

Obesity: An Emerging Concern for Patients and Nurses

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Abstract

The challenges of caring for larger, heavier patients arise in all healthcare settings. When an obese patient needs nursing care, physical size can complicate even the most basic interventions, regardless of the practice setting. In this article, definitions, etiologies, and long-term consequences of obesity are described. The nurse's role in anticipating obesity-related issues, such as skin, pulmonary, resuscitation, drug absorption, intravenous access, and mobility challenges, is considered. Strategies to address these issues in a size-sensitive manner are presented.

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The word *obesity* has its origins in the Latin language; it refers to the state of becoming "fattened by eating." The term *bariatrics*, which serves as a functional definition of obesity, is derived from the Greek expression *baros*, referring literally to weight or measurement. This term is used today to refer to the providing of healthcare for weight and weight-related conditions, including medical weight management, weight loss surgery, reconstruction after massive weight loss, and other associated treatments. The specialty of *bariatrics* is becoming increasingly important as the number of obese and overweight persons continues to rise. In this article, the incidence, etiologies, and long-term consequences of obesity are described. The nurse's role in anticipating obesity-related issues, such as skin, pulmonary, resuscitation, drug absorption, intravenous access, and mobility challenges, are considered. Strategies to address these issues in a size-sensitive manner are presented.

Incidence of Obesity

Overweight and obesity are common health conditions, and the prevalence of these conditions is increasing nationally and globally. Recent estimates suggest that over 67% of adults in the United States (US) are overweight, as indicated by a body mass index (BMI) higher than 25 (Camden, 2008). Of all Americans between the ages of 26 and 75 living in the US, 10 - 40% are obese (having a BMI greater than 30), and nearly 5% are morbidly obese (having a BMI greater than 40 (Ogden et al., 2006). From 1976 to 2000, the incidence of obesity in the US increased from 14.4% to 30.9% (Flegal, Carroll, Ogden, & Johnson, 2002). Although differences in obesity rates exist among certain groups, research indicates that some degree of increase has occurred among all groups regardless of age, gender, ethnicity, socioeconomic status, or race (Ogden, Carroll, & Curtin, 2006).

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Worldwide nearly two billion individuals are overweight, equaling the number of individuals suffering from starvation (Buchwald, 2007). The World Health Organization (WHO) has projected that by 2015 approximately 2.3 billion adults will be overweight and more than 700 million will be obese (WHO:, 2008). Although the US is often considered the world's leader in the number of obese citizens, other countries are not far behind in this regard. Worldwide, 10% of children are either obese or overweight (Yach, Stuckler, & Brownell, 2005). In 2002, Chinese researchers, who conducted a nation-wide survey of 270,000 adults, estimated that 200 million Chinese people were overweight; and they more recently found that over 20% of children in major Chinese cities were either clinically overweight or obese (Wang, Kong, Wu, Bai, & Burton, 2005). In India, Srinath Reddy, Shah, Varghese, and Ramadoss (2005) estimated that chronic diseases contributed to 53% of the deaths. They predicted that this burden would increase sharply by the year 2025. Cardiovascular diseases and diabetes are especially prevalent in urban areas in India, as well as other obesity-related conditions, such as hypertension and dyslipidemia, all of which are currently either undiagnosed, underdiagnosed, or inadequately treated.

Nurses will need to adjust their nursing care as the numbers of larger, heavier patients increase over time. When obese patients access nursing care, physical size can complicate even the most basic intervention, regardless of practice setting. Anticipating these issues and developing skills in addressing them will soon become part of the role of every nurse

Assessing Body Mass

The Body Mass Index (BMI) is the most frequently used and widely accepted tool to measure obesity. Calculating BMI is relatively simple and inexpensive. The Body Mass Index is a mathematical formula based on height and weight, which assigns a number to an individual's relative risk for morbidity and mortality. This assessment tool is not gender specific. It is the measurement of choice for obesity researchers and has been used extensively by healthcare professionals, including nurses, in recent years. Health organizations and policy makers use the BMI to measure and define obesity and to establish criteria for certain procedures. However, BMI as an assessment tool does carry certain limitations. One problem with using BMI as a measurement tool is that very muscular people may fall into the category of overweight when, in fact, they are very physically fit. Additionally, people who have lost large amounts of muscle mass may be in a healthy BMI category, when in reality they have diminished nutritional reserves. Therefore, the BMI has been most useful in tracking trends in the general population; it must be used in conjunction with other assessment criteria to determine the health status of an individual patient.

In 1995, WHO recommended using BMI to establish three grades or levels of overweight. Two organizations within the National Institutes of Health (NIH., n.d.a), the National Heart, Lung, and Blood Institute and the National Institute of Diabetes and Digestive and Kidney Diseases, concurred with this system, with the caveat that cutoff points are used only as a guide for obesity-level definitions and for comparative purposes across populations over time. This caveat is important because an overweight individual with a BMI of 29 does not instantly acquire all of the health consequences of obesity after crossing the threshold of a BMI of 30. Health risks, though, do increase gradually as BMI increases. The above organizations have agreed that Classification I corresponds to a BMI 30 – 34.9, Classification II corresponds to 35 – 39.9, and Classification III corresponds to a BMI equal to or greater than 40 (NIH, n.d.b).

Other tools can also be used to measure weight and weight–related conditions. Like BMI, some tools are based on mathematical calculations of the relationship between height and weight, while others are based on measurements of body fat. Some assessment tools establish certain risk factors for comorbidities, such as the waist-to-hip ratio (Gallagher, Langlois, Spacht, Blackett, & Henn, 2004). Studies have suggested that individuals with a high waist-to-hip ratio are at risk for certain cardiac and metabolic disorders, and that the presence of central obesity exacts greater tolls on this segment of the population (Rexrode, 1998). The value of using standardized measurements and definitions is that all stakeholders are speaking the same language. Reimbursement, guidelines, and protocols are generally defined by these standardized assessment tools.

Etiologies of Obesity

The National Institutes of Health describes obesity as a complex and multifactoral condition. It is often considered a condition of excess energy stores in the form of fat (NIH, 1998). Obesity can be related to emotional, environmental, and genetic situations.

Nurses often face difficulty in caring for overweight and/or obese patients because of inadequate education and widespread misunderstanding. From an emotional perspective, some authors contend that prejudice and discrimination aimed at larger people fuel emotional issues that lead to a further threat of obesity. The Rudd Center for Food Policy and Obesity (2008) has stated that weight bias affects millions of people at an alarming rate in a country, such as the US, where two of three adults and one of two children are overweight or obese. Weight discrimination was reported by 7% of U.S. adults between 1995 and 1996. In the years of 2004 to 2006, that percentage rose to 12% of adults (Andreyeva, Puhl, & Brownell, 2008). Furthermore, in the landmark meta-analysis conducted by Brownell and Puhl (2001) prejudice and discrimination was found to exist in employment, healthcare, education, public places, and housing. Social and economic consequences of this discrimination included social rejection, poor quality of relationships, inferior academic outcomes, and lower socioeconomic status (Puhl & Brownell, 2001). This discrimination continues today; failure to ensure

empathetic care affects access and quality in the care of complex, high-risk, obese patients (<u>Camden, 2008</u>). Nurses often face difficulty in caring for overweight and/or obese patients because of inadequate education and widespread misunderstanding (<u>Camden, Brannan, & Davis, 2008</u>).

Environmental etiologies of obesity are closely related to nutrition and physical activity (Falkner, Neumarksztainer, & Story, 2001). From a nutritional perspective even before the child is born, the mother's nutrition plays a part in the child's predisposition toward obesity, as intrauterine over or under nutrition can lead to weight issues. For example, Dutch men who faced "winter hunger" during the first trimester of their *in utero* life, during the winter of 1944-1945 near the end of World War II, have frequently become obese as adults (Yajnik, 2004). Many people in the US today consume a largely high-fat, low-protein diet taken in the form of large meals and/or snacks that include high sugar, and often supersized drinks. Limited physical activity is due to lifestyle changes often associated with frequent sitting in front of television sets and/or computers, along with labor saving devices that decrease the amount of energy expended to accomplish a given task (Phillippas & Lo, 2005). Research has suggested that as more hours are spent with electronic media, the overall BMI among children rises (Davison, Francis, & Birch, 2005).

Genetic conditions are also thought to play an important role in obesity. Some ethnic groups are predisposed to obesity by what has been described as the "thrifty gene." This theory, proposed in 1962 by James Neel, helps to explain why many Pima Indians are overweight. Neel's theory is based on the fact that, for thousands of years, groups that relied on farming, hunting, and fishing endured prolonged periods of alternately feast or famine. These groups were thought to adapt to these changes by developing a thrifty gene that allowed for fat storage in times of feast, which protected them in times of famine. This adaptation was useful as long as famine existed. However, famine is

now infrequent among the Pima Indians, and today this adaptation contributes to their high levels of body fat (NIH, n.d.b)

A genetic predisposition accounts for up to 80% of the risk for obesity in that obese children with obese parents are more likely to have genetic-related disorders linked to obesity than are obese children of thin parents (Dietz, 2004). A child of two obese parents has an 80% chance of becoming an obese adult, and a child of two normal weighted parents has a 15% chance of becoming obese. Childhood obesity is fast becoming a subspecialty of both bariatrics and pediatrics. These subspecialties are now introducing age-appropriate terminology and vocabularies related to obesity (Flegal, Tabak, & Ogden, 2006). Regardless of the etiologies of obesity, the consequences of obesity, with few exceptions, are significant in many ways.

Consequences of Obesity for Health

Excess weight is a threat to health. It is associated with an increase in the Metabolic Syndrome, osteoarthritis, cardiovascular disease, respiratory compromise, intra-abdominal pressure, skin conditions, and mental illness. Relationships between these conditions and obesity will be discussed below.

Excess weight is a threat to health.

In addition to these general consequences of obesity, certain patterns of obesity based on distribution of adiposity are associated with specific metabolic conditions. In one such condition, visceral fat obesity results clinically in an increased waist-to-hip ratio of fat distribution, which may be associated with glucose intolerance and hypertension (Pi-Sunyer, 2006). This

fat distribution often leads to a clustering of several disorders associated with an increased risk of cardiovascular disease. Although this condition has been recognized for over 80 years, it has been emphasized more recently by Reaven, who, in 1988, described it as the Metabolic Syndrome. This syndrome is comprised of insulin resistance, hyperinsulinemia, glucose intolerance, hypertension, raised triglyceride concentration, and a low high-density-lipoprotein-cholesterol concentration. The Metabolic Syndrome is not a disease; rather it is a group of conditions. Diagnosis of this syndrome does not provide an absolute measure of the risk of cardiovascular disease or diabetes, but rather identifies patients at increased risk for associated mortality and morbidity (American Heart Association, 2005). This holds true for teens as well as adults, as research suggests 33% to 50% of obese adolescents are at substantial risk for this Syndrome (Weiss, Dzuira, & Burgert, 2004).

Sixty-six percent of obese people suffer from osteoarthritis, a degenerative skeletal condition that becomes more severe in the presence of excess weight. Those individuals with a BMI greater than 40 are significantly at risk for disability associated with arthritis (Okoro, Hootman, Strine, Balluz, & Mokdad, 2004). Functional impairment and musculoskeletal pain interfere with activities of daily living leading to limited activity and a subsequent increase in weight.

From a cardiovascular perspective, obesity necessitates an increase in blood flow because of greater body mass as well as the increased metabolic needs of tissue. Cardiac hypertrophy occurs due to increased stroke work. Congestive heart failure results from increased systemic arterial pressure. Fluid overload is due to edema from right-sided failure resulting from increased pulmonary artery pressures and prolonged QT intervals. Respiratory compromise is manifested by elevated intra-abdominal pressure, reductions in lung volumes, and decreased muscle endurance. An increased oxygen demand, hypoventilation and hypercapnea, sleep apnea, and sudden death are not uncommon. Obstructive sleep apnea affects 10% to 20% of obese individuals (Gallagher, 2005a; Paje & Kremer, 2006).

Intra-abdominal pressure is a widespread condition among morbidly obese people. Fatty tissue accumulates in the abdominal cavity and creates pressure to varying degrees on the internal organs and the skin. This condition can lead to Bartlett's esophagitis, which is a risk factor for esophageal cancer. Stress urinary incontinence, varicose veins, venous insufficiency, lymphedema, hemorrhoids, and abdominal hernias can also occur.

The skin is affected in various ways in the presence of obesity. Skin, the largest organ of the body, both by weight and by surface area, accounts for nearly 16% of total body weight. The skin is comprised of two main layers: the epidermis and dermis. The dermis is tough, flexible, and elastic in most people. The highly vascular dermis contains lymphatics, epithelial cells, connective tissue, muscle, fat, and nerve tissue. Hair follicles and sebaceous and sweat glands are also found in the dermal layer. The vascular supply of the dermis nourishes the epidermis, which is the outermost layer of the skin (Gallagher, 2005b). Skin challenges related to obesity include: pressure ulcers, candidiasis, delayed wound healing, incontinence dermatitis, and irritation in the intertriginous areas, especially in the presence of co-morbidities, such as diabetes and immobility. Any threat to the skin surface places the patient at risk for infection or cellulitis (Gallagher, 2007)

Although obesity can lead to psychiatric conditions, it is important to recognize that when comparing obese and non-obese persons in terms of mental illness, the only condition that is consistently noted more frequently among obese persons is situational depression. Although the relationship between depression and obesity is unclear, most researchers agree that (a) the greater the person's BMI, the more likely that situational depression will occur. (b) once weight loss occurs, the incidence of depression decreases (Dixon, Dixon, & O'Brien, 2003), and (c) the longer the person has been obese, the more severe the depression is likely to be (Pine, Rise, Goldstein, & Weissman, 2001). Widespread cultural prejudice and

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discrimination are thought to contribute to this situational depression. Children as young as six years of age have been found to label silhouettes designed to look like obese people as lazy, dirty, stupid, ugly, and cheats (Richardson, Goodman, Hastorf, & Dornbusch, 1961). In addition, college acceptance and employment advances have been lost as a result of the applicant's size or weight (Puhl, Schwartz, & Brownell, 2005)

Many overweight and obese people express body-image dissatisfaction, viewing their bodies with hostility and contempt, and describing themselves as ugly and despicable (Harris, Waschull, & Walters, 1990). Size-acceptance groups, such as the National Association to Advance Fat Acceptance www.NAAFA.org and the Council for Size and Weight Discrimination www.cswd.org work diligently with larger people to help them understand their unique body and come to terms with the value and contribution each person can make, irrespective of body size or weight.

Nursing Care

Physical size can complicate even the most basic nursing interventions for obese patients. Skin care, respiratory challenges, assessment and resuscitation measures, altered drug absorption, intravenous access, and immobility can pose nursing concerns. This section will offer suggestions to facilitate the nursing care of patients experiencing these concerns.

Skin Care

Obese patients often present with atypical pressure ulcers as pressure within skin folds is sufficient to cause skin breakdown.

Obese patients face numerous challenges in maintaining their skin integrity. In obese patients tubes and catheters can burrow into the skin and soft tissue. Further skin erosion can be prevented by repositioning tubes and catheters at least every two hours (Camden, 2006). This repositioning, however, is difficult for patients who are immobile. Vendor representatives, supply officers, and/or equipment liaison persons may be able to locate specialized equipment to manage some of these threats (Camden, 2005). Excessive moisture accumulation in skin folds promotes bacterial, fungal, and viral growth leading to intertrigo and potential skin breakdown (Yosipovitch, DeVore, & Aerlyn, 2007). Obese patients often present with atypical pressure ulcers as pressure within skin folds is sufficient to cause skin breakdown. Wound healing is problematic because blood supply to adipose tissue is usually compromised, which diminishes oxygen and nutrients necessary to prevent breakdown and promote healing (Gallagher, 2005b). Each situation is

exacerbated if the patient lacks protein, vitamin or mineral stores, or has a wound within a skin fold where excess bacterial, fungal, or viral contamination and moisture can accumulate. A dietician can provide guidance to assist patients in meeting their nutritional goals so as to promote wound healing.

Respiratory Challenges

Several mechanisms have a negative effect on respiratory function in the presence of obesity. The most common abnormalities are reduced expiratory reserve volume and functional residual capacity. Studies also suggest that increased pulmonary blood volume leads to congestion which results in thickening of the airway wall, thus reducing the size of the airway (Boran et al., 2007). Clinically, ten percent of morbidly obese patients have severe respiratory impairments, such as obesity hypoventilation syndrome (OHS), while over 50% have moderate or severe sleep apnea (Resta, Foschino-Barbaro, & Legari, 2001).

From a nursing care perspective, the patient with OHS often breathes better in the semi-Fowler's position because abdominal fat is diverted from the thoracic cavity. A number of patients at home use a continuous positive airway pressure (CPAP) machine. It is essential that those managing the needs of the hospitalized patient are aware of the patient's home treatment practices. Further, depending on policy, some facilities request that patients bring their breathing equipment into the facility for evaluation, or even use, when appropriate. Resources such as a sleep study consultation can be very helpful to these patients. If long-term ventilator support becomes necessary, the needed tracheostomy surgery can be especially challenging when the trachea is buried deep within fatty tissue. Surgeons may create a large wound while accessing the trachea. This, however, increases the risk of postoperative complications, such as bleeding, infection, and erosion of the surrounding skin. Longer, wider tracheostomy tube ties may be necessary in order to accommodate the patient's larger, thicker neck. A longer tube, or an endotracheal tube may work better for these patients. Healthcare professionals, such as the pulmonologist or pulmonary clinical nurse specialist, can provide expert assistance in managing these situations.

It is important to note that a recent study suggested the relationship between obesity and pulmonary complications and risk factors were not as well understood as previously thought. Findings from this study indicated that there was little to no difference between obese and non-obese patients in the rates of pneumonia, tracheostomy, and in-hospital mortality. The study did suggest Intensive Care Unit length of stay may be longer for patients whose BMI exceeds 40 (Dossett et al., 2008).

Assessment and Resuscitation Measures

In assessing obese patients a blood pressure cuff sufficient to fit the patient comfortably is essential. Whether the hospital chooses to provide a thigh cuff because it is larger and fits properly around a larger arm, or a wrist cuff to fit around the lower arm area which seldom accumulates fatty tissue, the objective is to use a cuff that accommodates the patient properly. Using a cuff that is too small, or

taping the cuff together to attempt to make it fit, will lead to an inaccurate reading (Maxwell, Waks, Schroth, Karam, & Dornfeld, 1982). It is best to have the proper fitting cuff stored in a designated area so the nurse has easy access when the equipment is needed.

If resuscitation measures become necessary, and cardio-pulmonary resuscitation (CPR) is needed, a Doppler may be used to hear blood flow through the carotid artery to determine efficacy of compressions. Placing a backboard under the patient may pose a threat to caregiver safety because once resuscitation efforts are successfully completed, the board must be removed so as to prevent serious skin consequences from occurring. If the patient is on a low-air-loss surface with a CPR quick release, the surface can be deflated and the bed frame will serve as a backboard. During emergency intubation, it may be difficult to visualize anatomic landmarks, such as vocal cords, in the morbidly obese patient. A specially trained anesthesia provider is an important code team member because of these special challenges related to intubation. An esophageal-tracheal, double-lumen airway is recognized by the American Heart Association and the American Society of Anesthesiologists as an alternative to an endotracheal tube when obesity-related technical difficulties arise (Banyai, Falger, & Roggla, 1993). Even in a non-emergency situation, safe airway management may require more planning. As described earlier, standard tracheostomy tubes may be too short for use in the presence of a very thick neck. Some clinicians use an endotracheal tube, others use a specially measured and ordered tracheostomy tube in these situations.

Altered Drug Absorption

Excess body fat might alter drug absorption, depending on the medication. Additionally, the dosage of some medications is calculated using the patient's actual body weight, while the dosage of other medications is based on ideal body weight. Trying to remember which drug falls into which category is nearly impossible. The clinical pharmacist is an essential member on the healthcare team to assist in making these critical decisions for your obese patients. It is also important to consider the length of needles used for intramuscular injections because standard 1 to 1 ½ inch needles may not be able penetrate past adipose tissue in a patient with a thick layer of fatty tissue. A longer needle may be necessary.

Intravenous Access

Intravenous (IV) access can also be challenging in obese patients. If it takes more than two attempts to start a peripheral IV, and there is no other reason not to consider using a peripherally-inserted central catheter (PICC) or midline catheter, doing so may be the best option. Both can stay in place for weeks to months, thereby eliminating frequent attempts at restarting IV lines.

Immobility

Most very overweight patients are at risk for certain hazards of immobility. Common immobility-related complications include skin breakdown, cardiac deconditioning, deep vein thrombosis, muscle atrophy, urinary stasis, constipation, pain management problems, and depression. Immobility also contributes to pulmonary complications such as atelectasis and pneumonia. The obese patient is more inclined to develop these complications during a long hospitalization. Specific tasks such as moving and lifting immobile patients can seem overwhelming without proper mentoring and equipment. Ceiling lifts with properly fitted lifting and turning bands; portable lifts which aid in standing or walking an unsteady patient; a sliding board, slip, or inflatable transfer device; and more can be invaluable to nurses who are trained on their proper usage. As technology advances, so does the need to pursue opportunities to learn.

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Conclusion

Regardless of the etiology of a patient's obesity, nurses best serve the larger, heavier patient when there is an understanding of the complex clinical needs of the patient. This article has reviewed sequelae resulting from obesity along with the nursing care needed to care for the physical and emotional needs of obese patients (Camden, Shaver, & Cole, 2007). An interdisciplinary team that meets regularly to discuss patient care issues is essential for identifying clinical concerns in a timely and appropriate manner with the goal of preventing the common, predictable, and preventable complications associated with hospitalization. The team can also serve as a resource to consider some of the safe patient handling challenges in addressing the movement needs of larger, heavier patients and the nurses who care for them.

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