

Attitudes towards people with dementia: a cross-sectional study comparing dental hygiene students with registered dental hygienists

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Abstract

Objective: In order to adequately care for patients with dementia, it is necessary for dental hygienists to develop unprejudiced attitudes towards and obtain sufficient knowledge of dementia. The aim of this study was to assess attitudes towards and knowledge of dementia among Japanese dental hygiene students and identify related factors to the attitude and the knowledge. We compared the attitude and the knowledge between dental hygiene students and practising dental hygienists.

Background: Dental hygienists are required to care for patients with dementia by developing appropriate attitudes towards dementia and gaining knowledge of dementia.

Material and methods: Between May 2016 and July 2016, 191 third-grade dental hygiene students and 64 registered dental hygienists were surveyed. We modified questionnaires to assess attitudes towards and knowledge of dementia. Ageism was assessed using the Fraboni Ageism scale. To determine potential dementia awareness factors, information regarding participants' experiences with dementia was collected.

Results: Factor analysis revealed four factors in the attitude scale (Cronbach's α , 0.652-0.820). All item-total correlation coefficients for the knowledge scale were above 0.3, and Cronbach's α was 0.827. All awareness factors for dementia were significantly different between students and registered dental hygienists. Total scores of attitude and knowledge were higher among registered dental hygienists, indicating better attitude and knowledge, but total scores of ageism were lower among registered dental hygienists, indicating worse ageism. Multiple regression analysis revealed that the attitudes towards dementia correlated with years of experience, ageism, interest in dementia and desire to work with patients with dementia.

Conclusion: Registered dental hygienists had more positive and more knowledge compared to dental hygiene students. Attitudes towards dementia, but not knowledge of dementia, were significantly positively correlated with ageism.

KEYWORDS

ageism scale, attitude scale, dementia, dental hygienist, knowledge scale

1 | INTRODUCTION

The age-standardised prevalence of dementia has steadily increased, and the percentage of individuals suffering from dementia has increased from 4.6% to 11.3% over the last two decades.¹ As the elderly population increases, the number of elderly people in Japan suffering from dementia is expected to increase accordingly.¹ It is expected that the prevalence rate of dementia in those 65 years old and above will be 19.0%, and 7 million Japanese citizens will be diagnosed with dementia by 2025.² Dementia has various aetiologies, but the primary causes include Alzheimer's disease, vascular dementia and dementia with Lewy bodies. Dementia is a public health concern and poses a significant social and economic challenge to Japanese society.

Cognitive impairment in dementia causes the exacerbation of oral health problems primarily due to encumbering mouth cleaning, lack of manual control and visual-spatial agnosia.³ Compared to cognitively normal older adults, the treatment needs for caries and periodontitis were 5.5- and 15.9-fold higher in persons with dementia.³ Due to a deterioration in chewing ability, the variety of food consumed by persons with dementia decreases, leading to a higher risk of malnutrition.⁴ The ability to swallow is also reduced in individuals with cognitive impairment (including those with dementia),⁵ thereby increasing the risk of aspiration pneumonia.⁶ In addition, cognitive impairment also leads to complications in possessing dentures⁷; it is frequently reported that individuals with dementia swallow their dentures, causing them to choke.⁸ As these issues suggest, persons with dementia are in particular need of dental treatment and care.

Dental hygiene students in Japan receive extensive training on the clinical needs and oral functional/structural problems of patients with dementia. Practical training and lectures on the care of older adults are provided in dental hygiene courses. The Japanese national examination for dental hygiene emphasises the medical features and dental treatment/care needs of older people. Education on the pathological features of dementia and treatment/care for persons with dementia is part of the gerodontology curriculum. The attitudes acquired through geriatric/gerontological practices are as important to consider as knowledge when assessing the effects of geriatric/gerontological education on dental hygiene students. The attitude scale used in this study was developed to distinguish attitude with a positive valence (ie, pleasurable, favourable and supportive) from attitude with a negative valence (ie, unpleasurable, unfavourable and hostile).⁹ A previous study on nurses' attitudes towards older adults demonstrated that a negative attitude towards persons with dementia impairs communication and leads to impair older adults' dignity and autonomy.¹⁰ A positive attitude towards dementia is essential for a competent dental hygienist. To assess the attitude towards and knowledge of dementia among health workers and caregivers, two scales are frequently used: the Alzheimer's Disease Knowledge Scale,¹¹ and the Knowledge Quiz and Attitude Quiz.¹² These scales are not suitable for dental hygienists; the first scale specialises in Alzheimer's disease, and the second scale focuses on the therapeutics and diagnosis of dementia. Instead, in the

present study, we implemented scales for attitude and knowledge adapted from a previous study.¹³ The purpose of this study was to identify factors influencing attitudes towards dementia in dental hygiene students in comparison with registered dental hygienists. We hypothesise that a lack of relationship between dental hygiene students and older people or persons with dementia will negatively influence attitudes towards dementia.

2 | MATERIALS AND METHODS

2.1 | Data collection

We recruited 191 third-year students from four different dental hygiene schools in Fukuoka prefecture, Japan. In addition, we surveyed 64 registered dental hygienists who attended a seminar for dysphagia hosted by the Fukuoka Dental Hygienists' Association. Surveys were carried out between May 2016 and July 2016. Questionnaire sheets were mailed to each school or to the Fukuoka Dental Hygienists' Association, and subsequently returned for analysis. Recruitment advertisements were used to increase the response rate.

This study was conducted with the approval of the Medical Ethics Committee of Kyushu Dental University (No. 15-9). Informed consent was implied by oral agreement to answer the questionnaires. The authors declare that they have no competing interests.

2.2 | Study design

A cross-sectional study was conducted to evaluate the attitudes towards persons with dementia and to assess knowledge of dementia in dental hygiene students and registered dental hygienists.

2.3 | Questionnaires

Questionnaires addressed the following characteristics: relationship to individuals with dementia, interest in dementia, family structure (extended family or nuclear family), cohabitation with an elderly person, cohabitation with a person with dementia and desire to work at a dental clinic for patients with dementia (Table 1). We included a Japanese scale for assessing attitudes towards people with dementia, and knowledge of dementia modified previous research in Japanese.¹³ Attitudes towards dementia were assessed using a four-point Likert scale, and question numbers 5, 6, 9, 10, 14, 15, 16, and 17 were inverted items. A higher score indicated a more positive attitude. All questions assessing dementia knowledge were answered either "yes," "no," or "I do not know." The response "I do not know" was classified as an incorrect answer. A higher score indicated greater knowledge of dementia. Maximum scores for the attitude and knowledge scale were 72 and 15, respectively. Items of both the attitude and knowledge scales are shown in Tables 2 and 3, respectively.

Ageism was assessed using the Japanese version of the Fraboni Ageism Scale.¹⁴ The Fraboni Ageism Scale has three domains:

TABLE 1 Distribution of awareness factors in participants

Awareness factors	Student (N = 191), N (%)	RDH ^a (N = 64), N (%)	P-value ^b
Relationship to individuals with dementia, yes	99 (51.8)	55 (85.9)	<0.01
Interest in dementia, yes	148 (77.5)	59 (92.2)	<0.01
Extended family structure, yes	35 (18.3)	23 (35.9)	<0.01
Cohabitation with elderly person, yes	59 (30.9)	41 (69.1)	<0.01
Cohabitation with dementia patient, yes	12 (6.3)	14 (21.9)	<0.01
Desire to work with patients with dementia, yes	91 (47.6)	53 (82.8)	<0.01

^aRegistered dental hygienist.^bChi-squared test.

Discrimination, Avoidance, and Antilocution.¹⁵ The items of the Fraboni Ageism Scale were assessed using a five-point Likert scale, with a maximum score of 95. A higher score on the Fraboni Ageism Scale indicated less ageism. The term "Antilocution" is a neologism in psychology, meaning the most elementary form of prejudice.

2.4 | Statistical analysis

Values represent mean \pm SD. A good-poor (G-P) analysis was used to assess discriminant validity using the Mann-Whitney *U* test. All participants were divided into tertiles, and the lowest and highest tertiles were compared based on total scores and domain scores, for discriminant validity, using the Mann-Whitney *U* test. Internal consistency was assessed by Cronbach's α coefficients. Item-total (I-T) analysis was tested for internal consistency using Pearson's correlation coefficient. Multiple regression analysis was used to analyse factors correlated to attitude. Test-retest reliability was assessed by intraclass correlation coefficient (ICC). For test-retest, 25 students were selected. Statistical analysis was performed using SPSS (version 22; SPSS Japan Inc., Tokyo, Japan). We calculated two-tailed *P*-values in all analyses. The alpha level of significance was set at 0.05.

3 | RESULTS

All 255 study participants were women. For the registered dental hygienists, years of experience ranged from less than 10 years to over 30 years (mean years of experience: 29.6 ± 10.9). We asked participants questions to assess their exposure to and interest in dementia treatment. We refer to these questions as "awareness factors." In all measures of awareness factors, the registered dental hygienists performed higher than the students (Table 1).

Cronbach's α for the dementia attitude scale was 0.816, and the cumulative variance explained was 38.8% (Table 2). Factor analysis extracted four factors from the dementia attitude scale: tolerance, repulsion, shame and acceptance. Cronbach's α was 0.820 for tolerance, 0.652 for repulsion, 0.807 for shame and 0.775 for acceptance.

The sum of squares on rotated factor loading was 2.96 for tolerance, 2.24 for repulsion, 2.34 for shame and 2.45 for acceptance. G-P analysis demonstrated significant differences in all factors and in the total attitude scale scores ($P < 0.01$), verifying good discriminability. The average for total attitude scale scores was 49.6 ± 6.1 . Reliability assessed by the ICC was 0.825 for tolerance, 0.566 for repulsion, 0.593 for shame, 0.811 for acceptance and 0.739 for the total scale.

Table 3 shows the accuracy rate and I-T correlation coefficient for the dementia knowledge scale. Cronbach's α for the dementia knowledge scale was 0.827. I-T correlation coefficient analysis demonstrated Pearson's correlation coefficient, for all items, of 0.362-0.600, verifying adequate internal consistency (Table 3). The average score for the dementia knowledge scale was 10.6 ± 3.0 . All registered dental hygienists' scores were higher than those of the students, although this difference was not statistically significant for question numbers 10, 12, 14, and 15.

In the present study, Cronbach's α for the Fraboni Ageism Scale was 0.799 for total score, 0.808 for discrimination, 0.794 for avoidance and 0.65 for antilocution. All items in Fraboni Ageism Scale showed good discriminability, as analysed by G-P analysis ($P < 0.01$). The average score for the Fraboni Ageism Scale was 72.5 ± 10.2 .

Table 4 shows the correlation between the dementia attitude scale, the dementia knowledge scale and the Fraboni Ageism Scale. Overall, attitude and ageism scores were positively correlated. On the other hand, the knowledge scale correlated with tolerance on the attitude scale, and the total score and Discrimination domain on the ageism scale. Consequently, we separately analysed correlations between the three scales within the registered dental hygienists' cohort and students' cohort (Table A1). In the students' cohort, the results were similar to those obtained from the combined cohorts. In the registered dental hygienists' cohort, there were no correlation between shame or acceptance on the dementia attitude scale and the total score on the ageism scale.

Table 5 shows the relationship between awareness factors and the three scales (attitude, knowledge and ageism). The knowledge scores of participants who selected "yes" were higher than the participants who selected "no." On the other hand, participants who

TABLE 2 Rotated factor loading and Cronbach's α for the dementia attitude scale

Items	Factor loading			
	1	2	3	4
<i>Factor 1: Tolerance</i>				
Q8. I can talk with dementia person without hesitation	0.633	0.230	0.322	0.310
Q3. I can help dementia person in need without hesitation	0.578	0.491	0.449	0.477
Q2. There may be an opportunity to associate with a dementia person in daily life	0.575	0.172	0.179	0.140
Q7. I can share joy and pleasure with a dementia person	0.550	0.355	0.120	0.138
Q4. A dementia person should participate in a local action	0.502	0.093	0.203	0.289
Q15. I do not want to associate with the person of dementia as much as possible (i)	0.472	0.178	0.333	0.247
Q11. I do not mind that dementia person move in next my house	0.465	0.208	0.078	0.126
Q1. Dementia person also has ability to get along well with people around the person	0.434	0.193	0.088	0.257
Q12. It is good for a person of dementia to ask help of various people	0.339	-0.030	0.160	0.191
<i>Factor 2: Repulsion</i>				
Q14. I cannot recognize when and what dementia person will do (i)	0.194	0.687	0.193	0.227
Q13. I cannot understand the action of a dementia person (i)	0.356	0.622	0.318	0.387
Q5. A dementia person often annoys people around him/her (i)	0.165	0.507	0.279	0.273
Q6. A dementia person has feelings different from us (i)	0.147	0.305	0.261	0.294
<i>Factor 3: Shame</i>				
Q9. If a family would suffer from dementia, I would be worried about appearances and what other people think (i)	0.266	0.352	0.823	0.296
Q10. If a family would suffer from dementia, it would become hard to do with neighborly relations (i)	0.304	0.280	0.790	0.364
<i>Factor 4: Acceptance</i>				
Q16. A dementia person does not accept myself (i)	0.343	0.331	0.333	0.810
Q17. A dementia person does not accept dentist or dental hygienist (i)	0.322	0.384	0.309	0.762
Mean \pm SD of each domain	27.5 \pm 3.9	9.7 \pm 2.1	5.7 \pm 1.5	6.0 \pm 1.3
Sum of squares on rotated factor loading	2.96	2.24	2.34	2.45
Cronbach's α of each domain	0.820	0.652	0.807	0.775
ICC of each domain	0.825	0.566	0.593	0.811
Mean of total score (\pm SD)	49.6 \pm 6.1			
Cronbach's α of whole scale	0.816			
ICC of whole scale	0.739			
Cumulative variance explained (%)	38.8			

(i): Inverted item; ICC: intraclass correlation coefficient.

were more likely to give affirmative responses to the queries, "relationship to person with dementia," "interest in dementia" and "desire to work in a dental clinic for dementia persons," performed higher on the attitude scale. Similarly, participants who provided positive answers for "interest in dementia" and "desire to work in a dental clinic for dementia persons" scored significantly higher on the ageism scale. Given these differences, we analysed the correlation

between the three scales in the registered dental hygienists' cohort and students' cohort, independently (Table A2). In the registered dental hygienists' cohort, only participants who provided positive answers for "interest in dementia" scored significantly higher on all three scales.

When comparing students and the registered dental hygienists in terms of attitude, the registered dental hygienists scored higher than

TABLE 3 Accuracy rate and item-total (I-T) correlation coefficient for the dementia knowledge scale

No.	Questionnaires	I-T correlation coefficient	Accuracy rate (%)			P-value ^c
			Total	Student	RDH ^b	
1	A dementia person feels uneasiness by one's forgetfulness	0.414 ^a	62.3	53.9	84.7	<0.01
2	The symptom that sense of time and place disappear is over dementia	0.464 ^a	88.7	85.5	97.2	<0.01
3	Dementia is cause by various diseases	0.427 ^a	48.3	36.8	79.2	<0.01
4	Because it is caused by the aging of the brain, dementia becomes anyone when they get old (i)	0.362 ^a	74.3	70.5	84.7	0.02
5	Recent memories better keep than old memories in dementia (i)	0.469 ^a	74.3	69.4	87.5	<0.01
6	Dementia persons feel confusion when they hurry it up or are warned	0.600 ^a	78.9	74.1	91.7	<0.01
7	There is medicine to delay progression of symptom for dementia	0.497 ^a	60.4	51.3	84.7	<0.01
8	The depressed mental state of dementia persons expresses the thing that is in condition to be easy to lose confidence	0.509 ^a	55.1	50.3	68.1	<0.01
9	Wondering is easy to occur when dementia persons feel uneasiness in the inexperienced place	0.549 ^a	63.4	59.6	73.6	0.04
10	Creating familiar environment is effective to remove uneasiness and confusion	0.483 ^a	90.6	90.2	91.7	0.82
11	By relation with caregivers, dementia symptom is worsened or improved	0.477 ^a	80.4	75.1	94.4	<0.01
12	Persuasions, scolding, and correction are easy to cause an aggressive behavior for dementia persons	0.598 ^a	76.2	73.1	84.7	0.06
13	Against hallucination or delusion, it is effective to correct in the negative (i)	0.533 ^a	65.3	61.7	75.0	0.04
14	Target for delusions of theft in dementia often applies to person to whom is close	0.544 ^a	65.7	64.2	69.4	0.47
15	From an early stage, dementia persons have almost none of the appearance (i)	0.512 ^a	76.2	73.6	83.3	0.11
	Mean ± SD of total score (max: 15)	10.6 ± 3.0				
	Cronbach's α of whole scale	0.827				

(i): inverted term.

^aP < 0.01 in I-T correlation coefficient analysis.^bRegistered dental hygienist.^cChi-squared analysis comparing accuracy rates of student and registered dental hygienist.

the students in both the total and tolerance scores. In contrast, on the ageism scale, students had higher total scores and Antilocution domain scores (Table 6). Additionally, tolerance and total score on the attitude scale, as well as total score on the knowledge scale, were positively correlated with years of experience. Antilocution scores on the ageism scale were negatively correlated with years of experience (data not shown).

In a multiple regression analysis, we assessed factors correlated with attitude (Table 7). Ageism, years of experience, interest in dementia and desire to work with dementia patients, but not relationship to persons with dementia, were significantly correlated with attitude. The

highest standard partial regression coefficient among the factors correlated with attitude was the Fraboni Ageism Scale (0.52).

4 | DISCUSSION

To the best of our knowledge, the present study is the first to investigate the knowledge of and attitudes towards dementia among dental hygiene students and registered dental hygienists. The attitudes towards and knowledge of dementia were more positive among registered dental hygienists compared to students. Attitudes towards

TABLE 4 Correlation between attitude scale, knowledge scale and Fraboni Ageism Scale analysed by Pearson correlation coefficient

	Fraboni Ageism Scale				Dementia knowledge scale
	Total	Discrimination	Avoidance	Antilocution	
Dementia attitude scale					
Total	0.443**	0.427**	0.540**	0.278**	0.056
Tolerance	0.428**	0.448**	0.517**	0.176**	0.188**
Repulsion	0.269**	0.235**	0.330**	0.271**	-0.030
Shame	0.220**	0.165**	0.241**	0.201**	-0.078
Acceptance	0.246**	0.208**	0.223**	0.199**	-0.014
Dementia knowledge scale	0.158*	0.178**	0.077	0.027	-

* $P < 0.05$, ** $P < 0.01$.**TABLE 5** Comparison of attitude, knowledge and ageism scale scores with awareness factors

Awareness factors	N	Attitude		Knowledge		Ageism	
		Mean \pm SD	P-value	Mean \pm SD	P-value	Mean \pm SD	P-value
Relationship to individuals with dementia							
Yes	154	51.6 \pm 6.0	<0.01	11.2 \pm 2.8	<0.01	72.8 \pm 9.1	0.89
No	101	49.1 \pm 5.9		9.5 \pm 3.0		73.0 \pm 9.8	
Interest in dementia							
Yes	207	51.4 \pm 5.9	<0.01	10.9 \pm 3.0	<0.01	74.0 \pm 8.8	<0.01
No	48	47.4 \pm 5.4		9.3 \pm 2.8		68.4 \pm 10.6	
Extend family structure							
Yes	58	51.4 \pm 5.6	0.27	11.5 \pm 2.7	<0.01	74.1 \pm 10.0	0.28
No	197	50.4 \pm 6.2		10.3 \pm 3.1		72.6 \pm 9.2	
Cohabitation with elderly person							
Yes	100	51.0 \pm 5.8	0.42	11.2 \pm 3.1	<0.01	73.2 \pm 9.5	0.80
No	155	50.3 \pm 6.2		10.2 \pm 2.9		72.8 \pm 9.4	
Cohabitation with dementia patient							
Yes	26	52.5 \pm 5.7	0.09	11.9 \pm 3.2	0.02	71.3 \pm 9.4	0.31
No	229	50.4 \pm 6.0		10.5 \pm 3.0		73.2 \pm 9.4	
Desire to work with patients with dementia							
Yes	144	52.5 \pm 5.6	<0.01	11.2 \pm 3.0	<0.01	75.5 \pm 8.7	<0.01
No	111	48.0 \pm 5.8		9.7 \pm 2.9		70.2 \pm 9.3	

The bold values in tables indicate $p < 0.05$ (statistically significant values)

dementia were significantly correlated with ageism, but not knowledge of dementia.

This study has several limitations. The first limitation is the age range of the registered dental hygienists. Forty percentage of the registered dental hygienists' cohort were aged 50 years or older, resulting in an age discrepancy between the registered dental hygienists' cohort and the students' cohort. The second limitation relates to the difference in sample size between the two cohorts; the sample size of the registered dental hygienists was smaller than that of the students. Effect size of t test, chi-squared test and multiple regression analysis in this study was 0.41, 0.24 and 0.06, respectively, implying moderate effect size. The third limitation is the locality in which the participants were living; a previous multinational study in Europe suggested that

stigma and ageism were attributes of localities.¹⁶ Therefore, further intra- or international research on attitudes towards dementia is needed. The fourth limitation is that this study is a cross-sectional study. In order to evaluate the effect of education on attitude development, further studies related to the practical training for the care of persons with dementia are needed. The fifth limitation is that all recruited registered dental hygienists were attendees of a seminar on dysphagia, which could present potential confounds.

Attitude did not correspond with family structure, cohabitation with older persons or cohabitation with dementia patients. Among the students, exposure to dementia patients was positively correlated with attitude. In contrast, this correlation was not observed among the registered dental hygienists. A previous study

TABLE 6 Comparison of scale scores between students and registered dental hygienists

Scales	Student	RDH ^a	P-value ^b
	Mean ± SD	Mean ± SD	
Dementia attitude scale			
Total	50.0 ± 9.3	52.6 ± 5.8	<0.01
Tolerance	27.5 ± 3.9	30.2 ± 3.7	<0.01
Repulsion	9.9 ± 2.0	10.2 ± 2.0	0.32
Shame	5.9 ± 1.5	5.8 ± 1.6	0.65
Acceptance	6.1 ± 1.2	6.2 ± 1.2	0.65
Dementia knowledge scale			
Total	9.9 ± 2.9	12.5 ± 2.6	<0.01
Fraboni Ageism Scale			
Total	73.2 ± 9.3	70.1 ± 13.4	0.04
Discrimination	27.5 ± 3.5	27.9 ± 4.1	0.46
Avoidance	24.5 ± 4.2	25.2 ± 3.4	0.22
Antilocution	21.2 ± 4.1	19.4 ± 3.9	<0.01

^aRegistered dental hygienist.

^bStudent's *t* test.

The bold values in tables indicate $p < 0.05$ (statistically significant values)

TABLE 7 Multiple regression analysis for dementia attitude scale in students and registered dental hygienists

	B	SE	Beta	P-value	CI of B	
Constants	33.45	3.42		<0.001	26.72	40.18
Fraboni Ageism Scale	0.34	0.03	0.52	<0.001	0.27	0.41
Experience years	0.06	0.03	0.13	0.03	0.01	0.12
Relationship to individuals with dementia	-0.19	0.38	-0.03	0.61	-0.95	0.56
Interest in dementia	-1.36	0.50	-0.17	0.01	-2.34	-0.38
Desire to work with patients with dementia	-1.88	0.72	-0.14	0.01	-3.30	-0.46

Analysis of variance: $P < 0.01$.

The bold values in tables indicate $p < 0.05$ (statistically significant values)

demonstrated that a 1-year-long programme in which medical students were paired with a patient with Alzheimer's disease produced greater knowledge of and a positive attitude towards dementia.¹⁷ Our results, shown in Table 5, suggest that exposure to persons with dementia might be beneficial for acquiring positive attitudes towards patients with dementia.

The dementia attitude scales used in this study had four domains, and both the whole scale and individual domains affirmed good internal validity and reliability (Table 3). All scores on the Fraboni Ageism Scale (total score and domain score) and all scores on the dementia attitude scale were significantly correlated (Table 2). Considering the high prevalence of dementia among older adults, this result is easily understandable. The World Psychiatric Association Section of Old Age Psychiatry and the World Health Organization concluded that elderly persons with dementia tend to be subject to mental disorder prejudice and ageism.¹⁸ Our results are consistent with this report. This finding has significant implications for students and teaching

staff in the practical treatment and caring for older persons with or without dementia.

The dementia knowledge scale used in this study had good internal validity, as confirmed by Cronbach's α of total score and the I-T correlation coefficient. The dementia knowledge scale was only weakly correlated with tolerance in the dementia attitude scale. This result was similar to the results of a preceding study.¹⁹ Previous studies on the relationship between attitude and knowledge of dementia demonstrated positive correlations between these two factors in various groups, including medical or nursing students.^{12,20,21} Our results suggest that knowledge of dementia engenders a tolerant attitude towards persons with dementia. In contrast, repulsion, shame and acceptance were not correlated with the knowledge of dementia. Previous studies have demonstrated that feelings of shame in having relatives with dementia was influenced by the subject's level of education.²² A study on social distance towards mental disorders in Japan suggested that

knowledge of the disorder and experience with the disorder correlated with a negative image and increased social distance towards the disorder.²³ Attitudes towards dementia are not only relevant to medical problems, but also to societal problems. Sociocultural conceptualisation of symptoms of dementing diseases is affected by culture and/or country.²⁴ Since prejudice is not caused by ignorance, correct knowledge may not lead to a complete resolution of negative attitudes. Therefore, adding material regarding the treatment and care for persons with dementia to the dental hygiene curriculum would likely enrich not only the cognitive purview of the students, but also their affective role in society.

The registered dental hygienists scored higher on the attitude and knowledge scales compared to the students (Table 6). Unfortunately, in the Fraboni Ageism Scale, the registered dental hygienists scored lower than the students. This finding is supported by results from a US study, which indicated that adolescents and young adults had less ageism than middle-aged and older adults.²⁵ A previous study reported that nurses devalued the capabilities and personal attributes of older adults, problematising negative attitudes towards older adults among nurses.²⁶ Another study demonstrated a lower level of knowledge of among nurses compared to other healthcare professionals.^{27,28} These lines of evidence suggest that middle-aged dental hygienists might have a modest ageist attitude.

The results of the present study indicate the importance of training that includes contact with persons with dementia, within the dental hygiene curriculum. The total score and the Discrimination domain score in the Fraboni Ageism Scale were found to correlate with knowledge scale scores (Table 4). A recent study that analysed a wide range of age groups reported that knowledge about ageing reduced ageism.²⁵ Additionally, lectures for college students on memory decline in ageing and Alzheimer's disease have been shown to reduce ageism.²⁹ Our result suggested that adequate knowledge of dementia also reduced negative ageist behaviour. It will be necessary for future research to evaluate the effects of practical training associated with dementia on the attitudes towards and knowledge of dementia in dental hygiene students.

5 | CONCLUSION

The attitudes towards were more positive, and the knowledge of dementia was higher among registered dental hygienists compared to students. The attitude towards dementia was significantly correlated with ageism, but not knowledge of dementia, in both registered dental hygienists and students.

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DISCLOSURE

The authors declare no conflict of interests.

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APPENDIX

TABLE A1 Correlation between attitude scale, knowledge scale and the Fraboni Ageism Scale analysed by Pearson correlation coefficient

	Fraboni Ageism Scale				Dementia knowledge scale
	Total	Discrimination	Avoidance	Antilocution	
(A) Students' cohort					
Dementia attitude scale					
Total	0.551**	0.462**	0.544**	0.294**	-0.072
Tolerance	0.549**	0.476**	0.564**	0.256**	0.023
Repulsion	0.287**	0.207**	0.288**	0.188**	-0.105
Shame	0.293**	0.263**	0.232**	0.203**	-0.033
Acceptance	0.279**	0.255**	0.216**	0.197**	-0.055
Dementia knowledge scale	0.099	0.149*	-0.030	0.119	-
(B) Registered dental hygienists' cohort					
Dementia attitude scale					
Total	0.369**	0.342**	0.517**	0.447**	0.143
Tolerance	0.366**	0.417**	0.369**	0.248*	0.264*
Repulsion	0.278*	0.299*	0.474**	0.606**	0.076
Shame	0.090	-0.060	0.294*	0.190	-0.180
Acceptance	0.210	0.090	0.247*	0.259*	0.056
Dementia knowledge scale	0.499**	0.263*	0.398**	0.17	-

* $P < 0.05$, ** $P < 0.01$.

	n	Attitude		Knowledge		Ageism	
		Mean ± SD	P	Mean ± SD	P	Mean ± SD	P
(A) Students' cohort							
Relationship to individuals with dementia							
Yes	99	51.0 ± 5.9	0.015	10.4 ± 2.7	0.010	73.5 ± 8.7	0.629
No	92	48.9 ± 6.0		9.3 ± 3.0		72.9 ± 9.9	
Interest in dementia							
Yes	148	50.7 ± 6.1	0.005	10.1 ± 2.8	0.003	74.4 ± 8.6	0.001
No	43	47.8 ± 5.3		9.1 ± 2.9		69.0 ± 10.6	
Extend family structure							
Yes	35	51.4 ± 5.9	0.134	10.4 ± 2.6	0.205	75.7 ± 10.6	0.084
No	156	49.7 ± 6.0		9.8 ± 2.9		72.7 ± 8.9	
Cohabitation with elderly person							
Yes	59	50.4 ± 5.6	0.590	10.0 ± 2.8	0.768	74.4 ± 9.2	0.258
No	132	49.9 ± 6.2		9.8 ± 2.9		72.7 ± 9.4	
Cohabitation with dementia patient							
Yes	13	51.3 ± 5.9	0.421	10.4 ± 2.9	0.514	68.8 ± 9.0	0.084
No	178	49.9 ± 6.0		9.9 ± 2.9		73.6 ± 9.3	
Hope to work at dental clinic for patients with dementia							
Yes	95	52.2 ± 5.4	0.001	10.1 ± 3.0	0.183	76.9 ± 8.0	0.001
No	96	47.8 ± 5.8		9.5 ± 2.7		70.0 ± 9.3	
(B) Registered dental hygienist cohort							
Relationship to individuals with dementia							
Yes	56	52.5 ± 6.1	0.597	12.8 ± 2.4	0.567	71.5 ± 9.7	0.495
No	8	51.2 ± 4.2		12.2 ± 2.3		74.3 ± 8.8	
Interest in dementia							
Yes	59	53.2 ± 5.3	0.001	12.9 ± 2.3	0.032	72.9 ± 9.4	0.030
No	5	44.4 ± 6.1		10.6 ± 1.8		63.2 ± 9.2	
Extend family structure							
Yes	41	53.0 ± 6.1	0.291	12.5 ± 2.6	0.255	72.3 ± 10.3	0.834
No	23	51.4 ± 5.3		13.2 ± 1.8		71.8 ± 8.7	
Cohabitation with elderly person							
Yes	42	51.9 ± 6.1	0.338	13.0 ± 2.4	0.221	71.4 ± 9.8	0.392
No	22	53.4 ± 5.4		12.2 ± 2.2		73.7 ± 10.0	
Cohabitation with dementia patient							
Yes	15	53.6 ± 5.5	0.496	13.1 ± 3.0	0.568	73.4 ± 9.5	0.648
No	49	52.4 ± 5.8		12.7 ± 2.1		72.1 ± 9.6	
Hope to work at dental clinic for patients with dementia							
Yes	56	53.0 ± 5.9	0.557	13.0 ± 2.1	0.435	73.1 ± 9.4	0.860
No	8	51.5 ± 4.8		12.2 ± 4.1		72.3 ± 10.4	

The bold values in tables indicate $p < 0.05$ (statistically significant values)

TABLE A2 Comparison of scale scores of attitude, knowledge and ageism with awareness factors