

# Development of the portuguese version of the instrument for assessing hygiene - HI23

Desenvolvimento da versão em português do instrumento para avaliação em higiene- HI23

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## ABSTRACT

Hand hygiene is part of standard precautions and it has been emphasized that education of this practice depends on the individual's experience in general hygiene. The Hygiene Inventory (HI-23) assess the domains General Hygiene, in the fields of Hands, Personal, Household and Food. Aim: To make the trans-cultural adaptation of the HI-23 scale for Portuguese-Brazil and to investigate and describe the hygiene behavior according to the HI-23 scale among dental students. Material and Methods: The cross-cultural adaptation process consisted in five steps: two translations, two back translations, review committee, pre-test with a population sample, and reproducibility and reliability of the instrument adapted. For the intra-examiner reproducibility it was applied kappa statistics. The statistical Cronbach's alpha verified the reliability of the HI-23 scale adapted to Portuguese.

The adapted instrument was applied to 292 students of Dentistry from 1st to 5th year of graduation from a Faculty of Dentistry. Results: There was good reproducibility ( $0.43 \leq \kappa \leq 0.81$ ) and good internal consistency (Cronbach's  $\alpha = 0.75$ ) for the questions of the questionnaire. The adapted instrument applied among academics, showed that students have good and adequate hygiene pattern for most questions, except for the hygiene in the preparation of food and utensils used to prepare them, in the time spent washing hands, and cleanliness regarding the exchange of clothing (pants/skirt). Conclusion: The transcultural adaptation of the instrument for the Brazilian version was successfully obtained. The instrument can be safely applied to measure the profile of hygiene among professional of the health area.

**KEYWORDS:** Students; Dental; Hygiene; Occupational health; Handwashing.

## INTRODUCTION

The practice of hand hygiene is essential in the process of infection control, and is outstandingly the most important activity to perform to diminish the cross contamination of pathogens between the caregiver and patient<sup>1-11</sup>.

The crucial role of hand hygiene in the prevention of infections associated with health care was initially established by Oliver Wendell Holmes and Ignaz Semmelweis, in the 1840s. In spite of the evidence of the benefits of hand hygiene, the level of immediate adoption of this behavior in health services is still low<sup>2,3,5,6,12-15</sup>, and estimated at 40%<sup>1,13,16</sup>.

The WHO<sup>9</sup> guidelines emphasize that good hand hygiene practices are included in the principles of standard precautions for infection control in health, and must be performed at the following times: 1) before and after direct contact with the patient, 2) after removing gloves, 3) before performing an invasive procedure in a patient, whether or not gloves are used, 4) after contact with body fluids or secretions, mucous membranes, broken skin, or dressings, 5) when manipulating a contamina-

ted area and afterwards a non contaminated area of the patient's body; after contact with inanimate objects and surfaces of equipment or of areas adjacent to the patient<sup>9</sup>.

The literature has shown that health care workers are more likely to perform hand hygiene after concluding an activity than before performing it, and also after contact with body fluids<sup>13</sup>.

Studies in the area of dentistry have indicated that lack of time has been pointed out as the main reason for non adhesion to the practice<sup>17</sup>. Furthermore, the mistaken belief among dentists that the use of gloves for clinical procedures is a substitute for hand washing<sup>1,5,18</sup> is another factor causing concern, which interferes with safe behavior. Among Dentistry academic personnel, the lack of concern about hand washing before and after attending to patients was pointed out as a reason for non adhesion to the practice<sup>19</sup>.

Individual experience is of greater importance than formal education, when one wishes to explain hand hygiene behavior<sup>8,11</sup>. Therefore, it is important to have knowledge about hygiene behavior, which includes hand hygiene, personal

care, domestic cleanliness and hygiene related to food, in order to provide possible clues about how hygiene behavior can be improved<sup>20</sup>. It is known that the variety of practices learned at home and the expectations within the context of health care, partly explain the low rates of adherence among workers in the area of health<sup>13</sup>.

Therefore, with interest in evaluating the main determinants of hand hygiene behavior, one has to understand the reasons behind the low level of cooperation.

Given the importance of hygiene behavior in health establishments, a previous study<sup>20</sup> proposed the use of a scale, denominated the Hygiene Inventory (HI-23), to measure the behavior of individuals and to verify the relations between the various dimensions of hygiene, such as: hand hygiene, personal appearance, care with domestic (home) cleaning and hygiene relative to food. When investigating these factors and their interactions, one may obtain clues about how hygiene behavior may be improved.

Thus, the aims of the present study were 1) to make a transcultural adaptation of the HI-23 scale, and 2) to investigate and describe the hygiene behavior according to the HI-23 scale among dental students.

## MATERIAL AND METHODS

### CHARACTERISTICS OF THE INSTRUMENT

The Hygiene Inventory HI-23 in the English language, proposed by Stevenson et al. (2009)<sup>20</sup>, is composed of 23 questions, divided into 5 domains: general hygiene, domestic hygiene, food hygiene, hand hygiene and personal hygiene. The original and final versions of the translated and adapted instrument can be seen in Chart 1.

The scores for responses may vary from 1 to 4 or be awarded the value of 2.5 when the response is "does not apply". Higher scores reflect better hygiene behavior.

Chart 1 - Original English version and final Portuguese version of the Inventory in Hygiene - HI23 (in parentheses are the scores to each option of the answer)

### PARTICIPANTS AND PROCEDURES

The research was previously approved by the Research Ethics Committee of the Institution under Protocol No. 233/2012.

The study was conducted with academic personnel from a Dental School of a Public University in the State of São Paulo, Brazil, according to three stages. The first stage consisted of studying the transcultural adaptation of HI-23 from the English language to Brazilian Portuguese, using the methodology proposed by Guillemin et al.<sup>21</sup> (1993) and Guillemin<sup>22</sup> (1995), according to the following steps: 1) two translations of the HI-23 Inventory done by two bilingual translators whose native language is Portuguese, thus obtaining two translated versions of the research instrument; 2) comparison between the two versions, thereby producing a final translated document; 3) Back Translation: at this stage, the document in Portuguese was translated back into English (the language of the original questionnaire), in order to ensure quality of content. At this stage, following the recommendation proposed by Guillemin et al.<sup>21</sup>

### Original version

#### GENERAL HYGIENE

1. On an average day, approximately how many times do you wash your hands?
  - (1) never
  - (2) 1 to 5
  - (3) 6 to 10
  - (4) 11+
2. Upon getting home, do you wash your hands?
  - (4) always
  - (3) usually
  - (2) occasionally
  - (1) never
3. After touching a pet or other animal, do you wash your hands?
  - (4) always
  - (3) usually
  - (2) occasionally
  - (1) never
  - (2,5) don't touch them
4. Before eating food with your hands, do you wash your hands?
  - (4) always
  - (3) usually
  - (2) occasionally
  - (1) never
  - (2,5) never eat with hands
5. Before preparing food, do you wash your hands?
  - (4) always
  - (3) usually
  - (2) occasionally
  - (1) never
  - (2,5) never prepare food
6. If you need to touch your face or body (eg, to scratch) while preparing food, do you wash your hands?
  - (4) always
  - (3) usually
  - (2) occasionally
  - (1) never
  - (2,5) never prepare food
7. Do you wash fruit and vegetables before you eat them?
  - (4) always
  - (3) usually
  - (2) occasionally
  - (1) never
8. When you use a public toilet, do you cover the seat with paper?
  - (4) always
  - (3) usually
  - (2) occasionally
  - (1) never
  - (4) never use public toilets

#### HOUSEHOLD HYGIENE

9. How often, in the last month, has your bathroom at home been cleaned?
  - (1) never
  - (2) once
  - (3) twice
  - (4) three times or more
  - (2,5) unsure
10. How often, in the last month, has your toilet at home been cleaned?
  - (1) never
  - (2) once
  - (3) twice
  - (4) three times or more
  - (2,5) unsure
11. How often, in the last month, has your kitchen at home been cleaned?
  - (1) never
  - (2) once

- (3) twice  
 (4) three times or more  
 (2,5) unsure

**FOOD-RELATED HYGIENE**

12. After handling raw foods and before handling cooked foods, do you wash your hands?

- (4) always  
 (3) usually  
 (2) occasionally  
 (1) never  
 (2,5) never handle raw food

13. After handling raw foods and before handling cooked foods, do you wash the utensils used?

- (4) always  
 (3) usually  
 (2) occasionally  
 (1) never  
 (2,5) never handle raw food

14. Do you use separate chopping boards for raw and cooked foods?

- (4) always  
 (3) usually  
 (2) occasionally  
 (1) never  
 (2,5) don't use them

**HAND HYGIENE TECHNIQUE**

15. When warm water is available, do you wash your hands with warm water?

- (4) always  
 (3) usually  
 (2) occasionally  
 (1) never

16. After washing your hands, do you dry your hands completely?

- (4) always  
 (3) usually  
 (2) occasionally  
 (1) never

17. When soap is available, do you wash your hands with soap?

- (4) always  
 (3) usually  
 (2) occasionally  
 (1) never

18. When you wash your hands, approximately how long do you wash them for?

- (1) under 5 seconds  
 (2) 6 to 10 seconds  
 (3) 11 to 20 seconds  
 (4) 21 seconds or more

19. Do you use antibacterial gel or wipes to clean your hands?

- (4) often  
 (3) sometimes  
 (2) rarely  
 (1) never

**PERSONAL HYGIENE**

20. Do you wear the same top or shirt two days in a row?

- (4) never  
 (3) rarely  
 (2) sometimes  
 (1) often

21. Do you wear the same skirt or pants two days in a row?

- (4) never  
 (3) rarely  
 (2) sometimes  
 (1) often

22. Do you wear the same underclothes two days in a row?

- (4) never

- (3) rarely  
 (2) sometimes  
 (1) often

23. Do you go without a wash, shower or bath two days in a row?

- (4) never  
 (3) rarely  
 (2) sometimes  
 (1) often

**Final translated and adapted version****HIGIENE GERAL**

1. Em um dia normal, aproximadamente quantas vezes você lava suas mãos?

- (1) Nunca  
 (2) 1 a 5  
 (3) 6 a 10  
 (4) 11 ou mais

2. Ao chegar em casa, você lava suas mãos?

- (4) sempre  
 (3) geralmente  
 (2) às vezes  
 (1) nunca

3. Após tocar um animal de estimação ou outro animal você lava suas mãos?

- (4) sempre  
 (3) geralmente  
 (2) às vezes  
 (1) nunca  
 (2,5) eu não os toco.

4. Antes de comer algum alimento com as mãos, você as lava?

- (4) sempre  
 (3) geralmente  
 (2) às vezes  
 (1) nunca  
 (2,5) nunca como com as mãos

5. Antes de preparar algum alimento, você lava suas mãos?

- (4) sempre  
 (3) geralmente  
 (2) às vezes  
 (1) nunca  
 (2,5) nunca preparo alimentos

6. Caso precise tocar sua face ou corpo (ex: para se coçar) enquanto prepara algum alimento, você lava as mãos?

- (4) sempre  
 (3) geralmente  
 (2) às vezes  
 (1) nunca  
 (2,5) nunca preparo alimentos

7. Você lava frutas e vegetais antes de comê-los?

- (4) sempre  
 (3) geralmente  
 (2) às vezes  
 (1) nunca

8. Ao usar um vaso sanitário público, você cobre o assento com papel?

- (4) sempre  
 (3) geralmente  
 (2) às vezes  
 (1) nunca  
 (2,5) nunca uso vasos sanitários públicos

**HIGIENE DOMÉSTICA**

9. Com que frequência, no último mês, o banheiro de sua casa foi limpo?

- (1) nunca  
 (2) uma vez  
 (3) duas vezes  
 (4) três vezes ou mais  
 (2,5) não sei dizer

10. Com que frequência, no último mês, o vaso sanitário de sua casa foi limpo?

- (1) nunca
- (2) uma vez
- (3) duas vezes
- (4) três vezes ou mais
- (2,5) não sei dizer

11. Com que frequência, no último mês, a cozinha de sua casa foi limpa?

- (1) nunca
- (2) uma vez
- (3) duas vezes
- (4) três vezes ou mais
- (2,5) não sei dizer

#### HIGIENE NA ALIMENTAÇÃO

12. Depois de manusear alimentos crus e antes de manusear alimentos cozidos, você lava suas mãos?

- (4) sempre
- (3) geralmente
- (2) às vezes
- (1) nunca
- (2,5) nunca manuseio alimentos crus.

13. Após manusear alimentos crus e antes de manusear alimentos cozidos, você lava os utensílios usados?

- (4) sempre
- (3) geralmente
- (2) às vezes
- (1) nunca
- (2,5) nunca manuseio alimentos crus

14. Você usa tábuas diferentes para cortar alimentos crus e alimentos cozidos?

- (4) sempre
- (3) geralmente
- (2) às vezes
- (1) nunca
- (2,5) nunca as uso

#### MÉTODOS DE HIGIENE DAS MÃOS

15. Quando há água quente disponível, você lava as mãos com água quente?

- (4) sempre
- (3) geralmente
- (2) às vezes
- (1) nunca

16. Após lavar suas mãos você as seca completamente?

- (4) sempre
- (3) geralmente
- (2) às vezes
- (1) nunca

17. Quando há sabão disponível, você lava as suas mãos com sabão?

- (4) sempre
- (3) geralmente
- (2) às vezes
- (1) nunca

18. Normalmente, quanto tempo você leva para lavar as suas mãos?

- (1) menos de 5 segundos
- (2) 6 a 10 segundos
- (3) 11 a 20 segundos
- (4) 21 segundos ou mais

19. Você usa álcool gel ou lenços umedecidos para limpar suas mãos?

- (4) geralmente
- (3) às vezes
- (2) raramente
- (1) nunca

#### HIGIENE PESSOAL

20. Você tem por hábito usar a mesma blusa ou camisa por dois dias seguidos?

- (4) nunca
- (3) raramente

- (2) às vezes
- (1) geralmente

21. Você tem por hábito usar a mesma calça/saia por dois dias seguidos?

- (4) nunca
- (3) raramente
- (2) às vezes
- (1) geralmente

22. Você usa a mesma roupa íntima por dois dias seguidos?

- (4) nunca
- (3) raramente
- (2) às vezes
- (1) geralmente

23. Você passa dois dias seguidos sem tomar banho?

- (4) nunca
- (3) raramente
- (2) às vezes
- (1) geralmente

(1993) and Guillemín<sup>22</sup> (1995), two other persons, mandatorily natives of the English language did the “back-translation”. 4) Review Committee: at this stage, a multidisciplinary committee composed of three persons (a researcher from the area of validation of methods/ adaptation of instruments and two university professors, who worked in teaching and research in the area of Biosafety in Dentistry) met to discuss equality between the two back-translations, which were compared with the original instrument (in English). Equivalence was obtained between the original questionnaire and the translated version, indicating similarity between the two.

The second stage consisted of a preliminary study, in which the HI-23 Inventory was applied in the Portuguese language to 10 Dentistry academic participants, to measure their opinion with regard to the existence of doubts or difficulties in interpretation of the questions. After this, the adapted instrument was applied to 40 dental students at the same dental school where the final study would be conducted. These students filled out the questionnaire in two distinct periods of time, with an interval of one week between them. These data were not included in the final sample. The reliability of the results that were generated by using the adapted instrument was verified.

The third stage consisted of collecting the data, in which the participants of the study were 292 undergraduate students from the 1st to the 5th grades of the Dental School. The instrument was applied to the students inside their classrooms. The research was conducted in the period from October 2011 and June 2012. Afterwards, a database was created in the software program Excel, and then the data were transported to the statistical software program EPI-Info version 3.5.1 and STATA (StataCorp 2003. Stata Statistical Software: Release 8.0 College Station, TX: Stata Corporation).

#### DATA ANALYSIS

The reliability of the translated HI-23 instrument was verified by means of studies on the stability and internal consistency of the data. Kappa statistics were used ( $\kappa$ ), according to Light (1971), estimating the reproducibility by point and by interval of confidence of 95%, of which agreement of the data was classified according to the standards of Landis & Koch (1977): <0.00 (poor); 0.00-0.20 (weak); 0.21-0.40 (tolerable) 0.41-0.60 (regular); 0.61-

0.80=good; 0.81-0.99 (excellent/almost perfect). With regard to the internal consistency of the questionnaire (Cronbach-alpha), it would be taken as satisfactory if  $\alpha > 0.70$ , in accordance with the standards established by Sneed and Herman (1991).

## RESULTS

### PRE-TEST

The agreement values obtained (Table 1) showed that the reproducibility values for the majority of the questions of the adapted HI-23 ranged from regular to good agreement.

A Cronbach alpha coefficient equal to 0.75 was obtained, showing good internal consistency. With regard to the domains (or sub-scales) of which the HI-23 index is composed, the Cronbach alpha coefficient was observed to range from 0.74 (General Hygiene, Hand Hygiene and Personal Hygiene) to 0.76 (Domestic Hygiene), with 0.75 prevailing for Food Hygiene. Thus the homogeneity of the 23 items of the Hygiene Inventory adapted to the Portuguese language was verified.

### DEFINITIVE STUDY

In the group of students investigated (n=292) predominance of a good and adequate standard of hygiene could be observed with regard to the following domains: 1) "General Hygiene", being composed of "washing the hands on arrival at home", "after touching a pet animal", "washing fruits and vegetables before eating them", and "covering the public toilet seat with paper"; 2) "Domestic Hygiene": "cleaning the kitchen, bathroom and toilet bowl three or more times per month"; 3) "Method of Hand Hygiene": "not washing the hands with hot water", "completely dry the hands after washing them", "washing the hands with soap"; 4) "Personal Hygiene": "not using the same blouse or shirt and underwear for two consecutive days", "not going without taking a bath for two consecutive days".

However, the standard of hygiene was reasonable for the following questions: General Hygiene: "washing the hands when touching the face or body while preparing some food"; Food Hygiene: "washing the hands after handling raw foods", and "washing the utensils after handling raw foods"; Methods of Hand Hygiene: "cleaning the hands with alcohol in gel form"; Personal Hygiene: "wear the same trousers or skirt for two consecutive days".

The standard of hygiene was poor for the following questions: Food Hygiene "use different cutting boards for cutting raw and cooked foods"; Methods of Hand Hygiene: "time spent washing the hands".

## DISCUSSION

Given the relationship between personal hygiene and health, the hypothesis that the general level of hygiene among Dental students would be important predictors for determining professional hand hygiene behavior was formulated.

Thus, the aim of this study was to use the Hygiene Inventory HI-23 in a population of Dental Students. However, it was necessary to go through the stages of transcultural adaptation of the HI-23 in English to the Portuguese language of Brazil, and of verifying the reliability and internal consistency of the instrument obtained.

**Table 1.** Kappa Values ( $\kappa$ ) and their classification according to the variables studied.

Variable	K	Classification
1- Number of times the hands are washed.	0.78	Good
2- Frequency with which the hands are washed on arriving at home.	0.65	Good
3- Frequency with which the hands are washed when touching a pet.	0.71	Good
4 -Frequency with which the hands are washed before eating some food with the hands.	0.49	Regular
5 -Frequency with which the hands are washed before preparing some food.	0.48	Regular
6- Frequency with which the hands are washed after touching the face or body (e.g. to scratch yourself) while preparing some food.	0.43	Regular
7- Frequency with which fruits and vegetables are washed before eating them.	0.78	Good
8 - Frequency of covering the toilet seat with paper when using a public toilet.	0.69	Good
9- Frequency with which the bathroom at home was cleaned in the last month.	0.69	Good
10- Frequency with which the toilet bowl at home was cleaned in the last month.	0.58	Regular
11- Frequency with which the kitchen at home was cleaned in the last month.	0.52	Regular
12- Frequency with which the hands are washed after handling raw foods and before handling cooked foods.	0.65	Good
13- Frequency with which the utensil are washed after preparing raw foods and before preparing cooked foods.	0.61	Good
14- Frequency with which different cutting boards are used for cutting raw foods and cooked foods.	0.48	Regular
15- Frequency with which the hands are washed when there is hot water available.	0.75	Good
16- Frequency with which the hands are completely dried after being washed.	0.66	Good
17- Frequency with which the hands are washed when there is soap available.	0.81	Excellent
Time spent washing the hands.	0.54	Regular
19- Frequency with which alcohol in gel form or wet wipes are used for washing the hands.	0.47	Regular
20- Frequency with which the same blouse or shirt are used for two consecutive days	0.53	Regular
21- Frequency with which the same trousers or skirt are used for two consecutive days	0.61	Good
22- Frequency with which the same underwear used for two consecutive days	0.49	Regular
23- Frequency with which no bath is taken for two consecutive days	0.79	Good

A study of this nature is relevant because it allows the adapted HI-23 scale - which is potentially adequate for multiple uses in various scenarios, and for experimental and correlational approaches<sup>20</sup>, to be the object of new investigations in health services in the country, about the role of informal education as regards performing hygiene when doing the work of health care.

Knowledge about the hygiene behavior prior to professional life, by means of HI-23 may help to explain the reason related

to the low level of adhesion to hand hygiene protocols, indicating the successes and failures of training programs that are offered, as a way of preventing cross infection both in the hospital and dental areas. Furthermore, knowledge about the general hygiene profile of the individuals from a given institution or professional group allows one to elucidate all the challenges that should be faced to increase cooperation with the effective practice.

The parallel it can be traced we traced when proposing the present research was that hand hygiene is a behavior derived from the practice of general hygiene, in the context of daily life, and that this behavioral pattern, learned long before the individual was included in a profession within the area of health, has direct action on the practices at work, as has been shown in the literature<sup>11</sup>.

Hand hygiene behavioral standards are developed and established at the beginning of life. And, as most health professionals do not start their careers before the 20s, the improvement in adhesion to the correct practice means changing a behavioral pattern that has been practiced for decades, and continues to be reinforced in situations in the community. These hand hygiene patterns in communities and in the health services represent a complex, socially ingrained and ritualistic behavior<sup>11</sup>.

These patterns are probably formed as a result of a variety of determinants, including practices modelled on those of family members and colleagues, and those portrayed in the media and educational system, so that they may vary according to individual experience and interest<sup>23</sup>. Individual experience is believed to be more important than formal experience<sup>8,11,23,24</sup>. Although hand hygiene is part of the professional context and it must be complied with it is known that there is distance between the attitude and the intention to wash the hands. This is an act that depends on individual decision, and it is influenced among other factors, by the complexity inherent to the professional who provides the care<sup>8,24</sup>.

In the area of dentistry, adhesion to practices for the control of infection and hand hygiene is still unsatisfactory<sup>10,17-19</sup>. It is known that precarious adhesion to hand hygiene has been described in university students<sup>15,23</sup>. Among dental students, the rate of adhesion has been reported to be lower than 50%<sup>5</sup>.

When the results obtained in the present study are compared with those of the study that gave rise to HI-23, in general, the  $\alpha$ -Cronbach values obtained were 0.75, while in the original study the value obtained was 0.85. This indicates that they presented good internal consistency. Considering the values of  $\alpha$ -Cronbach according to each domain, the original study<sup>20</sup> presented values of 0.81 (General Hygiene), 0.82 (Domestic Hygiene), 0.71 (Food Hygiene), 0.67 (Hand Hygiene) and 0.69 (Personal Hygiene). In our study, we obtained better  $\alpha$ -Cronbach values in comparison with the original study, for Hand Hygiene and Personal Hygiene (0.74), and for Food Hygiene (0.75), while the values for General Hygiene (0.74) and Domestic Hygiene (0.76) were a little lower than the values of the original study. Nevertheless, in all the domains the values were higher than 0.70, demonstrating that the HI-23 questionnaire translated to Brazilian Portuguese was shown to be a reliable instrument.

According to the academic population evaluated, there was a good general standard of hygiene. Considering domain 1, the

hand washing habit was found to be adequate. With regards to hand hygiene after touching the face or body while preparing some food, the majority of the academics did not think it was necessary to wash them after touching these areas. Further studies need to be conducted, in order to know more about the influence of this belief among dental surgeons, since it is common to observe academics during attendance to patients, touching the face in the regions of the mask and protective goggles, with their hands inside gloves used in the dental procedure.

This behavior may be explained by the study of Whitby et al. (2007)<sup>11</sup>, in which they suggest that two types of hand hygiene practice could be classified: inherent and elective. Inherent hand hygiene practices drive the impulse to wash the hands when they are visibly dirty. Whereas the elective practice - which is the one in which there is hand contact in the act of measuring blood pressure, or in contact with inanimate object in the patient's hospital environment - and does not trigger an intrinsic need in the individual to clean the hands. This is because it is a type of touch similar to the touch that occurs in many social situations, such as shaking hands in greeting or touching motivated by empathy. Thus, it occurs only when the individual is conscious in the very moment that it is necessary to wash.

With regard to the domain "domestic hygiene" - Domain 2, the majority of the interviewees also presented good hygiene, because 90% affirmed that the bathroom and toilet bowl were cleaned "three or more times" per month, and 85% cleaned the kitchen "three or more times" per month. These are good domestic hygiene habits, and therefore, an expected and desirable behavior among future dental professionals.

With respect to "food hygiene" - Domain 3, 52.5% of the academic personnel affirmed they "always" washed their hands after handling raw foods and 62.5% of the students "always" wash utensils after handling raw foods. However, 45% of the interviewees "never" used different cutting boards for cutting raw and cooked food, indicating that this is not a routine hygiene practice in food handling. This may be implicated in cross contamination of foods, and in turn, this habit may have consequences on attitudes during professional practice. It is suggested that further studies should be conducted to find out about this knowledge.

With regard to domain 4 - "methods of hand hygiene" - relative to the use of hot water, we observed that this was not a frequent habit. According to Canham (2011)<sup>4</sup>, washing and drying the hands must be done with cold water, because hot water may cause drying of the skin. Therefore, not making use of hot water is an adequate behavior of the interviewees.

With regards the type of product used for hand hygiene, most students reported the use of soap and water and, for drying, they used paper towels. The culture of using alcohol gel was not common among the interviewed. However, it was considered as a good practice when hands were not visibly dirty<sup>1,4,6</sup>, because of being less harmful to the skin when compared with the washing of the hands with soap and water or other antimicrobial agents<sup>3</sup>. In the present research it was verified that at the time this investigation was carried out, alcohol gel was not greatly available at the hand washing basins inside the dental clinics, and probably that is why it was not used.

In relation to the mean time that was taken to wash the hands, the responses ranged from 6 to 10 seconds (45%), and 11 to

20 seconds (37.5%). However, the minimum duration for hand washing which is recommended is from 15 to 20 seconds<sup>6,25</sup>, and washing them for 30 seconds reduces the bacterial count on hands even further<sup>6</sup>. Therefore, the interviewees need to increase their hand washing time to improve the elimination of microbes from the hands.

With regard to the domain "personal hygiene" - Domain 5, about wearing a blouse/shirt or long trousers, it was common for this to be reported for two consecutive days. However, the academics related that they rarely or never wore the same underwear, or go without taking a bath for two consecutive days.

The good hygiene behavior obtained according to HI-23, may have occurred due to the fact of predominance of the female sex among the interviewees (62.5%), because the women demonstrated significantly better hygiene behavior than the men<sup>15,20,23,25</sup>. According to Anderson et al. (2008)<sup>15</sup>, the higher level of compliance by women is associated with their tendency towards acceptable social behavior, and these gender differences highlight the need for specific educational campaigns for the male group.

## CONCLUSION

The present study allowed the obtainment of an instrument in the Portuguese language of Brazil, capable of measuring the hygiene profile; with the quality for application in future health research area. The cross-cultural adaptation followed the methodological steps internationally recommended, providing good reliability of HI-23 index. With regards to the investigation of General Hygiene among dental students, the findings showed good general hygiene and good hand hygiene behaviors in daily life. Future studies should be conducted with the aim of observing the nature of General Hygiene and its impact on teaching and in training hand hygiene practices, among health professionals and dental students.

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**RESUMO**

A higiene das mãos é parte das precauções padrão e tem sido enfatizado que a educação dessa prática depende da experiência individual em higiene geral. O Inventário em Higiene (HI-23) avalia os domínios Higiene Geral, Mãos, Pessoal, Doméstica e na Alimentação. Objetivo: Realizar a adaptação transcultural da escala HI-23 para o português-Brasil e investigar e descrever o comportamento em higiene segundo o HI-23, entre acadêmicos de Odontologia. Material e Métodos: O processo de adaptação transcultural consistiu em cinco etapas: duas traduções; duas retrotraduções, comitê de revisão, pré-teste com uma amostra da população alvo, reprodutibilidade e confiabilidade do instrumento adaptado. Para a reprodutibilidade intraexaminador foi aplicada a estatística kappa. A estatística alfa de Cronbach verificou a confiabilidade da escala HI-23 adaptada para o português. O instru-

mento adaptado foi aplicado a 292 estudantes de Odontologia do 1º ao 5º ano do curso de graduação de uma Faculdade de Odontologia. Resultados: Houve boa reprodutibilidade ( $0,43 \leq k \leq 0,81$ ) e boa consistência interna (alfa de Cronbach=0,75) para as perguntas do questionário. O instrumento adaptado aplicado entre os acadêmicos, mostrou que os estudantes possuem um padrão de higiene bom e adequado para a maioria das questões, com exceção da higiene no preparo de alimentos e utensílios utilizados para prepará-los, no tempo gasto para lavagem das mãos e no asseio quanto a troca de vestimenta (calça/saia). Conclusão: A adaptação do instrumento para a versão brasileira foi obtida com sucesso. O instrumento pode ser aplicado com segurança para medir o perfil em higiene entre profissionais da área da saúde.

**PALAVRAS-CHAVE:** Estudantes de Odontologia; Higiene; Saúde do trabalhador; Lavagem de mãos.

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