# The effects of socioeconomic status and dental attendance on dental caries' experience, and treatment patterns in 5-year-old children

**M. Tickle,[1] M. Williams,[2] T. Jenner,[3] and A. Blinkhorn,[4]**

**Objective** To compare the dental caries' experience and treatment received by 5-year-old children registered with a GDP.
**Design** Retrospective case note review of all 5-year-old children registered with seven GDPs.
**Setting** The study was carried out in 1996/7 in Wirral and North Cheshire in the north west of England.
**Subjects and materials** Clinical, demographic and attendance data were collected from each practice using a common data abstraction form. Subjects were categorised according to regular/irregular attenders, and into five groups ranging from affluent to deprived using the Super Profiles geodemographic classification. The relationships between disease experience, treatment, attendance and socioeconomic status were compared using cross-tabulations, t-tests and multiple linear regression.
**Results** The dental records of 430 5-year-old children were available for analysis. Irregular attenders had significantly higher dmft, dt and mt, and fewer filled teeth. Only 29% of disease experience of regular attenders was treated by restoration. Both socioeconomic status and visiting behaviour exerted significant independent effects on dmft, but dental attendance alone had a significant effect on ft.
**Conclusions** Significant inequalities remain in the disease experience and service use of young children. Regularly attending children have less than a third of their diseased teeth restored. Consensus is needed across the profession on the care of the diseased deciduous dentition.

During the 1990s the National Health Service (NHS) nationally coordinated child dental health surveys have shown a fall in the care index in the primary dentition.[1] The care index is expressed as the number of filled teeth as a proportion of the total caries experience and has been advocated as a measure of the quality of dental care delivered to child populations.[2] From December 1996 to December 1997, the national percentage of children registered with a general dental practitioner (GDP) has remained unchanged at 68 per 100 population.[3] The fall in the care index particularly in the deciduous dentition coupled with this static level of registration has prompted some commentators to express concern about this situation and question whether or not GDPs are filling the teeth of their registered patients.[4] However registration does not necessarily equate with regular attendance and children may be registered with a GDP and not attend for regular care. The relationship between disease and attendance is also complicated by socioeconomic status. Children from a deprived background are more likely to have high levels of dental caries in the primary dentition[5–7] and visit the dentist on an infrequent basis[5,8,9] than children from more affluent backgrounds.

With the care index falling it is important to understand what is happening to the care of children in general dental practice. Specifically the relationships between disease status and treatment received as well as socioeconomic status and attendance. Therefore the objectives of this study were, for 5-year-old patients registered with GDPs in the north west of England:

- To compare the dental caries' experience and treatment received by regular and irregular attenders.
- To compare attendance patterns by area type of residence.
- To explore the effects of socioeconomic status and attendance on disease and treatment experience while controlling one for another.

## Method

The study took place in seven general dental practices in the north west of England, two in Wirral Health Authority and five in North Cheshire Health Authority. The study population included all 5-year-old children registered with the dentists. Data were collected by retrospective review of case notes using a common data abstraction form. The form included a simplified dental chart on which decayed, missing and filled teeth were recorded according to the status of the dentition at the last visit. The subject's postcode was also recorded, and whether or not the child was a regular attender. The definition of a regular attender was defined as a child who attended the practice for a check-up at least twice in a 3-year period.

Patients were categorised according to the above definition into regular and irregular attenders and the care index of each of these groups was calculated. Similarly DMFT and its components were calculated for each group and compared using *t*-tests. The subject's postcode was used to categorise each subject according to socioeconomic status using the Super Profiles geodemographic indicator.[10] This is a 3-tier, hierarchical classification available under contract to the NHS that classifies enumeration districts (the smallest geographical unit of the census with a population of around 400 individuals) into area types based on census and consumer data. The 'target market' tier of the classification consists of 40 categories ranked on an ordinal scale according to income. This scale was used to split the study population into quintiles to produce a 5-point scale ranging from 'affluent' to 'deprived'. Regular and irregular

[1]*Specialist in Dental Public Health,* [3]*Consultant in Dental Public Health, South Cheshire Health, 1829 Building, Countess of Chester Health Park, Liverpool Road, Chester CH2 1UL;* [2]*GDP, Weston Village, Runcorn, WA7 4LP;* [4]*Professor of Oral Health & Development, Turner School of Dentistry, University of Manchester, Manchester M15 6FH*
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attenders were compared according to this affluence scale using a chi-squared test for linear trend.

Finally, explanatory multivariate linear regression analyses were undertaken with dmft and ft as dependent variables and the 5-point affluence indicator and regular/irregular attendance as independent variables to determine their effects on disease and treatment received when controlling one for another.

## Results

Data were collected from the dental records of 430 5-year-old children. The attendance record of 11 subjects could not be determined, of the remaining 419 records, 76 (18.1%) subjects were irregular attenders and 343 (81.9%) were regular attenders. For children who were regular attenders 29% of teeth affected by decay were filled. This is in contrast to the 3% of decayed teeth of irregular attenders that were filled. Table 1 summarises the differences in dmft and its components. Irregular attenders had significantly higher mean dmft ($P < 0.001$), dt ($P < 0.01$) and mt ($P < 0.001$); they also had significantly fewer ($P < 0.05$) filled teeth.

The effect of socioeconomic status on attendance is summarised in Table 2 using the 5-point affluence scale. Of the 419 subjects, 414 (98.8%) had postcodes which could be matched to give a Super Profiles target market score. There was a significant ($P < 0.001$) linear trend detected, with children living in deprived areas more likely to be irregular attenders.

The results of the multiple regression are displayed in Table 3. When dmft was investigated as the dependent variable, both socioeconomic status and visiting behaviour exerted a significant effect independently of each other. For each point on the 5-point scale moving from affluent to deprived there was an increase of 0.29 of a tooth affected by decay. Likewise irregular attenders had 1.38 more teeth affected by decay than regular attenders. When FT was examined as the independent variable only attendance had a significant ($P < 0.05$) effect, with regular attenders having 0.21 more filled teeth than irregular attenders. Socioeconomic status did not have a significant influence on the number of fillings received after controlling for attendance.

**Table 1 Mean dmft and components of regular and irregular attending 5-year-old children**

| | Regular attenders N = 343 | | Irregular attenders N = 76 | | |
|---|---|---|---|---|---|
| | Mean | SD | Mean | SD | *P* |
| DT | 0.47 | 1.43 | 1.24 | 3.00 | < 0.01 |
| MT | 0.20 | 0.85 | 1.24 | 3.64 | < 0.001 |
| FT | 0.27 | 0.76 | 0.08 | 0.48 | < 0.05 |
| DMFT | 0.94 | 2.05 | 2.55 | 4.61 | < 0.001 |

## Discussion

This study confirms other findings in the literature that children from deprived backgrounds have an inequitable experience of dental caries in the primary dentition[5–7] and are more likely to be irregular dental attenders.[5,8,9] The profession agrees that regular attendance is conducive to good oral health[11] and the results of this study would seem to support this view for 5-year-olds. Children who were regular attenders had significantly less caries experience and received more treatment than irregular attenders, after controlling for socioeconomic status. Although the possibility that families displaying healthy visiting patterns may also exhibit other behaviours aimed at preventing dental disease irrespective of socioeconomic status, cannot be discounted.

The results of this study would suggest that the population experience of a decreasing care index in 5-year-olds cannot be wholly attributed to irregular attendance and non-attendance of patients at a General Dental Service (GDS) practice, as only 29% of disease experienced by regular attenders was treated by restoration. During the data collection process charting was compiled retrospectively from clinical records starting from the last attendance. The majority of patients were awaiting recall and not actively receiving treatment. Therefore the low care index cannot be accounted for by recording the status of the child's dentition at initial examination. The reasons why children are not receiving fillings in the deciduous dentition are multiple and complex. GDPs form the bulk of the profession and therefore their views and the cumulative effects of their treatment decisions have far reaching effects on population oral health. From a public health perspective it is important for academics and public health dentists to understand through research, the attitudes and practices of GDPs concerning prescribing in the primary dentition.

The results of this study also confirm that registration with a GDP does not equate to a 'healthy' attendance pattern, with nearly one-fifth of 5-year-old patients being irregular attenders. This has ramifications for population oral health as registration with a GDP is assuming increasing importance. The Department of Health has developed a programme aimed at increasing access through increased registration.[12] Registration is also one of the two oral health indicators suggested by the Department of Health as high-level outcome indicators[13] and many local oral health strategies also have targets to increase registration to improve oral health. This study would suggest that registration rates alone are a poor indicator of oral health promoting visiting patterns. A premise also questioned by Daley *et al.*[14] who could find no difference in the dental treatment needs of registered and unregistered 8–9-year-old children. However registration is easily measured by the Dental Practice Board, even though this is practice catchment population-based data and not person-based data. Patient-based information is needed for dentists to understand which patients are attending irregularly to develop strategies to convert irregular to regular attenders. At present the

**Table 2 Cross-tabulation: regular and irregular attending for 5-year-old children and their socioeconomic status**

| | Target market quintiles N (%) | | | | | |
|---|---|---|---|---|---|---|
| | 1 (Affluent) | 2 | 3 | 4 | 5 (Deprived) | Total N (%) |
| Regular attenders | 71 (20.9) | 96 (28.3) | 21 (6.2) | 53 (15.6) | 98 (28.9) | 339 (81.9) |
| Irregular attenders | 6 (8.0) | 9 (12.0) | 12 (16.0) | 11 (14.7) | 37 (49.3) | 75 (18.1) |
| Total N (%) | 77 (18.6) | 105 (25.4) | 33 (7.8) | 64 (15.5) | 135 (32.6) | 414 (100) |

Chi-squared = 17.03, 1 df, $P < 0.001$

**Table 3 Regression coefficients, standard errors and *P*-values from a linear regression fitted for the dependent variables ft and dmft, and independent variables dental attendance and a 5-point scale of socioeconomic status**

| | Beta | Standard error of Beta | *P* |
|---|---|---|---|
| *Dependent variable dmft* | | | |
| Attendance | 1.38 | 0.35 | < 0.001 |
| Socioeconomic status | 0.29 | 0.09 | < 0.01 |
| *Dependent variable ft* | | | |
| Attendance | – 0.21 | 0.09 | < 0.05 |
| Socioeconomic status | 0.01 | 0.02 | 0.54 |

information presented here can only be unearthed by laborious hand searching through case notes. The establishment of an agreed clinical minimum dataset which contains standardised demographic and patient service-use variables would be a first step in enabling useful information — such as attendance behaviour, to be collected electronically and in a standardised way.[15]

## Conclusions

For the population of registered children studied inequalities remain in disease experience and dental visiting patterns. Children who attend regularly have lower overall experience of disease and more restorative treatment of disease. However even for regularly attending 5-year-olds only 29% of deciduous teeth affected by disease were restored. There needs to be closer cooperation between GDPs and public health dentists to gain consensus on the care of the diseased deciduous dentition, to improve strategies to convert irregular to regular attendance and develop methods for meaningful monitoring of dental service use. The study casts doubt on the usefulness of using registration as a population oral health indicator, because of the disparities in disease experience between regularly and irregularly attending registered patients.

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