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### Article

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# Oral health services in prison settings: A global scoping review of availability, accessibility, and model of delivery

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## Abstract

This review aimed at evaluating the state of availability, accessibility and model of delivery of oral health services in prisons, globally. Five databases of peer-reviewed literature and potential sources of grey literature were systematically searched. Inclusion criteria encompassed oral health papers related to prisons globally, with exclusion of certain article types. Selection involved independent evaluations by two researchers, followed by quality assessment. Data on the availability of oral health interventions in prisons came from 18 countries, while information on the model of delivery of the services is scarce. In addition, two sets of individual and organizational barriers toward oral health service uptake in prisons were revealed and discussed in the text. Lack of oral health services in prisons affects people living in prisons and jeopardizes their reintegration. Urgent and concrete international actions are required to ensure the availability, accessibility, and quality of oral health services among people living in prisons.

## KEYWORDS

accessibility, dental services, global health, oral health, prisons

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## 1 | BACKGROUND

On any day, over 11 million people worldwide are held in prison settings (Fair & Walmsley, 2021). The high numbers of incarceration per se suggest a threat to wellbeing due to various factors. One significant factor is the issue of overcrowding in prisons that leads to cramped living conditions, limited access to essential resources and services, increased levels of violence and conflict, and higher risk of infectious diseases transmission (García-Guerrero & Marco, 2012). These conditions can have detrimental effects on the physical and mental health of individuals in prison, compromising their overall wellbeing (Hickson et al., 2022). A prison's purpose is not simply to hold individuals, but also to rehabilitate them from different perspectives and then reintegrate them back into society (UNODC, 2016).

Limited access to healthcare, receiving low-quality care, and experiencing unfavorable health outcomes collectively define people living in prisons (PLP) as a vulnerable population (WHO, 2014). According to the Penal Reform International and Thailand Institute of Justice (2023), approximately 120 countries have prison occupancy rates exceeding their capacity, coupled with inadequate infrastructure, which exacerbates the situation and further compromises the health of incarcerated individuals (Kamarulzaman et al., 2016). Overcrowded prison systems and long-term segregation, or isolation can exacerbate health issues among the unwell. Thus, there is a high potential of creating new health problems for the healthy, due to the prevailing norms, policies, culture, and even architectural design of prisons. Consequently, it becomes impractical to administer clinical treatment in such environments (National Academies Press, 2013).

The relationship between general health and oral diseases is intricate and multifaceted. Systemic diseases can affect oral health through direct pathological pathways or indirectly through changes in behavior caused by the disease or its treatment (Abnet et al., 2005). As demonstrated in the literature, respiratory distress in COVID-19 is strongly associated with infectious and inflammatory diseases, including periodontitis (Sukumar & Tadepalli, 2021). Similarly, poor dental plaque control is included in the common risk factor approach, where there is a relationship between oral disorders and noncommunicable diseases (NCDs) including cardiovascular disease, diabetes, and cancer (Heilmann et al., 2015). Oral infections and inflammation can exacerbate the health condition of individuals with NCDs. For instance, in a patient with diabetes, oral diseases can heighten insulin resistance and impede glycemic control (WHO, 2022). Therefore, disregarding these conditions and ignoring hygiene measures and harmful lifestyle choices renders vulnerable populations even more susceptible.

A substantial concern is placed on the prevalence of infectious diseases with oral manifestations. Tuberculosis (TB), which primarily affects the lungs can also involve other parts of the body, including the oral cavity (Sharma et al., 2019). Although oral lesions associated with TB are infrequent (account for 0.1%–5% of all TB infections), its identification plays a crucial role in the early diagnosis and interception of primary TB, limiting morbidity and mortality rates (Khan, 2015). Collaborative work between dentists and oral pathologists to include TB in the differential diagnosis of suspicious oral lesions to ensure timely and appropriate treatment is essential. Given the unique challenges of overcrowding and close contact in prison environments, early detection of different categories of TB cases poses a significant difference for public health, considering that TB is a frequent HIV co-infection (CDC, 2016).

Oral diseases such as dental caries, periodontal disease, tooth loss, oral mucosal lesions, oropharyngeal cancer, HIV/AIDS-related oral disease, and orodental trauma are major public health concerns (Petersen et al., 2005). According to the Global Burden of Disease, untreated tooth decay in permanent teeth represents the most prevalent health condition (Salari et al., 2022). Long-term oral negligence leads to more complex oral health issues ending in tooth loss. Edentulism is widely regarded as an accurate indicator and perhaps the most suitable measure of an individual's oral health status overall (Casarin et al., 2021). Although oral health issues may not lead to death, they are often disregarded as a critical healthcare concern for disadvantaged populations such as PLP (Manna et al., 2022). The prevalence of dental decay in PLP is substantially higher than in the general population (Nobile et al., 2007).

Various risk behaviors such as tobacco (smoked, chewed, or sniffed), alcohol, and illicit drug use, as well as infrastructural risk factors including limited availability, inadequate coverage, and low quality of healthcare services (Moazen et al., 2020), contribute to PLP poor dental health. While tobacco use has significantly decreased in the general population, it remains prevalent among PLP in high-income countries, with tobacco being the second leading risk factor for global mortality and morbidity (Alokan & Kabir, 2022). According to Ritter et al. (2011), high prevalence of tobacco use is due to multiple areas of life in prison including, as a stress reliever, a currency, a means of social connection, and a boredom reliever. Smoking and other forms of tobacco use adversely affect overall health and have a direct effect on the oral cavity due to their thermal and chemical properties, leading to conditions such as periodontal disease, dental caries, leukoplakia, mucous membrane/tongue pathology, and tumors (Trybek et al., 2018).

The 2022 WHO Global Oral Health Status Report emphasizes the concept of “oral health inequalities” highlighting the importance of fairness in disease prevention and the social aspect of dentistry (WHO, 2022). Oral diseases follow a social gradient, meaning they are socially patterned across all levels of society. Targeting only high-risk groups fails to address this gradient, which has significant policy implications. In the pursuit of a crime-free lifestyle, physical and mental health play a significant role in achieving reintegration (Davis et al., 2013). Preventive approaches have been proposed including the promotion of oral health within the primary healthcare system. During the 47th World Health Assembly, resolutions toward oral health were firmly embedded within the NCD agenda, and that oral healthcare interventions should be included in universal health coverage programs (World Health Organization, 2021).

Oral health is a neglected topic among PLP while the consequences of oral diseases follow PLP even after serving a prison sentence, further adding to social stigma and psychological barriers faced by this population, and complicating issues around self-esteem and reintegration into society (Priwe & Carlsson, 2018). Based on the aforementioned considerations, it is contended that the prison environment can be analyzed from two standpoints. On the one hand, prison can be seen as an impediment to accessing healthcare, including oral health services. On the other hand, from a prevention perspective, primary oral healthcare and interventions in prison can promote positive health behaviors and effectively tackle these issues (Wickramasinghe et al., 2022). The relationship between incarceration and oral health disparities is multifaceted and can be explained also in part, by socioeconomic status and health behaviors. Additionally, behaviors associated with incarceration, such as substance use and poor oral hygiene practices, further exacerbate oral health disparities after release. The lack of integration between prison health systems and dental health services poses significant challenges for formerly incarcerated individuals in accessing oral healthcare and successfully reintegrating into society (Testa & Fahmy, 2020).

This global review examines factors influencing oral healthcare delivery in prisons, including available services and resources, worldwide, and highlights the need to assess the demand for oral health services and the overall oral health conditions within prison settings. It also examines the barriers and facilitators that impact timely access to oral care, recognizing their role as either enablers or barriers to promoting good oral health practices. With a focus on the unique challenges of providing oral health services in correctional environments, this pioneering review offers insights that inform dental policy and practice in prisons, aiding the development of targeted interventions. It contributes to the field's understanding of the need for comprehensive oral healthcare in prisons and sets the stage for future research and interventions in this critical area.

## 2 | METHODS

### 2.1 | Data identification

A scoping review methodology was employed to investigate the extent and characteristics of the existing literature on oral healthcare provision within prison settings. Various delivery mechanisms are covered in this review, as well

as studies conducted across countries with varying justice systems. This study followed the five-stage process delineated by Arksey and O'Malley (Arksey & O'Malley, 2005), which includes the following steps: (1) defining the research question, (2) identifying pertinent studies, (3) selecting relevant studies, (4) extracting data from the studies, and (5) collating, summarizing, and analyzing the included literature. This study adhered to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses Extension for Scoping Reviews (PRISMA-ScR) guidelines (Page et al., 2021) to ensure transparency and comprehensiveness in reporting. Moreover, as the review did not involve human subjects, it was exempt from institutional ethical approval.

The identification of the research question was guided by the following questions: *What services are available to provide oral healthcare in prisons? and what are the barriers and facilitators to providing oral health in prison?* The definition of oral healthcare services for the present review includes all activities encompassing the prevention, diagnosis, treatment, and follow-up visit for oral diseases and disorders.

## 2.2 | Search strategy

A systematic literature search was conducted using five databases from different disciplines: PubMed, Cumulative Index to Nursing and Allied Health Literature (CINAHL), Cochrane Library, Web of Science, and ScienceDirect. To optimize search sensitivity the strategy employed involved intentionally utilizing broad search terms incorporating both oral health and prison as primary concepts. Boolean operators, specifically "OR" and "AND," were utilized to either merge or segregate search terms, complemented by Medical Subject Headings (MeSH) terms. The following combination proved to be the most appropriate for the study after testing various term combinations for PubMed search:

[(Prison\* OR Inmate OR Inmates OR Penitentiaries OR Penitentiary OR Jail OR Jails OR Detention Center OR incarcerat\*) AND [dental health OR oral health OR dental treatment OR Mouth Diseases OR Disease, Mouth OR Diseases, Mouth OR Mouth Disease OR Diagnosis, Oral]]. The search terms were modified for each database separately and employed. The search scope was limited to literature published within the past two decades, from January 2002 to August 2022.

To obtain grey literature, exclusively official webpages were employed. These sources encompass international and governmental entities and professional organizations that advocate for the welfare of PLP. To ensure an all-encompassing scope of the literature, a manual search was also conducted on the reference lists of incorporated studies.

## 2.3 | Inclusion/exclusion criteria

In this study, all papers were chosen for analysis through an initial screening process based on their titles and abstracts. This screening process aimed to identify articles that met the inclusion criteria. There were no limitations on publication country or language, and all types of study designs were considered. The inclusion criteria for this study included published studies, original articles, peer-reviewed papers, official reports, and studies specifically focused on oral health within prison settings worldwide. We included studies conducted in various prison setting. On the other hand, the initial exclusion criteria were articles related to health in prisons that did not specifically address oral health outcomes. Additionally, study designs such as reviews, methodology papers, study protocols, and nonobservational studies were excluded.

EndNote reference management software was used to efficiently organize and manage the publications identified. To streamline the process, we imported selected articles into an EndNote library and removed any duplicates or papers lacking complete identification data. The other software used to support the methodology process was Rayyan AI-powered tool for systematic literature reviews. It contributed to reducing the risk of bias

and to ensure that all potentially relevant papers were reviewed. The tool was employed to assess the relevance and pertinence of the papers selected by two independent reviewers (A. A. and B. M.). This initial screening process involved analyzing the titles, abstracts, and outcomes of all records and resulted in the identification of a pool of full-text articles that could be eligible for inclusion in the study. Any disagreements between the two reviewers were discussed and resolved to reach a consensus.

## 2.4 | Quality assessment

Selected papers underwent a second assessment to evaluate their quality. This assessment was based on the National Institute of Health's quality assessment tools for quantitative research and the Critical Appraisal Skills Program (CASP) checklist for qualitative research (Critical Appraisal Skills Programme, 2018). The Consolidated Health Economic Evaluation Reporting Standards (CHEERS) (Husereau et al., 2022) were used as a quality assessment tool for publications that utilized cost-effectiveness analysis or mathematical modeling approaches. A panel of four independent reviewers (A. A., B. M., S. M., I. M.) was tasked with assessing the quality of the studies. This assessment was conducted using a set of predefined evaluation domains, which included the clarity of the research aims, appropriateness of the research question, research design, rigor of data collection and analysis, study findings, author's acknowledgment of possible biases, ethical considerations, and value of the research.

## 3 | RESULTS

A total of 3942 publications were identified, consisting of 2720 peer-reviewed publications and 1222 from grey literature sources. After removing duplicates and screening titles and abstracts, 108 papers were retained, all of which were reviewed in full against the study inclusion and exclusion criteria. In total, 46 papers met the inclusion criteria (Figure 1).

### 3.1 | General characteristics of the included studies

Among the 46 included publications, 42 reported quantitative data and 4 reflected qualitative data about oral health services in prisons. All publications included in the review were original papers that had undergone peer-review. According to the World Bank's country classification by income (Serajuddin & Hamadeh, 2020), most of the included papers came from high income countries including Canada (1/46), Finland (2/46), Israel (1/46), Netherlands (1/46), Norway (1/46), Saudi Arabia (1/46), Sweden (1/46), United Kingdom (8/46), United States (3/46), and Italy (2/46); followed by upper-middle income countries: Argentina (1/46), Brazil (8/46), China (1/46), Russia (1/46), Kosovo (1/46), and South Africa (1/46). Lower-middle income countries reported were India (11/46) and Nigeria (1/46; Figure 2).

### 3.2 | Quality of the included studies

Results of evaluation indicated that none of the studies in this section reported high-quality evidence. Out of the 46 publications included, 21 had a moderate-to-high level of evidence, 21 had a moderate level of evidence, and 4 had a low level of evidence.

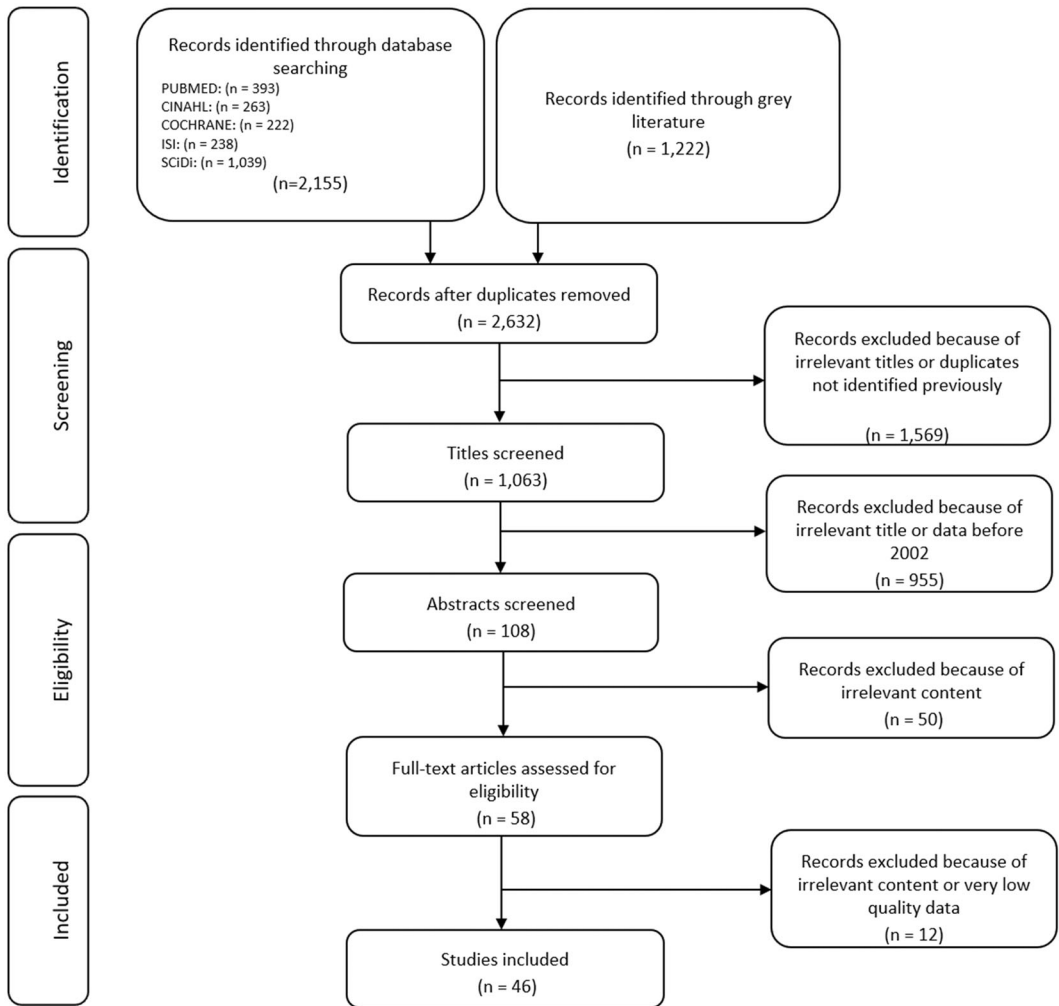


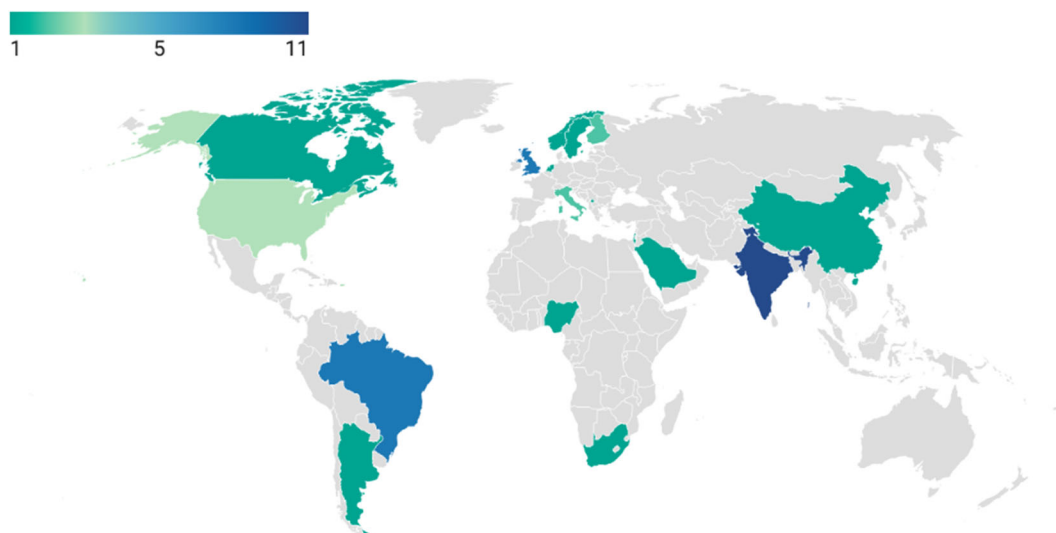
FIGURE 1 PRISMA chart of the included studies.

### 3.3 | Settings and samples

In 27 out of 46 of the included publications described the total population of the selected prison institutions ranged from 68 to 3200 detainees. Sample sizes of the included studies ranged from 16 to 1393. This review included studies with data reported from a variety of settings as follows: prisons (18/46), jails (9/46), other facilities (7/46), and combined institutions (5/46). The type of setting was not specified in 7 out of 46 of the included studies. In the vast majority of the publications, adult PLP was the main target population of the studies (39/46), while adolescents and young adults were studied in 7/46 publications. All publications reported the gender of the target population; male-only samples were reported in majority of them (24/46), followed by both genders (17/46) and female-only samples (5/46).

### 3.4 | Classification and analysis of data

Key findings were placed into a table to extract and organize the data (Table 1). Aspects considered were as follow: author, month and year of publication, country, study design, population described, type of setting, underlying



**FIGURE 2** Number of included papers by country.

diseases, medications reported, substance use, oral findings, duration of imprisonment, indexes used to assess oral health status, pain condition reported, availability of dental services, education programs applied, and determinants of provision or uptake of dental services.

The analysis revealed key themes related to oral health in prison settings, including the significant impact of substance use on oral and dental health, as evidenced by high prevalence rates of dental caries, periodontal diseases, and dental erosion. Various oral and dental health indexes were used to assess the severity and treatment needs, providing a comprehensive evaluation of oral health status in this population. Notable barriers to accessing dental services were identified at both individual and organizational levels, encompassing financial constraints, lack of awareness, and limited availability of dental services. Few facilitators, such as provision of oral health hygiene tools, aimed to improve oral health outcomes. The themes were generated through qualitative analysis, involving careful review of data, coding, comparison, and iterative discussions to ensure validity.

### 3.5 | Substance use

Out of the reviewed papers, one studied the effects of psychoactive substances on dental health (Vainionpää, Kinnunen, et al., 2019). The article analyzed the relationship between substance use, dental erosion, oral health, and the development of dental caries in a prison located in Finland. Based on the findings, the prevalence of erosive tooth wear (ETW) among Finnish prisoners in their thirties was frequently observed, and this condition is associated with dental caries and regular alcohol consumption.

Data on tobacco consumption in different forms (smokeless or smoking) among PLP were reported in half of the included publications (23/46). Conclusions from these studies pointed that participants' oral health profile was adversely affected by tobacco use, as smokers demonstrated poorer oral health compared to nonsmokers. Tobacco and oral cancer knowledge had no apparent influence on behavior modification among individuals living in prisons, as the prevalence of tobacco use remained high. The most frequently occurring oral mucosal lesions were leukoplakia and oral submucous fibrosis, reported in 6/46 of the total publications. Substance use or dependence were reported in publications where cannabis, crack, heroin, and intravenous drug use, were reportedly the most common substances among the samples. High alcohol consumption among PLP was reported in 8/46 publications.



**TABLE 1** General oral health, oral triage, and uptake of dental services in prisons from 2002 to 2022.

Author and year of publication	Country/region	Age in years	Medical history	Substance use as a risk factor	Index/score	Pain or dental emergency experience	Oral findings	Availability of dental services	Barriers to offer/uptake services
Donnelly et al. (2019)	Vancouver Canada	29–69	NR	NR	NR	"...6-month minimum waiting list, that's for an emergency situation..."	E, C,	Dental service reported. Teeth cleaning is no longer an option for anyone.	Stigma for marginalized and vulnerable and problem of scheduling appointments
Soares et al. (2019)	Curitiba, Brazil	19–60	Mental disorders	NR	DMFT, OHIP-14 CPI, OHRQoL	"pain" (23%) odds ratio reporting dental pain was 4.04	C, E, RF, PD	52% of the prisoners, the last dental treatment occurred at the penitentiary.	Lack of health professionals and material resources needed for medical, dental, and pharmaceutical care
Kondratyev et al. (2019)	Kotelnich, Russia	21–40	HIV, Hepatitis C	NR	DMFT, OHI-S	NR	C, STL, E, PD, G, Pulp/periapical, Cheilitis, glossitis, palatal nicotinic leukokeratosis	NR	NR
Rouxel et al. (2013)	Holloway, UK	18–59	NR	Reported	OIDP, DMFT PUFA-index	(73%) reported oral impact on daily performances	C, E, PD, RF	NHS Islington provides dental care to HMP Holloway.	Need for fully resourced oral health promotion activities in prisons. Ninety-seven percent

TABLE 1 (Continued)

Author and year of publication	Country/region	Age in years	Medical history	Substance use as a risk factor	Index/score	Pain or dental emergency experience	Oral findings	Availability of dental services	Barriers to offer/uptake services
Sharma et al. (2020)	Rajasthan, India	20–69	NR	NR	CPI, LOAs	NR	PD, C, E	NR	Limited number of dental professionals and resources. Difficult for prisoners to receive routine and appropriate oral healthcare.
Thetakala et al. (2018)	Karnataka, India	18–49	NR	NR	OHRQoL	NR	TMD, Bruxism, dental wear	NR	NR
Vainionpaa, Kinnunen, et al. (2019)	Vaala, Finland	21–61	MCDR	Reported	BEWE DMFT ICDAS	NR	ETW, Tooth wear BEWE C, PD, RF, E	All the clinical examinations available	Due to their clinical status and health behavioral patterns, they also remain at risk for oral diseases in the future
Zajmi et al. (2018)	Lipjan, Kosovo	19–35	NR	Reported	DMFT, OHI, CPI tartar index	NR	PD, C, E, RF, Bruxism, Oral breathing	Dental clinic, fully supplied, 1 general dentist available	No dental services; the inmates must be transported to the dentist who works in Lipjan prison

(Continues)

TABLE 1 (Continued)

Author and year of publication	Country/region	Age in years	Medical history	Substance use as a risk factor	Index/score	Pain or dental emergency experience	Oral findings	Availability of dental services	Barriers to offer/uptake services
Agrawal et al. (2011)	Rajasthan, India	6–18	NR	NR	OHI-S, CPI	NR	PD prevalence was 80.2%	NR	NR
Torwane et al. (2014)	Pradesh, India	34–55	Mental diseases	Reported	CPI	NR	STL, Oral in psychiatric inmates.	Dental chair in the dental unit of central jail, Bhopal	No standardized system of assessment and prioritization of the dental needs of prisoners
Buunk-Werkhoven et al. (2010)	Groningen, Netherlands	23–49	Mental illness	NR	OHIP-14NL OH-QoL, DAS	NR	STL	Patients in need received dental treatment at the center	Dental anxiety
Heng and Morse (2002)	Connecticut, US	20–65	NR	Reported	DMF and D/DF	NR	C, E, F	Dental clinic available in the prison	NR
Lunn et al., 2003	Winchester, UK	18–30	NR	Reported	DMFT	high incidence of dental pain	C, E, PD	Dental practitioner reported	Prison health staff reported care overall health (including oral health), whereas prisoners enter the system with high unmet health needs.

TABLE 1 (Continued)

Author and year of publication	Country/region	Age in years	Medical history	Substance use as a risk factor	Index/score	Pain or dental emergency experience	Oral findings	Availability of dental services	Barriers to offer/uptake services
Casarín et al. (2021)	Rio Grande do Sul, Brazil	15–19	MCDR	Reported	DMF	NR	C, E, DT, Prevalence of tooth loss	NR	NR
Cavalcanti et al. (2014)	Guarabira, Brazil	18–55	Exocrine disorders	Reported	DMFT, CPI	Dental pain, main reasons appointments	C, E, FR	Dental services are available. Eighty percent had their last dental appointment <1 year ago, visits occurring in prison (80%), restorative treatment (32%)	Obstacles include unavailability of professionals, low budget for maintenance of equipment and materials, security issues. Dental records not updated, limited information on dental services.
Heidari et al. (2007)	London, UK	19–34	MCDR	Reported	DMFT	Extractions to release pain	C, P, E, F, DT (54%) latest dental visit was during their previous conviction	The majority of prisoners have visited the dentist last year. Their most recent dental visit was in prison.	The Department Health's recommendations for short-term prisoners are pragmatic only
Boyer et al. (2002)	Iowa, US	17–53	NR	Reported	DMFT	Emergency dental care to relieve pain	C, E,	Two dental chairs in one room	NR

(Continues)

TABLE 1 (Continued)

Author and year of publication	Country/region	Age in years	Medical history	Substance use as a risk factor	Index/score	Pain or dental emergency experience	Oral findings	Availability of dental services	Barriers to offer/uptake services
Akaji and Folaranni (2013)	Enugu, Nigeria	15–66	It has a medical Center manned	Reported	OHI-S, DMFT CPITN	Injuries	DT, STL, E with mucosal burn, oral candidiasis, P, periodontal abscess. C.	Absence of oral healthcare facility	Lack of oral healthcare facility
Carvalho et al. (2021)	Recife, Brazil	18–70	NR	Reported	ANDREASEN DMFT	Injuries from violent events	C, DT	NR	NR
Fotedar et al. (2016)	Pradesh, India	Mean: 40.8 ± 6.3	NR	NR	DMFT, CPI	Pain reported by those having decayed teeth	C, E, B, PD shallow pockets, and deep pockets	No dental services for the prison inmates inside the prison hospital	Low utilization of preventive and therapeutic dental services
Harner and Riley (2013)	Philadelphia, US	NR	MCDR, injuries (accidents and fights)	Reported	NR	"You have to beg them to get in to see Medical. They ignore us."	Young women, showed missing, broken, and rotting teeth	Two prison dentists available for population of about 1600 women	Access to "medical." "Medical" (the terminology used by participants for the prison's physical health unit) was described as an overburdened and under-staffed unit where women sought care for health problems.

TABLE 1 (Continued)

Author and year of publication	Country/region	Age in years	Medical history	Substance use as a risk factor	Index/score	Pain or dental emergency experience	Oral findings	Availability of dental services	Barriers to offer/uptake services
Evensen and Næss (2019)	Stavanger, Norway	NR	NR	Reported	MPS	NR	C, E	Prison health-care service and dental hygienists reported	Prisoners explained irregular dental service due to poor finances, dental anxiety, or substance use
Engelberg-Gabbay et al. (2016)	Tel Aviv, Israel	20–58	Methadone control	Reported	Axis I TMD Dworkin/Leresche's	NR	SB, AB, C, Dental attrition	NR	NR
Buchanan et al. (2008)	London, UK	NR	NR	NR	OHI-S	Waiting list for emergency dental care	28.1% of the subjects had a good oral hygiene status. C, P.	NR	Experienced dentists working in the prison warned research team prisoners would be untruthful
Bolin and Jones (2006)	Dallas, US	12–17	NR	NR	DMFT NHANES III	ASTDD Seven-Step Model for urgency 6.2% had high urgency of treatment need	C, S, FR, P,	NR	A primary challenge is obtaining the greatest benefit for the most people with the available resources
Clark et al. (2019)	Salisbury, UK	24–49	blood-borne viruses	Reported	NR	NR	MT, E, C, MT	NR	Logistics in clinic appointment is difficult both for the prison service and the NHS and these affects the patient's care

(Continues)

TABLE 1 (Continued)

Author and year of publication	Country/region	Age in years	Medical history	Substance use as a risk factor	Index/score	Pain or dental emergency experience	Oral findings	Availability of dental services	Barriers to offer/uptake services
Dahiya and Croucher (2010)	Haryana, India	20–80	NR	Reported	NR	NR	NR	NR	NR
Barnette and Cornejo (2016)	Córdoba, Argentina	14–18	MCDR	NR	CPOD, MDFT OHIP-49	Dental pain functional limitation	C, E, FR	NR	NR
Marshman et al. (2014)	Sheffield, UK	20–35	NR	NR	OHIP-14	When in pain reported prefer extraction	SD, C,	Dental service available	Dental indifference
McGrath (2002)	Hong Kong, China	60>	NR	Reported	DMFT, CPI	NR	E, C, PD	NR	Authorities may be aware of the high levels of oral disease among inmates, and it consequences on the day-to-day living of the prisoners
Morosini et al. (2014)	Paraná, Brazil	15–19	NR	NR	DMFT	Store-and-forward teledentistry model reported	C 93.1%, 77.5% untreated. DT 10%, S, E, F.	NR	NR
Naidoo et al. (2005)	Cape Town, S. Africa	20–44	NR	Reported	WHO, CPI, DMFT, Sliness and Loe, Carter and Barnes.	NR	Chelitis, DT, E, G, Dentoalveolar abscesses, herpetic, and aphthous ulcers	Seventy-two percent reported that the dental services receive	NR

TABLE 1 (Continued)

Author and year of publication	Country/region	Age in years	Medical history	Substance use as a risk factor	Index/score	Pain or dental emergency experience	Oral findings	Availability of dental services	Barriers to offer/uptake services
Nobile et al. (2007)	Calabria region, Italy	20–81	NR	NR	DMFT, DMFS, CPI	NR	C, F, PD, E	Dental services are provided on demand by visiting dentists on a regular basis	This study reported that the increasing age and the decreasing frequency of tooth brushing were accompanied by a significant increase of the various dental health indicators
Oliveira et al. (2015)	São Francisco, Piracara, Brazil	15–19	NR	Reported	Dean's Index, OHIP-14 DMFT.	Reported discomfort in mouth	C, PD, DT, malocclusion Fluorosis	NR	Adolescents may exaggerate reports of negative impact on OHRQoL to obtain priority with regard to dental treatment
Cavallo et al. (2014)	Campania, Italy	19–69	Anxiety depression	Reported	EuroQoL EQ-5D, DMFT	43.9% reported pain/discomfort	B 29.2%, C 12.62	26.4% reported pain attended inside prison. 32% restorative treatment, 17.6% extractions	NR

(Continues)



TABLE 1 (Continued)

Author and year of publication	Country/region	Age in years	Medical history	Substance use as a risk factor	Index/score	Pain or dental emergency experience	Oral findings	Availability of dental services	Barriers to offer/uptake services
Prive and Carlsson (2018)	Malmö, Sweden	20–79	MCDR	Reported	DMFT, CPI	Caused by trauma, caries lesions, and infections of teeth, jaws	C, PD, E, RF	Basic dental care is provided only for those with an incarceration period exceeding 24 months	An emergency treatment is temporary, and a permanent treatment must be done in the near future
Gray and Fawcett (2014)	Belfast, UK	16–21	Medication history	Reported		Three percent prioritized as emergency and seen immediately	C, E, PD 41%, MT 22% T 22%	Dental clinics available	Need for strategically address problems with waiting times and inequity in service utilization
Rawlani et al. (2019)	Amravati, India	NR	NR	Reported	WHO (1997) proforma	NR	Mucosal fibrosis FR, E, STL, C, leukoplakia, attrition abrasion	NR	There is a need for building up a sustainable tobacco cessation and a counseling program for the inmates to help them quit tobacco
Reddy et al. (2012)	Karnataka, India	18–54	NR	Reported	OHI-S, CPI DMFT LOA	Pain, swelling, and infection reported	Oral submucous fibrosis, Ulcers, leukoplakia C, E, PD,	Only two out of seven had part-time visits of dentists and permanent dental healthcare facilities	Lack of awareness reported from those who never visited dental services

TABLE 1 (Continued)

Author and year of publication	Country/region	Age in years	Medical history	Substance use as a risk factor	Index/score	Pain or dental emergency experience	Oral findings	Availability of dental services	Barriers to offer/uptake services
Rodrigues et al. (2014)	Campina Grande, Brazil	18–65	NR	NR	CPI, DMFT	Fifty percent Pain in the last 6 months led to extractions	C, RF, PD, E	Lack of dental office installed at the penitentiary	Limited access to preventive and treatment measures
Andrews (2015)	Glamorgan, UK	15–18	Mental disorders	NR	NR	Pain might be present with third molar symptoms	One or more third molars clinically erupted	Dental unit for treatment	Accuracy of age implications for protection seekers under international humanitarian laws and for those who are sentenced under criminal law
Alkhadra (2017)	Riyadh, Saudi Arabia	12–17	NR	Reported	DMFT, OHI	Services only in severe pain	C	Have dental services	Prisoners may use it only in emergency situations
Motghare et al. (2021)	Durg, India	20–69	NR	Reported	CPI, LOA	NR	PD	NR	Deteriorating condition of prisons, understaffed for general and oral healthcare and rarely have dental services and dental health check-up
Vainionpaa, Kinnunen, et al. (2019)	Vaala, Finland	21–61	MCDR	Reported	DC/TMD Axis I protocol	TMD symptoms, pain and headache	TMD symptoms during the preceding 30 days	Dental clinical services available	NR

(Continues)

TABLE 1 (Continued)

Author and year of publication	Country/region	Age in years	Medical history	Substance use as a risk factor	Index/score	Pain or dental emergency experience	Oral findings	Availability of dental services	Barriers to offer/uptake services
Pallavi et al. (2018)	Madhya Pradesh, India	5–20	NR	Reported	OHI-S, CPI DMFT Vermillion	NR	PD 16.7%, E, C, RF	NR	Multifactorial influence on oral health status of detainee population, oral health promotion and intervention programs should be targeted
Bansal et al. (2012)	Haryana, India	35–74	NR	Reported	CPI probe	46.2% toothache	C, 912 subjects had never visited a dentist	Dental surgeons and infrastructure to carry out dental treatments	Prisons lacked dental manpower and equipment. Taking PLP out to a hospital, involves many security issues.

Abbreviations: AB, awake bruxism; B, bruxism; BEWE, Basic Erosive Index; C, cavities; CEJ, cemento-enamel junction; Co, complications; CPI, Community Periodontal Index; CPITN, community periodontal index of treatment needs; DC, diagnostic criteria; DMFT, decayed missing and filled teeth; DT, dental trauma; E, edentulism; ETW, erosive tooth wear; F, female; FR, filling/restorations; G, gingivitis; I, Index; ICDAS, international caries detection and assessment system; LOA, Loss of Attachment Index; M, male; MT, maxillofacial trauma; NA, not available/applicable; NR, not reported; OA, original article; OH, oral health; OH-QoL, oral health-related quality of life; OHI-S, Oral Hygiene Index-Simplified; OHIP-14NL, Oral Health Impact Profile Questionnaire; OHIP-49, oral health impact profile; OHRB, oral health related behavior; PD, periodontal disease; PH, poor hygiene; S, sealants on permanent molars; SB, sleep bruxism; STL, soft tissues lesions; TL, tooth loss; TMD, temporomandibular symptoms.

It was found that substance use was identified as a risk factor in PLP and can negatively impact their oral health. Specifically, long-term substance use was reportedly associated with stomatognathic hyperactivity, therefore resulting in temporomandibular disorders.

### 3.6 | Oral health status

This review did not find any records of past oral health check-ups in the sample papers. It was not possible to disentangle the complex relationship between the oral health topics and health outcomes for PLP. In this review, the major themes reported were quality of life (7/46), dental caries (6/46), oral health needs (4/46), disorders of the temporomandibular joint (4/46), tooth loss (2/46), oral soft tissue lesions (3/46), periodontal diseases (2/46), oral cancer (1/46), hygiene practices (2/46), maxillofacial (1/46) and dental trauma (1/46), third molars retention (1/46), dental urgencies (1/46), tobacco habits, (2/46), drugs (2/46), oral cancer (2/46), oral health access (1/46), use of dental services (2/46), oral health improvement (1/46), teledentistry (1/46), and nutrition (1/46).

Information regarding the episodes of oral pain, toothache, and swelling among PLP was reported in 20 out of 46 of the papers included. Of the assessed studies, half (23/46) reported the availability of dental services within the prison setting. The remaining papers reported the absence of oral health facilities (4/46), only emergency treatments being available (1/46), or the requirement for logistical arrangements for external dental services (2/46). In 16 out of the 46 papers, no information was provided regarding the availability of dental services within the prison setting.

### 3.7 | Oral and dental health indexes and scores

In this review was included a subset of studies (36/46) that utilized indexes and scores to establish a standardized and systematic approach to measuring and comparing oral parameters. These measures enable consistent evaluation and monitoring of oral health status. The assessment process involved Type III clinical examinations conducted in a dental chair within the dental unit, utilizing a mouth mirror and community periodontal index probe. To ensure a comprehensive evaluation, the collected information was categorized into two main groups: oral health and dental health.

#### 3.7.1 | Oral health indexes and scores

The Community Periodontal Index (CPI) was reported in 9 out of 46 papers included. This index indicates periodontal disease among PLP (code ranges from 0 meaning *healthy gingiva* to 4 *deep periodontal pockets*) (Greene & Vermillion, 1964). In included studies the results conveyed poorer oral health knowledge and negative attitudes toward oral health among PLP compared to the general population. Risk factors were identified such as tobacco and other substance use, dental indifference and lack of regular checkup were present (Agrawal et al., 2011; Akaji & Folaranmi, 2013; Fotedar et al., 2016; McGrath, 2002; Pallavi et al., 2018; Reddy et al., 2012; Sharma et al., 2020; Soares et al., 2019; Motghare et al. 2021).

The Community Periodontal Index of Treatment Needs (CPITN) is a dental index used to assess periodontal health and treatment needs in a population. It categorizes periodontal conditions into five codes, ranging from *healthy tissues* (Code 0) to *deep pockets* (Code 4), providing an overview of the prevalence and severity of periodontal conditions within a community (Petersen, 2013). This index is used in one article. Results from Bansal et al. (2012) indicated 80% of dental need of PLP, although use of oral services from government are provided at no

or little cost. While most studies mentioned a subjective need for dental treatment based on their findings and scores or through a triage system: for example, Gray and Fawcett (2014).

This study includes three papers reporting on the periodontal loss of attachment LOA index, (Reddy et al., 2012; Sharma et al., 2020; Motghare et al. 2021). This measurement determines the severity of periodontal disease typically expressed in millimeters and represents the distance between the cemento-enamel junction (CEJ) and the bottom of the periodontal pocket. Results found in these papers showed burden of periodontal disease in more than the half of the studied population. The authors found that planning appropriate oral health interventions is necessary to improve the health outcomes of the tissues that support teeth.

In total 6/46 papers used OHIP-14NL (Buunk-Werkhoven et al., 2010; Fotedar et al., 2016; Marshman et al., 2014; Mc Grath, 2002; Oliveira et al., 2015; Soares et al., 2019), which is a self-reported questionnaire designed to assess the impact of oral health conditions on an individual's quality of life. The questionnaire is a shortened version of the Oral Health Impact Profile (OHIP) (Slade, 1997). Result of these studies showed significant and accounted variance in oral health and quality of life (OH-QoL). Results agreed that oral hygiene behaviors have a positive impact on OH-QoL. Additionally, dental anxiety is a major component and influence PLP's mental and physiological functioning.

The term OH-QoL stands for Oral Health-Related Quality of Life, which measures how oral health issues affect a person's overall well-being. We found OH-QoL assessed in two papers through questionnaires that cover different aspects of oral health and its impact on daily activities (Slade, 1997). The scoring range of OH-QoL questionnaires may differ depending on the tool used, but typically ranges from 0 to 100. Higher scores indicate better oral health-related quality of life, while lower scores suggest greater impairment and negative impact on daily functioning and overall well-being. According to Buunk-Werkhoven et al. (2010), Marshman et al. (2014), and Oliveira et al. (2015), individuals with oral health problems have a lower quality of life and tend to be more concerned about greater negative effects on their oral health. Their oral health behaviors can also affect their overall well-being.

Dworkin and Leresche's assessment scale for Temporomandibular Disorders (TMD) is a widely used tool for evaluating the severity and impact of TMD symptoms. The scale assesses several domains, including pain intensity, functional limitations, jaw movements, and psychological factors from 0 to 3. While Enguelberg-Gabbay et al. (2016) showed that there is a direct or indirect association between methadone maintenance treatment and sleep bruxism in male prisoners, for Vainionpää, Tuulaniemi, et al. (2019) results showed that prevalence of self-reported TMD symptoms and clinical assessed was 76%, considered high among Finnish PLP.

The Oral Hygiene Index-Simplified (OHI-S) 7/46 is a simple tool for assessing oral hygiene practices. Scores range from 0 to 3, with higher scores indicating "poor oral hygiene" (Greene & Vermillion, 1964). Studies suggest that poor oral hygiene tends to worsen over time (Agrawal et al., 2011; Akaji & Folaranmi, 2013; Alkhadra, 2017; Reddy et al., 2012; Zajmi et al., 2018). As a result, oral hygiene instruction is needed to improve oral health. According to Pallavi et al. (2018) study, the oral hygiene of the participants was classified as "fair." This aligns with the overall results of the study, which highlights the benefits of providing access to preventive oral health treatments in prisons.

Oral Health Related Behavior (OHRB) refers to an individual's behavior within the social context of their culture's typical lifestyles. The specific ranges and scores can vary depending on the study design. In this review 2/46, the impact of nutrition (Sharma et al., 2020) and tobacco use (Akaji & Folaranmi, 2013) was included concerning OHRB. Studies have shown that individuals who have poor health are more likely to experience declining dental health, particularly among older adults and those who have spent extended periods in jail.

### 3.7.2 | Dental health indexes and scores

Decayed, Missing, and Filled Teeth (DMFT) is a dental indicator used to measure the prevalence and severity of dental caries in a population or an individual, and scores range from 0 to a higher number (WHO, 1997). The DMFT was used in 22/46 studies included (Akaji & Folaranmi, 2013; Bolin & Jones, 2006; Cavalcanti et al., 2014; Fotedar

et al., 2016; Heidari et al., 2014; Heng & Morse, 2002; Kondratyev et al., 2019; Lunn, 2003; McGrath, 2002; Morosini et al., 2014; Naidoo et al., 2005; Nobile et al., 2007; Oliveira et al., 2015; Priwe & Carlsson, 2018; Reddy et al., 2012; Rodrigues et al., 2014; Rouxel et al., 2013; Sharma et al., 2020; Soares et al., 2019; Vainionpää, Tuulaniemi, et al., 2019; Zajmi et al., 2018). The findings suggest that there is limited access to preventive and treatment measures, as well as a lack of dental care planning from organizational institutions. This resulted in mutilating treatments and is compounded by deleterious habits and inadequate availability of dental services. On the other hand, Carvalho et al. (2021) and Pallavi et al. (2018) showed that low mean DMFT (score 1 to 4) in their studies, which can be credited to the effective use of preventive and therapeutic dental services.

The Dean's Dental Fluorosis Index (DFI) was included in two papers (Fotedar et al., 2016; Oliveira et al., 2015). This measure divides the severity of dental fluorosis into six categories ranging from 0 (*no fluorosis*) to 5 (*severe*). This classification system provides a standardized method for evaluating and categorizing the severity of fluorosis based on visible changes on the tooth surface. The Basic Erosive Wear Examination (BEWE), included in one paper (Vainionpää, Tuulaniemi, et al., 2019) is a dental index used to assess the severity of ETW. The categorization system of BEWE ranges from 0 to 3 (Bartlett et al., 2008). The study included for this review found that both ETW and daily alcohol consumption are linked to dental caries.

### 3.8 | Barriers to accessing dental services

The studies reviewed in this paper have highlighted a range of potential barriers to accessing oral healthcare in prisons. The identified challenges can be broadly categorized into two components: the first one will be entitled organizational component barriers and encompasses the various structures and systems put in place to ensure that the health needs of PLP are adequately met. The second component identified in this review was categorized as individual component barriers, which focuses on each individual's specific health needs and behaviors related to attitudes toward self-care, trustworthiness among staff and PLP, and dental anxiety stemming from stress associated with dental consultations.

#### 3.8.1 | Organizational component barriers

In this category we classified elements that pertain to the system, facilities, and decision-making processes. Therefore, many factors fell into this category: budgeting and financing issues as a barrier to accessing oral healthcare in prisons (1/46), deteriorating conditions in the prison setting and facilities (1/46), insufficient dental staff (4/46), lack of a dental service office with appropriate equipment (2/46), only emergency usage (1/46), not preventive check-up (1/46), long waiting list (3/46), burden of unmet health needs (1/46), and lack of better data sources (1/46), were related to the system reactivity identified from the included studies.

#### 3.8.2 | Individual component barriers

In addition to institutional challenges, individual challenges for uptake of oral health in prisons refers to the specific barriers that PLP may face in accessing and utilizing dental care while incarcerated. These challenges can be influenced by various factors, including personal attitudes and beliefs, access to dental care services, and the overall prison environment. In this review behavioral reasons such as security concerns during the transfer (PLP fear of custodial staff) (1/46), dental anxiety (1/46), mistrust about the capabilities of dental staff (1/46) and indifference to dental health (5/46) were also reported in the included studies. One paper described characteristics of overuse of

dental services, mostly to spend some time out of their cells, this study also mentioned that PLP tend to lie about dental pain or emergencies to avoid waiting lists (1/46).

### 3.9 | Facilitators to accessing dental services

Only one study reported the implementation of motivational interviewing to improve the performance of PLP in terms of service uptake and oral health behavior, although implemented for research purposes (Evensen et al., 2021). Apart from that, we did not find published information on the availability of any other facilitating interventions including peer-led or other forms of education or provision of services through external healthcare providers for example, NGOs to increase the uptake of oral health services in prisons. However, availability of oral health services in prisons per se is a potential facilitating factor to increase service uptake in prison settings, as documented in 23 included publications.

## 4 | DISCUSSION

This unique global review draws attention to the scarcity of oral healthcare resources within prisons, underscoring the persistent challenges in embracing the "Mandela Rules" (UNODC, 2016) in terms of recognizing PLP entitlement to receive the same treatment as community outside the prison walls. The various themes described emphasize the urgent need for addressing dental neglect, together with cohesive relationship between policies, governing dental services in correctional institutions, and the provision of timely, evidence-based, and respectful oral healthcare to PLP, as this represents a substantial public health concern.

This review concentrates on identifying the key areas that pose challenges to oral healthcare practices for PLP, as well as identifying potential facilitators, given the dearth of published interventions in this domain. Valuable insights and practical strategies for promoting oral health interventions for PLP were collected from a worldwide perspective. The use of qualitative methods to elucidate global oral health, centered on the viewpoint of PLP who encounter challenges accessing these interventions as a component of a broader phenomenon (Tracy, 2010).

The vast majority of the included records in this review focused on collecting status through different indexes. Most common index in juvenile prison settings was OHI-S, demonstrating that high scores are strongly associated with poor oral hygiene (Alkhadra, 2017). Even though periodontal diseases are highly preventable, long periods of incarceration are associated with OHI-S scores, resulting in negative cumulative effect of plaque, and calculus that increases with age of the population (Motghare et al., 2021). Despite the availability of dental services in prison settings, the DMFT scores remain high at 5.26% (Reddy et al., 2012). Long waiting lists and limited availability of specialized treatments contribute to the neglect of oral health conditions, ultimately resulting in painful experiences and severe damages leading to tooth loss. This condition of edentulism has a significant impact on individuals seeking to reintegrate into society after release from prison (Rodrigues et al., 2014). Recognizing these challenges, this review aimed to examine the various perspectives regarding the coverage and accessibility of oral health services, with a focus on identifying the necessary measures to address these oral health needs.

According to the included studies, it can be deduced that the existing literature on oral health in prisons primarily focuses on gathering information and evaluating the oral health requirements of PLP, indicating an initial phase of research. However, not all triage processes incorporate a self-perception approach of PLP as patients, and this absence of involvement translates into disparities between the outcome and future intervention (Gray & Fawcett, 2014). Implementation of self-reported Oral Health Related Behavior (OHRB) index, should be utilized more often in prisons (Timková et al., 2019). While there are different scoring systems available to assess oral health habits and routines, such as regular brushing, frequent dental check-ups, proper sanitation for brushing teeth, and the correct use of floss or other cleaning tools, it can be difficult to standardize these criteria (Rouxel et al., 2013).

By customizing the OHRB index for each prison context, it can accurately assist identifying specific areas that need improvement more comprehensively and transdisciplinary.

Few studies have been conducted to implement public health programs focusing on oral health in prison. Positive outcomes in periodontal tissues resulted from the provision of dental hygiene kits to PLP, accompanied by motivational interviewing, which have demonstrated this intervention's feasibility (Evensen et al., 2021). Therefore, through empowerment with the aim of self-efficacy, uptake of hygiene habits will make a significant progress in dental public health (McLeod et al., 2019). Improvements on this area, compliance with frameworks, and PLP-staff relationships in terms of health promotion and health system trust could be an attention focus for further research in prison health, in specific oral health in prison settings.

Despite the lack of implementation of programs championing oral health in prisons, innovative options have been explored for oral health in prison settings, such as introducing teledentistry for diagnosis. Successful remote oral health status was obtained, with similar results to those performed by traditional visual inspection, supported in auxiliary diagnostic methods such as X-rays and clinical photography when in doubt (Morosini et al., 2014). It is important to mention that the role of prison staff regarding health promotion remains unclear, not only in training toward oral health promotion, but also for implementation of high-quality technology resources when most basic necessities remain a challenge worldwide.

This review also observed a need for more attention in the existing literature toward broader factors, such as the penitentiary institution's conditions, identified as an organizational barrier. Thus, behaviors associated with oral health and lifestyle risk factors in prison settings depend not only on the individuals themselves, who have little ability to control, but must be endured because of the social determinants of health of their context (Janakiram & Dye, 2020). Chronic untreated oral diseases have significant personal consequences, including persistent pain, decreased quality of life, and negative impacts on education, family life, and work productivity. These consequences contribute to the overall social determinants of health for individuals, including those living in prison. Moreover, the economic burden of oral diseases on households and healthcare systems further exacerbates existing health inequities (Peres et al., 2019). Therefore, while individual factors such as motivation are essential for successful behavior, the environment must reinforce good oral health, as stated on Andersen's model (Donnelly, 2019) where the advancement of concepts relies upon incorporating PLP in social and environment variables.

A limited number of studies assessing mucosa and soft tissue lesions in PLP were identified, while substance use is described in prison settings as an issue of significant concern. Tobacco used in different forms, has a potential to harm oral soft tissue creating lesions that evolve into malignant up to 5% in a year period (Arjun et al., 2014). Among the most common conditions including oral mucosal burn, oral candidiasis, and leukoplakia (Akaji & Folaranmi, 2013), not all of them evident on the mucosal surface. Raising awareness among PLP about substance use implications in health is proposed in included studies of this review, such as tobacco cessation programs (Rawlani et al., 2019). However, this action requires sustainable efforts and specialized long terms commitments.

The review suggests that health promotion is still perceived more as a reactive measure associated with acute healthcare actions than long-term community health results. As of now, prisons are primarily concerned with promoting individual health and preventing disease (Woodall & South, 2012), unlike public health that aims to focus on providing health-promoting environments at a community level, to achieve positive implications for PLP. An exceptional benefit to promote health in prison settings is the considerable proportion of them, who trust healthcare services provided within the prison setting (Marshman et al., 2014; Rodrigues et al., 2014). It is likely that PLP reported their last dental appointment taking place within the penitentiary as a cause of pain deteriorating their life quality (Soares et al., 2019). Use of dental services was repeatedly evidenced to be highly symptom-related. A strong association was established between 92.1% of use of dental services and high scores of DMFT and DMFS (Nobile et al., 2007). Hence, by covering the components of the organizational structure, through the availability of dental services, the gap in oral health promotion is expected to be reduced.

Another organizational issue to be considered is the provision and restocking of basic hygiene implements for oral health, suggested by the WHO (2014) "Health in prisons: a WHO guide to the essentials in prison health" and



which according to this review remains a challenge worldwide. Literature points out that toothbrushes are part of the items that should be confiscated in prisons, for their high-risk potential to be modified into daggers, shanks (homemade knives), darts, and spears increasing violent episodes for PLP (Lincoln, 2006). Instead, offering tooth powder and salt as an alternative for brushing teeth has been adopted to promote dental hygiene in some prisons (Motghare et al., 2021). A lack of scientific research has been considered to support this practice, due to the potential consequences caused in oral health like pressure applied, amount and irregularity of grain size. Research has shown that toothpaste vary greatly in their relative enamel abrasiveness and relative dentin abrasiveness values, resulting in statistically significant differences in absolute wear on enamel and dentin (Dobler et al., 2023). Abrasion can contribute to the development of cavities, turning enamel more vulnerable to the accumulation of local irritants in the irregular surface created and subsequent development of dental decay, especially in individuals with poor oral health.

It is accurate to point out that PLP population has a particular susceptibility to affecting their enamel layer. The use of substances among PLP is another factor that can exacerbate the deterioration of enamel surface quality and increase the risk of cavities. Research has indicated that PLP and individuals with high alcohol consumption are at greater risk for ETW, especially if they have previously experienced dental caries (Vainionpää, Tuulaniemi, et al., 2019). To effectively promote oral hygiene in prison settings, it is important to provide hygiene products that clean teeth and provide superior performance in promoting remineralization and protecting against dental erosion (Fowler et al., 2021), specifically for PLP using substances.

Treatment of substance use disorder among people in prison and following release is another aspect to be improved as an alliance between institutions to improve oral health. Incorporating individual components, such as education on harm reduction education is a crucial aspect of health planning for prison settings. PLP influenced by addictive substances face challenges in oral hygiene practices, dental indifference, and adverse effects on health status (Shekarchizadeh et al., 2013). Therefore, besides other privileges, facilitating access to drug treatment services during incarceration and following release is a protective intervention to mitigate the burden of oral diseases among this vulnerable population.

Research indicates a strong correlation between tooth loss and all-cause mortality, as well as mortality related to cardiovascular diseases (Holmlund et al., 2010). Consequently, changes in oral health not only have an impact on systemic health, it also impacts on oral health-related to quality of life (Soares et al., 2019). Projects to support a referral system after imprisonment is also a structural necessity for PLP (Gray & Fawcett, 2014). NGOs advocating for substance use could use this review to inform and strengthen their efforts. This would promote sustainability in the reintegration process and prevent health relapse and health system breakdown. Additionally, it is crucial to disseminate these findings to other stakeholders involved, including ministries of health and justice, territorial health services, and research institutions.

## 4.1 | Strengths and limitations

This study thoroughly examined a significant number of papers regarding oral health in prisons for the last two decades. The researchers followed a strict methodology and used reliable quality tools and multiple scores and indexes measurements, making the findings trustworthy and credible. However, there are some limitations to the study that should be acknowledged. One major constraint is the scarcity of information available on this topic, which makes it challenging to conduct comprehensive research. Additionally, while there is a considerable amount of literature on the general health of prisoners, there need to be more studies that specifically address hindering factors in prison dental care and PLP personal experiences. Furthermore, it is important to acknowledge the potential lack of generalizability of findings from high-income countries to other contexts. The published literature suggests that knowledge production in the Northern Hemisphere dominates the field of oral health, influencing the dissemination and interpretation of information in this area (Aas, 2012).

Dental care systems globally should prioritize oral health promotion and maintenance while striving for greater equity. It is imperative to recognize that risk factors for oral diseases, such as sugar and substance use, are interconnected with various social and commercial determinants that contribute to the development of NCDs (Watt et al., 2019). To effectively tackle these shared risk factors, comprehensive regulation and legislation are needed that address these underlying determinants. Furthermore, it is crucial to establish clear conflict of interest policies and procedures to mitigate the influence of the sugar industry on research, policy, and practice to combat the commercial determinants of oral diseases and other NCDs. These priorities should be at the forefront of policy discussions and initiatives.

The perception of dental procedures that restore functionality, such as prosthetics or implants, as luxurious or cosmetic perpetuates inequities in access to oral health services (Stabley, 2022). This limited perspective exacerbates the challenges faced by the global population in performing basic functions including eating, speaking, and smiling. The prevailing focus on pain relief and extractions neglects the broader aspects described in this review of oral healthcare in prisons. Successful transition of PLP into a crime-free lifestyle is a matter of individuals' holistic well-being and quality of life.

## 5 | CONCLUSIONS

In conclusion, this review underscores the urgent need to prioritize and improve oral health conditions for individuals in prison settings. The identified barriers at both organizational and individual levels highlight the importance of addressing systemic barriers to enhance oral health provision in these environments. By implementing evidence-based interventions we can significantly enhance the oral health-related quality of life for individuals in prison. However, achieving sustainable improvements requires concerted efforts and interinstitutional support to position oral health as an integral component of overall health and well-being. Through a collaborative approach involving prison health services and a multidisciplinary team, will be effectively reduced the burden of oral diseases, ensure equitable access to essential and rehabilitation oral health services, and ultimately improve the oral health outcomes for PLP as a vulnerable population.

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## CONFLICT OF INTEREST STATEMENT

The authors declare no conflict of interest.

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