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Evidence-based prevention: a comparison of oral hygiene advice given by dental and dental care professional students

Abstract: *Aim*: This study aimed to examine the oral hygiene advice given by student dentists and dental care professionals (DCPs), focussing on adherence to evidence-based recommendations provided by the Department of Health and the Scottish Intercollegiate Guidelines Network. *Method*: A self-administered questionnaire was distributed to 121 fourth- and fifth-year dental undergraduates and 38 hygiene/combined dental hygiene and dental therapy students at a UK dental school. *Results*: Completed questionnaires were returned by 39/64 fourth-year and 36/57 fifth-year dental students and 23/38 student DCPs, an overall response rate of 61.6%. Only 48% (36) of dental undergraduates in comparison with 95.7% (22) of DCP students stated that they would give oral hygiene advice to every adult patient ($P < 0.001$). In addition, only 24 (32%) responding dental students were able to accurately state the recommended fluoride toothpaste concentration for adult use; this contrasts with 18 (78.3%) student DCPs. Dental undergraduates tended to accord less importance to oral hygiene advice when compared with student DCPs, only providing it when they felt it was clinically necessary. *Conclusions*: The role of the dental practitioner in providing oral health education requires greater emphasis in the undergraduate curriculum. Given the unfavourable comparison between the attitude and knowledge of dental students and that of DCPs, prequalification training for the dental team should be integrated wherever possible. The apparent lack of awareness of current guidelines is of concern.

Key words: dental student; hygienist; oral hygiene; prevention; therapist

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Introduction

In Western society, tooth brushing with fluoride toothpaste is now an integral part of most people's daily oral hygiene routine. A wide variety of toothbrush designs are available and manufacturers promote, through advertising, a confusing array of tooth brushing techniques. Advice on frequency and duration of brushing is also inconsistent. This emphasizes the need for all dental professionals to deliver accurate, consistent and evidence-based guidance to all patients.

The General Dental Council publication (1) outlines the learning outcomes dental schools should provide to graduate dentists who are fit for practice. It specifically states that dentists should be competent to

provide oral hygiene instruction and fluoride therapy. The equivalent document for training dental hygienists and therapists, *Developing the Dental Team* (2), states that dental therapists and hygienists should '*be competent in the principles of oral health promotion*' and '*at instructing patients in the various methods of plaque control, in both chemical and mechanical means*'.

The Department of Health (DoH) emphasizes that dental professionals have a duty to provide preventive advice where clinically appropriate. To this end, it has provided an evidence-based toolkit, containing clear guidance for dental professionals (3). The oral hygiene advice that should be delivered to adult patients may be summarized as follows:

- Brush twice daily with fluoridated toothpaste.
- Use fluoridated toothpaste with at least 1,350 ppm fluoride.
- Brush last thing at night and on another occasion.
- Spit out after brushing and do not rinse.

To date, however, little is known as to what extent dental professionals are adhering to this guidance. Likewise, while cooperation and communication between the dentist and other dental care professionals is clearly necessary to ensure the best possible patient care, there has been only limited examination of the working relationship between members of the dental team. Crucially, data from studies carried out in the USA and the Netherlands suggest that dentists and dental care professionals (DCPs) have different perceptions with regard to role delineation and patient care (4, 5).

The aims of this study were, therefore, to examine:

- whether undergraduate dental students and student DCPs at a UK dental school were giving oral hygiene advice to all adult patients;
- whether oral hygiene advice correlated with evidence-based recommendations;
- whether there was consistency in the advice given by the different professional groups;
- students' perception of their prequalification training in prevention.

Materials and methods

A self-administered questionnaire was developed for data collection. The instrument was divided into three sections:

1 Oral hygiene advice – 12 predominantly closed questions examining the specifics of the oral hygiene advice given by respondents to patients or the wider population
2 Relevance and importance of oral hygiene advice – A four-point Likert scale examining the level of respondents' agreement with ten statements
3 Training and experiences – Six predominantly closed questions focussing on the training of respondents in aspects of prevention and their confidence in providing oral hygiene advice

Questions were designed using information from the evidence-based toolkit for prevention provided by the British Association for the Study of Community Dentistry (3) and the 3D mouth website advice provided by the British Dental Association (6).

Face validity was checked by asking experts to scrutinize the questions; content validity was checked by ensuring that the questions covered all areas of knowledge mapped out by the initial objectives (7). Finally, an informal pilot was undertaken among non-participating colleagues.

The study protocol incorporating the survey questionnaire satisfied all ethical requirements relating to the use of human subjects; formal ethical approval was obtained from the Cardiff University Ethics Committee.

The study population comprised all fourth- and fifth-year undergraduate dental students, dental hygiene and combined dental hygiene/dental therapy students studying at Cardiff University School of Dentistry. Questionnaires were distributed via the School of Dentistry's internal postal system; a covering letter provided details of the study, instructions for completion of the instrument and researcher contact details. To allow the identification of non-respondents, each questionnaire was coded. However, to ensure anonymity, the code-break was kept by a third party not directly involved in the analysis of the responses. Response rates were maximized by distributing second copies of the questionnaire to non-respondents (8).

Data were analysed using descriptive frequencies, cross-tabulations of categorical variables, and calculation of χ^2 statistics for differences between subgroups.

Results

Questionnaires were distributed to 121 undergraduate dental students (64 fourth- and 57 fifth-year students) and 38 student dental hygienists and combined dental hygiene/dental therapists (DCPs). Responses were received from 75 undergraduate dental students (39 fourth-year (61%) and 36 fifth-year (63%) students) and 23 DCPs (61%), an overall response rate of 61.6%.

Section 1 – Oral hygiene advice

Forty-eight per cent (36) of dental undergraduates in comparison with 95.7% (22) of DCP students stated that they would give oral hygiene advice to every adult patient ($P < 0.001$). When questioned in more detail, 87% (20) of DCP students viewed oral hygiene advice as a key component of patient care compared with 41.3% (31) of dental undergraduates. In contrast, over half [56% (42)] of dental undergraduates but only 13% (3) of DCP students stated that oral hygiene advice should be given only when they felt it was required.

When asked '*When would you give oral hygiene advice to adult patients?*' 42.7% per cent (32) of dental students stated that they would give such advice only at the first and last appointments of a treatment plan. An additional 17.3% (13) stated that they would give it only at the first appointment (Table 1). In contrast, the majority of DCPs (78.3%, 18) indicated that they would give oral hygiene advice at every appointment (Table 1).

Almost all students stated that they recommended the use of fluoride toothpaste; only 2 dental students indicated that they did not recommend a toothpaste type. Tables 2–5 present data on the various types of tooth brushing advice given by respondents. The advice given by the majority of respondents concurred with published guidelines (i.e. brushing should be carried out twice/day for 2 min using a small-sized toothbrush head; the toothbrush should be replaced every 3 months). Over 90% (89) of the respondents also recommended and demonstrated the modified Bass tooth brushing technique. All 23 DCPs stated that they would recommend the Bass technique, whilst 88% (66) of dental undergraduates did the same; the remaining 12% (9) said they did not recommend any particular technique.

Only 32% (24) of undergraduate dental students identified the correct fluoride concentration for a toothpaste for adult use (1350–1500 ppm); this compares with 78.3% (18) of DCPs ($P < 0.001$, Table 5). It is of concern that 68% (51) of dental undergraduates were either not recommending a fluoride concentration or recommending a concentration lower than the evidence-based recommendations (Table 5).

With regard to the quantity of toothpaste recommended, approximately half of both student groups stated that they did not give any advice, with 37.3% (28) and 43.5% (10) of dental and DCP students advocating a *pea-sized amount* (Fig. 1). All students, irrespective of student grouping would advise patients not to rinse out toothpaste with water. Furthermore, 92% (90) of all respondents advised patients to spit out their toothpaste after brushing and not to rinse; 90.7% (68) and 91.3% (21) of dental undergraduates and DCP students stated that they provided this advice.

Table 1. **Responses to the question '*When would you give oral hygiene advice to adult patients?*'**

		Frequency	Per cent
Dental student	At every appointment	13	17.3
	At the first and last appointment of a treatment plan	32	42.7
	At the first appointment of a treatment plan	13	17.3
	Occasionally	16	21.3
	Never	1	1.3
	Total	75	100.0
DCP student	At every appointment	18	78.3
	At the first and last appointment of a treatment plan	1	4.3
	Occasionally	4	17.4
	Total	23	100.0

Table 2. **Type of toothbrush advised**

	What type of toothbrush would you recommend?			What size of toothbrush head would you recommend?		
		Frequency	Per cent		Frequency	Per cent
Dental student	Electric	15	20	Small	17	22.7
	Manual	8	10.7	Medium	17	22.7
	Both	33	44.0	Nothing	41	54.7
	Nothing	19	25.3			
	Total	75	100	Total	75	100
DCP student	Electric	3	13	Small	19	82.6
	Manual	4	17.4	Medium	4	17.4
	Both	15	65.2			
	Nothing	1	4.3			
	Total	23	100	Total	23	100

Table 3. **Responses to the question '*How often do you recommend to change a toothbrush?*'**

		Frequency	Percent
Dental student	3 months	49	65.3
	6 months	4	5.3
	when worn	4	5.3
	Nothing	18	24.0
	Total	75	100.0
DCP student	3 months	20	87.0
	when worn	1	4.3
	Nothing	2	8.7
	Total	23	100.0

Table 4. **Advice on frequency and length of brushing**

	How often do you recommend to brush per day?			How long do you recommend to brush each session?		
		Frequency	Per cent		Frequency	Per cent
Dental Student	Twice	72	96.0	2 min	74	98.7
	Nothing	3	4.0	3 min	1	1.3
	Total	75	100.0	Total	75	100.0
DCP student	Twice	23	100.0	2 min	21	91.3
	Nothing	0	0.0	3 min	2	8.7
	Total	23	100.0	Total	23	100.0

Table 5. **Concentration of fluoride toothpaste recommended by respondents**

		Frequency	Per cent
Dental student	1000 ppmF	16	21.3
	1100 ppmF	4	5.3
	1400 ppmF	7	9.3
	1450 ppmF	4	5.3
	1500 ppmF	13	17.3
	Nothing	31	41.3
	Total	75	100.0
DCP student	1000 ppmF	1	4.3
	1100 ppmF	1	4.3
	1400 ppmF	5	21.7
	1450 ppmF	9	39.1
	1500 ppmF	4	17.4
	Nothing	3	13.0
	Total	23	100.0

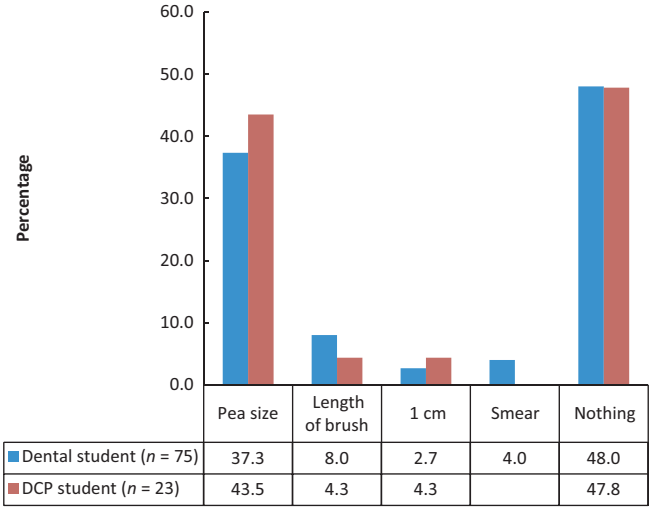

Fig. 1. Responses to the question 'What quantity of toothpaste do you recommend?'

Section 2 – Relevance and importance of oral hygiene advice

The majority of respondents agreed that *'oral hygiene plays an important causal role in many oral disease processes'* and that *'modifications to oral hygiene advice could prevent many oral disease processes'* (Table 6). The majority disagreed with the statement that *'the average British person has good oral health'*. Approximately seventy per cent (70) of respondents, however, felt that insufficient oral hygiene advice is given to patients, and 96% (94) agreed that *'improved oral hygiene advice given by dental professionals can have a significant positive effect on their oral health*. Despite the differences in prioritizing oral hygiene advice identified above, both professional groups believed that '*all dental professionals have an equal role to play in providing oral hygiene advice to patients*'. Worryingly, however, 78.3% (18) of DCP students and 46% (35) of dental undergraduates agreed that *'conflicts exist between dentists and DCP's about oral hygiene advice given*' (Table 6).

Section 3 – Training and experience

Over one-third (37.3%) of dental undergraduates believed that they had not received sufficient training in these preventive aspects of patient care; in contrast, no DCP student felt that this was the case ($P = 0.001$) (30). It should, however, be noted that the majority of dental and DCP students felt confident in both providing and modifying oral hygiene advice for an individual (Table 7).

Discussion

In an ideal world, dental practices would consist of an effective dental team with a broad skill mix; if every patient were to have contact with a dentist and a DCP, any differences in emphasis would likely be ameliorated. In reality, however, the current NHS dental contract, coupled with a shortage of DCPs, often means that patients have access only to a dentist. In the light of this observation, it is vital that dentists see the provision of appropriate oral hygiene advice as integral to the care of every adult patient. The time for this attitude to

Table 6. **Participants' level of agreement with selected statements**

	Strongly agree				Agree				Disagree				Strongly disagree			
	BDS		DCP		BDS		DCP		BDS		DCP		BDS		DCP	
Statement	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%
Oral hygiene plays an important casual role in many oral disease processes	47	62.7	14	60.9	25	33.3	8	34.8	3	4.0	0	0.0	0	0.0	0	0.0
The average British person has good oral health	0	0.0	0	0.0	16	21.3	3	13.0	58	77.3	19	82.6	1	1.3	0	0.0
Modifications to oral health can prevent many oral disease processes	30	40.0	10	43.5	43	57.3	12	52.2	2	2.7	0	0.0	0	0.0	0	0.0
Oral hygiene given by dental professionals had no effect on the oral health of an individual	0	0.0	0	0.0	5	6.7	1	4.3	53	70.7	12	52.2	17	22.7	10	43.5
Dental professional do not given sufficient oral hygiene advice to their patients	4	5.3	2	8.7	52	69.3	12	52.2	19	25.3	7	30.4	0	0.0	1	4.3
All dental professionals have an equal role to play in providing oral hygiene advice to patients	21	28.0	9	39.1	48	64.0	11	47.8	6	8.0	3	13.0	0	0.0	0	0.0
Conflicts in oral health messages may have a negative effect on the behaviour, motivation and attitudes of an individual	12	16.0	4	17.4	59	78.7	18	78.3	4	5.3	1	4.3	0	0.0	0	0.0
Eliminating any conflicts can have significant positive effects on the oral health of the nation	12	16.0	4	17.4	58	77.3	18	78.3	4	5.3	1	4.3	1	1.3	0	0.0
Conflicts exist between dentists and dental care professionals about advice given	1	1.3	2	8.7	58	77.3	34	45.3	38	50.7	4	17.4	2	2.7	1	4.3
Improved advice by dental professionals on disease prevention can have significant positive effects on the health of the nation	18	24.0	6	26.1	53	70.7	17	73.9	4	5.3	0	0.0	0	0.0	0	0.0

Table 7. **Participants responding "yes" to questions on training and confidence**

	BDS		DCP	
Statement	*n*	%	*n*	%
Do you feel you have had sufficient training of patient care and disease prevention	47	62.7	23	100.0
Would you feel confident giving oral hygiene advice to adult patients	74	98.7	23	100.0
Would you feel confident to be able to modify oral hygiene advice to an individual	69	92.0	23	100.0

be inculcated is undoubtedly during undergraduate training, when barriers to change are limited (9). The observation that students DCPs accord oral hygiene advice more importance than do undergraduate dental students is, therefore, of concern.

It was gratifying to observe that the majority of respondents were providing appropriate tooth brushing advice to their patients. However, as previously stated, there were concerns in relation to the accuracy of the advice provided about the choice of toothpaste, suggesting a need to improve knowledge in this area.

Interestingly, more than one-third of dental undergraduates acknowledged that they would benefit from further training in the preventive aspects of patient care whereas no DCP felt that this was the case. The aetiology of this observation may lie not in the content or accuracy of the undergraduate teaching, but rather in its delivery: within the School of Dentistry, different tutors teach oral hygiene education to the two professional groups. It may be that DCP tutors who, by virtue of their backgrounds, are preventively orientated are the more effective teachers in this area. Other factors such as time devoted to this area of the curriculum, teaching style and integration of course modules cannot, however, be ignored.

Whatever its aetiology, the apparent 'devaluation' of oral hygiene education evident among young dentists at the start of their careers is of particular concern when the environment in which many will later practise in the United Kingdom is considered. To quote from the 2009 review of NHS dental services in England '*For the 60 years that NHS dentistry has been in existence the focus of the service has been mainly on treatment rather than prevention or quality. This means that there is little visible reward for good dentists who are improving oral health…*' It is to be hoped that a revised contract in which the reward system explicitly recognizes the quality of a service will remedy this.

It should be recognized that prevention and high-quality provision are related concepts that depend on the whole dental team working together towards a common oral health goal. It is here that the necessity for the various professional groups to place equal emphasis on prevention and provide patients with accurate and consistent advice should be apparent.

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