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Investigation of the Oral Health Status of Patients Based on Rehabilitation Nursing

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Abstract

Objective: To investigate the current situation of knowledge, attitude, and practice (KAP) of oral health among rehabilitation nursing patients, and provide some reference for implementing oral health intervention measures for rehabilitation nursing patients. Method: A total of 231 nursing patients in the rehabilitation department of a tertiary hospital in this city from January 2023 to October 2023 were selected as the research subjects. Their oral health knowledge, attitudes, and behaviors were investigated, and the oral health behavior habits of patients with different genders, education levels, and disease situations were compared. Result: The total awareness rate of oral health knowledge among patients was 73.16%, and the average score of oral health knowledge was 6.58 ± 1.25 points. The overall positive rate of oral health attitude among patients is 55.70%, and the average score of oral health attitude is 5.01 ± 1.04 points. The average score for oral health behavior is 16.87 ± 5.23 points. Only 8.48%, 3.3%, 1.3%, 2.6%, and 0.87% of patients seek timely medical treatment for bleeding tooth roots, gum swelling and pain, gum bleeding, tooth pain, and dental calculus, respectively; Only 5.19% of people change their toothbrush every 3 months, and only 10.39% use the vertical brush method to brush their teeth. The scores of oral health knowledge, attitudes, and behaviors of patients are related to age, educational level, disease type, and smoking situation. The oral health knowledge and attitude scores of elderly patients were lower than those of younger patients, and the difference was statistically significant ($P < 0.001$ or $P < 0.05$). The oral health knowledge and behavior scores of patients with low education levels were lower than those of patients with high education levels, and the difference was statistically significant ($P < 0.001$). The oral health attitude score of medical insurance-paying patients is higher than that of self-funded patients, and the difference is statistically significant ($P < 0.05$). The oral health knowledge score

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of patients with cerebrovascular disease is lower than that of patients with other diseases, and the difference is statistically significant ($P < 0.05$). Conclusion: The oral health status of rehabilitation nursing patients is not optimistic, with a moderate level of oral health knowledge, weak awareness of oral health, and a low qualification rate of oral health behaviors. Strengthening oral health education for rehabilitation nursing patients and incorporating oral health care procedures into rehabilitation nursing procedures is of great significance.

Keywords

Oral Health, Questionnaire Survey, Knowledge, Attitude, Behavior

1. Introduction

According to the 2022 Global Oral Health Report [1], around 3.5 billion individuals are impacted by oral diseases. These conditions not only disrupt the normal functions of the oral cavity but also have a profound impact on overall health and quality of life. However, previous research indicates that a significant portion of the population grapples with subpar oral health, a lack of awareness regarding oral hygiene, passive attitudes toward oral care, and poor oral health behavior habits [2] [3]. Given China's expansive and diverse geographical landscape, demographic characteristics such as age, income, education, and dietary habits vary significantly among different groups. Oral health is intricately linked to factors like socioeconomic status, social standing, age, marital status, education level, tobacco and alcohol use, and dietary habits [1] [4]-[9]. For hospitalized patients in the rehabilitation department, their disease course is usually long and their mobility is inconvenient, which brings challenges to their oral hygiene and care. Along with it, risks such as bad breath, insect teeth, toothache, and an increase in harmful oral microorganisms can lead to decreased appetite, difficulty eating, increased risk of infection, and even death [10] [11] [12]. These complications not only diminish the quality of life for hospitalized patients, leading to additional financial burdens but also escalate the workload for clinical nursing personnel.

Therefore, this study takes rehabilitation nursing patients in a tertiary hospital in this city from January 2023 to October 2023 as the research object, conducts a survey on their oral health knowledge, attitudes, and behaviors, and analyzes their influencing factors. The objective is to investigate the oral health status of rehabilitation nursing patients and their possible risk factors and provide some reference for improving and developing personalized oral health education and prevention measures in the local area and even nationwide.

2. Materials and Methods

From January 2023 to October 2023, 231 nursing and treatment patients from a certain tertiary hospital's rehabilitation department in this city were randomly

selected as research subjects. Among them, there were 139 male patients and 92 female patients, aged 18 to 76 years old, with an average age of 53.65 ± 12.49 years old; 142 cases had cerebrovascular diseases, while 89 cases had other types of diseases. Inclusion criteria: 1) Residents who have settled in this city for a long time; 2) Voluntary participation in questionnaire surveys; 3) Clear mind. Exclusion criteria: 1) Individuals with cognitive impairment and unclear consciousness; 2) Individuals who have received dental treatment within six months. All respondents were informed of the investigation related matters and obtained informed consent.

Based on relevant literature [13] [14], a self-designed survey questionnaire was designedunder the guidance of professional dentists, which mainly includes four dimensions: basic information of the survey subjects, oral health knowledge, attitudes, and behaviors, with a total of 26 questions. The evaluation criteria for knowledge and attitude questionnaires refer to the methods used in HU-DBI questionnaire evaluation [15], with 9 questions and 7 questions for knowledge and attitude dimensions, respectively. A correct answer was scored 1 point, and an incorrect answer was scored 0 points. The score range was 0 - 9 points and 0 - 7 points, respectively. The higher the score, the higher the awareness of oral health knowledge and the more positive the attitude towards oral health. Oral health behaviors are evaluated using the Likert scale's five points scoring method, with scores ranging from 0 to 4 for each item from "none" to "always". There are a total of 10 items, with a score range of 0 to 40 points. The higher the score, the better the oral health behavior habits.

The questionnaire was conducted following the principle of random sampling, selecting rehabilitation nursing treatment patients for the survey. For patients with writing disabilities, their family members or investigators assisted in completing the questionnaire using a one-on-one question-and-answer approach. This survey utilized paper-based questionnaires, and all participants and their families involved in the survey were informed about the survey details and obtained informed consent.

3. Analysis

Statistical analysis was conducted using SPSS 26.0 software. Descriptive statistics were presented as percentages or mean ± standard deviation. Spearman correlation analysis was employed to examine the correlation between general patient information and scores related to oral health knowledge, attitudes, and behaviors. One-way analysis of variance (ANOVA) was utilized for intergroup comparisons, a corrected F-test was used when the variance was not uniform, and a significance level (P-value) of ≤ 0.05.

4. Results

4.1. Baseline Data

A total of 250 questionnaires were distributed in this survey, and 231 valid ques-

tionnaires were collected, with a response rate of 92.4%. The baseline data statistics of patients are shown in Table 1.

Table 1. Baseline data of all patients [n(%)].

Variable	Outcome	Frequency /n(%)
Age	<40	39 (16.88)
	40 - 60	102 (44.16)
	≥60	90 (38.96)
Gender	Male	139 (60.17)
	Female	92 (39.83)
Residential area	Countryside	153 (66.23)
	Town	78 (33.8)
Payment method for medical expenses	medical insurance	159 (68.8)
	self-funded	72 (33.77)
Educational Level	primary school and below	131 (56.71)
	middle school	47 (20.35)
	high school	33 (14.29)
	College degree or above	20 (8.66)
Smoking	Yes	40 (17.32)
	No	191 (82.68)
Drink	Yes	92 (39.83)
	No	139 (60.17)
Prevalence	Cerebrovascular disease	142 (61.47)
	other	89 (38.53)
Participated in oral health education activities	Yes	1 (0.43)
	No	230 (99.57)

4.2. Oral Health Knowledge and Attitudes of Rehabilitation Nursing Patients

4.2.1. Survey on Oral Health Knowledge of Rehabilitation Nursing Patients

In this survey, the vast majority of rehabilitation nursing patients have a moderate level of knowledge in oral health care. The oral health knowledge score of rehabilitation nursing patients is 6.58 ± 1.25, with a minimum score of 3.00 and a maximum score of 9.00; the total awareness rate of oral health knowledge among rehabilitation nursing patients is 73.16%. The survey found that rehabilitation nursing patients had the highest recognition (96.10%) of the view that "eating sweets can cause tooth decay", and the lowest correct awareness rate (37.23%) that gum bleeding during brushing is normal, the vast majority of patients believe that long-term toothpick removal (95.67%) and sweets (89.2%) can lead to gum bleed-

ing and tooth decay, while fluoride toothpaste (87.45%) can help prevent tooth decay, and oral health can affect overall health (86.58%), as shown in Table 2.

4.2.2. Survey on Oral Health Attitudes of Rehabilitation Nursing Patients

In this survey, the vast majority of rehabilitation nursing patients had weak awareness of oral health care. The oral health attitude score of rehabilitation nursing patients is 5.01 ± 1.04, with a minimum score of 2.00 and a maximum score of 7.00; the overall positive rate of oral health attitudes among rehabilitation nursing patients is 55.70%. The survey found that the vast majority of patients agree that oral health helps improve their quality of life (94.37%), and less than half (37.23%) of patients hold a positive attitude that their oral health is good, more than half of those who actively engage in dental care (53.68%) and agree that smoking and drinking (57.14%) are harmful to oral health, as shown in Table 2.

4.3. Rehabilitation Nursing Patients' Oral Health Behavior Habits

In this survey, the vast majority of rehabilitation nursing patients had low compliance rates with oral health behaviors. The total average score of oral health

Table 2. Correct answers to oral health knowledge and attitudes of rehabilitation nursing patients [n(%)].

Dimension	Item descriptions	Correct answer	accuracy/n(%)
Knowledge	1. Gingival bleeding during brushing is normal	Disagree	86 (37.23)
	2. Bacteria can cause gum bleeding	Agree	195 (84.42)
	3. Dental floss helps with oral hygiene	Agree	123 (53.25)
	4. Oral health may affect overall health	Agree	200 (86.58)
	5. Eating sweets can cause tooth decay	Agree	222 (96.10)
	6. Drinking carbonated drinks can lead to tooth decay	Agree	131 (56.71)
	7. Using thread pressing after meals is beneficial for oral health	Agree	141 (61.04)
	8. Long-term use of toothpicks for tooth removal can damage gums	Agree	221 (95.67)
	9. Using fluoride toothpaste can prevent insect teeth	Agree	202 (87.45)
Attitudes	10. As I get older, it's inconvenient to go to a dental hospital for examination	Agree	228 (98.70)
	11. Fear of seeing the dentist	Disagree	124 (53.68)
	12. Believe that one's oral health is good	Agree	86 (37.23)
	13. Regular oral examinations are required	Agree	174 (75.32)
	14. Oral health helps improve quality of life	Agree	218 (94.37)
	15. The quality of teeth is related to one's protection, not all are innate	Agree	196 (84.85)
	16. Believing that smoking and drinking can affect oral health	Agree	132 (57.14)

Note: The overall awareness rate of oral health knowledge = Total number of correct answers/(Number of knowledge section questions per questionnaire × Effective number of survey participants) × 100%; The overall positive attitude rate towards oral health care = Total number of positive attitude responses/(Number of attitude section questions per questionnaire × Effective number of survey participants) × 100%.

behavior in rehabilitation nursing patients is 16.87 ± 5.23 points, with the lowest score of 4.00 points and the highest score of 36.00 points. A survey found that 47.62% of patients brush their teeth at least twice a day, but only 1.30% seek timely medical treatment for gum bleeding; Only 2.60% of patients seek timely medical treatment for tooth pain, and only 0.87% seek timely medical treatment for blood tooth stones; Only 5.19% of people change their toothbrush every 3 months, and only 10.39% use the vertical brush method, as shown in Table 3.

4.4. Correlation Analysis of Factors Affecting Oral Health in Rehabilitation Nursing Patients

Spearman correlation analysis showed that the oral health knowledge score of rehabilitation nursing patients was negatively correlated with age (r = −0.233, $P < 0.001$), and positively correlated with education level and disease type (r = 0.260, $P < 0.001$; r = 0.149, $P = 0.024$). The score of oral health attitude is positively correlated with educational level (r = 0.137, $P = 0.038$). The score of oral health behavior is positively correlated with educational level and smoking (r = 0.149, $P = 0.024$; r = 0.137, $P = 0.038$). The score of oral health attitude is positively correlated with oral health behavior (r = 0.232, $P < 0.001$), as shown in Table 4.

4.5. Kap Status of Oral Health in Patients with Different Rehabilitation Nursing

Univariate analysis of variance found that patients with different ages, educational levels, and disease types had different levels of oral health knowledge, and the differences were statistically significant ($P < 0.05$ or $P < 0.001$); Patients of different ages and payment methods for medical expenses have different attitudes towards oral health, and the differences are statistically significant ($P < 0.05$); The oral health behaviors of patients with different educational levels are significantly inconsistent, and the differences are statistically significant ($P < 0.001$). As shown in Table 5.

Table 3. Oral health behavior status [n(%), $\bar{x} \pm s$].

	0 score	1 score	2 score	3 score	4 score	average score
1. Timely go to the hospital to treat residual roots in teeth	66 (27.97)	40 (16.95)	93 (39.41)	12 (5.09)	20 (8.48)	1.48 ± 1.20
2. Timely go to the hospital to deal with gum swelling and pain	93 (40.26)	76 (32.90)	40 (17.32)	15 (6.49)	7 (3.30)	0.99 ± 1.05
3. Timely go to the hospital to treat gum bleeding	94 (40.69)	52 (22.51)	71 (30.74)	11 (4.76)	3 (1.30)	1.03 ± 1.01
4. Timely go to the hospital to deal with dental pain	75 (32.47)	67 (29.00)	48 (20.78)	35 (15.15)	6 (2.60)	1.26 ± 1.14
5. Timely go to the hospital to clean up dental calculus	107 (46.32)	69 (29.87)	38 (16.45)	15 (6.49)	2 (0.87)	0.86 ± 0.97
6 . Rinse your mouth promptly after each meal	24 (10.39)	14 (6.06)	46 (19.91)	88 (38.10)	59 (25.54)	2.62 ± 1.22
7 . Brush your teeth at least twice a day	13 (5.63)	44 (19.05)	6 (2.60)	58 (25.11)	110 (47.62)	2.90 ± 1.33
8. Replace toothbrushes at least every 3 months	64 (27.71)	64 (27.71)	57 (24.68)	34 (14.72)	12 (5.19)	1.42 ± 1.19
9. Brushing teeth for no less than 3 minutes each time	12 (5.19)	66 (28.57)	26 (11.26)	49 (21.21)	78 (33.77)	2.50 ± 1.35
10. Vertical brushing method for brushing teeth	63 (27.27)	33 (14.29)	45 (19.48)	66 (28.57)	24 (10.39)	1.81 ± 1.38

Table 4. Correlation analysis of factors affecting oral health knowledge, attitude, and behavior scores of rehabilitation nursing patients.

Variable	Age	Gender	Residential area	Payment method for medical expenses	Educational Level	Smoking	Drink	Prevalence	Knowledge score	Attitude score	Behavior score
Age	1	−0.077	−0.132*	0.107	−0.386**	−0.102	−0.045	−0.213**	−0.233**	−0.146	−0.047
Gender		1	0.020	−0.019	0.027	−0.232**	−0.138*	−0.010	−0.041	0.044	−0.072
Residential area			1	−0.067	0.153*	0.012	−0.055	0.168*	0.027	0.014	0.072
Payment method for medical expenses				1	−0.078	−0.081	0.076	0.118	−0.061	−0.129	−0.124
Educational Level					1	0.034	0.067	0.379**	0.260**	0.137*	0.440**
Smoking						1	0.259**	0.057	−0.055	0.088	0.137*
Drink							1	0.008	0.005	0.083	0.106
Prevalence								1	0.149*	−0.124	0.080
Knowledge score									1	0.090	0.022
Attitude score										1	0.232**
Behavior score											1

Note: Significance: *: $P < 0.05$, **: $P < 0.01$.

Table 5. Scores of oral health knowledge, attitudes, and behaviors among population with different characteristics ($\overline{x} \pm s$, n = 231).

Variable	Outcome	Knowledge score	Attitude score	Behavior score
Age	≤40	7.05 ± 1.02	5.38 ± 0.85	17.00 ± 5.37
	41 - 60	6.72 ± 1.11	4.99 ± 1.02	17.33 ± 5.30
	≥61	6.23 ± 1.39	4.88 ± 1.11	16.30 ± 5.08
F		7.228	3.339	0.948
P		0.001**	0.037*	0.389
Gender	Male	6.56 ± 1.13	5.06 ± 0.94	16.58 ± 5.16
	Female	6.62 ± 1.42	4.95 ± 1.18	17.32 ± 5.31
F		0.121	0.639	1.088
P		0.740	0.446	0.298
Residential area	Countryside	6.55 ± 1.29	5.01 ± 1.05	16.55 ± 5.16
	Town	6.65 ± 1.17	5.03 ± 1.02	17.51 ± 5.33
F		0.364	0.017	1.764
P		0.547	0.895	0.185

Continued

Payment method for medical expenses	medical insurance	6.59 ± 1.24	5.03 ± 1.03	16.93 ± 5.20
	self-funded	5.50 ± 2.12	3.50 ± 0.71	10.00 ± 4.24
F		1.527	4.328	3.531
P		0.218	0.039*	0.062
Educational Level	primary school and below	6.32 ± 1.31	4.90 ± 1.09	14.77 ± 4.22
	middle school	6.74 ± 1.09	5.15 ± 1.00	19.62 ± 5.42
	high school	7.09 ± 1.13	4.97 ± 0.98	19.24 ± 4.46
	College degree or above	7.10 ± 0.91	5.50 ± 0.76	20.30 ± 5.73
F		5.461	2.293	20.779
P		＜0.001**	0.079	＜0.001**
Smoking	Yes	6.75 ± 1.06	4.80 ± 1.11	15.55 ± 4.27
	No	6.55 ± 1.28	5.06 ± 1.02	17.15 ± 5.37
F		0.851	2.037	3.137
P		0.357	0.155	0.078
Drink	Yes	6.61 ± 1.17	4.92 ± 1.00	16.07 ± 4.81
	No	6.57 ± 1.30	5.07 ± 1.07	17.41 ± 5.43
F		0.058	1.121	3.711
P		0.810	0.291	0.055
Prevalence	Cerebrovascular disease	6.42 ± 1.29	5.11 ± 1.04	16.49 ± 4.61
	other	6.84 ± 1.14	4.87 ± 1.02	17.49 ± 6.06
F		6.347	2.947	2.047
P		0.012*	0.087	0.154

Note: Significance: *: $P < 0.05$, **: $P < 0.01$.

5. Discussion

Oral disease is one of the most common human diseases. The occurrence of oral disease not only affects the normal functions of chewing and swallowing but also is closely related to the occurrence of malnutrition, diabetes, cardiovascular disease, and other systemic diseases [16] [17] [18] [19]. There are many risk factors for oral health, mainly in the following two aspects: immutable factors including age, gender, and genetic predisposition, as well as external variable factors such as socio-economic living conditions, unhealthy lifestyle habits, and limitations in oral health services [13]. Therefore, exploring the oral health status and influencing factors of various populations is both challenging and necessary. This study investigated the current status of oral health knowledge, attitudes, and behaviors among nursing patients in the rehabilitation department, to provide valuable references for clinical practice, epidemiology, and clinical research.

This survey found that rehabilitation nursing patients have moderate knowledge of oral health and weak awareness of oral health. This is similar to the re-

sults obtained by Júlia Moldvai *et al.* [10], which found that stroke patients exhibited poorer oral health conditions. But contrary to the research results of Rui Jiang *et al.* [20] on the population in Guangzhou, China. This suggests that the oral health status may be related to the population, region, and disease situation of the surveyed individuals; and it indirectly proves the importance of conducting oral health surveys on different populations. The vast majority of patients agree that sweets and long-term use of toothpicks for tooth removal are harmful to oral health, but the awareness of carbon water drinks causing tooth decay is relatively low. It is now clear that the intake of sugar in food and beverages is the most important risk factor for dental caries and shows a clear dose-response relationship. The World Health Organization's sugar guidelines also recommend reducing the daily total energy intake of free sugar to less than 10% and further reducing it to 5% of total energy [21] [22]. The awareness rate of oral disease hazards such as gum bleeding during brushing and the effectiveness of dental floss in oral cleaning among respondents is not ideal. Previous studies have shown that gum bleeding during brushing is a precursor to gingivitis [23] [24], and the use of water floss can help reduce plaque. According to data from the American Dental Association, dental floss can remove up to 80% of interdental plaque [25], and compared to regular dental floss, water floss shows stronger effectiveness in reducing plaque in adjacent areas of teeth [26]. This suggests that it is necessary to educate patients to reduce their intake of carbonated beverages and take relevant preventive measures while strengthening oral health education and knowledge dissemination among the population. A survey on oral health attitudes found that the majority of rehabilitation care patients are aware of the importance of oral health and acquired oral care. However, those who hold a positive attitude towards their own oral health (37.23%), are not afraid of seeing their teeth (53.68%), and are aware that smoking and drinking are harmful to oral health (57.14%) are in the minority. Dental anxiety and fear are common phenomena in the dental environment, and dental fear can have a negative impact on dental care patterns, clinical and subjective oral health conditions [27]. There is literature indicating that smoking and alcohol can increase the risk of periodontal disease and affect oral health [28] [29]. The reason for this is that currently, the public's knowledge of oral health is not yet complete, and there is a lack of supporting oral health services, which to some extent affects the establishment of a positive attitude towards oral health.

This survey found that the overall qualification rate of oral health care behaviors among rehabilitation nursing patients is not high. A survey on oral health behavior shows that there are not many people who maintain brushing their teeth at least twice a day, and seek medical attention promptly when there is gum swelling, bleeding, and tartar. There are even fewer people who change their toothbrush every three months and use the correct brushing method to brush their teeth. The frequency of brushing teeth is related to the severity of periodontitis [30], and dental calculus can cause gingival bleeding and expand the radius of periodontal damage caused by dental plaque [31]. The above results all

indicate that it is necessary to strengthen the education of oral health behaviors among patients. That is, cultivating good oral health habits, regular dental examinations, and mastering the correct brushing methods are of great significance for early detection and prevention of oral health problems. In addition, in subsequent follow-up visits, it was learned that the majority of patients believe that the inconvenience of movement caused by illness is the main reason affecting their implementation of oral health behaviors.

This survey found that individuals with higher levels of education possess richer oral health knowledge, more positive attitudes, and higher compliance rates with oral health behaviors. Smoking status influences oral health behaviors. Higher education levels are often associated with a greater wealth of oral health knowledge and more oral health care needs, thereby reducing the risk of poor oral hygiene habits [13] [15]. The results of this survey also indicate that as age increases, the scores of oral health knowledge, attitude, and behavior show a decreasing trend, and there are significant differences in the scores of oral health knowledge and attitude among patients of different age groups ($P < 0.001$ or $P < 0.05$), but there is no significant difference in the scores of oral health behavior ($P > 0.05$). As the level of education increases, the scores of oral health knowledge and behavior show an upward trend, and there is a statistical difference in the scores of oral health knowledge and behavior among patients with different levels of education ($P < 0.001$). The oral health knowledge scores of patients with cerebrovascular disease were lower than those of non-cerebrovascular disease patients, and the difference was statistically significant ($P < 0.05$). Oral health is related to the deterioration of cognitive function and physical condition. Elderly patients with cognitive fragility pay less attention to oral health [32], which may be related to the lack of public health policies in this age group [33]. The older the age, the worse the oral condition, and the corresponding increase in adverse health consequences and medical and dental expenses [34], which will inevitably bring economic pressure to the patient's family. In addition, Mary Lyons *et al.* [11] proposed that oral care after a stroke is important, but it is often overlooked due to the high work pressure of nursing staff, weak oral health care guidelines, and a lack of information on how to better provide oral care. Therefore, it is of great significance to introduce professional dental physician training and oral health care procedures in the inpatient treatment ward of the rehabilitation department.

In addition, it was found in this survey that only one out of 231 patients had participated in oral health education activities, and it was an accidental experience during a dental visit many years ago. This indicates that the oral health education and publicity efforts in the local area are insufficient and need to be further strengthened.

It should be noted that due to time and resource limitations, and since this survey only involves one hospital in the city, the research results cannot be extrapolated to the entire province or even the whole country. We suggest conducting a nationwide study with multiple centers in different provinces to com-

prehensively understand the oral health knowledge, attitudes, and behaviors of rehabilitation nursing patients.

6. Conclusion

The oral health status of rehabilitation nursing patients is not optimistic, with a moderate level of oral health knowledge, weak awareness of oral health, and a low qualification rate of oral health behaviors. Older patients, self-funded medical expenses, low education levels, and poor oral health are associated with cerebrovascular disease. In this survey, there was almost no oral health education and training for rehabilitation nursing patients, indicating that it is urgent to strengthen the promotion and education of oral health public health; It is of great significance to simultaneously carry out oral health education and popularization for patients, and introduce oral health care procedures in rehabilitation wards.

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Conflict of Interest

The authors declare no conflicts of interest.

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