Title: Infection prevention and control in dental surgeries in the Pará state prison system in Brazil.

Article Type: Major articles.

Abstract:

Background: To analyze the infection prevention and control processes and occupational hazards in prison dental surgeries in the Brazilian state of Pará. Methods: A trained examiner inspected 11 of the 12 clinics located in prisons, using a structured data collection form and interviewed 12 prison clinic dentists using a questionnaire based on Brazilian legislation. Results: The dental surgeries in six of the clinics were located in specially adapted rooms, however in seven surgeries the same sink was used for washing instruments, hands and for environmental cleaning of the clinic. One clinic possessed a specific area for decontaminating/sterilizing instruments. Manual washing of instruments prior to sterilization was the cleaning method used in all clinics but interview data revealed no access to descaling, enzyme or disinfectant detergents. In terms of occupational risk, half of the dentists interviewed (n= 6) worked single-handed with no documented infection control policy or health safety procedures in place, and only five surgeries having access to functioning dental stools and working compressors for dental equipment. Most of the dental chairs used for treatment required maintenance. The majority of dentists (n=11) reported having insufficient instruments to meet their clinical work requirements. Conclusions: This survey reports many deficiencies in the infection prevention and control procedures and inadequate operating conditions for dental healthcare workers.

Keywords: Infection prevention; infection control; occupational hazards; dental surgery; prisons

INTRODUCTION

In Brazil, the prison population numbers 711,463 inmates, which also includes 147,937 individuals under house arrest, and is the fourth largest prison population in the world. In the state of Pará, the prison population was 12,433 in 2012[1]. Historically, the issue of healthcare for the prison population in Brazil has been confined to immunization and limitation of harm associated with the abuse of alcohol and other drugs. Understanding its responsibility faced with these needs, the Ministry of Health, together with the Ministry of Justice, produced the National Health Plan for the Prison System. The consolidation into one specific policy makes it possible to access health-related actions and services which seek to reduce the risks and damage caused by the present conditions of confinement[2]. There is a lack of current data in respect of seroprevalence for HIV and Syphilis in the prison population in Brazil[3]. Existing STD/HIV/AIDS morbidity data are related to occasional studies carried out in prison units and depict values ranging from 1-25% (HIV) and from 4-18% (Syphilis). The prevalence of Tuberculosis (TB) in the prison system is also an important public health issue and the prevalence of active and latent TB at the time of admission ranges from 3 - 60%, respectively[4].

In the Brazilian literature, no previous publications have evaluated infection prevention and control or occupational hazards of Dental Surgeries in the Prison System and, therefore, there is no domestic epidemiological data that provide effective strategies and actions to minimize the risks run by these professionals. Although basic healthcare within the prison system is an act established by the Brazilian Constitution, oral healthcare in the prison system has been poorly reported in the literature. In the International literature, there have been few studies that have focused on an analysis of dental care within the prison system[5-7] but all have reported shortcomings of the reported models of delivery.

OBJECTIVES

The objective of this study was to analyze the infection prevention and control processes and occupational hazards in prison dental surgeries in the Brazilian state of Pará.

MATERIALS AND METHODS

This project was developed according to the principles set out in Resolution 196 of the Ministry of Health's National Health Council and approved by the Ethics Committee at the São Leopoldo Mandic Dental Research Center (document no. 2011/192).

Of the 40 Penitentiaries in the Brazilian State of Pará, 12 have dental surgeries, to which 13 dentists are assigned. One surgery and one professional were excluded as she was already part of the present study. Accordingly, 11 surgeries were inspected and 12 dental practitioners were interviewed.

The data collection sheets were based on the framework of a previous investigation5 adapted to Brazilian legislation, containing questions that were grouped according to the following topics: infection control, use of personal protective equipment, waste management, infection prevention training and the dental clinic infrastructure. In addition, the researcher inspected all the clinics based on a format produced by the Municipal Health Surveillance Department and the 1st Regional Social Protection Department of the Executive Public Health Office in the state, evaluating topics related to the dental instruments and equipment available, and working conditions[8,9].

RESULTS

The physical lay-out of the dental surgeries inspected (n=11) was such that six surgeries were located in non-specialized rooms, of which four occupied an area of under $9m^2$ (minimum area required by National Legislation is $9m^2$, RDC/ANVISA no. 50, February 21, 2002) with five surgeries located in a purpose-built environment. In seven surgeries, the same sink was used for washing the instruments, hands and for environmental cleaning. All faucets were manually operated. Only one clinic had a specific area set aside for decontaminating/sterilizing the instruments (Table 1)

Table 1 – Description of the physical space allocated in the prison dental clinics.

CONDITION OBSERVED	**Absolute frequency (n)**	**Relative frequency (%)**
Adapted Clinic	6	55
Physical area less than $9m^2$	4	36
Faucets turned on and off by hand	11	100
Specific area for the decontamination of instruments	1	9
Clean and tidy storage areas for sterile products	1	9
Walls with surfaces that can be easily cleaned and disinfected	3	27
Floors with surfaces that can be easily cleaned and disinfected	4	36

Analyzing infection control procedures, it was found that the majority of the clinics (n=7) only had one sink, which was used for washing hands and instruments. Only 3 had specific hand-washing procedures and one professional reported the existence of infection control procedures. Five clinics had separate areas for setting down clean and dirty instruments. In all of the clinics (n=11), the instruments were sterilized in ovens (1 hour in dry heat, pre-

heated to 170° C). The instruments were washed by hand and they were not packaged prior to sterilization. Only 3 professionals reported having access to disinfectant/ descaling substances for washing the instruments. As for the separation of waste, 7 professionals reported having a single waste bin to dispose of both common and contaminated waste. (Table 2)

Table 2 – Infection control procedures adopted and existing in the prison dental clinics.

CONDITION OBSERVED	Absolute frequency (n)	Relative frequency (%)
Single sink for washing instruments, hands and for cleaning the area	7	64
Dry heat sterilization method (ovens)	11	100
Professionals who reported having a procedure for aseptic hand-washing	3	25
Professionals having access to disinfectant /descaling substances	3	25
Professionals who reported having defined dirty and clean areas in the clinic	5	42
Professionals who reported the existence of infection control procedures	1	8
Clinics with manual instrument-washing methods	11	100
Clinics that do not pack instruments for sterilization	11	100
Professionals with single waste bins for both common and infectious waste	7	58

In terms of the staffing of the dental clinics, 50% (n=6) of dentists have an assistant and the other six work alone and are also responsible for processing the reusable instruments. The assistants comprise a nursing technician and five interns, for which there was no documented training relating to their ability to undertake infection control. The dentists (83%) reported that their assistants had not been vaccinated against hepatitis B or could not recall if they had been.

An analysis of the available dental equipment showed that five clinics had working air compressors (used to drive the dental turbines) and dental stools (to allow the dentist to remain seated during operations). Most dental stools were in a poor state of repair with no wheels or were rusty, preventing mobility. All the clinics had dental chairs although many of them needed repair and maintenance due to tears in the upholstery and problems with chair movement, preventing the patient from being properly positioned to undergo dental treatment. The poor condition of the surgery equipment resulted in 55% (n=6) of SUSIPE dentists working standing up to perform treatment. Spittoons were not available or did not work in 5 clinics.

DISCUSSION

In the clinical working environment, dental professionals are exposed to a variety of risks: chemical, physical, biological and ergonomic. Occupational diseases can occur as a result of incorrect procedures[10,11]. In the context of providing control over occupational hazards, the dental services should adopt safe behavior based on the recommendations of national legislation[12,13]. In terms of the physical infrastructure, the majority of clinics evaluated have been adapted to function as a dental clinic but are very small, less than $9m^2$ in area. A lack of decontamination/sterilization facilities was observed for establishing a correct instrument flow, avoiding mixing dirty, clean and sterile materials. Both of these conditions are contrary to the requirements of RDC/ANVISA 50[14]. Regulatory Standard NR 32 states that in locations where there is exposure to biological agents, there should be sinks which are exclusively set aside for cleaning the hands with controls that dispense with manual contact, however the presence of just one sink was normally found[15]. Serious deficiencies were observed in relation to the disinfection and sterilization processes. Although ANVISA[12] has advocated the use of autoclaves for the sterilization of dental instruments, all of the clinics evaluated still used Pasteur ovens, a sterilization method which uses dry heat which reaches a temperature of 170 degrees Celsius for a 1 hour cycle. To ensure the quality of sterilization, the Pasteur oven

requires monitoring using chemical and biological indicators, as well as the use of thermometers to ensure proper temperatures in the sterilization cycle. In this study, no monitoring programs were reported. Another problem was observed with the lack of chemical products and equipment for cleaning instruments. It was reported that washing was performed exclusively by hand, where there is a recognized risk of sharps injuries. Although all the professionals have access to PPE, the use of PPE during the washing process was not verified. In order to lessen the exposure of workers to blood and body fluids during the cleaning of instruments, the use of ultrasonic washers or benchtop washer disinfectors would be safer options[13.]

With regard to personal protection, the National Immunization Program established that all professionals should be immunized according to the Vaccine calendar. The vaccines most recommended for this group are those that prevent infection by the hepatitis B virus (HBV), measles, mumps, rubella, varicella and influenza[12]. The dentists stated that their assistants had not received vaccination against hepatitis B, thereby endangering both professionals and the patients being treated. As for the infection control measures, legislation recommends that in all locations where the possibility of exposure to biological agents exists, written instructions should be supplied providing details of the working routines and accident prevention measures, with standard rules being applied for health and safety procedures[15].

The safe management and segregation of clinical waste is important for the control of infection[9] but this was found to be poorly managed. The recommendation of federal legislation RDC/ANVISA 306/2004[16] is that the different types of waste must be separated at the point of generation and subsequently packed to assure containment. In this regard, infectious waste should be packed in closed waste bins with pedal-activated lids and lined with white plastic bags, while common (household type) waste should be disposed of in similar waste containers lined with black bags[17].

This study observed a lack of maintenance of the air compressors, stools and dental chairs rendering the operation of the clinics untenable. In addition, the fractures, rusting and lack of replacement instruments had an adverse impact on the performance of clinical procedures, exposing the dental surgeons to ergonomic risks. A variety of factors are linked to the development of musculoskeletal injury such as prolonged static posture, poor working conditions and inappropriate positioning. The symptoms observed are sensitivity and pain in the muscles and joints of the back, shoulders, neck and arms[11]. Prolonged working in a standing position, reported by 55% of professionals, also results in injury to the legs, knees and particularly the feet[18]. To prevent these problems, Regulatory Standard NR 32 states that it is the responsibility of the institution to assure the proper maintenance of working equipment and instruments. The dental surgeons interpreted these working conditions as being of high biological and ergonomic risk. These problems may explain why dental professionals are so reluctant to work within the country's prison system[19]. Corrective action to minimize these risks consists of adopting strategies to control infection, maintain equipment, provide continuous training and standardized health and safety procedures[,10,20]. It is the responsibility of the employer, in other words the State, to provide dental professionals with suitable conditions of hygiene, comfort and safety in the working environment[12].

CONCLUSION

The working and health and safety conditions of dental surgeons working within the Pará State Prison System were found to be inadequate, due to limited surgery space, poorly maintained equipment and insufficient infection control procedures. These findings do not comply with the recommendations of the prevailing Brazilian legislation.

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