

Process of instrument sterilization in shops with manicure and pedicure services

Processo de Esterilização de instrumentais em estabelecimentos comerciais com serviços de manicures e pedicuros

Cecília Harumi Yoshida¹

Rosane Aparecida de Oliveira¹

Patricia Granja Coelho²

Fernando Luiz Affonso Fonseca³

Rosangela Filipini¹

Keywords

Public health nursing; Sterilization/ methods; Hepatitis B virus; Hepatitis C virus; Beauty and aesthetic centers

Descritores

Enfermagem em Saúde Pública; Esterilização/métodos; Virus da hepatite B; Virus da hepatite C; Centros de embelezamento e estética

Submitted

January 9, 2014

Accepted

February 27, 2014

Corresponding author

Fernando Luiz Affonso Fonseca
Prof. Artur Riedel street, 275,
Diadema, SP, Brazil.
Zip Code: 09972-270
profferfonseca@gmail.com

Abstract

Objective: Understanding the sterilization process of critical items used in commercial establishments that offer the services of manicures and pedicure to the public.

Methods: Cross-sectional study with 90 employees exercising the function of manicure and pedicure in commercial establishments. The research instrument was a questionnaire with open and closed questions about the knowledge and procedures related to disinfection and sterilization of instruments.

Results: The mean age was 33.8 years, 72 % had taken vocational courses and had professional experience of more than five years. The use of hot air oven was prevalent in 84.3 % of establishments and 65.7 % reported opening the oven during sterilization. The relation between the higher cost of the service and the use of autoclave was statistically significant ($p < 0.001$).

Conclusion: The sterilization process of the instruments used in the studied commercial establishments that offer services of manicures and pedicure to the public have significant deficiencies related to cleaning and sterilization of instruments.

Resumo

Objetivo: Conhecer o processo de esterilização de artigos críticos utilizado em estabelecimentos comerciais que oferecem ao público os serviços de manicures e pedicuros.

Métodos: Estudo transversal que incluiu 90 funcionários de estabelecimentos comerciais que exerciam a função de manicure e pedicuro. O instrumento de pesquisa foi um questionário com perguntas abertas e fechadas sobre os conhecimentos e procedimentos relacionados a desinfecção e esterilização dos instrumentais.

Resultados: A idade média foi de 33,8 anos, 72% havia realizado curso profissionalizante e tem experiência profissional há mais de cinco anos. O predomínio do uso de estufa ocorreu em 84,3% sendo que 65,7% referiram abrir a estufa durante a esterilização. A relação entre o custo maior do procedimento com uso de autoclave apresentou significância estatística ($p < 0,001$).

Conclusão: O processo de esterilização de instrumentais utilizados nos estabelecimentos comerciais que oferecem ao público os serviços de manicures e pedicuros estudados têm deficiências importantes relacionadas à limpeza e a esterilização dos instrumentais.

DOI: <http://dx.doi.org/10.1590/1982-0194201400005>

¹Faculdade de Medicina do ABC, Santo André, SP, Brazil.

²Serviço Nacional de Aprendizagem Comercial, São Paulo, SP, Brazil.

³Instituto de Ciências Ambientais, Químicas e Farmacêuticas, Universidade Federal de São Paulo, Diadema, SP, Brazil.

Conflict of interest: no conflicts of interest to declare.

Introduction

Viral hepatitis is a major public health problem worldwide, due to the fact of its association with the high degree of chronicity and progression to liver cirrhosis and hepatocellular carcinoma.⁽¹⁻³⁾

It is estimated that 240 million people have chronic infection with hepatitis B virus and 170 million with hepatitis C virus worldwide.⁽⁴⁾ In Brazil, between 1999 and 2010, were confirmed 104,454 cases of hepatitis B and 60,908 cases of hepatitis C.^(5,6)

The Hepatitis B virus is transmitted through blood and blood products, organ transplantation, hemodialysis, breastfeeding, contaminated needles, syringes and intravenous materials, and through sex, highlighting body fluids such as semen and saliva.^(7,8)

As the virus is highly resistant, it can survive up to a week outside the body while remaining highly infective. And it is known that a single viral particle is capable of infecting humans. It can also stand for 10 hours at 60 °C, for 5 minutes at 100° C, to ether and alcohol 90°C.⁽⁸⁾

The Hepatitis C virus is an infectious agent transmitted primarily by blood, its infectious potential through sex is not high and vertical transmission is also considered unusual.⁽⁹⁾

Among the possible ways of contamination stand out blood transfusions, hemodialysis, contamination by needles, syringes and intravenous materials.⁽¹⁰⁾ Its resistance to external environment is poorly defined, but it is known that it is more labile than the hepatitis B virus.⁽⁸⁾

There are several situations that increase the risk of transmission of hepatitis due to possibilities of sharing cutting items of personal use - razors, shavers and nail pliers -, which are important sources of percutaneous transmission of hepatitis.^(10,11)

In commercial establishments that offer manicure and pedicure services, nail tools such as pliers and scissors are widely used.⁽¹¹⁾

These instruments are described as possible carriers of the virus, and therefore, commercial establishments that provide this type of service should be the object of educational activities of knowledge and awareness to the adoption of preventive measures such as personal

protection, special care in the handling of instruments, handwashing with soap and water or 70% alcohol and sterilization of instruments.⁽¹¹⁾

Another problem is that there is no specific physical space for an adequate sterilization process in these commercial establishments. The sterilization of materials should be done by sterilization equipment like autoclave, which uses saturated steam under pressure and is a process that offers greater security and economy. In these establishments, called beauty salons, the hot air oven - that provides dry heat sterilization - is widely used. This type of sterilization requires longer exposure time at high temperatures, so that the penetration and heat distribution are uniform.⁽¹²⁾

It is noteworthy that the sterilization processes can only occur after the instruments are washed in running water with detergent to remove the dirt, decreasing the amount of micro-organisms.⁽¹³⁾

The aim of this study was to know the sterilization process of instruments used in commercial establishments that offer the services of manicures and pedicure to the public.

Methods

This is a cross-sectional study involving 90 employees of commercial establishments in the municipalities of Santo André and São Bernardo do Campo, in the state of São Paulo, southeastern region of Brazil. Data were collected in four months. All professionals that exercised the activities of manicure and pedicure were eligible for the study. The establishments that used materials sterilized by third parties were excluded.

An instrument of the questionnaire type was developed with open and closed questions, structured on the selected variables referring to the knowledge and procedures for disinfection and sterilization.

The statistical software Epi-Info version 6.0 was used for data storage and analysis. The analysis was descriptive and the data presented in tables in absolute and relative numbers. For associations the significance level was 5%, with $p < 0.05$.

The study followed the national and international standards of ethics in research involving human beings.

Results

Ninety employees who performed the functions of manicure and pedicure were included in the study, all females, among which 44.4% worked in shops in the city of Santo André and 55.6% in São Bernardo do Campo. The mean age was 33.8 years with a high standard deviation (11.4 years).

The sociodemographic variables (Table 1) had no statistical significance in relation to the quantity of instruments (pliers) used (Table 2).

Table 1. Sociodemographic variables

Variables	n(%)
Marital status	
Married	43(47.8)
Single	36(40.0)
Widowed/ divorced	10(11.1)
Unknown	1(1.1)
Education	
Primary school	24(26.7)
Secondary school	61(67.8)
Tertiary school	4(4.44)
Unknown	1(1.1)
Residence	
Own	52(57.8)
Rented/Mortgaged	29(32.2)
Ceded	8(8.88)
Unknown	1(1.1)
Income	
Up to two minimum wages	59(65.5)
Above two minimum wages	21(23.4)
Unknown	10(11.1)
Another activity	
Yes	61(67.8)
No	29(32.2)
People who contribute to the family income	
None	24(26.7)
1	36(40.0)
2 or more	20(22.2)
Unknown	10(11.1)
Total	90(100)

Sixty-five of the employees (72%) have taken vocational courses, have more than five years of experience and the majority acts only in a commercial establishment. As for disinfection processes used, it was observed that 71.1% used solutions with products available for cleaning of instruments (Table 2).

Table 2. Variables related to work activities

Variables	n(%)
Time of Experience	
Less than 5 years	35(38)
More than 5 years	53(59.0)
Unknown	2(2.2)
Number of beauty salons where they work	
1	76(84.4)
2	3(3.3)
3 or more	10(11.2)
Unknown	1(1.1)
Customers with private instruments (within a week)	
0	31(34.4)
1	22(24.4)
2	15(16.7)
More than 3	22(24.4)
Cleaning of instruments	
With soap and water	9(10.0)
Water, soap and other substances	12(13.3)
Only other substances	64(71.1)
Unknown	5(5.5)
Total	90(100)

The hot air oven (developed by Pasteur) was the most used equipment for sterilization (84%), however, 65.7% of participants reported opening the oven during the sterilization process, yet 85.6% still considered it satisfactory. Only 15.7% reported using an autoclave for sterilizing instruments, which is not statistically significant.

The relationship between the type of appliance used and the average differences between the prices of the service was statistically significant ($p < 0.001$) (Table 3), noting that in the establishments using an autoclave, the average price of the service is higher than of those using the hot air oven.

Table 3. Relation between the price charged by the manicures and the type of appliance used

Appliance	Obs**	Min	Min/Máx	Standard deviation	p-value
Hot air oven	75	8.7	5/19	1.9	<0.001*
Autoclave	14	14.6	8/22	4.5	

*p-value: significant for the Kruskal-Wallis H test;

**Obs: number of times the appliance was mentioned when used as a sterilization method

Discussion

The limits of the results of this study refer to the cross-sectional design, which does not allow establishing relations of cause and effect.

The results indicated that the employees of commercial establishments that provide services of manicure and pedicure are part of a risk group due to the use of contaminated instruments. Furthermore, the risk of cross contamination should be considered due to the fact that employees use the instruments on themselves.⁽¹⁴⁾

Commercial establishments that offer services of manicure and pedicure to the public should follow the current health law to ensure the safety of clients and the quality of services. The steps for sterilization of the mentioned instruments are washing, drying and sterilization.

The washing of instruments is of great importance to the effectiveness of other stages, because at this point occurs the removal of dirt, decreasing the amount of existing micro-organisms, therefore, it should be done with the use of detergents, mechanical action and individual protective equipment.⁽¹³⁾

It was noted that most of the respondents did not know the meaning of cleaning and disinfection, as they reported using alcohol, acetone and other products. After cleaning, instruments should be rinsed, dried and accommodated in a suitable packaging for the sterilization process, containing the sterilization date and name of the responsible person. This package is valid for seven days and should be open in front of the customer.⁽¹⁵⁾

It is also noteworthy that the sterilization processes should be daily monitored by a combination of chemical and biological indicators and physical controls that evaluate the sterilization conditions and the effectiveness of the sterilization cycle.⁽¹⁶⁾

Establishments that used the hot air oven did not follow the recommendations on the time and temperature required for sterilization, a result mentioned in other studies too.^(14,17)

The sterilization of materials by high pressure saturated steam is the one that offers greater safety and economy. The commercial establishments using autoclave were few and charged double the amount for the rendered services.

The professionals stated that the sterilization processes they used were satisfactory, indicating the need for training on the prevention of hepatitis, use of personal protection equipment, hygiene of hands

and sterilization of instruments. The Brazilian government recognizes the exercise of the professional activities of manicure and pedicure, and demands the following of health standards regarding sterilization of materials. In the case of commercial establishments, the technical standards related to biosecurity should be defined by the municipality where they are located.⁽¹⁸⁾ The municipalities that have created training programs for manicures and pedicures have been reaching improvements in the quality and safety of services provided.⁽¹¹⁾

Conclusion

The sterilization process of the instruments used in commercial establishments offering the services of manicure and pedicure to the public showed important deficiencies related to cleaning and sterilization of instruments.

Collaborations

Yoshida CH and Oliveira RA contributed to the project design, analysis and interpretation of data. Coelho PG contributed to the analysis and interpretation of data and writing of the article. Fonseca FLA and Filipini R contributed to the relevant critical review of the intellectual content and final approval of the version to be published.

References

1. European Association for the Study of Liver. EASL Clinical practice guidelines: management of chronic hepatitis. *J Hepatol.* 2009;50(2):227–42.
2. Pelegrini A, Barbanera EE, Gonçalves FB. Incidência da infecção e de fatores de risco para os vírus das hepatites B e C em diferentes populações e a associação com diagnóstico sorológico, bioquímico e molecular. *Rev Panam Infectol.* 2007;9(3):32-8.
3. McMahon BJ. Natural history of chronic hepatitis B – clinical implications. *Medscape J Med.* 10(4):91, 2008.
4. Ott JJ, Stevens GA, Groeger J, Wiersma ST. Global epidemiology of hepatitis B virus infection: new estimates of age-specific HBsAg seroprevalence and endemicity. *Vaccine.* 2012;30(12):2212–9.
5. Shepard CW, Finelli L, Alter MJ. Global epidemiology of hepatitis C virus infection. *Lancet Infect Dis.* 2005; 5(9):558-67.
6. Brasil. Ministério da Saúde. Secretaria de Vigilância em Saúde, Departamento de DST, Aids e Hepatites Virais. Boletim epidemiológico

- hepatites virais. Brasília (DF); Ministério da Saúde; 2011. [citado 2014 Fev 23]. Disponível em: http://www.aids.gov.br/sites/default/files/anexos/publicacao/2011/50073/boletim_hepatites2011_pdf_64874.pdf.
7. Centers for Disease Control and Prevention. Guidelines for viral hepatitis surveillance and case management. Atlanta: Centers for Disease Control and Prevention; 2005. [cited 2014 Fev 25]. Available from: <http://www.cdc.gov/hepatitis/pdfs/2005guidelines-surv-casemngmt.pdf>.
 8. BRASIL. Ministério da Saúde. Programa Nacional para a Prevenção e Controle das Hepatites Virais: Manual de aconselhamento em Hepatites Virais. Brasília (DF); 2005. p. 43. C[itado 2014 Fev 23]. Disponível em: http://bvsmms.saude.gov.br/bvs/politicas/hepatites_aconselhamento.pdf.
 9. Brasil. Ministério da Saúde. Secretaria de Vigilância em Saúde. Departamento de Vigilância Epidemiológica. A, B, C, D, E de hepatites para comunicadores Série F. Comunicação e Educação em Saúde. Brasília (DF); Ministério da Saúde; 2005. [citado 2014 Fev 23]. Disponível em: http://bvsmms.saude.gov.br/bvs/publicacoes/hepatites_abcd.pdf.
 10. Brasil. Ministério da Saúde. Secretaria de Políticas de Saúde. Programa Nacional de Hepatites Virais. Hepatites Virais: o Brasil está atento. Brasília(DF): Ministério da Saúde; 2008. [citado 2014 Fev 23]. Disponível em: http://bvsmms.saude.gov.br/bvs/publicacoes/hepatites_virais_brasil_atento_3ed.pdf.
 11. Melo FC, Isolani AP. Hepatite B e C: do risco de contaminação por materiais de manicure/ à prevenção. SaBios: Rev Saúde Biol. 2011;6(2):72-8.
 12. Brasil. Ministério da Saúde. Hepatites virais longe do salão de beleza, 2011. [citado 2014 Fev 23].Disponível em: <http://www.aids.gov.br/pagina/2011/50067>.
 13. Traitel M. Do Especialista para o clínico. Rev Bras Odontol (Rio de Janeiro). 2009; 66(2):148-9.
 14. Oliveira AC, Focaccia R. Survey of hepatitis B and C infection control: procedures at manicure and pedicure facilities in São Paulo, Brazil. Braz J Infect Dis. 2010;14(5):502-7.
 15. Secretaria de Saúde do Estado de São Paulo. Beleza com segurança. Guia Técnico para profissionais. 2009. [citado 2014 Fev 23]. Disponível em: http://www.prefeitura.sp.gov.br/cidade/secretarias/upload/Guia_Final_1_1254748059.pdf.
 16. Moraes JT, Barbosa FI, Costa TR, Ferreira AF. Hepatite B: Conhecimento dos riscos e adoção de medidas de biossegurança por manicures/s de Itaúna-MG. Rev Enferm Centro Oeste Min. 2012;2(3):347-57.
 17. Tipple AF, Pires FV, Guadagnin SV, Melo DS. O monitoramento de processos físicos de esterilização em hospitais do interior do estado de Goiás. Rev Esc Enferm USP. 2011. 45(3):751-7.
 18. Garbaccio JL, Oliveira AC. Biossegurança e risco ocupacional entre os profissionais do segmento de beleza e estética: revisão integrativa. Rev Eletr Enf. 2012;14(3):702-11.