

Paediatric dentists' identification and management of underweight and overweight children

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Key points

Highlights that increasing rates of overweight and obese children are a public health concern.

Shows that specialists in paediatric dentistry (SPDs) are supportive of opportune screening for body mass index (BMI) during consultations, in order to identify children who are underweight, overweight or obese.

Indicates that, at present, few SPDs routinely measure height, weight or BMI, in part due to lack of knowledge of interpretation of results, and a lack of local guidance. Therefore, further training and development of local protocol is needed.

Introduction Dental caries and obesity are growing challenges for the NHS. Dentists are in the unique position of being able to identify both conditions and intervene, following UK government strategy of 'making every contact count'. **Aims** Identify specialists in paediatric dentistry's (SPD) current practice regarding diagnosis and management of underweight or overweight/obese children presenting to dental services. **Materials and methods** An online survey was emailed to the UK SPD group. Questions investigated whether height, weight or body mass index (BMI) were measured, actions taken, and dentists' feelings regarding their role. **Results** 49/118 (42%) SPDs responded. All felt they had a responsibility to identify underweight or overweight/obese children. Around a quarter (26%) measured BMI 'always' or 'often', while 37% did not measure BMI. Only 41% of SPDs who measured BMI took action more than twice in a year. Most commonly (90%) the child's GP was informed. **Conclusions** SPDs were supportive of the identification of underweight or overweight/obese children. However, many felt uncertain about BMI interpretation. Thus, few routinely measured BMI or acted on abnormal results. SPDs would benefit from training, alongside development of a local protocol, regarding BMI calculation and interpretation.

Introduction

The World Health Organisation (WHO) has declared obesity 'one of the most serious public health challenges of the twenty-first century'.¹ In 2015–2016, the National Child Measurement Programme in England identified more than one in five 4- to 5-year-olds, and one in three 10- to 11-year-olds, as overweight or obese.² Obese teenagers are likely to remain obese as adults. Being overweight or obese carries significant preventable health consequences, such as cardiovascular disease, type 2 diabetes mellitus and non-alcoholic fatty liver

disease.^{3,4} The estimated cost of treating these complications is around £16 billion per year.⁵

Dental caries is a serious public health challenge, with a quarter of five year olds affected.⁶ Public Health England estimate that paediatric dental extractions account for 7% of hospital procedures for 0 to 19-year-olds.⁷ In addition, obesity affects management of children with dental caries: children who are obese may require increased peri-operative intervention, or may not be fit for general anaesthesia.⁸

Children are defined as 'overweight' if their body mass index (BMI) exceeds the ninety-first centile for their age and gender, and 'obese' if their BMI exceeds the ninety-eighth centile.⁹ Unfortunately, parents often fail to recognise their children as being overweight or obese.^{10,11} Such parents have a decreased concern for their child's weight status; conversely, recognition of their child's weight status was linked to uptake of lifestyle modifications.¹² The National Institute for Health and Care Excellence (NICE) advise that health professionals should

'use clinical judgement' when deciding if to measure height and weight.³ Health Education England have launched 'Making Every Contact Count' – to utilise every interaction with a health care professional to optimise lifestyle choices.¹³

Dentists are well-placed to identify, and act, when children who are underweight, or overweight/obese attend. Poor diet contributes to obesity as well as poor oral health.¹⁴ Children visit dentists regularly, enabling repeated promotion of behaviour modification^{15,16} and advice regarding diet optimisation.^{15,17–19} Dentists' involvement in such public health strategies is supported by the British Society of Paediatric Dentistry (BSPD),⁸ the American Academy of Pediatrics, and other bodies.²⁰

The measurement of BMI in children presenting to dental services may provide an opportunity to identify children who would benefit from intervention. It is currently unknown to what extent paediatric dentists assess BMI and what, if any, action is taken following identification of a low or high BMI value.

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Table 1 Dentists' self-reported habits regarding measurement of children's weight and height, and calculation of BMI

	X = Weight		X = Height		X = BMI	
	n	%	n	%	n	%
Do you ever measure X?	n/46		n/46		n/46	
Yes	40	87	35	76	29	63
No	6	13	11	24	17	37
If you do, how frequently do you measure X?	n/40		n/35		n/29	
Always	8	20	7	20	3	10
Often	12	30	11	31	9	31
Occasionally	18	45	14	40	13	45
Rarely	2	5	3	9	4	14
When do you measure X?¹	n/40		n/35		n/29	
At new patient appointments	20	50	19	54	13	45
At treatment appointments	1	3	2	6	1	3
At recall appointments	2	5	6	17	4	14
If the patient will have a general anaesthetic or sedation	35	88	22	63	21	72
If the patient looks underweight	13	33	14	40	14	48
If the patient looks overweight	13	33	16	46	16	55
If you do not measure X, why not?*	n/6		n/11		n/6	
It is too time consuming	2	33	1	9	1	17
Not enough staff	1	17	1	9	0	0
I don't know what to do with results	3	50	4	36	4	67
Other						
No equipment	–	–	1	9	–	–
It is done by someone else	–	–	1	9	2	33
No direct effect on management	–	–	1	9	–	–

*Total percentages exceed 100% as respondents undertake more than one action

Project aims

Identify paediatric dentists' current practice regarding diagnosis and management of children who are underweight, or overweight/obese presenting to them.

Materials and methods

Survey questions were developed by the project team (paediatric dentist and paediatrician). Questions investigated whether height, weight or BMI were measured; when measurements were taken; reasons for measurements not being taken; actions taken following identification of an abnormal BMI; and dentists' feelings regarding their role. Questions were multiple

choice, with free text options where appropriate. An online survey was generated using www.kwiksurveys.com (supplementary online only information). Skip logic was employed so that only relevant questions were shown, based on the participant's previous answer. All shown questions were compulsory, with exception of the final question, eliciting dentists' feelings on their role in weight management. A link to the survey was emailed to all specialists in paediatric dentistry through the BSPD membership list in May 2017. A further reminder email was sent in July 2017. All responses were anonymous. Descriptive statistics were calculated using Excel. Response rate was calculated by dividing the number of survey responses by the number of SPDs on the membership list.

Results

Summary characteristics

Of the 118 SPDs invited to participate, 49 (42%) responded. Three responses were incomplete; therefore, 46 responses were analysed. Forty-four were consultants in paediatric dentistry, with one specialist and one clinical dental director. Thirty-nine (85%) worked in hospital dental services and 15% in the community.

Measurement of weight, height, and BMI

Most responding dental practitioners measured weight, but not BMI, routinely (see Table 1). Many (72%) used an online tool to calculate BMI (Table 2). All dental practitioners who had

measured BMI had taken action at least once following an abnormal result. However, action was taken infrequently, with only 41% taking action more than twice a year. The most common action taken was informing the child's GP (90%); providing dietary advice (48%); or referring to a paediatrician (41%). Four of the six practitioners who measured height and weight but did not calculate BMI did so because they did not know what to do with the result; two did not calculate BMI as 'someone else would do so'.

Dentists' role in taking action

A free text question elicited the dentists' thoughts regarding their role in diagnosis of underweight/overweight children. All answering respondents (N = 39) considered that they had a role to play.

SPDs stated that they may see patients more frequently than other health care professionals, or indeed, may be the only healthcare professional to see the child regularly. They feel that they are in a good position to comment on weight changes.

The presence of a poor diet as a risk factor for being both underweight/overweight and dental caries was established as a reason for dentists' desire to be involved in weight management. Dentists already frequently give advice about diet. SPDs stated they were happy to contribute to a holistic approach to health, and felt that it was their 'duty'.

Challenges to dentists' involvement in weight management were identified, including that weight is 'not always an easy topic to raise'.

Many respondents commented that there was a lack of clear guidance or referral pathway, and that this should be addressed. Some considered that informing the patient's general practitioner was the minimum, so that they would be able to further support the family, with further referrals to medical specialists. Dentists additionally wanted guidance on where they could advise patients to get support and further advice.

Teaching

Twenty-four respondents (52%) are involved in teaching undergraduate dental students (Table 3).

Discussion

All dentists in this survey stated that they would like to play a part in the identification of children who are underweight, or overweight/obese. SPDs felt they were in a good position to comment on weight changes. Despite this, one-third did not measure BMI at all.

Table 2 Dentists' use of BMI values

	n/29	%
Interpretation of BMI		
Online Tool	21	72
Chart	5	17
Other		
Standard cut-off value of BMI 30	1	3
Scales have BMI calculation	1	3
Do you ever take any action?		
Yes	29	100
No	0	0
How often have you taken action in the last 3 years?		
Once	1	3
2-5 times	16	55
6-10 times	4	14
More than 11 times	8	28
What action do you take?*		
Provide dietary advice	14	48
Provide exercise advice	6	21
Write to the patient's GP	26	90
Refer the patient to a dietitian	8	28
Refer the patient to a paediatrician	12	41
Other		
Inform the parent	1	3
Liaise with paediatrician/anaesthetist if GA required	1	3

*Total percentages exceed 100% as respondents undertake more than one action

Table 3 Topics taught by dentists

Topics taught	n/24	%*
How to measure height and weight	5	21
How to calculate BMI	5	21
How to diagnose over/under weight	3	13
How to discuss BMI and weight with patients	3	13
Health effects of being under / over weight	3	13
How to refer patients after a diagnosis of under / over weight	4	17
Links between diet, dental caries and overall health	21	88

*Total percentages exceed 100% as respondents undertake more than one action

BMI screening in the dental clinic

Dentists' involvement in BMI screening has been called for by international literature,^{4,8,15-17,19-26} and the BPSD, who advocate a proactive and sensitive approach.⁸ SPDs were

positive about their contribution to the holistic health care of children. In the UK, Henderson et al.²⁷ considered the acceptability of weight management strategies in a dentistry setting to dental staff, children and their parents. In

line with our survey, staff were motivated, and quoted sayings such as ‘healthy life, healthy mouth’ to exemplify that good diet is the crux of good physical and oral health. However, they were concerned that clinicians may advise contradictory dietary advice (for example, regarding fruit juice – seen as ‘healthy’ but containing high levels of sugar). These findings are broadly in keeping with Tavares et al., who piloted a ‘healthy weight intervention’ based on motivational interviewing, in a paediatric dental clinic and found it to be acceptable to children, parents, and dentists.¹⁸ We support increased involvement of dentists in opportunistic paediatric BMI screening.

Frequency and timing of anthropometry measurement

This survey has demonstrated that if anthropometry is measured, weight is most commonly assessed. Twenty of 46 (43%) measured weight ‘always’ or ‘often’; values were 39% for height and 26% for BMI. This compares favourably to a 2008 study of American paediatric dentists, where 67% did not routinely assess weight and 94% did not routinely measure height.²⁴ There were key times where measuring anthropometry took place: in our survey, 28% of respondents calculated BMI at new patient appointments, and 46% calculated BMI before general anaesthetic (GA) or sedation. However, SPDs felt that a GA appointment would be an inappropriate time for weight counselling, even though weight is measured at this time in order to calculate drug doses.

Respondents in our survey were concerned about the lack of clear guidance on when to assess weight. NICE guidelines suggest that clinical judgement be used in deciding whether to assess a child’s BMI.³ ‘Making Every Contact Count’ advises that any interaction be utilised for weight screening.¹³ While BMI measurement at every interaction may be problematic, discussion to identify opportune times for routine BMI assessment is needed.

Interpretation of BMI

A significant proportion of dentists were deterred from measuring BMI due to lack of knowledge as to interpretation of results: four of the six dentists who measured height and weight but did not calculate BMI did not know what to do with the results. Conversely, others may be interpreting BMI incorrectly: one respondent stated they used a ‘standard cut-off’. Although customary in adults, in children, BMI must be plotted on age- and

gender- appropriate centile charts.⁹ Most respondents used an online tool for BMI interpretation (21/29).

Actions taken

Encouragingly, all respondents stated they had taken action regarding a child’s BMI. However, given the prevalence of overweight and obesity (as per the National Child Measurement Programme²), we might have expected action to have been taken more often than reported in our survey. Only 12/29 respondents who measured BMI had taken action more than six times in three years. The most common actions taken were informing the GP (90%); provision of dietary advice (28%); and referral to a paediatrician (41%). Our results compare well to the international literature. In a survey of paediatric dentists in the US, one quarter offered dietary advice, but less than 20% had ever referred a child to another practitioner.²⁴ A similar study in the US demonstrated that two-thirds of paediatric dentists offered diet advice; with one in ten offering diet and weight loss advice, but one in five offering neither service.²⁵ In Portugal, one in ten dentists offered referral in the event of abnormal BMI; one in ten would discuss weight loss themselves; and only 3% had advice leaflets in the clinic.²² Dentists may not feel suitably competent to offer intervention,¹⁹ thus reducing the impact of BMI screening.

Dentists’ knowledge

Our survey did not investigate dentists’ knowledge or training, however, five of the 21 dentists who taught undergraduates did teach their students about measurement of height and weight, and how to calculate BMI. Only three taught diagnoses of under- or overweight. A lack of knowledge and training is a known barrier to providing weight loss services.^{15,22} We would advise development and implementation of undergraduate training in BMI assessment and management to ensure all clinicians have skills needed to counsel patients on their weight.

Healthcare barriers to identification and management of abnormal BMI

1. Local protocol

The SPDs commented on the absence of clear guidance or referral pathway for the identification and management of under- or overweight children. Adaptation of NICE guidelines to develop local protocol advising dentists of when to routinely assess BMI may increase

diagnosis of children with abnormal BMI, and improve subsequent management. Other studies outside the United Kingdom cite a lack of clear pathway as a barrier to optimal care.¹⁵ There is a paucity of data on the effect of introduction of protocol on identification and management of children.

2. Sensitive nature of discussions around weight

Concerns were raised that weight was a difficult topic to raise, and that parents may not be receptive to weight counselling during a general anaesthetic assessment clinic. A large study in the USA concluded that half of dentists would like to support weight management services, but half were also fearful of upsetting patients.²⁵ Other studies agree that dentists are discouraged by the potential to cause upset or deterioration in the patient-clinician relationship^{15,22,25,27} or lack of patient engagement.^{22,24,25}

3. Other barriers

Our survey did not identify further barriers, however, other studies have highlighted that in an environment under time and financial pressures, the clinical priorities may be treatment instead of prevention, and oral health instead of general health.²⁷ Additionally, the lack of evidence to support a direct association between obesity and dental caries has been commented upon.^{15,21}

Study limitations

The survey response rate was low at 42%, despite a follow up reminder email. Non-responders may not have seen the topic as relevant to their practice or simply have been too busy. Those who responded may have felt more engaged with the subject. Therefore, it is possible that our results reflect a ‘best case’ scenario. The response rate does limit the study’s external validity. However, the responses do demonstrate a lack of awareness among many SPD, which highlights opportunities for improvement of clinical practice. Even in the unlikely event that all non-responders did measure BMI, those who did respond to the survey and did not measure BMI would still represent 14% (17/118). Therefore, we believe our recommendations are still justified.

Recommendations

Currently, few paediatric dentists routinely measure weight and height, and even fewer routinely calculate BMI. Thus, the

opportunistic identification of children who are underweight, or overweight/obese is hampered. Many dentists felt uncertain as to how to calculate BMI or interpret the result, and felt unclear how to act on the results. BMI screening in the dental clinic is a low-input intervention, with possible beneficial effects within the multi-disciplinary NHS approach to tackling obesity. Dental schools need to incorporate BMI calculation, interpretation and management into the undergraduate curriculum. Dedicated training must be held for practising dentists so that they feel empowered to contribute to the holistic care of paediatric patients. Children 'do not have freedom of choice'⁵ as they are subject to the care they receive from their parents or guardians. As clinicians within the NHS we all have a duty to advocate for the health of our most vulnerable patient group.

For further learning and guidance, we suggest the following resources may help:

BMI calculation and interpretation

- Calculator with interpretation of result: <http://www.nhs.uk/Tools/Pages/Healthyweightcalculator.aspx>
- BMI charts for children aged 2–20 years: https://www.rcpch.ac.uk/sites/default/files/2018-03/boys_and_girls_bmi_chart.pdf

General advice for overweight/obese patients

- For clinicians: <https://patient.info/doctor/obesity-in-children>
- For patients: <https://patient.info/health/obesity-and-overweight-in-children>.

General advice for underweight patients:

- <http://www.nhs.uk/Livewell/Goodfood/Pages/Underweightyoungchild.aspx>
- <http://www.nhs.uk/Livewell/Goodfood/Pages/Underweightolderchild.aspx>.

Diet advice

- Healthy eating for children leaflet: <https://www.bda.uk.com/foodfacts/healthyeatingchildren.pdf>
- Interactive guidance for a balanced diet: <http://www.nhs.uk/Livewell/Goodfood/Pages/the-eatwell-guide.aspx>.

Exercise advice

Ideas for keeping active: <https://www.nhs.uk/change4life-beta>.

Policy, position statements, national guidance

- BSPD position statement: <http://bspd.co.uk/Portals/0/Public/Files/PositionStatements/Obesity%20and%20Dental%20Health%20Final%20PS%20Final.pdf>
- Making every contact count: <http://www.makeeverycontactcount.co.uk/>
- NICE Guidelines: <https://www.nice.org.uk/guidance/cg189>.

Conclusion

This survey is the first national survey in the UK assessing paediatric dentists' actions and opinions regarding identification of underweight or overweight/obese children. Dentists are supportive of strategies to improve identification of underweight or overweight/obese children presenting to dental clinics. At present, many paediatric dentists do not routinely measure BMI or act on abnormal results. This may be in part due to a lack of clear guidance, or concerns about the difficulties of discussing weight.

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1. World Health Organisation. *Global strategy on diet, physical activity and health; childhood overweight and obesity*. Available at <http://www.who.int/dietphysicalactivity/childhood/en/> (accessed July 2017).
2. NHS Digital. *National Child Measurement Programme England, 2015/16 school year*. NHS Digital; 2016. Available at <https://files.digital.nhs.uk/publicationimport/pub22xxx/pub22269/nati-chil-meas-prog-eng-2015-2016-rep.pdf> (accessed May 2018).
3. National Institute of Health and Clinical Excellence. *Obesity: identification, assessment and management. NICE clinical guideline [CG189]*. National Institute of Health and Clinical Excellence; 2014.
4. Bimstein E, Katz J. Obesity in children: a challenge that paediatric dentistry should not ignore - review of the literature. *J Clin Pediatr Dent* 2009; **34**: 103–106.
5. Royal College of Paediatrics and Child Health. *Tackling England's childhood obesity crisis. A report by the Royal College of Paediatrics and Child Health to inform the development of the UK Government's childhood obesity strategy*. Royal College of Paediatrics and Child Health, 2015.
6. Public Health England. *National Dental Epidemiology Programme for England: oral health survey of five-year-old children 2015. A report on the prevalence and severity of dental decay*. Public Health England; 2016.
7. Public Health England. *Hospital episodes for teeth extraction among children aged 0 to 19 years, 2011-12 to 2015-16*. Public Health England; 2016. Available at <http://www.nwph.net/dentalhealth/extractions.aspx>.
8. British Society for Paediatric Dentistry. *Obesity and Dental Decay in Children - A Position Statement*. British Society for Paediatric Dentistry, 2015. Available at <https://www.bspd.co.uk/Portals/0/Public/Files/Position-Statements/Obesity%20and%20Dental%20Health%20Final%20PS%20Final.pdf>.
9. Royal College of Paediatrics and Child Health. *Body Mass Index (BMI) charts*. Royal College of Paediatrics and Child Health, 2013.
10. Doolen J, Alpert P T, Miller S K. Parental disconnect between perceived and actual weight status of children: a metanalysis of the current research. *J Am Acad Nurse Pract* 2009; **21**: 160–166.
11. Jeffery A N, Voss L D, Metcalf B S, Alba S, Wilkin T J. Parents' awareness of overweight in themselves and their children: cross sectional study within a cohort (EarlyBird 21). *BMJ* 2005; **330**: 23–24.
12. West D S, Raczynski J M, Phillips M M, Bursac Z, Heath Gauss C, Montgomery B E. Parental recognition of overweight in school-age children. *Obesity (Silver Spring)* 2008; **16**: 630–636.
13. NHS Health Education England. *Making Every Contact Count Factsheet*. NHS Health Education England. Available at <http://www.makeeverycontactcount.co.uk/media/1129/mecc-factsheet.pdf> (accessed September 2017).
14. Public Health England. *Sugar reduction: Achieving the 20%*. Public Health England, 2017.
15. Curran A E, Caplan D J, Lee J Y *et al*. Dentists' attitudes about their role in addressing obesity in patients: a national survey. *J Am Dent Assoc* 2010; **141**: 1307–1316.
16. Ziegler J, Hughes C V. Weighing in on paediatric obesity: Weight screening at the dental visit. *J Am Dent Assoc* 2016; **147**: 146–150.
17. Tavares M, Dewundara A, Goodson J M. Obesity prevention and intervention in dental practice. *Dent Clin North Am* 2012; **56**: 831–846.
18. Tavares M, Chomitz V. A healthy weight intervention for children in a dental setting: a pilot study. *J Am Dent Assoc* 2009; **140**: 313–316.
19. Singhal A, Garcia R I. Role of Dentists in Obesity Prevention in Children. *Dental Abstracts* 2017; **62**: 116–118.
20. Tseng R, Vann W F, Perrin E M. Addressing childhood overweight and obesity in the dental office: rationale and practical guidelines. *Pediatr Dent* 2010; **32**: 417–423.
21. Kading C L, Wilder R S, Vann W F, Curran A E. Factors affecting North Carolina dental hygienists' confidence in providing obesity education and counseling. *J Dent Hyg* 2010; **84**: 94–102.
22. Gomes F J, Paula A B, Curran A E *et al*. Portuguese Dentists' Attitudes Towards Their Role in Addressing Obesity. *Oral Health Prev Dent* 2016; **14**: 13–20.
23. Hisaw T, Kerins C, McWhorter A G, Seale N S. Pediatric obesity curriculum in pediatric dental residency programs. *Pediatr Dent* 2009; **31**: 486–491.
24. Braithwaite A S, Vann W F, Switzer B R, Boyd K L, Lee J Y. Nutritional counseling practices: how do North Carolina pediatric dentists weigh in? *Pediatr Dent* 2008; **30**: 488–495.
25. Lee J Y, Caplan D J, Gizlice Z, Ammerman A, Agans R, Curran A E. US paediatric dentists' counseling practices in addressing childhood obesity. *Pediatr Dent* 2012; **34**: 245–250.
26. Vann W F, Bouwens T J, Braithwaite A S, Lee J Y. The childhood obesity epidemic: a role for pediatric dentists? *Pediatr Dent* 2005; **27**: 271–276.
27. Henderson E J. Acceptability of delivery of dietary advice in the dentistry setting to address obesity in pre-school children: a case study of the Common Risk Factor Approach. *Public Health Nutr* 2015; **18**: 1801–1806.