Adult Dental Health Survey 2009: implications of findings for clinical practice and oral health policy

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IN BRIEF

- The 2009 Adult Dental Health survey shows that the oral health of adults is improving.
- Oral diseases remain a significant problem for a sizeable proportion of the adult population.
- The 2009 ADHS results have key implications for maintaining and protecting the healthy cohort of young adults as they age, and providing appropriate care for the increasingly complex oral health needs of older adults.

GENERAL

This is the final paper in a series reporting on the results of the 2009 Adult Dental Health Survey. Since 1968 national adult surveys have been repeated every decade with broadly similar methods providing a unique overview of trends in oral health over a 40-year period. This paper aims to explore the implications for dentists and oral health policy of the key results from the Adult Dental Health Survey 2009. Although repeat, cross-sectional, epidemiological surveys provide very valuable data on trends in disease patterns, they do not provide answers to test causal relationships and therefore cannot identify the causes for the significant improvements in oral health over the last 40 years. Evidence would indicate, however, that broad societal shifts in population norms and behaviours, combined with changes in clinical diagnostic criteria, treatment planning and clinical procedures are the main reasons for the changes that have taken place. Key implications of the survey results include the need to monitor, support and maintain the good state of oral health of the increasing proportion of younger adults with relatively simple treatment needs. A smaller number of young and middle aged adults but a significant proportion of older adults will have far more complex treatment needs requiring advanced restorative and periodontal care. Future oral health policy will need to address oral health inequalities, encourage skill mix and promote and facilitate the dental profession to deliver appropriate and high quality care relevant to the needs of their local population.

INTRODUCTION

This paper is the final in a series reporting the findings of the 2009 Adult Dental Health Survey (ADHS) in England, Wales and Northern Ireland. The first national adult survey was conducted in 1968 and has been repeated every decade since with a largely similar methodology for England and Wales. Scotland and Northern Ireland have not been involved in all surveys and importantly Scotland was not included in 2009. Nevertheless very few (if any) countries in the world have such a wealth of high quality, regularly collected, epidemiological data on adult oral health over a 40-year period. The clinical and questionnaire data presented in the ADHS 2009 have important implications for clinical practice, oral health policy and research, particularly when seen in the context of previous surveys.

While there are inevitable methodological limitations with repeated cross-sectional epidemiological surveys they provide very useful insights into overall levels of oral health and related behaviours and the analysis of trends over time. This paper aims to explore the implications for dentists and dental policy of the key results from ADHS 2009 as described in the previous three papers in this series,[1–3] in the context of trends in adult oral health observed over recent decades. We hope that this paper will stimulate debate and discussion over the future challenges facing the dental profession across the UK.

SUMMARY OF MAIN FINDINGS FROM THE ADULT DENTAL HEALTH SURVEY 2009

A detailed description of the clinical and questionnaire data has been presented in the full ADHS report[4] and earlier papers in this series.[1–3] Overall the results of the 2009 survey present a positive and very encouraging picture of improving oral health and high levels of engagement of the public with their own oral health and its maintenance.

Compared to earlier surveys a remarkable transformation in adult oral health has occurred. In 2009 only 6% of the sample for England, Wales and Northern Ireland were edentate, a dramatic reduction from 1968 when 37% of adults in England and Wales had no natural teeth. Now, for the first time since the first surveys were conducted, the majority of adults, even those aged over 85 years in England, were dentate. A very high proportion (86%) of adults had 21 or more natural teeth, a good indicator of a 'functional' natural dentition and dietary freedom for most people. The overall prevalence of visible dental caries into dentine has fallen from 46% in 1998 to 28% in 2009, using identical criteria. Of particular note was the generally good overall state of oral health that now exists among younger adults, broadly those aged under 45 years in 2009, with low and apparently decreasing levels of disease and restoration in successive age cohorts.

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In terms of oral health behaviours and subjective measures of oral health further encouraging results were found. The majority of those interviewed (75%) reported brushing their teeth twice daily and 61% reported attending for regular check ups. Generally high levels of satisfaction with NHS dental services were reported with, for example, 90% rating the quality of dental care received as good or very good. The majority (71%) of those interviewed rated their oral health as good or very good and there was a reduction in the proportion of adults reporting negative impacts from problems with their oral health on their day to day lives in the previous 12 months, from 51% in 1998 to 41% in 2009. This last observation is perhaps particularly important, suggesting that many individuals are seeing improving quality of life as well as improvements in clinical measured health.

However, nobody should be complacent. The 2009 ADHS also reveals several areas of concern. Nearly a third (31%) of the sample had obvious decay on either crowns or roots with an average of 2.7 teeth affected, indicating that while the prevalence of decay may have fallen for those affected the extent is little different. Decay, or to be more precise, decay into dentine that remains unrestored, is becoming increasingly concentrated in a minority of the population. Furthermore, the affected minority is not evenly distributed across the population. While all sections of society were affected, stark inequalities in the likelihood of caries experience were found with significantly higher levels of disease among routine and manual occupational groups.

Moderate tooth wear was also relatively common (15%) and 7% of the sample had badly diseased and broken down teeth caused by extensive caries as measured by the PUFA index. In terms of periodontal health, although moderate disease generally reduced nearly half (45%) of the sample still had pocketing exceeding 4 mm, two thirds (66%) of adults over 55 years had loss of attachment of 4 mm or more and 9% of adults had some deep pockets of 6 mm or more. This latter measure was notable as it bucked the otherwise improving trend in oral health, including the improvements in moderate periodontal disease. It increased a little from 1998, particularly in adults in middle age. Nearly a fifth (19%) of the sample were classified as having complex oral health needs with multiple management issues, a particular issue for those aged over 45 years. In terms of oral health behaviours and subjective measures, nearly 1 in 10 (9%) reported current pain and well over a third (41%) reported experiencing one or more oral impacts in the last 12 months. Extreme dental anxiety was reported by 12% of the sample and more than a quarter (26%) stated that cost concerns were a barrier to attending a dentist. There are still plenty of oral health problems to concern the profession and policy makers. Table 1 presents an overall summary of both the positive findings from the 2009 ADHS, together with points of ongoing concern.

Table 1 Summary of the key findings from the 2009 Adult Dental Health Survey

Positive findings	Areas of concern
Only 6% edentate – 22% fall since 1978	Nearly third (31%) had obvious decay – average 2.7 teeth affected
Large majority (86%) had 21 or more teeth	Strong inequalities in caries experience by social class
Prevalence of obvious caries fallen from 46% to 28% since 1998	Nearly half (45%) had periodontal pocketing exceeding 4 mm
Overall 17% had very healthy periodontal condition	Two thirds (66%) of adults aged over 55 years had loss of attachment of 4 mm or more
Positive oral health behaviours – 75% brushing twice daily and 61% attend for regular check ups	15% had moderate tooth wear
High level of satisfaction with NHS dentists – 90% reported quality of care was good or very good	9% said they had current dental pain or discomfort
Majority (71%) rated their oral health as good or very good	7% had one or more PUFA lesion
Fall in OHIP 14 score since 1998 – from 51% to 41%	Nearly a fifth (19%) had three or more indicators of complexity – especially over 45 year olds
	Low level of reported preventive advice given by dentists
	Cost concerns still a barrier to attendance for many (26%)
	Over 10% were classified as having extreme dental anxiety
	41% experienced one or more problems from OHIP 14 – inequalities in impact

INTERPRETING THE FINDINGS

Cross-sectional epidemiological surveys provide valuable data on overall levels of disease and associated behaviours within a defined population. The analysis and interpretation of data from these repeated surveys provide insights into the changing patterns and trends in oral diseases, but the surveys are not longitudinal and cannot test causal relationships. Nevertheless, the dramatic changes and trends observed have implications for dentistry and individual dentists. Further detailed interrogation of the data may be able to give us some clues as to why such changes have occurred, but it is impossible to be certain about which of many factors have caused the dramatic changes in oral health seen over recent decades.

Nowadays, the main methodological concern is the gradual and general decline in response rates over recent surveys. This is not restricted to oral health surveys but is a widespread problem with epidemiological field studies. For the 2009 ADHS a 60% response rate was achieved for the home interviews, in contrast to 85% in the 1968 survey.[5] Although a huge expert effort goes into calculating weightings to correct response bias as precisely as possible before analysis, lower response rates inevitably raise some concerns over the generalisability of survey findings because, no matter how sophisticated the adjustments, a higher response rate is always preferred.

It is also important to remind ourselves of familiar methodological difficulties in repeated cross-sectional dental surveys such as the ADHS series. The clinical examinations are conducted using standardised methods and epidemiological criteria that are agreed *a priori* and designed to be consistent from decade to decade, but the examination is quite different from a dental check-up. For example, no radiographs can be taken to diagnose caries and while great efforts are made to train and calibrate examiners, with around 80 examiners there will be variation. The overall effect is that while survey data are comparable from survey to survey and the

patterns of disease across the population within surveys will be robust absolute disease levels for both caries and periodontal disease will always tend to be underestimated, particularly perhaps periodontal disease where it may be easy to under record periodontal pockets. In this context, it is interesting to note the diverging trends between moderate periodontal disease (which has reduced) and advanced disease (which has increased), suggesting that this observation is not an artefact.

Despite these inevitable methodological issues there is a very high degree of consistency in the overall trends, indicating that a major shift in oral health has occurred across the adult population of England, Wales and Northern Ireland.

WHY HAVE THESE CHANGES OCCURRED?

Perhaps it is easiest to dismiss factors that we can confidently assert have not been responsible for these changes. Across England, Wales and Northern Ireland no nationally coordinated preventive or dental public health programmes have been implemented for adults. The availability of evidence-based preventive advice has certainly improved[6] and the use of preventive measures such as topical fluorides delivered in clinical settings has also increased in recent years, but given the very recent timescale of these, they probably only have a small part to play for the overall improvements in oral health in adults. The cumulative nature of the effects of oral disease, the nature of the diseases themselves and the long-term implications of treatment mean that many of the changes are gradual and take decades to manifest in a population. We are almost certainly seeing a very complicated picture that has developed over decades, perhaps slightly nuanced by shorter term factors.

While it is impossible to be certain, it is highly likely that the improvements in oral health have largely been driven by two broad and possibly interacting factors: firstly a range of broad societal shifts in population social norms and behaviours have occurred in recent decades that would be expected to have had an indirect effect in improving oral health and, secondly changes in clinical diagnostic criteria, treatment planning and clinical procedures.

SOCIETAL SHIFTS

There are multiple, well documented societal shifts in the behaviours of British adults. Rates of smoking in the UK have steadily declined since the 1950s and are now at their lowest level recorded.[7] Body hygiene has also dramatically improved and linked to this shift in social norms towards hygiene results from adult dental surveys, including this one, have shown that levels of plaque and calculus have steadily improved over the last 40 years.[8] As a population we now appear to be more engaged with our oral health than ever before.

Another significant social change has been the widespread and now almost universal use of fluoridated toothpastes in the UK. This change again took place from the late 1960s and particularly early 1970s onwards and was largely driven by the marketing strategies of multi-national toothpaste manufacturers. In addition, a whole range of supplementary methods of cleaning (floss, interdental brushes, mouthrinses etc) have been developed by manufacturers and taken up by an increasing proportion of the population (58% in 2009). A more complex factor has been the changes that have taken place in the consumption of sugars in the British diet. Overall, levels of sugars consumption among adults have not decreased significantly, but there has been a dramatic change in the consumption patterns of sugars in recent decades.[9] The use of table sugars has decreased a great deal but now most sugars are consumed in processed and manufactured foods and drinks. There may be a range of unfathomable and unmeasurable changes interacting with these that we simply do not understand.

DENTAL CARE

Patterns of behaviour and risk of disease is only one part of the picture. A second major factor likely to be responsible for some of the changes in oral health status is the change that has occurred in how dentists diagnose and treat caries and periodontal disease. The huge number of edentate people observed in the 1968 survey reflected historic patterns of care where early clearance of natural teeth was common. Subsequently there was a move towards restoration but since the 1980s a radically different treatment philosophy and approach has been gradually adopted by the dental profession. In line with contemporary evidence in the field of cariology, the diagnostic criteria, treatment planning and management of caries are all substantially different from the approaches used 30 years ago. In general, dentists are now less likely to intervene with early carious lesions and adopt a more conservative restorative approach.[10]

This is not just about scientific knowledge and the teaching in dental schools and on postgraduate courses. The experience of dentists will inevitably have changed as their own experience of the prevalence and extent of disease has altered. For example, millions of decisions about how to manage individual lesions are made by tens of thousands of clinicians every month in the UK. As the wider environment changes the clinicians' experience and understanding of what it means to have a carious lesion will also inevitably alter. We might hypothesise that where caries is abundant and needs are high, it makes clinical sense to err on the side of early intervention. Where caries is less common or less rapid in its progression, it makes sense to be more cautious with the air rotor. Played out on a continuous iteration over decades and hundreds of millions of decisions it is possible to start to see just how the wider societal shifts and clinical care may interact to lead to the improved oral health that we have witnessed. The adoption of evidence for good care is central to that process, but the transformation is far from complete.

IMPLICATIONS

In broad terms the results of the 2009 ADHS present three key challenges for the dental profession and policy makers:

1. How best to maintain and protect the healthy cohort of young adults aged under 45 years as they progress across the lifecourse
2. How to provide appropriate care and treatment for the increasingly complex oral health needs of adults aged over 45 who bear the legacy of previously high levels of disease and treatment, the majority of whom have the potential and desire to retain their natural teeth throughout their lives
3. How to address inequalities in oral health across the adult population.

The implications on how best to meet these challenges will now be outlined in terms of the future nature of clinical practice, oral health policy and dental research.

Clinical practice and the needs and demands of the population

The dental profession, in its widest sense, clearly needs to have the appropriate clinical and behavioural skills to meet the changing oral health needs of the adult population. Based on the findings from ADHS, it is highly likely that an increasing proportion of adult patients, particularly those now aged under 45 years will have relatively simple treatment needs. These patients will need on-going monitoring and support to ensure that their good state of oral health is maintained and managed effectively. A smaller number of young and middle aged adults, but a very significant proportion of older adults, will have far more complex oral health needs requiring advanced restorative care, challenging endodontic and periodontal therapy and surgical interventions presenting a range of problems. As they age, the environment in which this will be provided will become increasingly challenging as a result of chronic illness and its effects.

Consequently, clinicians will need highly developed skills in diagnosis, treatment planning and clinical care for these patients. Focused postgraduate clinical training may be required to enable advanced evidence-based techniques to be developed if excellent outcomes are to be ensured. In addition, if the population continues to take an interest, becomes even better informed and more able to question professionals over their clinical decisions and alternative choices, well developed communication skills will be at a premium.

While dentists will have a key role in the diagnosis, treatment planning and provision of this more complex care, the large population with good and stable health may be well served by dental care professionals who can take responsibility for the provision of preventive support and more routine clinical care. Effective team working requires understanding of the roles and responsibilities of team members if finite and constantly pressured health resources (public or private) are to be used to best effect. This may also impact on the needs of the estate, in other words, dental premises may also have to change.

In order to deal with the complexities around care for older adults, primary care dental teams will also need to work effectively with colleagues in secondary and tertiary care to ensure that patients with complex oral health needs, and in many cases other co-morbidities, are appropriately managed. This may need those leading the secondary care specialties to rethink their roles. The development of local care pathways is a pressing challenge for newly formed local professional networks across England and is an opportunity for this process to begin. This will inevitably need to be a gradual restructuring of the workforce rather than a sudden transformation.

Oral health policy and the needs of the population

It is vitally important that the oral healthcare system enables and facilitates the dental profession to deliver appropriate, high quality care to meet the needs of their local population. In any system, whether publicly or privately funded, remuneration by incentivising treatment over prevention is no longer appropriate for most of the population. The current GDS pilots running in the NHS in England, as well as slightly different models in Wales, recognise this and seek to build a model for care around promoting oral health and managing risk as a priority, as well as ensuring treatment is appropriate. They are also designed to recognise quality as well as activity. No payment system is perfect though and the capitation approach being piloted also carries recognised risks that will need to be managed. Thinking about how a combination of charges, payments and clinical monitoring may be used to manage demand and meet expectations of quality will be an uncomfortable but necessary step if we are to develop an excellent publicly funded service. At the same time there is an increasing proportion of the adult population who pay privately for dental care under a variety of arrangements; this has risen from 6% in 1968 to 26% in 2009. The regional differences in the balance between NHS and private care are stark, probably reflecting underlying differences in both wealth and culture.

The constant link between the care provided and the evidence for its effectiveness also makes sense in any system of care and in any population. This linkage should be strengthened for the future. We may celebrate the improvements in health described in this series and recognise the potential for further improvement, but we will only maintain this trajectory if there is a constant process of refinement. There are still major gaps in the range, scope and rigor of clinical guidelines that currently exist, often related to the very long term outcomes of oral health interventions. Collecting and using good data from practices, particularly those in the NHS, have the capacity to complement evidence from well run trials and surveys like this. Many of the problems of the future can be identified from the trends we have observed in this series of papers, so a cohesive national research and development strategy may be appropriate.

One final and difficult policy question relates to how best to tackle the stark oral health inequalities that exist in the adult population and that are evident from the ADHS data. We know that such inequalities are largely a result of social determinants rather than what happens in a dental surgery and therefore require upstream policies that address these broader influences on health.[11] However, dental professionals working at a local level do have a major role to play in ensuring that their services are accessible, responsive and appropriate to the characteristics and diversity of their populations. In England the new local professional networks should have a key responsibility to ensure that oral health inequalities are addressed and that upstream and downstream activities are aligned.

CONCLUSION

The results of the 2009 ADHS reveal a fascinating picture of the oral health of adults living in England, Wales and Northern Ireland. Significant and dramatic overall improvements have taken place over recent decades. However, many millions of adults also suffer from disease, many millions will have long term needs because of the legacy of the past and many more have, or will have, complications from anxiety to co-morbidities that complicate care. At the same time engagement with oral health issues are probably larger than

ever before but this brings with it expectations and demands. The results of the survey are rich and have more to reveal but are an essential starting point for thinking about clinical care and dental policy for the future.

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