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Characteristics, Treatment and Healthcare Utilisation of Patients with Xerostomia in Primary Care Settings in the United Kingdom

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Introduction

- Xerostomia, also known as dry mouth, is prevalent in older populations[1] and associated with key determinants such as continual use of medication, radiation, and chronic diseases.[2–4]
- Elderly people with chronic diseases (i.e., cardiovascular diseases, nervous system disorders, gastrointestinal tract diseases and metabolic disorders) using multiple medications are more likely to have dry mouth.[5,6]
- Xerostomia significantly increases the risk of experiencing demineralisation, dental caries, tooth sensitivity, candidiasis, and other oral conditions that may negatively affect quality of life.[3,7]
- An effective strategy to manage the risk of dental caries for patients with xerostomia is the prescription of high-fluoride products with proven efficacy.[8–12]
- Currently, xerostomia is predominantly managed by general practitioners.[13] However, there was limited data on xerostomia burden in the United Kingdom.[14]

Aim

- The purpose of this study was to provide evidence on the burden of xerostomia, patient characteristics, comorbidities, treatments susceptible to cause xerostomia, treatment for xerostomia, and healthcare resource use that may highlight the unmet need in this patient population in the UK.

Conclusions

- The majority of patients aged ≥65 years had chronic diseases for which they received ≥4 medications in the baseline period.
- Although xerostomia is predominantly managed in primary care, few patients are prescribed high-fluoride toothpaste, which is a cost-effective and simple way to introduce fluoride and reduce the inevitable risk of dental caries onset or progression.
- Interprofessional national and regional guidelines, communication and collaboration between dental and primary care professionals are fundamental in providing effective oral health care for patients with xerostomia.
- Integrated care partnerships include the various "new care models" being developed in the NHS across England which may potentially have implications for the future of dentistry.[19]

References

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Relationships and Activities

FSH designed the study, DH analysed the data, FSH developed the poster, and all authors interpreted the results and reviewed the draft poster.

FSH and DH: Employees of OPEN Health, which has received consulting fees from Colgate

JG: Employees of Colgate

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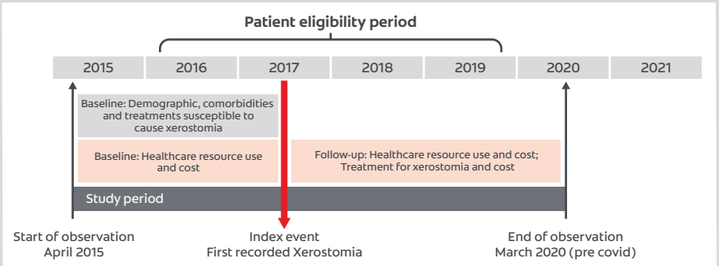
Methods

- A retrospective observational study on patients diagnosed with xerostomia using the Optimum Patient Care Research Database (OPCRD)[15], an electronic health records database containing deidentified primary care records routinely collected by the National Health Service (NHS) in the UK.
- Costs of primary care activity and delivery of treatment were derived from the British National Formulary (BNF) Drug Costs for cost treatment and NHS reference costs in the Personal Social Services Research Unit (PSSRU) for activity.[16,17]
- **Study observation period:** started on 1st April 2015 and ended on 31st March 2020 (**Figure 1**)
- **Patient eligibility period:** The period from 1st April 2016 to 31st March 2019 (allowing at least one year pre- and post-index date)
- **Inclusion criteria**
  - Patients with a first record of a diagnosis of xerostomia or dry mouth during the study eligibility period
- **Exclusion criteria**
  - Patients with <12 months baseline and follow-up data
  - Patients <16 years old

Statistical analyses

- Categorical variables were described with frequencies and percentages and continuous variables with arithmetic means and standard deviation (SD) and median (quartile (Q)1- Q3).
- Analyses of study variables were conducted excluding missing data.
- Healthcare resource use and cost estimates were reported per patient-year.
- Duration of treatment was calculated between the record of the first prescription to the last record of prescription, with no assumptions or adjustments made for any time in terms of gaps.
- Study was purely descriptive, and no statistical comparison was performed.

Figure 1. Study schema



Results

Baseline patients' characteristics

- A total of 11,731 patients (mean [SD] age: 67.9 [15.6] years) who newly diagnosed with xerostomia during the study period were included. (**Table 1**)
  - 72.27% of the patients with xerostomia were older than 60 years.
  - 65.3% of patients were female.
  - 17.1% of patients were current smoker.
  - 29.8% of the patients were from White ethnicity; ethnicities of the patients were mostly unknown (61.9%).
  - 16.2% of the patients had moderate Charlson comorbidity index (CCI)[18] scores (CCI=3-4), and 5.9% had severe CCI scores (CCI≥5).

Baseline clinical characteristics

- Anxiety or depression was the most common xerostomia-related comorbidity (59.7%) followed by diabetes (19.0%) and stroke (5.6%). (**Figure 2**)
- Analgesic agents (80.6%), cardiovascular drugs (70.3%), antidepressants and antipsychotic agents (57.3%), and antihypertensive agents (47.6%) were common prescriptions reported before diagnosis of xerostomia. (**Figure 3**)
- 76.7% of the elderly patients (aged ≥65 years (n=7,518)) received ≥4 class of medications in the baseline period.
- On average, elderly patients received a median of 5 (Q1-Q3: 4-6) drug classes in the baseline period. (Figure 4)
- Analgesic agents, antihypertensive/cardiovascular drugs, and antidepressants/antipsychotic agents were the most frequent drug classes found in the top drug combinations.

Treatment prescribed for xerostomia in follow-up period

- 70.1% (N = 8,225) of the patients received at least one treatment in follow-up period.
- Of the 8,225 patients who had treatment, 99.6% initiated artificial saliva and 16.3% received saliva stimulants. (**Figure 5**)
- Only 2.2% of the patients received high fluoride toothpaste.
- The majority of patients were prescribed with artificial saliva or saliva stimulants soon after diagnosis of xerostomia. (**Table 2**)
- The median time to initiation of high fluoride toothpaste after diagnosis was 48 days; the median time on treatments was 459 days. The median prescription frequency was 3.5 per patient per year.

Primary healthcare resource use and cost

- Patients had 24.2 primary care visits with the associated costs of £727.7 per patient-year during follow-up. (**Table 3**)
- Mean (SD) referrals to secondary care for dental care in those with ≥1 referrals (N=234) was 1.2 (0.4) referrals in the follow-up period.

Limitations

- Referrals to secondary care for dental care would be usually made by dentists but this was not recorded in the dataset, therefore the referrals documented in the dataset were likely to be an underestimate.
- There was a lack of information on
  - dental care visits and treatments outside of primary care in the study (e.g. fluoride treatment prescribed by dentists).
  - if fluoride was prescribed initially by a GP or prescribed by dentist and re-prescribed by a GP.
  - the reason for referral to secondary care dental service.
- Ethnicity was poorly recorded in the primary care data.

Table 1. Baseline characteristics of the patients diagnosed with xerostomia

Patients' characteristics		Total patients (N=11,731)
Age, Mean (SD)		67.9 (15.6)
Gender, N (%)	Female	7,658 (65.3%)
	Male	3,921 (33.4%)
	Unreported	152 (1.3%)
Smoking status, N (%)	Current smoker	2,005 (17.1%)
	Non-smoker	5,838 (49.8%)
	Ex-smoker	2,023 (17.2%)
	Ex or current smoker*	1,728 (14.7%)
	Missing	137 (1.2%)
CCI, N (%)	No comorbidities	4,128 (35.2%)
	Mild score (1-2)	5,003 (42.6%)
	Moderate score (3-4)	1,905 (16.2%)
	Severe score (≥5)	695 (5.9%)

SD: standard deviation; CCI: Charlson comorbidity index;
* Ex or current smoker is a category for codes which cannot be placed into a definitive category i.e. history of smoking is not clear if the patient has previously and is no longer or is currently smoking.

Table 2. Treatment prescriptions for xerostomia in follow-up period (N=8,225)

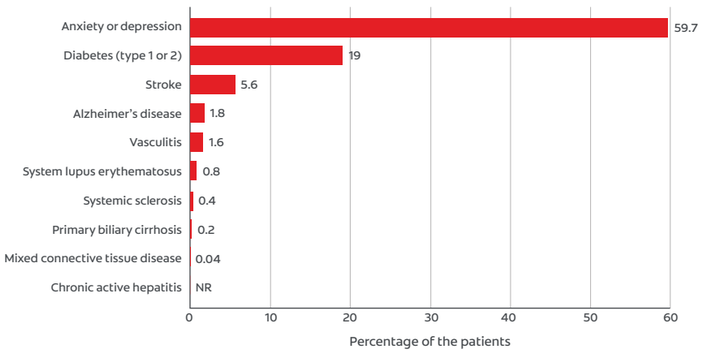
Patients' characteristics		Artificial saliva	Saliva stimulants	Any sialagogues	Pilocarpine	High fluoride toothpaste
Patients with ≥1 treatment, N (%)		8,196 (99.6%)	1,343 (16.3%)	52 (0.6%)	51 (0.6%)	178 (2.2%)
Frequency of treatments, Per patient per year	Mean (SD)	2.1 (4.2)	2.32 (4.2)	4.9 (5.3)	4.94 (5.4)	4.63 (4.8)
	Median (Q1-Q3)	0.8 (0.5 – 1.7)	0.8 (0.57 – 1.8)	1.8 (0.7 – 9)	2.4 (0.7 – 9.4)	3.5 (1 – 6.7)
Time from diagnosis to treatment initiation, days	Mean (SD)	9.5 (70.6)	44.7 (148.8)	245 (279.4)	249.8 (280)	126.6 (197.8)
	Median (Q1-Q3)	0 (0 - 0)	0 (0 - 0)	148 (35 - 336)	150 (37 - 362)	48 (7 - 140)
Time on treatments (patients with ≥1 Rx), days	Mean (SD)	252.1 (353.6)	291.2 (373.7)	433.8 (415)	433.8 (415)	527.8 (368.2)
	Median (Q1-Q3)	57 (0 - 411)	98 (0 - 497)	286 (59 - 813)	286 (59 - 813)	459 (225 - 767)
Cost of treatment, Per patient per year (£)	Mean (SD)	11 (31.5)	8.5 (15.3)	199 (219.6)	203 (220.2)	38.8 (43.2)
	Median (Q1-Q3)	3.6 (2.1 – 7.9)	2.8 (1.7 – 6.5)	71.9 (26.6 – 371)	97.3 (27 – 387.2)	23 (6.7 – 50.8)

SD: standard deviation; Q: quartile

Table 3. Primary health care use and the associated costs in patients diagnosed with xerostomia

Patients' characteristics		Pre-index observation period	Post-index observation period
Primary care visits, Per patient-year	Mean (SD)	27.9 (20)	24.2 (20.7)
	Median (Q1 - Q3)	23.7 (15.1 – 36)	20 (9.4 - 33.7)
Referrals to secondary care for dental care (≥1 referral), n=234	Mean (SD)	NR	1.2 (0.4)
	Median (Q1-Q3)	NR	1 (1 - 1)
Primary care cost, Per patient-year (£)	Mean (SD)	837.3 (600.1)	727.7 (619.9)
	Median (Q1-Q3)	710.2 (452.1 – 1081)	601 (281.5 - 1010.6)

Figure 2. Proportion of the patients with comorbidities in baseline



NR: not reported; events which occur in <5 patients are not reported for privacy reasons.

Figure 3. Proportion of the patients with a treatments susceptible to cause xerostomia

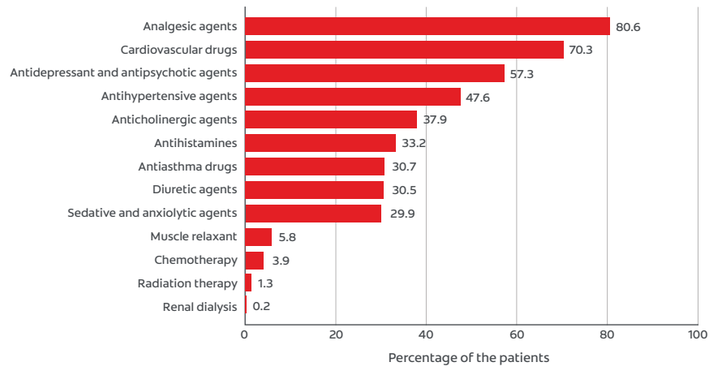


Figure 4. Proportion of the patients aged ≥65 years receiving multiple drug classes at baseline (N=7,518)

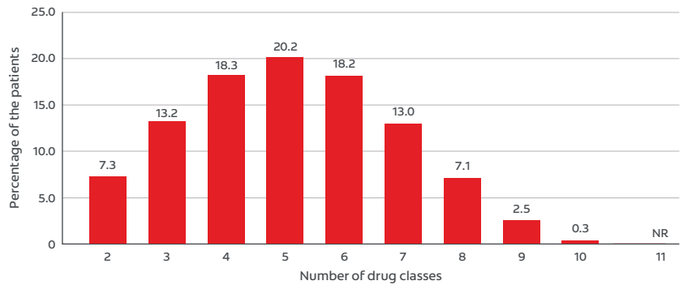


Figure 5. Treatments prescribed for xerostomia in follow-up period (N=8,225)