

Running Title: CDHS 2013 Impact

ABSTRACT

Background: The 2013 Children's Dental Health survey is the fifth in a series of national surveys.

Aim: To summarise key findings on oral health perceptions, oral symptoms, and the impacts of oral conditions on the daily life of children and their families.

Methodology: A representative sample of children (aged 5, 8 12 and 15 years) and their parents in England, Wales and Northern Ireland completed relevant questionnaires.

Results: Oral symptoms, even more profound ones such as toothache, were prevalent among all age groups. Overall, 58% of 12- and 45% of 15-year-olds reported at least one oral impact in the past three months. The most prevalent oral impact was feeling embarrassed to smile or laugh, followed by difficulty eating. These symptoms and oral impacts were disproportionately high among children eligible for free school meals. Furthermore, one fifth to one third of parents reported that their children's oral conditions had some impact on their family life.

Conclusion: Oral symptoms were common and oral conditions had a negative impact on the quality of life of large proportions of children. There were clear and marked socioeconomic inequalities, with considerably worse oral health perceptions and higher levels of oral impacts among the more deprived children.

BACKGROUND

Historically, epidemiological surveys of oral health have focused upon clinical indicators. However, looking at clinical indicators in isolation may provide little information with regard to their impact on the individual. More recently, there has been growing interest in the impact of oral conditions on the daily lives of people, allowing us to evaluate the consequences of health and disease from the point of view of society rather than just the perspective of a clinician.

In the UK, measurement of the impact of oral conditions was introduced into the 1998 Survey of Adult Dental Health. The 2003 Children's Dental Health Survey (CDHS) then incorporated several questions to evaluate the impacts of oral conditions on children's lives and found that 4-10% of children of all ages reported impacts on oral function, self-confidence, orally related activity and emotions. The most frequently reported type of impact was pain [1].

The CDHS 2013 is the fifth in a series of national children's dental health surveys that have been carried out every ten years since 1973. There have been some methodological differences between surveys. The CDHS 2003 sampled from all UK countries whereas the CDHS 2013 collected data only from England, Wales, and Northern Ireland. Additionally, following the 2006 Department of Health guidance [2], positive consent was obtained from the parents of 5- and 8-year-olds but directly from 12- and 15-year-old children themselves in CDHS 2013, unlike assumed consent in all ages in the 2003 survey unless parents opted them out of the study. The CDHS 2013 also included a pupil questionnaire administered to 12- and 15-year-olds with more direct information on children's perceptions about their oral health and related impacts rather than only relying on proxy information from the

parental questionnaires. The pupil questionnaire contained a validated oral health related quality of life (OHRQoL) measure to assess the impacts of oral conditions on the daily life of the children. Furthermore, the parental questionnaire also included questions to measure the impact of children's oral conditions on the life of their families.

The main CDHS 2013 findings have been published in a series of official reports. In this paper, we summarise the key findings on oral health perceptions and symptoms, as well as on the impacts of oral conditions on the daily life of children and their families. These are presented in detail in the relevant official report [3].

METHODOLOGY

The CDHS 2013 collected data from a representative sample of children aged 5, 8, 12 and 15 years attending state and independent schools in England, Wales and Northern Ireland. The survey involved 775 primary schools and 219 secondary schools. A total of 13,628 children were sampled and 9,866 children received a dental examination. The overall response rate was 72% and varied between ages (5-year-olds: 70%; 8-year-olds: 65%; 12-year-olds: 83%; 15-year-olds: 74%). Full details of sampling, response, examination protocols and statistical methods can be found elsewhere [4]. The survey received ethical approval (UCL Research Ethics Committee, Project ID: 2000/003).

We present findings from the questionnaires that relate to: (1) Self-rated oral health, (2) Oral symptoms and problems, (3) Impact of oral health on the quality of life of the child, and (4) Impact of child's oral health on the family. The data are drawn mostly from the pupil questionnaire completed by 12- and 15-year-olds as this

gives direct and robust information for all variables mentioned in points 1-3 above, based on a very high response rate (99.6% of participating children). We also used data from the parental questionnaire at ages 5, 8, 12 and 15, in relation to points 2 and 4 above, but the response rate from the parents was much lower (43% of participating children) so the risk of biases is higher.

Self-rated dental health: Children aged 12 and 15 years were asked to rate their dental health overall. The answer options were 'very good', 'good', 'fair', 'poor', and 'very poor'.

Oral Symptoms and problems: We used parental questionnaire data for 5- and 8-year-olds, and pupil questionnaire data for 12- and 15-year-olds in relation to a range of symptoms and problems.

Impact of child's oral health on his/her quality of life: The pupil questionnaire asked 12- and 15-year-olds to evaluate the impact of oral health on their daily life, using the Child-OIDP (Child Oral Impacts on Daily Performances) [5]. This is one of the most widely used OHRQoL measures that has the advantage that it is short and has successfully been used in epidemiological studies [6]. The Child-OIDP has been validated for use in the UK [7]. Unlike other OHRQoL measures that focus only on frequency, it assesses the severity to which oral conditions may have negatively affected eight key aspects of daily life over the past three months, through the following items: difficulty eating; difficulty speaking; difficulty cleaning teeth; difficulty relaxing; feeling different; embarrassed smiling or laughing; difficulty doing schoolwork; difficulty enjoying being with people. Answer options for each question were 'not at all', 'a little', 'a fair amount' and 'a lot'.

Impact of child's oral health on the family: The parental questionnaire included seven questions, mainly extracted from the Family Impact Scale [8], to rate how children's oral health had affected various aspects of family life in the past six months.

Prior to the survey, both the pupil and the parental questionnaires were subject to an expert review followed by a cognitive testing on a sample of children and parents. This process confirmed the appropriateness and good understanding of the questions. The questionnaires were completed fully with just few missing items, and only minor wording changes were required.

We present descriptive data on the prevalence of these outcomes and bivariate analyses for their distribution by demographic and socioeconomic factors. The CDHS 2013 used children's eligibility for free school meals (FSM; information available at the individual child level) as a proxy for deprivation. For the sake of brevity, the tables do not include confidence intervals or P-values. However, statistically significant differences ($p < 0.05$) are reported in the text. As the samples were large, statistically significant differences were common so it is the scale of the difference that is often of most interest.

Given the complexity of the sampling design, all analyses employed weights that adjust for selection probabilities, non-response bias and population totals, so the data presented are representative of the population.

RESULTS

Overall, 66% of 12-year-olds and 74% of 15-year-olds rated their dental health as 'good' or 'very good'. At each age, girls rated their dental health significantly better than boys; similarly, those not eligible for FSMs reported better dental health ratings than those eligible (Table 1).

Oral problems were very common. Over a third of 5-year-olds (37%) and nearly half of 8-year-olds (55%) had experienced some kind of oral problem in the previous 6 months, according to their parents (Table 2). The three most commonly reported problems in both age groups were toothache, other pain in the mouth and bad breath. At age 8 parents noted problems with appearance at a higher prevalence than at age 5, presumably a reflection of the beginning of the transition to a mixed dentition. Differences by sex and country were variable but most were not particularly large. Differences by deprivation highlighted an emerging pattern of the types of problems reported, with parents of FSM non-eligible children noting issues of appearance or bad breath, whilst parents of children from low-income backgrounds tended to report pain related problems.

Focussing on self-reports among 12- and 15-year-olds, around two thirds of all children reported an oral health problem, but once again the pattern bears some scrutiny (Table 3). Sensitive teeth, mouth ulcers and bad breath were most prevalent and there were generally modest variations by sex and country, though girls at both ages were more likely than boys to report toothache. Again, it was FSM eligibility where a clear pattern started to emerge. FSM eligible children reported a much higher prevalence of toothache (nearly a quarter at both ages compared to just over one in ten of non-eligible children). Conversely, 21% of FSM non-eligible children reported mouth ulcers at both age 12 and 15, but the proportions were lower for eligible children (12% and 16% respectively). These differences almost cancelled

each other out and there was no overall difference in any reported problems at age 12 by FSM eligibility, while the respective difference was greater at age 15.

Approximately half of the children (58% and 45% of 12- and 15-year-olds, respectively) reported at least one impact on their daily activities due to oral conditions. Feeling embarrassed to smile or laugh (35% and 28% of 12- and 15-year-olds, respectively) was the most prevalent oral impact, while difficulty eating (22% and 19% of 12- and 15-year-olds, respectively) and difficulty cleaning teeth (22% and 14% of 12- and 15-year-olds) were also very prevalent (Table 4). Girls were more likely to report oral impacts than boys at age 15. Differences in oral impacts by income deprivation were substantial in both ages (Table 5). Among 12-year-olds this difference was more pronounced for those that reported two or more oral impacts (39% among the FSM eligible but only 28% among those non-eligible). For 15-year-olds, the income inequalities in OHRQoL were extensive both for the overall prevalence (53% for the FSM eligible vs 43% for the non-eligible) and also for those that reported two or more oral impacts (32% vs 23% respectively).

Using parental reports for the family, between one out of five to one out of three parents reported that their children's oral conditions had some impact on their family life (Table 6). Prevalent impacts were feeling stressed or anxious, as well as the child needing more attention and the parents feeling guilty. For 12- and 15-year-olds the most prevalent family impact was taking time off work, possibly reflecting additional orthodontic care at these ages.

DISCUSSION

The CDHS 2013 findings showed that a considerable proportion of children experienced oral symptoms and problems. More importantly, oral conditions had a negative impact on the quality of life of a large proportion of children, affecting their daily life and making it difficult for them to smile, eat and clean their teeth. These symptoms and oral impacts were disproportionately high among the more deprived children, providing clear evidence of the existence of marked oral health inequalities.

A large proportion of children from all age groups reported at least one oral symptom in their mouth. It seems that despite the overall improvement in oral health of populations, oral diseases are still an important public health problem in child populations and affect considerable groups in society. This is highlighted, in particular, by the high prevalence of toothache with approximately one in six to one in seven children having experienced toothache in the past 3 months. Clearly, this is an issue of concern making it important to understand the determinants of toothache among children. However, caution should be practiced when comparing findings across ages as the respective questionnaires were methodologically different. Indeed, we did not attempt to compare the reported symptoms from the younger ages (aged 5 and 8 years) that were assessed through parental proxy reports with the respective estimates for the older children (aged 12 and 15 years) that came from self-reports and we even used different Tables to present the data. Evidence suggests that there is no agreement between parental proxy and child self-reports and the former estimates tend to be lower than the latter [9]. We have also shown

that deprivation is an important social determinant of toothache, but more advanced multivariable analysis is needed to comprehensively address this issue.

Oral conditions adversely affected the quality of life of around half of the 12- and 15-year-olds. The high prevalence of oral impacts provides further evidence for the importance of maintaining good oral health in childhood and adolescence. Usually, oral impacts relating to more physical aspects of daily life, such as difficulty eating and cleaning teeth, are quite prevalent in studies on adults and this was also the case here. However, with about a third of the population affected, the most common oral impact referred to feeling embarrassed to smile or laugh, thus highlighting the increased importance of oral health for the social and psychological well-being at these ages. This is further supported by the considerable proportions that reported “feeling different” as well as difficulty relaxing due to their oral problems. As most oral impacts were rather prevalent, it is clear that oral health can negatively influence different aspects of quality of life.

The impact of the children’s oral health was not limited to their own quality of life, but extended also to the quality of life of their family, showing the wider consequences of oral conditions in childhood. These impacts on the family referred to more psychological aspects, such as parents feeling stressed or anxious and more practical concerns as they had to take time off work to deal with their children’s oral conditions. Maintaining good oral health throughout childhood does not only give a solid foundation for good oral function in adulthood but it also has beneficial effects for the quality of life of the family.

Boys and girls differed in their oral health perceptions and this may seem sometimes contradictory. For example, 12- and 15-year-old girls were more likely to

rate better their oral health overall. In contrast, they reported more oral symptoms (e.g. toothache). Compared to boys, girls also felt that their oral conditions were more likely to impact on their daily life, in accordance with findings from previous studies using the same OHRQoL measure [10]. Such findings serve to illustrate that boys and girls interpret their oral health in different ways, which may have implications in terms of how we manage oral health and expectations.

Deprivation, on the other hand, was shown to be very important in almost every self-reported measure of oral health and its impact. We evaluated the role of deprivation by dividing children into two groups, those eligible and those not eligible for free school meals, with eligibility being linked to income and therefore acting as a proxy for deprivation. Comparing these two groups clearly indicated a strong pattern of inequalities; poor self-rated oral health, prevalence of toothache, and oral impacts on daily life were all more prevalent in children eligible for FSMs. It seems logical to conclude that deprivation was related to poorer perceived oral health and the way it influences their daily life. This pattern of social inequalities is consistent across different subjective outcomes, including toothache [11, 12] and oral impacts [13]. We also showed that these inequalities are profound for high thresholds that reflect excessively impaired quality of life.

Even where differences did not appear great, the detail seems to tell a different story. Whilst there was no large difference in the overall prevalence of symptoms between deprived and non-deprived children, the underlying patterns of the distribution of the types of symptoms revealed important variations, with the more deprived children reporting pain in much higher proportions than the less deprived who in turn reported more commonly symptoms that were more social in nature, such as those related to appearance. Socioeconomic position is a well-established

predictor of oral health and we know that disease rates (for example caries) were higher in deprived groups in this population and this appeared to translate to relevant symptoms and impacts.

The administration of a pupil questionnaire to older children (12 and 15 year olds) was a major addition to CDHS 2013 and provided new insights into the impact of oral health. This was facilitated through the use of a brief and validated OHRQoL measure that focuses on the severity of the impact of oral conditions on the daily life of the children. Ideally, we would be interested to evaluate how oral health perceptions and the impact of oral conditions have changed since the last CDHS in 2003. However, comparing data from these two surveys on oral impacts is somewhat problematic. Most of the data reported here were from the pupil questionnaire, whereas in 2003 less robust data were drawn from the parental questionnaire as children were not asked directly. As already discussed, parental and child reports do not concur, with parents under-reporting the prevalence of their children's quality of life compared to self-reports [9]. It was sensible to obtain the most meaningful data even if it prevented direct backwards comparison, whilst some of the information collected in the CDHS 2013 had not been collected in the CDHS 2003 (e.g. OHRQoL measure, and family impact). Therefore, we cannot comment on trends in the prevalence of oral impacts in the last 10 years. Instead, we focused on looking in more detail at different subjective perceptions and oral impacts on the recent survey and exploring variation by demographic and socioeconomic determinants that helped reveal important contemporary patterns and considerable inequalities in oral impacts. Future research in the CDHS 2013 dataset should also focus on exploring the associations between clinical and OHRQoL measures in order to highlight possible clinical determinants of oral impacts.

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