ABSTRACT

Objective: To describe infection control practices used by technicians doing manicures and pedicures in an urban setting in Ontario.

Methods: A random sample of 120 establishments was selected from a sampling frame. A survey was designed and administered to technicians through face-to-face interviews.

Results: Technicians in 72 establishments were interviewed, representing a 60% response rate. Twenty-nine (40%) of these technicians indicated that they had been immunized against hepatitis B. Technicians re-used almost all instruments even if this was not the intent of the manufacturer. Isopropyl alcohol was the most commonly used disinfectant. Many technicians did not wear gloves while performing procedures. Most did not follow universal precautions when asked how they would react to incidental cuts on either the client or themselves.

Conclusion: There is a need for the development of infection control protocols for manicure and pedicure establishments since the potential for transmission of infectious diseases does exist.

ABRÉGÉ

Objectif : Décrire les pratiques de prévention des infections employées par les manucures et les pédicures d'une ville ontarienne.

Méthode : Nous avons sélectionné un échantillon aléatoire de 120 établissements à partir d'une base de sondage, puis conçu un questionnaire d'enquête que nous avons administré aux manucures/pédicures lors d'entrevues en personne.

Résultats : Nous avons interviewé les manucures/pédicures de 72 établissements, ce qui représente un taux de réponse de 60 %. Vingt-neuf répondants (40 %) ont déclaré avoir été vaccinés contre l'hépatite B. Les manucures/pédicures réutilisaient presque tous leurs instruments, même ceux à usage unique. Le désinfectant le plus commun était l'alcool isopropylique. De nombreux manucures/pédicures ne portaient pas de gants au travail. La plupart ne prenaient pas de précautions élémentaires en cas de coupures accidentelles sur soi ou sur les clients.

Conclusion : Il faut élaborer des protocoles de prévention des infections dans les établissements de soin des mains et des pieds, où les possibilités de transmission de maladies infectieuses sont réelles.

Survey of Infection Control Procedures at Manicure and Pedicure Establishments in North York*

Ian L. Johnson, MD, MSc, FRCPC,¹ John J.M. Dwyer, PhD,²
I.D. Rusen, MD, MSc, FRCPC,³ Rita Shahin, MD, MHS, FRCPC,²
Barbara Yaffe, MD, MHS, FRCPC²

Although hepatitis B is mainly transmitted through sexual transmission and use of contaminated needles, no risk factors are identified for approximately 43% of reported cases.¹ A large outbreak of hepatitis B among patients who attended EEG clinics² raised awareness of other possible sources of infection in the community.

The literature indicates that outbreaks of viral hepatitis B have occurred with the use of acupuncture, body-piercing, and other contaminated needles.³⁻⁸ An Italian study⁹ reported that, compared to persons who had contracted hepatitis A, persons who had hepatitis B were more likely to report having had manicures or pedicures. Potential spread from ear piercing has been investigated¹⁰ and two letters to the editor^{11,12} also cite the beauty industry as possible sources of infection.

This paper describes a survey of manicure and pedicure establishments in the North York area of Toronto. The purpose of the survey was to assess the infection control practices and potential for spread of hepatitis B and other bloodborne pathogens.

METHODS

Since nail care establishments are unregulated in Ontario and there are no professional associations to which technicians belong, no existing inclusive list of manicure and pedicure establishments in North York was available. A sampling frame was created using two methods. First, local

phone books were searched under the headings of hair and beauty salons, manicure and pedicure. A second method accessed the public health department's internal inspection information system. Two research assistants called each establishment to determine if it was in business and which services were offered. This process identified 229 establishments that offered both manicure and pedicure services and 23 businesses that only offered manicures.

A random sample of 120 of the 252 original establishments was selected for inclusion in the survey. Letters of introduction, stating both the purpose and the voluntary nature of the survey, were sent to owners of the selected establishments. A research assistant then phoned to arrange a site visit for consenting establishments and interviewed the nail care technician in attendance. Educational information was given and infection control practices were discussed at the end of the visit. All surveys were conducted during a two-month period, beginning in August 1996.

The questionnaire was specifically developed for this investigation. Two manicure/pedicure establishments were visited in order to obtain background information to facilitate development of the survey. Existing surveys were obtained^{13,14} and used in designing the one for this investigation. The final survey consisted of closed- and open-ended questions.

Analysis of responses to the closed-ended questions was done using the SPSS/PC statistical package, whereas the open-ended responses were transcribed into a word processor, categorized, and analyzed descriptively.

RESULTS

Of the 120 establishments in the random sample, 72 (60%) agreed to partici-

1. Department of Public Health Sciences, University of Toronto, Toronto, ON
2. Toronto Public Health Division, Toronto, ON
3. Community Medicine Residency Program, University of Toronto (at the time of study)

Correspondence: Dr. Ian Johnson, Rm. 4017, McMurrich Building, 12 Queen's Park Cres. W, University of Toronto, Toronto, ON M5S 1A8, Fax: 416-978-8299, E-mail: ian.johnson@utoronto.ca

* This work was done prior to amalgamation. The area is now part of Toronto.

pate. Since no data were available on those establishments that refused to participate, no comparisons between respondents and non-respondents can be made.

The characteristics of the respondents are presented in Table I. Seventy-nine percent of the technicians worked on a full-time basis and 76% obtained their education from private schools. One third of the technicians had 5 years or less of work experience.

The technicians reported that, on average, they did 5 manicures per day and that each took approximately 30 minutes to complete. The number of manicures per day ranged from 1 to 16 and the length of time for each manicure ranged from 20 to 60 minutes. The time spent on a manicure was not related to the experience or training of the technician.

The technicians did an average of 2 pedicures per day and each pedicure took almost an hour to complete. Again, there was considerable variation in the number of pedicures per day (range = 1-10) and time taken to complete a pedicure (range = 30-60 minutes).

Forty percent of the technicians indicated that they had been immunized against hepatitis B. Eighteen of the 43 unimmunized technicians indicated they were unaware of hepatitis B vaccine. As shown in Table II, immunized technicians were more likely to have graduated recently ($p < 0.05$) and were 1.5 times more likely to use gloves when performing a pedicure ($p < 0.05$).

The technicians reported inconsistent use of gloves in performing a manicure and pedicure. Twenty-five of the 72 (35%) respondents reported ever wearing gloves while performing a manicure, but 22 of these 25 technicians reported not using them consistently. Similarly, 42 of the 67 responding technicians (63%) reported ever using gloves during a pedicure but 29 of these reported using them inconsistently.

In terms of instruments, between 95 and 100% of tools were re-used even if this was not the intent of the manufacturer (see Figure 1). As depicted in Table III, nearly 40% of technicians had only one set of tools for manicures and one set for pedicures. In situations with minimal time

between clients, the technicians may not have had sufficient time to disinfect their instruments between procedures.

Technicians were asked which solutions they used to disinfect their instruments. The most commonly used solutions were those containing isopropyl alcohol. Fifty-seven (79%) respondents indicated that they used either 70% or 99% isopropyl alcohol and an additional 8 respondents (11%) used a solution containing 14% isopropyl alcohol. One person used 2% glutaraldehyde alone and two technicians reported using this solution as well as isopropyl alcohol. For the remaining technicians, combinations of chemicals were used, including many which could not be identified. Most appeared to have quaternary ammonium compounds as their active ingredient.

Only one technician (1%) reported using an autoclave to sterilize the instruments. Other methods of "sterilization" included UV light (38%), Glass Beads (18%) and Ultrasonic solution (1%). Forty-nine percent of technicians reported not using any method of sterilization. Some technicians reported using multiple methods of sterilization.

Three scenarios dealing with injuries were presented to each technician. The technicians' responses to these open-ended questions were recorded and categorized into four main types of responses. Table IV shows the lack of knowledge of appropriate procedures in that very few reported disinfecting their instruments and many reported stopping the bleeding without using gloves.

A final set of questions dealt with the disposal of sharp instruments such as razor blades. Approximately one third of technicians indicated that they re-used razor blades on instruments like the callus remover. When disposal of sharp instruments was required, most indicated they disposed of the razors in garbage cans without any special precautions. A few indicated that they wrapped the blades in tissues or placed them back in the original wrappers. Only two technicians indicated they considered such razors as biomedical waste or used a proper puncture-resistant, sharps container.

TABLE I
Characteristics of the Nail Care Technicians Who were Interviewed (n = 72)

	n	%
Type of Work		
Full time	57	79
Part time	15	21
Education*		
Private school	55	76
Community college	16	22
Apprentice	13	18
Correspondence	1	1
Other	1	1
Experience† (years)		
≤ 5	24	33
6-10	13	18
11-15	13	18
16-20	11	15
≥ 21	9	12
Non-response	2	3

* Each technician reported receiving training via one or more methods. Therefore, percents do not add up to 100%.

† Percents do not add up to 100% due to rounding.

TABLE II
Characteristics of Immunized and Unimmunized Nail Care Technicians

Characteristic	Immunized Technicians (n)	Unimmunized Technicians (n)
Experience (years)		
≤ 5	10	14
6-15	15	11
≥ 16	4	16
Missing data	-	2
Wore Gloves During Manicures		
Yes	12	13
No	17	30
Missing data	-	-
Wore Gloves During Pedicures		
Yes	22	20
No	6	19
Missing data	1	4

TABLE III
Number of Technicians (n = 72) Who Used Certain Number of Sets of Instruments for Manicures and Pedicures

	n	%
Number of Sets for Manicure		
1	27	38
2	20	28
3	10	14
4 or more	12	17
Non-respondents	3	4
Number of Sets for Pedicure		
1	28	39
2	18	25
3	11	15
4 or more	8	11
Non-respondents	7	10

Note: Percents do not add up to 100% due to rounding.

Figure 1. Most Frequently Used Instruments in Nail Care and Frequency of Re-use

DISCUSSION

The completeness of the sampling frame in capturing all nail care establishments in North York cannot be assessed. Certainly operations, such as those located in a person's home, were unlikely to be included in this survey. The representativeness of the sample cannot be assessed since no data exist on those who refused to participate. While a 60% response rate is fairly good, it is possible that those with poor infection control procedures were less inclined to participate. Therefore the survey results may suggest better infection control practices than actually exist.

The results raise important issues in terms of infection control. The potential for the spread of pathogens was in three areas: (a) re-use of disposable instruments such as razors; (b) inadequate disinfection of equipment; and (c) inadequate management of cuts and abrasions. More stringent precautions are required to prevent possible exposures to blood and bloodborne pathogens.

The re-use of disposable equipment is a potential source of infection. The primary concern is that a cut caused by a re-used tool may lead to transmission of blood-borne infections. Procedures such as tat-

TABLE IV
Nail Care Technicians' Responses to Three Scenarios,
as a Function of Glove Use

Response to Scenario	Glove Use During Manicures (Number of Technicians)	
	Yes	No
Scenario 1: Inadvertent cut on client's finger with resultant bleeding		
Would use either a powder astringent, styptic pencil, alcohol, peroxide, or soap and water to clean the wound and stop the blood flow.	14	30
Would apply pressure to the area with the aid of a cotton ball or Q-tip and then apply a bandage.	13	17
Would disinfect the soiled instruments and other articles.	1	3
Would continue the manicure/pedicure work, avoiding the injured area.	3	10
Scenario 2: Client has an existent cut on his/her hand		
Would use alcohol, peroxide, or soap to clean the cut or area where the skin condition was located.	2	15
Would cover the cut with a piece of cotton or bandage.	2	9
Would continue the manicure/pedicure work, avoiding the injured area.	7	17
Would not perform the massage component of the nail service.	9	9
Scenario 3: Technician has a cut on his/her hand		
Would use a latex finger glove or wear latex gloves to cover the affected area.	13	9
Would use a bandage to cover the area.	7	19
Would wash the cut with an antiseptic/bactericidal soap.	1	15
Would not perform manicures or pedicures until the cut was healed.	1	2
Note: these are categorized responses to open-ended questions. Some respondents gave multiple answers and some gave none.		

tooning^{6,15,16} have been shown to be associated with the transmission of hepatitis B, hepatitis C, HIV, syphilis and warts. It is likely that transmission of infections could also result from re-using razors and scissors without adequate sterilization.

The disinfection process used in such establishments is inadequate for the job. Isopropyl alcohol and quaternary ammonium materials are classified as "low level" disinfectants and should not be used on instruments that pierce the skin. Although isopropyl alcohol is effective against hepatitis B, it is not usually recommended since contact time is limited by its volatility.¹⁷ Only one establishment reported using an autoclave. UV light and ultrasonic solutions are not approved methods of sterilization and should be discouraged. Glass bead sterilizers, initially designed for endodontics procedures, have not been approved for sterilization.^{18,19} The effectiveness of this method depends on the instrument size, preparation time for the sterilizer and infective load.^{20,21}

From discussions with technicians, methods for manicures do vary. Some technicians insist that they do not cause cuts (i.e., they push back cuticles and do not cut them) and thus they feel they will not cut their clients. Others do cut cuticles so the risk of bleeding is higher. While a manicure and pedicure is not intended to cause bleeding, informal discussions with experienced technologists revealed that inadvertent cuts do occur. However, these technologists indicated that such occurrences became less frequent once they gained experience. The use of styptic pencils is discouraged since they may act as a vehicle for transmitting infections. When injuries do occur, technicians should follow the standard universal precautions²² to prevent transmission of infection to themselves and other clients.

All of the above findings speak to the lack of information and training on infection control available to technicians working in these establishments. Informal conversations indicated that most technicians received little training in infection control. Moreover, they receive information on disinfectants directly from salespersons and at trade shows. The lack of familiarity of the technicians with hepatitis B suggests the need for improved infection control education.

In conclusion, there is a need for the development of infection control protocols for manicure and pedicure establishments since the potential for transmission of infectious diseases does exist.

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