International Journal of Innovation and Scientific Research
ISSN 2351-8014 Vol. 75 No. 2 Nov. 2024, pp. 159-170

http://www.ijisr.issr-journals.org/

Prevention of infectious risks in dental prosthesis offices and laboratories in Bamako

A. Ba[1], A. Kassambara[1], H. Koita[1], F. Diarra[1], S. Traore[1], and M. Keita[2]

[1]University Hospital Center of Odonto Stomatology (CHU-OS), Bamako, Mali

[2]University Hospital Center of Gabriel Touré (CHU-GT), Bamako, Mali

ABSTRACT: Dental impressions for prosthetics are a vector of contamination due to contact with the mucus and serous fluids of the oral cavity.
The objective of this work was to assess the knowledge and practices of dental prosthesis practitioners regarding contamination via impressions in the dental office and in the dental prosthesis laboratory.
This was a descriptive cross-sectional study of 40 volunteer practitioners who take or manipulate dental impressions in dental prosthesis offices and laboratories in the district of Bamako. Statistical analysis was performed using SPSS statistics version 25.0 software.
The male sex represented 82% of cases with an average seniority of 8.75 years. Private structures accounted for 60% of cases. Dental offices accounted for 82% of cases. Alginate was used as impression material in 97.5% of cases. Rinsing with water as a decontamination method was used in 42% of cases. Sodium hypochlorite was used as a disinfectant in 25% of cases.
The training of the actors of the prosthetic chain, the development of the procedures of the decontamination and individual protection of each prove to be essential.

KEYWORDS: decontamination, impressions, dental practice, Bamako.

1 INTRODUCTION

The transmission of diseases such as HIV AIDS, hepatitis and tuberculosis is a public health problem against which dental surgeons must adopt hygiene and asepsis measures in order to reduce the risk of contamination during dental care. especially when taking dental impressions [1].

In dentistry, the prosthetic act is certainly one of the acts where the break in the asepsis chain is most frequent due to the diversity of acts, equipment and materials involved, impressions which are often difficult to decontaminate, different round trips between the dental office and the prosthesis laboratory. It is difficult to have a sure method, perfectly codified, as it exists for the surgical act [2].

Dental impressions for prosthetics are a vector of contamination due to contact with the mucus and serous fluids of the oral cavity [3].

The decontamination of fingerprints is a public health problem, which concerns the entire population. Not only does it protect patients but also practitioners, which helps reduce the risk of cross-contamination [4].

1.1 TYPE OF STUDY

This is a cross-sectional, prospective study of the descriptive type established on the basis of a questionnaire intended for practitioners of prosthetic services (dental practice + dental prosthetic laboratories) of the CHU-CNOS and practitioners of private structures (cabinet dental + dental prosthesis laboratories) of Bamako.

Corresponding Author: A. Ba

1.2 PLACE AND FRAMEWORK OF STUDY

The study was carried out at the prosthetic services of the CHU-CNOS (Dental offices + dental prosthesis laboratories) and at the level of private offices and laboratories in Bamako.

1.3 STUDY PERIOD

A period from 26/10/2018 to 26/11/2018 (1 month).

1.4 STUDY POPULATION

The population studied consisted of all the dental surgeons as well as the laboratory technicians of the CHU CNOS plus the dental surgeons and laboratory technicians of the private structures of Bamako (dental practices + prosthesis laboratories) who agreed to participate in our survey and therefore answer the questionnaire.

Sample: (Exhaustive).

The sample size spanned all dental offices and prosthetic laboratories in Bamako.

We met 33 dental surgeons and 07 prosthetic technicians.

- Material used: A survey sheet: in the form of a questionnaire.
- Pencils and pens.
- Means of transport: two-wheeled vehicle: Motorcycle.
- SPSS version 25 data processing software.

1.5 STUDY METHOD

The questionnaire was distributed by hand: Self-administered.

We have made a list of dental practices and prosthetic laboratories which has been made up of the order of dental surgeons of Mali and updated in the field.

Then we made a chronogram of visits to these cabinets and laboratories.

Dental according to proximity of location.

1.6 SELECTION CRITERIA

1.6.1 INCLUSION CRITERIA

Were included:

- Any practitioner who takes dental impressions.
- Any practitioner who handles dental impressions.
- Any practitioner who agreed to answer our questionnaire.

1.6.2 NON-INCLUSION CRITERIA

Were excluded from our study:

- Practitioners who did not agree to submit to our questionnaire.
- Practitioners who did not make impressions and did not use them either.

1.7 DATA ANALYSIS AND PROCESSING PLAN

The data was entered on a computer and analyzed with Microsoft Office Excel software, Word 2010 with license and IBM SPSS statistics version 25.

1.8 Ethical Considerations

Participation in our study was completely voluntary. Practitioners were informed of the purpose of our study in order to obtain their informed consent. The questionnaire was anonymous to ensure the honesty of respondents.

1.9 Scientific Benefits

This study will raise the awareness of practitioners regarding the risks of contamination.

It allows practitioners to evaluate their decontamination methods when taking dental impressions.

It also allows practitioners to know the most effective products, establish protocols for decontaminating impressions, involving all actors in the prosthetic chain for the prevention of cross-contamination.

2 Results

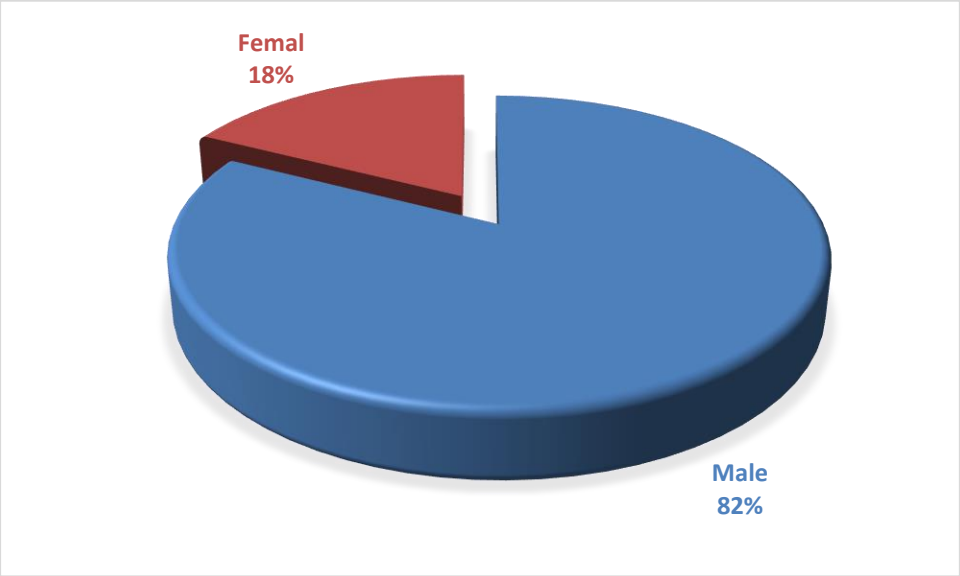

Fig. 1. Distribution of the sample according to gender

The male sex was predominant with 82% of our sample.

The sex ratio is 4.71.

Table 1. Distribution of the sample according to the structure

Structure	Number	Percentage %
Public	16	40,0
Private	24	60,0
Total	**40**	**100**

During our study, more than half worked in the private sector, i.e. 60% of our sample, 40% in the public sector.

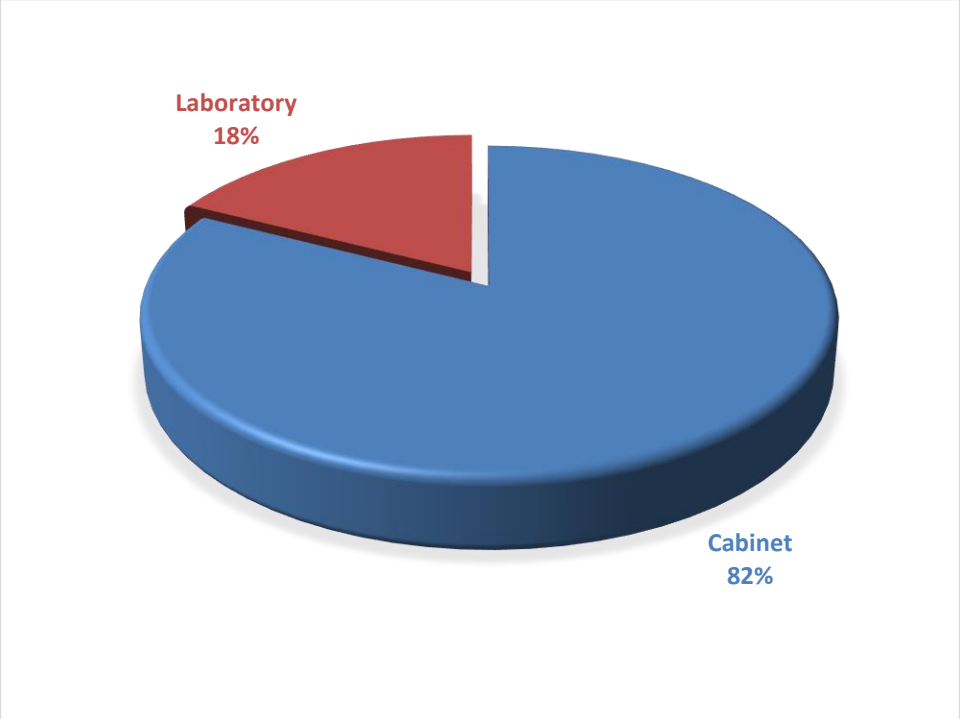

Fig. 2. Distribution of the sample according to the type of structure

Dental surgeons represented 82% of the sample and only 18% were laboratory technicians.

And it is quite normal that dental offices are more numerous than dental prosthesis laboratories because their work depends on that of dental surgeons.

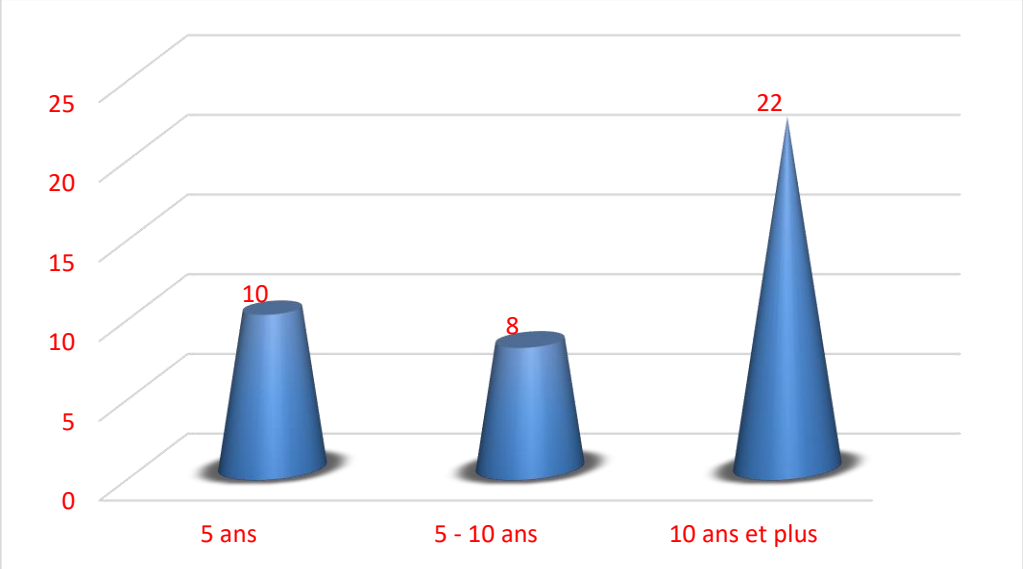

Fig. 3. Distribution of the sample according to seniority

Among dental surgeons and dental laboratory technicians, our study shows that the oldest (10 years and over) were the most numerous, i.e. 55%, 25% the youngest in their careers.

Table 2.

Product used	Yes		No	
	Effectif	%	Effectif	%
Alginate	39	97,5	1	2,5
Silicone	16	40,0	24	60,0

The use of alginate as impression materials accounted for 97.5% of cases.

Table 3. Transfer of the impression from the practice to the laboratory

Transfert	Yes		No	
	Effectif	%	Effectif	%
With form	24	60	16	40,0
Wthout form	13	32,5	27	67,5
With raised hand	13	32,5	27	67,5
In a container	10	25,0	30	75,0
Plastic bag	19	47,5	21	52,5
Paper cardboard	0	0	40	100
Plateau	7	17,5	33	82,5
With closure	7	17,5	33	82,5
Without closure	2	5,0	38	95,0
Plastic box	3	7,5	37	92,5

The dental surgeons who send the impressions to the laboratory with a form accounted for 60%. And 17.5 with closure.

Table 4. Notification of patient at risk

Notification of patients at risk	Effectif	Percentage %
Yes	23	57,5
No	17	42,5
Total	**40**	**100**

Practitioners who notify patients at risk were predominant with 57.5% of the sample.

Table 5. Accuracy of the disease

Disease accuracy	Effectif	Percentage %
Yes	19	47,5
No	21	52,5
Total	40	100

Practitioners who specified the disease: 47.5% of the sample, 52.5% without any details.

Table 6. Specified diseases

Specified diseases	Yes		No	
	Effectif	%	Effectif	%
HIV 1	11	27,5	29	72,5
HIV 2	12	30,0	28	70,0
Hépatitis	15	37,5	25	62,5
Tuberculosis	11	27,5	29	72,5

Among the diseases to be specified, hepatitis accounted for 37.5%.

Table 7. Processing of the imprint before sending it to the laboratory

Processing of the imprint before sending	Effectif	Percentage %
Yes	36	90,0
No	4	10,0
Total	**40**	**100**

Only 10% of our sample did not process the prints before sending them to the laboratory.

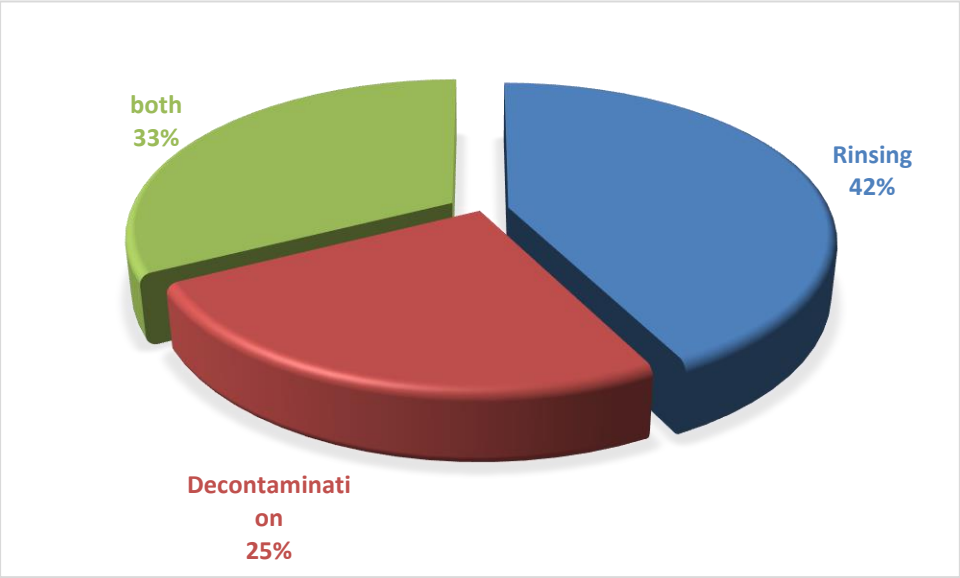

Fig. 4. Impression processing method before sending it to the laboratory

Rinsing with running water accounted for 42% of cases.

Table 8. Type of decontamination

Type of decontamination	Effective	Percentage %
Immersion	20	87,0
Spray	3	13,0
Total	**23**	**100**

Decontamination by immersion represented 87%.

Table 9. Duration of decontamination of prints

Duration of décontamination	Effectif	Percentage %
5 - 10 min	10	43,5
10 - 20 min	7	30,4
20 min and more	6	26,1
Total	**23**	**100**

The majority of our respondents took 5 to 10 minutes to decontaminate the prints, i.e. 43.5% of the sample.

Table 10. Product used for the decontamination of impressions

Decontamination product used	Effectif	Prcentage %
Running water	17	42,5
Hypochlorite	13	32,5
Aldéhydes	1	2,5
Running water + hypochlorite	9	22,5
Total	40	100

The use of hypochlorite represented 32.5% of the sample.

Table 11. Agent responsible for decontaminating fingerprints

Person who takes care of decontamination	Effectif	Percentage %
Doctor	12	30,0
Medical assistant	14	35,0
Caregiver	6	15,0
Prosthetist	5	12,5
Prosthetist assistant	3	7,5
Total	**40**	**100**

Dentists who take care of the decontamination of their impressions represented 30% of our sample.

Table 12. Training of the entire team in the decontamination of prints

Training of the practitioner and team	Effectif	Percentage %
Yes	25	62,5
No	15	37,5
Total	**40**	**100**

In our study, 62.5% of our sample were trained in fingerprint decontamination (practitioners + team).

Table 13. Knowledge of decontamination protocol specific to each impression material

knowledge of decontamination protocol specific to each material (practitioner + team)	Effectif	Percentage %
Yes	27	67,5
No	13	32,5
Total	40	100

Our study showed that 67.5% of practitioners and their teams knew the specific decontamination protocol for each material.

Table 14. Existence of decontamination sheet within the service

Existence of decontamination sheet in the service	Effectif	Percentage %
Yes	7	17,5
No	33	82,5
Total	40	100

Only 17.5% of our respondents had a decontamination sheet in their departments.

Table 15. Use of means of protection during the decontamination of impressions

Use of protective means during decontamination	Effectif	Percentage %
Yes	35	87,5
No	5	12,5
Total	**40**	**100**

Our study showed that 87.5% of practitioners used means of protection during the decontamination of impressions.

Table 16. Means of protection used for the decontamination of impressions

Means of protection used	Yes		No	
	Effectif	%	Effectif	%
Gloves	32	80,0	8	20,0
Masks	26	65,0	14	35,0
Eye protection	7	17,5	33	82,5
Short sleeve blouse	10	25,0	30	75,0

In our study, 80% of our sample answered yes to wearing gloves as a means of protection during the decontamination of impressions.

Table 17. Vaccination against hepatitis B

Vaccination against hepatitis B	Effectif	Percentage %
Yes	28	70,0
No	12	30,0
Total	40	100

More than 2/3 of the sample, or 70%, are vaccinated against hepatitis B.

3 COMMENTS AND DISCUSSION

This study is the first in Mali to examine the practices of asepsis relating to the impression transferred to the laboratory as well as the perceptions of the professionals surrounding this field.

It is also the first to be carried out simultaneously with the two groups of professionals.

Our results demonstrate that the application of fingerprint decontamination measures is variable and in many aspects.

In order to improve the practice of professionals, students must have notions of the asepsis of the transferred articles and of cabinet and laboratory instrumentation during their initial training. Continuous training must be organized for professionals already in practice.

Our study involved all dental practices and prosthetic laboratories in Bamako over a period of one (1) month.

The target population: dentists and prosthetists working in the public and private sectors of the city of Bamako.

An anonymous paper version questionnaire was distributed to 44 people (dentists and prosthetists) having a practice of taking impressions after having explained to them the objective of this study. The survey sheet consisted of seven (07) series of questions on 4 pages. Indeed we found 40 respondents, two refusals from dentists and two from dental technicians.

SOCIODEMOGRAPHIC ASPECT

SEX

In our study, the male sex represented 82.5% against 17.5% of the female sex with a sex ratio of 4.71.

This result is comparable to that of GUEYE.M et al in Senegal in 2013 who found 80% in favor of men (laboratory technicians) [5] 73.3% still in favor of men (dental surgeons) in 2012.

In Morocco L. BAHIJE and coll. reported 61.7% male in 2013 [6].

The low proportion of women could be explained by the fact that not only are many of them at home, but it must also be recognized that not many of them go to school.

Seniority.

The majority of our respondents had seniority of 10 years or more (55%).

In Morocco L. BAHIJE and coll. in their study reported 40% from 10 to 20 years in 2013 [6].

The average professional seniority was around 8.75.

GUEYE.M et al from Senegal found 17.5 (dental surgeons) in 2013 19.26 (Laboratory technicians) [5] as average professional seniority.

This predominance could be explained by the fact that the existence of the odontology sector is very recent within our faculty of medicine. The training of dental surgeons outside the country stopped for a while before the opening of the national sector.

THE STRUCTURE

It can be seen that 60% of those interviewed were workers in the private structure.

In MoroccoL. BAHIJE et al. found 96.70% practicing in individual practices versus 3.30% practicing in group practices [6].

This could be explained by the fact that in public structures we found few responses to our questionnaire, only prosthesis specialists were interested. Departments such as periodontology, oral surgery, endodontic conservative dentistry, plus some laboratory staff (i.e. 2 out of 8) were not interested in answering our questionnaire, whereas in the private sector we found many respondents.

The frequency of dental practices was the highest with 82.5% of the sample, on the other hand dental laboratories represented 17.5% because there are few laboratories per practice.

PATIENTS AT RISK

In our study, they were 57.5% to notify patients at risk.

GUEYE. M etcoll in Senegal in 2012 found 53.3% close to our result [5].

This explains why they are aware of the risk of cross-contamination in their daily exercise, mainly when taking fingerprints and that they take measures to avoid it. In addition, with the HIV pandemic, there has been the implementation in Mali of the National Policy for the Fight against Risky Diseases with continuous training and awareness campaigns.

On the other hand, 52.5% of practitioners do not notify the type of disease, and this rate reaches 72% for HIV and tuberculosis.

Processing of impressions before sending to the laboratory.

Almost all of them, or 90% of the sample, had the impression decontaminated before sending it to the laboratory.

In Canada in 2009 Joanna Bezerianos had found 74.9 of the professionals who disinfect regularly in her study and 96% according to the research of another study [8].

This shows us that practitioners avoid the risk of cross-contamination while putting into practice the different knowledge acquired during the different trainings.

KNOWLEDGE OF DECONTAMINATION PROTOCOL

More than half of our respondents (67.5%) mentioned having known an established protocol for the decontamination of each impression material in particular; on the other hand, in the structures visited, 82.5% do not have a decontamination sheet.

Joanna Bezerianos in a study in Canada in 2009 reported 65.4% [9].

The highest frequency was that of doctors, i.e. 55% of the sample, on the other hand, prosthetist assistants represented only 5% of cases.

Qualified personnel are aware of the risk of contamination, while unqualified personnel are not familiar with the protocol.

DECONTAMINATION

In a study, 42% of them rinsed with running water compared to 25% who used a disinfectant for complete decontamination; 33% did both.

GUEYE.M et al from Senegal reported:

60% of prosthetists rinse alginate impressions under running water;

46.7% of dentists used a disinfectant for impressions;

66.7% used a disinfectant for the decontamination of prosthetic parts [10].

L. BAHIJE et al. in Morocco in 2013 reported 42.1% of practitioners always disinfected impressions against 8.8% who never disinfected impressions [11].

In Burgundy in 2005, the authors reported in their study that 59.9% of professionals clean and disinfect the impression before sending it to the laboratory [12].

The essential treatment time is rinsing under cold running water for at least 15 seconds as soon as the oral cavity is removed, regardless of the type of impression material, because by eliminating traces of physiological fluids (saliva, blood) and organic matter, this gesture optimizes the action of the disinfectant product. It thus allows a significant reduction in the initial microbial load [13].

The result obtained by us shows that there is a high proportion of transmission of soiled fingerprints from the practice to the laboratory.

Regarding the type of decontamination, in our study immersion was the most frequent, i.e. 87% of cases, with 5 to 10 minutes of duration as decontamination time (43.5% of cases). This suggests a low respect for the asepsis procedures of the impressions.

At the cabinet level, we have noticed that the decontamination task is delegated to medical assistants with 35% of cases, while at the laboratory level, this task in general is very little performed by the staff, i.e. 12.5% of the prosthetists.

Qualified staff (doctors and assistants) in the practice are the most likely to have taken decontamination training (70%).

Caregivers and laboratory staff are less.

MEANS OF PROTECTION

MEANS OF INDIVIDUAL PROTECTION

The majority of our respondents answered yes to:

- Wearing the means of protection, i.e. 87.5%;
- Wearing gloves 80%;
- Wearing masks 65%;
- Eye protection was at 17.5%.

In Morocco in 2013 L. BAHIJE et al. in them found 85% of practitioners who wore full clothing during decontamination [14].

In Burgundy in 2005, the authors reported:

81.2% for wearing gloves and changing;

75.9% for the systematic wearing of a mask;

85.2 for the wearing of systematic eye protection [15].

Practitioners have the obligation of maximum and complete protection not only for their own health but also to avoid cross-contamination.

We note that they apply the necessary but still insufficient protection measures.

IMMUNOLOGICAL PROTECTION: VACCINATED STAFF

We note in our report that more than half or 70% of respondents had been vaccinated against hepatitis B, and that doctors represented 57.5% against 17.5% of assistants.

In Burgundy in 2005, the authors reported 92.6% of practitioners vaccinated against hepatitis B, a frequency of vaccinated assistants very close to that with 91.3%, contrary to our study [16].

A survey conducted in Italy on the knowledge, attitudes and practices of dentists with regard to immunization showed that 85.7% of a sample of 369 dentists were vaccinated against hepatitis B [17].

There was the national hepatitis B vaccination campaign for health personnel at the level of public structures by the Ministry of Health with a reminder.

The low number of medical assistants immunized against hepatitis B could be explained by the fact that the staff of private structures did not benefit from this campaign.

This study also made it possible to identify strengths and weaknesses, especially of dental surgeons.

4 CONCLUSION

The risk of cross-contamination is a reality at the level of the prosthetic chain.

Indeed, the observation of a good chain of asepsis is an obligation for dental surgeons as well as for dental laboratory technicians.

This study allowed us to observe that dental surgeons in Bamako are aware of the risks of cross-contamination and take the necessary measures to minimize it. On the other hand, at the laboratory level, the laboratory technicians are poorly trained in decontamination and they are not equipped for risk prevention. We have noticed that there is no communication between dental surgeons and laboratory technicians in terms of risk prevention.

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