Dentistry and Obesity: A Review and Current Status in U.S. Predoctoral Dental Education


Abstract: Obesity has become an epidemic and a public health concern in the United States and many other countries around the world. The impact of obesity on individuals’ overall and oral health and its influence on dental treatment protocols and postoperative procedures have been well documented. It is therefore important for dentists to understand and recognize obesity, educate their patients on its associated risks, promote a healthy lifestyle for their patients, and modify any necessary dental treatments and postoperative procedures for obese patients. To investigate the current practice of obesity assessment in U.S. dental school clinics and the inclusion of obesity topics in predoctoral dental curricula, surveys were sent to all sixty-two U.S. dental schools. Thirty-five surveys were returned but one was blank because the institution is newly established, so the total number used for analysis was thirty-four. The results showed that the topic of obesity has been incorporated into predoctoral dental curricula and is thought to be important for dentists and dental students by most respondents. However, the majority do not routinely measure weight and height, nor calculate Body Mass Index for comprehensive care patients in their predoctoral dental clinics. The authors argue that the topic of obesity should be emphasized in predoctoral dental curricula and that assessments of obesity should be practiced in predoctoral dental clinics.

Obesity is a major public health concern and a multifactorial disease. Overweight and obesity are defined as abnormal or excessive fat accumulation that may impair health. Obesity develops from an imbalance between energy intake and expenditure through interactions among genetic, environmental, and psychosocial factors. The World Health Organization (WHO) recommends Body Mass Index (BMI) as a means to measure and categorize obesity for men and women and all adult age groups. An adult BMI of 25 kg/m² or more is defined as overweight, whereas an adult BMI of 30 kg/m² or more is classified as obese.

Obesity has become an epidemic in many developed and developing countries, and its prevalence is increasing globally. Worldwide, the prevalence of obesity has more than doubled since 1980 in North America, the United Kingdom, Eastern Europe, the Middle East, the Pacific Islands, Australia, and China. Overall, 9.8 percent of the world’s adult population was obese in 2005, an estimated 396 million people. In 2008, more than 500 million adults globally were obese, and it has been projected that 1.12 billion individuals will be obese by 2030. The United States has the highest obesity index among the high-income countries. The prevalence of obesity in the U.S. adult population has increased from 32 percent in 2003 to 37.4 percent in 2010. If this trend continues, by 2030, 51.1 percent of U.S. adults will be obese.
The incidence of childhood and adolescent obesity is also rising worldwide. Childhood obesity increased from 4.2 percent in 1990 to 6.7 percent in 2010, with approximately 43 million children under five being overweight. This trend is expected to reach 9.1 percent (~60 million) in 2020. Childhood obesity is associated with an increased likelihood of adult obesity and an increased prevalence of obesity-related disorders.

The impact of obesity on the economy and health care is enormous and cannot be overstated. The consequences of obesity include increased expenditure on health care, predisposition to co-morbidities, and increased complications in systemic and oral health. As such, obesity accounts for up to 7 percent of total health care expenditures in developed countries. Medical care costs have been reported to be 36 percent higher over nine years among the obese cohorts compared to that of normal weight counterparts in the United States. Therefore, obesity is a major public health concern that needs to be addressed on an individual basis and as a society.

Obesity has an impact on many aspects of dental practice, and dentists are increasingly acknowledged to be part of the U.S. health care system that must address obesity causes and effects. However, the status of obesity topics in predoctoral dental curricula has not been widely explored. Therefore, in this study, we sought to investigate the current practice of obesity assessment in dental school clinics, as well as the integration of obesity topics in the predoctoral dental curricula of U.S. dental schools.

Obesity in Systemic Diseases

Evidence suggests that obese individuals constitute a distinct cohort of patients, based on the potential differences in anatomy and physiology from the normal weight population. Therefore, additional understanding of anatomy and physiology may be required to provide appropriate medical and dental care for obese patients. Obesity is associated with many chronic diseases, including Type II diabetes, cardiovascular diseases, endometrial cancers, sleep-breathing disorders, and osteoarthritis, resulting in higher risk of morbidity and mortality. In addition, obesity is related to several health-related risk factors, such as high cholesterol levels, asthma, and arthritis. With the high obesity prevalence in the United States and its continuous epidemic trend in the future, treating obese patients in everyday health care settings will become more routine. As a result, all health care providers should become knowledgeable about the recognition and prevention of obesity and be aware of its implications for treatment.

Obese patients require a higher burden of care and have a higher incidence of postsurgical complications than non-obese patients. These patients are prone to have an increased length of stay in the intensive care unit, a higher infection rate after breast reconstructions and lumbar spinal fusion, and a higher incidence of wound dehiscence, drainage, and infection after acetabular fracture surgery. Many of these complications may be the result of an impaired immune response, a sub-therapeutic pharmacokinetic mechanism, a higher susceptibility to infection, and impaired wound healing. Wound healing is a multifactorial process that involves complex biological interactions. Hypovascularity and hypoperfusion have been associated with the decreased ability to combat infection and delayed wound healing. Predisposing factors associated with obesity complicate the healing process, suggesting a poor outcome in this subset of the population.

The relationship of obesity to bone mass is controversial. While some evidence supports a positive correlation between obesity and bone mass, other studies have found that obesity is negatively associated with bone mass, outweighing the benefits of mechanical loads. These findings suggest that obesity can have a detrimental effect on bone. Obesity has also been found to adversely influence the cortical bone structure and strength. Obese individuals have lower bone mass and bone mineral content relative to their weight compared to non-obese individuals. Relative low bone strength index implies reduced capacity to withstand mechanical load and greater risk for fracture.
Obese individuals may pose a challenge to the dental clinic due to their anatomical and physiological differences from normal weight individuals. These patients may present poor surgical visibility and accessibility for anesthesia and surgical procedures, and using a standardized blood pressure cuff on an obese individual may result in a false positive reading. Furthermore, the standard dental chair or operatory unit may not be suitable for obese patients. It has been suggested to use armless treatment chairs and armless waiting room chairs to accommodate these individuals.

Since oral health is an integral part of overall general health, it is important to integrate primary prevention and risk-reduction strategies into the dental care environment in order to promote a healthy diet and lifestyle for all patients, particularly those who are obese. As such, assessing obesity, dietary screening, and counseling in the dental setting are important steps for halting this epidemic. Dental professionals must also be prepared to manage the obesity-related effects of co-morbidities and oral diseases, while working in conjunction with other health care providers in promoting general health. Therefore, the topic of obesity should be integrated into predoctoral dental curricula so that future dentists will learn to recognize and understand obesity and its impact, promote awareness, and educate their patients, as well as to modify necessary treatments to provide comfort and reduce post-treatment complications.

Materials and Methods

A survey was designed consisting of two sections: predoctoral clinic and curriculum (the survey is available from the corresponding author). Seven multiple-choice questions asked the respondents to check all answers that applied; there was also one open-ended question. The names and addresses of the deans of all U.S. dental schools were obtained from the American Dental Association website (www.ada.org/267.aspx). The questionnaires were mailed on August 19, 2011, with a due date of September 15, 2011. The mailed package included a cover letter describing the purpose of the study and instructions, a questionnaire, and a pre-stamped envelope without any form of labeling or identification. If necessary, the dean was asked to pass the survey to an associate dean or clinical or curriculum director who was more familiar with the subject. Participation in the study...
was voluntary, and the respondents were assured that the questionnaire was anonymous. The research protocol received exempt status by the Office for the Protection of Research Subjects and Institutional Review Board at the University of Illinois at Chicago (protocol number 2011-0592).

After we received the responses, the raw data were entered into an electronic spreadsheet (Microsoft Excel 2003, Redmond, WA). The data were analyzed, compiled, and reported as frequencies.

Results

Of the sixty-two surveys that were mailed, thirty-five responses were received, for a 56 percent response rate. One questionnaire was returned without answers because the institution was newly established and its clinic and curriculum had not fully operated yet. Therefore, the total questionnaires included for analysis were thirty-four.

Almost three-quarters (n=25, 73 percent) of the respondents in the study said they do not ask their students to measure the weight and height of their patients during the first clinical exam (Table 1). Three respondents specified measuring the BMI of pediatric patients. For the majority of the responding dental schools, BMI is not routinely calculated for comprehensive care patients (n=30, 88 percent), nor is it incorporated into new patient assessments (n=21, 64 percent). Of the institutions that reported calculating BMI routinely, one said it provides the instrument to measure patients’ BMI in the general clinic.

The majority of the respondents reported having specific lectures in their curricula focusing on the effects of obesity on dental treatment (n=20, 59 percent). Some respondents stated the topic is incorporated into other courses, such as nutrition, screening, and medically compromised patients. Some stated that the topic of the effects of obesity on dental treatment was being developed and discussed at the time the survey was completed. The majority of the respondents said they think it is important for dentists/dental students to understand the effects of obesity on dental treatments (n=25, 74 percent) (Table 1). The majority of the respondents reported feeling somewhat familiar (n=23, 68 percent) with the effects of obesity on dental treatments.

Discussion

We believe that BMI measurement should be considered a standard of care procedure performed in dental practice. In dental schools, the predoctoral dental clinics should strongly encourage students to calculate patients’ BMI by measuring their weight and height as these procedures do not appear to be time-consuming or invasive. Our study found that most of the respondents felt it is important for dentists and dental students to understand the effects of obesity on dental treatments; nevertheless, most reported that BMI was not routinely measured or calculated in their clinics. Some possible reasons may include limited awareness and lack of funding and facilities, such as weight and height scales. An alternative to measuring patients’ weight and height in the clinic would be to include weight and height questions on new patient assessment forms. With that information, a software program could be added to the electronic patient

Table 1. U.S. dental schools’ responses to selected survey questions (N=34)

<table>
<thead>
<tr>
<th>I. Clinic</th>
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<tbody>
<tr>
<td>1. Do you ask your students to measure the weight and height of comprehensive care patients during the first clinical exam?</td>
</tr>
<tr>
<td>Yes: 6 (18%)</td>
</tr>
<tr>
<td>No: 25 (73%)</td>
</tr>
<tr>
<td>Sometimes: 3 (9%)</td>
</tr>
<tr>
<td>2. Is the Body Mass Index (BMI) routinely calculated for the comprehensive care patients during the first clinical exam?</td>
</tr>
<tr>
<td>Yes: 0</td>
</tr>
<tr>
<td>No: 30 (88%)</td>
</tr>
<tr>
<td>Sometimes: 4 (12%)</td>
</tr>
<tr>
<td>4. Do you incorporate any questions regarding weight, height, or BMI into new patient assessment forms at your institution?</td>
</tr>
<tr>
<td>Yes: 12 (36%)</td>
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<tr>
<td>No: 21 (64%)</td>
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<tr>
<th>II. Curriculum</th>
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<tr>
<td>3. Do you think it is important for dentists/dental students to understand the effects of obesity on dental treatments?</td>
</tr>
<tr>
<td>Yes: 25 (74%)</td>
</tr>
<tr>
<td>No: 0</td>
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<tr>
<td>Maybe: 9 (26%)</td>
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<tr>
<td>4. Are you familiar with the effects of obesity on dental treatments?</td>
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<tr>
<td>Very: 7 (20%)</td>
</tr>
<tr>
<td>Somewhat: 23 (68%)</td>
</tr>
<tr>
<td>Limited: 4 (12%)</td>
</tr>
</tbody>
</table>

Note: The number of responses to Clinic question 4 was 33.
health record system to calculate BMI automatically and alert the practitioners to the patient’s obesity status during the diagnosis and treatment planning phase. Dental professionals would benefit from having the patient’s BMI level prior to formulating a treatment plan because it would enable them to understand potential complications associated with the treatment.

To improve their clinical practice as students and in their future practice, dental students should be trained to understand the effects of obesity on patients’ general health and oral health and to educate their patients and promote awareness. Also, students should learn how to modify treatment protocols to provide the most appropriate dental care for this cohort of patients. Specific protocols such as administering the maximum safe dose of anesthesia agent and prescribing medications tend to be weight-dependent and should be modified for obese patients.

It is interesting to note that while most respondents in our study reported feeling it is important for dentists/dental students to understand the effects of obesity on dental treatments, the majority of them said they themselves were not very familiar with the issue. Furthermore, although the majority said their institution had already incorporated or had started incorporating specific lectures regarding obesity effects on dental treatment into their predoctoral curricula, it is clear that many dental schools still need to address this topic in their students’ education including demonstrating its importance and teaching them about its implications for dental treatment and necessary modifications to care. Barriers to offering obesity-related interventions and counseling may include fear of offending the patient or the patient’s parents and appearing to be judgmental. In addition, studies have found that lack of education, trained personnel, and knowledge of the topic of obesity, as well as a perceived lack of direct association between obesity and oral health, may discourage providers from offering dietary counseling.

As health care professionals, dental professionals are as responsible as our medical counterparts in educating patients about the risks of being obese and recommending that patients seek help when needed. As dental educators, we should better prepare future dental professionals to interact with other medical professionals in interdisciplinary treatment, to assist patients in managing their overall medical and dental health, and to modify treatment protocols to reduce unforeseen complications. Therefore, the topic of obesity should be incorporated into predoctoral dental curricula.

There are some limitations to this study. First, we acknowledge that some of the survey questions could have been expanded to obtain more detailed and important information. For example, the survey did not specifically address the reasons why BMI is not obtained. Second, because of the limited response rate, the findings may not represent all dental schools in the United States, so caution should be used in interpreting the results. Some institutions may have implemented methods to measure patient obesity in their clinical settings, but they did not respond to the survey. Finally, although we recognize the important role of dental hygienists in patient education, we did not include them as part of this study since that topic has been previously investigated.

Conclusions

Obesity has become an epidemic and a public health concern in the United States and many other countries around the world, and the impact of obesity on oral health should no longer be ignored. The topic of obesity should be incorporated into all dental schools’ predoctoral curricula. It is important for future dentists to learn how to understand and recognize obesity, educate patients about potential associated risks, promote a healthy lifestyle for their patients, and modify any necessary dental treatments and postoperative procedures for this group of patients. Our study found that the topic of obesity has been incorporated into the predoctoral dental curricula of most of the responding institutions. However, most of the predoctoral clinics in these schools do not routinely measure weight and height nor calculate BMI for their comprehensive care patients. The topic of obesity should be strongly emphasized, and the assessment of obesity should be learned and practiced at the predoctoral level.

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REFERENCES

41. Arthurs ZM, Cuadrado D, Sohn V, Wolcott K, Lesperance K, Carter P, Sebeta J. Post-bariatric pancreatectomy: pre-pancreatectomy body mass index impacts the


