

Treating patients with dry mouth: general dental practitioners' knowledge, attitudes and clinical management

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IN BRIEF

- Shows the benefit of greater experience of dental education and clinical exposure on dentists' confidence to provide appropriate clinical management of xerostomic patients.
- Postgraduate dental education provided a benefit with regards to practitioner knowledge, attitudes and intentions to provide appropriate clinical management for xerostomic patients.

Aim To assess primary care dental practitioners' knowledge, attitudes and clinical management of patients presenting with dry mouth. **Method** A convenience sample of 200 dentists working in primary care in an NHS Health Board in Scotland was obtained. A questionnaire to assess knowledge, attitudes and clinical management of dry mouth patients was sent to all dentists on the NHS primary care service inventory. Ethical approval was obtained. **Results** Two hundred questionnaires were sent to the participants and 114 were returned, giving a valid response rate of 58%. Fifty percent were woman and 80% worked in the general dental service. Seventy-nine percent had been taught about xerostomia as undergraduates but only 21% had postgraduate educational experiences of dry mouth. The majority correctly stated that patients with Sjögren's syndrome would have an increased risk of dental caries, oral candidosis, frictional oral ulcers and squamous cell carcinoma. Participants had positive attitudes with regard to the importance of treating dry mouth; that it was not a trivial complaint; it affected patients' quality of life and their general health. The dentists were not confident to manage dry mouth patients. Knowledge, attitudes, confidence and intention to treat were affected by gender and type of primary care practice. Thirty-two percent of the variance of the intention to provide treatment was explained by working in the salaried dental service (SDS), confidence and attitudes regarding severity of the condition. **Conclusions** Dentists working in the SDS had positive attitudes and increased confidence which were related to postgraduate educational experiences. Education at both undergraduate and postgraduate levels should be supported by clinical exposure to patients in order to improve dentists' confidence and competence to manage xerostomia and its complications.

INTRODUCTION

Xerostomia is the term used to describe the subjective experience of dry mouth. Dry mouth affects 10-30% of people.¹ The clinical effects of hyposalivation are increased prevalence of rampant caries, mucosal infections and salivary gland disease,²⁻⁵ which significantly impact upon quality of life (QoL).^{6,7} People with dry mouth have difficulties in eating, swallowing and speaking, and tend to have reduced self-esteem.^{6,7} Xerostomia may also be a

symptom of a wider physical ailment⁸⁻¹¹ and general dental practitioners (GDPs) should be aware of the significance of dry mouth in their patient case loads.

Despite the prevalence of xerostomia and the effect of hyposalivation on oral health status, quality of life and general health, research has shown that the symptoms of dry mouth are often overlooked by GDPs.^{12,13} Xerostomia is 'a neglected symptom'¹² and in some cases, dental health professionals consider it trivial and of little significance.¹³ However, considering the psychological^{6,7} and physical^{2-5,8-11} distress caused by xerostomia, GDPs should have a specific management strategy, which should include careful history-taking and clinical examination to identify the underlying pathology giving rise to the patient's presenting symptom of dry mouth. This may only be achieved if the GDP has a sound knowledge of xerostomia and perceives the condition as one which affects the patient's quality of life.

The aim of this survey was to assess primary care dental practitioners' knowledge, attitudes and clinical management of patients presenting with dry mouth.

METHOD

Sample

A non-probability convenience sample of 200 dentists working in primary care in an NHS Health Board in Scotland was gathered. A list of all the GDPs' names and addresses were obtained from the NHS primary care service. All GDPs whose names appeared on the NHS primary care service list were sent an information sheet and a consent form in a stamped addressed return envelope. On receipt of written consent, the questionnaire was mailed to the GDPs. A second mail-out was conducted two months later.

The questionnaire

The questionnaire was comprised of four sections. The first section inquired of the

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GDPs' demographic characteristics such as age, gender, type of practice and educational experiences. Part 2 evaluated the GDPs' knowledge of dry mouth and Sjögren's syndrome. Part 3 consisted of a series of six attitudinal questions which were measured on a seven-point Likert scale (from 'extremely unlikely' scoring 1 to 'extremely likely' scoring 7) and included 'importance to treat patients with dry mouths'; 'dry mouth is a trivial condition'; and 'dry mouth affects quality of life'. The GDPs' confidence in their management of patients with dry mouth and their intention to treat patients with dry mouths were also assessed on a seven-point Likert scale. The final part of the questionnaire asked the dentists about their clinical management of xerostomia, including the medical history and treatment strategies. The knowledge questions and medical history items were informed by the evidence-based literature.^{8-11,14-16}

Ethical considerations

Ethical approval was obtained from the University of Dundee, Ethics Committee (UREC No 9045).

Statistical analysis

The data were entered and analysed using SPSS v17. The data were subjected to frequency distribution, Chi-squared analysis, Mann-Whitney U test and Kruskal-Wallis Test, Spearman's rank correlation and linear regression analysis.

RESULTS

A total of 114 GDPs participated in the survey, of whom 90 responded to the first mail-out and 24 to the second mail-out. The response rate was 57%. Three GDPs resigned during the period of the survey and were subsequently excluded, resulting in a valid response rate of 58%. The majority of the dentists worked within the general dental service (80%) and were aged between 23 and 54 years (88%). Eighteen percent of male dentists and 32% of female dentists were aged between 23 and 27 years. The age range was divided into three interval groups ranging from 23-35 years (n = 49), 36-54 years (n = 51) and over 55 years (n = 14). Fifty percent of the sample were male.

Educational experiences

Seventy-nine percent of the sample reported that as undergraduates they had

Table 1 Knowledge items: dry mouth and Sjögren's syndrome

Knowledge items	Percentage of GDPs with the correct answer
Over one million people have dry mouth in the UK	91%
Males are more affected than females	84%
The prevalence of dry mouth is between 10% and 30%	69%
Individuals with Sjögren's syndrome have increased risk of tooth decay	93%
Individuals with Sjögren's syndrome have increased risk of oral thrush	91%
Individuals with Sjögren's syndrome have increased risk of lichen planus	54%
Individuals with Sjögren's syndrome have increased risk of lymphoma	37%
Individuals with Sjögren's syndrome have increased risk of squamous cell carcinoma	76%
Individuals with Sjögren's syndrome have increased risk of recurrent oral ulcers	71%
Individuals with Sjögren's syndrome have increased risk of frictional oral ulcers	90%

Table 2 Comparison of total xerostomia knowledge by demography and practice type of general dental practitioner

Age group (Years)	Knowledge Rank mean scores	X ^{2*}	p
23-35 (n = 48)	64.45 ^{2**}	5.74	<0.05
36-54 (n = 51)	53.75 ²		
55+ (n = 14)	43.29 ¹		
Gender	Knowledge Rank mean scores	Z [†]	p
Male (n = 57)	51.86	2.06	0.04
Female (n = 57)	63.14		
Type of practice	Knowledge Rank mean scores	Z [†]	p
GDS (n = 91)	54.67	2.06	0.04
SDS (n = 23)	58.75		

*Kruskal-Wallis Test

†Mann-Whitney U Test

**Pairwise posthoc comparisons between different age groups. Significant differences between the age groups are identified by the suffixes

been taught about xerostomia and its management. Only 21% of the participants in both the salaried dental service (SDS) and general dental service (GDS) reported that they had attended postgraduate courses in this topic area. Significantly larger proportions of dentists working in the SDS (52%) than those working in the GDS (16%) had a postgraduate qualification ($X^2[3] = 19.49$; $p < 0.001$).

GDPs' knowledge of dry mouth

One hundred and three GDPs (91%) correctly stated that over one million people have dry mouth. Sixty-nine percent of the GDPs knew the prevalence of dry mouth in the population was between 10% and

30% and that women were more affected than men. The majority of GDPs correctly stated that patients with Sjögren's syndrome would have an increased risk of dental caries, oral candidosis, frictional oral ulcers and squamous cell carcinoma, however, only 37% of GDPs knew that patients with Sjögren's syndrome would be at risk of lymphoma (Table 1). A total score for xerostomia knowledge was calculated from the ten questions on dry mouth and Sjögren's syndrome. Each time a participant correctly answered a question a score of 1 was allocated. The possible scores ranged from 0 (none correct) to 10 (all correct). The mean total xerostomia knowledge score for all practitioners was

7.60 (95% CI: 7.32, 7.88). Seven percent of the GDPs scored 10, with 29% scoring the median score of 8.

Participants' rank mean scores for total knowledge of xerostomia are shown in Table 2. The grouping variable age group significantly explained the differences in mean total knowledge scores. Younger practitioners had significantly higher rank mean knowledge scores than older practitioners. The grouping variable gender explained differences in total rank mean knowledge scores between male and female GDPs. Male GDPs had significantly lower rank mean knowledge scores than women and GDPs working in the GDS had significantly lower rank mean scores than those working in the SDS (Table 2).

GDPs' attitudes towards patients with dry mouth

No significant differences in attitude were shown between age groups (Table 3). Female dentists had significantly higher rank mean scores than male dentists for the attitudes 'importance to treat patients with dry mouth' and 'dry mouth impacts on general health', but significantly lower rank mean scores for the attitude 'dry mouth is a trivial complaint'. For 'the intention to treat' women dentists had significantly higher rank mean scores than male GDPs (Table 4). Dentists working in the SDS had significantly greater rank mean scores for 'importance to treat' and 'dry mouth impacts on general health' than those working in the GDS, but significantly lower rank mean scores for 'dry mouth is a trivial complaint'. For 'the intention to treat' dentists in the SDS had significantly higher rank mean scores than those working in GDS (Table 5).

There were significant associations between intention to treat patients with dry mouth and the attitudes 'dry mouth is a trivial complaint' ($r_s = -0.40$; $p < 0.001$); 'dry mouth affects people's QoL' ($r_s = 0.30$; $p < 0.001$); 'dry mouth impacts on patients' general health' ($r_s = 0.31$; $p < 0.001$); and confidence to treat patients with dry mouth ($r_s = 0.31$; $p < 0.001$).

Clinical practice and intention to treat patient with dry mouths

Seventy-four respondents (65%) stated that patients complaining of dry mouth had attended their practices in the previous

Table 3 Comparison of attitudes towards dry mouth by age of general dental practitioner

Attitudes	Age group (Years)			X ^{2*}	p
	23-35 (n = 48) Rank mean scores	36-54 (n = 51) Rank mean scores	55+ (n = 14) Rank mean scores		
Importance to treat patients with dry mouth	60.61	52.13	66.18	3.10	0.21
Dry mouth is a trivial complaint	65.75	50.31	54.78	5.16	0.08
Dry mouth affects people's QoL	51.81	62.64	58.64	3.02	0.22
Dry mouth impacts on patients' general health	53.93	59.92	61.14	0.82	0.66
Confidence to manage patients with dry mouth	61.06	52.35	63.78	2.57	0.28
Intention to provide treatment for patients with dry mouth	54.44	60.71	56.50	2.41	0.29

*Kruskal-Wallis Test

Table 4 Comparison of attitudes towards dry mouth by gender of general dental practitioner

Attitudes	Male (n = 57) Rank mean scores	Female (n = 57) Rank mean scores	Z [†]	p
Importance to treat patients with dry mouth	51.32	63.67	2.12	0.03
Dry mouth is a trivial complaint	66.63	48.36	3.13	0.002
Dry mouth affects people's QoL	53.53	61.46	1.35	0.17
Dry mouth impacts on patients' general health	51.57	63.42	2.00	0.05
Confidence to manage patients with dry mouth	60.65	54.34	1.05	0.29
Intention to provide treatment for patients with dry mouth	51.22	62.68	2.00	0.04

†Mann-Whitney U Test

Table 5 Comparison of attitudes towards dry mouth by type of general dental practitioner

Attitudes	GDS (n = 91) Rank mean scores	SDS (n = 23) Rank mean scores	Z [†]	p
Importance to treat patients with dry mouth	54.75	68.36	1.87	0.06
Dry mouth is a trivial complaint	61.71	40.83	2.87	0.004
Dry mouth affects people's QoL	58.37	54.02	0.59	0.55
Dry mouth impacts on patients' general health	54.10	70.93	2.28	0.03
Confidence to manage patients with dry mouth	57.48	57.56	0.01	0.99
Intention to provide treatment for patients with dry mouth	52.06	79.00	3.58	<0.001

†Mann-Whitney U Test

month. Larger proportions of dentists working in the SDS (13%), compared with GDS (5%), stated that they had seen six or more dry mouth patients in the previous month.

Medical history taking

Table 6 provides an overview of the medical history items⁸⁻¹¹ included in the

questionnaire. Over 70% of the GDPs reported that they asked about current medication while lower proportions asked about dry eyes (23%), rheumatoid arthritis (18%), diabetes (18%) or depression (11%). Similar patterns with respect to items asked from the patient were noted between genders and type of general practice.

The median score for confidence was 4. A median split of the sample was conducted, with those participants scoring 4 or less being designated as having 'lower confidence' (n = 79) and those scoring 5 or more were designated as having 'higher confidence' (n = 35) in the management of patients presenting with dry mouth. Significantly greater proportions of dentists designated as having higher confidence than those designated as having lower confidence asked their patients who presented with dry mouth about current medications, dry eyes, rheumatoid arthritis, diabetes, autoimmune disease, depression, halitosis, experiencing a change in taste or smell, being able to eat biscuits without drink and needing a drink of water during the night (Table 7). GDPs with higher confidence had significantly higher rank mean scores for the intention to provide treatment in their surgeries for dry mouth patients (rank mean = 73.60) than those dentists designated as having lower confidence (rank mean = 50.37) (z = 3.56, p <0.001).

Treatment of patients presenting with dry mouth

Seventy-one percent (n = 71) of the sample stated that they would either treat the patient in their surgeries or refer to secondary services. A further 15% (n = 17) stated they would neither treat nor refer a dry mouth patient and only 14% (n = 16) stated that they would treat the patients, reassess in one month before referring to secondary services if necessary. Of those dentists that stated that they would provide treatment, 49% stated they would prescribe Biotene Oralbalance, 23% Glandosane and 22% BioXtra. Only 10% of the participants stated they would prescribe fluoride mouthwash.

Predicting the intention to provide treatment for presenting with dry mouth

A regression analysis was conducted to predict intention to provide treatment for patients presenting with dry mouth. The dependent variable was the dentists' intention to provide treatment for patients with dry mouth and independent variables were gender, age group, type of primary dental care practice and the attitudes 'importance to treat', 'dry mouth is a

Table 6 Items asked by GDPs when taking a history from a patient presenting with dry mouth

History item	Percentage of GDPs who were extremely likely to include item in history taking of dry mouth patients				
	Total sample (n = 114)	Male (n = 57)	Female (n = 57)	GDS (n = 91)	SDS (n = 23)
Current medications	71%	61%	81%	62%	78%
Dry eyes	23%	18%	19%	21%	30%
Rheumatoid arthritis	18%	16%	18%	14%	26%
Diabetes	18%	21%	14%	17%	22%
Autoimmune disease	17%	14%	19%	13%	30%
Irritable bowel syndrome	2%	2%	2%	2%	0%
Fibromyalgia	2%	3%	0%	2%	0%
Depression	11%	11%	11%	8%	22%
Halitosis	17%	17%	16%	17%	17%
Change in taste or smell	16%	14%	18%	13%	26%
Change in nutritional status	10%	9%	11%	8%	17%
Being able to eat biscuits without drink	9%	9%	9%	6%	22%
Needing a drink of water during night	29%	21%	22%	21%	26%

Table 7 Clinical management; history taking by confidence to treat

History item	Higher confidence n (%)	Lower confidence n (%)	X ²	p
Current medications	15 (42)	11 (14)	11.51	0.001
Dry eyes	15 (43)	11 (13)	11.53	0.001
Rheumatoid arthritis	12 (34)	7 (9)	11.28	0.001
Diabetes	10 (28)	10 (13)	4.42	0.04
Autoimmune disease	12 (34)	7 (9)	11.28	0.001
Irritable bowel syndrome	0 (0)	2 (3)		1.00 [§]
Fibromyalgia	1 (3)	1 (1)		0.52 [§]
Depression	9 (26)	3 (4)	12.37	<0.001
Halitosis	12 (34)	7 (9)	11.28	0.001
Change in taste or smell	10 (28)	8 (10)	6.21	0.03
Change in nutritional status	6 (17)	5 (6)	3.25	0.07
Being able to eat biscuits without drink	6 (17)	4 (5)	4.42	0.04
Needing a drink of water during night	14 (40)	11 (14)	9.63	0.002

[§]Fisher's Exact Test

trivial complaint' and 'dry mouth impacts on patients' general health'. Gender was defined by a dummy variable with male acting as baseline, age group was defined as a dummy variable with 23-35 years acting as baseline, and type of primary dental care was defined by a dummy variable with the GDS acting as baseline. The significant predictions of intention to

provide treatment for patients with dry mouth were 'type of primary dental care practice', 'confidence to manage patients with dry mouth', 'dry mouth is a trivial complaint' and 'dry mouth impacts on patients' general health'. The complete model explained 32% of the variance of the intention to treat in the dentists studied (Table 8).

Table 8 Linear regression summary results of intention to treat dry mouth patients

	B	Std. error	t	p
(Constant) ^l	2.63	0.76	3.45	0.001
Type of practice ^a	0.73	0.28	2.59	0.01
Confidence to manage patients with dry mouth ^b	0.24	0.09	3.84	<0.001
Dry mouth is a trivial complaint ^b	-0.20	0.08	-2.36	0.02
Dry mouth impacts on patients' general health ^b	0.34	0.10	2.30	0.02

R squared = 0.32, F[6, 106] = 8.55, p <0.001
 Only significant values presented in Table 8
 a: 0 = GDS, 1 = SDS 0
 b: High scores denote greater confidence; greater attitude that dry mouth is a trivial complaint and that dry mouth does impacts on people's general health

DISCUSSION

The aim of this survey, was to assess primary care dental practitioners' knowledge, attitudes and management of patients presenting with dry mouth. Fifty-eight percent of dentists working in primary care in the NHS Health Board took part in the survey. Half of the participants were men and larger proportions of the female than male GDPs were between 23 and 27 years of age. This demographic profile was consistent with that for dentists practising in Scotland as reported in the Scottish Dental Practice Board Report.¹⁷

The dentists knew the prevalence and aetiology of dry mouth and Sjögren's syndrome and since younger GDPs had greater knowledge than older GDPs, this finding seemed to reflect their undergraduate teaching experiences. Women dentists and those working in the SDS had higher levels of knowledge than male dentists and those working in the GDS. This latter result was consistent with the finding that dentists in the SDS had different postgraduate educational experiences compared with those who worked in GDS, with larger proportions having postgraduate qualifications.

In general, the dentists had positive attitudes towards the treatment of patients with dry mouth. They did not regard dry mouth as a trivial complaint, they recognised its negative effect on people's quality of life and general health and were aware of the importance to treat such patients.

Over 70% of the dentists asked their patients with dry mouth about current prescribed medications; lower proportions, however, inquired about dry eyes, depression, diabetes or rheumatoid disease in their history taking. Practitioners who worked in the SDS rather than the GDS

not only had increased confidence to treat dry mouth patients but also asked more about the signs, symptoms and associated illnesses when undertaking the medical history.⁸⁻¹¹

The relationship between knowledge, attitude and educational experiences with degree of confidence, however, remained unclear. Certainly, dentists working in the SDS, with increased education and higher confidence levels, were more likely to take a comprehensive medical history and also had greater intention and confidence to provide treatment to patients with dry mouths – but was this due to clinical experience or postgraduate education? Previous work¹⁸ demonstrated that dentists working in the SDS were more likely to treat medically complex patients, including those with dry mouth. Although not statistically significant, dentists in the SDS did state that they saw larger proportions of patients with dry mouth compared with dentists in the GDS. This suggests that SDS dentists' greater clinical exposure to xerostomic patients could have influenced their attitudes to the condition. Alternatively, their experience of postgraduate training may have resulted in the SDS practitioners being able to recognise patients with dry mouth who present in their practices.

The literature suggests that the choice of dry mouth treatment is dependent on the aetiology of the condition.¹⁴⁻¹⁶ For instance, Biotene Oralbalance has the Advisory Committee on Borderline Substances¹⁵ approval for treatment of dry mouth associated with, for example, radiotherapy, while saliva stimulating tablets should be prescribed for patients with salivary gland impairment. The results suggested that dentists' choice of

products for the management of xerostomia was not necessarily related to clinical recommendations.^{8,9,14-16}

Nearly two-thirds of dentists stated that they had seen patients who presented with dry mouth in the previous month, with over 70% reporting that they would either treat or refer patients with dry mouths. Only 16 of the participants reported that they would assess, review and if necessary refer to secondary care. Dentists with the highest intention to treat patients with dry mouths were those with positive attitudes and highest confidence. Thirty-two percent of the variance in the prediction of the intention to provide treatment for patients with dry mouth was explained by working in a SDS practice and appreciating the seriousness of the condition together with the confidence to treat. This supports the view that dentists working in the SDS had more positive attitudes and greater confidence which seemed to be related to their increased clinical experience and postgraduate educational experiences.

It would seem reasonable to conclude that education at the postgraduate level had an influence upon the practitioners' knowledge, intentions and confidence to manage the patient with dry mouth. While recognising the relative influences of knowledge, attitudes and clinical experience upon management, it is suggested that it is the ongoing education on xerostomia and its treatment, at both undergraduate and postgraduate levels, that is of central importance. Moreover, education at both undergraduate and postgraduate levels should be supported by clinical exposure to patients in order to improve dentists' confidence and competence to manage xerostomia and its complications.

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