Overweight and obesity among patients attending a Nigerian oral surgery clinic: implications for oral surgical practice in Nigeria

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Abstract

Aim: To determine the prevalence of overweight and obesity among patients attending oral and maxillofacial outpatient clinic of the Lagos University Teaching Hospital, Nigeria; and discuss the clinical and surgical implications that obesity has on the delivery of oral and maxillofacial surgical and anaesthetic care.

Methods: Consecutive patients presenting to the oral and maxillofacial surgery outpatient clinic at the Lagos University Teaching Hospital, Nigeria over a 4-month period (May-August 2004) were screened for age, sex, height and weight. All of the patients were treated for dentoalveolar surgical procedures (routine and surgical extractions), incisional and excisional biopsies, and enucleation under local anaesthesia.

Results: The BMIs of the studied patients ranged from 16.7 to 39.8 kg/m², with a mean of 24.6 ± 4.5 kg/m². Prevalence of excess weight was 39.1%. Thirty-one (11.4%) patients were obese and 75 (27.7%) patients were overweight. A significant difference was observed in the BMIs of male and female patients (P=0.000). The age groups < 30 years had mean BMIs that were considered normal; whereas other age groups above 30 years had mean BMIs that were considered overweight. Prevalence of obesity increases with increasing age. Obese individuals were seen in all the age groups except those < 20 years.

Conclusions: The prevalence of excess weight (overweight and obesity) in patients presenting in the studied oral and maxillofacial outpatient setting was 39.1%. Oral and maxillofacial surgeon needs to be aware of obesity-/overweight-related medical and surgical issues and take them into consideration when treating these patients.

Introduction

Obesity is the most prevalent nutrition-related disorder in most parts of the developed and developing countries. It is a condition in which excess body fat may put a person at health risk, and also a condition with poorly established specific aetiology, due to the multifactorial nature of the disorder. Various components have been implicated in obesity, including genetic, metabolic, biochemical, cultural, and psychosocial factors. It is a disorder in which diet, sedentary life and genetic predisposition, all play a part. Obesity appears to be worldwide and in many countries has reached sufficient proportions to be considered epidemic. Overall the obesity problem is fuelling increasing concern worldwide. The definitions of obesity are variable, but a reliable and easy to perform index is the body mass index (BMI). BMI is considered one of the most accurate ways to determine the extent of obesity and its correlation with health risk. BMI is equal to (weight in kilograms)/(height in metres²). A BMI between 20 and 24.9 kg/m² is usually considered normal for most individuals. A person is considered overweight with BMI between 25 and 29.9 kg/m², and obesity is classified as greater than or equal to 30 kg/m². Morbid obesity is defined by a BMI of greater than 40, or between 35 and 40 when other medical conditions such as high blood pressure and diabetes are present.

Due to increasing prevalence of obesity worldwide, increasing number of obese patients is expected to present for oral and maxillofacial treatment. Such treatment includes routine oral and maxillofacial procedures (teeth extraction, fracture fixation, biopsies), specific corrective procedures for snoring and obstructive sleep apnea, and intermaxillary fixation for weight reduction. Such patients provide a unique challenge because of their body habitus, medical conditions, and physiologic response to treatment, all of which have significant consequences on the surgical procedure being performed. Therefore, the oral and maxillofacial surgeon needs to be aware of these associated medical and surgical issues and take them into consideration when treating these patients.

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The aim of the present study was to determine the prevalence of overweight and obesity among patients attending oral and maxillofacial outpatient clinic of the Lagos University Teaching Hospital, Nigeria. In addition, this paper discusses the clinical and surgical implications that obesity has on the delivery of oral and maxillofacial surgical and anaesthetic care.

**Methods**
Consecutive patients presenting to the oral and maxillofacial surgery outpatient clinic at the Lagos University Teaching Hospital, Nigeria over a 4-month period (May-August 2004) were screened for age, sex, height and weight. All of the patients were treated for dentoalveolar surgical procedures (routine and surgical extractions), incisional and excisional biopsies, and enucleation under local anaesthesia. A BMI was calculated on all patients (weight in kilograms divided by the heights in metres squared). BMI data was compared and classified into 4 main groups: underweight, with a BMI less than 19.9 kg/m$^2$; normal weight, with a BMI of 20 to 24.9 kg/m$^2$; overweight, with a BMI of 25 to 29.9 kg/m$^2$; and obese with a BMI of greater than or equal to 30 kg/m$^2$.

Data was analysed using the SPSS for Windows (version 12.0; SPSS Inc, Chicago, IL) statistical software package. Comparisons between age, sex and associated BMI was examined and presented in descriptive and tabular forms. Test of significance was used as appropriate, and $P$ value was set at less or equal to 0.05.

**Results**
Of the two hundred and seventy-one patients that were included in the study, 141 were male and 130 were female (M: F =1.1:1). The ages ranged from 9 to 85 years, with a mean of 33.8 ± 13.8 years. The mean height and weight was 1.7 ± 0.1 metres (range, 1.22 - 1.96 metres) and 68.9 ± 13.7 kilograms (range, 35 - 113 kilograms) respectively. The BMIs ranged from 16.7 to 39.8 kg/m$^2$, with a mean BMI of 24.6 ± 4.5 kg/m$^2$. A significant difference was observed in the height, weight and BMI between male and female patients as indicated in Table 1.

<table>
<thead>
<tr>
<th>Variables*</th>
<th>Sex</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
</tr>
<tr>
<td>Height (m)</td>
<td>1.7 ± 0.1</td>
</tr>
<tr>
<td>Weight (kg)</td>
<td>71.3 ± 12</td>
</tr>
<tr>
<td>Body mass index (kg/m$^2$)</td>
<td>23.8 ± 3.5</td>
</tr>
</tbody>
</table>

*Values as mean ± standard deviation

The prevalence of excess weight (overweight and obesity) was 39.1%. One hundred and thirty-four (49.4%) studied patients were normal weight, thirty-one (11.4%) were obese and 75 (27.7%) patients were overweight as shown in Table 2. Obesity was more prevalent in female (P<0.05). Nineteen percent of the females studied were considered obese, and 28.5% were overweight. In contrast, only 4% of the males were obese, and 27% were overweight.

<table>
<thead>
<tr>
<th>Sex</th>
<th>Underweight</th>
<th>Normal weight</th>
<th>Overweight</th>
<th>Obese*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>16</td>
<td>81</td>
<td>38</td>
<td>6</td>
</tr>
<tr>
<td>Female</td>
<td>15</td>
<td>53</td>
<td>37</td>
<td>25</td>
</tr>
<tr>
<td>Total</td>
<td><strong>31</strong></td>
<td><strong>134</strong></td>
<td><strong>75</strong></td>
<td><strong>31</strong></td>
</tr>
</tbody>
</table>

*P<0.05

The study population was also compared according to age-groups as shown in Table 3. The age groups <30 years had mean BMIs that were considered normal; whereas other age groups above 30 years had mean BMIs that were considered overweight. It is noteworthy that obese individuals were seen in all the age groups except those <20 years. Prevalence of obesity increases with age; and prevalence was highest in patients above 60 years.
Table 3: Distribution of BMI and prevalence of excess weight according to age groups

<table>
<thead>
<tr>
<th>Age group</th>
<th>Mean ± SD (Kg/m²)</th>
<th>Range (Kg/m²)</th>
<th>Number of patient</th>
<th>Prevalence</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Overweight</td>
</tr>
<tr>
<td>&lt;20</td>
<td>21.7 ± 2.9</td>
<td>18.2 - 29.1</td>
<td>21</td>
<td>9.5</td>
</tr>
<tr>
<td>20-29</td>
<td>22.8 ± 3.6</td>
<td>16.7 - 37.8</td>
<td>109</td>
<td>18.3</td>
</tr>
<tr>
<td>30-39</td>
<td>25.5 ± 3.9</td>
<td>19.2 - 35.7</td>
<td>70</td>
<td>32.9</td>
</tr>
<tr>
<td>40-49</td>
<td>27.3 ± 4.8</td>
<td>19.1 - 39.8</td>
<td>36</td>
<td>47.2</td>
</tr>
<tr>
<td>50-59</td>
<td>25.7 ± 5.2</td>
<td>18.4 - 35.2</td>
<td>12</td>
<td>33.3</td>
</tr>
<tr>
<td>60-69</td>
<td>28 ± 5.4</td>
<td>19.1 - 38</td>
<td>17</td>
<td>35.3</td>
</tr>
<tr>
<td>More or equal to 70</td>
<td>28.6 ± 4.0</td>
<td>21.3 - 32.9</td>
<td>6</td>
<td>50</td>
</tr>
<tr>
<td>Total</td>
<td>24.6 ± 4.5</td>
<td>16.7 - 39.8</td>
<td>109</td>
<td>27.7</td>
</tr>
</tbody>
</table>

Discussion

In the past 20 years, the rates of obesity have tripled in developing countries that have been adopting a Western lifestyle involving decreased physical activity and over consumption of cheap, energy-dense food.\(^9\) Such lifestyle changes are also affecting children in these countries; the prevalence of overweight among them ranges from 10 to 25%, and the prevalence of obesity ranges from 2 to 10%.\(^9\) The Middle East, Pacific Islands, Southeast Asia, and China face the greatest threat. The relationship between obesity and poverty is complex: being poor in one of the world's poorest countries (i.e., in countries with a per capita gross national product [GNP] of less than $800 per year) is associated with underweight and malnutrition, whereas being poor in a middle-income country (with a per capita GNP of about $3,000 per year) is associated with an increased risk of obesity.\(^3,10\) Some developing countries face the paradox of families in which the children are underweight and the adults are overweight. This combination has been attributed by some people to intrauterine growth retardation and resulting low birth weight, which apparently confer a predisposition to obesity later in life through the acquisition of a “thrifty” phenotype that, when accompanied by rapid childhood weight gain, is conducive to the development of insulin resistance and the metabolic.\(^10\)

In Nigeria, not much has been written on obesity, although, it has been reported to be commonly seen among the affluent business executives and middle-aged females with a sedentary life-style.\(^3\) It is also seen among those in the catering profession who are exposed to food preparation and consumption.\(^4\) In Nigeria and other developing countries, obesity is not generally regarded as a disease until complication sets in.\(^3\) In fact, a mild degree of obesity is socially acceptable in African culture as a sign of affluence.\(^3\) A study by Kumanyika et al\(^11\) among African American women revealed that 40% of moderately and severely overweight women considered that their figures were attractive or very attractive.

Although, there is presently no established figure for the national prevalence of obesity in Nigeria,\(^3\) anecdotal evidence suggests that the general public (especially the affluent ones) is becoming less active and becoming prone to adverse health affects of obesity and overweight. Few studies on the prevalence of overweight and obesity in Nigerian children can be found in the literature.\(^12-14\)

In the present study, 11.4% of the studied patients were considered obese; and obesity was observed in all age groups except in those below the age of 20 years. This prevalence of 11.4% is much lower than the prevalence of 36.5% and 23% in two similar studies from the United States.\(^7,8\) This difference may reflect the fact that obesity has become a serious health issue in the US with more than 51 million American considered obese and about 70 million considered to be overweight including at least 1 in 5 children.\(^13\) The prevalence of obesity in the US adults is reported to be between 25% and 32%; and this has been projected to increase to 30% - 44% by the year 2020.\(^15\) The socio-cultural environments that influence food, eating patterns and physical activity vary enormously across populations and these influences undoubtedly explain many of the differences in obesity prevalence among populations and sub-populations.\(^17\) In addition, the fact that obesity and excess weight was observed to increase with increasing age in the present series has been reported in previous studies.\(^8,10,16,18\) Closely akin to obesity is the overweight problem, and about 28% of the studied patients were overweight. This is also significantly lower than 62% and 51% prevalence reported by Marciani et al\(^7\) and Kempers et al\(^8\)
respectively. An overweight individual is at greater risk for the morbidity and mortality associated with obesity.\textsuperscript{19} It has been reported that overweight, which may progress to obesity, is an evolving concern and may be related to the equally evolving change in lifestyle.\textsuperscript{12} Although, none of our patient had a BMI of 40kg/m\textsuperscript{2}, few of them could be considered morbidly obese because of history of hypertension and diabetes.\textsuperscript{12}

In this study, female patients had a significantly higher BMIs than their male counterparts; and obesity was also significantly prevalent in female. Women and girls have been widely reported to have higher BMIs than men and boys.\textsuperscript{7,8,12} This has been attributed to the fact that the social environment of women especially black and African American is less negative about obesity. Some Nigerian African women actually regard excess weight (overweight and obesity) as a sign of a good living. Similar studies in patients attending oral and maxillofacial practice have also shown that obesity was more prevalent in female patients.\textsuperscript{7,8}

Overweight and obese patients present the oral and maxillofacial surgery with anaesthetic, surgical, practice ergonomics, and potential postoperative problems that distinguish heavy patients from other patient cohorts.\textsuperscript{7} Therefore, the operative team must be alert to the increased potential for airway obstruction, poor surgical visibility and accessibility, and the influence of intercurrent diseases on intraoperative and postoperative outcomes. Also, obese and overweight patients are not compatible with standard size office equipment (surgical chairs, monitoring cuffs, wheel chairs) that are designed for small patients.\textsuperscript{7} Obese and overweight patients tend to be less mobile, may depend on wheelchair transportation, and may pose a challenge to establish peripheral intravenous access.

In addition, outpatient and inpatient anaesthesia will require patients to be in recumbent or supine position on either the dental chair or operating table which will predispose them to increased work of breathing, hypoxemia, and increased metabolic demands.\textsuperscript{8} This is due to the fact that obese patients are known to experience periods of hypoxemia.\textsuperscript{8} Elevated intra-abdominal pressures and difficulty expanding the thoracic cavity leads to incomplete inflation of the lungs. These changes in the lung volume lead to closure of small airways and cause ventilatory/perfusion defects (V/Q mismatch). The V/Q mismatch eventually leads to hypoxemia and hypercapnia.\textsuperscript{20} Obese patients also have a corresponding increase in metabolic demand at rest.\textsuperscript{8} The increased work of breathing also causes a higher metabolic rate, requiring more energy and oxygen utilization. This situation is aggravated when the patient is in a supine position. This increased risk for increased work of breathing is a concern when oral and maxillofacial surgery is performed.\textsuperscript{7,8} In addition, obesity-hypoventilation syndrome results when chronic hypoventilation exists because of the large weight preventing full expansion of the lung fields.\textsuperscript{20} Hypercapnia is the cardinal sign of obesity-hypoventilation syndrome. The normal central response to high levels of CO\textsubscript{2} does not exist, the work of breathing is severely elevated, and respiratory efficiency and lung compliance are dramatically reduced. These patients are an extremely high anaesthetic and surgical risks.\textsuperscript{21} Obese oral and maxillofacial surgery patients can develop severe hypercapnia during sedation for outpatient procedures because of positioning and the administration of opiates.\textsuperscript{8}

Many adult patients with obstructive sleep disorder are obese/overweight and should be identified as much higher anaesthetic risk. Surgeons should be cautious scheduling obese patients for conscious and deep sedation when oropharyngeal examination indicates that the base of the tongue obliterates visualization of the palatal arches and the planned surgery is expected to contribute to airway obstruction.\textsuperscript{7}

Obese and overweight patients who will require surgery with local anaesthesia with sedation or general anaesthesia will need additional care for safe treatment and successful outcomes.\textsuperscript{8} Inherent to the safe and effective practice of surgery is the surgeon’s ability to visualize and have ready access to the surgical site. Operations are more likely to proceed smoothly when the surgical team is comfortably positioned around the patient.\textsuperscript{7} Morbidly obese patients have been reported to require longer operative times than non-obese patients.\textsuperscript{22} Poor posture and poor visibility translates into increased risk of surgical adventures, increased operating time, and physical and mental stress on the OMS surgical team.\textsuperscript{8,22}

The positioning of obese patients should maximize pulmonary mechanisms during surgery. If possible supine and Trendelenberg positions should be avoided.\textsuperscript{8} During surgical procedures, patients should be sitting upright or positioned in reverse Trendelenberg. All pressure points should be padded. If the patient does not adequately fit in the surgical
chair or operating room table, additional support should be provided. Prevention of venous thrombosis and subsequent pulmonary embolism can be achieved with pneumatic compression stockings, subcutaneous heparin, and early ambulation.8

Delayed postoperative recovery due to pulmonary atelectasis following general anaesthesia is not uncommon in morbidly obese patients.23 Therefore, if inpatient anaesthesia and surgery are anticipated; early consultation with the anaesthetist should be requested. However, if outpatient treatment is scheduled, proper resuscitative equipment should be available. Oxygen is critical before, during, and after surgery. Short, simple surgical procedures are best performed under local anaesthesia. Longer and more complicated surgeries may be managed better in an inpatient setting.

Obesity is considered a risk factor for increased complications in several surgical specialties like cardiothoracic, orthopaedic, reconstructive and transplant surgery.24,25,26 Obesity as a risk factor for postoperative complications following an oral and maxillofacial procedure has not been widely studied. Marciani et al25 found that excess weight and obesity do not appear to be risk factor for postoperative complications following dentoalveolar surgery. However, Gbotolorun et al27 found that increasing body mass index was significantly associated with occurrence of postoperative complications following impacted mandibular third molar surgery. A recent study also found that increased surgical difficulty in third molar surgery was associated with increasing body mass index.28 Obesity has also been reported a strong risk factor for the development of osteonecrosis of the jaw.29

Adult obesity is a well-established risk factor for development of cancers in different parts of the body.30,32 Adult weight gain, particularly during the peri-menopausal period, has been reported to play a significant role in the development of endometrial and breast cancers.30,32 Presently, little is known about the association between obesity/overweight and the risk of development of oral cancer. Therefore, studies are needed to elucidate the role of obesity in the development of oral cancer.

Conclusion
The prevalence of excess weight (overweight and obesity) in the studied oral and maxillofacial patients was 39.1%. Obesity was commoner in female; and was observed to increase with age with highest prevalence in patients above 60 years. Obese individuals were seen in all the age groups except those < 20 years. Oral and maxillofacial surgeon needs to be aware of obesity-/overweight-related medical and surgical issues and take them into consideration when treating these patients.

References


