
HIDDEN IN THE RISK SEGMENT OF AESTHETIC AND BEAUTY: AN ASSESSMENT OF THE KNOWLEDGE OF PROFESSIONAL AND PRACTICES IN SALONS BIOSAFETY¹

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ABSTRACT: The risk of microbial transmission potentially increases when manicurists and pedicurists are unaware of or do not use biosecurity procedures. This study aimed to evaluate the knowledge and adherence to biosecurity procedures for manicurists/pedicurists who work in beauty salons. This was a cross-sectional survey with manicurists in beauty salons and in a technical school of podiatry, which evaluated the adherence to and knowledge of biosecurity procedures, with 75% of correct answers taken as the minimum for adequate adherence and knowledge. A total of 84 manicurists/pedicurists were interviewed, all female. There was poor adherence to the use of personal protection equipment (45%) and to methods of reprocessing equipment. The oven was the most widely used method of sterilizing, insufficient for cleaning and decontamination of material. A significant portion did not use an apron/uniform or closed shoes at work. The intervening factor most cited for non-adherence to the measures was the lack of information. The results reinforce the need for increased assistance regarding biosecurity procedures for professionals in this sector.

DESCRIPTORS: Beauty and aesthetic centers. Podiatry. Exposure to biological agents. Universal precautions.

O RISCO OCULTO NO SEGMENTO DE ESTÉTICA E BELEZA: UMA AVALIAÇÃO DO CONHECIMENTO DOS PROFISSIONAIS E DAS PRÁTICAS DE BIOSSEGURANÇA NOS SALÕES DE BELEZA

RESUMO: O risco da transmissão microbiana potencializa-se quando manicures/pedicures desconhecem e não utilizam medidas de biossegurança. Esta pesquisa teve como objetivo avaliar o conhecimento e a adesão às recomendações de biossegurança por manicures/pedicures que trabalham em salões de beleza. Tratou-se de uma pesquisa transversal, do tipo *survey*, em salões de beleza e em uma escola técnica de podologia em Minas Gerais, considerando adesão e conhecimento adequados quando houve acerto mínimo nas questões de 75%. Foram entrevistadas 84 mulheres manicures/pedicures. Houve baixa adesão aos equipamentos de proteção individual (45%) e aos métodos de reprocessamento de artigos, com deficiência na limpeza destes. Uma parcela significativa não utilizava avental/uniforme nem sapatos fechados no trabalho. O fator dificultador principal para não adesão às medidas foi a falta de informação. Os resultados deste estudo reforçam a necessidade de maior assistência dos órgãos públicos aos profissionais deste segmento acerca das medidas de biossegurança.

DESCRIPTORIOS: Centros de embelezamento e estética. Podiatria. Exposição a agentes biológicos. Precauções universais.

EL RIESGO OCULTO EN EL SEGMENTO DE ESTÉTICA Y BELLEZA: UNA EVALUACIÓN DE LOS CONOCIMIENTOS DE LOS PROFISIONALES Y LA PRÁCTICA DE LA BIOSEGURIDAD EN LAS PELUQUERÍAS

RESUMEN: El riesgo de transmisión microbiana se convierte en potencial cuando manicuras/pedicuras desconocen y no utilizan las medidas de bioseguridad. Este estudio tuvo como objetivo evaluar el conocimiento y la adhesión a las recomendaciones de bioseguridad para manicuras/pedicuras. Esta fue una investigación transversal, *Survey*, en peluquerías de belleza y escuela técnica de podología, teniendo en cuenta la adhesión y conocimiento apropiado cuando se produjo precisión adecuada de al menos 75%. Se entrevistó 84 mujeres manicura y tuvo una baja adhesión a los equipos de protección personal (45%), métodos de reprocesamiento de artículos, con deficiencia de limpieza de los mismos. Una parte importante no usaba delantal/uniforme, ni zapatos cerrados en el trabajo. El factor de intervención a la no adhesión a las medidas fue la falta de información. Los resultados de este estudio refuerzan la necesidad de una asistencia para los profesionales de este segmento sobre las medidas de bioseguridad.

DESCRIPTORIOS: Centros de belleza y estética. Podiatria. Exposición a agentes biológicos. Precauciones universales.

INTRODUCTION

The beauty and aesthetics market has grown in recent decades, driven by the media, which has brought with it image and style patterns reaching all social strata and age groups. The result has been the employment of a significant amount of manual workers in this sector, among them manicurists and pedicurists.¹

Manicurists and pedicurists manipulate tissues of the hands and feet, especially when the practice of removing the cuticle in Brazil is considered, which in countries such as Spain, Portugal, Italy and the United States is not performed, more for cultural reasons than due to legislation prohibiting such an act. This practice increases the risk of exposure to biological agents, potentially present in the blood, such as the hepatitis B and C viruses and the Human Immunodeficiency Virus (HIV).²⁻³

The risk of microbial transmission becomes imminent when manicurists and pedicurists are unaware and do not adhere to biosecurity procedures, which include: use of Personal Protective Equipment (PPE), proper reprocessing techniques, disposal of single-use materials, and adherence to hand hygiene practices.³⁻⁶

Transmission may occur through a small volume of blood due to visible or invisible injuries of the professionals and clients.³ Furthermore, manicurists also use the equipment of the beauty salon to take care of their own nails. Another risk is the contamination of eye structures, caused by fragments of nails, that can be thrown off while cutting, especially when the professional does not prevent this with the use of protective eye glasses.³

Although thousands of procedures are performed in beauty and aesthetics establishments, there are few records of infections related to professionals and clients, not due to a lack of events but more a lack of notification. There are also few well-conducted national and/or international epidemiological studies focusing on this type of activity. The beauty and aesthetics professionals' empirical way of working, due to a lack of preparation and knowledge about biosecurity recommendations, forms a relevant discussion on the risk of transmission of microorganisms to the professionals (occupational) and to the clients in this line of activity.

This study is justified due to the scarcity of studies that focus on the beauty and aesthetics sector, specifically the adherence and professional knowledge regarding biosecurity procedures of manicurists/pedicurists. Furthermore, concern

with the control of infections and microbial spread is no longer exclusive to the hospital environment, affecting several services linked to health, among them, those of beauty and aesthetics. Thus, this study aimed to evaluate the knowledge and adherence to biosecurity recommendations by manicurists and pedicurists that work in beauty salons.

METHOD

This was a cross-sectional, survey type study, with manicurists/pedicurists, conducted between August 2010 and May 2011. It was carried out in salons located in the town of Arcos, in the central west of Minas Gerais, 230 km from Belo Horizonte, Brazil, and a technical school of podiatry in the city of Belo Horizonte. The professionals were interviewed in two locations: in beauty salons and in the podiatry school. For the selection of the salons, those with business license issued by the city of Arcos were initially sought. The city council provided a list that contained only six establishments, all of which could not be located. It was chosen to map the salons found by neighborhoods, regardless of the council license, and interviews were conducted so that all the establishments were covered. During the interviews the manicurists indicated other salons, which were then visited. Although interviewing professionals of both sexes was proposed, one manicurist/pedicurist was interviewed per establishment, with a minimum age of 18 years, the owner or an employee of the salon, and randomly selected when more than one professional wished to participate.

Manicurist students of the podiatry technician course, who had taken the discipline "contamination in podiatry practice" (40 hours) were also interviewed. The choice of the technical level institution was due to it being the one to have continuously offered the course in podiatry for the longest period.

The study was approved by the Research Ethics Committee (CAAE - 0032.0.213.000-10). The professionals were verbally invited to participate, detailing the study and, after acceptance and signing the Terms of Free Prior Informed Consent, the interviews were performed. A structured questionnaire was administered containing multiple-choice questions and open questions, divided into the following parts: I- sociodemographic characteristics; II- issues facing professional adherence to the reprocessing of equipment, disposal of single-use articles and disinfection of surfaces; III- knowledge of the professionals regarding the same measures

discussed in part II; IV- factors that hinder the adoption of the measures referred to in part II. The questionnaire was previously evaluated by four researchers with expertise in statistics, epidemiology, infectious diseases and infection control.

Table 1 presents the topics of evaluation of the adherence and knowledge of biosecurity procedures. Adherence and knowledge were treated dichoto-

mously; adequate/inadequate, sufficient/insufficient, with at least 75% of the questionnaire answered correctly being considered adequate/sufficient.⁷ The data obtained were tabulated and presented in the SPSS (Statistical Package for the Social Sciences) version 13.0 program. For the treatment of the data the descriptive statistical methods, Pearson's chi-square test or Fisher's exact test, were used.

Table 1 - Description of the topics of evaluation of the adherence and knowledge of the biosecurity recommendations for manicurists and pedicurists. Arcos and Belo Horizonte-MG, 2010-2011

Adherence questions	Knowledge questions
	Simple hand hygiene (HH)
Situation in which HH is performed	Recognition of the importance of HH
Devices used for HH	Equipment recommended for HH
	Use of PPE
Uses one or more PPE in the practice	PPE important in the practice
Use of gloves/change gloves	Change procedure gloves
HH before and after putting on gloves	Knowledge of HH in the use of gloves
	Clothing, accessories and personal hygiene
Type/reprocessing of garments	Ideal clothing and reprocessing
Use of closed shoes	
	Reprocessing
Decontamination of equipment	Concept of decontamination
Sterilization of equipment and process used	Concept of sterilization
Conditions in which articles are disinfected/sterilized	Conditions indicated for sterilization/disinfection
Use of own sterilization containers	Knows own sterilization containers

RESULTS

All 84 manicurists/pedicurists invited to participate agreed, with 54 working and residing in the town of Arcos and 30 students of a technical course in podiatry in Belo Horizonte. To facilitate the description and evaluation, the sample was divided into two groups called: Manicurist Profes-

sionals (MP) and Manicurist Podiatry Students (PS).

All the respondents were female, with no male manicurists encountered. The prevalent ages in the MP group were between 18-24 years (27.8%) and 37-42 years (27.8%) (mean 32.6 years) and in the PS group between 31-36 years (23.3%) (mean 33.4 years). Table 2 presents the sociodemographic data.

Table 2 - Distribution of the sociodemographic variables of manicurists and pedicurists from Arcos and Belo Horizonte-MG, 2010-2011

Sociodemographic variables	MP=54		PS=30		Total=84		P-value
	n	%	n	%	n	%	
Gender							-
Female	54	100	30	100	84	100	
Age group (years)							-
18 to 24	15	27.8	6	20.0	21	25.0	
25 to 30	9	16.7	6	20.0	15	17.9	
31 to 36	7	13.0	7	23.3	14	16.7	
37 to 42	15	27.8	5	16.7	20	23.8	
³ 43	8	8.9	6	20.0	14	16.7	
Marital status							0.484
Single	29	53.7	12	40.0	41	48.8	

Married/with partner	18	33.3	13	43.3	31	36.9	
Divorced	7	13.0	5	16.7	12	14.3	
Time working in the sector (years)							0.244
1 to 5	17	31.5	8	26.7	25	29.8	
6 to 10	14	25.9	7	23.3	21	25.0	
11 to 15	10	18.5	8	26.7	18	21.4	
> 21	13	24.0	7	23.0	20	23.0	
Hours worked/day							0.024
Up to 8 hours	33	61.0	22	73.4	55	65.5	
9 to 12 hours	21	39.0	8	26.6	29	34.6	
Professional training							0.048
Regular vocational course*	22	40.7	17	56.7	39	46.4	
Irregular/informal†	32	59.3	13	43.3	45	53.6	
Professional updating							0.650
Yes	32	59.3	16	53.3	48	57.1	
No	22	40.7	14	46.7	36	42.9	
Participation in the business							-
Owner	34	63.0	17	56.7	51	60.7	
Partner	7	13.0	-	-	7	8.3	
Informal employee ‡	13	24.1	11	36.7	24	28.6	
Formal employee §	-	-	2	6.7	2	2.4	

MP=Manicurist professionals; PS=Manicurist podiatry students; p-value=chi-square test or Fisher's exact test; * Education in schools regulated by the Ministry of Education guidelines; † Did not take place in vocational schools or beauty sector courses; ‡ Provision of service without employment contract; § Recorded in the work papers.

When analyzing the overall adherence of the professional participants of this study, through all the proposals questions, and considering a percentage of 75% or more correct responses to the questions as adequate, it was found that adherence was inadequate for 76 manicurists (90.5%). Only eight professionals (30%) in the PS group achieved adequate adherence and, in the MP group, none of the participants reached a minimum percentage of correct responses. Correct answers to the questions ranged from 21.7% to 74% for the MP and 36.4% to 86.2% for the PS.

In the overall evaluation of all the questions for the analysis of knowledge regarding biosecurity procedures, insufficient knowledge was perceived for 69 (82%) respondents, with correct answers to the questions ranging from 29.2% to 66.7% in the MP group and 59% to 95.5% in the PS group. Only 15 professionals (50%) in the PS group demonstrated sufficient knowledge.

Among the MP group, independent of the sociodemographic variables, adherence and knowledge were insufficient and inadequate. Therefore, in this group, it was not possible to calculate the association (p value) of the sociodemographic variables with the other aspects evaluated.

In the PS group no association was observed (p>0.05) for any of the variables studied, except

between knowledge and professional updating. Among those who presented sufficient knowledge, 71.4% had not performed any updating (p<0.05), which was not reflected in the adherence (inadequate in 85.7%). Those who had attended a course showed less knowledge (68%).

Among the PS group there was a higher percentage of professionals with adequate adherence to biosecurity in the age group 37-42 years (40%) followed by the age group 43 years or over (34%), with insufficient knowledge about biosecurity (40% and 50% respectively). The 25-30 years age group presented a higher percentage of professionals with sufficient knowledge (67%), however, despite this, this knowledge was insufficient to alter the practice (100% inadequate adherence). When evaluating the variable length of practical work in the beauty and aesthetics sector, greater adherence and knowledge was perceived for professionals who had been working for between one and five years (37.5% and 50%) and lower adherence among those who had worked for 11 to 15 years (12.5% and 25%). However, in both periods of professional experience, knowledge of biosecurity was better than adherence. Regarding the daily workload, the highest percentage of professionals who presented poor adherence were those who worked more than eight hours per day (87.5%).

Regarding professional manicurist training, it was verified that, to have performed a regular professional course did not result in greater adherence to biosecurity procedures, with this group presenting the highest percentage of inadequate responses (64.7%), despite sufficient knowledge in 52.9%.

The manicurists reported performing simple hand hygiene (washing with soap and water), with adherence of 83.3% among the MP group and 73.3% among the PS group, and all acknowledged the importance of performing this throughout the work day. The majority of professionals of the MP (77.8%) and PS (70%) groups reported washing hands between attending each client, however, 13% reported not having any criteria or routine in the frequency. When analyzing the assistive equipment (soap, towels) it was observed that knowledge was sufficient for 50% of the MP group and 80% of the PS group. However, adherence proved inadequate for many of the professionals (MP/74.1% and PS/53.3%) ($p < 0.05$), with 18.5% of the MP group and 16.7% of the PS group using a bar of soap and 53.7% of the MP and 33.3% of the PS using a cloth towel to dry the hands.

In evaluating the personal protective equipment (PPE) low adherence in the use of this was perceived among the MP (33.3%) and PS (63.3%) ($p < 0.05$) groups, however, there was no statistical association with knowledge ($p > 0.05$). Both groups had sufficient knowledge (MP/98.1% and PS/100%) regarding what PPE is essential in the professional practice. Percentage data in relation to the PPE used by the MP and PS groups are presented in figure 1.

Among those who reported adhering to PPE use, there was no statistical difference between the two groups of participants, with 55.6% of the MP and 84.2% of the PS making use of this for all procedures. However, 27.8% of the MP group and 5.3% of the PS group only used gloves when they perceived a risk or when they knew that the customer was carrying a disease. Among those who reported using gloves, 17.6% of the MP said that they reuse them between clients and all the PS mentioned the single use of the gloves. Concerning knowledge of this theme, the highest percentage of responses related to changing them between each client (MP/64.5% and PS/90%), however, 21.6% of the MP and 6.7% of PS cited the need to discard gloves when they are visibly soiled.

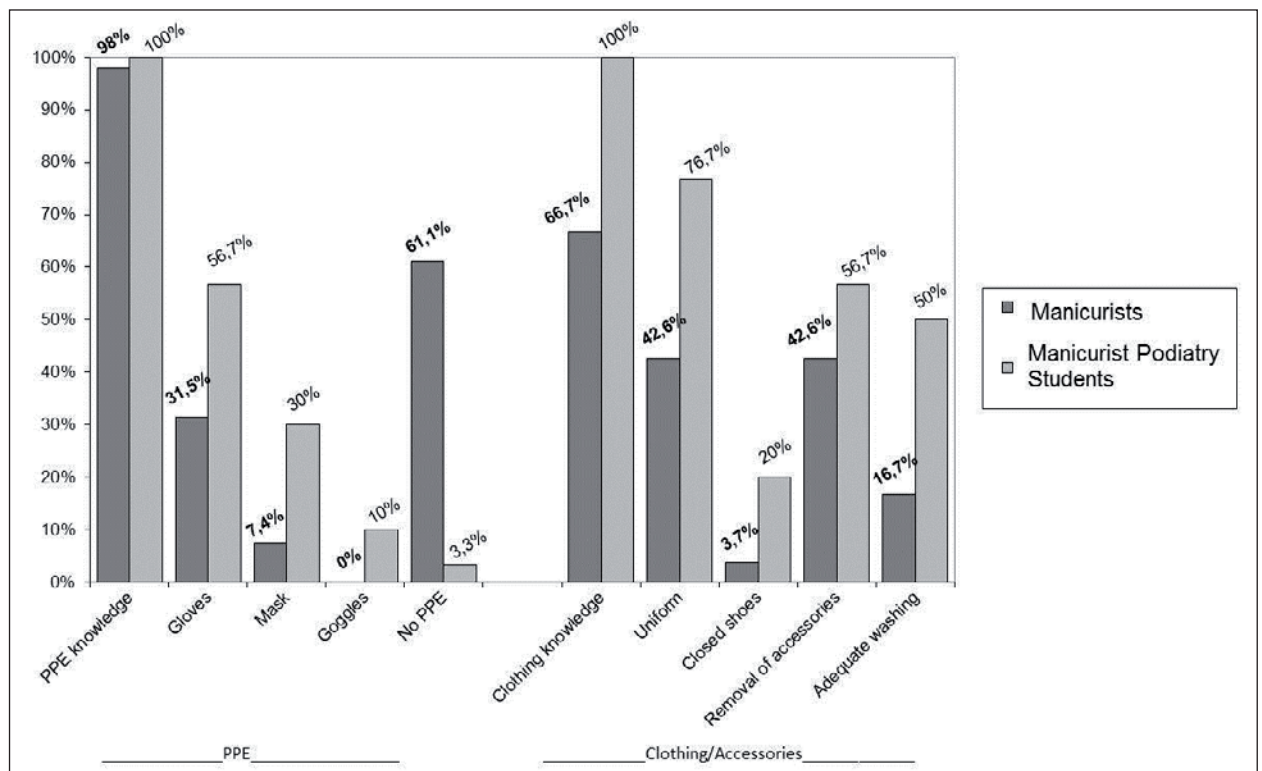


Figure 1 - Adherence and knowledge regarding personal protective equipment and clothing for manicurists and pedicurists. Arcos and Belo Horizonte-MG, 2010-2011

In the analysis of the clothing, use of accessories and personal hygiene, there was a significant difference ($p < 0.05$) between the two groups regarding

adherence to closed footwear, the use of uniform/apron and the technique used to wash this garment. In the MP group only 3.7% reported using closed

shoes and only 16.7% said they wash the clothes they wear in the salon separate from other clothing or from the rest of the clothes of the family (Figure 1).

In the evaluation of reprocessing (metal retractors and pliers to remove cuticles, scissors and nail clippers) we found that both the MP and the PS presented adequate adherence in some of the situations investigated. However, the

knowledge was low especially for the MP group (7.4% to 27.8%) with a significant difference for the PS group (46.7% to 90%) ($p < 0.05$).

The decontamination of instruments is an essential step in reprocessing and, in this study the two groups interviewed presented poor or no adherence (MP/0% and PS/3.3%) to the recommended method using enzymatic detergent among (Figure 2).

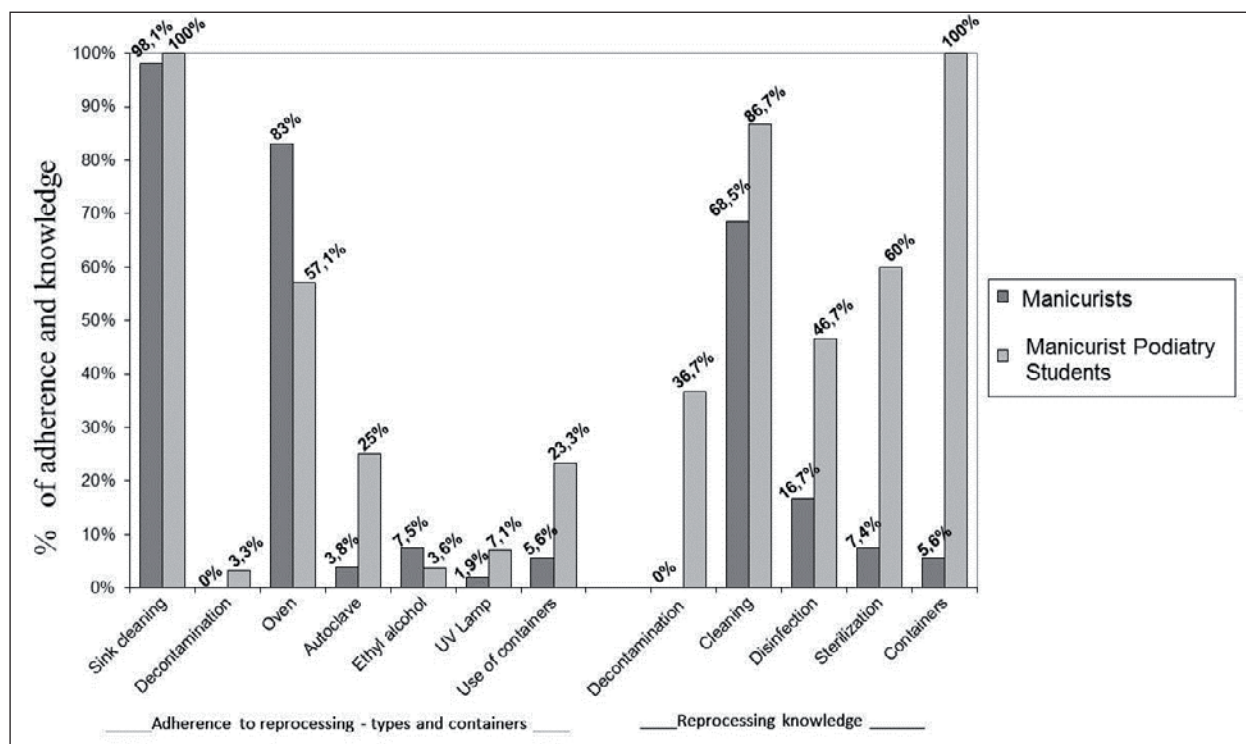


Figure 2 - Percentage of adherence and knowledge among manicurists and pedicurists regarding reprocessing of equipment. Arcos and Belo Horizonte-MG, 2010-2011

The decontamination process was equivocally associated with sterilization: rubbing with alcohol, boiling, use of disinfectants, household detergents and flaming. None of the MP group mentioned enzymatic detergent and only one of the 30 PS interviewed mentioned the use of this product, even though 36.7% of them had the correct concept of decontamination.

Analyzing the knowledge about decontamination, 50% of the MP group were unable to provide any definition for the term evaluated, leaving the question unanswered. A similar trend was found for the term disinfection with only 16.7% of the MP and 43.3% of the PS correctly defining this reprocessing method ($p < 0.05$). There was little clarity and inconsistency among 11% of the MP and 20% of the PS in differentiating disinfection from sterilization.

Adherence to the sterilization of equipment was reported by more than 90% of the participants,

however, the concept of this process was not clearly described, with a significant difference between the MP and PS groups ($p < 0.05$). Among those who reported using some method of sterilization, the most cited was dry heat, represented by the oven, with 83% of the MP group and 57.1% of the PS group mentioning it, however, in a more detailed evaluation it was realized that, among the MP group, the sterilization apparatus used was a “toaster oven” (device without external thermometer). Considering moist heat, the use of an autoclave was rarely reported (MP/3.8% and PS/25%). The use of ethanol was cited by a greater percentage of the MP group (7.5%) which corroborated the lack of knowledge of the concept of sterilization among the majority of the MP (92.6%) compared to the PS (40%). It was also reported that disinfection or sterilization of articles was only performed when there was contamination with blood (MP/9.5%

and PS/10%) or when some dirt was noticed on the instrument (MP/1.8% and PS/3.3%).

Regarding knowledge about sterilization methods, the PS provided more correct responses to the questions ($p < 0.05$). Sterilization of metallic equipment performed on the stove or in the oven at temperature of 100°C for 30 minutes was cited by 74.1% of the MP group and 10% of the PS group. Use of the autoclave at 121°C for 15-30 minutes was mentioned by 90% of the PS and 14.8% of the MP.

With respect to containers suitable for sterilization, it was noticed that there the MP were unawareness of their existence and the professionals of this group responded that the instruments were placed within the "toaster oven" without any container and kept inside the device until used. The PS group (100%) mentioned knowledge of the containers, although only a few (23.3%) used them (Figure 2).

In the evaluation of the sanitization of basins/sinks, the majority of the respondents (MP/98% and PS/83.3%) reported using these items, and 94.4% of the MP and 53.4% of the PS said that they protect them with disposable plastic or clean them with soap and water after each client.

There were also questions about the replacement of cloth towels between each client, which was more frequent among the MP groups (88%) compared to the PS group (65%) ($p < 0.05$). Only changing them in the presence of visible dirt was cited by 8% of the MP and 24% of the PS and performed without criteria by 4% and 8% of MP and PS, respectively. In this study, all the professionals stated that they perform the cleaning and/or disinfection of the surfaces and furniture of the salon, however, 7.5% of the MP and 30% of the PS used a duster, some kind of cloth, pure alcohol or unspecified methods.

Considering the factors hindering adherence to biosecurity procedures, the main justification was the lack of information on the subject (43%). Asked about the laws concerning biosecurity procedures, which are disseminated by the Health Surveillance Agency (Visa), only 1.9% in the MP group knew any legislation regarding sanitary requirements for salons. Less than half (37%) of the participants reported the establishment where they worked having received an inspection by Visa, however, all lacked business licenses.

DISCUSSION

In this study all the professionals invited agreed to participate, with results superior to those obtained by other studies, such as in salons of São

Paulo where 96% accepted, in Italy with 94%, and in Canada with 60%.⁸⁻¹⁰ All the participants were women, a result that has been found in other studies, confirming the prevalence of females in some categories of the beauty and aesthetics sector, being different when it comes to barbers, a position usually occupied by men.^{1,5,10-12}

The mean age of the professionals was 32.6 years for the MP group and 33.4 years for the manicurist podiatry students, with a mean daily workload, in the previous year, of up to eight hours, similar to a study with Canadian manicurists.⁹ It is known, however, that the workday can be extended between Thursday and Saturday, when the salons receive the greater amount of clients and consequently a higher demand for appointments, which was also the case in Canada.⁹

The remuneration predominantly occurred informally for the service performed (MP/24.1% and PS/36.7%) with only 2.4% having a formal employment contract recorded in the work papers. Despite being an old profession, it was only recognized in Brazil in 2012, however, still without being regulated.¹³ In this regard, an urgent need is noted for the regulation of the Law that addresses the specificities of the professions, such as the minimum wage, working hours, educational training and sanitary recommendations.

Poor adherence and inadequate knowledge were highlighted in general, among the groups, with the PS presenting better results, although lower than expected, possibly due to undergoing technical level training with specific content on biosecurity, the knowledge of which may therefore have influenced their adherence to biosecurity procedures. In the item specific to hand hygiene (HH) between attending the clients, 13% reported not having any criteria or routine, similar to that found in São Paul (22%), in addition 67% determined HH to be an important personal hygiene issue and not an indispensable measure for their own safety and that of the client.^{3,10} Among other professionals in the beauty and aesthetics sector, studies have indicated adherence to HH between each client of 90% for hairdressers and 10% to 40% for barbers.^{5-6,8,11}

To promote the practice of HH the National Health Surveillance Agency (ANVISA) recommends the use of paper towels to dry hands and liquid soap stored in dispensers for the lowest possibility of product contamination by microorganisms.¹⁴ The taps of sinks should preferably have an action that does not require touching them with the hands, the sinks must be easily accessible and

near the working areas.^{1,2,14-15}

The correct use of assistive devices for HH was not demonstrated in the present study ($p < 0.05$) and the amount of knowledge regarding this issue was less than expected. References were particularly made to the bar of soap and cloth towels to dry hands, similar to that recorded in the salons of São Paulo, where there were no specific HH sinks or liquid soap dispensers and a limited availability of paper towel.^{3,14}

In addition to HH, the use of personal protective equipment (PPE) constitutes part of the biosecurity procedure standard precautions. In this study the knowledge of the professionals regarding which PPE is indispensable was sufficient, however, this knowledge was not reflected to the same extent in the behavior of adhering to their use ($p < 0.05$). The data of this study relating to adherence to the use of PPE are in line with two other studies,⁹⁻¹⁰ which highlighted variations between 26% and 95% of manicurists/pedicurists not adhering to the use of procedure gloves when attending clients. In São Paulo 100% of the manicurists interviewed reported having come into contact with blood from clients without gloves and with the majority of them presenting a positive serological marker for hepatitis B. Among those who wore the gloves, 34% used them to avoid disease and 19% to protect themselves and the client. A relevant piece of data, in São Paulo, was no adherence the use of any other PPE, such as a mask, goggles and cap.^{3,10} Among Italian hairdressers, the use of gloves was reported by 68%, however, 50.5% of them reused the gloves and, among Moroccan barbers, there were also records of poor adherence to PPE, without the use of gloves even when in contact with blood.^{5,8}

The manicurists of the present study showed different adherence to the use of a uniform or apron (MP/42.6%, PS/76.7%), poor adherence to the use of closed shoes (MP/3.7%, PS/20%), and poor adherence to washing clothing worn in the salons separately from other clothes (MP/57.4% PS/50%). Ideally uniforms and aprons should be reprocessed daily and separated from other types of clothing, such as in hospitals, due to the clothing becoming contaminated with micro-organisms that have a pathogenic potential.¹⁶ Even in the PS group, where the professionals had received specific biosecurity training in the technical course, the behavior regarding the shoes and washing of the clothing was inadequate. Interestingly, in this group, knowledge was sufficient with 100% of correct responses ($p < 0.05$). Studies with barbers showed a lack of care with

the clothes and aprons, which were not washed or changed regularly (80% to 100%).⁵⁻⁶

In both groups of participants of the present study there was low adherence to decontamination of equipment and, in the MP group, the respondents were unable to define the term. The PS had better adherence compared to the MP, which would be expected due to their technical level training. This result is similar to that found in São Paulo, where 86% to 98% of the manicurists did not perform decontamination prior to the submission of the instrumental to the sterilization or disinfection process. The author did not note the presence of a written protocol for reprocessing or care of equipment in any of the salons.³ Decontamination is a process which removes the dirt (blood, pus) from equipment, thereby reducing the microbial load and improving the effectiveness of the cleaning. If the equipment contains organic matter residues, there is the possibility that the sterilizing or disinfecting agent does not reach the microorganisms sufficiently to eliminate them. In the decontamination process the use of enzymatic detergent is recommended, which has the advantages of removing organic matter, having low toxicity and not being corrosive to the instruments.^{1,5,17}

The instruments used by manicurists can be considered semi-critical equipment, as they come into contact with broken skin and therefore require high-level disinfection or sterilization.^{3,9} In this study both groups presented insufficient knowledge about sterilization (MP/7.4% and PS/60% correct responses to the questions) despite claiming to perform it (MP/96.3% and PS/93.3%), with the same observed in São Paulo where none of manicurists managed to define the concept of sterilization.^{3,10}

The equipment most often cited for sterilization was the "toaster oven", conforming to the term used by the interviewees, which performs internal heating without any form of temperature control, through means of a thermometer, or control of the exposure time. Sterilization by autoclave was not often used (11.1%) by these professionals, possibly due to the higher cost compared to ovens or even due to their limited knowledge of the process.^{3,17}

Another problem observed both in the adherence and the knowledge refers to the time and temperature of exposure of metal instrumental below those recommended for sterilization in ovens, with the temperature of 100°C for 30 minutes being cited. These results are similar to other studies in which knowledge about time and temperature suitable for ovens or autoclaves was far from adequate.^{5-6,9} In

São Paulo none of manicurists interviewed knew the difference between the oven and autoclave.³

Among the 84 manicurists interviewed (MP and PS) 4.8% said they did not sterilize their instruments, with indices ranging from 13% to 49% being highlighted in other studies.^{3,9} Other studies also indicate that 10% to 30% of barbers, hairdressers and podiatrists revealed that they did not sterilize or disinfect their instruments. The methods most cited by barbers were alcohol in varying concentrations, flaming, and bleach (sodium hypochlorite).^{5-6,11}

Ethanol was also cited as a "sterilization method" by 7.5% of the MP group, who presented insufficient knowledge about the sterilization of metal instruments. Similar results were found among the manicurists in São Paulo and Canada, who used methods such as ultraviolet light, alcohol, heated glass beads, ether, acetone, sodium hypochlorite, boiling water, and autoclaving, ranging from 1% to 60%.^{3,9,12}

An insufficient number of instruments could also contribute to not reprocessing materials, a condition that worsens on days and times of increased demand from clients in the salons, when there is not enough time or human resources to disinfect or sterilize the equipment.^{3,9}

With regard to containers for sterilization and storage of items, there was greater ignorance and incorrect behavior among the MP group, who did not use them and stored items inside the equipment ("toaster ovens"). In São Paulo, among the manicurists that made use of containers, all were inadequate to ensure the action of the sterilizing agent and to maintain the sterility, there was no date of reprocessing or validity, and they were not packaged so as to ensure the maintenance of the sterility.³

In this study, between 12% and 35% of the respondents said they did not perform the replacement of towels when attending each client. This fact was also revealed in São Paulo with 93% of the manicurists, and in Pakistan with 66% of barbers.^{3,6}

In the beauty and aesthetics sector the professionals do not seem to be very concerned with cleaning and disinfecting the surfaces in the salons, therefore they are not carried out with a set routine, between attending different clients and at the end of the workday.^{3,5} In this study, all the interviewees stated that they perform this, although some reported using household techniques, with the use of nonspecific, ineffective products, such as pure alcohol or alcohol diluted in water, and the use of cloths or mops, which favors the dispersal of dust carrying microorganisms.

All surfaces in salons including floors and walls should be easy to clean and disinfect, allowing the use of soap and water and/or rubbed down with 70% alcohol, and the floor should not be dry dusted, but cleaned damp incorporating a disinfectant.¹⁷

Another serious problem in the beauty and aesthetics sector is the large proportion of establishments operating without approval or licenses issued by the municipalities.³ All those interviewed in this study reported working in salons without business licenses, however, 37% said they had received a visit from Visa, which performs inspections in registered establishments. This fact can be explained, as some of the participants did not have an employment contract with the salons visited and possibly worked in more than one establishment, having received a health inspection at some moment.

CONCLUSION

In general it was found that adherence was inadequate and knowledge insufficient for the participants of this study. There was poor adherence to the use of personal protective equipment and to the correct methods of reprocessing and cleaning surfaces. Assistive hand hygiene devices were not those recommended, with the bar of soap and cloth towel reported. There was poor adherence to the use of aprons or uniforms, to the removal of accessories, and to the use of closed shoes. The most used reprocessing method was dry heat, represented by the "toaster oven" without an external thermometer for temperature regulation and no device to control the time of exposure. In addition, only a small percentage of the manicurists and pedicurists used containers suitable for sterilization, with the items more often being stored within the available equipment as a means of maintaining the sterilization.

The main intervening factor alleged by the professionals for non-adherence to biosecurity procedures was the lack of information. The inspection by the Health Surveillance Agency that contributes to the education and guidance of these professionals regarding biosecurity procedures was insufficient, possibly due to the agency not knowing of the existence of the salons, since they had no business license.

From the findings the following measures are suggested, performance of a wide reaching awareness campaign for beauty and aesthetics professional of the country and for the population regarding biosecurity procedures, development of legislative

regulation for the manicurist/ pedicurist profession and detailed sanitary legislation for the sector; strict control by the municipal health councils in accrediting beauty salons and professionals, as well as providing comprehensive sanitary control.

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