceived risk, and concerns about safety caused by the SARS-CoV-2 are positively associated with actual or intended engagement in preventive behaviors (Bacon & Corr, 2020; Bodas & Peleg, 2020; Dryhurst et al., 2020; Eno Loudon et al., 2020; Harper et al., 2020; Kuiper et al., 2020; Marinthe et al., 2020; Niepel et al., 2020; Ozdemir et al., 2020; Pakpour & Griffiths, 2020; Pollak et al., 2021; Rubaltelli et al., 2020; Seale et al., 2020; Webster et al., 2020), including washing hands, wearing face masks, and practicing physical distancing. This association has been observed in prior pandemics (Ferrer & Klein, 2015; Leppin & Aro, 2009; Lin et al., 2014) but, to our knowledge, it has never been tested among prison staff.

Fears of the SARS-CoV-2 impact may have a functional role, acting as a motivational factor to adopt preventive behaviors (Harper et al., 2020; Pakpour & Griffiths, 2020). According to the Protection Motivation Theory (Rogers, 1975) – a model to explain decision-making and action about health behaviors – people engage in positive health behaviors when they perceive a threat as severe and feel vulnerable. They react by adopting health behaviors to reduce the threat, when they believe they have the required capabilities. People with a higher level of fear of the SARS-CoV-2 impact may therefore follow the restrictions and protective measures imposed by the government more closely (Rubaltelli et al., 2020). However, fears may also have a maladaptive function, resulting in feelings of helplessness that can lead to defensive reactions rather than active coping (Leppin & Aro, 2009; Witte & Allen, 2000). Furthermore, high levels of fears can be detrimental for mental health, potentially causing symptoms of anxiety, stress, and depression, among other problems (Fitzpatrick et al., 2020; Koçak et al., 2021).

Arguably, prison staff may fear more the SARS-CoV-2 impact than other groups of professionals. First, prison staff are exposed daily to a high-risk population, endangering their own life (Alexander, Allo & Klukoff, 2020; Oladeru et al., 2020; Seal, 2020). Second, they are responsible to preserve the health and safety of detained persons, which are a vulnerable group (CPT, 2020; Montoya-Barthelemy et al., 2020; Tsoungui Obama et al., 2021). Third, it is difficult to implement certain preventive measures (e.g., distancing) in prisons due to inherent limitations within their structure and function (Novisky et al., 2020). Since prison staff are essential workers (to ensure the continuity of critical functions and services in the country), understanding and addressing their fears regarding the SARS-CoV-2 impact is important to maintain adequate services for persons living in places of detention during the pandemic.

To address the outlined gaps in knowledge, the present study aimed to provide empirical evidence on prison staff adoption of COVID-19 preventive behaviors and the prevalence of fears regarding the virus's impact on people's health and livelihood (including their own) during the first wave of the pandemic in Switzerland. Specifically, we aimed to (1) quantify the proportion of staff who (a) were afraid of the pandemic impact and (b) adopted preventive behaviors; (2) identify socio-demographic and clinical characteristics associated with fears and preventive behaviors; and (3) test the association between fears of the pandemic impact and preventive behaviors among prison staff. We hypothesized that: (H1) the majority of prison staff would have fears related to the SARS-CoV-2 impact and would have adopted preventive behaviors; (H2) socio-demographic (e.g., age) and clinical characteristics (e.g., health issues) would be associated with a higher level of fears and preventive behaviors; and that (H3) fears of the pandemic impact would be positively associated with preventive behaviors. Despite the increasing rate of vaccinated persons, these questions remain relevant attending to the successive waves of the pandemic, vaccine hesitancy, and exposure to variants of the virus potentially more contagious.

Methods

Research context

Data for this study were collected at the Champ-Dollon prison (a penitentiary institution intended for the confinement of people in preventive detention but that also accommodates convicted persons), canton of Geneva, between June and August 2020. The research site is the most populated prison in Switzerland (on average, 655 detainees in 2019). The conditions of detention include overcrowding (on average, 175% between 2013 and 2018), the mix of persons with different needs (e.g., pre-trial and sentenced, males and females, young and adults) and violence (CPT, 2012, 2016). Staff (349 persons in 2020) is short to deal with these problems, which has resulted in manifestations from correctional officers, absenteeism, and working overtime (Guigon, 2017; Guinand, 2018). Overturning is also high, with about 650 persons entering the institutions each day. In March 2020, to prevent a SARS-CoV-2 outbreak, incarcerations were reduced and preventive measures were put in place (Wolff & Gétaz, 2020). At that time, Switzerland was one of the countries with the highest number of reported SARS-CoV-2 cases per capita (Salathé et al., 2020). Public health recommendations were introduced on February 28, 2020, and, between March 16 and April 26, 2020, the country was in lockdown (Federal Office of Public Health, 2020a). Information regarding preventive measures was widely disseminated by the government (Nivette et al., 2021). During the spring 2020, the average seropositivity rate among essential workers in Geneva was 9.8% – slightly higher than in the general working-age population – but varied widely across sectors, facilities, and occupations, nursing home workers being the most affected (14.3%; see, Stringhini et al., 2021).

Procedure

Data were collected through a paper survey developed for and utilized as part of a larger study on the prevalence of anti-SARS-CoV-2 antibodies among essential workers in the canton of Geneva (see, Stringhini et al., 2021). It includes questions on socio-demographic characteristics (e.g., age, sex, education, and profession), clinical information (e.g., COVID-19 symptoms, testing, and infection), perceptions on the pandemic and preventive measures, and adoption of preventive behaviors. The original survey and the dataset are available in French on request from the corresponding author.

All staff members of the Champ-Dollon prison (i.e., correctional officers, administrative staff, interns, and persons with management functions) excluding medical staff were informed about the research objectives via e-mail and requested to voluntarily participate in the study. All were informed that their participation or refusal would not have any impact in their working relationships. The response rate was 50.4%. Staff who accepted to participate signed a written informed consent form, answered the self-report questionnaire individually, and were invited to make a serological COVID-19 test. This procedure took place during working hours or a working break. The research team clarified the questions in which prison staff had doubts. The Cantonal Research Ethics Commission of Geneva, Switzerland, approved the study protocol (no. 2020-00881).

Variables

Covariates

The present study includes eight socio-demographic and clinical variables, chosen based on the findings of prior research and their availability in the survey. *Socio-demographic* variables included age (in years), sex (0 = female, 1 = male), education (0 = primary/secondary, 1 = tertiary), and profession (0 = not correctional officer, 1 = correctional officer; i.e., law enforcement officials responsible for the surveillance and regulation of detained persons). *Clinical* variables included vulnerability to severe COVID-19 (0 = no, 1 = yes; including age ≥ 60 , cancer, diabetes, hypertension, cardiovascular disease, respiratory disease, and BMI ≥ 30 , as defined by the World Health Organization, 2020b and the Federal Office of Public Health, 2020b), the number of symptoms compatible with COVID-19 prison staff had since the pandemic (count variable; including fever, temperature $\geq 38^{\circ}\text{C}$, dry cough, sputum, coughing up blood, runny/stuffy nose, sneezing, sore throat, shortness of breath, difficulty breathing, headache, muscle/joint pain, chest pain, fatigue/exhaustion, loss of appetite, nausea/vomiting, diarrhea, stomach pain, loss of smell/taste, and itchy/watery eyes, as defined by the Geneva University Hospitals), having family members infected by the SARS-CoV-2 (0 = no, 1 = yes), and the result of the antibody SARS-CoV-2 test (i.e., EUROIMMUN Anti-SARS-CoV-2 ELISA [IgG]) made for the purposes of this study (0 = negative, 1 = positive), where results >1.1 are considered indicative of infection (see, Beavis et al., 2020).

Fears

Fears comprise worries about the COVID-19 impact on eight areas. These include fears regarding one's (1) own physical health, (2) the physical health of relatives, (3) own mental health, (4) the mental health of relatives, (5) own economic/professional situation, (6) the economic/professional situation of relatives, (7) the economic situation in Switzerland, and (8) the family situation/personal relationships. The questions were introduced as "Are you worried about the possible impact of a future COVID-19 wave in the following areas: (e.g., Your own physical health)" and answered in a "yes" or "no" format. One item was removed (own financial situation) because it reduced the reliability of the scale. These indicators had high internal consistency (α [Cronbach's alpha] = .82) and were combined into a total score (i.e., the total number of fears; ranging from 0 to 8) where higher values represent a higher level of fears regarding the pandemic impact. In addition to this count variable, the proportion of prison staff with any fear of the pandemic was generated (i.e., scores > 0 were coded as 1 and 0 otherwise).

Preventive behaviors

Preventive behaviors comprise nine measures adopted by prison staff at work and in their personal life. These include (1) mask wearing (0 = not always, 1 = always), (2) hands disinfecting (0 = not always, 1 = always), (3) distance keeping (not frequently/always, 1 = frequently/always; i.e., 2 m), (4) other protective measures (0 = no, 1 = yes; e.g., using gloves or protective visors), (5) not taking public transports to work (0 = no, 1 = yes), (6) reduction of social contacts (0 = no, 1 = yes), (7) not traveling abroad (0 = no, 1 = yes; since January 2020), (8) having been in confinement (0 = no, 1 = yes; i.e., teleworking or cessation of professional activity, since March 2020), and (9) having made a SARS-CoV-2 test (independently of the result) prior to the serological test taken for this study (0 = no, 1 = yes). Tests were free and easily accessible for

all prison staff, who had been instructed to take a test when having symptoms compatible with the SARS-CoV-2, especially fever, cough, and tiredness. Questions 1 to 3 were originally measured on a 5-point Likert scale (i.e., never, rarely, occasionally, frequently, and always) but later dichotomized due to the non-normal distribution of the results. These questions were introduced as “Do your working conditions allow you to follow the recommendations of the FOPH: (e.g., To ensure a distance of 2 m from the people with whom you have direct contact?).” Questions 4 to 9 were dichotomous (“yes” or “no”) and introduced as “Since the COVID-19 epidemic, did you: (e.g., Reduced the number of people you meet in your daily life?).” The association between these different behaviors was low ($\alpha = .28$). Variables representing the prevalence (0 or 1) and total number of adopted behaviors (range 0 to 9) were generated.

Analyses

The statistical analyses were conducted using the software Stata 15.0 (Stata Corp, 2017). To address the first research objective, we calculated the proportion and 95% confidence intervals (CI) of prison staff who feared the COVID-19 impact as well as who adopted preventive behaviors. To answer the second objective, fears and preventive behaviors were regressed on the study covariates and, for the third objective, preventive behaviors were regressed on fears of the pandemic. Bivariable and multivariable analyses were performed. Logistic regressions were used for specific fears and behaviors (dichotomous variables) and negative binomial regressions with robust standard errors were used for the total number of fears and preventive behaviors (count variables). Missing data were not imputed. All regression results are presented in terms of unstandardized coefficients (*b*) and their associated CIs. Statistical significance was set at $p < .005$.

Results

Sample

The sample includes 171 participants aged between 24 and 63 years ($Mean = 38.4$, $SD = 8.0$). Most (82.5%, $n = 141$) were male and worked as correctional officers (80.0%, $n = 128$). Only 16.0% ($n = 27$) had a tertiary education. At the clinical level, 24.2% ($n = 40$) had a vulnerability to severe COVID-19 and 69.0% ($n = 118$) have had symptoms compatible with the disease ($Mean = 4.0$, $SD = 3.9$, range 0–15). Among the antibody SARS-CoV-2 tests made for this study, the seropositivity rate was 4.1% (7 positives out of 170 tests). The full descriptive characteristics of the sample are presented in [Table 1](#).

Prevalence of fears and preventive behaviors

At the time of this study, the majority of prison staff (58.5%, 95% CI [51.0, 65.9]; $n = 100$) reported to have fears regarding the impact of the SARS-CoV-2 virus in general ($Mean = 2.2$, $SD = 2.3$, $Min = 0$, $Max = 8$). The physical health of relatives was their major worry (50.3%, $n = 86$). Their own economic/professional situation (11.7%, $n = 20$) and own mental health (15.8%, $n = 27$) were the areas of least concern (see, [Table 1](#)).

Table 1. Descriptive characteristics of the sample.

Variables	<i>N</i>	<i>M</i> /%	<i>SD</i> / <i>n</i>	Min	Max
Covariates					
Age	167	38.4	8.0	24	63
Male	171	82.5	141	0	1
Tertiary education	169	16.0	27	0	1
Correctional Officer	161	80.0	128	0	1
COVID-19 vulnerability	165	24.2	40	0	1
COVID-19 symptoms	171	4.0	3.9	0	15
Infected family member(s)	167	8.4	14	0	1
Positive COVID-19 test result	170	4.1	7	0	1
Fears (total number)	171	2.2	2.3	0	8
Fears (proportion)	171	58.5	100	0	1
Own physical health	171	31.6	54	0	1
Physical health of relatives	171	50.3	86	0	1
Own mental health	171	15.8	27	0	1
Mental health of relatives	171	30.4	52	0	1
Own economic/professional situation	171	11.7	20	0	1
Economic/professional situation of relatives	171	24.0	41	0	1
Economic situation in Switzerland	171	29.8	51	0	1
Family situation/personal relationships	171	25.2	43	0	1
Preventive behaviors (total number)	164	5.2	1.3	2	9
Preventive behaviors (proportion)	164	100	171	1	1
Mask wearing	168	75.6	127	0	1
Hands disinfecting	167	72.5	121	0	1
Distance keeping	168	38.1	64	0	1
Other protective measures	168	27.4	46	0	1
Not taking public transport to work	171	94.2	161	0	1
Reduction of social contacts	168	89.3	150	0	1
Not traveling abroad	168	67.9	114	0	1
Confinement	168	37.5	63	0	1
Prior COVID-19 test	167	15.0	25	0	1

N = total sample size, *M* = mean, *SD* = standard deviation, *n* = partial sample size, Min = minimum, Max = maximum.

In addition, all prison staff (100%, *n* = 164 [1, 1]) reported to adopt SARS-CoV-2 preventive behaviors permanently (*Mean* = 5.2, *SD* = 1.3, Min = 2, Max = 9). The most frequently reported preventive measures were not taking public transports (94.2%, *n* = 161) and reduction of social contacts (89.3%, *n* = 150). Testing was the measure least frequently reported (15.0%, *n* = 25; see, Table 1).

Characteristic associated with fears and preventive behaviors

The regressions analyzing covariates of COVID-19 fears and preventive behaviors are presented in Table 2. In bivariable analyses, no study variable was associated with fears of the pandemic impact. On the other hand, correctional officers appeared to adopt a lower number of preventive behaviors (*Mean* = 5.0 vs 5.9) compared to other staff members ($b = -0.16 [-0.26, -0.07]$, $p = .001$). Particularly, they were less likely to keep the 2 m distance at work ($b = -1.75 [-3.30, -0.20]$, $p = .027$) and to have been in confinement ($b = -2.23 [-3.13, -1.35]$, $p < .001$). However, they avoided more taking public transports to work ($b = 2.42 [1.00, 3.83]$, $p = .001$). In multivariable analyses, entering all study covariates in the regression model at the same time, the association between profession and preventive behaviors was only marginally significant ($b = -0.12 [-0.25, 0.02]$, $p = .091$).

Table 2. Socio-demographic and clinical characteristics associated with fears of the pandemic impact and preventive behaviors.

Bivariable analyses						
Covariate	Fears (total)			Preventive behaviors (total)		
	<i>b</i>	95% CI	<i>p</i>	<i>b</i>	95% CI	<i>p</i>
Age	-0.01	[-0.03, 0.01]	.604	0.00	[-0.00, 0.01]	.082
Male	-0.03	[-0.42, 0.37]	.899	-0.09	[-0.17, 0.00]	.055
Tertiary education	0.12	[-0.33, 0.57]	.600	0.09	[-0.03, 0.21]	.127
Correctional officer	-0.05	[-0.41, 0.31]	.780	-0.16	[-0.26, -0.07]	.001
Vulnerability	0.12	[-0.27, 0.50]	.552	0.04	[-0.05, 0.14]	.378
Symptoms	0.01	[-0.03, 0.06]	.599	-0.00	[-0.01, 0.01]	.934
Infected family	-0.27	[-0.97, 0.44]	.463	-0.10	[-0.29, 0.09]	.291
Positive test	-1.15	[-2.60, 0.30]	.120	0.08	[-0.17, 0.33]	.533
Multivariable analyses						
Covariate	Fears (total)			Preventive behaviors (total)		
	<i>b</i>	95% CI	<i>p</i>	<i>b</i>	95% CI	<i>p</i>
Age	-0.01	[-0.04, 0.01]	.266	0.00	[-0.01, 0.01]	.830
Male	0.25	[-0.20, 0.70]	.270	-0.07	[-0.17, 0.03]	.181
Tertiary education	0.09	[-0.40, 0.58]	.710	0.04	[-0.11, 0.19]	.601
Correctional officer	-0.27	[-0.75, 0.21]	.264	-0.12	[-0.25, 0.02]	.091
Vulnerability	0.18	[-0.26, 0.62]	.416	0.01	[-0.09, 0.12]	.774
Symptoms	0.01	[-0.04, 0.05]	.790	0.00	[-0.01, 0.01]	.711
Infected family	-0.11	[-0.81, 0.59]	.750	-0.09	[-0.29, 0.12]	.419
Positive test	-1.14	[-2.37, 0.08]	.067	0.15	[-0.07, 0.36]	.185

b = unstandardized regression coefficient, CI = confidence interval, *p* = statistical significance. *N* ranges between 161 and 171 in bivariable analyses. In the multivariable analyses, *N* = 151 and 148 for fears and preventive behaviors, respectively.

Table 3. Bivariable association between fears of the pandemic impact and preventive behaviors.

Outcome	Fears (total)		
	<i>b</i>	95% CI	<i>p</i>
Preventive behaviors (total)	0.01	[-0.01, 0.03]	.318
Mask wearing	-0.05	[-0.20, 0.10]	.499
Hands disinfecting	0.04	[-0.11, 0.19]	.600
Distance keeping	-0.01	[-0.15, 0.12]	.865
Other protective measures	0.01	[-0.14, 0.15]	.905
Not taking public transport to work	0.06	[-0.23, 0.35]	.687
Reduction of social contacts	0.62	[0.20, 1.05]	.004
Not traveling abroad	-0.06	[-0.20, 0.08]	.402
Confinement	0.10	[-0.04, 0.23]	.156
COVID-19 test	0.06	[-0.12, 0.23]	.530
Predictor	Preventive behaviors (total)		
	<i>b</i>	95% CI	<i>p</i>
Own physical health	0.10	[0.01, 0.18]	.020
Physical health of relatives	0.04	[-0.04, 0.12]	.286
Own mental health	0.06	[-0.06, 0.18]	.316
Mental health of relatives	-0.01	[-0.10, 0.08]	.801
Own economic/professional situation	-0.02	[-0.16, 0.13]	.818
Economic/professional situation of relatives	-0.01	[-0.10, 0.09]	.869
Economic situation in Switzerland	0.01	[-0.08, 0.10]	.793
Family situation/personal relationships	0.07	[-0.02, 0.16]	.124

b = unstandardized regression coefficient, CI = confidence interval, *p* = statistical significance. *N* ranges between 153 and 171.

Table 4. Association between fears of the pandemic impact and preventive behaviors controlling for socio-demographic and clinical characteristics.

Fears (total)			
Outcome	<i>b</i>	95% CI	<i>p</i>
Preventive behaviors (total)	0.02	[0.00, 0.04]	.132
Mask wearing	0.04	[-0.21, 0.12]	.620
Hands disinfecting	0.10	[-0.07, 0.27]	.248
Distance keeping	0.04	[-0.12, 0.20]	.592
Other protective measures	0.00	[-0.16, 0.16]	.995
Not taking public transport to work	0.16	[-0.22, 0.54]	.412
Reduction of social contacts	0.63	[0.18, 1.09]	.006
Not traveling abroad	0.08	[-0.24, 0.07]	.293
Confinement	0.12	[-0.05, 0.29]	.161
COVID-19 test	0.17	[-0.05, 0.39]	.130

Preventive behaviors (total)			
Predictor	<i>b</i>	95% CI	<i>p</i>
Own physical health	0.12	[0.03, 0.21]	.006
Physical health of relatives	0.06	[-0.03, 0.15]	.165
Own mental health	0.07	[-0.05, 0.20]	.250
Mental health of relatives	0.02	[-0.06, 0.10]	.611
Own economic/professional situation	0.01	[-0.15, 0.16]	.948
Economic/professional situation of relatives	0.02	[-0.08, 0.12]	.720
Economic situation in Switzerland	0.02	[-0.07, 0.11]	.684
Family situation/personal relationships	0.09	[-0.01, 0.18]	.066

b = unstandardized regression coefficient, CI = confidence interval, *p* = statistical significance. *N* ranges between 145 and 151.

Association between fears and preventive behaviors

The bivariable regressions analyzing the association between fears of the COVID-19 impact and the adoption of preventive behaviors are presented in Table 3. The total number of fears was not associated with the total number of preventive behaviors. When looking at specific preventive behaviors, a higher number of fears was associated with the reduction of social contacts ($b = 0.62$ [0.20, 1.05], $p = .004$). When analyzing specific fears, staff who were worried about the impact of the COVID-19 on their own physical health adopted a higher number of preventive behaviors ($b = 0.10$, [0.01, 0.18], $p = .020$).

Table 4 presents the association between fears of the COVID-19 impact and the adoption of preventive behaviors, controlling for the socio-demographic and clinical characteristics of prison staff. The associations between the total number of fears and the reduction of social contacts ($b = 0.63$ [0.18, 1.09], $p = .006$), as well as between fear of the virus's impact on one's own physical health and the total number of preventive behaviors (0.12 [0.03, 0.21], $p = .006$) remained significant in the multivariable models.

Discussion

This study is innovative by documenting the prevalence of fears of the COVID-19 impact and the adoption of preventive behaviors among prison staff at the beginning of the pandemic; identifying socio-demographic and clinical characteristic associated with fears and preventive behaviors; and testing the association between fears of the pandemic impact and preventive behaviors among this group of essential workers.

Overall, the results indicate that the level of COVID-19 fears and preventive behaviors among prison staff was high; correctional officers adhered less to preventive measures; and, taken as global measures, fears of the COVID-19 impact had no influence on preventive behaviors.

Most prison staff (58.5%) were worried about the impact of the pandemic. This is in line with findings in the general population (Bacon & Corr, 2020; Dryhurst et al., 2020; Fitzpatrick et al., 2020; Lauri Korajlija & Jokic-Begic, 2020) and other groups of professionals in closed institutions, such as healthcare workers (Krishnamoorthy et al., 2020; Pappa et al., 2020). High levels of fears may be detrimental for mental health. However, the psychological impact of the COVID-19 was one of the areas prison staff were less worried about (15.8%). This finding may be related to the early stage at which fears were measured (June to August 2020). The National COVID-19 Science Task Force (2021) reported a sharp increase in people with mental health symptoms during the second wave of the pandemic (November 2020), healthcare workers being those more affected. Thus, mental health symptoms and associated fears may also have increased among prison staff. Still, at the time of the study, their major worry was the physical health of relatives (50.3%). Similarly, healthcare workers have been found to be especially worried about their families and loved ones becoming infected because of their occupation (Deressa et al., 2021; Egeh et al., 2021).

During the first wave of the pandemic, the entire sample (100%) adopted (at least two) preventive measures constantly, especially not taking public transports (94.2%) and reducing social contacts (89.3%). At work, mask wearing (75.6%) and hands disinfecting (72.5%) were also followed constantly by most, but distance keeping was not so frequent (38.1%). Such level of self-reported adherence to preventive measures is comparable to the general population (Kuiper et al., 2020; Sabat et al., 2020; Shahnazi et al., 2020) and healthcare workers (Egeh et al., 2021; Tien et al., 2021). This confirms that correctional agencies in Europe took timely and proportionate preventive measures, which probably allowed to limit the spread of the virus in places of detention (Council for Penological Co-operation Working Group, 2020). In fact, despite the high overcrowding and turnover at the research site, at the time of this study, the infection rate among prison staff was 4.1%, a value that is lower than among other essential workers and the general population of the canton of Geneva during the same period (see, Stringhini et al., 2021). Nevertheless, despite the availability of tests for prison staff at the research site, only 15.0% had taken a test prior to their participation in this study. This rate is quite low, especially when considering that 69.0% of the sample have had symptoms compatible with COVID-19, which means that most staff with symptoms (54.5%) were not tested. At the time of the survey, regular testing for preventive purposes was not yet widespread recommended, but prison staff had been encouraged to take a test when having symptoms compatible with the SARS-CoV-2.

Among socio-demographic and clinical characteristics, only profession was associated with preventive behaviors. Correctional officer were found to adopt fewer preventive measures than other prison workers, particularly keeping distance and having been in confinement. This can be related to the characteristics of their job. Physical distancing is difficult due to the close human contacts that correctional officers have to maintain with detained persons during their daily activities (Franco-Paredes et al., 2020; Li & Liu, 2020; Malloy et al., 2020; Murdoch, 2020; Tsoungui

Obama et al., 2021), namely for teaching, serving meals, body searches, escorting, etc. In addition, correctional officers are considered essential workers and understaffing at correctional facilities is common (Alexander et al., 2020; Montoya-Barthelemy et al., 2020). Therefore, most cannot work from home or cease their activity (25.0% among correctional officers vs 75.8% among other prison workers had been in confinement). Furthermore, when taking other personal characteristics into account, the association between profession and preventive behaviors was reduced. Nevertheless, future research could try to replicate the association between correctional officers and preventive behaviors to explain this phenomenon with more detail.

The results regarding the association between fears of the pandemic impact and preventive behaviors among prison staff were consistent in bivariable and multivariable analyses. The total number of fears was not associated with the total number of preventive behaviors adopted, and only significantly explained one (i.e., reduction of social contacts) of the nine behaviors here investigated. This suggests that, overall, fears of the pandemic impact were not a significant influence for the compliance with COVID-19 preventive behaviors among prison staff. As the fears we examined are quite different in nature and can drive different and contradicting behaviors, this result could partly be expected. Furthermore, prison staff may engage in preventive behaviors regardless of their fears since several protective measures were mandatory. Maybe there is also a certain optimism bias among prison staff (Van Bavel et al., 2020). Nevertheless, prison staff with a higher level of fears of the pandemic impact were more likely to reduce their social contacts. This association has also been observed in the general population (Graham et al., 2020; Harper et al., 2020; Imhoff & Lamberty, 2020). Perhaps COVID-19 fears are associated with avoidance-related but no other preventive behaviors (Seale et al., 2020), or with behaviors that are more optional than mandatory, since those behaviors are more strictly enforced.

However, fear of the COVID-19 impact on one's own physical health appeared to play a role on the level of prevention adopted by prison staff. Maybe a higher level of fears was not related to preventive behaviors (unless reduction of social contacts) because most prison staff did not feel vulnerable to the virus. Indeed, less than one third (31.6%) were worried about their own physical health, but those were the group complying more with preventive behaviors in general. These persons may feel more vulnerable to the COVID-19 and therefore engage in more preventive behaviors to reduce the threat. This would agree with the stage model of processing of fear-arousing communications (De Hoog et al., 2008), which states that individuals are only motivated to engage in protective actions when they feel vulnerable to the health threat, even if the risk is depicted as severe. That is, the situation has to seriously threaten people's belief of being healthy to arouse defense motivation. Besides, maybe these persons are generally more health conscious.

Limitations and implications

This study has several limitations. First, the sample was relatively small and the results may therefore not be very precise. Furthermore, data were collected from only one prison. Consequently, the results may not represent the prison staff population in Switzerland or elsewhere. International comparisons would be useful to understand

how Swiss prisons differ from other systems. In addition, the measures of fears and preventive behaviors had not been used in prior prison studies, which hinders the comparability of the results. Future prison research employing the same survey is welcome. Besides, this study was conducted during the first wave of the SARS-CoV-2 pandemic. Prison staff's fears and preventive behaviors may have increased over time, as it was found in studies among the general population (Bodas & Peleg, 2020; Lauri Korajlija & Jokic-Begic, 2020; Rubaltelli et al., 2020).

Other limitations relate to the data collection method. Self-report data are susceptible to social desirability and do not really inform about the quality of preventive behavior adopted by prison staff (contrary to observational studies). The questionnaire format may also have contributed to the low response rate observed in the study. Prison workers may be reluctant to provide personal information, fearing professional consequences due to their answers. It is possible that persons who did not take part in the study have different types or levels of fears and preventive behaviors compared to the rest of the sample. With their inclusion, the results could potentially be different (e.g., lower level of preventive behaviors).

It must also be noted that important variables for the explanation of preventive behaviors were not included in the survey. For example, self-efficacy (peoples' beliefs that they can prevent infection) has been frequently related to the engagement in preventive behaviors (Lin et al., 2014; Ozdemir et al., 2020; Roma et al., 2020; Shahnazi et al., 2020). Furthermore, we did not collect data on the organizational culture of the institution, which varies across settings and may influence the results (e.g., preventive measures may be more strictly enforced in certain institutions). Perhaps the organizational culture is also related to the low response rate observed in this study (e.g., reluctance in participating in research). Finally, due to the cross-sectional design of the study, no causal associations can be made. That is, despite possible associations between fears of the pandemic impact and preventive behaviors, we cannot say which one caused the other (Dryhurst et al., 2020).

Despite limitations, this study may provide useful recommendations for correctional policies in future waves of the SARS-CoV-2 or other pandemics. Overall, the level of preventive behaviors among prison staff at the beginning of the pandemic seems high, but some measures could be improved, especially testing. Since testing can help to reduce the number of cases in prison facilities (Hagan et al., 2020; Marcum, 2020; Tsoungui Obama et al., 2021), testing staff members at regular intervals, especially in the presence of symptoms compatible with COVID-19, could be important for SARS-CoV-2 infection prevention and mitigation plans (Hagan et al., 2020). Being aware of their infection status could also help reducing prison staff's worries regarding the health of their relatives.

Furthermore, among prison workers, correctional officers are a group that may require additional attention in terms of prevention strategies and health education. Since they appear to be less able to constantly keep the recommended 2 m distance from other persons living and working in the institution, prison managers could try to implement policies allowing greater physical distancing to correctional officers during their activities, despite the restrictions of the environment (Franco-Paredes et al., 2020;

Li & Liu, 2020; Murdoch, 2020). In addition, during waves of the SARS-CoV-2 pandemic, prison staff availability could be reinforced (CPT, 2020), so their exposure to the detained population could be decreased.

Finally, accurate risk perceptions are critical in managing public health risks, and both downplayed and exaggerated fears can undermine the adoption of protective measures (Dryhurst et al., 2020). The results of this study suggest that, for prison health campaigns to be successful, communication strategies may have to increase prison staff awareness regarding their vulnerability to the SARS-CoV-2, so they may comply better with the preventive measures (De Hoog et al., 2008). However, a balance between optimistic bias and excessive fears is necessary for an optimal effectiveness of preventive measures (Van Bavel et al., 2020). Because fears regarding the SARS-CoV-2 impact may result in psychological distress (Koçak et al., 2021), and the mental health of prison workers is vulnerable during the pandemic (Montoya-Barthelemy et al., 2020), efforts to improve prison staff's quality of working life (e.g., reducing overcrowding, increasing staff availability, and optimizing preventive measures) should be considered (Ellison & Caudill, 2020). Importantly, more in-depth research is necessary to develop our understanding of safety protocols and training in prison settings in order to help guide policies aiming to reduce the spread of COVID-19 among persons living and working in places of detention.

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Data availability statement

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy and ethical restrictions.

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