

Dentists' views on the effects of changing economic conditions on dental services provided for children and adolescents in Iceland

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In 2008, Iceland experienced a major financial crisis, with serious effects on the economy of the country and its inhabitants. **Objective:** To describe the opinions of dentists in Iceland regarding the influence of economic changes on the demand for dental health services for children and adolescents, aged 0-18 years, and also to describe the preventive dental care the dentists reported providing for children and adolescents. **Basic research design and participants:** Questionnaires were sent by electronic mail to all dentists in Iceland in January 2013. Of the dentists working with children, 161 (62%) returned the questionnaire. **Results:** Important findings were that 119 (74%) of the respondents reported increased caries experience in children and adolescents and 150 (93%) reported that decreased reimbursement for dental treatment of children in recent years had affected the dental health of most or some children and adolescents. Most dentists reported reduced parental demand for most aspects of caries prevention and treatment, apart from treatment for acute dental pain. The mean interval between dental visits was reported to be 9.4 months (sd 2.8) and the mean maximal interval 12.1 months (sd 2.8). The mean proportion of working time allocated for caries preventive services was reported to be 31% (sd 21). **Conclusions:** The results indicate a contrast between increased need for children's dental care perceived by the dentists and reduced demand for care from the parents. This may be a temporary phenomenon, as the economic crisis passes, reimbursement for dental care may increase.

Key words: dental health services, economic recession, Iceland, prevention

Introduction

In 2008, Iceland experienced a major financial crisis, part of the recession which began in December 2007 and affected many countries in the world. In Iceland this had serious effects on the economy of the country and its inhabitants. The national currency fell sharply in value: cutting in living standard and purchasing power; reducing citizens work opportunities (less overtime, more unemployment); reducing extra benefits; increasing taxes and the debt burden (Olafsson, 2011). Elsewhere associations have been noted between the recession and reduction in health care utilisation (Dorn *et al.*, 2012; Mortensen and Chen, 2013) and lower spending in primary care (Chen *et al.*, 2013; Karaca-Mandic *et al.*, 2013; Martin *et al.*, 2012) including dental care (Chen *et al.*, 2013; Manski *et al.*, 2012a; 2012b). One study reported no change in the utilisation of dental care in Iceland from 2007 to 2009 (McClure and Saemundsson, 2013), an interval perhaps too short to reveal changes induced by the financial crisis. In economics the equilibrium between needs and demands is frequently discussed. During economic recessions this equilibrium changes, as spending on luxuries is reduced in favour of necessities. In dentistry, that may mean less spending on routine examinations and preventive services, while the demand for acute dental pain treatment probably remains stable. Whether the economic changes in Iceland in recent years have influenced the dental health of the children and the dental health services provided for children by the dentists is not documented.

Prevalence of dental caries in developed countries has changed dramatically during the last decades. Increased focus on preventive care was followed by reduction of caries at the end of the twentieth century (Pettersson and Bratthall, 1996). In Iceland, the decline in caries started in the 1980s, later than in other western countries (Bjarnason *et al.*, 1997; Einarsdottir and Bratthall, 1996; Marthaler *et al.*, 1996) and the goal of the Icelandic National Health Plan for the year 2010 was to further reduce the caries experience in children (MHSS, 2004). Virtanen and co-workers (2007) reported a decrease in children's use of dental services in Iceland, along with the other Nordic countries, between the 1980s and 1990s. It was concluded that marked decrease in dental caries and an economic recession, together with increased use of individual recall intervals, probably contributed to the reduced use of dental services. In 2010, it was reported that caries levels in Iceland were higher than expected, with DMFT higher than 2.0 in 12 year olds (Agustsdottir *et al.*, 2010). This has raised concerns in the Icelandic dental community and discussions about possible explanations.

Caries prevalence in Iceland is higher than in the other Nordic countries (Koposova *et al.*, 2013; CECDO, 2013) and the provision of dental care for children and adolescents is different (Poulsen *et al.*, 1998). Dental care in Iceland is provided by private practitioners. In the 1980s, when the caries decline started, child dental care was fully reimbursed by the government. Because of improved children's oral health, the government reimbursement was reduced in 1992, 1999 and subsequently with limitations

set on reimbursement of fluoride treatments, sealants and other preventive services (Árnadóttir, 2005), to the point where only a small fraction of the costs of children's dental services were reimbursed. This arrangement differs from the other Nordic countries, where dental care for children is provided by public systems, which do not charge for child dental care (Poulsen *et al.*, 1998; Widström *et al.*, 2005). In the 1990s, a study on caries preventive services for children and adolescents in Denmark, Iceland, Norway and Sweden showed that in Iceland examinations and prevention were mainly performed by dentists, while, in the other countries, auxiliaries performed these services to a greater extent (Källestal *et al.*, 1999; Wang, 1998; Wang *et al.*, 1998). Despite the differences, Icelandic dentists seemed to provide the same type and amount of preventive services as dentists in other Nordic countries (Källestal *et al.*, 1999; Wang, 1998; Wang *et al.*, 1998). Studies on caries preventive services in Iceland have not been conducted since the 1990s. The fact that caries experience in Icelandic children still is higher than expected gives rise to discussions on the provision of dental care and how caries preventive services are provided by dentists and dental personnel.

The purpose of this study was to describe the opinions of Icelandic dentists regarding the influence of economic changes on the demand for dental health services for those aged 0-18 years, and, additionally, to describe the preventive dental care the dentists reported providing for children. In this paper the term 'children' is used for all ages 0-18 years and includes adolescents.

Methods

In January 2013, a questionnaire was distributed by electronic mail to all 279 dentists in Iceland, including specialists, on the member list of the Icelandic Dental Association. Participation was voluntary and four reminders were sent to non-respondents during the two month data collection period.

The questionnaire was used to gain insight into the influence of the economic changes on dental health and dental health services given by Icelandic dentists. It consisted mainly of multiple-choice questions, based partly on a similar study from the 1990s (Källestal *et al.*, 1999; Wang, 1998; Wang *et al.*, 1998).

The questionnaire provided information on background variables; the age and gender of the dentists, whether they worked as general dentists or as specialists, where they completed their dental degree, the number of years they had been working with children, the number of children they treated per year and the proportion of their working time they spent on child patients.

The dentists' opinions regarding changes in children's dental health in Iceland in the last 5-10 years and perceived reasons for changes were addressed by four questions. One question addressed whether the dentists felt that the dental health of the children had improved, deteriorated or was unchanged. The dentists reporting deterioration were asked for possible explanations; less interest in dental health among the population, changed strategies in the provision of preventive dental care by dentists, low reimbursement from the government or changes in diet. The dentists were asked if they assumed

that economic changes in recent years had reduced parents' demand for children's dental care, such as the frequency of routine examinations, caries prevention, restorative treatment, more expensive treatments such as root fillings instead of extractions, or acute treatment of dental pain. The dentists were asked whether they assumed that declining reimbursement to children's dental care in recent years had influenced the dental health of the children.

Provision of preventive dental care was studied by questions on whether the dentists believed the importance of preventive methods had changed in recent years. The respondents were asked to classify fluoride therapy, oral hygiene advices, dietary counselling, use of chlorhexidine and fissure sealants as more important, unchanged and less important. Changes in the amount of preventive advice provided by the dentists were reported by the dentists to be increased, unchanged or reduced. The dentists were asked about how often they used fluoride varnish for their child patients: almost at every visit, at the end of the treatment sequence for all or most patients, on specific indications or seldom or never.

Preventive dental care was assessed by questions on the number of minutes used for routine dental examinations and preventive services, the proportion of working time used for prevention and the longest and the most frequently used recall intervals between routine examinations. The dentists were also asked whether they classified their patients by risk category and, if so, the perceived proportion of risk children.

The questionnaire was pilot tested by two dentists in Iceland and some questions were modified to eliminate misunderstandings and to take into account comments from the dentists.

Analyses used SPSS v20.0 statistical software to calculate the data's frequency distributions, means and standard deviations and proportions and tested differences between means using *t*-tests with $p < 0.05$ indicating statistical significance.

The study was reported to the Data Protection Authority in Iceland and the Norwegian Social Science Data Services (NSD) in Norway, and approved by the Regional Committees for Medical and Health Research Ethics (REC) in Norway. The cover letter accompanying the questionnaire sent to the respondents stated completion was voluntary and return of a completed questionnaire was taken as consent.

Results

Questionnaires were returned by 190 dentists (68%) but excluded were one practising abroad, six retired dentists and 22 specialists who did not perform caries preventive services for children. The remaining study population of 161, (62%) included 42% ($n=67$) women and 58% ($n=94$) men, 92% ($n=148$) were general dentists and 8% ($n=13$) were specialists who provided caries preventive services for children. The mean age of the dentists was 46 years (sd 12) and the majority, 86% ($n=138$), had completed their dental education in Iceland, 10% ($n=17$) in Scandinavian countries and 4% ($n=6$) in other European countries.

A description of the respondents is provided in Table 1. About half the dentists had worked with children for

20 years or more, and about half reported treating more than 200 children per year. Only 8% treated fewer than 50 children per year and a similar fraction spent more than half their working time on children.

Almost three-quarters of the dentists, 74% (n=119), reported that caries experience in children had increased in recent years, while 5% (n=8) reported that the dental health of the children had improved. Of the dentists that reported increased caries experience, 85% (n=101) reported decreasing reimbursement for child dental care as the main reason. The remaining dentists reported changes in diet (10%), parental irresponsibility (3%) and changes in preventive services among dentists (2%) as the main reason. Nearly all dentists, 93% (n=150), reported that decreased reimbursement for dental treatment of children in recent years had affected the dental health of most or some children and adolescents. Only one dentist reported that decreased reimbursement had not had any effect. Most dentists (85%) reported that they classified their patients as caries risk or non-risk patients. The mean proportion of children classified to be at risk was 23% (sd 15.0).

Table 1. Distribution of the respondent dentists (n=161) by years of working with children, number of children treated per year and proportion of working time spent on child patients.

	n	%
Years working with children		
1	6	4
2-4	19	12
5-9	21	13
10-19	38	23
20-29	42	26
30-39	26	16
40-49	9	6
Children treated per year		
<50	12	8
50-200	65	40
>200	84	52
% of working time spent with children		
> 75%	8	5
75-50%	6	4
49-25%	97	60
< 25%	50	31

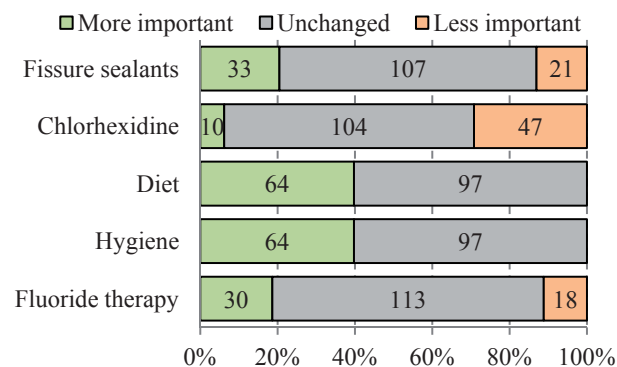


Figure 1. Numbers and proportions (%) of dentists who reported changes in the importance of preventive measures the last 5-10 years (n=161)

The proportion of dentists who reported reduced parental demand for certain types of dental care for children due to the financial crisis varied considerably. Almost all dentists (94%) reported an adverse effect on the frequency of children's routine dental visits. Most had noticed a fall in parents' demand for both caries preventive care (63%) and restorative treatment for their children (70%) and that parents chose cheaper over more expensive treatment (64%). The only type of dental treatment for children not to be reduced was treatment for acute dental pain, reported by 67% of dentists.

The amount of preventive services provided by dentists the last 5-10 years was reported to be unchanged by 66% (n=107) of the dentists, to have increased by 25% (n=40) and decreased by 9% (n=14) of the dentists.

Figure 1 presents the proportions of dentists who reported changed importance of preventive services; fluoride therapy, hygiene advice and diet counselling, use of chlorhexidine and fissure sealants during recent years. The majority reported not to have changed or to have increased the emphasis on preventive care. A few had decreased the emphasis on preventive measures.

Turning to the delivery of dental care for children in Iceland, the mean interval between dental visits was reported to be 9.4 months (sd 2.8) and the maximum mean interval was 12.1 months (sd 2.8). The mean time used for routine examination of children by dentists was 22 minutes (sd 8). The annual time allocated for caries preventive procedures was significantly greater for a risk child than for a non-risk child, 34 minutes (sd 25) vs. 17 minutes (sd 13, p<0.05). The mean proportion of working time allocated for caries preventive services was 31% (sd 21).

Fluoride varnish was used by 75% of the dentists, either at every visit, or at the end of the treatment sequence for all or most patients. A quarter of the dentists used fluoride varnish only on specific indications.

Discussion

This study focussed on the opinions of the Icelandic dentists regarding the influence of economic changes on the dental health services provided for children and on the preventive dental care the dentists reported providing for children aged 0-18 years. Most dentists thought the caries experience of children had increased in recent years, at the same time as parental demand for most aspects of caries prevention and treatment had reduced, as well as some aspects of preventive services provided by the dentists.

The response rate (62%) was in line with other similar studies. Since all dentists who provide caries preventive care for children in Iceland were invited to participate, the respondents can be considered to be representative of all dentists who treat children and adolescents in Iceland. The study was based solely on answers to a questionnaire and has all the limitations inherent in this type of data collection. Most questions related to the daily work of the clinicians, so it is likely that recall and reporting errors are randomly distributed (Hennekens and Buring, 1987).

The increase in caries experience of children and adolescents in recent years, reported by 74% of the dentists, is in line with the findings of a study where higher

caries experience than expected was reported (Agustsdottir *et al.*, 2010). This also agrees with the finding in the present study that 23% of children and adolescents were classified as risk-children, significantly higher than in the 1990s, 14% risk-children (Wang *et al.*, 1998; personal communication with the authors). It is likely that the increase in caries experience among children reported by the dentists is in accordance with the real caries situation in Iceland described in the introduction.

An important finding in this study was that nearly all of the dentists reported decreasing reimbursement to insured patients as the main reason for the increase in caries experience. Iceland is the only Nordic country where dental care for children is not free of charge and hence the only one where the child's opportunity to get appropriate dental care depends partly on the wealth of its parents. As previously discussed, reimbursement to child dental care has been gradually reduced over the last two decades despite dentists' voiced concern for the children's dental health. In 2013, after the present study, extensive reimbursement for child dental care was introduced but it is too soon to tell whether this has contributed to an improvement in child caries prevalence in Iceland.

The present results indicate that the financial crisis in Iceland has affected the parental demand for most types of caries prevention and treatment, apart from treatment for acute dental pain. The reported reduced demand for children's routine examinations, caries prevention, restorative treatment and more expensive treatments, such as root fillings (rather than extractions) could be partly explained by shifts in spending from luxuries to necessities during times of economic constraint. During a financial crisis, it may seem logical to postpone dental appointments, preventive care, etc. until the finances improve. This agrees with previous studies of consequences of the recession, which decreased dental visits (Manski *et al.*, 2012a; 2012b; Virtanen *et al.*, 2007), reduced spending on dental care (Chen *et al.*, 2013) and delayed treatment for dental problems (Abasaheed *et al.*, 2013).

Unlike most other types of caries prevention and treatment, the dentists reported that parental demand for treatment of acute dental pain in children remained unaffected. This has also been pointed out in previous studies which have documented increased frequentation of emergency departments for dental problems (Lee *et al.*, 2012). This is most likely a consequence of reduced utilisation of dental health services, which may have adverse effects on dental health in the long run, since lack of effective caries prevention may lead to acute dental pain, necessitating dental treatment.

Despite a reported increase in caries experience, two-thirds of the dentists reported not to have changed the amount of preventive care provided in the past 5-10 years, and only 25% reported an increase. When the present study was conducted, parents had to pay for preventive care and during the financial crisis many families could not afford such "luxuries" as caries prevention. Another potential explanation is that children from lower socioeconomic backgrounds were disproportionately less likely than others to seek dental care in times of economic crisis even allowing for the socioeconomic inequalities (Manski *et al.*, 2012a; Mantonanaki *et al.*, 2013; McClure

and Saemundsson, 2013) and their associated higher caries experience (Mantonanaki *et al.*, 2013; Wigen and Wang, 2010).

Most of the dentists reported unchanged or increased emphasis on preventive methods, both use of fluoride, hygiene and diet measures, chlorhexidine and fissure sealants in the last 5-10 years (Figure 1). This may be due to the fact that the dentists experience higher caries experience and see a higher proportion of risk-children who need for increased caries prevention. At the same time, the parents requested less preventive care because of economic difficulties. Delivery of dental care for children was studied by questions on frequencies of and time used for routine dental visits and prevention. Compared with the 1990s, dentists in the present study reported significantly longer intervals between dental visits, a remarkable reduction in the time allocated for caries preventive services and decreased use of fluoride varnish (Wang *et al.*, 1998). These changes may indicate decreased parental demand for dental services. Increased recall intervals in the present study could also be explained by adjustment towards routines followed in the other Nordic countries, where recall intervals are considerably longer (Wang and Aspelund, 2010; Wang *et al.*, 1998). However lower prevalence in the other Nordic countries than in Iceland could warrant longer intervals (Koposova *et al.*, 2013; CECDO, 2013).

In conclusion, the Icelandic dentists reported an increase in caries experience in children and adolescents in recent years, at the same time as they reported a reduction in parental demand for most aspects of caries prevention and treatment. Less frequent dental visits and a reduced proportion of time spent on caries prevention was reported. This could partly be explained by the financial crisis, which had an impact on the economy of the population, and partly by limited reimbursement of dental services for children and adolescents from the government. That may be a temporary phenomenon, as the reimbursement increases and the economic crisis passes warranting future studies into the changing delivery of children's dental services.

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