

Understanding avoidance and non-attendance among adolescents in dental care - an integrative review

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Objective: To review articles exploring manifestations of avoidance of or non-attendance to dental care, to identify background and concomitant factors specifically associated with dental avoidance among adolescents. **Methods:** PubMed, CINAHL and PsychINFO were searched using MeSH terms and keywords covering dental avoidance, non-attendance and non-utilization. Searches were limited to peer-reviewed studies in English, published in 1994–2014. Twenty-one research articles were included. Data were extracted, ordered, coded, categorized, and summarized according to the integrative review method. **Results:** The identified factors formed three common major themes: Environmental, Individual and Situational factors. Only seven studies, all from Sweden or Norway, investigated factors associated with dental avoidance. The remaining 14 studies were geographically widespread. Regarding avoidance, the main focus was found to be on individual and situational factors, while environmental factors were more often investigated for the outcome non-attendance. **Conclusions:** Although a wide variety of environmental, individual and situational factors could be summarized in this review, factors specifically associated with dental avoidance in a context of free dental care still need to be investigated. The possible impacts of cultural background, of tobacco, alcohol or drug use and of psycho-social circumstances deserve further research. Clinical implications of today's knowledge may be to pay attention to the adolescents' individual background and everyday life situation, to offer agreed and individualized treatment, taking fears and attitudes into consideration, to avoid painful treatments, and to be alert for early signs of avoidance.

Key words: dental health services, health care utilization, adolescent, review

Introduction

Dental health care services differ between countries in terms of the organization, accessibility, availability and costs (World Health Organization, WHO, 2015b). In some countries, full dental health services are readily available through private or public systems, while in other countries dental services are limited to pain relief and emergency care (WHO, 2015b). Some countries offer free dental care for children and adolescents up to a certain age (Crocombe *et al.*, 2011; Helsenorge, 2014; Norden, 2014; Socialstyrelsen, 2015), while others offer insurance for specific dental treatments (Birch and Anderson, 2005; Lewis *et al.*, 2007; Quinonez *et al.*, 2005). In the Nordic countries, children and adolescents have free access to dental care regardless of socioeconomic or insurance status (Socialstyrelsen, 2015). Despite this, missed and cancelled dental appointments among children and adolescents occur frequently both in public (Kvist *et al.*, 2012; Skaret *et al.*, 1999) and in Specialized Paediatric Dentistry (Gustafsson *et al.*, 2010). Missed appointments have been more reported among older children (Heidmann and Christensen, 1985; Klingberg, 1995) and among boys (Craven *et al.*, 1994; Lissau *et al.*, 1989; Wang and Aspelund, 2009).

Missed dental appointments and non-regular dental care have frequently been associated with poorer oral health or emergency care among both children (Klingberg *et al.*, 1994; Wang and Aspelund, 2009; Wigen *et al.*, 2009; Wogelius *et al.*, 2003) and adults (Armfield, 2013;

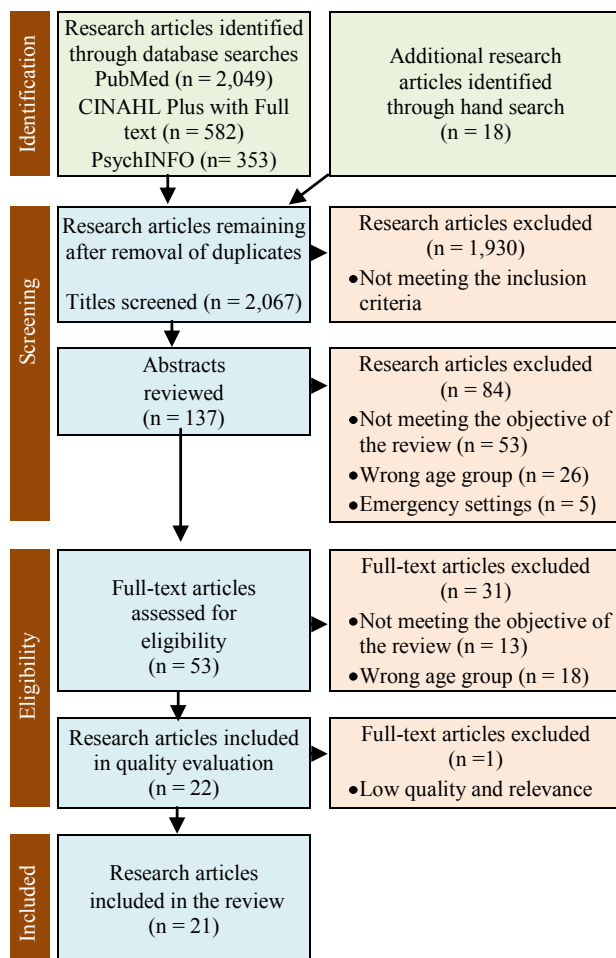
Crocombe *et al.*, 2011). Further, among adults with high dental fear, long-standing avoidance of dental care has been associated with feelings of guilt and shame which in turn enhance both avoidance and dental fear, and a vicious circle is established (Berggren and Meynert, 1984).

Besides dental fear or anxiety (Armfield, 2012; Eitner *et al.*, 2006; Hägglin *et al.*, 2000; Klingberg *et al.*, 1995; Pohjola *et al.*, 2007), a spectrum of different antecedents or concomitant factors associated with avoidance or non-attendance of dental care have been discussed (Armfield, 2012; George *et al.*, 2007; Hilton *et al.*, 2007; King, 2003; Lissau *et al.*, 1989; Vargas *et al.*, 2003). Cultural beliefs in different ethnic groups and parental dental anxiety have been reported to influence young children's access to dental care in the US (Hilton, *et al.*, 2007). The risk of being an irregular dental attender at age 20–21 in Denmark increased by 12% among those living with mothers who were irregular dental attenders (Lissau *et al.*, 1989). Among adults, dental fear, insurance and cost problems (Armfield, 2012; Vargas *et al.*, 2003), lack of time (Armfield, 2012; George *et al.*, 2007), being too busy, having no problems with teeth (King, 2003) and not liking the dentist (Armfield, 2012) have been reported as reasons for dental avoidance.

A deeper understanding of why some adolescents fail to attend their dental appointments is important in efforts to enable good oral health and a continuation of regular dental care into adulthood in the general population.

Table 1. Criteria for inclusion and exclusion of articles

<i>Inclusion criteria</i>	<i>Exclusion criteria</i>
Quantitative or qualitative research	Intervention studies
Research published in English between 1994 and 2014	Studies on perceptions of dental health personnel
Peer-reviewed primary research reports	Research data published in duplicate papers
Factors associated with dental avoidance, non-attendance or non-utilization	Audit/review/analysis of case notes
Adolescents aged 13–19 years	

**Figure 1.** Process of literature selection through the different phases of the review process (after Moher et al., 2009)

Therefore, the aim of this study was to review articles exploring manifestations of avoidance of dental care, or non-attendance to dental appointments, to identify background and concomitant factors specifically associated with dental avoidance among adolescents (13–19 years old).

Methods

An integrative review method allows broad inclusion of diverse data sources and thematic data analysis (Whittemore and Knafl, 2005). It parallels systematic reviewing by specifying the question or research problem, thoroughly and systematically searching the literature, followed by data evaluation, data analysis and presentation of the results (Whittemore and Knafl, 2005). The integrative review method was chosen mainly to allow the thematic processing of the data while the literature search was restricted to databases on research articles.

The goal of the literature searches was to find both empirical and theoretical research articles studying dental avoidance, non-attendance or non-utilization among adolescents. The databases used were PubMed, CINAHL Plus with Full text, and PsycINFO. The following MeSH terms were used: “*dental health care*” OR “*health care services/dent**” using the asterisk as an open-ended term. The key words used in the searches were those often used in the literature covering the topics of this study aim, such as “*dental avoidance*”, “*dental attendance*”, “*dental non-attendance*”, “*dental utilization*”, “*dental no-show*”, “*dental appointments*”, “*missed dental appointments*”, “*dental visit*” and “*dental priority*”. The Boolean operators AND and OR were used to cover all key word pair combinations (e.g. “*dental AND avoidance*” OR “*dental AND attendance*”). The search was limited to peer-reviewed studies in English, published in 1994–2014 and covering adolescent populations (13–19 years old). The age range was chosen to cover the period of clearly increasing individual independence as adolescents make more of their own decisions with the specific limits decided after considering the US National Library of Medicine (2015) definition of between 13–18 years and the 10–19 years of the WHO (2015a).

The main literature search took place in May 2014 with assistance from a librarian at the Medical Library, Örebro University, Örebro, Sweden. The search was updated in June 2014 and January 2015 by the first author (AF). In total, 3,002 articles were identified during the search of electronic databases. From reference lists of relevant articles, no additional studies were identified. After removing duplicates, 2,067 articles were included in the further evaluation.

The first author initially screened all 2,067 titles and excluded 1,930 which did not meet the inclusion criteria (Table 1). Abstracts of the remaining 137 articles were independently screened by two authors (AF, KA), leaving 53 articles that appeared to meet the inclusion criteria and were therefore independently reviewed in full text by all three authors. Of these 53 articles, 31 were excluded because they did not meet the inclusion criteria, resulting in 22 articles for evaluation of quality and relevance (Figure 1).

For the purpose of the review, dental avoidance as an outcome was defined as cancelled or missed appointments in a system with dental care free of charge for adolescents and with a recall system and appointment booking initiated by the dental care provider (Crocombe *et al.*, 2011; Helsenorge, 2014; Norden, 2014; Socialstyrelsen, 2015). For the outcome defined as dental non-attendance (including non-utilization), a variety of manifestations of non-regular dental care (no use of preventive dental services (Honkala *et al.*, 1997; Lopez and Baelum, 2007;

Mak and Day, 2011; Okullo *et al.*, 2004; Yu *et al.*, 2001), not having visited a dentist during the last two years (Honkala *et al.*, 1997; Zimmer-Gembeck *et al.*, 1997), visiting for emergency care only (Honkala *et al.*, 1997; Lopez and Baelum, 2007; Mak and Day, 2011; Okullo *et al.*, 2004; Yu *et al.*, 2001) were allowed.

The 22 full-text articles were evaluated using a pre-set protocol, constructed by combining two review templates for quantitative studies (Forsberg and Wengström, 2013; Willman *et al.*, 2011). The protocol included assessments of inclusion and exclusion criteria, aims, study design, study population, selection methods, measurements, analysis and result reporting. Study quality and relevance to the aim of this review were each classified as high, moderate, or low. To qualify for high quality a study had to meet the following criteria: the drop-out rate had to be stated and to be <20%; and, where applicable, consideration of confounders had to be included. For classification of high relevance, a study had to meet the following criteria: it had to contain relevant material; the results had to be clearly described and be consistent with the aims of this review. Uncertainties were resolved by discussion until consensus was reached. One article was excluded being rated of both low quality and low relevance. Therefore, 21 studies were finally included in the review.

Using an appropriate data analysis method is critical in the integrative review process (Whittemore and Knafl, 2005). The guiding framework for this study was based on the five-stage systematic integrative review process developed by Cooper (1998): problem formulation; data collection; evaluation of data points; data analysis and interpretation; and, public presentation of results. Data considering factors with proposed or potential relationships with any of the outcomes were extracted, processed and tabulated. Background data were compared factor by factor. Where similar, factors were first ordered in groups, and then coded and categorized. By summarizing related categories, different themes were identified (Tables 2 and 3). All three authors were involved in the data analysis process.

Results

Data extractions and quality/relevance evaluations for the 21 articles are summarized in Table 2. Only data on 13–19-year-olds are included in this review.

The thematic analysis process resulted in three major themes, common for both outcomes: *Environmental factors* consisting of four categories (sociodemographic status, socioeconomic status, cultural background, and societal factors); *Individual factors* covering five categories (psychosocial factors, personal characteristics, attitudes, and lifestyle factors); and *Situational factors* formed by dental and medical experiences and history of attendance (Table 3).

The following presentation of the results will be structured primarily based on themes and factors and secondarily on outcomes. Thus, within each theme or factor category, the reporting starts with factors associated with dental avoidance followed by dental non-attendance.

Environmental factors

Sociodemographic category

Being a boy was repeatedly associated with dental avoidance (Östberg *et al.*, 2010; Skaret *et al.*, 1998; 2000; 2007) as well as non-attendance (Honkala *et al.*, 1997; Lopez and Baelum,

2007; Mak and Day, 2011; Okullo *et al.*, 2004; Yu *et al.*, 2001) (Tables 2 and 3). Studies from Norway and Sweden reported that boys had missed/cancelled more dental appointments than girls (Östberg *et al.*, 2010; Skaret *et al.*, 1998; 2000; 2007), and studies from the US, Finland, Chile, China and Uganda concluded that boys were less likely than girls to make annual dental visits (Honkala *et al.*, 1997; Lopez and Baelum, 2007; Mak and Day, 2011; Okullo *et al.*, 2004; Yu *et al.*, 2001). By contrast, four studies, from the US, Norway, Canada and Brazil (Davoglio *et al.*, 2013; Skaret *et al.*, 1999; Vingilis *et al.*, 2007; Zimmer-Gembeck *et al.*, 1997), found no association between gender and dental non-attendance.

One Norwegian study (Skaret *et al.*, 1998) revealed an increase in cancelled/missed dental appointments with increasing age. In Finland, the US, Uganda and Canada, older adolescents were found to be less likely to have annual dental visits (Honkala *et al.*, 1997; Okullo *et al.*, 2004; Yu *et al.*, 2001; Zimmer-Gembeck, *et al.*, 1997) or were utilizing dental services less than younger adolescents (Vingilis *et al.*, 2007). Three studies found no relationship between dental utilization and age (Davoglio *et al.*, 2013; Lopez and Baelum, 2007; Mak and Day, 2011).

One US study (Yu *et al.*, 2001) reported that lack of annual dental visits was associated with the language spoken at home not being English.

In Sweden, living with a single parent has been associated with dental avoidance among adolescents, referred to Specialized Paediatric Dentistry because of dental behaviour management problems (DBMPs) (Gustafsson *et al.*, 2010). In Canada, on the other hand, adolescents from single-parent families were more likely to use dental services than were those living with both parents (Vingilis *et al.*, 2007). Living with unmarried parents in a US study (Yu *et al.*, 2001) and having siblings in a study from China (Mak and Day, 2011) have been associated with dental non-attendance.

Socioeconomic status

Low socioeconomic status (SES) was, among those in Sweden referred to Specialized Paediatric Dentistry because of DBMPs, associated with dental avoidance (Gustafsson *et al.*, 2010), and among adolescents in Brazil (Davoglio *et al.*, 2013) and the US (Zimmer-Gembeck *et al.*, 1997) associated with less frequent dental visits. Low educational level of the father was associated with “not planning future regular dental visits” among adolescents in Sweden (Östberg *et al.*, 2010). Among adolescents in Chile, China, Uganda, the US and Brazil, less frequent dental visits were also associated with low parental education (Freire *et al.*, 2001; Lopez and Baelum, 2007; Lu *et al.*, 2011; Okullo *et al.*, 2004; Yu *et al.*, 2001). Among adolescents in the US, Canada, China and Brazil, non-regular utilization of dental services was associated with living with unemployed parents (Yu *et al.*, 2001), having low income (Lopez and Baelum, 2007; Lu *et al.*, 2011; Scott *et al.*, 2002; Vingilis *et al.*, 2007; Yu *et al.*, 2001), being uninsured (Scott *et al.*, 2002; Yu *et al.*, 2001) and having low annual education expenses (Lopez and Baelum, 2007). Missed/cancelled dental appointments among adolescents in Norway were associated with individual occupations (i.e. working or occupation not specified) (Skaret *et al.*, 1998; 1999; 2000) while lower utilization of dental care services among adolescents in Canada was associated with school and/or work involvement (Vingilis *et al.*, 2007).

Table 2. Summary of included articles with the outcomes dental avoidance and non-attendance

Author, year / country	Aim	Sample size / age span	Design/method	Findings: factors associated with the respective outcomes	Quality/ relevance
Outcome: dental avoidance					
Skaret <i>et al.</i> , 1998 / Norway	To evaluate the prevalence and distribution of missed and cancelled dental appointments, and to explore possible relationships with demographics and individual caries experience	1,119 / 12–18 yrs	Retrospective cohort Cross-sectional Proportional randomized cluster Questionnaires sent by mail at 18 yrs Dental records	Gender – boys Age – older adolescents Community – rural Individual occupation - unspecified occupation/work Oral health status – DMFT index Treatment discontinuation – treatment not completed	Moderate/ high
Skaret <i>et al.</i> , 1999 / Norway	To explore the prevalence and possible explanatory factors of dental avoidance due to dental anxiety	754 / 12–18 yrs	Retrospective cohort Cross-sectional Proportional randomized cluster Questionnaires sent by mail at 20 yrs Dental records	Individual occupation – unspecified occupation/work Community – rural Pain – experiences of dental and medical pain; insufficient effect of local anaesthesia Availability – number of dentists Oral health status – DMFT index at 18 yrs Treatment discontinuation – treatment at 18 yrs	Moderate/ high
Skaret <i>et al.</i> , 2000 / Norway	To explore possible explanatory factors related to high frequency of missed /cancelled dental appointments	754 / 12–18 yrs	Retrospective cohort Cross-sectional Randomized cluster Dental records Questionnaires sent by mail at 20 yrs	Gender – boys Individual occupation -- unspecified occupation/work Other priorities – travelling, buying music/new clothes, being with boy/girlfriend Oral health status – DMFT index Attitudes – like/respect or dislike the dentist, indifferent, negative attitude towards the dentist Treatment discontinuation – treatment at 18 yrs Fear/anxiety – high dental anxiety, high phobic anxiety	Moderate/ moderate
Vika <i>et al.</i> , 2006 / Norway	To evaluate the prevalence of self-reported problems with dental and medical injections, and the extent to which such problems may lead to avoidance of necessary treatment	1,385 / 18 yrs	Cross-sectional Proportional randomized cluster Questionnaires in the classroom Questionnaire during a clinical examination	Pain Fear/anxiety – fear, unpleasantness, fainting	Moderate/ moderate
Skaret <i>et al.</i> , 2007 / Norway	To explore and compare psychological characteristics in the two groups: those reporting no likelihood of visiting the dentist in a situation with toothache, and those who definitely would see the dentist in the same situation	1,385 / 18 yrs	Cross-sectional Randomized cluster Questionnaires in the classroom	Gender – boys Fear/anxiety – dental anxiety, multiple fears, anxiety Attitudes – negative attitude towards the dentist	High/ high

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Gustafsson <i>et al.</i> , 2010 / Sweden	To identify the possible predictors of non-attendance among children and adolescents with dental behaviour management problems (DBMPs)	79 / 13–19 yrs	Cross-sectional, prospective (treatment), longitudinal (outcome) Consecutive Semi-structured interview (participants and parents) Questionnaires (participants and parents) Clinical examinations and radiographs (participants)	Family SES – parental education and parental employment/occupation Family structure Personal professional support Temperament – sociability, impulsivity	High/ high
Östberg <i>et al.</i> , 2010 / Sweden	To analyse and describe oral health habits and lifestyle factors in relation to the priority of regular dental care in 19-year-old individuals with specific reference to gender, residential area and socioeconomic grouping	758 / 19 yrs	Cross-sectional Computer-based random selection Questionnaire prior to a dental examination Patient files from the dental clinic (missed dental appointments)	Gender – boys Community – urban Priorities – housing, clothes, leisure time Family SES – father's education Oral health habits – tooth brushing Tobacco use – smoking, snuffing	Moderate/ moderate
Outcome: dental non-attendance					
Honkala <i>et al.</i> , 1997 / Finland	To analyse the trends and the socioeconomic differences in dental visits between 1977 and 1995	9,556 / 14, 16, 18 yrs	Cross-sectional cohort Strategic/age cohort Questionnaire sent by mail	Gender – boys Age – older adolescents Oral health habits – tooth brushing frequency	High/ moderate
Macgregor <i>et al.</i> , 1997 / UK	To examine the relation between some dental health behaviours and two measures of self-concept in adolescents	22,984 / 13–16 yrs	Cross-sectional cohort Cluster Questionnaires in the classroom	Self-esteem, HLOC	Moderate/ moderate
Vignarajah 1997 / Antigua, West Indies	To gather data on dental knowledge including self-reported dental behaviours and factors affecting regular dental attendance	345 / 15–19 yrs	Cross-sectional Randomly selected Questionnaire at school	Dental fear Priorities – dental care “expensive”, “not necessary” Accessibility and availability – difficult to get an appointment	Moderate/ high
Zimmer-Gembeck <i>et al.</i> , 1997 / US	To describe student access to health care services, identify populations of students with unmet health care needs, and highlight specific unmet needs for health care identified by these adolescents	13,992 / ≤14–18+ yrs	Cross-sectional Randomized Questionnaire in the classroom	Age – older adolescents Ethnicity – race/ethnicity Family SES – low SES index Community – rural	Moderate/ low
Freire <i>et al.</i> , 2001 / Brazil	To investigate the relationship between sense of coherence and oral health	664 / 15 yrs	Cross-sectional Randomized Questionnaires (participants and mothers) Clinical examination	SOC Social class of the family Parental education – mother's education	High/ moderate

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Yu <i>et al.</i> , 2001 / US	To examine adolescents' use of preventive medical and dental services and the relationship between this use and demographic characteristics and other variables reflecting access to and need for care	2,995 / 15–17 yrs	Longitudinal Questionnaires in school In-depth in-home interview In-home interview (parents) Interviewer-assisted questionnaire (parents)	Gender – boys Age – older adolescents Ethnicity – race/ethnicity Language spoken at home Insurance – health insurance Oral health habits – perceived health status Community – place of birth Parental education Family structure – marital status Parental employment Income – annual household income	High/ moderate
Scott <i>et al.</i> , 2002 / Canada	To identify the parental factors associated with regular use of dental services by second-year secondary school students in Québec	1,202 / 13–14 yrs	Cross-sectional cohort Stratified probabilistic Questionnaire at home (parents) Clinical examination	Income – household income Insurance – dental insurance Family attendance patterns – parent not visiting the dentist in at least a year	Low/ moderate
Okullo <i>et al.</i> , 2004 / Uganda	To describe clinical and self-perceived indicators of oral health status and the use of oral health care services by social and demographic characteristics	1,117 / 13–19 yrs	Cross-sectional Systematic random Questionnaires at school Clinical examination	Gender – boys Age – older adolescents Community – school location, place of residence Parental education Religion – religious affiliation	High/ moderate
Levin <i>et al.</i> , 2007 / Israel	To evaluate the relationship between dental behaviour, dental anxiety and personality attachment traits among a healthy young adult population	429 / 18–19 yrs	Cross-sectional Convenience Questionnaire during dental screening	Fear/anxiety – dental anxiety	Moderate/ moderate
Lopez and Baelum, 2007 / Chile	To describe the patterns of dental visits in an adolescent population and to explore whether selected sociodemographic and behavioural indicators for oral disease were associated with dental attendance patterns	6,396 / 15–17 yrs	Cross-sectional Two-stage random cluster Questionnaire at school Questionnaire at clinical examination Information on monthly tuition and annual school fees by school headmasters	Gender – boys Parental education Income – father's income Education expenses – annual education expenses Oral health habits – tooth brushing	Moderate/ moderate
Vingilis <i>et al.</i> , 2007 / Canada	To examine how predisposing characteristics, enabling resources, needs, personal health practices, and psychological factors influence health care utilization, and whether this varies across physicians, non-physicians and dentists	1493 / 12–19 yrs	Cross-sectional Longitudinal Two-stage stratified random Interview in person and via telephone	Tobacco use – smoking Oral health status – self-perceived oral health status Age – older adolescents Family structure Income School/work involvement Social support Smoking BMI Overall health status Tobacco use Alcohol bingeing	Moderate/ moderate

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Author(s)	Study aim	Sample size	Study design	Study location	Study period	Study population	Study variables	Study outcomes
Lu <i>et al.</i> , 2011 / China	To investigate trends in oral health and describe how the oral health of young adults is affected by their family socioeconomic characteristics, oral health status, and utilization of dental services	638 / 12, 15, 18 yrs	Prospective longitudinal observational population-based Random cluster Questionnaires at baseline and at follow-up Clinical examination at three time points	China	2008–2010	Individuals aged 12–18 yrs	Parental education Income – monthly household income Individual attendance patterns – utilization of dental care at 12–15 and 15–18 yrs	Moderate/low
Mak and Day, 2011 / China	To investigate the prevalence and socioeconomic differences in dental health behaviours	4,927 / 14–15 yrs	Cross-sectional Stratified sampling Questionnaires at school	China	2008–2009	Students aged 14–15 yrs	Gender – boys Ethnicity Number of siblings, living arrangements, housing type	Low/moderate
Davoglio <i>et al.</i> , 2013 / Brazil	To assess factors associated with the use of dental services	1,366 / 13 yrs	School-based cross-sectional Randomized cluster Questionnaire at school	Brazil	2008–2009	Students aged 13 yrs	Family SES Concern about body image Social interaction – frequency of parents knowing where their children spent their leisure time, number of close friends, involvement in fights Priorities – reason for going to the dentist Oral health habits – oral hygiene habits, frequency of tooth brushing, daily use of dental floss Tobacco use	High/moderate

BMI = body mass index; DMFT = decayed, missing, filled teeth; HLOC = health locus of control; SES = socioeconomic status; SOC = sense of coherence

Cultural background

In the US, non-White adolescents (Zimmer-Gembeck *et al.*, 1997) and adolescents born outside the US (Yu *et al.*, 2001) were more likely to not have visited the dentist in the past two years or to never have had a dental examination. In China, Caucasian and other ethnic groups were more likely to have annual dental visits compared with Chinese adolescents (Mak and Day, 2011). In Uganda, Muslims were more likely than Catholic and Protestant 13–19-year-olds to have received oral health care during the past two years (Okullo *et al.*, 2004).

Societal factors

Missed/cancelled dental appointments in Norway (Skaret *et al.*, 1998; 1999; 2000) as well as non-regular dental visits in the U.S. (Zimmer-Gembeck *et al.*, 1997) were more common among adolescents in rural areas, while no plan for future regular dental visits in Sweden (Östberg *et al.*, 2010) and non-regular dental visits in Uganda (Okullo *et al.*, 2004) were more common among adolescents in urban areas.

Accessibility and availability of dental care services (Skaret *et al.*, 1999; Vignarajah, 1997) were also related to dental avoidance or non-attendance (Table 3). In Norway, those who had been treated by more than five different dentists were more likely to show avoidance behaviour (Skaret *et al.*, 1999). Adolescents in Antigua, West Indies, reported that the reason for not visiting the dentist regularly was the difficulty to get an appointment (Vignarajah, 1997).

Individual factors

Psychosocial factors

In Sweden, among children and adolescents with DBMPs, experiences of personal professional support (from a school psychologist, social worker, or other psychosocial professional) were associated with dental avoidance (Gustafsson *et al.*, 2010).

Brazilian adolescents with lower scores on sense of coherence (SOC) (Freire *et al.*, 2001) and English adolescents with poorer self-esteem (Macgregor *et al.*, 1997) were more likely to be less frequent dental attenders. In another Brazilian study, adolescents who were concerned about their body image used dental services less frequently (Davoglio *et al.*, 2013).

Canadian adolescents with higher level of social support (i.e. those who had someone whom they could confide in and count on, who could give them advice and make them feel loved) were less likely to have visited the dentist in the last 12 months (Vingilis *et al.*, 2007). In Brazil, less frequent dental visits were more common among adolescents who were involved in fights and those whose parents did not know where they spent their leisure time (Davoglio *et al.*, 2013).

Personal characteristics

Dental anxiety (Gustafsson *et al.*, 2010; Levin *et al.*, 2007; Skaret *et al.*, 2000; 2007; Vignarajah, 1997) and high fear, unpleasantness and fainting during dental/medical injections (Vika *et al.*, 2006), contributed to dental avoidance and less frequent or no dental visits.

Table 3. Overview of themes, categories and factors identified in the reviewed articles as associated with the outcomes dental avoidance/non-attendance

Theme	Category	Factor	Representation in articles with the outcome avoidance	Representation in articles with the outcome non-attendance
Environmental factors	Sociodemographic status	Gender	Skaret <i>et al.</i> , 1998; 1999; 2000; 2007; Östberg <i>et al.</i> , 2010	Honkala <i>et al.</i> , 1997; Lopez & Baelum, 2007; Mak & Day, 2011; Okullo <i>et al.</i> , 2004; Yu <i>et al.</i> , 2001
		Age	Skaret <i>et al.</i> , 1998	Honkala <i>et al.</i> , 1997; Okullo <i>et al.</i> , 2004; Vingilis <i>et al.</i> , 2007; Yu <i>et al.</i> , 2001; Zimmer-Gembeck <i>et al.</i> , 1997
	Socioeconomic status	Language		Yu <i>et al.</i> , 2001
		Daily living	Gustafsson <i>et al.</i> , 2010	Mak and Day, 2011; Vingilis <i>et al.</i> , 2007; Yu <i>et al.</i> , 2001
		Family socioeconomic status	Gustafsson <i>et al.</i> , 2010; Östberg <i>et al.</i> , 2010	Davoglio <i>et al.</i> , 2013; Freire <i>et al.</i> , 2001; Lopez & Baelum, 2007; Lu <i>et al.</i> , 2011; Okullo <i>et al.</i> , 2004; Scott <i>et al.</i> , 2002; Vingilis <i>et al.</i> , 2007; Yu <i>et al.</i> , 2001; Zimmer-Gembeck <i>et al.</i> , 1997
Individual factors	Cultural background	Insurance status		Scott <i>et al.</i> , 2002; Yu <i>et al.</i> , 2001
		Education expenses		Lopez and Baelum, 2007
		Individual occupation	Skaret <i>et al.</i> , 1998; 1999; 2000	Vingilis <i>et al.</i> , 2007
	Ethnicity		Mak and Day, 2011; Yu <i>et al.</i> , 2001; Zimmer-Gembeck <i>et al.</i> , 1997	
	Societal factors	Religion		Okullo <i>et al.</i> , 2004
Community		Skaret <i>et al.</i> , 1998; 1999; 2000; Östberg <i>et al.</i> , 2010	Okullo <i>et al.</i> , 2004; Zimmer-Gembeck <i>et al.</i> , 1997	
Psychosocial factors	Access to and availability of dental care		Skaret <i>et al.</i> , 1999	Vignarajah, 1997
		Social interaction		Davoglio <i>et al.</i> , 2013; Vingilis <i>et al.</i> , 2007
	Self-efficacy, sense of coherence			Davoglio <i>et al.</i> , 2013; Freire <i>et al.</i> , 2001; Macgregor <i>et al.</i> , 1997
		Personal professional support	Gustafsson <i>et al.</i> , 2010	
	Personal characteristics	Fear/anxiety	Gustafsson <i>et al.</i> , 2010; Skaret <i>et al.</i> , 1999; 2000; 2007; Vika <i>et al.</i> , 2006	Levin <i>et al.</i> , 2007; Vignarajah, 1997
		Temperament	Gustafsson <i>et al.</i> , 2010	
	Attitudes	Negative attitudes	Skaret <i>et al.</i> , 1999; 2000; 2007	
		Priorities	Skaret <i>et al.</i> , 2000; Östberg <i>et al.</i> , 2010	Davoglio <i>et al.</i> , 2013; Vignarajah, 1997
	Lifestyle factors	Oral health habits	Östberg <i>et al.</i> , 2010	Davoglio <i>et al.</i> , 2013; Honkala <i>et al.</i> , 1997; Lopez and Baelum, 2007; Yu <i>et al.</i> , 2001
		Tobacco use	Östberg <i>et al.</i> , 2010	Davoglio <i>et al.</i> , 2013; Lopez and Baelum, 2007; Vingilis <i>et al.</i> , 2007
		Alcohol use		Vingilis <i>et al.</i> , 2007
	BMI		Vingilis <i>et al.</i> , 2007	

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Situational factors	Dental and medical experiences	Oral health status	Skaret <i>et al.</i> , 1998; 1999; 2000	Lopez and Baelum, 2007; Vingilis <i>et al.</i> , 2007
	History of attendance	Pain	Skaret <i>et al.</i> , 1999; Vika <i>et al.</i> , 2006	
		Family dental attendance patterns		Scott <i>et al.</i> , 2002
		Individual dental attendance patterns	Skaret <i>et al.</i> , 1998; 1999; 2000	Lu <i>et al.</i> , 2011

Dental avoidance was more common among those Swedish children and adolescents with DBMPs who had higher scores on two temperamental dimensions, namely self-rated sociability and parent-rated impulsivity (Gustafsson *et al.*, 2010).

Attitudes

Norwegian adolescents with lower respect for and higher dislike of dentists (Skaret *et al.*, 2000) as well as those with more negative attitudes towards the dentists (Skaret *et al.*, 2007) had higher frequency of missed / cancelled dental appointments. Other priorities (travelling, buying music or new clothes, being with the boy/girlfriend, housing and leisure time activities) were more important to Swedish and Norwegian adolescents than their dental visits (Östberg *et al.*, 2010; Skaret *et al.*, 2000).

Lifestyle factors

Lifestyle factors such as oral health habits (Davoglio *et al.*, 2013; Honkala *et al.*, 1997; Lopez and Baelum, 2007; Östberg *et al.*, 2010; Yu *et al.*, 2001), tobacco use (Davoglio *et al.*, 2013; Lopez and Baelum, 2007; Östberg *et al.*, 2010; Vingilis *et al.*, 2007) and alcohol consumption, as well as body mass index (BMI) (Vingilis *et al.*, 2007), were also associated with attendance patterns (Tables 2 and 3). Tooth brushing once a day or less was more common among those who did not plan to visit the dentist in the future (Östberg *et al.*, 2010), those who used dental services less frequently (Davoglio *et al.*, 2013; Honkala *et al.*, 1997) and those who never attended the dentist (Lopez and Baelum, 2007). Smoking (Davoglio *et al.*, 2013; Lopez and Baelum, 2007; Östberg *et al.*, 2010; Vingilis *et al.*, 2007) and snuffing (Östberg *et al.*, 2010) were more common among those without plans for future dental visits (Östberg *et al.*, 2010), those with less frequent dental visits (Davoglio *et al.*, 2013; Vingilis *et al.*, 2007) and those who went to the dentist only when they had dental symptoms (Lopez and Baelum, 2007). Besides tobacco use, alcohol consumption as well as movement into both the top and bottom BMI quintile was associated with decreases in dental utilization among adolescents in Canada (Vingilis *et al.*, 2007).

Situational factors

Dental and medical experiences

In Norway, high caries experience was more common among adolescents with dental avoidance behavior (Skaret *et al.*, 1998; 1999; 2000). Adolescents with poor oral health status had lower rates of dental utilization (Lopez and Baelum, 2007; Vingilis *et al.*, 2007) and only visited the dentist when they had dental symptoms (Lopez and Baelum, 2007). In Norway, higher frequency of missed/cancelled dental appointments was found among those with unfinished dental treatment at age 18 years (Skaret *et al.*, 1998; 1999; 2000), those who experienced dental pain (Skaret *et al.*, 1999; Vika *et al.*, 2006) and those who experienced insufficient effect of local anaesthesia (Skaret *et al.*, 1999).

History of attendance

Dental attendance patterns within families (Scott *et al.*, 2002) and own previous dental attendance patterns (Lu *et al.*, 2011) were associated with adolescents' dental non-attendance (Table 2, 3). Canadian adolescents whose parents did not visit the dentist in the last year were

non-regular users of dental services (Scott *et al.*, 2002). Utilization of dental services among Chinese 12–15 year-olds also affected their utilization of dental services at ages 15–18 (Lu *et al.*, 2011).

To summarize, the pattern of factors associated with dental avoidance emanated from two Swedish and five Norwegian studies. Besides gender and age, other background and concomitant factors were daily living, family socioeconomic status, individual occupation, the community, accessibility and availability of dental care, personal professional support, temperament, negative beliefs and attitudes, priorities, oral health habits, tobacco, oral health status and individual attendance patterns. Furthermore, dental anxiety and pain were potential causal factors associated with dental avoidance.

The factors behind dental non-attendance emanated from 14 studies with wide geographic spread. Background or concomitant factors associated with dental non-attendance were gender, age, language, daily living, family socioeconomic status, insurance status, education expenses, individual occupation, ethnicity, religion, the community, accessibility and availability of dental care, SOC, self-esteem, social support, social interaction, priorities, oral health habits, use tobacco, alcohol, BMI, oral health status, and family and individual attendance patterns. A potential causal factor was dental anxiety.

Discussion

This integrative review aimed to explore manifestations of dental avoidance and non-attendance among adolescents aged 13–19 years in order to identify associated background- and concomitant factors. The review included 21 articles with a quantitative approach and showed that factors associated with dental avoidance or non-attendance could be categorized within three common themes of environmental, individual and situational factors.

Within these themes, partly different sets of factors were found for the different outcomes, with more focus on individual (psychosocial and psychological factors, personal characteristics, attitudes, and lifestyle factors) and situational (dental and medical experiences, history of attendance) factors for the outcome dental avoidance, and environmental (sociodemographic status, socioeconomic status, cultural background, and societal factors) and individual factors for the outcome dental non-attendance.

Seven studies from Norway and Sweden, countries with free dental care for children and adolescents, investigated factors associated with the outcome defined as dental avoidance. The other 14 studies were from different parts of the world, with different dental care systems, and investigated dental non-attendance.

Gender, evaluated as a factor in 13 studies, emerged as a universal factor since being a boy was associated with both dental avoidance (four studies) and non-attendance (five studies). Age, a second factor associated with both outcomes, was investigated in nine studies, six of which revealed that older adolescents had more cancelled/missed dental appointments (avoidance), were less likely to have annual dental visits and were utilizing dental services less compared with younger adolescents. Our results concur with previous studies reporting dental avoidance or non-attendance among older children (Heidmann and Chris-

tensen, 1985; Klingberg, 1995) and among boys (Craven *et al.*, 1994; Lissau *et al.*, 1989; Wang and Aspelund, 2009). The age effect on avoidance may be due to the fact that older adolescents increasingly make their own decisions influenced by their own priorities (Skaret *et al.*, 2000) or difficulties to leave studies or jobs for dental visits (Skaret *et al.*, 1999; 1998; 2000). Another, and gender differentiated, aspect may be oral health status, often poorer among boys than among girls (Kanli *et al.* 2008; Östberg *et al.* 1999) and *per se* known as a factor behind dental avoidance or non-attendance. Dental anxiety, a third universal factor, was investigated in six studies showing that high dental anxiety was associated with both dental avoidance and dental non-attendance as shown also in studies on dental anxiety among children (Klingberg *et al.*, 1995) and adults (Armfield, 2012; Eitner *et al.*, 2006; Hägglin *et al.*, 2000; Pohjola *et al.*, 2007).

Therefore, dental personnel should pay more attention to signs of dental avoidance or non-attendance among boys and older adolescents as well as the dentally anxious, to help prevent future dental avoidance or non-attendance and also to establish good relationships with these patients.

In contrast to the universal factors, similar across different outcomes, contradictory results on the impact of daily living were reported by two of the included studies. The Swedish study (Gustafsson *et al.*, 2010) reported an association between not living with both parents and a higher frequency of avoidance, while the Canadian study (Vingilis *et al.*, 2007) reported a higher use of dental services for adolescents living in single-parent families. However, there are differences between these two study populations and also between the dental care systems in these countries. In Sweden, dental care is free for all children and adolescents while in Canada, children and adolescents need to have insurance or pay for their dental visits. The Swedish population consisted of children and adolescents with DBMPs, referred to Specialized Paediatric Dentistry, thus being a risk population for dental avoidance. In this population it was shown that the non-attender group more often came from single-parent families. By contrast, the Canadian study included a nationally representative, longitudinal sample of Canadian adolescents.

Two studies, one from Norway and another from Antigua, presented different types of dental accessibility (treatment by more than five different dentists) and availability (difficulties to get an appointment) associated with the different outcomes, as may be expected in two countries with different dental care systems. Discontinuity in treatment over time or treatment by several different dentists may be explained by shortage of dental personnel and can contribute to difficulties to establish an interpersonal relationship (Widström *et al.*, 2010).

Another inconsistent factor was community (urban/rural). On one hand, dental avoidance in Sweden (Östberg *et al.*, 2010) and non-attendance in Uganda (Okullo *et al.*, 2004) was reported to be more common in urban areas. In Norway (Skaret *et al.*, 1998; 1999; 2000) and the US (Zimmer-Gembeck *et al.*, 1997), dental avoidance and dental non-attendance, respectively, were more common in rural areas. Difficulties to recruit dentists to public dental service in rural areas in Norway, where most dentists are working in the private sector providing dental care for adults (Widström *et al.*, 2010), and a reported lower dentist-patient ratio in

US rural areas (Byck *et al.*, 2002) may partly contribute.

Furthermore, attitudes and priorities deserve some reflection. Studies from the Scandinavian countries revealed that other priorities and negative attitudes towards dental personnel still contributed to dental avoidance (Östberg *et al.*, 2010; Skaret *et al.*, 2007). A possible explanation may be a short perspective on future oral health since many adolescents in Scandinavia have low caries experience (Petersson and Bratthall, 1996).

In this review, only studies from Sweden ($n=2$) and Norway ($n=5$) focused on dental avoidance as an outcome. Three of the five studies from Norway (Skaret *et al.*, 1998; 1999; 2000) were based on the same study population with data collection from dental records at ages 12–18 years and questionnaires at 18 years (Skaret *et al.*, 1998) and 20 years (Skaret *et al.*, 1999; 2000), which may be considered a limitation. However, different sets of factors associated with dental avoidance were investigated in those three studies. The results from the first study (Skaret *et al.*, 1998) were strengthened by follow-up studies at 20 years of age (Skaret *et al.*, 1999; 2000).

One strength was the integrative review method that, despite differences regarding organization, accessibility, availability and costs of dental health care, as well as classifications of socioeconomic status and parental educational level, allowed us to identify factors associated with dental avoidance or non-attendance. Another strength was the critical appraisal of the articles, since all three authors independently reviewed, evaluated, and discussed the articles until consensus was reached. Furthermore, besides the database PubMed, we used CINAHL Plus with Full Text and PsycINFO in the literature search, covering biomedicine, the health sciences, psychology, medicine, nursing, law, social work, and neuroscience, to in a broad and systematic search find possibly relevant research articles. The three databases complement one other and only partly overlap. Thus, we do not expect any serious shortcomings by the focus on research articles and not including books or other grey literature.

A possible limitation of this study was the inclusion of only studies of 13 to 19 year-olds. However, when analysing and evaluating the data the decision was made to encompass a wider age span if the information on the chosen 13–19 age range was identified and reported in the articles. Differences in lifestyles, maturity and priorities between younger and older adolescents within the 13–19 age group may well have an impact with different factors being associated with dental avoidance in different ages. Younger adolescents may be more prone to parental influence and family circumstances than older adolescents who make their own decisions and may have other priorities or difficulties to leave studies or jobs for dental visits. In the review, no attempt was made to describe different sets of factors for different ages.

Another potential limitation was the difficulty separating the outcomes dental avoidance, non-attendance and non-utilization in the included literature. We decided that dental avoidance should be defined by an individual choice to not attend in a context where dental care was available free of charge. Dental non-attendance and non-utilization were, from the articles included, inseparable and were thus combined to describe all

forms of non-regular dental care.

Due to different nations organising dental care differently international comparisons are difficult. However, factors such as gender, age, daily living, SES, occupation, community, access and availability, dental anxiety, priorities, lifestyle factors, oral health status and previous dental attendance patterns, were common for both dental avoidance and non-attendance. Although such a wide range of factors was reported, few studies focussed on dental avoidance (two Swedish and five Norwegian) which calls for further research. Future research on dental avoidance should include factors such as personal professional support, temperament, oral health habits and tobacco use, oral health status and pain experience. In addition, some of the factors hitherto associated with dental non-attendance (language, ethnicity, religion, self-efficacy and lifestyle factors) need to be further investigated also in relation to dental avoidance. Furthermore, qualitative research methods could complement the quantitative methods used in the included studies. A specific challenge, in research as well as in clinical practice, is the difficulty in contacting dental avoiders or non-attenders, which makes a qualitative approach even more important.

Conclusion

Although a wide variety of environmental, individual and situational factors associated with dental avoidance or non-attendance among adolescents were summarized in this review, factors specifically associated with dental avoidance (i.e. missed or cancelled appointments in a system of free dental care) still need to be investigated. The identified factors associated with dental avoidance emanated only from seven studies performed in Sweden and Norway.

Besides the associations between avoidance and being a boy or an older adolescent, there were associations reported with environmental factors such as daily living, family situation, and availability of dental care. The impact of cultural background on dental avoidance remains to be investigated.

Individual factors such as experiences of personal professional support, a temperamental profile of impulsivity or high sociability, other priorities, and negative beliefs and attitudes toward dental care were reported to be associated with dental avoidance. Some life-style aspects (poor oral health habits and tobacco use) were associated with avoidance, while alcohol consumption was investigated in relation to non-attendance only. Tobacco, alcohol and drug abuse should be further investigated as concomitants for non-regular attendance in systems of free dental care.

Dental anxiety and pain experiences were associated with dental avoidance as were poor oral health status and an individual or family history of avoidance. Thus, clinical implications may involve paying attention to the adolescents' individual background and everyday life situation, to offer agreed and individualized treatment which take fears and negative beliefs or attitudes into consideration, to take all efforts to avoid painful treatments, and to be watchful for early signs of avoidance.

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