

The impact of age and deprivation on NHS payment claims for domiciliary dental care in England

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Domiciliary dental care provides care to patients who are unable to attend dental clinics for a variety of reasons. **Objective:** This research analyses NHS payment claim data for domiciliary dental care in England to identify any variations by area and determine whether age or deprivation are associated with levels of domiciliary care provided. **Methods:** Publicly available data from the NHS Business Services Authority and demographic data from additional public datasets were linked to assess the variation in claims made for NHS domiciliary activity across England. Associations with factors such as the proportion of older people and deprivation were investigated using correlation, univariable and multivariable regression models. **Results:** There was substantial variation by area in the number of NHS payment claims made for domiciliary activity and a statistically significant but very weak positive correlation between the population of each area and the number of domiciliary payment claims made. Correlation, univariable and multivariable analyses demonstrated positive but weak associations between area deprivation measures and the number of claims per population. There was little evidence of an association between proportions of older adults and numbers of domiciliary claims per population. **Conclusion:** As older and more deprived populations are those most likely to require domiciliary dental care, these results suggest that access to services is variable and not always based upon need. This highlights a potential need to reconsider the criteria upon which this type of dental care is offered and the commissioning of these services in different localities.

Keywords: Domiciliary, Older Adults, Deprivation, Dental Health Services, Special Care Dentistry

Introduction

An ageing population presents many challenges. Largely as a result of more effective preventative measures and changes in attitude, there has been a significant reduction in the proportion of older adults who are edentulous and an increase in the proportion retaining a functional dentition over recent decades (Steele *et al.*, 2012; Watt *et al.*, 2013). This has substantial implications for treatment need and treatment planning due to the increased impact and complexity of exodontia in later life (Pretty *et al.*, 2014). As optimal oral health contributes to overall quality of life (Gerritsen *et al.*, 2010; Porter *et al.*, 2015), it is important to provide and plan treatment that meets the needs of patients and to tackle challenges in access to dental care. Niesten and colleagues (2017) identified that frailty associated with ageing is associated with lower attendance at dental services and worse oral hygiene and oral health-related quality of life, suggesting limited success in achieving equitable access to dental services for older people. Like increasing age, socio-economic deprivation is associated with potential difficulties in accessing dental settings and higher levels of dental disease (Steele *et al.*, 2015; Schwendicke *et al.*, 2015; Jamieson and Thomson, 2006). Consequently, for older people experiencing deprivation, dental attendance at a dental surgery can be a greater challenge due to factors such as frailty, progressive medical conditions, cognitive impairment and difficulty with transport and logistics.

Attempting to tackle inequalities in access, domiciliary dental care can be provided to patients who find it difficult to attend dental services. Domiciliary oral health care has

been described as “a service that reaches out to those who cannot reach a service themselves” and involves patients being seen in their usual place of residence (Lewis and Fiske, 2011). Guidelines from the British Society for Disability and Oral Health (2009) provide a comprehensive description of situations where domiciliary dental care is appropriate, whilst the Equality Act (HSMO, 2010) and NHS Constitution (Department of Health, 2015) both highlight the value of equity in access to services and the need for patient-centred care delivery. Domiciliary dental care provision is not part of the typical General Dental Services contract. In England, NHS England remains responsible for commissioning dental services, including domiciliary contracts, which may be awarded to either general dental practices or dental specialist services such as Community Dental Services. The variation in commissioning of domiciliary services has led to a variation in the accessibility of this type of care, although access to domiciliary dental care should be available to all patients who require it, with the NHS commissioning guide specifying that care should be provided against set criteria which are consistently applied (NHS England, 2016). Any course of dental treatment, including domiciliary care, should result in a payment claim to the NHS Business Services Authority which enables an analysis of the variation in domiciliary care delivery in England. This study aims to review recent data on claims made for domiciliary care across England, identify any variations across different areas of England and to determine whether population, age or deprivation are associated with area levels of domiciliary care provided.

Method

The NHS Business Services Authority makes data regarding NHS dental treatment available in the public domain. Within these data is information regarding the number of payment claims made for NHS treatment of varying types, including claims made for domiciliary care delivery. The latter should accurately reflect the number of courses of domiciliary care provided, as compliance with claims submission is high. The most recent release of this information relates to care provided in 2015, where areas in which care is delivered are grouped by the 209 Clinical Commissioning Groups (CCGs) (NHS Digital, 2015). Additional public data describe the population of each CCG (NHS England, 2017) and provide additional demographic indicators, in particular the proportions of individuals in higher age categories (Public Health England, 2017) and information on levels of deprivation (Department for Communities and Local Government, 2015). These datasets were linked to facilitate analysis of the provision of domiciliary dental care in areas of England and to determine its association with proportions of older individuals and deprivation in these areas. Two measures of age (the proportion of adults aged 60+ and the proportion of adults aged 80+) and two measures of deprivation (the Index of Multiple Deprivation (IMD) and the Index of Health Deprivation and Disability, which is a component of the IMD) were utilised to reflect different aspects of age and deprivation. Baseline statistics are presented for all measured variables by CCG area. A Pearson's correlation coefficient was calculated to assess the relationship between the number of claims made in each CCG area and population size. Additionally, Pearson's correlation, univariable and multivariable regression analyses were undertaken to determine associations between claims per 100,000 population and deprivation and age variables. Data for children were removed from the figures from the NHS Business Services Authority as this review aims to assess the care provision for older patients, the typical recipients of domiciliary care. There were no missing data and SPSS version 24 (SPSS Inc., Chicago, IL) was used for all analyses.

Results

A total of 68,063 NHS payment claims were made for domiciliary dental care for adults in 2015 across 209 CCG areas. No claims for domiciliary care were made in 22 areas, the greatest number of claims made by one area was 3,955 and the median number of claims was 108 (IQR 22.0-365.3). The number of claims per 100,000 of population varied from 0-1981 with a median of 57.7 (IQR 11.8-144.0) (Table 1). Figure 1 details the number of claims made per 100,000 population across different CCG areas in England. There was a significant ($p<0.01$) but weak correlation ($p=0.29$) between the population of each area and the number of domiciliary claims made within it.

Analyses between age and deprivation variables and claims per 100,000 population showed weak but significant positive correlations between both deprivation measures and claims ($p=0.19$ and 0.18 , $p<0.01$) (Table 2). These associations were confirmed by univariable regression analyses and wide confidence intervals, and again, indicate the lack of consistency with which domiciliary claims increase with increasing deprivation (Table 2). Correlation and univariable

regression analyses suggested there was no association ($p>0.05$) between the proportions of populations aged 60+ or 80+ and claims per 100,000 population (Table 2).

Multivariable regression models showed that the positive associations between both deprivation measures and claims per 100,000 population remained significant ($p<0.01$) after adjusting for either of the age variables, although confidence intervals remained wide, confirming the lack of consistency related to these associations (Table 3). A positive association ($p<0.05$) between the proportion of adults aged 80+ and claims per 100,000 population also emerged, after adjusting for IMD, but again, confidence intervals were wide. There was, however, no association between the proportion of adults aged 80+ and claims per 100,000 population when adjusting only for Health Deprivation and Disability. The association between the proportion of adults aged 60+ and claims per 100,000 population also remained non-significant when adjusting for either of the deprivation variables (Table 3).

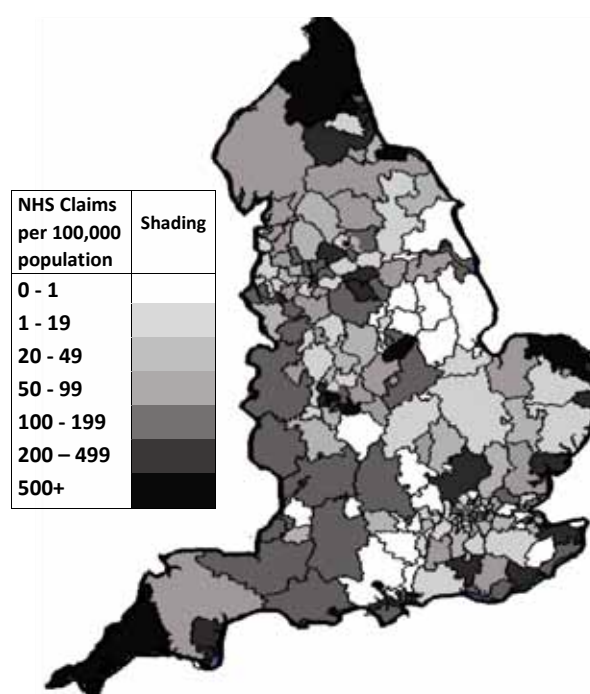


Figure 1. Number of NHS domiciliary claims per 100,000 population by CCG area of England in 2015

Table 1. Descriptive statistics for all variables across 209 CCG areas of England in 2015.

Variable	Median	IQR	Range
Number of domiciliary claims	108.0	(22.0, 365.3)	0-3955
Number of claims per 100,000 population	57.7	(11.8, 144.0)	0-1981
Variable	Mean	SD	Range
Proportion aged 60+ (%)	22.3	5.1	8.5-34.7
Proportion aged 80+ (%)	4.6	1.2	1.6-8.5
Health Deprivation and Disability Score	0.0	0.6	-1.8-1.5
Index of Multiple Deprivation Score	21.9	8.4	5.7-51.6

Table 2. Relationships between age and deprivation and domiciliary claims per 100,000 population (n=209).

Variable	β	<i>p</i> value	95% CI	Pearson's Correlation Coefficient (ρ)	<i>p</i> value (ρ)
Health Deprivation & Disability Score	66.8	0.007	(18.6, 115.0)	0.19	0.007
Index of Multiple Deprivation Score	4.8	0.009	(1.2, 8.5)	0.18	0.009
% aged 60+	2.2	0.460	(-3.8, 8.2)	0.05	0.464
% aged 80+	14.4	0.270	(-11.0, 39.8)	0.08	0.265

Table 3. Multiple regression analyses to assess age and deprivation as predictors of number of domiciliary claims per 100,000 population (n=209).

Variable	β	<i>p</i> value	95% CI
REGRESSION 1:			
IMD	5.9	0.002	(2.1, 9.8)
% aged 60+	5.4	0.087	(-0.8, 11.7)
REGRESSION 2:			
Health Deprivation & Disability	70.7	0.005	(22.0, 119.4)
% aged 60+	3.4	0.258	(-2.5, 9.4)
REGRESSION 3:			
IMD	6.0	0.002	(2.3, 9.8)
% aged 80+	27.0	0.042	(-1.0, 53.1)
REGRESSION 4:			
Health Deprivation & Disability	72.7	0.004	(24.0, 121.3)
% aged 80+	20.1	0.118	(-5.1, 45.2)

Discussion

The above analyses show that there is substantial variation in the number of domiciliary claims made in different areas of England in 2015, and only limited association between the number of claims and population size. In addition, there is an overall association between area levels of deprivation and numbers of domiciliary claims made per 100,000 population, but this association is not very consistent between CCG areas. There is some evidence of a significant association between area proportions of individuals aged 80+ and numbers of claims per 100,000 population, but, again, this association is inconsistent. There is no evidence of an association between area proportions of adults aged 60+ and numbers of domiciliary claims per 100,000 population.

In terms of limitations, these analyses are restricted to only a single year of dental activity. This analysis also assumes that payment claims are accurately submitted to the NHS Business Services Authority whenever a course of domiciliary care is provided. Discussions with relevant parties confirm that, in general, compliance with the submission process is very high and submissions for domiciliary care are generally an accurate reflection of courses of treatment provided. However, despite this, the data only reflect the number of courses of treatment provided, not the actual number of visits in which treatment was provided nor the number of patients for whom this type of care was provided. Additionally, the analysed claims are based around CCGs which pertain to large geographic areas each containing significant demographic variation within them. Associations can only be made at the CCG area level, and do not take account of individual-level data. Some services con-

tracted to provide domiciliary care may also cover wide geographic areas which may overlap CCG boundaries. There may be cases where claims are submitted from a central site, which could affect the accuracy of the claims data by CCG area.

Based on guidelines detailing who should be able to receive dental care in the home setting (British Society for Disability and Oral Health, 2009), it is surprising to see such significant area variation in NHS domiciliary care activity, in relation to both age and deprivation demographics. Although some areas will have greater need than others, it would be anticipated that domiciliary activity would be consistently associated with deprivation indices, including summary measures of deprivation, such as IMD, and levels of health deprivation alone, due to associations between poorer states of both oral health and general health and socio-economic deprivation (Kondo *et al.*, 2009; Butler *et al.*, 2013). It would also be expected that in older populations there would be an increase in the number of patients receiving treatment at home. Age is associated with poorer systemic health (Barnett *et al.*, 2012) and multiple conditions which can adversely affect independence and mobility (Ferrucci *et al.*, 2016; Laan *et al.*, 2013), which would result in a greater need for domiciliary dental care. Contrary to the above expectations, however, the analyses presented suggest that, although present, associations between domiciliary claims and deprivation are inconsistent. Additionally, there was little association between area proportions of older adults and domiciliary activity, apart from some evidence of an association, albeit an inconsistent one, between the proportions of adults in the oldest age group (aged 80+) and domiciliary claim activity.

Accepting that NHS BSA claims data are generally an accurate reflection of domiciliary activity in each CCG, excepting the minor caveats addressed earlier in this discussion, a multitude of potential explanations could exist for the area variations in domiciliary care provision. From a commissioning perspective, commissioning of dental services is not standardised across the country, but is the responsibility of regional commissioning teams. Variations in the priorities, constraints, funding, workforce or other factors between commissioning teams may be responsible for significant variations in domiciliary care commissioned. The availability, location and expertise of providers who may bid for domiciliary contracts, and availability, training or attitudes of clinicians, may also vary significantly across areas, affecting the commissioning of suitable services in certain areas. Care pathways for patients can also be complex and the type of care offered and responsibility for its provision can vary hugely between areas, depending on local arrangements and available services, which may affect the availability and use of domiciliary services by area.

From the above findings, it seems there may be an element of a 'postcode lottery' regarding the availability of and access to domiciliary dental care services. Many individuals in certain areas who need to be seen in their residential setting, due to age, health or other forms of deprivation, may either be unable to access care or may be transported to dental surgeries despite the challenges of doing so. This could be putting certain groups of the population at risk of poor oral health, a poorer quality of life, and could be exacerbating existing oral health inequalities in the UK.

Without more detailed information and patient-level information, the cause of area variation is challenging to identify in greater detail, although it is likely to be multifactorial. Further research to elucidate the specific causes of this variation would be valuable and could include qualitative research with commissioners and other stakeholders who contribute towards contracting decisions in different areas, or with dentists involved in the provision of domiciliary care. This would enable the variation in access to and provision of domiciliary care to be tackled as a public health priority.

Conclusion

Despite the greater risks of oral disease in those who are confined to their places of residence (Critchlow, 2017) and the need to commission and plan services based on need (Borreani *et al.*, 2008), there is significant area variation in the provision of domiciliary oral health care in England. Specifically, amongst CCG areas of England, there is little or no association between claims per population and increasing age, and a present but inconsistent association between claims per population and deprivation. This would suggest a limitation in the commissioning of domiciliary services or the criteria determining when dental contract holders will provide domiciliary care. It is crucial that patients are assessed comprehensively, and that commissioning of services allows those who require domiciliary dental care to receive it, ensuring equitable access to oral healthcare.

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