The impact of teamworking on the knowledge and attitudes of final year dental students

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IN BRIEF

- The opinion of undergraduates on provision of treatment still tends to be dentist-centric.
- The broader dental team should be aware of the professional status and clinical ability of their colleagues.
- Teamworking should be encouraged throughout the undergraduate curriculum.

Aims To relate final year UK dental undergraduates' experience of teamwork-related training to their knowledge of the clinical role of dental hygienist-therapists, and their views of the clinical roles of dental care professionals. **Methods** A postal questionnaire was sent to the ten UK dental schools which had agreed to participate. Analysis was based on standard non-parametric statistical tests. **Results** Of the 705 final year students in the ten schools, 358 (51%) returned questionnaires. Numbers from each school ranged from 79 to 6 (mean 35.8). Eighty-nine percent of students reported receiving information on roles of dental team members; 61% had experienced joint teaching sessions with DCPs; 53% had shared clinical treatment of patients with student hygienists or hygienist-therapists. Thirty-two percent of respondents had experienced all three elements. Views on this experience were generally positive, particularly in relation to shared clinical treatment sessions. Students who had received such training were more knowledgeable about the clinical remit of dental hygienist-therapists. However, training experience was not related to their views on the appropriate clinical activity of DCPs which tended to be dentist-centric even for many procedures within the legal remit of hygienists and hygienist-therapists. **Conclusions** The study suggests that acceptance of non-dentists providing patient care lags behind the comparable situation within the primary care medical team. If we are to succeed in the delivery of a modernised dental care system, it is crucial that dental education promotes awareness and acceptance of the professional status and ability of DCP colleagues.

INTRODUCTION

The ethos of teamworking in dentistry has gained much support in recent times, resulting in growing recognition of the contribution of all members of the team to the care and treatment of patients. The Nuffield Foundation Report of 1993, 'Education and Training of Personnel Auxiliary to Dentistry' aimed to describe what a dental and oral health service should provide.¹ Many of the early proposals have, after much deliberation by various groups, been adopted by the General Dental Council (GDC). Dentistry is currently undergoing perhaps its most extensive reform

and modernisation process, with the roles and responsibilities of non-dentists or dental care professionals (DCPs) progressing in line with Nuffield's suggestions. Since 2006, DCPs in the UK have been able to practise the business of dentistry, and therefore greater parity in the way dentistry is delivered to the UK population is evolving. As a result, UK dental primary care has seen a significant increase in skill-mix in recent years with the role of DCPs, and in particular dental hygienists and hygienist-therapists, expanding and gaining considerable importance in the treatment of patients. Approximately 250 dually qualified hygienist-therapists were trained in 2006/7, which represents a fourfold increase since 2003. By 2008 there were over 5,000 dental hygienists and hygienist-therapists registered with the GDC.

Further progress has been made in that two other groups of DCP have recently emerged, these being orthodontic therapists and clinical dental

technicians, both of whom will be able to treat patients following a recognised period of training. In addition, a ground-breaking initiative by the Scottish Government Health Department has now been implemented which allows suitably trained dental nurses to apply fluoride varnish to the teeth of nursery school children.² These very positive developments both in the way in which DCPs are permitted to practise and the extension of their responsibilities have progressed Nuffield's vision of 1993, albeit there has been a considerable time-lapse between recommendation and inception. As from 2008, it is a legal requirement that all groups of DCPs are registered with the GDC in order to practice in the UK, thus raising the educational and professional profile of all DCP groups.

The successful utilisation of DCPs in current and future dental services is dependent on skill-mixing and team-building to bring about the desired multidisciplinary approach in dental

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healthcare. The acceptance by dentists of the developing role of DCPs is crucial to this shift towards greater teamwork. There is evidence from recent research that such acceptance is not yet established. A Norwegian survey of 504 dentists and 112 dental hygienists found that dentists prefer not to share clinical work, even though it is within the remit of dental hygienists.³ In the UK, surveys of general dental practitioners (GDPs) have reported poor knowledge regarding the capabilities of hygienist-therapists, a reluctance to consider their employment and negative attitudes towards them in general.^{4,5}

One influence on such lack of knowledge and negative attitudes may be the extent to which teamwork is emphasised during undergraduate dental training, both by lecture-based education and by direct team-based clinical experience. Interprofessional education is encouraged at an early stage of education by the GDC, as stated in their curricula frameworks for both dentists and DCPs.^{6,7}

The GDC Report of the Visitation of UK Dental Schools (2006) recommends that 'Joint training and working of dental students with dental care professionals should be increased and become more integrated. Further work is required to increase the amount of joint small group learning and to monitor interactive clinical work involving both dental students and student dental hygienists and therapists'.⁸ While there is evidence of some support from practitioners for such preparation for teamworking,^{9,10} little is known about the views of dental students, and whether it may influence their knowledge of, or attitudes towards the roles of DCPs.

AIM

The aim of this study was to determine the extent to which final year UK dental undergraduates were informed about the roles of other members of the dental team, and to establish their experience of shared didactic and clinical teaching during the course of their training. It also explored the relationship this experience may have had with their knowledge of the clinical role of dental hygienist-therapists, and their views and perceptions of the current clinical roles of DCPs.

Table 1 Teamwork-related training

Undergraduate training reported to include:	Yes (n)	Range across schools
i) Information re roles of dental team members	89% (316)	62% - 100%
ii) Joint teaching sessions with DCPs	61% (218)	32% - 100%
iii) Joint clinical treatment of patients with student hygienists or hygienist-therapists	53% (188)	29% - 100%
All three elements	32% (116)	9% - 94%

Table 2 Usefulness of teamwork-related training

Nature of training (1 = very useful, 5 = not at all useful)	1	2	3	4	5
i) Information re roles of dental team members	12% (36)	30% (94)	39% (122)	19% (58)	1% (4)
ii) Joint teaching sessions with dental team students	8% (18)	25% (53)	37% (80)	20% (44)	10% (21)
iii) Joint clinical treatment of patients with student hygienists or hygienist-therapists	29% (54)	23% (43)	23% (44)	18% (34)	7% (13)

MATERIALS AND METHODS

A postal questionnaire was developed and piloted. Following initial contact with all UK dental schools to explain the aims and methods of the study and request co-operation, a contact person who was willing to receive, distribute, collect and return the questionnaires was identified. A number of follow-up telephone calls and emails to administrative departments ensued to encourage schools to respond.

Descriptive statistics are used to describe the students' responses. In order to test the possibility that students' training had influenced their views on DCP roles, Spearman's rank correlations were used to investigate any relationship between reported experience of joint training and the students' knowledge and attitudes.

RESULTS

A total of 10 (67%) of the 15 UK dental schools participated in this survey, which was conducted towards the end of the 2006/7 academic year. Of the 705 final year students in the responding schools, 358 (51%) returned usable questionnaires. Numbers from each school ranged from 79 to 6 (mean 35.8). Ninety-five percent (339) were UK nationals, 67% (240) were females, and 11% (37) were aged 25 or over. The

majority (87%, 311) had commenced their undergraduate dental education immediately following completion of secondary education.

Teamwork-related training

Respondents were asked about three aspects of their education relating to working with DCPs: (i) being given information about the roles of other dental team members, (ii) sharing joint teaching sessions, and (iii) sharing clinical treatment of patients with student dental hygienists or dental hygienist-therapists. Table 1 shows the percentage of students who stated that their training had contained these elements.

According to the students, three dental schools appeared to cover all three aspects of teamwork in their undergraduate programme. Another three schools offered their students the first two elements (information about roles and joint teaching), but not the third (shared clinical treatment of patients). At another, shared clinical treatment was provided but not information about roles or joint teaching. The majority of students at the two remaining schools reported not receiving any of the three elements. In all, 32% (116) of students stated they had experienced all three modes of team-based

Table 3 Knowledge of GDC registration requirements

Registration required?	Yes	No	Don't know	N (missing)
Dental therapist	91% (320)	2% (6)	7% (24)	350 (8)
Dental hygienist	91% (316)	2% (8)	7% (23)	347 (11)
Hygienist-therapist	87% (296)	3% (9)	11% (37)	342 (16)
Dental nurse	71% (246)	13% (44)	16% (56)	346 (12)
Orthodontic therapist	62% (210)	10% (33)	27% (96)	339 (19)
Practice manager	17% (54)	57% (186)	26% (86)	326 (32)
Clinical dental technician	44% (146)	20% (68)	36% (120)	334 (24)
Dental technician	29% (95)	43% (141)	28% (91)	327 (31)

Note: correct responses are indicated in bold.

Table 4 Knowledge of hygienist-therapist clinical remit

Is this procedure in the clinical remit of hygienist-therapists?	Yes	No	Don't Know	N (missing)
Administer Local Infiltration Analgesia	91% (319)	2% (8)	7% (25)	352 (6)
Root canal therapy in adult teeth	2% (7)	86% (301)	12% (41)	349 (9)
Place temporary restorations	80% (282)	7% (23)	14% (48)	353 (5)
Restore deciduous teeth	78% (275)	7% (23)	15% (53)	351 (7)
Extract permanent teeth	5% (18)	77% (268)	18% (62)	348 (10)
Restore permanent teeth	75% (261)	14% (49)	11% (38)	348 (10)
Pin-retained amalgam restorations	7% (25)	70% (245)	22% (78)	348 (10)
Take impressions	60% (209)	18% (61)	22% (76)	346 (12)
Can treat without dentist on premises	60% (207)	13% (46)	27% (94)	347 (11)
Extract deciduous teeth	57% (198)	25% (86)	19% (66)	350 (8)
Place rubber dam	55% (193)	21% (75)	24% (83)	351 (7)
Re-cement crowns	52% (183)	23% (79)	25% (87)	349 (9)
Administer Inferior Dental Block Analgesia	51% (178)	32% (112)	16% (57)	347 (11)
Take dental radiographs	50% (176)	19% (67)	31% (108)	351 (7)
Multi-surface restorations in adult teeth	42% (144)	38% (129)	20% (70)	343 (15)
Restore deciduous teeth with s-s crowns	33% (115)	34% (119)	32% (112)	346 (12)
Undertake a deciduous pulpotomy	31% (168)	43% (148)	26% (92)	348 (10)
Treat patients under conscious sedation	11% (37)	70% (241)	20% (69)	347 (11)

Note: correct responses are indicated in bold.

education, 40% (144) that they had experienced two aspects, 24% (86) only one and 3% (12) none. This count of teamwork-related training was used as a predictor of knowledge and attitudes. Students who reported receiving such education were asked to rate its usefulness on a scale of 1 (very useful) to 5 (not at all useful). Table 2 shows their responses.

Of the students who had not received such teamwork-related training, 83% (25 of 30) indicated they would have liked to have learnt about the different roles of team members, 43% (48 of 111) that they would have liked to have had joint teaching sessions, and 63% (102 of 162) that they would have liked to have had joint clinical experience.

Knowledge of GDC registration requirements

The students were asked about current requirements for dental team members to register with the GDC. Correct responses are shown in bold (Table 3).

A large majority of students knew that dental hygienists, therapists and hygienist-therapists must be GDC registered. However, awareness that dental nurses, orthodontic therapists, clinical dental technicians and dental technicians also had to be registered was less good, as was the knowledge that practice managers did *not* have to be registered. There was no association between teamwork-related training (range 0-3) and knowledge of registration requirements (range 0-8) (Spearman rank correlation: $R = 0.02$, $n = 358$, $p = 0.744$).

Knowledge of the clinical remit of dental hygienist-therapists

Students were asked to identify which clinical procedures were within the clinical remit of dually qualified dental hygienist-therapists (Table 4).

Students' reported experience of teamwork-related training predicted their knowledge of the clinical remit of dental hygienist-therapists (Spearman rank coefficient: $R = 0.21$, $n = 358$, $p = 0.001$). The 116 students who reported having had joint teaching, shared clinical treatment sessions, and information about the roles of different dental team members had a mean of 9.7 (sd: 3.5) of clinical remit questions correct (out of a maximum 19), compared with 8.8 (sd: 3.2) for the 144 students who had experienced two of these three training elements, 7.9 (sd: 3.9) for the 86 students who had experienced only one element, and 6.3 (sd: 4.1) for the 12 who had not experienced any of these. Further investigation of the relationship between the individual elements of teamwork-related training and knowledge of hygienist-therapist remit revealed that receiving information about roles, and undertaking shared clinical treatment of patients were both significantly associated with higher remit knowledge scores ($t = 2.74$, $p = 0.007$, $df = 336$; $t = 3.84$, $p = 0.001$, $df = 341$), while attending joint teaching was not ($t = 1.87$, $p = 0.081$, $df = 188.53$).

Views on clinical responsibilities

Students were given a list of six procedures within the clinical remit of hygienist-therapists, and asked whether they felt a dentist or hygienist-therapist was the more appropriate clinician to carry them out (Fig. 1).

Hygienist-therapists were seen as appropriate for undertaking smoking cessation advice and restorative fissure sealant application. For the remaining procedures, two-thirds or more felt the dentist was more appropriate.

There was no relationship between teamwork-related training and the frequency that the dentist was cited as the more appropriate clinician to undertake the procedures shown in Figure 1 (Spearman rank correlation: $R = 0.04$, $n = 352$, $p = 0.47$).

Students were asked which, if any, DCPs should be allowed to carry out certain procedures. More than one response was permitted. Most students made a distinction between the first three procedures shown in Figure 2. Restorative fissure sealants, local analgesia and temporary restorations were identified as appropriate for DCPs by over 80% of respondents and the remaining treatments were viewed by most to be the reserve of dentists.

As with the procedures shown in Figure 1, a count was made of the times 'none of these' was cited for the procedures shown in Figure 2 (range 0-9). There was no relationship between teamwork-related training and this measure (Spearman rank correlation: $R = -0.01$, $n = 350$, $p = 0.92$).

Students were asked to indicate their view of patients being able to access dental care directly from a wider range of DCPs on a five-point scale, as shown in Table 5.

There was no relationship between teamwork-related training and the prospect of patients having direct access to DCPs (Spearman rank correlation: $R = -0.02$, $n = 350$, $p = 0.74$).

DISCUSSION

This survey was challenging to conduct, given that the authors had to rely on the active participation of dental school staff to ensure response. This meant, for example, that it was not possible to ensure

Fig. 1 Should dentists or hygienist-therapists undertake these procedures? (n = 350-353)

Fig. 2 Which DCPs should be allowed to carry out these procedures? (n = 464-476: n >100% due to multiple choice option)

Table 5 Views on direct access to dental care professionals

Direct access to DCPs	1 Strongly agree	2	3	4	5 Strongly disagree
	10% (34)	27% (95)	40% (140)	17% (59)	6% (22)

non-respondents were sent reminders or duplicate questionnaires. One third of schools did not respond, and only half of final year students in the ten participating schools returned questionnaires. Students with less favourable views of teamwork-related training may have been less likely to respond. These weaknesses may limit the generalisability of the results of the survey. The first part of the questionnaire asked students to report on elements of

their training. This reliance on recall may have introduced error.

Nevertheless, this survey produced some revealing information regarding the preparation of prospective dentists who were about to enter the developing team-working milieu. Fewer than one-third of the responding students had experienced joint teaching, shared clinical treatment of patients, or been given information about the roles of different dental team

members as part of their dental degree course. Students tended to be positive in regard to this experience, although a significant minority were not. Those who had received such training were particularly positive in relation to learning about different roles of team members, while students who had not experienced this were keen on the possibility of joint clinical treatment sessions.

There is some evidence that this training may have influenced students' knowledge of the hygienist-therapist remit. In this respect, receiving information and sharing clinical treatment sessions seemed to be more effective than joint attendance at teaching sessions. However, no relationship between teamwork-related training and knowledge of GDC registration requirements was found. Equally, there was no evidence that students' experience of teamwork-related training had influenced their views regarding appropriate clinical roles of DCPs, as reflected in the scores based on responses in Figures 1 and 2. This was also the case regarding attitudes toward direct provision of care by DCPs (Table 5). Could it be that the often dismissive way in which students alluded to DCPs in the questionnaire could have been perpetuated by their teachers and mentors? These views do not correlate with the current clinical standards demanded

of DCPs, and in particular hygienists and hygienist-therapists.

The finding that only 37% of students agreed that patients should be able to access dental care from DCPs directly compares with Abelsen and Olsen's report that only 21% of practising dentists in Norway agreed that dental hygienists should be the entry point for dental services.³ Recent studies in Australia and Canada also reported dentists' strong opposition to independent practice for hygienists.^{11,12} A number of students in our survey suggested that extended roles and responsibilities for DCPs may undermine the dental profession and take treatment away from dentists.

Why this should be the case is unclear. Hygienists and hygienist-therapists are skilled individuals whose education is rigorous in terms of both the educational process, and examination and assessment procedures. It seems that the acceptability of non-dentists providing patient care has some way to go to achieve the level of confidence found within the medical profession in other allied professionals. Perhaps further emphasis on the role and responsibilities of DCPs should be made and standardised within any revised dental undergraduate curriculum, in an attempt to encourage professional acceptance and

increase knowledge amongst all dental colleagues. If we are to succeed in the delivery of a modernised dental care system, then it is vital that each member of the broader team is aware of the professional status and ability of their colleagues.

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