DOI: 10.17765/2176-9206.2022v15n4.e11085

Processing of dental products in basic health units of Porto Velho, state of Rondônia

Processamento de produtos odontológicos em unidades básicas de saúde de Porto Velho, Rondônia

Bruna Mariano de Aguiar[1], Daniela Oliveira Pontes[1*], Priscilla Perez da Silva Pereira[1], Miguel de Araujo Vilela[1], Rosa Maria Ferreira de Almeida[1], Karla de Paula Paiva[1]

[1] Departamento de Enfermagem, Laboratório de Pesquisa sobre Cuidados em Saúde, Universidade Federal de Rondônia (UNIR), Porto Velho (RO), Brasil.

***Corresponding author**: Daniela Oliveira Pontes – *E-mail*: daniela.pontes@unir.br

ABSTRACT
To evaluate the processing of dental products in basic health units in the capital of the state of Rondônia. Cross-sectional study conducted in 13 units with collection in three stages: filling out a questionnaire, non-participant observation and reading of records. Compliance in product processing was evaluated in accordance with the recommendations and regulations in force in Brazil. Just over half of the units had an exclusive purge room (53.8%) and there were nonconformities related to lighting (69.3%), potable water (100%) and lack of adequate brushes (46.2%). All units offered personal protective equipment. Only 18.6% used adequate detergent or descaling soap and 100.0% products were washed by hand. The main nonconformities were the use of abrasive material (46.2%), non-use of glasses or masks (100.0%), inadequate inspection after washing (100.0%), inadequate preparation of chemical disinfection solutions (77.0%) and 84.6% did not rinse with abundant water. The processing of dental products in primary care in Porto Velho has weaknesses that can lead to infections related to health care.

Keywords: Primary Health Care. Dentistry. Sterilization.

RESUMO
Avaliar o processamento de produtos odontológicos em unidades básicas de saúde na capital de Rondônia Estudo transversal conduzido em 13 unidades com coleta em três etapas: preenchimento de questionário, observação não participante e leitura de registros. A conformidade no processamento dos produtos foi avaliada de acordo com as recomendações e normativas vigentes no Brasil. Pouco mais da metade das unidades apresentam sala de expurgo exclusiva (53,8%) e havia inconformidades relacionadas à iluminação (69,3%), água potável (100,0%) e falta de escovas adequadas (46,2%). Todas as unidades ofereciam equipamento de proteção individual. Apenas 18,6% utilizavam detergentes adequados ou sabão desincrustante e 100,0% dos produtos eram lavados manualmente. As principais inconformidades foram o uso de material abrasivo (46,2%), não utilização de óculos ou máscaras (100,0%), inspeção incorreta após a lavagem (100,0%), preparo inadequado de soluções de desinfecção química (77,0%) e 84,6% não realizava o enxágue adequadoO processamento de produtos odontológicos na atenção básica em Porto Velho apresenta fragilidades que podem levar a infecções relacionadas à assistência à saúde.

Palavras-chave: Atenção primária à saúde. Odontologia. Esterilização

Received in August 05, 2022
Accepted on October 18, 2022

INTRODUCTION

Healthcare associated infections (HAIs) are defined as any infection acquired after a patient is admitted to a health care unit and is associated with clinical procedures[1]. The dental surgeon and their team carry out several activities that can produce chains and routes of contamination that can lead to the occurrence of adverse events (AE), among them the HAIs. Dental care is often highly invasive and the frequent contact with secretions, tissues and other biological materials increases the risk of AE in dental offices[2].

However, it appears that the documentation of these incidents is reduced in dentistry, which makes the rate of notifications low, perhaps because the damage to patients is considered minor, although potentially dangerous[2]. It is estimated that most AEs in the dental environment are due to problems related to care and procedures[2].

In order to minimize the risks to which the dental surgeon, the team and the patient are subjected to in the dental environment, it is necessary to apply measures to protect and control infections. Among these measures, the dental surgeon must treat in a special way the instruments of the dental clinic that are highly contaminated, and thus, must be processed with strict cleaning protocols[3].

According to Resolution of the Collegiate Board of Directors number 15, of March 15, 2012, the processing of health products, among which dental health products, is understood as actions related to pre-cleaning, reception, cleaning, drying, evaluation of integrity and functionality, preparation, disinfection or sterilization, storage, and distribution. However, the processing of health products performed in dental offices and individual offices not linked to health services are excluded from the resolution, which generates discrepancy in the requirements of health surveillance in relation to Dentistry[4].

Nevertheless, the use of infection control procedures, such as cleaning, disinfection and sterilization, the use of universal precautions standards in the dental office and laboratory, can prevent cross-infection between dentists, assistants, prosthetists and patients[5]. Regarding the quality of processing of dental products in this environment, there is a lack of financial and instrumental resources to guarantee its effectiveness, in which the lack of processing rooms and professionals dedicated exclusively to this purpose are common[6].

The analysis of the Brazilian Census of Basic Health Unit Infrastructure, carried out in 2013, reveals disparity in the structure of Health Units in the country, with the lack of resources and compromised physical structure more present in the North and Northeast regions[7]. Corroborating this finding, during professional practice in basic units in the capital of the state of Rondônia, a lack of adequate structure for

processing dental products was noticed, but this needed to be evaluated in a systematic way for an accurate situational diagnosis. A previous literature review showed that in Brazil there are few studies dealing with the processing of health products in the field of dentistry. And, in primary health care units, only two studies were found[6,8]. Thus, the objective of this study was to evaluate the processing of dental products in basic health units in the capital of the state of Rondônia.

METHODOLOGY

This was a cross-sectional study conducted in the municipality of Porto Velho, capital of the state of Rondônia. In 2018, the population of the municipality was 529,544 inhabitants[9]. The dental care network of the Municipal Health Department consisted of thirty-eight BHUs, three specialized centers and two urgency and emergency units. In these environments, 186,744 dental procedures were performed throughout the health care network, most of them (150,796) performed by primary health care[10].

Of the total BHUs in the municipality, 19 are in the urban area and were elected to participate in the study. Units that do not provide dental care during the collection period or in which the professional responsible for processing products was on leave were excluded. Professionals responsible for processing dental products at the BHU in Porto Velho are oral health technicians, health assistants or oral health assistants.

Data were collected between August and December 2020, the researchers spent at least one shift of the day in the unit and an instrument proposed by Passos and collaborators was applied to analyze the compliance with product processing in basic health units. This instrument is organized according to Donabedian's Theory, which proposes indicators for evaluating the quality of health services, divided into structure, process and results[11]. These indicators were evaluated according to current recommendations and regulations for processing health products (Supplementary Material 1). This instrument is organized into three parts: 1) Questionnaire applied to the professional responsible for processing products; 2) Non-participant observation (inspection) carried out by the researchers; 3) Reading the records on the processing of products available at the units. For the items evaluated in the instrument, the answers could be: Compliance (C), when it has the evaluated indicator or a substitute with a similar function; Non-compliance (NC), when it did not present the evaluated component or similar substitute; Unavailable (UN) when the item under evaluation does not fit[8].

Questionnaires were completed by the researchers and were divided into two parts: 1) Professional profile of workers; 2) Indicators: a) Structure - technical-operational resources for cleaning, preparation, packaging,

disinfection/sterilization, storage and distribution of health products (43 items); b) Process – cleaning, preparation, packaging, disinfection/sterilization, storage and distribution of health products (49 items); c) Results - cleaning, occupational accidents, sealing, conservation and packaging of health products (five items). For inspection of dental instruments, such as clinical trays, mirrors, levers, forceps, drills, spatulas, curettes, dentin spoons, among others, visual inspection was used without a magnifying glass or additional light. The records analyzed in the units were made by the professionals and according to the routines established in these services, these records detailed dates of equipment maintenance, testing, among others.

Data were analyzed using descriptive statistics with absolute and relative frequency. At the end of each group of indicators, the mean and standard deviation were presented for the frequencies of compliance.

This study is part of the matrix project entitled: Good Practices in Patient Care, Infection Control and Processing of Health Products in the state of Rondônia authorized by the Research Ethics Committee of the Federal University of Rondônia, CAE 20070719.5.0000.5300.

RESULTS

Of the 19 existing units in the urban area, two were undergoing renovation, one had a change of physical address, two were not working on the date of collection and in one the professional responsible for processing dental products was on vacation. In all, 13 basic health units were included in the study.

Regarding those responsible for processing dental products, the role of those responsible associated with dentistry and oral health prevailed (Table 1). All workers are civil servants hired through a public tender, just over half have completed higher education and work in the product processing sector for less than five years, and 30.7% have employment relationships with other institutions.

Table 1. Characteristics of training and performance of professionals, Porto Velho, state of Rondônia, 2021 (n=13)

Variables	N (%)
Professional category	
health assistant	1 (7.8)
oral health assistant	6 (46.1)
oral Health Technician	6 (46.1)
Education	
complete high school	6 (46.1)
complete higher education	7 (53.9)
Time of work in the processing of health products	
1 to 5 years	6 (46.1)
6 to 10 years	2 (15.4)
11 or more	5 (38.5)
Employment relationship	
Contest	13 (100.0)
Temporary	0 (0.0)

STRUCTURE INDICATORS

In the evaluation of technical-operational resources for cleaning products, just over half of the units had an exclusive purge room (53.8%) with a minimum area to allocate furniture and equipment for activities related to processing (Table 2). All units offered personal protective equipment (PPE), but only one unit had a specific place for storing PPE (7.8%). All of them have an appropriate place for disposal of sharps and residues of biological material. Regarding the purge area, a minority of the units had an area isolated from the other facilities by physical structure (38.5%), and among the others there was not even the presence of a technical barrier. The average of BHU compliance for the structure indicator regarding product cleaning was 61.5%.

Table 2. Structure Indicator: technical-operational resources for cleaning products, Porto Velho, state of Rondônia, 2021 (n=13)

ITEM	C (%)*	NC (%)**	UN (%)***
Exclusive purge room with a minimum area capable of allocating furniture and equipment for related activities	53.8	46.2	-
Ventilation.	84.4	15.6	-
a) ventilation is natural, windows have screens.	-	-	100.0
b) artificial ventilation, the environment is air-conditioned.	84.4	-	15.6
Specific place for storing PPE.	7.8	84.4	7.8
Sharps disposal container.	100.0	-	-
Container for biological material waste.	100.0	-	-
Purge area is isolated from other facilities by a physical barrier.	38.5	61.5	-
Purge area is isolated from other facilities, at least, by a technical barrier.	38.5	61.5	-
Cleaning area is well lit with fluorescent lighting.	30.7	69.3	-
Finishing material is resistant, washable and is intact	69.3	30.7	-
The room is equipped with washable benches.	92.2	7.8	-
The room is equipped with deep sinks and a faucet.	84.4	15.6	-
There are brushes with soft bristles for manual cleaning of products.	53.8	46.2	-
The water available at the taps is potable.	-	100	-
Thick, long, waterproof, rubber gloves are available individually as mandatory PPE.	76.9	23.1	-
Individual protective eyewear is provided as mandatory PPE.	100.0	-	-
Masks (or face masks) are made available individually as mandatory PPE	100.0	-	-
Long waterproof aprons are available individually as mandatory PPE	100.0	-	-
Ear protectors are available individually if there is an ultrasonic washer, as indicated by the manufacturer.	-	-	100
Clear definition and availability of the care flow of the professional who is victim of accident	7.8	92.2	-
Purge room rules and routines are easily accessible	-	100.0	-
Norms and routines are reviewed and updated at least annually.	-	100.0	-
The professionals who perform such procedures have these activities regulated by their class councils.	84.6	15.4	-
Average compliance: 68.8%; Standard deviation: 31.3			

** compliance ** non-compliance *** non-applicable*
CSSD- Central Sterile Service Departments

For the indicator of structure of preparation, packaging, disinfection/sterilization, storage and distribution of products, the average compliance was 43.7% (Table 3). None of the units had a preparation and packaging bench equipped with at least eight magnifying lenses; presence of forced drying devices; final verification of the cleanliness of cannulated materials or with complex conformations; and validated steam autoclave.

Table 3. Structure Indicator: indicator of technical-operational resources for the preparation, packaging, disinfection/sterilization, storage, and distribution of health products. Porto Velho, state of Rondônia, 2021. (n=13)

ITEM	C (%)*	NC (%)**	UN (%)***
Exclusive area in the CSS for the preparation, packaging, and sterilization of products, close to the purge area	23.0	77.0	-
Minimum area capable of allocating furniture and equipment for related activities	38.5	61.5	-
Ventilation.	23.0	77.0	-
a) ventilation is natural, windows have screens.	0.0	100	-
b) artificial ventilation, the environment is air-conditioned.	69.2	30.8	-
The area is equipped with benches made of easy-to-clean material (stainless steel, melanic laminate, granite) and are intact	92.3	7.69	-
Preparation and packaging area is well lit with fluorescent lights	30.8	69.2	-
The preparation and packaging bench is equipped with lenses for image magnification (for example: magnifying lenses used in aesthetic medicine or microsurgery), with a minimum of eight times magnification.	0.0	100.0	-
Forced drying devices and final verification of the cleanliness of cannulated materials or with complex conformations.	0.0	100.0	-
No gross accumulation of dust, garbage and the presence of rodents or insects	100.0	0.0	-
The area is cleaned daily and as often as necessary.	100.0	0.0	-
Sterilized products are stored in an exclusive place, away from water sources, open windows, exposed pipes	100.0	0.0	-
There are records of maintenance of packaging sealing equipment	23.0	77.0	-
For chemical disinfection, solutions approved by competent bodies are available, compatible with the products to be processed	53.8	46.2	-
The sterilization room is equipped at least with a pre-vacuum steam autoclave, and ovens are not used	92.2	7.8	-
The steam autoclave is validated	0.0	100.0	-
There are supporting reports demonstrating the effectiveness of the water treatment system used by steam autoclaves, meeting the manufacturer's specifications. If water is purchased, reports are available upon request	0.0	100.0	-
There is a documented preventive maintenance plan for the equipment used for sterilization	23.0	77.0	-
Norms and routines of the area are easily accessible	0.0	100.0	-
Norms and routines are reviewed and updated at least annually	0.0	100.0	-
There are resources for hand hygiene: sinks with liquid soap and absorbent paper towel, which does not release particles and does not stick to the hands and easy access to alcohol gel.	100.0	0.0	-
The professionals who perform such procedures have this activity regulated by their class councils.	92.2	7.8	-
There is a clearly described assessment plan for the package integrity of the processed product.	-	100	-
Average compliance: 43.7%; Standard deviation:41.3			

** compliance ** non-compliance *** non-applicable. CSSD- Central Sterile Service Departments*

High non-compliance items were found, on the other hand, there were also items with 100% compliance by all units, such as no gross accumulation of dust, garbage and the presence of rodents or insects, daily cleaning of the area in case of need, sterilization, and storage of products in an exclusive place, away from water sources, open windows, exposed pipes, as

well as the presence of resources for hand hygiene.

Items related to easy access to rules and routine of the area and annual review of these, were not met by any health unit. In addition, no unit had a clearly described assessment plan on the integrity of the packaging of the processed product or supporting reports demonstrating the effectiveness of the water treatment system that serves the steam autoclaves, meeting the manufacturer's specifications.

PROCESS INDICATORS

For the cleaning step process indicator, the average compliance was 74.1% (Table 4). As for the presence of gross dirt, most met the criteria, but draws attention to the fact that 15.4% had detectable tissue remains. The most fragile point was the failure to change the enzymatic detergent solution that did not meet the manufacturer's recommendations (84.6%).

Table 4. Process indicator: cleaning. Porto Velho, state of Rondônia, 2021, (n=13)

ITEM	C (%)*	NC (%)**	UN (%)***
Products received at the CSSD are free of gross dirt (without the presence of tissue remains) and not dried out.	84.6	15.4	-
Neutral/enzymatic/alkaline detergents or descaling soap are used with defined criteria, according to the manufacturer's instructions, intended for hospital use and officially authorized	100.0	-	-
Changing the enzymatic detergent solution meets the defined solution saturation criterion (when dirt is no longer removed), according to the manufacturer's recommendation	15.4	84.6	-
Hand-processed products are washed piece by piece	100.0	-	-
Long, thick, waterproof rubber gloves are used as mandatory PPE	53.8	46.2	-
Protective eyewear is used as mandatory PPE	100.0	-	-
Masks (or face masks) are used as mandatory PPE	100.0	-	-
Ear protectors are used individually if there is an ultrasonic washer, as indicated by the manufacturer	-	-	100.0
Abrasive material, such as steel sponge, is not used for manual cleaning of products	61.5	48.5	-
At least one nurse from the Unit or Network who participates in the decision to purchase the products and supplies used in the purge room	100.0	-	-
Washed products are dried with absorbent non-woven fabric, discarded after use and/or airflow.	92.2	7.8	-
Documented preventive maintenance planning of the ultrasonic washer	7.8	7.8	84.4
Continuing education program for CSSD professionals	-	100.0	-
Average compliance: 74,1%; Standard deviation:34.9			

** compliance ** non-compliance *** non-applicable*
CSSD- Central Sterile Service Departments

In the evaluation of the process of preparation, packaging, disinfection/sterilization, storage and distribution of health products, the average

compliance was 38.9% (Table 5). No health unit carries out rigorous inspections of cleanliness under fluorescent light and magnifying lenses. Also, several other components were not met by any health unit, including: Bowie and Dick testing before the first cycle of the day in autoclave; hand recording of temperature, pressure, and time parameters of all autoclave cycles; exclusive use of autoclaves registered with National Health Surveillance Agency of Brazil control of autoclave sterilization performed by biological indicators for three consecutive times, after corrective maintenance and in situations of suspected autoclave malfunction. Another weak point was the lack of different records related to product processing.

Table 5. Process Indicator: preparation, packaging, disinfection/sterilization, storage, and distribution of health products. Porto Velho, state of Rondônia, 2021 (n=13)

ITEM	C (%)*	NC (%)**	UN (%)***
In these areas, rigorous inspections are made for cleanliness under fluorescent lighting and magnifying lenses, of the conservation conditions of the material, looking for points of oxidation and stains, and the functioning of the racks of the instruments, as well as the packaging and identification of packages, boxes, and trays.	0.0	100.0	-
For chemical disinfection, solutions are prepared according to the manufacturer's instructions.	23.0	77.0	-
In chemical disinfection, chemical tests are performed and recorded with a frequency recommended by specific regulations for the unit or manufacturer's recommendations.	7.8	92.2	-
Plastic containers with lids for immersion of the material, and in the case of using hypochlorite, they are not made of transparent plastic.	69.2	30.8	-
Containers are dried before immersed in disinfectant solution	38.5	61.5	-
Products are dried before immersed in disinfectant solution	30.8	69.2	-
Materials are completely immersed in the disinfectant solution, and the entire inner surface is filled with solution	84.4	15.6	-
After immersion, the materials are rinsed thoroughly with potable water.	15.6	84.4	-
The disinfected product is completely dried before packed in clean, individual packaging.	100.0	0.0	-
Records of the disinfection processes (disinfectant and batch used, type of product, immersion time, monitoring test performed and professional performer), which are archived for 5 years	7.8	92.2	-
For products processed by moist heat, surgical grade paper/film, non-woven fabric, crepe paper or cotton	100.0	0.0	-
Cotton fabric packaging is t1 or t2 twill for steam	-	-	100.0
If cotton is used, is there a record of the number of reuses?	-	-	100.0
Packages to be autoclaved do not exceed 55X33X22 cm or 11 kg in weight.	100.0	0.0	-
Every product to be autoclaved is monitored with process indicator tape (class I)	15.6	84.4	-
A dentist from the unit or network participates in the decision to purchase the products and supplies used in the preparation, packaging and sterilization room	100.0	0.0	-
Use only packaging registered with the competent bodies	23.0	77.0	-
Well-defined routine for the rational use of chemical integrators or emulators/simulators (5th or 6th generation)	7.8	92.2	-

Records of the sterilization processes (readable identification of the products, batch number, date of sterilization and professional performer), archived for 5 years	7.8	92.2	-
In pre-vacuum autoclaves, the Bowie and Dick test is performed before the first cycle of the day	0.0	100.0	0.0
Temperature, pressure, and time parameters of all autoclave cycles are manually recorded or microprocessed and stored for 5 years	0.0	100.0	-
Uses only autoclaves registered with Anvisa	0.0	100.0	-
Items to be sterilized are not stacked in the autoclave, but arranged in a vertical position with a gap (25 to 50 mm) between the packages	92.2	7.8	-
Concave-convex conformation products are arranged in the autoclave baskets in a vertical or inclined position and products such as jugs, buckets and jars must be arranged upside down. Large products should be in a lower position.	92.2	7.8	-
Packages come out of the autoclave dry	92.2	7.8	-
Packages sterilized without the use of wire baskets wait for cooling time before transferred to the storage area	100.0	0.0	-
The professional sanitizes the hands before unloading the material from the autoclave	92.2	7.8	-
In material storage, packages with older dates are ahead of the most recent ones.	7.8	92.2	-
The control of autoclave sterilization is carried out by biological indicators, at a minimum weekly or daily frequency.	7.8	92.2	-
The control of autoclave sterilization is performed by biological indicators, three consecutive times, after corrective maintenance and in situations of suspected autoclave malfunction.	0.0	100.0	-
The results of biological indicators are archived for 5 years	0.0	100.0	-
There is a written routine on the collection of material in cases of unsatisfactory results of physical, chemical, or biological control	0.0	100.0	-
Class 5 or 6 chemical indicator is placed in the highest density packages	0.0	100.0	-
The product is only distributed or stored after inspection of the process indicator	0.0	100.0	-
Workers in the area of preparation and packaging of critical and semi-critical products, wear caps	100.0	0.0	-
The packaging of processed products is evaluated for integrity	7.8	92.2	-
Average compliance: 38.9%; Standard deviation: 42.2			

** compliance ** non-compliance *** non-applicable*
CSSD- Central Sterile Service Departments

RESULT INDICATORS

Of the total number of products evaluated after cleaning, 2.9% showed dirt on inspection (Table 6). None of the evaluated units had records of puncture-cutting accidents, which made it impossible to assess whether there were no accidents or if they were not recorded. As for product sealing, only one was considered in non-compliance. The conservation of products was carried out through inspection of the packaging, being considered in compliance with those that did not have stains, erasures, openings, dents, or dirt, with 2.27% showing non-compliance. And, as for the conservation of packages of 44 evaluated, 6.41% showed non-compliance.

Table 6. Result Indicators: cleaning, occupational accidents, sealing, conservation and packaging of health products. Porto Velho, state of Rondônia, 2021

Indicator	N total	Non-compliance
Health product cleaning result indicator		
Number of products found dirty after cleaning x 100 / Total products evaluated	304	2.9%
Evaluation indicator of occupational accidents with cleaning of health products		
Number of accidents with sharp punctures in the purge in the last year x 100 / Total products evaluated	0	0.0%
Evaluation indicator of the health product packaging sealing		
Number of products with inadequate sealing x 100 / Total products evaluated	81	1.2%
Evaluation indicator of the conservation of disinfected health product packaging		
Number of packages of disinfected products with conservation problems x 100 / Total packages inspected	390	2.3%
Evaluation indicator of the conservation of the packaging of sterilized health products		
Number of packages of sterilized products with conservation problems x 100 / Total packages inspected	44	6.4%

DISCUSSION

In Porto Velho, most units were responsible for processing dental products by technicians and oral assistants. These professionals have action regulated by the Federal and Regional Council of Dentistry, and they are recognized as having the competence for cleaning, asepsis, disinfection and sterilization of instruments, dental equipment, and the work environment[12]. However, some professionals responsible for the processing did not have a higher education degree, which is contrary to the legislation that provides that the technical responsibility for the processing is attributed to a legally qualified professional with higher education[12].

Just over half of the units had exclusive processing rooms, but most did not have purge areas. Regarding the structure of preparation, packaging, disinfection/sterilization, storage, and distribution of dental products processed in primary care, only 23% had their own areas for such action. A study in 29 Health Units in a city in the interior of the state of São Paulo found that only 20% family health units and 40% BHUs had an exclusive room for the sterilization of products[6].

Another observational study in 11 BHUs in the state of Bahia evaluated the functioning of the processing and identified that several problems compromise the success of the processing, including the absence of exclusive rooms for the purge[13]. However, in the state of Bahia, 72.7% units had physical barriers to separate the purge area[13]. The absence of a separation barrier represents a structural non-compliance in the processing, because although it is admitted the non-use of physical barriers in Central Sterile Service

Departments (CSSD) class I, the technical barrier should always be used as a way of minimize the risk of cross-contamination between clean and contaminated areas[12].

Another observational study in 11 BHUs in the state of Bahia evaluated the functioning of the processing and identified that several problems compromise the success of the processing, including the absence of exclusive rooms for the purge[13]. However, in the state of Bahia, 72.7% units had physical barriers to separate the purge area[13]. The absence of a separation barrier represents a structural non-compliance in the processing, because although it is admitted the non-use of physical barriers in CSSD class I, the technical barrier should always be used as a way of minimize the risk of cross-contamination between clean and dirty areas[12].

In Porto Velho, as in many other places, the structural problems of the units are because they are old buildings that did not have a planned area for product processing, and thus, adaptations were made to allocate the process[14].

In the state of Rondônia, in almost half of the units, the glove was not correctly used during the cleaning stage. The provision of PPE alone does not ensure its use by the processing operator. A study carried out in Teresina identified that in 33.3% CSSD that provided protective equipment, there was no correct use by professionals[15]. Several reasons culminate in the non-adherence to PPE during processing, among them, the rush to perform the procedures, the availability of wrong numbering of the same, or even environmental factors related to the increase in ambient temperature due to incorrect or non-existent ventilation[16].

In this study, the use of detergent was complied, however, in only 13.6% units there was an exchange of the enzymatic detergent solution according to the defined criterion of saturation of the solution provided by the manufacturer, representing a non-compliance. The use of concentrations lower than recommended compromises the action of the product and higher concentrations make rinsing difficult[17].

Manual washing was verified in all units, but the washing process must be carried out piece by piece using non-abrasive brushes and without releasing bristles[18]. In the present study, 48.5% units used abrasive instruments, such as steel sponge.

In addition to manual washing, products whose lumen has an internal diameter of less than five millimeters, inaccessible internal spaces or with a blind bottom, cleaning must be carried out in an automated manner in an ultrasonic washer with a connector for cannulas that have intermittent flow technology[12]. Only two units had ultrasonic washers, however, their use for cleaning dental products was not identified, and of these only one presented a documented preventive maintenance plan.

No health unit had devices for forced drying and final cleaning of cannulated material and with complex conformations. In most cases, drying was

performed with absorbent non-woven fabric, discarded after use and/or airflow.

Once the cleaning is finished, it is essential to inspect the products, since no product should be subjected to disinfection or sterilization with the presence of dirt resulting from cleaning[15]. For visual evaluation of cleanliness, it is necessary to use image magnifying glasses (8X), however, the presence of these devices was not found in any unit.

After cleaning and disinfection/sterilization of products, it is expected that they are free of dirt or contamination. In Porto Velho, 3.72% instruments were dirty. Dissatisfaction with cleaning is the result of several aspects of processing in primary care, among them the lack of training of professionals for processing dental products, lack of equipment and maintenance, lack of standardized procedures and dissemination of standards of work, execution, and operation at work[19]. In the units evaluated, no records of continued training of professionals on product processing were found. Nor was found a standard operating protocol or similar document that supported the worker's work process.

In a health unit, an oven was used for sterilization, which did not comply with current legislation[12]. Several studies demonstrate a high risk in the use of an oven for sterilization, such as lack of process control, high variation in temperature and time of use, lack of evaluation of physical parameters and lack of installation, operation, and performance qualifications[6]. In relation to autoclaves, no records were found at National Health Surveillance Agency of Brazil, as well as records of periodic evaluation of their operation, which must be carried out annually[17].

Product handling for chemical disinfection was not carried out properly in most units and half of them had disinfection with solutions approved by competent bodies and compatible with the products to be processed. Two studies found in the literature review show that in BHU, from sodium hypochlorite and ethyl alcohol to glutaraldehyde or peracetic acid solution are used[6,15].

The problem of the lack of standardization in the disinfection process lies in the failure of processing, compromising both the health of the user and the operator[19]. In Porto Velho, there was a lack of standardization in disinfection procedures, as well as the absence of records about the solutions and batch used, type of product, immersion time and monitoring test.

No unit evaluated the performance of the autoclave air removal system by means of the Bowie and Dick testing or monitoring the physical components of the equipment, that is, the absence of manual or microprocessed recording of temperature, pressure, and time parameters. Physical monitoring is an integral part of the parameters capable of avoiding future problems that may compromise the quality of sterilization, and biological indicators are fundamental for the process, since from them it is possible to ensure that

sterilization has occurred effectively with all parameters reached[21].

The packaging for sterilization was adequate, prevailing the use of creped paper and in some cases surgical grade paper, dimensions of the packages were adequate, but only 15.6% units used process indicator tape. There was a lack of identification on the products, noting the date of the procedure and other associated factors, in addition to only one health unit having records of the sterilization processes filed for five years.

As for the arrangement of the packages during sterilization, the correct positioning was found. In addition, all units waited for the material to cool before removing the products from the autoclave in order to protect the packaging from scratches, as placing them on surfaces with a lower temperature allows the accumulation of moisture in the packaging and inside it[22].

As for the arrangement of packages during sterilization, the correct positioning was found. In addition, all units waited for the material to cool before taking the products from the autoclave in order to protect the packaging from scratches, as placing them on surfaces with a lower temperature allows the accumulation of moisture in the packaging and inside[22].

In the present study, there was a low level of non-compliance related to the sealing and conservation of packages. The compromise of the seal during processing, or even after it, results in risks of contamination with the possibility of contact of the product with pathogenic microorganisms that compromise patient safety[23].

Two studies conducted in China, one in Hong Kong[24] and another in Singapore[25] evaluated failures in sterilization of health products in dental clinics. The failures found in these studies were related to human error, equipment malfunction or system failure. And, among the main adverse events reported was the cross-infection of hepatitis viruses and human immunodeficiency virus. The authors of these studies concluded that the identification of failures in sterilization processes and a rapid response to failures was crucial to minimize the impact of such an incident and alleviate the anxiety of exposed patients. They also recommended properly recording the processes for monitoring and planning actions to improve the quality of services.

And, among the main adverse events reported, the cross-infection of hepatitis virus and human immunodeficiency virus. The authors of these studies concluded that the identification of failures in sterilization processes and a rapid response to failures was crucial to minimize the impact of such an incident and alleviate the anxiety of exposed patients. They also recommended properly recording the processes for monitoring and planning actions to improve the quality of services.

Among the limitations of this study is the memory bias by the workers that may have been present during the completion of

the questionnaires, but it is believed that the results found in this study can present a situational diagnosis of the reality of the processing of dental products in the BHU of the capital of the state of Rondônia.

CONCLUSION

The physical structure was seen as a critical point, as the areas for processing and purging dental material were often improvised and/or precarious. Regarding the standardization in processes, no standardization protocol was observed, indicating a variable routine and a possible outdated regarding the current literature on the processing of health products, exclusively, dental products. In all the indicators evaluated, non-compliances were found, thus, it can be concluded that no stage of the processing was completely satisfactory. The processing of dental products in primary care in Porto Velho presented a compromise in its quality, safety of the professionals involved and the users of the health system.

From the situational diagnosis, it is suggested adequate adaptation of the physical structure of the units, mainly attention to the technical barrier in the purge area and organization of the physical space in order to favor the unidirectional flow. It is also important to implement norms and routines for each area and make them available to professionals through permanent education actions.

REFERENCES

1. Liu JY, Dickter JK. Nosocomial Infections: A History of Hospital-Acquired Infections. Gastrointest Endosc Clin N Am. 2020 Oct;30(4):637-652. doi: 10.1016/j.giec.2020.06.001.

2. Christiani JJ, Rocha MT, Valsecia M. Seguridad del paciente en la práctica odontológica. Acta Odont Colomb. 2015; 5(2):21-32.

3. Dourado R. Esterilização de instrumentais e desinfecção de artigos odontológicos com ácido peracético. Revisão de Literatura. J Biod Biomat. 2017;2(2):31-45.

4. Donatelli LJP. A RDC 15 inclui a Odontologia ou não? Cristófoli Biossegurança. Paraná. 2018. Disponível em: https://www.cristofoli.com/biossegurança/rdc-15-inclui-odontologia-ou-nao/

5. Galicioli SM, Baratieri T, Lentsck MH. Biossegurança em odontologia: o uso de mini manual como estratégia de educação permanente. Rev Esp Saude. São Paulo. 2016; 16(4):120-127.

6. Roseira CE, Silva DM, Passos IPBD, OrlandI, FS, Padoveze, MC, Figueiredo RM. Diagnóstico da conformidade do processamento de produtos de saúde na atenção primária. Rev Latino-Am Enfermagem. 2016;24:e2820 DOI: 10.1590/1518-8345.1439.2820

7. Bousquat A. Tipologia da estrutura das unidades básicas de saúde brasileiras: os 5R. Cad Saude Publica, Rio de Janeiro. 2017; 33(8):213-219.

8. Passos IPBD, Padoveze MC, Roseira CE, Figueiredo RM. Adaptação e validação de indicadores para o processamento de produtos na atenção primária à saúde. Rev Latino-Am Enfermagem. 2015;23(1):148-54 DOI: 10.1590/0104-1169.3518.2536

9. Instituto Brasileiro de Geografia e Estatística. Salário médio mensal dos trabalhadores formais. Minas Gerais: IBGE; 2017.

10. Porto Velho. Secretaria Municipal de Saúde. Relatório Anual de Gestão Ano: 2018. Porto Velho; 2019.

11. Graziano, Kazuko Uchikawa et al. Indicadores de avaliação do processamento de artigos odonto-médico-hospitalares: elaboração e validação. Rev Esc Enferm USP. 2009; 43(2):1174-1180. doi: https://doi.org/10.1590/S0080-62342009000600005.

12. Brasil. Agência Nacional de Vigilância Sanitária. RDC Nº 15. Diário Oficial da República Federativa do Brasil, Brasília, de 15 de março de 2012.

13. Costa EAM, Santos QNF, Dantas AS. Risco em processamento de produtos para saúde em Unidades Básicas de Salvador, BA. Rev Vigil Sanit Debate. 2018; 6(2):38-43. doi: https://doi.org/10.22239/2317-269X.00991.

14. Ribeiro JM da S et al. Avaliação do conhecimento da equipe de enfermagem no processo de esterilização de materiais cirúrgicos. REAS. 2019;11(15):e1177. doi: https://doi.org/10.25248/reas.e1177.2019

15. Madeira MZ, Santos AM, Batista OM, Rodrigues FT. Processamento de produtos para saúde em centro de material e esterilização. Rev. SOBECC, São Paulo. 2015; 20(4):220-227. doi: https://doi.org/10.5327/Z1414-4425201500040006.

16. Andreotti VO. Educação para a Cidadania Global. Soft Versus Critical. Sinergias: diálogos educativos para a transformação social. 2014; (1)57–65.

17. Araújo AAA, Paulino RG. Manual de processamento de produtos para saúde. Diretoria de Enfermagem. Secretária de saúde: Brasília. 2020; 108p.

18. Associação Brasileira de Enfermeiros de Centro Cirúrgico, Recuperação Anestésica e Centro de Material e Esterilização. Diretrizes de práticas em enfermagem cirúrgica e processamento de produtos para a saúde. SOBECC, 7a. ed. Barueri: Manole; 2017.

19. Souza SS, da Silva SBS, Silva MJ do N, Formigosa LAC. Desafios na implantação de boas práticas na Central de Material e Esterilização e a segurança do paciente. Rev Elet Acervo Saude.2020;12(11): e4760-e4760. doi: https://doi.org/10.25248/reas.e4760.2020

20. Schwaab G, Jacoby AM, Lukens JT, Ascari RA, Lautert A. Esterilização de produtos para saúde em serviços públicos. Rev enferm UFPE online. 2016;10(12):4591-4598. doi: 10.5205/reuol.9978-88449-6-ED1012201621.

21. Gonçalves RCS, Sé ACS, Pezzi MCS, Pinto CMI. Atividades de enfermagem para o diagnóstico “Risco para contaminação de artigos”. Res Soc

Development. 2020;9(9):e683997794-e683997794. doi:10.33448/rsd-v9i9.7794

22. Association of perioperative registered nurses. Perioperative standards and recommended practices. 2013th ed.United States; 2013.

23. Araujo GM, Reisdofer N, Silva LAA, Soder RM, Santos AM. Segurança do paciente: embalagens, acondicionamento e tempo de guarda de materiais esterilizados na atenção básica. Cienc Cuid Saude. 2016;15(4):662-668. doi: https://doi.org/10.4025/ciencuidsaude.v15i4.29925

24. Cheng VC, Wong SC, Sridhar S, et al.. Management of an incident of failed sterilization of surgical instruments in a dental clinic in Hong Kong. J Formos Med Assoc. 2013;112:666–75. doi: 10.1016/j.jfma.2013.07.020

25. Chanchareonsook N, Ling ML, Sim QX, Teoh KH, Tan K, Tan BH, Fong KY, Poon CY. Failure of sterilization in a dental outpatient facility: Investigation, risk assessment, and management. Medicine. 2022 Aug 5;101(31):e29815. doi: 10.1097/MD.0000000000029815.