

# Impact of oral comorbidities on incarcerated women: an integrative review

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## ABSTRACT

**Introduction:** Oral health care directly impacts the well-being of incarcerated women. It is related to the quality of life, social and economic discrepancies and lack of access to programs that offer free dental services and health promotion for this population.

**Objectives:** This work aimed to understand oral health challenges faced by women incarcerated in Brazil and worldwide.

**Material and method:** The following databases were selected: EMBASE, (Virtual Health Library=LILACS+BDENF), Scielo, Scopus, Cochrane-Library and the PubMed search engine. These databases were searched until the closing date of October 2021 with no time limit for the searches. The key words used in the searches were “incarceration”, “prison”, “woman”, and “oral health”.

**Results:** Caries, periodontal disease, tooth pain, and the use of dental prostheses were the most prevalent oral health conditions amongst incarcerated women in Brazil and worldwide. Regarding the level of scientific evidence, the included articles fit level III, according to Melnyk and Fineout.

**Discussion:** Bearing in mind the limitations of the study, oral diseases in the global context showed that the quality of life related to oral and systemic health of women during and after incarceration was negatively affected. It is also essential for further clinical and follow-up studies to be carried out on incarcerated women that address their actual oral health needs.

**Key words:** oral health; women; prisons; review.

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## INTRODUCTION

In 2017, the Birkbeck Criminal Police Research Institute at the University of London, England issued a report entitled “World Female Imprisonment List,” which showed a significant increase in the global female prison population when compared to males<sup>1</sup>.

The health care system, when it exists, does not support the basic needs of incarcerated women, especially in an overcrowded prison system, as there are additional concerns regarding the reproductive menstrual cycle (pregnancy), maternity, and children’s

health<sup>2,3</sup>. The unhealthy environment of the prison system can bring about the emergence and dissemination of infectious and even chronic diseases, impacting the human rights of these individuals as a result of government negligence<sup>4,5</sup>.

Oral health care directly impacts the well-being of prisoners, and related diseases are generally related to quality of life, social and economic discrepancies and the lack of access to programs that offer free dental services and health promotion<sup>6</sup>.

In both developing and developed countries, a high prevalence of oral cavity diseases such as caries,

periodontal disease, and high rates of tooth loss have been observed amongst prisoners<sup>7,8</sup>. However, the incidence and prevalence of oral diseases in the incarcerated population has not yet been fully assessed, and the unsatisfactory oral conditions reported may come from situations of abandonment and social vulnerability experienced by inmates prior to incarceration, but further research is needed to confirm this hypothesis<sup>6,9,10</sup>.

It is known that incarcerated women have a history of neglect and unmet needs, while incarceration also contributes significantly to the development or worsening of oral conditions (Soares et al.)<sup>11</sup>. Activities to encourage oral health promotion and prevention for this group are therefore needed. According to Fadel et al.<sup>5</sup>, this context is also an obstacle for health professionals, who have to deal with social imbalances, problems and the unwillingness of the State to fulfill its obligations.

Thus, based on the assumption that oral health is essential for maintaining quality of life and the fact that its consequences can have an impact on systemic health, this study aimed to understand the oral health challenges of incarcerated women in Brazil and worldwide. For this, an integrative review of the scientific literature available on the subject was carried out.

## MATERIAL AND METHODS

This integrative review followed the methodological rigor described by Hermont et al.<sup>12</sup>, which provides support for new research, clinical resolutions in dentistry, and gaps in knowledge that need to be filled. The following methodological steps were followed:

1. Elaboration of the central question of this research.
2. Determination of the exclusion/inclusion criteria.
3. Searches in several databases.
4. Extraction of the selected data.
5. Analysis of the information obtained.
6. Discussion of the hypotheses raised.
7. Synthesizing the knowledge from the study.

### Integrative review research question

The objective proposed by this integrative review was to address the following guiding question: “What are the oral health conditions of incarcerated women in Brazil and worldwide?”. To this end, it followed the PICo approach (Population= Incarcerated women; Interest= Oral health conditions during incarceration

Oral health conditions and Context= Oral conditions identified by dentists amongst incarcerated women)<sup>13</sup>.

### Data sources and search strategy

Strategic searches were performed in the databases: Excerpta Medica database (EMBASE), Virtual Health Library= Latin American and Caribbean Literature in Health Sciences + Nursing Database (BVS= LILACS+BDENF), Scientific Electronic Library Online (SciELO), Scopus, Cochrane Library and the PubMed search engine. The included studies were published until October 2021, without the use of time restrictions for the search. The keywords used in the search were: “incarceration”, “prison”, “woman”, and “oral health” separated by the Boolean algorithm “AND” between words as shown in the diagram below. The term “incarceration” is commonly used to denote the correctional facility and the terms “incarceration,” “jail,” and “prison” are frequently joined in the American English language as described in Dumont’s et al.<sup>14</sup> study and applied by Baker et al.<sup>15</sup> in his integrative review. The references were exported to the EndNote™ Program version X7 (Thomson Reuters, New York, NY, USA) and duplicates were removed.

### Eligibility criteria

Articles published in full that exclusively addressed the theme of oral health conditions of incarcerated women and in the English language were included. Review articles, letters to the editor, brief communications and publications in proceedings were excluded.

### Selection and summarization of studies

The Rayyan selection platform was used to carry out the inclusion/exclusion of the articles and the included studies were critically analyzed in four important steps:

1. Reading of the title and abstract.
2. Full, systematized and critical reading of the selected information.
3. Summarization of the data by two calibrated and independent researchers (co-authors M.T.M.L. and R.U.O.S.), and in conflicting situations of the information, a third evaluator was selected (co-author F.I.D.C.).
4. Categorization of information was conducted according to the levels of evidence described by Melnyk and Fineout-Overholt<sup>13</sup>:
  - Level 1: Meta-analysis of multiple controlled studies.

- Level 2: at least one randomized controlled-trial.
- Level 3: Study with quasi-experimental design.
- Level 4: Experimental studies study with non-experimental design such as correlational and qualitative descriptive research or case studies.
- Level 5: Case report or systematically obtained data of verifiable quality or program evaluation data.
- Level 6: Qualitative studies and
- Level 7: Opinion of reputable authorities based on clinical competence or expert committee opinion, including interpretations of non-research based information.

The selected articles were summarized according to the instrument described by URSI<sup>16</sup>, identifying the author's name, year, country, sample number, paper title, study objective, research conclusion, and the level of scientific evidence as shown in Table 1<sup>17,18</sup>.

## RESULTS

115 publications were initially identified in the selected databases. Of these, 28 articles were in duplicity and 83 articles were excluded for not answering the guiding question. Thus, 4 original articles that evaluated the

oral health conditions of incarcerated women were retained (Figure 1).

The articles in this study were classified as scientific evidence level III, according to the classification of Melnyk and Fineout-Overholt (Table 1).

Table 2 shows the oral health conditions identified in the studies. Only one study reported periodontal disease and caries in incarcerated women (Soares et al.)<sup>11</sup>. There was no statistical difference among dental pain, tooth loss, and the use of prosthesis (Rodrigues et al.)<sup>19</sup>. On the other hand, significant differences regarding the impacts of oral health conditions on incarcerated women were pointed out by Soares et al.<sup>11</sup> and Moraes et al.<sup>20</sup>. In addition, Brazil was the country that predominantly reported the oral health conditions of incarcerated women (n=3-75%).

## DISCUSSION

This integrative review allowed us to determine which oral health conditions affect incarcerated women in Brazil and in the World. Determining these

comorbidities is important to outline public health policies for this segment of the population, since the prison system has structure deficiency, rarely presenting an ideal environment for humanized treatment.

Thus, the demographic profiles of these populations will be discussed, as well as their relationship to oral health conditions, such as caries, periodontal disease, dental pain, tooth loss, and the need for dental prostheses.

### Demographic profile of incarcerated women

The analysis of the sociodemographic profile of female inmates reveals that the predominant age group is between the second and third decade of life<sup>21</sup>, which matches the study conducted by Soares et al.<sup>11</sup> in Paraná, in which 42.9% of the women had an average age of 47.5 years and 47.5% were black.

In this context, the sociodemographic profile of prisoners is mostly young, poor, black and/or brown women, single mothers, with low education levels and who have committed crimes related to drug use or trafficking, according to Monteiro et al.<sup>21</sup>.

### Dental caries in incarcerated women

Given the various clinical conditions recorded amongst incarcerated women, it was possible to identify that caries is highly prevalent in this segment of the population. A study conducted in Brazil analyzed oral health conditions and their consequences in 305 women inmates at the prison of Paraná<sup>11</sup>. It was observed that 256 (83.9%) of them had cariogenic lesions in their oral cavity. Similar results were observed in Karnataka, India<sup>22</sup> and Malmo, Sweden<sup>23</sup> in which 97.5% and 66% of the prison population had at least one carious tooth in their oral cavity.

According to Walsh et al.<sup>24</sup> the high rate of caries occurs because the prison population is more inclined to practice habits deleterious to health, a strictly cariogenic diet and poor oral hygiene. Therefore, it can be seen that dental caries is a prevalent oral condition in the prison system in Brazil and in the world.

### Periodontal disease in incarcerated women

Periodontal disease is characterized as a dysbiotic disease that affects the supporting tissues of the oral cavity. Like caries, periodontal disease is also influenced by poor oral hygiene<sup>25</sup>.

Soares et al.<sup>11</sup>, found significant values for periodontal disease parameters. As such, imprisoned women had 66.9% gingival bleeding and 17.7% perio-

Table 1. Studies included in the integrative review.

Name/ Year	Country	Sample (n)	Title of the paper	Study objectives	Conclusion of investigation	Level of Scientific Evidence
Moraes et al. <sup>20</sup>	Brazil	99	Self-Perceived Impact of Oral Health on the Quality of Life of Women Deprived of Their Liberty	Measure the self-perceived impact of oral health on the quality of life of Brazilian women in detention.	Our study revealed the self-perceived impact of oral health on the quality of life of female inmates in a prison unit in Minas Gerais. The results show the need for greater investment in the prison system, in the sense of expanding and qualifying oral health services to allow access to vulnerable groups and reeducate them, and it is also expected that the findings of this research may support health strategies for women: incarcerated women not only in the municipality of Juiz de Fora but also for the entire female prison population.	Cross- sectional
Rodrigues et al. <sup>19</sup>	Brazil	65	Locked Mouths: Tooth Loss in a Women's Prison in Northeastern Brazil	Locked Mouths: Tooth Loss in a Women's Prison in Northeastern Brazil.	Given this context, there is need for better organization of the prison system in order to improve dental services and allow greater resolution and efficiency of the dental assistance aimed at this population. Therefore, there is a need for the implementation of actions intended to inform and promote oral health and prevent further tooth loss and prosthetic rehabilitation in order to restore the oral health of these women and thus to contribute to their social reintegration.	Cross- sectional
Soares et al. <sup>11</sup>	Brazil	305	Impact of oral conditions on the quality of life of incarcerated women in Brazil	Analyze the impact of oral health conditions on the quality of life	Based on these findings, we advocate that health assistance of imprisoned populations should be guided not only by the mitigation of oral health problems and oral rehabilitation, but mainly by the empowerment of detainees regarding self- care, prevention, and well-being, based on comprehensive care practices and health promotion.	Cross- sectional
Treadwell et al. <sup>29</sup>	United States	98	Implications for Improving Oral Health Care Among Female Prisoners in Georgia's Correctional System	The purpose of this study was to assess the barriers that impact female inmates' access to oral health care prior to incarceration within Georgia's prison and this study sought to determine the need for improved comprehensive oral care programs within Georgia's prison and the community at large and identify service and policy gap in the oral health network in Georgia to assist incarcerated women and those re-entering society with oral care needs.	Women, specifically those who reside within correctional settings, represent only a fragment of the total unserved population. Despite the overwhelming plurality of respondents understanding the need for care, cost and dental insurance status still hindered care attainment. Dentists, dental hygienists, organized dentistry, and policymakers must be engaged to support the development of policies and practices needed to reduce oral health disparities and advance oral health equity. Moreover, comprehensive solutions should be created that address the systemic challenges associated with establishing or maintaining an oral health home, providing quality oral health services, and reducing the costly burden of episodic care.	Cross- sectional

dental pockets. In the study by Testa and Fahmy<sup>26</sup>, incarcerated persons in the United States showed poor results regarding periodontal disease.

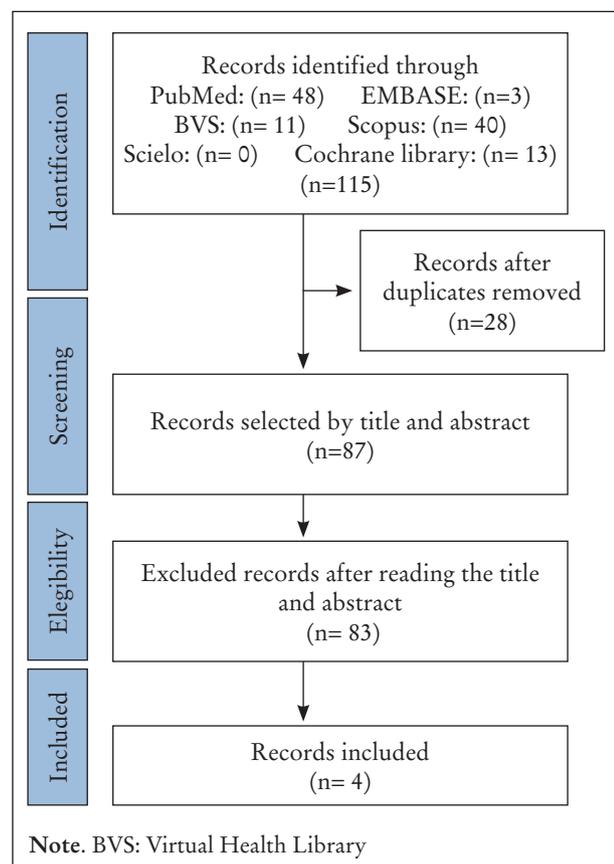


Figure 1. Flowchart and step-by-step sampling process.

In addition to insufficient oral hygiene associated with the lack of preventive measures and inefficient treatment for oral diseases, habits such as smoking are closely related to periodontal disease. The high rate of smokers has a considerable impact on high rates of periodontal disease in the incarcerated population. Therefore, it is inferred that women deprived of liberty are more likely to acquire unfavorable habits to both systemic and oral health, which significantly affects the quality of life<sup>27</sup>.

### Dental pain and tooth loss amongst incarcerated women

Dental pain can be caused by both odontogenic and non-odontogenic factors. Added to this, tooth loss, as described in the prospective longitudinal study by Velden et al.<sup>27</sup>, is related to caries, periodontal disease, education, gender, and smoking. Of these, caries was the most relevant factor. In this integrative review, the work of Soares et al.<sup>11</sup> and Rodrigues et al.<sup>19</sup> showed results regarding tooth loss (57% and 50%) and toothache (72% and 64.7%), as well as, a 40% association between these two variables<sup>11</sup>. Thus, there is an evident relationship between these results and the poor dental care offered to incarcerated women, since quick and conclusive treatment for pain is extraction<sup>11,19,20</sup>.

### Oral rehabilitation amongst incarcerated women

According to Bansal et al.<sup>28</sup>, prosthetic rehabilitation has the ability to reduce and or eliminate deficits

Table 2. Oral conditions reported in the studies affecting incarcerated women.

Name/ Year	Oral conditions	Sample (n)	Yes n (%)	No n (%)	Significance/ p value	
Soares et al. (2019)	Dental Caries	305	256 (83,9)	49 (16,1)	Sig.	
Soares et al. (2019)	Periodontal Disease	305	Bleeding	204 (66,9)	101 (33,1)	Not sig.
			Calculus	269 (82,2)	36 (11,8)	
			Shallow pockets	140 (45,9)	165 (54,1)	
			Deep pockets	54 (17,7)	251 (82,3)	
Rodrigues et al. (2014)	Dental Pain	24	12 (50,0)	12 (50,0)	Not sig.	
Soares et al. (2019)		305	174 (57,0)	131 (43,0)	Sig.	
Moraes et al. (2021)		99	33 (33,3)	66 (66,6)	Sig.	
Rodrigues et al. (2014)	Tooth loss	34	22 (64,7)	12 (35,3)	Not sig.	
Soares et al. (2019)		305	219 (72,0)	86 (28,2)	Sig.	
Rodrigues et al. (2014)	Prosthesis	65	19 (29,2)	46 (70,8)	No information	
Soares et al. (2019)		305	39 (12,8)	266 (87,2)	Sig.	

**Note.** Significant:  $p < 0.05$ ; Not significant:  $p > 0.05$ .

attributable to tooth loss<sup>28</sup>. In the studies of Rodrigues et al.<sup>19</sup> and Soares et al.<sup>11</sup> these needs were also identified in 29.2% and 12.8% of incarcerated women. The use of prostheses is extremely low in relation to the needs for their use in prison systems, going beyond problems related to the lack of dental elements, since deep changes in biological and biopsychosocial behavior are present in these segments of the population<sup>28,29</sup>.

### Partial study limitation

A partial limitation of this study is the lack of literature when the issue is the oral health of women in the context of the prison system. The lack of studies in other populations, as well as the low number of research articles that longitudinally associate the impact of oral diseases and the influence on quality of life during and after incarceration. Despite this, the articles included in the sample allowed us to delineate what oral comorbidities exist amongst incarcerated women in Brazil and abroad.

### CONCLUSION

The incarceration of women is an important social condition and determinant of their oral health conditions and may, consequently, jeopardize their well-being. Prison conditions and lack of adequate health care result in unfavorable health conditions for incarcerated women.

These results and the lack of studies related to the oral health of incarcerated women suggest the urgent need to know more about the oral health conditions of these women, so that health actions can be planned, both from a preventive and curative point of view. In addition, interest-based action and activities with other health stakeholders may contribute to improving the oral health conditions of this population.

### Conflicts of Interest

The authors declare that there are no conflicts of interest.

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### REFERENCES

1. Walmsley R. World Female Imprisonment List. Londres: International Centre for Prison Studies; 2006.
2. Sufrin C, Beal L, Clarke J, Jones R, Mosher WD. Pregnancy Outcomes in US Prisons, 2016-2017. *Am J Public Health.* 2019;109(5):799-805.
3. Sufrin C. Making mothers in jail: carceral reproduction of normative motherhood. *Reprod Biomed Soc Online.* 2018;7:55-65.
4. Constantino P, Assis SG, Pinto LW. The impact of prisons on the mental health of prisoners in the state of Rio de Janeiro, Brazil. *Cien Saude Colet.* 2016;21(7):2089-100.
5. Fadel CB, Valentim LM, Fillus TM, Langoski JÉ, Bordin D. Oral health, the perspective of the inmate and the context of vulnerability. *Rev Odontol Unesp.* 2015;44(6):368-73.
6. Hassell KD, Archbold CA, Stichman AJ. Comparing the Workplace Experiences of Male and Female Police Officers: Examining Workplace Problems, Stress, Job Satisfaction and Consideration of Career Change. *Int J Police Sci Manag.* 2011;13(1):37-53.
7. Bukhari R, Al-Sulaimi A, Fadaak A, Balhaddad A, AlKhalfan A, El Tantawi M, et al. Oral health amongst male inmates in Saudi prisons compared with that of a sample of the general male population. *S Afr Dent J.* 2017;72(9):402-7.
8. Fotedar S, Chauhan A, Bhardwaj V, Manchanda K, Fotedar V. Association between oral health status and oral health-related quality of life among the prison inmate population of kanda model jail, Shimla, Himachal Pradesh, India. *Indian J Public Health.* 2016;60(2):150-3.
9. Greenfeld LA, Snell TL. Women offenders. US Department of Justice, Office of Justice Programs, Bureau of Justice; 1999.
10. Sabol WJ, Couture HJW, DC: Bureau of Justice Statistics. Prison inmates at midyear. 2008.
11. Soares GH, Mendonça I, Michel-Crosato E, Moysés SJ, Moysés ST, Werneck RI. Impact of oral conditions on the quality of life of incarcerated women in Brazil. *Health Care Women Int.* 2019;40(7):776-87.
12. Hermont AP, Zina LG, Da Silva KD, Da Silva JM, Martins-Júnior PA. Revisões integrativas: conceitos, planejamento e execução / Integrative reviews: concepts, planning, and execution. *Arq Odontol.* 2021;57:3-7.
13. Melnyk BM, Fineout-Overholt E. Evidence-based practice in nursing & healthcare: A guide to

- best practice. 2<sup>a</sup> ed. Lippincott Williams & Wilkins; 2011.
14. Dumont DM, Parker DR, Viner-Brown S, Clarke JG. Incarceration and perinatal smoking: a missed public health opportunity. *J Epidemiol Community Health.* 2015;69(7):648-53.
  15. Baker B. Perinatal Outcomes of Incarcerated Pregnant Women: An Integrative Review. *J Correct Health Care.* 2019;25(2):92-104.
  16. Ursi ES, Gavão CM. Perioperative prevention of skin injury: an integrative literature review. *Rev Lat Am Enfermagem.* 2006;14(1):124-31.
  17. Thomas BH, Ciliska D, Dobbins M. Quality assessment tool for quantitative studies. Toronto: Effective Public Health Practice Project McMaster University; 2003.
  18. Costa BC, Silva dos Santos Azevedo G, Ferreira P, Rodrigues Almeida LM. Probióticos na redução de sintomas de ansiedade e depressão: uma revisão integrativa. *Health Sci J.* 2020;10(4):97-108.
  19. Rodrigues IS, Silveira IT, Pinto MS, Xavier AF, De Oliveira TB, De Paiva SM, et al. Locked mouths: Tooth loss in a women's prison in northeastern Brazil. *ScientificWorldJournal.* 2014;587469.
  20. Moraes LR, Duarte de Aquino LC, Da Cruz DT, Leite ICG. Self-Perceived Impact of Oral Health on the Quality of Life of Women Deprived of Their Liberty. *Int J Dent.* 2021;5520652.
  21. Monteiro FM, Cardoso GR. A seletividade do sistema prisional brasileiro e o perfil da população carcerária: um debate oportuno. *Civitas Rev Ciên Soc.* 2013;13:93-117.
  22. Reddy V, Kondareddy CV, Siddanna S, Manjunath M. A survey on oral health status and treatment needs of life-imprisoned inmates in central jails of Karnataka, India. *Int Dent J.* 2012;62(1):27-32.
  23. Priwe C, Carlsson P. Oral Health Status of Male Swedish Citizens at Admission to Prison. *J Correct Health Care.* 2018;24(4):382-94.
  24. O'Hara K, Walsh E, Forsyth K. Undertaking action research in prison: Developing the older prisoner health and social care assessment and plan. *Action Res.* 2014;12(2):136-50.
  25. Caldeira FID, Hidalgo MAR, De Carli Dias ML, Scarel-Caminaga RM, Pigossi SC. Systematic review of ratios between disease /health periodontitis modulators and meta-analysis of their levels in gingival tissue and biological fluids. *Arch Oral Biol.* 2021;127:105147.
  26. Testa A, Fahmy C. Oral health status and oral health care use among formerly incarcerated people. *J Am Dent Assoc.* 2020;151(3):164-73.
  27. Van der Velden U, Amaliya A, Loos BG, Timmerman MF, Van der Weijden FA, Winkel EG, et al. Java project on periodontal diseases: causes of tooth loss in a cohort of untreated individuals. *J Clin Periodontol.* 2015;42(9):824-31.
  28. Bansal V, Veerasha KL, Sogi GM, Kumar A, Bansal S. Assessment of dental prosthetic status and needs among prisoners of haryana, India. *J Indian Prosthodont Soc.* 2013;13(3):303-7.
  29. Treadwell HM, Blanks SH, Mahaffey CC, Graves WC. Implications for Improving Oral Health Care Among Female Prisoners in Georgia's Correctional System. *J Dent Hyg.* 2016;90(5):323-7.