

## Comparison of their recognition about the denture cleansers among Japanese, Chinese, and Indonesian dentists

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**Purpose:** The purpose of this study was to investigate knowledge about denture cleansers of dentists in Japan, China, and Indonesia.

**Materials and Methods:** Forty-three dentists from Japan (Hiroshima University), 26 dentists from China (Hebei Medical University and Wuhan University) and 62 dentists from Indonesia (Airlangga University) were surveyed by questionnaire about their knowledge and understanding of denture cleansers in this study.

**Results:** The response rate was 91.6%. Significant differences among the three countries were found for ten questions. For the question "Have you heard of denture cleansers?", 100% of Japanese dentists answered "Yes", whereas 19.2% of Chinese dentists and 14.5% of Indonesian dentists answered "No". For the question "Have you ever seen denture cleansers in the clinic?", more than 90% of subjects in Japan answered with "often" or "occasionally", whereas 69.2% of Chinese dentists and 54.1% of Indonesian dentists answered "No". For the question "Do you think the use of denture cleanser is more effective than a clinical intervention?", over 90% of the subjects in Japan answered "Yes"; however, over 55% of subjects in China and over 65% of Indonesian subjects answered "No".

**Conclusion:** The results suggest that dental professionals in China and Indonesia have little knowledge about denture cleansers. The study confirms that there is a difference in the interest and knowledge about denture cleansers among the three countries of Japan, China, and Indonesia. (*Int Chin J Dent* 2010; 10: 29-34.)

**Key Words:** China, dentist, denture cleanser, Indonesia, Japan, questionnaire

### Introduction

Denture cleansers have been widely used in prosthodontics to prevent colonization of *Candida albicans* and related *Candida* species and formation of denture plaque.<sup>1-5</sup> However, daily use of denture cleansers can affect the physical and mechanical properties of denture base materials.<sup>6-11</sup>

Budtz-Jorgensen<sup>12</sup> reported that approximately 65% of the denture wearers in Denmark exhibit signs of denture stomatitis. Jagger et al.<sup>13</sup> reported that 35% of denture wearers used, or had used, denture cleansers daily. Gornitsky et al.<sup>14</sup> reported that the use of denture cleansers significantly reduced the number of microorganisms on dentures in a hospitalized geriatric population. Although denture cleansers would be a useful adjunct to removing stain and reducing biofilm formation on the surface irregularities of dentures, Murdoch-Kinch<sup>15</sup> noted the occurrence of oral mucosal injury caused by denture cleansers. In addition, denture cleansers cause significant deterioration of the physical and mechanical properties of denture base materials if not correctly used.<sup>8,10,11</sup>

Denture wearers would benefit greatly from a dental professional's guidance regarding the use of denture cleansers. However, little is known about dentists' knowledge and experience of denture cleansers. Furthermore, the knowledge, experience and attitudes towards denture cleansers of dentists in Japan, China, and Indonesia remain unclear. The purpose of this study was to investigate the interest and knowledge about denture cleansers of dentists in Japan, China and Indonesia.

## Materials and Methods

In this study, 131 subjects were asked to complete and return a structured questionnaire (Table 1). The subjects were selected at random from dentists in Japan (Hiroshima University, Hiroshima), China (Hebei Medical University, Shijiazhuang; Wuhan University, Wuhan) and Indonesia (Airlangga University, Surabaya). They included 43 Japanese dentists (men, 27; women, 16; mean age: 30.8 years), 26 Chinese dentists (men, 12; women, 14; mean age: 27.0 years), and 62 Indonesian dentists (men, 30; women, 32; mean age: 38.6 years). The distribution and collection of the questionnaire was instituted by the members of the survey team in Japan, China, and Indonesia from 2006 to 2007. This questionnaire was administered after explaining the aim of the survey to the subjects and gaining their consent.

**Table 1.** Questionnaire items and percentage distributions of answers by dentists in Japan, China and Indonesia.

Item descriptions		Category score			$\chi^2$ test
		2	1	0	
Q 1. Have you heard of denture cleansers?	JPD	20	23	0	A **
	CND	1	20	5	
	IND	7	46	9	
Q 2. Do you know what the function of a denture cleanser is?	JPD	26	17	0	A **
	CND	1	20	5	
	IND	15	39	8	
Q 3. Do you know of any disadvantages of denture cleansers?	JPD	11	21	11	A **
	CND	1	5	20	
	IND	2	22	38	
Q 4. How many imported brands of denture cleanser do you know?	JPD	9	5	29	B **
	CND	0	3	23	
	IND	4	15	41	
Q 5. How many domestic brands of denture cleanser do you know?	JPD	24	12	7	B **
	CND	0	1	24	
	IND	0	5	52	
Q 6. Have you ever been taught about denture cleansers?	JPD	12	23	8	C **
	CND	0	8	18	
	IND	0	24	38	
Q 7. Have you ever seen denture cleansers in books or lecture meetings?	JPD	8	28	7	C **
	CND	1	4	21	
	IND	0	38	24	
Q 8. Have you ever seen any TV commercials about denture cleansers?	JPD	19	23	1	C **
	CND	0	0	26	
	IND	0	11	51	
Q 9. Do you know any alternatives to denture cleansers?	JPD	4	14	25	A **
	CND	0	0	26	
	IND	4	32	26	
Q10. Have you ever seen denture cleansers in the clinic?	JPD	20	20	3	C *
	CND	0	8	18	
	IND	4	24	33	
Q11. Do you think the use of denture cleanser is more effective than a clinical intervention?	JPD	21	19	3	A NS
	CND	0	10	13	
	IND	11	9	40	

A 2:Yes, very much, 1:Yes, but only a little, 0:No B 2:Three or more, 1:Less than three, 0:None  
C 2:Yes, often, 1:Yes, occasionally, 0:No \*: p<0.01 \*\*: p<0.001 NS: Not significant

The questionnaire was written in Japanese and then translated into Chinese and Indonesian. After discussion

with the staff in Japan, China, and Indonesia, it was decided to retain the same estimation criterion. The questionnaire consists of 11 questions: five questions about knowledge and comprehension, four questions about education, and two questions about clinical practice. Each question had three response options; “No” or “None” (score 0), “Yes, but only a little” or “Yes, occasionally” (score 1), and “Yes, very much” or “Yes, often” (score 2).

Chi-square tests were used to examine the differences in the responses for each item on the questionnaire among the three groups. Then, two stepwise logistic regression analyses were carried out on the dependent variable (between Japan and China; between Japan and Indonesia; and between China and Indonesia). The Wald statistic was used to test the null hypothesis that the regression coefficients were zero. The Nagelkerke  $R^2$  statistic was used to discriminate how well the model was able to distinguish between the interest and knowledge of Japanese, Chinese, and Indonesian dentists. All analyses were computed with SPSS for Windows operating system (SPSS 16, SPSS Japan Inc., Tokyo, Japan).

## Results

The response rate was 91.6%. The response rate of the Japanese dentists was 100% (n=43), that of the Chinese dentists was 84.6% (n=22), that of the Indonesian dentists was 88.7% (n=55). Table 1 shows the questionnaire items and the percentage distributions of the responses. Significant differences among the three groups were found for ten questions. For the question “Have you heard of denture cleansers?”, 0% of Japanese dentists answered “No”, whereas 19.2% of Chinese dentists and 14.5% of Indonesian dentists answered “No”. Almost 50% of Japanese subjects (20 people) answered “Yes, very much”. For the question “Do you know what the function of a denture cleanser is?”, 60.5% of Japanese dentists answered “Yes, very much”, whereas 19.2% of Chinese dentists and 12.9% Indonesian dentists answered “No”. For the question “Do you know of any disadvantages of denture cleansers?”, 74.4% of Japanese dentists answered “Yes, very much” or “Yes, but only a little”, whereas 76.9% of Chinese dentists and 61.3% of Indonesian dentists answered “No”. For the question “How many imported brands of denture cleanser do you know?”, most respondents (67.4% of Japanese; 88.5% of Chinese and 68.3% of Indonesian) answered “None”. For the question “How many domestic brands of denture cleanser do you know?”, 83.7% of Japanese dentists answered “Three or more” or “Less than three”, whereas 96.0% of Chinese dentists and 91.3% of Indonesian dentists answered “None”. For the questions “Have you ever been taught about denture cleansers?”, 69.2% of Chinese dentists and 61.3% of Indonesian dentists answered “No”. For the questions “Have you ever seen denture cleansers in books or lecture meetings?”, 83.7% of Japanese dentists and 61.3% of Indonesian dentists answered “Yes”, whereas 80.8% of Chinese dentists answered “No”. For the question “Have you ever seen any TV commercials about denture cleansers?”, 100% of Chinese dentists and 82.3% of Indonesian dentists answered “No”. For the question “Have you ever seen denture cleansers in the clinic?”, 93.0% of Japanese dentists answered “Yes”, whereas 69.2% of Chinese dentists and 54.1% of Indonesian dentists answered “No”.

Table 2 shows the estimated coefficients and related statistics from the logistic regression model that predicts group membership (between Japan and Indonesia). The model contained two variables using a forward stepwise method ( $P < 0.01$ ); Q8 (TV commercials of DC) and Q10 (Seen DC in the clinic); and three variables using a backward stepwise method ( $P < 0.05$ ); Q5 (Domestic brands of DC), Q8 (TV commercials of DC) and Q10 (Seen DC in the clinic). Table 3 shows the estimated coefficients and related statistics from the logistic regression

model that predicts group membership (between China and Indonesia). The model contained two variables using a backward stepwise method ( $P < 0.1$ ); Q4 (Imported brands of DC) and Q7 (Seen DC in books or lecture meetings).

**Table 2.** Results of binary logistic regression analysis using two Wald methods between Japan and Indonesia.

Item No.	B	S.E.	Wald chi-square	Freedom	P	Exp (B)
Forward stepwise (Wald)						
Q 8: TV commercials of DC*	-4.55	1.12	16.44	1	0.000	0.01
Q10: Seen DC* in the clinic	-1.87	0.69	7.49	1	0.006	0.15
Backward stepwise (Wald)						
Q 5: Domestic brands of DC*	-2.11	0.99	1.58	1	0.032	0.12
Q 8: TV commercials of DC*	-3.53	1.22	8.31	1	0.040	0.03
Q10: Seen DC* in the clinic	-1.66	0.79	4.40	1	0.036	0.19

\*denture cleanser. For the forward stepwise method, variables were entered in step 1 to 2: Q8, Q10 in that order. For the backward stepwise method, variables were removed in steps 1 to 8: Q4, Q5, Q8, Q9, Q10 in that order.

**Table 3.** Results of binary logistic regression analysis using two Wald methods between China and Indonesia.

Item No.	B	S.E.	Wald chi-square	Freedom	P	Exp (B)
Backward stepwise (Wald)						
Q 4: Imported brands of DC*	1.51	0.84	3.24	1	0.072	4.51
Q 7: Seen DC* in books or lecture meetings	1.13	0.61	3.38	1	0.066	3.09

\*denture cleanser. For the backward stepwise method, variables were removed in steps 1 to 11: Q4, Q7, Q9 in that order.

**Table 4.** Observed and predicted group membership using two Wald methods between Japan and China.

Group	Predicted country		Percentage correct
	Japan	China	
Forward Stepwise (Wald)			
Japan	42	1	97.7
China	0	22	100.0
Total			98.5
Backward Stepwise (Wald)			
Japan	42	1	97.7
China	0	22	100.0
Total			98.5

The cut value is 0.50. Nagelkerke  $R^2 = 0.948$  (forward stepwise), 0.948 (backward stepwise).

\*Four Chinese dentists were deleted because they did not give complete answers in the questionnaire.

**Table 5.** Observed and predicted group membership using two Wald methods between Japan and Indonesia.

Group	Predicted country		Percentage correct
	Japan	Indonesia	
Forward Stepwise (Wald)			
Japan	41	2	95.3
Indonesia	6	49	89.1
Total			91.8
Backward Stepwise (Wald)			
Japan	41	2	95.3
Indonesia	2	53	96.4
Total			95.9

The cut value is 0.50. Nagelkerke  $R^2 = 0.804$  (forward stepwise), 0.861 (backward stepwise).

\*Seven Indonesian dentists were deleted because they did not give complete answers in the questionnaire.

Table 4 shows that 42 Japanese dentists (97.7%) were correctly predicted using the forward stepwise method. Similarly, 22 Chinese dentists (100%) were correctly predicted. The Nagelkerke  $R^2$  statistic was 0.948; that is,

94.8% of the variation in the outcome variable was explained by the logistic regression model.

Table 5 shows that 41 Japanese dentists (95.3%) were correctly predicted using the forward stepwise method. Similarly, 49 Indonesian dentists (89.1%) were correctly predicted. The Nagelkerke  $R^2$  statistic was 0.804; that is, 80.4% of the variation in the outcome variable was explained by the logistic regression model.

Table 6 shows that 15 Chinese dentists (68.2%) were correctly predicted using the forward stepwise method. Similarly, 47 Indonesian dentists (85.5%) were correctly predicted. The Nagelkerke  $R^2$  statistic was 0.518; that is, 51.8% of the variation in the outcome variable was explained by the logistic regression model.

**Table 6.** Observed and predicted group membership using two Wald methods between China and Indonesia.

Group	Predicted country		Percentage correct
	China	Indonesia	
Forward Stepwise (Wald)			
China	0	22	0.0
Indonesia	0	55	100.0
Total			71.4
Backward Stepwise (Wald)			
China	15	7	68.2
Indonesia	8	47	85.5
Total			80.5

The cut value is 0.50. Nagelkerke  $R^2=0.393$  (forward stepwise), 0.518 (backward stepwise). \*Four Chinese dentists and seven Indonesia dentists were deleted because they did not give complete answers in the questionnaire.

## Discussion

Denture cleansers are widely used by denture wearers to remove plaque, stain and calculus from the surface of dentures.<sup>1-5</sup> In the clinic, patients would benefit greatly from a dentist's guidance in the use of denture cleansers. This study was designed to survey the knowledge, understanding and level of education about denture cleansers among Japanese, Chinese, and Indonesian dentists.

More than 76% of Chinese dentists and more than 62% of dentists in Indonesia said that they had heard only a little about denture cleansers and that they knew only a little of the function of denture cleansers. Furthermore, more than 76% of dentists in China and more than 61% of Indonesian dentists answered that they did not know of any disadvantages of denture cleansers. It is important for dentists to be familiar with the disadvantages of denture cleansers; in particular, the risk of deterioration of the physical and mechanical properties of denture base materials and oral mucosal injury caused by inappropriate use of denture cleansers.<sup>15</sup> Professional education about denture cleansers is therefore necessary. Almost none of the dentists in China and Indonesia knew of any domestic brands of denture cleanser. In China and Indonesia, there are practically no domestic manufacturers of denture cleansers, and denture cleansers are mainly imported. This may be why so many dentists in China and Indonesia did not know of any domestic brands.

Over 61% of dentists in China and Indonesia responded that they had never been taught about denture cleansers, and between 80% and 100% of Chinese dentists had never encountered denture cleansers in books, lecture meetings or on television. Information about denture cleansers often comes from textbooks and lectures, but dentists often encounter this information only in technical journals and specialty books. In China and Indonesia, there have been few reports about problems caused by denture cleansers. Therefore, problems arising from the improper use of denture cleansers, such as deterioration of the physical and mechanical properties of denture base materials and oral mucosal injury, may be prevented by raising dental professionals' awareness and

knowledge of denture cleansers. We suggest that it is particularly important to teach dentists about the advantages and disadvantages of denture cleansers in professional continuing education and training.

Over 69% of the dentists in Chinese and over 54% of the Indonesian dentists stated that they had never seen denture cleansers in the clinic. There are various environmental differences among the three countries. These differences could affect dental treatment, and could affect the use of denture cleansers.

Some limitations can be identified in this study. Firstly, indirect translation of the questionnaire from Japanese to Chinese and Indonesian might have influenced the results. Secondly, the sample sizes were small. Thirdly, there were significant differences in age among the three groups of subjects. It is unknown whether the results can be generalized to other samples; therefore, it is necessary to conduct future research over more diverse samples. Although caution should be exercised in making generalizations based on the results of this study, the questionnaire is a starting point for investigating the awareness and knowledge of dentists in Japan, China, and Indonesia about denture cleansers. These methods may be useful for comparing awareness of denture cleansers among other groups, and may further contribute to the evaluation of denture cleansers.

#### Acknowledgment

This research was supported in part by a Grant-in-Aid for Scientific Research (21791899) from the Ministry of Education, Culture, Sports, Science and Technology, Japan.

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Accepted June 7, 2010.

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