Received: 5 July 2023 | Accepted: 8 July 2023

DOI: 10.1002/jcop.23077

RESEARCH ARTICLE

JOURNAL OF COMMUNITY PSYCHOLOGY WILEY

Interventions to increase vaccine uptake among people who live and work in prisons: A global multistage scoping review

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Funding information
European Commission

Abstract

The objective of this study is to examine interventions implemented to increase vaccine uptake among people who live and work in prisons around the world. Peer-reviewed and gray literature databases were searched systematically to identify relevant information published from 2012 to 2022. Publications were evaluated by two researchers independently and underwent quality assessment through established tools. Of the 11,281 publications identified through peer-reviewed (2607) and gray literature (8674) search, 17 met the inclusion criteria. In light of limited data, the identified interventions were categorized into two categories of educational and organizational interventions, and are discussed in the text. The lack of availability of vaccination services and interventions to increase vaccine uptake among people who live and work in prisons, worldwide, is a serious public health concern. These interventions reported in this review can be adapted and adopted to mitigate the burden of infectious diseases among people who live and work in prisons.

KEYWORDS
immunization, infection control, infectious diseases, prisons, vaccination

1 | INTRODUCTION

On any given day, over 11.5 million people are living in places of detention throughout the world (Fair & Walmsley, 2021). Individual, social, managerial, and environmental risk factors make people living in prisons (PLPs) vulnerable to various communicable diseases (Awofeso, 2010; Moazen et al., 2018; Moazen, Assari, Neuhann, et al., 2019; Moazen, Assari, Stöver, et al., 2019), including vaccine-preventable infections (Larney et al., 2013). Yet, a large proportion of PLP are either unvaccinated or undervaccinated at the time of entering into prisons and are less likely to uptake vaccines during incarceration (Madeddu et al., 2019). Furthermore, the annual turnover of people in prison institutions worldwide has been estimated to be over 30 million (Dolan et al., 2015), highlighting the fact that PLP are likely to act as a bridge for transmitting infectious diseases from prisons to the community. It is also important to note that those who work in prisons live in the community; millions of prison staff enter and leave prisons across the world every day, each potentially acting as vectors of transmission by bringing infection from the community into the prison and from the prison into the community. Therefore, scaling up vaccination services in prisons is not only a crucial intervention to control infection transmission in prisons but it also reduces the risk of transmission of infectious disease to the community (Tavoschi et al., 2018).

Although limited, studies have assessed prison-based vaccination programs all around the world. A national program to expand hepatitis B immunization among people who inject drugs in the United Kingdom led to a 32% increase in vaccine uptake in a 7-year period; prisons were the most common source of vaccine uptake among the participants (Hope et al., 2007). In Canada, a study of determinants of vaccine willingness in three federal prisons found that the participants who had received influenza vaccine in the past season were more likely to accept COVID-19 vaccines; those who identified as "indigenous" and lived in medium- or maximum-security prisons were less likely uptake vaccines (Romanchuk et al., 2022). In Kansas, USA, only 8% of male and 35% of female PLP who participated in a survey reported receiving human papillomavirus (HPV) vaccine and participants were found to have limited knowledge of the disease and the vaccine (Allison et al., 2018). Yet, in spite of these studies, various dimensions of vaccination in prisons remain under researched and largely unknown.

Vaccine uptake and hesitancy among PLP are multifaceted. A qualitative study in Canada identified three levels of factors including individual-, interpersonal-, and system-level factors, leading to COVID-19 vaccine refusal among PLP. Of those described, three factors were particularly relevant to the prison setting, namely: low-risk perception, structure of healthcare services in prisons, and universal distrust in prison authorities (Ortiz-Paredes et al., 2022). Similarly, in a national study in the USA, younger age, female gender, non-Hispanic Black and Asian race/ethnicity, and living with few underlying medical conditions were associated with lower acceptance of COVID-19 vaccines among PLP (Hagan et al., 2021). Evidence also shows that accelerated vaccination schedule may significantly increase the uptake of the third dose of HBV vaccine among PLP, compared with the standard schedule (Madeddu et al., 2019).

The European research project "Reaching the hard-to-reach: Increasing access and vaccine uptake among prison populations in Europe (RISE-Vac)" aims to improve the healthcare status of PLP in Europe by increasing vaccine uptake among this marginalized and high-risk population. As a part of the RISE-Vac project, the present review has been conducted to examine interventions implemented to increase vaccine uptake among PLP and those who work in prisons around the world.

2 | MATERIALS AND METHODS

The European research project RISE-Vac, cofunded by the European Commission, was started in May 2021 with the ultimate goal of improving vaccine uptake in prisons in Europe. The project objectives include, but are not limited to, revealing the gaps in vaccine offer and uptake in Europe's prisons, improving vaccine literacy among PLP and staff members, as well as having sustainable impacts in terms of transferability of models of care and project findings. The RISE-Vac consortium comprises nine partners from six European countries namely Cyprus, France, Germany, Italy, Moldova, and the United Kingdom. More information about the project can be found on the project website (https://wephren.tghn.org/rise-vac/). This review contributes to the objective of work package four of RISE-Vac: promoting evidence-informed policies for prison health systems.

2.1 | Data identification

The present review was conducted following the Arksey and O'malley (2005) methodological framework for scoping reviews. The process of data collection in this review had three main stages: searching the peer-reviewed and gray literature; posting a call for data on the Worldwide Prison Health Research and Engagement Network's (WEPHREN) website, Twitter, and LinkedIn; and circulating a call for data among the authors' international network of colleagues including the RISE-Vac advisory board members via email. The project is taking advantage of a well-experienced advisory board including researchers, prison health policy makers and healthcare providers, stakeholders working in national, regional and global organizations active in the field of prison health, and experts with lived experience of incarceration.

2.2 | Search strategy

We systematically searched five databases for peer-reviewed publications including Medline through PubMed, Web of Science, Cochrane library, Science Direct, and EBSCO, to obtain information on interventions implemented to increase vaccine uptake in prisons. After testing various term combinations consisting of Medical Subject Headings (MeSH), Entry terms, and non-MeSH keywords, the following combination was chosen to be final for PubMed search: ((Prison* OR Inmate OR Inmates OR Penitentiaries OR Penitentiary OR Jail OR Jails OR Detention Center OR incarcerat*) AND (Vaccin* OR Immunization)). Due to different search algorithms the search terms were modified for each database.

In addition to the aforementioned databases, we searched 14 potential sources of gray literature to complement the data set. World Health Organization (WHO), WHO Europe, Centers for Disease Control and Prevention (CDC), ECDC, United Nations Office on Drugs and Crime, WEPHREN, ResearchGate, Google, and Google Scholar websites were among the gray literature databases searched. In some databases, including Google and Google Scholar, evaluation of the identified titles was continued until the titles were considered to be irrelevant. To maximize the relevance of the identified titles, search terms were modified for each website. In Google in particular, a wide range of terms, including "vaccine-preventable diseases," were combined with prison terms and applied separately.

2.3 | Inclusion/exclusion criteria and quality assessment

Suitable publications were reviewed by two researchers (BM and NA) independently to avoid missing any relevant information. Although the databases were searched in English, publications identified in other languages were

reviewed as well. Papers published from January 1, 2012, to December 31, 2022, in peer-reviewed scientific journals or gray literature, reporting information relating to interventions implemented to increase vaccine uptake among people who live and work in prisons were included. Papers published before 2012, reporting information on pre- or postincarceration period, and those with no relevant information were excluded. In this review, we had no limitations in terms of age of samples reported, type of correctional setting, or location. Any discrepancies or disagreement in assessment were handled by a third reviewer. The National Institute of Health's quality assessment tools for quantitative research and the Critical Appraisal Skills Programme checklist for qualitative research were used to assess the quality of the included papers. This review did not involve human subjects and was exempt from institutional ethical approval. The RISE-Vac project, however, has been approved by the ethics committee of the University of Pisa (approval number: 0049433/2022).

2.4 | Data classification and analysis

Variables, including year of publication, location (country/region), scope, total number of prison residents, sample size, type of publication, type of closed setting, target population, characteristics of the implemented intervention, target disease, as well as challenges towards implementation of the interventions, were extracted, classified, and reported in this manuscript.

3 | RESULTS

From a total of 11,281 publications identified through peer-reviewed (2607) and gray literature (8674) search, 17 met inclusion criteria. The PRISMA chart of the included studies is presented in Figure 1. Characteristics of the included studies are presented in Table 1.

3.1 | General characteristics of the included studies

In line with the inclusion criteria, the included papers were published between 2012 and 2022, reporting data from 2005 to 2021. All included publications were peer-reviewed in forms of original articles (10/17), brief reports (4/17), research letter (1/17), commentary (1/17), and conference abstract (1/17). The majority of the included studies came from the United States (10/17) followed by Italy (3), Australia (1/17), Canada (1/17), France (1/17), and the United Kingdom (1/17). Most included publications reported data from 1 to 3 prison institutions (9/17); 4 studies were conducted at provincial/state levels and 3 at national levels. Scope of the study was not reported in one included publication.

3.2 | Settings and samples

Nine out of the 17 included papers did not report the total eligible of the studied institutions at the time of the study. In the included prisons with data, the total eligible (living and working at the time of study) ranged from 119 to 164,283. Sample size of the included studies, however, ranged between 32 and 690,343. The included papers report data from various institutions including prisons (8/17), jails (4/17), other facilities (3/17), and combined institution types (2/17). PLPs were the target population in the majority of the included studies (13/17), whereas the rest of the studies targeted both PLP and prison staff members (4/17). Gender of the target population was

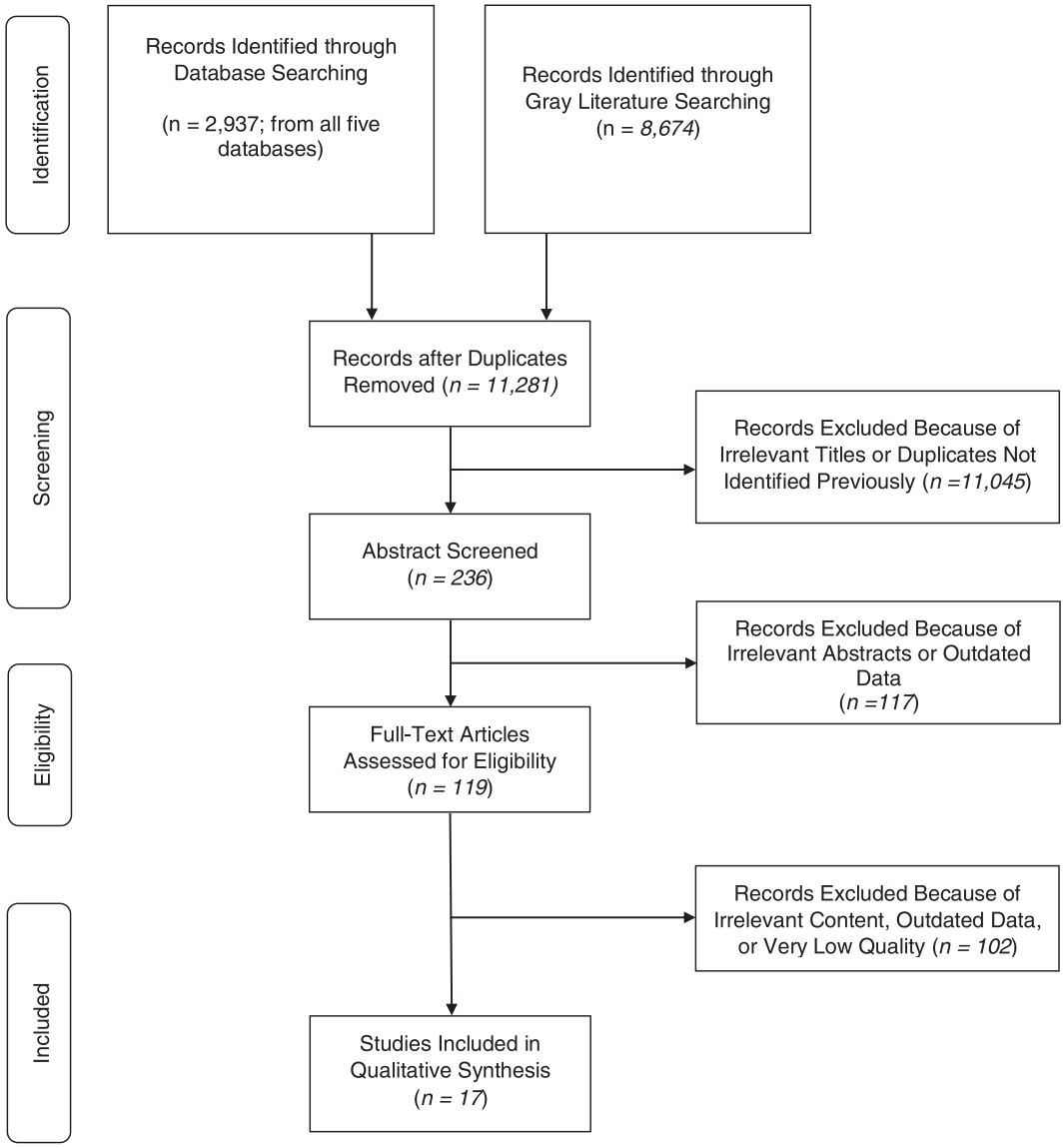

FIGURE 1 PRISMA chart of the included studies.

reported in eight included publications; seven of these publications reported data on interventions targeting both genders and one publication only targeted men.

3.3 | Target diseases and interventions

The included studies reported information on vaccination against the following vaccine-preventable diseases: COVID-19 (5/17), hepatitis B (5/17), HPV (3/17), hepatitis A (1/17), influenza (1/17), measles (1/17), and varicella (1/17). In 8 out of the 17 included studies, the interventions had been implemented as a response to an existing

TABLE 1 Interventions to increase vaccine uptake in prisons from 2012 to 2022.

Source/year of publication	Year of data	Country/ Region	Scope	Type of publication	Type of setting	Target population	Where/when/ by whom	Target disease	Intervention	Challenges to implement/efforts to overcome	Comments
Allison et al. (2019)	2017–2018	USA	1 Institution	PL (BR)	Jail	Juvenile PLP (B 10–18 years)	Intervention implemented by researchers after receiving consent from parents	HPV	Knowledge dissemination through posters and factsheets	NR	
Berk et al. (2021)	2020–2021	USA	1 Institution (RIDOC)	PL (OA)	Prison containing various facilities	PLP and STF (B)	Intervention implemented by two public health educators	COVID-19	For PLP: educational course with a QA session For STF: A video created by the medical director; additional info sent via email	NR	Responding to a pandemic
Besney et al. (2017)	2013	Canada	1 Institution	PL (BR)	Remand facility	PLP	NR	Influenza	Providing education on influenza vaccination	NR	Responding to an outbreak
Biondi et al. (2022)	2020–2021	USA	36 States	PL (RL)	All institutions	All PLP	Intervention implemented by policy makers	COVID-19	State prioritization of incarcerated people for vaccination	NR	Responding to a pandemic
Emerson et al. (2020)	2016–2017	USA	1 Facility	PL (OA)	Jail	PLP juveniles (ages 9–18 years) and young adults	Intervention implemented by HD nurses after receiving	HPV	Posters and pamphlets developed by HD staff to be	NR	

TABLE 1 (Continued)

Source/year of publication	Year of data	Country/ Region	Scope	Type of publication	Type of setting	Target population	Where/when/ by whom	Target disease	Intervention	Challenges to implement/efforts to overcome	Comments
						(ages 19–26 years)	consent/ parental consent/ during incarceration		distributed by jail STF		
Erfani et al. (2022)	2021	USA	1 State	PL (COM)	Jail	PLP	In jail housing units or jail common areas (i.e., the cafeteria) Intervention implemented by physicians, community-faith leaders, and medical students	COVID-19	Education and QA sessions	Lack of participation in some jails; building trust to overcome disclosing affiliations, emphasizing attendees' right to deny vaccination, and explicitly initiating a discussion around systemic racism and distrust; limited information regarding vaccine eligibility and unclear processes in requesting vaccination	Responding to a pandemic

(Continues)

TABLE 1 (Continued)

Source/year of publication	Year of data	Country/ Region	Scope	Type of publication	Type of setting	Target population	Where/when/ by whom	Target disease	Intervention	Challenges to implement/efforts to overcome	Comments
Fusillo et al. (2018)	2017	Italy	1 Facility	PL (Abs)	Prison	PLP B	Intervention implemented by vaccination staff	Measles	Information sheets on vaccine and disease	Four cases of waste of vaccine	After a month the program continued to vaccinate all PLP at entry.
Goldman et al. (2022)	2021	USA	1 Facility	PL (OA)	Juvenile detention center	PLP M (Youths 10–21 years old)	Intervention implemented by attending physicians, advanced practice providers, and Adolescent and Young Adult Medicine fellows	COVID-19	A virtual forum with youth, guardians, and community partners; one-on-one outreach to guardians; motivational interviewing with youth; and coordination with organizational leaders.	Barriers to uptake: limited parental involvement to help access vaccination, feeling unlikely to be infected with COVID-19 or unlikely to become significantly ill, mistrust of the vaccines, influence by adults who express mistrust, misinformation about vaccine safety Barriers to provide vaccine: lack of transportation, distance, and needing to provide advanced notice to probation officers	Responding to a pandemic Recommended: services providers share the same racial background as the majority of youth and their families in attendance.

TABLE 1 (Continued)

Source/year of publication	Year of data	Country/ Region	Scope	Type of publication	Type of setting	Target population	Where/when/ by whom	Target disease	Intervention	Challenges to implement/efforts to overcome	Comments
Hagan et al. (2021)	2020–2021	USA	National	PL (OA)	Various types of closed settings	PLP/STF B	Intervention implemented by existing clinical staff	COVID-19	Education of product's safety, efficacy, and side effects together with answering individual's questions	NR	Responding to a pandemic
Murphy et al. (2018)	2016–2017	USA	NR	PL (OA)	Prison	PLP	NR	Varicella	Vaccine information statement	NR	Responding to an outbreak
Perrett et al. (2013)	2012–2013	UK Wales	National	PL (OA)	Prison	PLP/STF	NR	HBV	An e-learning course to increase awareness of STF on prevalence of BBVs in prison, transmission risks, confidentiality, how to deal with a blood spillage, remaining safe during control and restraint procedures and hepatitis B vaccination.	NR	

(Continues)

TABLE 1 (Continued)

Source/year of publication	Year of data	Country/ Region	Scope	Type of publication	Type of setting	Target population	Where/when/ by whom	Target disease	Intervention	Challenges to implement/efforts to overcome	Comments
Perrodeau et al. (2016)	2013–2014	France	1 Facility	PL (BR)	Prison	PLP B	Day 0, Month 1, and Month 6	HBV	Using rapid schedule	NR	
Stasi et al. (2019)	2016–2017	Italy	1 Province (15 facilities)	PL (OA)	Prison	PLP	NR	HBV	Using rapid schedule	NR	
Stasi et al. (2022)	2016–2017	Italy	1 Province (15 facilities)	PL (OA)	Prison	PLP/STF	Intervention implemented by PLP as peer educators	HBV	Educational course on HBV and other infectious diseases; distribution of brochures on HBV	NR	
Walsh et al. (2022)	NR	US	1 Facility	PL (OA)	Juvenile temporary detention center	Juvenile PLP B	NR	HPV	Health education Open focus group	The facility had multiple restrictions regarding materials allowed	
Winter et al. (2016)	2005-8	Australia	3 Facilities	PL (OA)	Prison	PLP B	Intervention implemented by two specialist public health nurses	HBV	Testing and vaccine offer by nurses	Difficulty in full vaccinating PLP in Australia due to frequent movements of prisoners both between and in and out of prisons	

TABLE 1 (Continued)

Source/year of publication	Year of data	Country/ Region	Scope	Type of publication	Type of setting	Target population	Where/when/ by whom	Target disease	Intervention	Challenges to implement/efforts to overcome	Comments
Zellmer et al. (2021)	2019	USA	1 Facility	PL (BR)	Jail	PLP	Intervention implemented by prison authorities	HAV	Changing the protocols to offer HAV vaccine at the initial intake nursing assessment and were subsequently administered by a nurse circulating to the different housing units daily during weekdays	'NR	Responding to an outbreak

Abbreviations: Abs, abstract; B, both genders; BR, brief report; COM, commentary; F, female; GL, gray literature; HD, health department; HPV, human papillomavirus; LE, letter to the editor; M, male; MM, mixed methods; MSM, men who have sex with men; NR, not reported; OA, original article; PL, peer-reviewed literature; PLP, people living in prison and other closed settings; PLWUD, people who use drugs; RL, research letter; STF, staff.

crisis, including pandemics, epidemics, or local outbreaks. In three studies, the interventions were implemented for research purposes rather than routine implementation.

Fourteen out of the 17 included publications reported data from adult PLP that are categorized as either educational or organizational interventions. For adult PLP, educational interventions included holding courses on target diseases and vaccines (e.g., product safety, efficacy, and side effects) together with question/answer sessions, and knowledge dissemination through learning materials (e.g., posters, factsheets, pamphlets, and brochures). Implementing the program by external healthcare providers, using accelerated vaccination schedules, changing the existing vaccination protocols to offer vaccination at the time of entrance, and prioritization of PLP for vaccination by the government were the organizational interventions implemented to increase vaccine uptake among adult PLP.

Only four included studies reported data from juvenile prisons, all implementing educational interventions. Creating a virtual forum with youths, guardians, and community partners, one-on-one outreach to guardians, and motivational interviews with youths were implemented in an attempt to increase the rates of vaccine uptake among young PLP.

We found only educational interventions aimed at increasing vaccine uptake among prison staff members. Knowledge dissemination through videos, holding e-learning courses about the target diseases and vaccines, as well as further communications and awareness raising through emails were implemented as staff-specific interventions to increase vaccine uptake among people who work in prisons.

Only two publications addressed the effectiveness of the implemented programs. In a study conducted in Australia, a vaccination program implemented by specialist nurses resulted in an increase in the rate of HBV vaccine uptake among PLP from 2% to 19%. Similarly, another study conducted in the United States found an increase in HAV vaccine uptake from 0.6% to 7.1% after changing the existing vaccination protocols and offering HAV vaccines at the "initial intake nursing assessment." Although not mentioning the effectiveness directly, another study conducted in France found a rise in vaccine coverage and a reduction in the proportion of PLP susceptible to HBV from 42.8% to 27.5%, following the implementation of a rapid schedule vaccination program. No studies looked at the cost effectiveness or any sort of economic analysis of increased vaccination strategies.

Lack of participation in educational courses and open discussion sessions, low levels of perceived risk and perceived severity of disease, being influenced by people who express mistrust and misinformation, and high turnover of PLP were reported to be the barriers towards implementing interventions to improve vaccine uptake in prisons.

3.4 | Quality of the included studies

Based on our assessment, no included study was high quality. The level of evidence was moderate in the majority of the included studies (10/17) and low in the rest of the included publications in this section (7/17).

4 | DISCUSSION

In this review, we examined the interventions implemented in the past decade to increase vaccine uptake among people who live and work in prisons worldwide. Although most implemented interventions focus on knowledge dissemination through holding educational courses with or without open group discussions, and distributing learning materials, other interventions including revising vaccination protocols, prioritizing PLP for vaccination, and implementing the interventions by external healthcare providers were in place in some prisons as well. A large proportion of the included studies were focusing on COVID-19, although no more than three years have passed

since the emergence of the recent pandemic. Data on various aspects of the implemented interventions including model of delivery, coverage, quality, effectiveness, and cost-effectiveness were either unavailable or scarce.

Vaccine hesitancy is a universal healthcare challenge and a barrier towards mitigating the burden of vaccine-preventable diseases in the world. Larson et al. (2022) believe that "vaccine hesitancy is a state of indecision and uncertainty about vaccination before a decision is made to act or not act." With a broader approach, the ECDC defines vaccine hesitancy as "a behavior, influenced by a number of factors including issues of confidence (level of trust in vaccine or provider), complacency (do not perceive a need for a vaccine, do not value the vaccine), and convenience (access)" (ECDC, 2017). The same document mentions that "vaccine-hesitant individuals may accept all vaccines but remain concerned about vaccines, some may refuse or delay some vaccines, but accept others, and some individuals may refuse all vaccines"; and suggests a set of interventions to deal with vaccine hesitancy; among them are individually tailored education, parental education for youths, specialist immunization clinics, vaccine risk communication messages, and countering antivaccination attitudes (ECDC, 2017). Although the prison context is more complex than the community and addressing vaccine hesitancy and refusal among PLP requires extra efforts, the aforementioned strategies might be effective to increase vaccine uptake in prison settings as well.

Knowledge dissemination, through educational courses, group and panel discussions, and learning materials e.g. posters, factsheets, pamphlets, and brochures, was the most frequently reported intervention implemented to increase vaccine uptake among people who live and work in prisons. However, none of the included studies reported the effectiveness of these learning materials. This leaves a considerable gap in the evidence given that although education is a necessary component for behavioral change, it is often not sufficient to make a change in public behaviors (Nichols, 1994). The health belief model suggests six components of behavior change including perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cue to action, and self-efficacy (Rosenstock et al., 1988). Therefore, considering self-efficacy as one of the main components of behavior change, education with the ultimate goal of behavioral change should focus on why and how a change needs to be made (Arlinghaus & Johnston, 2017).

The United Nations Standard Minimum Rules for the Treatment of Prisoners (Nelson Mandela Rules), one of the most commonly-accepted international guidelines concerning healthcare provision in prisons, suggests that "prisoners should enjoy the same standards of health care that are available in the community, and should have access to necessary health-care services free of charge without discrimination on the grounds of their legal status." (UN, 2015). Yet, lack of availability, accessibility, coverage, and quality of healthcare services in prisons, worldwide, remain a chronic problem (Moazen, Assari, Stöver, et al., 2019). The findings of our review suggest that the organizational-level interventions such as appropriate vaccination programs tailored to the unique needs of the prison population have the potential to increase the rates of vaccine uptake in PLP. Therefore, ensuring the availability of vaccines in prisons, for example, through including PLP in national vaccination programs and prioritizing them to receive vaccines, is not only in accordance with the Mandela Rules but is likely to be effective, and therefore should be considered a priority action to increase vaccine uptake not only in times of crisis but also in routine national vaccination plans.

Prison staff can play a significant role in transmitting infectious diseases from communities into prisons and vice versa; a number of studies have shown staff to be the likely vectors for prison outbreaks (Blackmore et al., 2022). In addition, evidence shows that a well-deployed vaccination program for prison staff is crucial to alleviate morbidity and mortality, as well as to decline absenteeism and prevent disruption in facility operation (Meyer et al., 2022). Despite this, during the COVID-19 pandemic most recommendations focused on masking, testing, disinfecting, decarceration, lockdown, and restriction of visits for PLP (Kinner et al., 2020), with less attention to vaccination of staff members. In our review, we found only four publications reporting information on interventions implemented to increase vaccine uptake among people who work in prisons. Equal attention should be paid to prison staff and PLP in designing and implementing comprehensive interventions aimed at increasing vaccine uptake in prisons, taking into account the different needs of these two populations.

As PLP are hard-to-reach while in the community, prisons provide a unique opportunity to ensure completion of immunization schedules among this high-risk population. High turnover of prisons, however, is a challenge towards completion of vaccine schedules, in particular among PLP serving short sentences. Implementing a rapid or accelerated schedule for selected vaccines including HAV and HBV (e.g., at entrance, first, and third week, with a booster at Month 12) is a strategy to improve compliance and increase vaccine uptake among PLP. Evidence found through this review and previous research (Vicente-Alcalde et al., 2020) confirms this. Nevertheless, implementing a rapid vaccination schedule may not be possible in all prisons and so there should be a strong referral system to ensure completion of the vaccination schedule among PLP after their return to the community.

We found evidence from four studies reporting data on implemented interventions to increase vaccine uptake among youth and juvenile PLP, mostly focusing on knowledge dissemination and training awareness. Vaccination among youths and adolescents is of great public health importance, not only because of the protective impacts of vaccines against infectious diseases, but also because of the potential influence of youths' attitudes on their peers and even parents (Willis et al., 2021). However, vaccine hesitancy may be more prevalent among young people due to lower perceived risks of being infected compared to older people (Tu et al., 2022). In addition to low risk perception, a set of factors including lack of attention to the healthcare of young PLP, lack of a linkage between community and prison health services, as well as need of consent from parents or legal guardians are among the other challenges towards implementation of vaccination programs (Mazzilli et al., 2022) that should be considered in designing and implementing successful vaccination programs for young PLP.

In our review, we included only the interventions that have been implemented to increase vaccine uptake among people who live and work in prisons. In the literature, however, there are numerous publications recommending interventions which did not meet inclusion criteria in our review. The most frequently recommended interventions include the following: increased allocation of nursing personnel and targeting subpopulations, for example, men who have sex with men and people who use drugs in prisons; implementing opt-out instead of opt-in vaccination programs; recommendation of vaccines by physicians; providing incentives for vaccination; availability of vaccines at the time of screening; starting the vaccine schedule as close to admission as possible; peer-education; and tailoring learning materials in multiple formats and languages for all health literacy levels. Although the above-mentioned interventions may have been effective in the community, further research is required to produce valid and reliable evidence on their effectiveness and possible risks in prison settings.

5 | STRENGTHS AND LIMITATIONS

This is the first review to synthesize the global evidence on interventions implemented to increase vaccine uptake among PLP and those who work in prisons. It was carried out in a robust manner, adhering to best practice in the conduct of systematic reviews. However, there were some limitations. Although we applied a multistage data collection approach and wide conclusion criteria, only 17 publications met inclusion criteria. Lack of data on all aspects of prison health, however, is a common problem faced by prison health researchers, and a barrier towards assessing the effectiveness of the implemented interventions in prisons. Low levels of evidence, low sample size, and inadequate information, for example, regarding the efficacy of the interventions reported in the publications, were the other limitations of our review. The quality of the included studies was not high and therefore limits the strength of our conclusions.

6 | PRACTICE AND POLICY IMPLEMENTATIONS

The following recommendations developed based on the findings of the present scoping review will assist prison policy makers and healthcare providers improve the quality of services and increase vaccine uptake among people who live and work in prisons:

- To develop organizational level vaccination tailored programs supported with educational materials for both staff and PLP;
- To involve PLP and staff in the development of the course content and learning materials;
- To conduct further research and evaluation to examine the effectiveness and cost-effectiveness of these initiatives; and
- To ensure the health of prison staff not neglected.

7 | CONCLUSIONS

We systematically searched peer-reviewed and gray literature databases to find evidence on the interventions implemented to increase the levels of vaccine uptake among people who live and work in prisons around the world. All but one included study came from high-income countries, which suggests lower priority given to vaccination in prisons in low- and middle-income countries but also highlights global inequities in prison health research. In a large number of the included studies, the interventions were implemented in response to a public health crisis, for example, a local outbreak, epidemic, or pandemic, indicating the lack of routine vaccination programs and interventions to increase vaccine uptake in prisons.

Most interventions implemented to increase vaccine uptake in prisons were focused on education and knowledge distribution among PLP and staff members with no robust evidence of effectiveness. There was some, albeit limited, evidence for other interventions including implementing the program by external healthcare providers, using accelerated vaccination schedules, changing the existing vaccination protocols, and prioritization of PLP for vaccination. These interventions can be adapted and adopted to increase vaccine uptake in prisons and to mitigate the burden of infectious diseases among PLP and people who work in prisons.

As prison staff members commute daily between prisons and communities, and the majority of PLP will eventually be released back to their communities, improving the vaccination coverage of both of these groups should be a public health priority to benefit those living and working in prisons and wider society. Apart from its public health impacts, increasing vaccine uptake among people who live and work in prisons is a step forward towards reaching the Sustainable Development Goal 3 of "ensuring healthy lives and promoting well-being for all at all ages" set forth by the UN.

ACKNOWLEDGMENTS

Open Access funding enabled and organized by Projekt DEAL.

CONFLICT OF INTEREST STATEMENT

The authors declare no conflict of interest.

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How to cite this article: Moazen, B., Agbaria, N., Ismail, N., Mazzilli, S., Klankwarth, U.-B., Amaya, A., Rosello, A., D'Arcy, J., Plugge, E., Stöver, H., & Tavoschi, L. (2023). Interventions to increase vaccine uptake among people who live and work in prisons: A global multistage scoping review. *Journal of Community Psychology*, 1–17. https://doi.org/10.1002/jcop.23077