

## Adherence to standard precautions from the standpoint of the Health Belief Model: the practice of recapping needles

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**Abstract** *The aim of this study was to apply the Health Belief Model to explain the adherence to the recommendation not to recap needles by dentists and dental assistants of the public health system in a municipality in the State of São Paulo. A questionnaire validated and adapted for the oral health area was used, which included variables related to the frequency of recapping and health beliefs using Likert-type scales. The relationship between beliefs and adherence to the recommendation not to recap needles was obtained by regression analysis. Of all the professionals in this study (n=79), the majority (83.5%) reported recapping needles at least once in the last month. Through regression analysis, it was observed that the relationship between the beliefs described by the model and the attitude whether or not to follow the recommendation not to recap needles was explained by a lower perception of psychological barriers and a greater perception of stimuli not to recap needles. The conclusion reached is that the acceptance of recommendations to prevent working accidents with biological material was explained by some dimensions of the Health Belief Model, enabling discussion about reformulation of training offered to professionals of the public health system.*

**Key words** *Occupational risks, Universal precautions, Human resources in health, Health education*

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## Introduction

The exercising of a profession, particularly in the area of health services, exposes workers to biological hazards, since their work activities result in their having direct contact with body fluids<sup>1</sup>. However, it was only after the discovery of the human immunodeficiency virus (HIV) in the 1980s, and the occurrence of a high rate of contagion of the hepatitis B and C viruses, that health service professionals became concerned with their occupational exposure to potentially contaminated biological materials, by virtue of their contact with blood and other body fluids<sup>2</sup>.

Among the various forms of occupational exposure, the percutaneous type is especially significant for dental professionals (Dental Surgeon, Dental Technician, Dental Assistant), since they spend their workday handling sharp instruments, both ultrasonic and rotary, with a restricted field of view, as well as being surrounded by dental equipment, all of which contribute to increasing the risk of these types of occupational accidents<sup>3</sup>.

In order to minimize the risk of exposure to blood-borne infections, the Standard Precautions (Precauções Padrão - PP) were established in the health services. They are specific preventive measures intended to be adopted in the provision of services to all patients, regardless of whether they have a confirmed or presumed diagnosis of an infectious disease, in the handling of blood, secretions or excretions and in having contact with mucosa or non-intact skin. Such precautions include the use of Personal Protective Equipment (Equipamento de Proteção Individual - EPI), hand hygiene, vaccination against hepatitis B and a high degree of care when handling or disposing of blood-contaminated materials, and a recommendation of "not recapping needles"<sup>4,5</sup>.

The adherence to these recommendations entails acquiring and maintaining adequate preventive behaviors, which require professional motivation and technical knowledge. The non adherence to the measures established by the PP can result in a high frequency rate of occupational accidents from exposure to body fluids and sharps<sup>4</sup>. In this context, the high rate of recapping needles stands out, such practice being reported as still common among dental students and professionals<sup>1,3</sup>.

In a study that had the objective of observing the degree of adherence to the recommendation of not recapping needles, the contents of the containers used for the disposal of sharps were analyzed. It was found that the majority of the nee-

dles had been recapped, at least at one end, contrary to what is recommended in the Standard Precautions and the Regulatory Standard no. 32 (NR 32) for Occupational Health and Safety in Health Service Facilities<sup>6,7</sup>.

Thus, the adherence to the recommendation of not recapping needles can be understood as a form of preventive behavior against the risks of occupational exposure to HIV, HBV and HCV from injuries involving needles<sup>8</sup>. In order to explain the adoption of preventive behaviors and measures, some theoretical models seek to establish a relationship between an individual's behavior and some of his beliefs. Among these theoretical models, the Health Belief Model (Crenças em Saúde - MCS) has gained prominence due to its widespread use in studies in the health services area<sup>8-11</sup>.

The MCS is considered the principal model for explaining and predicting the acceptance of health care recommendations. It has been applied in studies on sexual behavior and AIDS, cancer prevention and control, adherence to treatment for various diseases such as diabetes and hypertension, and to various health behaviors related to obesity, sedentary lifestyle, diet, smoking, etc.<sup>8,10,11</sup>. According to this theoretical model, the individual's decision to adhere to a preventive behavior is based on four psychological variables, two of them related to the infirmity itself and two others related to the health behaviors to prevent or treat it. Perceived Susceptibility refers to an individual's belief in being susceptible to an illness; Perceived Seriousness is the subjective perception of the association between the health problem and the consequences caused by the it (death, pain, disturbances to family and social relations, etc.); Perceived Benefits refer to the individual's belief that preventive action can avoid this health problem; and Perceived Barriers represent the negative aspect of the action, assessed by a cost-benefit analysis for taking action, considering the possible impediments, obstacles, discomfort, costs of time and money, among other factors<sup>9</sup>.

Studies have shown that a large number of occupational accidents involving dental professionals occur with handling sharps, especially from recapping needles<sup>1,3,12</sup>. Given the above, and considering the lack of research in the literature on the application of the Health Belief Model (HBM) to dental teams, the present study aimed to examine the adherence to Standard Precautions, specifically in relation to the act of not recapping needles, by dental health professionals of

the public health system of a given municipality in the interior of the State of São Paulo, Brazil.

## Methodology

The study was of the cross-sectional descriptive type with a quantitative approach. The research universe consisted of the 107 dental professionals (59 dentists and 48 dental assistants) working in the public dental health system in the municipality of Araçatuba (SP) in 2012. The survey was restricted to participants who signed the consent form, and were not on vacation or sick leave in the period from July to August 2012.

Prior to carrying out the research the management of the municipal health system was informed about the study's objectives and the use of the data to be collected, in order to obtain their support. The health professionals were also informed about the objectives and confidentiality of the information received. Those who agreed to participate signed a declaration that they gave their free and informed consent.

Data was collected using a questionnaire, developed and validated by Brevidei and Cianciarullo<sup>8</sup>, and adapted for the dental health area. It consisted of two parts: The first part related to data on the population profile: Gender, age, professional category, length of professional experience, work unit and length of service in the SUS system, training in PP and frequency of needle recapping. The second part of the questionnaire was composed of Likert-type scales, with five possible responses (strongly agree, agree, undecided, disagree and strongly disagree).

The Health Belief Model related to recapping needles used the following scales and sub-scales: Seriousness of AIDS, with the sub-scales "Evaluation of the impact of AIDS on social life", "Evaluation of the impact of AIDS on personal life" and "Emotional response to the severity of AIDS"; Seriousness of Hepatitis B, with the sub-scale "Evaluation of the seriousness of hepatitis B"; Benefits of not recapping needles, with the sub-scale "Control over risk"; Barriers for not recapping needles, with the sub-scale "Physical and cognitive barriers"; Stimuli for not recapping needles, with the sub-scale "Social and circumstantial influences." The criterion for considering the confidence level of the scales/sub-scales was  $\alpha \geq 0.60$ .

The data obtained was entered into an Excel spreadsheet and subsequently analyzed using the following software: Statistical Analysis System (© SAS), North Carolina, USA, version 9.2.

A logistic regression analysis was carried out in order to analyze the relationship between the adherence to the practice of not recapping needles and the beliefs described by the MCS. To achieve this the frequency of recapping needles was transformed into a binary variable with two distinct groups: the group of those who adhered to the practice (those who reported that they had never recapped needles in the month preceding the survey) and the group that did not adhere (those who reported having recapped needles at least once in the month preceding the survey). The dependent variables were composed by both groups, whereas the independent variables comprised the measured beliefs and the data describing the study sample.

This study was conducted according to the ethical standards set out in Resolution 466 of 12/12/2012 of the National Health Council<sup>13</sup> and was approved by the Committee for Ethics in Research on Human Beings (CEPSH) of the Faculty of Dentistry of Araçatuba-UNESP, under process.

## Results

Of the total 107 professionals working in the municipality's public dental health system, 79 (73.8%) responded to the questionnaire, of whom 45 (57%) were Dental Surgeons and 34 (43%), were Dental Assistants. It was observed that the vast majority of participants were female (84.8%), who had an average age of 37.7 years (SD = 9.6), and more than two years of work experience (81%).

The analysis of the length of service of these professional revealed that a significant percentage had been recently employed in the public health system, that is, they had less than one year of experience (30.4%). However, the majority of professionals (69.6%) had worked for more than a year in the system, which implied that these workers should be aware of and familiar with the rule established by the PP for not recapping needles (Table 1).

It was found that the great majority of the respondents said that they had recapped a needle at least once (83.5%), which made that individual susceptible to having accidents and acquiring infectious diseases, even though a number of the professionals had reported having received training on the Standard Precautions (47.4%).

In the logistic regression analysis, it was observed that three variables had an influence on

the relationship between the beliefs described by the MCS and adherence to the recommendation of not recapping needles, and that such behavior was explained by a lower level of perception of psychological barriers and by a higher level of

perception of the stimuli for not recapping needles (Table 2).

## Discussion

The data obtained and described in this study was collected by means of retrospective self-reported questionnaires, which could have led to an overestimation of the adherence of the subjects to the study objectives, since this type of research instrument is subject to biases for recall and response<sup>14</sup>.

The predominance of females among the group of professionals analyzed corroborated the findings of other studies, which evidenced that a large proportion of dentistry professionals and students was female<sup>14-16</sup>. This fact can be explained by the advent of the female socialization process, that is, the increase in their level of education, and their increased access to universities and, consequently, to higher-paid jobs.

Working in the health services area makes a professional susceptible to occupational exposure to biological materials. These can occur from percutaneous injuries (for example, drilling or cutting intact skin) or from contact between potentially infectious blood, tissue or body fluids and their ocular, nasal and oral mucosa or non-intact skin. However, the majority of occupational exposures are preventable by adhering to the recommendations of the PP, including the use of EPIs and the proper disposal of sharps<sup>12</sup>.

Studies have shown a high incidence of accidents with sharps among dental students and professionals<sup>1,3,12</sup>. Similarly, the percutaneous type of exposure is also a risk for workers in other areas of health services<sup>8,17,18</sup>. The largest number of such exposures to biological material occurs due to the inappropriate behavior of recapping needles<sup>1,8,12,17</sup>. Even though this behavior is contrary to the recommendations of the Standard Precautions and NR 32, there is evidence that it

**Table 1.** Characteristics of the research subjects, Araçatuba, 2012.

Characteristics	n	%
Gender		
Male	12	15.2
Female	67	84.8
Age		
< 20 years old	1	1.3
20-29 years old	19	24.1
30-39 years old	19	24.1
40-49 years old	31	39.2
50 years old or more	9	11.3
Professional Category		
Dental Surgeon	45	57
Dental Assistant	34	43
Length of Professional Experience		
0 to 2 years	15	19
2 to 5 years	14	17.7
5 to 10 years	10	12.7
10 years or more	40	50.6
Length of Service in SUS		
0 to 3 months	13	16.5
3 months to 1 year	11	13.9
1 to 5 years	30	38
5 years or more	25	31.6
Place of Service		
Baby Clinic	9	11.4
Dental Specialties Center	8	10.1
School	17	21.5
Family Health Strategy	16	20.3
Dental Treatment Unit	29	36.7
Training in Standard Precautions		
Yes	38	47.4
No	41	52.6
Frequency of Practice of Recapping Needles		
Never	13	16.5
Rarely, sometimes, often, always	66	83.5

**Table 2.** Logistic regression analysis between the beliefs described by the MCS and the adherence to the behavior of not recapping needles, Araçatuba, 2012.

Parameter	G.L	Estimativas	Erro	Qui-quadrado	p
Quest25*	1	1.3257	0.4457	8.8486	0.0029
Quest35*	1	-1.1197	0.4299	6.7854	0.0092
Quest38**	1	1.7624	0.5428	10.5413	0.0012

\* Quest25: "Sometimes I forget and recap used needles." \*\* Quest35: "I often hear about Standard Precautions in conferences, lectures or events." \*\*\* Quest38: "Placing the containers for the disposal of needles near the professional can prevent injuries from needles."

is widely practiced<sup>19</sup>, which is also in accordance with the findings of the present study.

The number of years of professional experience and the length of time employed in the SUS system should show a positive correlation with preventive behaviors in terms of adherence to the recommendation of not recapping needles, since most professionals reported that they had received education/training in PP. However, the level of adherence to the recommendation of not recapping needles found in this study was low. In view of these findings, it is valid to affirm that independently of the learning institution or the structure of the curriculum adopted in universities and technical courses, infection control and the prevention of occupational accidents should play a prominent role in the academic training of professionals in the health service areas, and there should be a process of continuing education during their professional practice, facilitating the necessary ongoing training of these professionals<sup>4</sup>.

The MCS adopted here to explain such preventive behaviors demonstrated that the professionals participating in the study had a lower level of subjective perception in relation to the psychological barriers to adhering to the recommendation of not recapping needles, corroborating the findings of Dela Coleta<sup>9</sup>. In this study the author demonstrated that behavioral beliefs (perceived benefits and barriers) had a more important role in predicting preventive health behavior than the perceptions of seriousness and susceptibility to illness. It was also found that the perception of positive stimuli for not recapping needles was significant for the behavior of the individuals partic-

ipating in the research, which was in accordance with the findings of Brevidelli and Cianciarullo<sup>8</sup>. In this study the authors carried out research involving 319 nursing professionals and observed that although these professionals were shown to be sensitive to the stimuli of not recapping needles, it was not possible to attribute the influence of this variable to individual behavior.

The findings of the present study highlighted the need for education and training focused on the prevention of accidents and on PP, with a specific approach and actions for the dental health area, since the higher the level of knowledge in this professional category, the higher the probability of the adoption of measures and recommendations related to the Standard Precautions and their appropriate use. However, purely informative training will not be sufficient to ensure adherence to the recommendation of not recapping needles. There is also a need to set up a multi-professional group to discuss the challenges to adopting preventive measures and to find solutions to increase the perceived benefits in adhering to them.

The literature on models that seek to explain preventive behavior is sparse, especially in the area of dental health, when compared to the other areas of health services. Given this situation, it will be necessary to conduct further studies with the aim of expanding the discussion of the occupational risks from sharps to which dental health professionals are exposed, identifying behavioral aspects, relative to the both the work itself and the relevant organizations, in order to decrease or eliminate the problem.

## Collaborations

RJ Martins and PRV Gonçalves: participated in the collection, analysis and interpretation of the data presented, as well as contributing to the drafting of the paper. SAS Moimaz, MLMM Sundefeld, AJI Garbin and CAS Garbin: participated in the planning of the study, the analysis and interpretation of the data collected, the drafting and critical revision of the paper, as well as the approval of the final version presented.

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