Women’s Knowledge regarding Obesity at al-Hamadab North, al-Shegara Locality, Khartoum State, Sudan (2014)

Ebtehal khabir Khalid Mohamed

B.Sc. of Science in Nursing (2007)
Alzaeem Alazhari University

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Department of Nursing
Faculty of Applied Medical Sciences

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Women’s Knowledge regarding Obesity at al-Hamadab North, al-Shegara Locality, Khartoum State, Sudan (2014)

Ebtehal Khabir Khalid Mohamed

Supervision Committee:

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<td>Main supervisor</td>
<td>............</td>
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<tr>
<td>Dr. Bothyna Bassyonie Elssyed Etewa</td>
<td>Co. Supervisor</td>
<td>............</td>
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Date: september, 2014
Women’s Knowledge regarding Obesity at al-Hamadab North, al-Shegara Locality

Khartoum State, Sudan (2014)

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Examination Committee:

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<td>Chairperson</td>
<td></td>
</tr>
<tr>
<td>Dr.Alsaida Abd Elmageed Alrufaie</td>
<td>External Examiner</td>
<td></td>
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<tr>
<td>Dr.Syda Idris Abd Alrhman Fudal Alla</td>
<td>Internal Examiner</td>
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Examination Date: 14 / December/ 2014
Dedication

I dedicate this research with my best wishes, happy feeling and wonderful memories to my parents and my husband for their kind support.
Acknowledgement

A lot of thanks go to Gezira University, and special thanks go to the Faculty of Applied Medical Sciences. Also express my thanks to my main supervisor Dr.Ietimad Ibrahim Kambal and Co-supervisor Dr.Bothyna Bassyonie Elssyed Etewa for their helpful guidance throughout this work. I sincerely thank everybody who helped me.
Women’s Knowledge regarding Obesity at al-Hamadab North, al-Shegara Locality, Khartoum State, Sudan (2014)

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Abstract

Obesity is an abnormal or excessive accumulation of fat that may impair health. Women with a body mass index (BMI) of 30 kg/meters squared or more are considered obese; it is a complex multifactorial chronic disease that develops from an interaction of genotype and the environment. A descriptive community-based study was conducted aimed at assessing women’s Knowledge regarding obesity at al-Hamadab North at al-Shegara locality, Khartoum State, Sudan in September 2013. The sample size consisted of 100 women who were available during the period from December 2013 to February 2014. Data were collected by using an open questionnaire designed for the study. Data were analyzed by using the Statistical Packages for Social Sciences (SPSS). Results showed that 50% of women defined the obesity correctly and completely. The results also showed that only 20% of the respondents know the reasons of obesity and 78% of them don’t know that food style and behaviors can affect weight, 95% of respondents do not know that obesity is a life-threatening disease that can lead to death. Only 20% of respondents know that obesity is more in women than men, only 43% of respondents were knowledgeable that body mass index of more than 30% is one of the obesity signs. Most of respondents (74%) do not know that obesity is associated with some types of cancers. Only 19% of the study sample was knowledgeable about the measuring method of obesity by dividing weight in pounds by the square of height in inches and multiplying product by 703, only 37% of them were knowledgeable about losing weight by bariatric surgery. The study concluded that women’s knowledge regarding obesity is poor. The study recommended setting periodic training program for women to change their food style and to encourage exercise activities to lose weight because obesity is more dominant in women than men; training women about how to calculate BMI; and how to detect that someone is overweight or obese, provide women with information about how to manage the obesity disease, to lose the excess weight and to keep their body healthier; provide monthly record of weight, height, hip circumference and abdominal circumference and updating programs for weight loss.
معرفة النساء عن السمنة في شمال الحماداب بمنطقة الشجرة، ولاية الخرطوم، السودان (2014)
إبتهال خيرال خالد محمد

ملخص الدراسة

السمنة هي تراكم غير طبيعي أو أكثر يعتبرن بدينين; وهي مرض مزمن متعدد العوامل ومعقد ينشأ عن تفاعل التركيب الوراثي والبيئي. أجريت دراسة وصفية مجتمعية استناداً هدفت إلى تقييم معرفة النساء فيما يتعلق بالسمنة في منطقة الحماداب شمال، محلية الشجرة، ولاية الخرطوم، السودان في سبتمبر 2013. تكونت حجم العينة من 100 إمرأة كن موجودات خلال الفترة من ديسمبر 2013 إلى فبراير 2014. تم جمع البيانات باستخدام استبيان مفتوح تم تصميمه للدراسة. تم تحليل البيانات باستخدام الحزم الإحصائية للعلوم الاجتماعية (SPSS).

إظهرت النتائج أن 50٪ من النساء عرفن السمنة بشكل صحيح وكامل. وأظهرت النتائج أيضاً أن 20٪ فقط من المستجيبات لاعبرن أسباب السمنة. و78٪ لاعبرن أن نمط الغذاء والسلوك يمكن أن تؤثر على الوزن، 95٪ من المستجيبات لاعبرن أن السمنة مرض مهدد للحياة ويمكن أن يؤدي إلى الموت. و20٪ فقط من المستجيبات يعرفن أن السمنة في النساء أكثر من الرجال، 43٪ فقط من المستجيبات مدركات أن مؤشر كثافة الجسم أكبر من 30٪ هو واحد من علامات السمنة. معظم المستجيبات (74٪) لا يعرفن أن السمنة مرتبطة ببعض أنواع السرطانات. فقط 19٪ من عينة الدراسة على دراية بطرقية قياس السمنة وذلك بقاعدة الوزن بالرطل على مربع الطول بالبوصة وضرب الناتج في 703، فقط 37٪ منهم دراية بفقدان الوزن عن طريق جراحة تضيق الدم. خلصت الدراسة إلى أن معرفة المرأة فيما يتعلق بالسمنة ضعيفة. أوصت الدراسة بوضع برنامج تدريبي دوري للنساء لتغيير نمطهم الغذائي وتشجيعهن بالقيام بتمارين وأنشطة لإنقاص الوزن لأن السمنة سائدة في النساء أكثر من الرجال. تدريب النساء حول كيفية قياس مؤشر كثافة الجسم، كيفية إكتشاف أن شخص ما زائد الوزن أوبدين، ومنح النساء المعلومات حول كيفية إدارة مرض السمنة وإنقاص الوزن الزائد وحفظ الوزن، وتحديث برامج إنقاص الوزن.

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<tr>
<td>Kg</td>
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<tr>
<td>M</td>
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<td>WHO</td>
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<tr>
<td>US</td>
<td>United States</td>
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<tr>
<td>CM</td>
<td>centimeter</td>
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<tr>
<td>CNS</td>
<td>Central Nervous System</td>
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<tr>
<td>GI</td>
<td>gastrointestinal</td>
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<tr>
<td>HBA1C</td>
<td>Hemoglobin A1C</td>
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<tr>
<td>DEXA</td>
<td>Dual energy radiographic absorptiometry</td>
</tr>
<tr>
<td>SMART</td>
<td>Specific, measurable, attainable, realistic and timely</td>
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<td>p/wk</td>
<td>Per week</td>
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<td>NWCR</td>
<td>National Weight Control Registry</td>
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<td>G</td>
<td>gram</td>
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<tr>
<td>L</td>
<td>liter</td>
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<td>L.D.L_C</td>
<td>Low density lipo protein cholesterol</td>
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<td>IV</td>
<td>intravenous</td>
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<td>GLP-1</td>
<td>The first glucagon like peptide</td>
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<td>AIDS</td>
<td>Acquired immunodeficiency syndrome</td>
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Chapter (1)

Introduction
1. Introduction

1.1 Backgrounds

Obesity occurs over time when you eat more calories than you use. The balance between calories-in and calories-out differs for each person. Factors that might affect your weight include your genetic makeup, overeating, eating high-fat foods, and not being physically active. Being obese increases your risk of diabetes, heart disease, stroke, arthritis, and some cancers. If you are obese, losing even 5 to 10 percent of your weight can delay or prevent some of these diseases. For example, that means losing 10 to 20 pounds if you weigh 200 pounds. Obesity has become a serious health threat for women at every stage of life. It is linked as a serious factor in more than 30 conditions that effect women. As the prevalence of obesity has grown significantly, obesity has become the second largest cause of preventable death in the United States, following tobacco. This document highlights some research being done to understand the effect of obesity on women and its treatment. (Haslam DW, James WP (2005).

Despite research suggesting that body weight is determined by a complex interaction of genetic, biological, and environmental factors, responsibility for weight is characteristically attributed to the affected individuals and perceived to be under personal control. Often, this leads to the stereotypical view that people are obese due to lack of self-discipline or willpower or because of self-indulgence or Laziness (Puhl & Latner, 2007).

1.2 Problem Statement

1.2.1 Worldwide. The prevalence of obesity worldwide is increasing, particularly in the industrialized nations of the Northern hemisphere, such as the United States, Canada, and most countries of Europe. Available data from the Multinational Monitoring of Trends and Determinants in Cardiovascular Disease (MONICA) project suggest that at least 22% of women in Europe are obese. (Finkelstein EA, DiBonaventuraMd, Burgess SM, Hale BC. The costs of obesity in the workplace. (J Occup Environ Med.).

1.2.2 Developed Countries. Reports from countries such as Malaysia, Japan, Australia, New Zealand, and China have detailed an epidemic of obesity in the past 2-3 decades. Data from the Middle Eastern countries of Bahrain, Saudi Arabia, Egypt, Jordan, Tunisia, and Lebanon, among others, indicate this same disturbing trend, with levels of obesity often exceeding 40%. A somewhat
higher rate would be expected, given the biologically higher percentage of body fat in women. Information from the Caribbean and from South America highlights similar trends. Although data from Africa are scant, a clear and distinct secular trend of profoundly increased BMIs is observed when people from Africa immigrate to the northwestern regions of the world. Comparisons of these indices among Nigerians and Ghanaians residing in their native countries with indices in recent immigrants to the United States show this trend poignantly. Conservative estimates suggest that as many as 250 million people (approximately 7% of the estimated current world population) are obese. Two to 3 times more people than this are probably overweight. Although socioeconomic class and the prevalence of obesity are negatively correlated in most industrialized countries, including the United States, this correlation is distinctly reversed in many relatively undeveloped areas, including China, Malaysia, parts of South America, and sub-Saharan Africa. (Flegal KM, et al 2012).

1.2.3 The Sudan. The high prevalence of obesity in women represents a competing public health problem in the Sudan.

1.3 Justifications

The prevalence of obesity is rising in many countries, it would seem entirely reasonable to adopt public health measures to combat a disorder that is widespread and of high prevalence. This approach has succeeded in controlling epidemics of infectious diseases and in reducing the incidence of smoking. Why then is obesity proving so much more difficult to control? This question cannot be answered without first understanding the regulation of body weight and the etiology of obesity. Several studies have shown that, although many obese women who make the effort can achieve and maintain significant weight loss for 1–2 years, the weight is usually regained over the longer term. Weight loss reverses or ameliorates many of the co morbid conditions associated with obesity, including type 2 diabetes; metabolic syndrome, obstructive sleep apnea, and infertility. 47% of Australian women in the same age group are either overweight or obese. Both overweight and obesity increase with age in men and women until age 65 years when the prevalence of both overweight and obesity decrease in men and the prevalence of obesity decreases in women (AIHW, 2006). Obesity appeared to have a particularly strong effect among black women, with 26.8% of deaths associated with a BMI of 25 kg/m² or higher. (Flegal KM, et al 2012).
1.4 Objectives

1.4.1 The General Objective:

Assessment of women’s knowledge regarding obesity at *al-HamadabNorth* at *al-Shegara* locality in Khartoum state, Sudan in September, 2014.

1.4.2 The Specific Objectives:

- To assess the knowledge of women about the definition of obesity, the causes and its relation with health during the time of study.
- To identify attitudes and lifestyle that increase weight during the time of study.
- To assess health care practitioners and health care organizations for the treatment of obesity during the time of study.
2. Literature Review

Obesity is an abnormal or excessive accumulation of fat that may impair health. Individuals with a body mass index (BMI) of 30 kg/meters squared or more are considered obese. Obesity is a complex multifactorial chronic disease that develops from an interaction of genotype and the environment. Overweight is an individual with a body mass index (BMI) of 25 kg/meters squared or more (Catenacci, Hill & Wyatt, 2009).

2.1 Measuring Overweight and Obesity

Measuring overweight and obesity and their relationship to health or illness is not without challenges. For one thing, there is no clear agreement on how best to measure overweight and obesity. Some researchers argue that percentage of body fat is the best measure of healthy weight, while others maintain that waist circumference is better able to identify individuals at heightened risk of weight-related health conditions. The easiest and most economical measure – and therefore the one most commonly used – is Body Mass Index (BMI). BMI is calculated from the height and weight of an individual where the weight in kilograms or pounds is divided by the square of height in meters or inches. For example, an individual who is 83.6 kg and a height of 1.7 m will have a BMI of 28.8. Normal or healthy weights fall within the range of 20 to 25 on the BMI scale while overweight is categorized as a BMI between 25 and 30 and obesity is defined as a BMI of 30 or greater (Razak et al., 2007).

While BMI is widely used, there is a general recognition that as a measure of healthy and unhealthy weight it is far from perfect. For one thing, BMI is often calculated using self-reported measurements of height and weight, which are often inaccurate, leading to miscalculations in as many as 30% of cases (Elgar & Stewart, 2008).

For another thing, BMI fails to differentiate between fat and musculoskeletal as sources of weight. Some studies have also highlighted the limitations of BMI across diverse populations. This measure was developing with individuals of European descent, it may not be accurate or appropriate for other ethnic populations, For example, the gap in rates of obesity between white and African-American women is cut in half when percent body fat rather than BMI is used to measure healthy weight (Burkhauser & Cawley, 2007).

It is also unclear whether BMI captures the relationship between weight and wellness. In other words, the point at which weight becomes unhealthy may vary between individuals.
and across populations. For example, research suggests that the health risks associated with obesity, defined as a BMI of 30 or above, may be greater in particular racial or ethnic groups. Some studies suggest that BMI under-represents the risk of heart disease associated with obesity among Aboriginal peoples in Canada (Razak et al., 2007).

These limitations have led some researchers to argue for the development of population-specific BMI scales, or the design and use of alternative measures of healthy body weight. Despite its many drawbacks, BMI is still the most commonly used measure in existing research on overweight and obesity and it is impossible to avoid in a review of the literature. But research using BMI should be viewed with caution. (Duncan et al., 2004).

2.1.1 Body Mass Index (BMI):

The BMI, which describes relative weight for height, is significantly correlated with total body fat content. The BMI should be used to assess overweight and obesity and to monitor changes in body weight. In addition, measurements of body weight alone can be used to determine efficacy of weight loss therapy. BMI is calculated as weight (kg)/height squared (m2). To estimate BMI using pounds and inches, use: [weight (pounds)/height (inches) 2] x 703. Weight classifications by BMI selected for use in this research. (WHO, 2011).

<table>
<thead>
<tr>
<th>BMI</th>
<th>Weight status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Below 18.5</td>
<td>Underweight</td>
</tr>
<tr>
<td>18.5-24.9</td>
<td>Normal</td>
</tr>
<tr>
<td>25-29.9</td>
<td>Overweight</td>
</tr>
<tr>
<td>30 and higher</td>
<td>Obese</td>
</tr>
<tr>
<td>40 and higher</td>
<td>Extreme obesity</td>
</tr>
</tbody>
</table>

Body mass index = Body weight in kg

__________________________
(Body height in meter) 2
2.1.2 Waist Circumference:

The presence of excess fat in the abdomen out of proportion to total body fat is an independent predictor of risk factors and morbidity. Waist circumference is positively correlated with abdominal fat content. It provides a clinically acceptable measurement for assessing a patient's abdominal fat content before and during weight loss treatment. Clinicians may use the waist circumference as a measure of central adiposity. According to the US Preventative Task Force, men with a waist circumference greater than 40 inches and women with a waist circumference greater than 35 inches are at increased risk for cardiovascular disease (JAMA, 2005).

2.1.3 Hip Circumference:

The circumference of hips is measured at the largest circumference at the posterior extension of the buttocks (JAMA, 2005).

2.1.4 Waist-hip Ratio:

The circumference of the waist divided by the circumference of the hips

\[
\frac{\text{Waist circumference in cm}}{\text{Hips circumference in cm}}
\]

(JAMA, 2005).

2.2 Signs and Symptoms of Obesity:

Although several classifications and definitions for degrees of obesity are accepted, the most widely accepted classifications are those from the World Health Organization (WHO), based on BMI. The WHO designations are as follows:

- Grade 1 overweight (commonly and simply called overweight) - BMI of 25-29.9 kg/m²
- Grade 2 overweight (commonly called obesity) - BMI of 30-39.9 kg/m²
- Grade 3 overweight (commonly called severe or morbid obesity) - BMI ≥40 kg/m²

Some authorities advocate a definition of obesity based on percentage of body fat, as women - percentage of body fat greater than 33%, with 31-33% being borderline. The
clinician should also determine whether the patient has had any of the co-morbidities related to obesity, including the following:

- **Respiratory** - Obstructive sleep apnea, greater predisposition to respiratory infections, increased incidence of bronchial asthma, and Pickwickian syndrome (obesity hypoventilation syndrome).
- **Malignant** - Association with endometrial, prostate, colon, breast, gall bladder, and possibly lung cancer.
- **Psychological** - Social stigmatization and depression.
- **Cardiovascular** - Coronary artery disease, essential hypertension, left ventricular hypertrophy, cor pulmonale, obesity-associated cardiomyopathy, accelerated atherosclerosis, and pulmonary hypertension of obesity.
- **Central Nervous System (CNS)** - Stroke, idiopathic intracranial hypertension, and meralgia paresthetica.
- **Obstetric and prenatal** - Pregnancy-related hypertension, fetal macrosomia, and pelvic dystocia.
- **Pelvic** - Stress incontinence.
- **Gastrointestinal (GI)** - Gall bladder disease (cholecystitis, cholelithiasis), nonalcoholic steatohepatitis (NASH), fatty liver infiltration, and reflux esophagitis.
- **Orthopedic** - Osteoarthritis, coxaVera, slipped capital femoral epiphyses, Blount disease and Legg-Calve-Perthes disease, and chronic lumbago.
- **Metabolic** - Type 2 diabetes mellitus, pre-diabetes, metabolic syndrome, and dyslipidemia.
- **Reproductive (in women)** - An ovulation, early puberty, infertility, hyperandrogenism, and polycystic ovaries.
- Coetaneous - Intertrigo (bacterial and/or fungal), acanthosisnigricans, hirsutism, and increased risk for cellulites and carbuncles.
- Extremity - Venous varicosities, lower extremity venous and/or lymphatic edema.
- Miscellaneous - Reduced mobility and difficulty maintaining personal hygiene.


2.3 Who is at Risk?

All overweight and obese women (aged 18 years or older) with a BMI of 25% are considered at risk for developing associated morbidities or diseases such as hypertension, high blood cholesterol, type 2 diabetes, coronary heart disease, and other diseases. Females with a BMI of 25 to 29.9 are considered overweight, while females with a BMI 30% are considered obese. Obesity is also associated with complications of pregnancy, menstrual irregularities, hirsutism, stress incontinence, and psychological disorders (depression). The presence of co-morbidities in overweight and obese women should be considered when deciding on treatment options (Catenacci, Hill & Wyatt, 2009; Razak et al., 2007).

2.4 Diagnosis:

2.4.1 Laboratory Studies

- Fasting lipid panel
- Liver function studies
- Thyroid function tests
- Fasting glucose and hemoglobin A1C (HbA1c) (Ward LC., 2012).

2.4.2 Evaluation of Degree of Body Fat

BMI calculation, waist circumference, and waist/hip ratio are the common measures of the degree of body fat used in routine clinical practice. Other procedures that are used in few clinical centers include the following:
• Caliper-derived measurements of skin-fold thickness
• Dual-energy radiographic absorptiometry (DEXA)
• Bioelectrical impedance analysis
• Ultrasonography to determine fat thickness
• Underwater weighing (Sjöström L, et al, 2007).

2.5 Etiology:

The etiology of obesity is far more complex than simply an imbalance between energy intake and energy output. Although this view allows easy conceptualization of the various mechanisms involved in the development of obesity, obesity is far more than simply the result of eating too much and/or exercising too little. Possible factors in the development of obesity include the following:

• Metabolic factors
• Genetic factors
• level of activity
• Endocrine factors
• Race, sex, and age factors
• Ethnic and cultural factors
• Socioeconomic status
• Dietary habits
• Smoking cessation
• Pregnancy and menopause
• Psychological factors
• History of gestational diabetes
• Lactation history in mothers. (Duncan et al., 2004)

2.6 Management:

Treatment of obesity starts with comprehensive lifestyle management (i.e., diet, physical activity, behavior modification). The 3 major phases of any successful weight-loss program are as follows:
• Preinclusion screening phase
• Weight-loss phase
• Maintenance phase - This can conceivably last for the rest of the patient's life but ideally lasts for at least 1 year after the weight-loss program has been completed. (Duncan et al., 2004)

2.6.1 Approach Considerations:

Treatment of obesity starts with comprehensive lifestyle management (i.e., diet, physical activity, behavior modification), which should include the following:

• Self-monitoring of caloric intake and physical activity
• Goal setting
• Stimulus control
• Nonfood rewards
• As with all chronic medical conditions, effective management of obesity must be based on a partnership between a highly motivated patient and a committed team of health professionals. This team may include the physician, a psychologist or psychiatrist, physical and exercise therapists, dietitians, and other subspecialists, depending on the co-morbidities of the individual patient. Scientific evidence indicates that multidisciplinary programs reliably produce and sustain modest weight loss between 5% and 10% for the long-term (JollyK, et al, 2011).

2.6.2 Weight-loss Programs

The 3 major phases of any successful weight-loss program are as follows:

• Preinclusion screening phase
• Weight-loss phase
• Maintenance phase - This can conceivably last for the rest of the patient's life but ideally lasts for at least 1 year after the weight-loss program has been completed.
Evidence supports the use of commercial weight-loss programs. A 12-week randomized, controlled trial found that commercially available weight-loss programs are more successful and more affordable than primary care practice–based programs led by specially trained staff. (Nainggolan L., 2013)

### 2.6.3 Pharmacologic Therapy

Few drugs are available for the treatment of obesity, and their effectiveness is limited to palliation (i.e., production and maintenance of weight loss) rather than cure, with benefits fading when the drugs are stopped. Because all medications inherently have more risks than diet and exercise do, pharmacologic therapy should be used only in patients in whom the benefit justifies the risk. (Bray GA.2011).

### 2.6.4 Surgery

In patients with morbid obesity associated with co-morbidities, bariatric surgery is the only available therapeutic modality associated with clinically significant and relatively sustained weight loss. Well-performed bariatric surgery, in carefully selected patients and with a good multidisciplinary support team, substantially ameliorates the morbidities associated with severe obesity.

Among the standard bariatric procedures are the following:

- Roux-en-Y gastric bypass
- Adjustable gastric banding
- Gastric sleeve surgery
- Vertical sleeve gastrectomy
- Horizontal gastroplasty
- Vertical-banded gastroplasty
- Duodenal-switch procedures
- Biliopancreatic bypass
2.6.5 Co-morbidities

The management of obesity is not complete without attention being paid to potential co-morbidities. Addressing these issues can have profound effects on the patient's well-being and risk of morbidity and mortality. According to guidelines released by the American College of Cardiology (ACC), the American Heart Association (AHA), and The Obesity Society (TOS) in 2013, weight loss should be encouraged at a BMI of 25 with just 1 co-morbidity (instead of 2 as was the case in previous guidelines), and elevated waist circumference can be one of those co-morbidities. (Flegal KM, et al, 2012).

2.6.6 Weight-loss-associated Morbidity

Although obesity in itself is associated with increased morbidity and mortality, massive poorly monitored weight loss and/or weight cycling can have equally dire consequences. Among the important potential complications to watch out for in the setting of weight loss are the following:

- Cardiac arrhythmias
- Electrolyte derangements - Hypokalemia is the most important of these
- Hyperuricemia
- Psychological squeal - Including depression and the development of eating disorders (particularly binge-eating disorders)

2.6.7 Patient Screening, Assessment and Expectations

Before enrolling any patient in a weight-loss program, the clinician must have a clear idea of that individual’s expectations. A patient with unrealistic expectations should not be enrolled until these are changed to realistic and attainable goals. The clinician should guide the patient who seeks weight reduction to create goals that fit the mnemonic SMART: Specific, Measurable, Attainable, Realistic, and Timely.

A specific goal has a much greater chance of being accomplished than a general goal does. To set a specific goal, the patient must answer the following 6 W questions:
- Who - Who is involved?
- What - What do I want to accomplish?
- Where - Identify a location
- When - Establish a time frame
- Which - Identify requirements and constraints
- Why - Identify specific reasons for or purpose or benefits of the goal

Also crucial is a clear assessment of the patient's level of motivation regarding the changes in diet, exercise, and behavior required to maintain weight loss. This assessment should be completed before the patient is enrolled in a weight-loss program. Comprehensive, written, informed consent must be obtained and should address details of the expected weight loss and the required changes. Clinical judgment may support a less stringent approach in some situations. (Jiao L, et al, 2010)

2.6.8 Psychiatric Co-morbidities

Because of the potential harm of attempting weight loss in an unsuitable candidate, all patients to be enrolled in any surgical, medical, or other weight-loss program should be screened for serious mental illness (e.g., severe or untreated depression) and for eating disorders. Many of the psychological and psychiatric problems commonly associated with obesity are not contraindications to enrollment in a weight-loss program; for example, mild to moderate depression typically improves with weight loss. Nevertheless, clinicians and patients must be aware of these problems before enrollment. In addition, the clinician must ensure that any such problems are relatively stable, quiescent, or well managed before the patient begins a weight-loss program (Flegal KM, et al, 2012).

2.6.9 Weight-Loss Goals

In general, body weight and body fat are tenaciously regulated. This underlies the challenge of weight loss and highlights the importance of setting realistic weight-loss goals. Recognition of this challenge, and of the value of modest weight loss, have led to a paradigm shift in the medical management of obesity from a goal of massive weight loss to
one of maintaining the highest weight possible while still eliminating obesity-related co morbidities or reducing them to a minimum.

Available data suggest that a loss of approximately 10% of body weight in persons who are obese (body mass index [BMI] < 40 kg/m$^2$) is associated with substantial health benefits regarding obesity-related co morbidities. (Wing RR, et al, 2011).

However, according to guidelines released by the American College of Cardiology (ACC), the American Heart Association (AHA), and The Obesity Society (TOS) in 2013, clinically meaningful health improvements can even be seen with weight loss in the range of 2%-5%(FlegalKM, et al, 2012).

A reasonable goal for weight loss in the setting of a medical treatment program is approximately 1-2 lb/wk. However, it is becoming increasingly apparent that the weight-loss goal for each patient must be individualized and cannot be unilaterally based on standard weight-for-height norms. In addition to the patient’s weight, factors to consider when setting individualized weight loss goals are the weight of other family members, as well as the patient's cultural, ethnic, and racial background. A study of approximately 200 obese black women, the Obesity Reduction Black Intervention Trial (ORBIT), found evidence that greater weight loss can be achieved with a culturally adapted weight-loss program than with a more general health program. (StolleyMR, et al, 2009).

In ORBIT, the women randomized to a 6-month, culturally adapted program aimed at altering dietary and physical activity patterns (followed by 1 year of maintenance intervention) lost significantly more weight than did participants in a general program. Despite this success, however, the average weight loss in the culturally adapted program was still relatively modest, and the amount of weight loss varied greatly among the women in the program. (Wing RR, et al, 2011).
2.6.10 Weight-Loss Maintenance

Evidence from the National Weight Control Registry (NWCR), which tracks indices and predictors in individuals who have lost at least 30 pounds and have maintained that loss for at least 1 year, suggests that patterns associated with successful weight maintenance include the following:

- Self-monitoring of weight
- Consumption of a low-fat diet
- Daily physical activity of approximately 60 minutes
- Minimal sedentary “screen time”
- Consumption of most meals at home

Data from randomized trials of diets of different macronutrient composition indicate that caloric restriction, self-monitoring, and program attendance are more important than any specific composition of dietary macronutrient. According to a study by Blüher et al, patients regaining weight after initial weight loss on long-term dietary intervention nevertheless continued to show long-lasting improvements in high-sensitivity C-reactive protein, adiponectin, fetuin, high-density lipoprotein cholesterol, progranulin, and vaspin. This finding may indicate that there are delayed effects following initial weight loss and/or continuous beneficial effects from switching to a healthier diet. (Blucher M, et al 2012)

Diet-induced weight loss can result in elevated levels of hormones that increase appetite. After successful weight loss, circulating levels of these hormones do not decrease to levels recorded before diet-induced weight loss. Thus, long-term strategies are needed to prevent obesity relapse. (Sumatran P, et al, 2011)

2.6.11 Energy Expenditure and Weight Loss

Achieving a caloric deficit is still the most important component in achieving sustained weight loss. However, the considerable variance in individual energy expenditures and compliance with calorie-deficient plans make it difficult to reliably predict how much weight an individual will lose. Among the caveats is the fact that energy expenditure is related to body weight; about 22 kcal/kg of energy is required for basal maintenance of 1 kg
of weight in a typical adult. Therefore, weight loss tends to reduce energy expenditure, dampening the effect of caloric deficits. (Wing RR, et al, 2011).

Because of their lowered energy expenditure, older subjects have increased difficulty in achieving sustained weight loss. The estimated reduction in energy expenditure is 100 kcal per decade after the age of 30 years. Presumably because of their greater lean mass proportions, men tend to lose more weight than women do when caloric deficits are similar. (FAO/WHO/UNU, 2001).

2.6.12 Conventional Diets

Conventional diets can be broadly classified into 2 categories: balanced, low-calorie diets (or reduced portion sizes) and diets with different macronutrient compositions. The latter include the following:

- Low-fat diets - Egg, the Ornish diet
- Low-carbohydrate diets - E.g., the Atkins diet
- Midlevel diets - E.g., the Zone diet, in which the 3 major macronutrients (fat, carbohydrate, protein) are eaten in similar proportions of 30-40%

2.6.13 Reduced-portion, size, diets and balanced, low-calorie diets

Balanced, low-calorie diets and reduced-portion size diets are the types that dietitians and other weight-management professionals most commonly prescribe. Although these diets are useful for short-term weight loss, none of them alone is associated with reliable, sustained weight loss. These diets underlie most commercial weight-loss programs, such as those advocated by Jenny Craig, Weight Watchers, Take off Pounds Sensibly (TOPS), and Overeaters Anonymous (OA). The basic premise for people on these diets involves obtaining their detailed dietary inventory and using it to estimate their mean daily caloric intake. A reasonable goal for the caloric deficit is based on the new goal for total daily calories. Meal plans are then devised to provide this total, divided among 3 or more meals throughout the day (Wing RR, et al, 2011).
2.6.13.1 Reduced-portion, size diets

The meals may be based on regular, everyday foods. In such cases, strategies for effective reduction of portion sizes become central. Alternatively, portion control can be achieved by participation in structured weight loss programs (e.g., Jenny Craig, Nutrisystem) or by the purchase of products such as meal-replacement shakes, bars, prepackaged meals, and frozen entrees (e.g., Slim-Fast, Glucerna, Lean Cuisine, Healthy Choice, Smart Ones). These have adequate amounts of the major macronutrients based on the food pyramid from the US Department of Agriculture and recommended daily allowances (RDAs). These sources also have adequate micronutrients and trace elements (Wing RR, et al, 2011).

Alcohol, sodas, most fruit juices, and highly concentrated sweets are generally calorie dense and nutrient deficient (so-called empty calories). Consequently, these are generally prohibited or reduced to a minimum. (Wing RR, et al, 2011).

2.6.13.2 Low-calorie diets

Low-calorie diets involve reducing daily caloric intake by 500-1000 kcal/day, to a level of 800-1800 kcal/day. These diets are associated with a mean weight loss of 0.4-0.5 kg per week (1-2 lb/wk). In ideal settings, total loss can be 5-10% of starting weight (10-20 lb for a 200-lb person) over 3-6 months, occasionally higher if the individual is very successful. With any low-calorie diet, maintaining an intake of protein with a high biologic value of 1-1.5 g/kg of adjusted body weight (adjusted body weight = ideal body weight + one quarter of the excess weight) is vital to preserve lean body mass. Reducing intake to less than 1200 kcal/day while keeping the percentage protein constant may lead to protein malnutrition and significant muscle mass loss. For example, for a person following a 1200 calorie diet and aiming to consume 25% protein, the goal should be 300 kcal/day of protein (75 g). (Foster GD, et al, 2010).
Major potential complications to watch for include the following:

- Vitamin deficiency
- Starvation ketosis
- Electrolyte derangements

### 2.6.13.3 Diets with Different Macronutrient Compositions

Diets with different macronutrient compositions involve a caloric intake of greater than 1200 kcal/day. This type of diet is designed to reduce the caloric intake by 500-1000 kcal/day from the patient's current dietary intake.

The suggested composition used by the best-validated dietary programs is as follows:

- Protein intake of 0.8-1.5 g/kg of body weight (not to exceed 100 g/day)
- 10-30% of total calories from fat (preferably ≥90% as polyunsaturated fat and < 10% as saturated fat)
- Carbohydrate intake of 50 g/day or more
- Water intake of 1 L or more
- Adequate micronutrients and macronutrients based on the RDAs (Foster GD, et al, 2010).

### 2.6.13.4 Low-carbohydrate Diets

Low-carbohydrate diets have become popular in the past few decades, with the Atkins diet being the most popular. The Atkins diet is a high-protein and/or high-fat, very-low-carbohydrate diet that induces ketosis. The very-low-carbohydrate content is critical in inducing short-term weight loss in the first 2-4 weeks; this is largely the result of fluid mobilization. Ketone bodies tend to be generated when an individual’s daily dietary carbohydrate intake is under 50 g, and sodium diuresis is forced, causing most of the short-term weight loss. No robust data about the safety or long-term effectiveness of this diet are available. The premise of the diet is that caloric intake as protein is less prone to fat storage than is the equivalent caloric intake as carbohydrate; however, no physiologic data support
this premise. Owing to the high fat content of such diets, low-density lipoprotein cholesterol (LDL-C) levels were found to be increased by at least 10% in 25% of patients who used this diet.

Data on the long-term effects of a high-protein diet in rodents cause concern. They indicate that these diets may be associated with a reduced life span and a predisposition to neoplasia. In 2 randomized trials, weight loss with Atkins-type diets was compared with conventional low-fat or balanced calorie-deficit diets. Although the Atkins-type diet led to the greatest initial weight loss, weight loss became similar within 1 year. Adherence to this diet is poor; in those studies noted, the noncompliance rate in the Atkins-type group was close to 50%. (Foster GD, et al, 2010).

The South Beach diet is another low-carbohydrate diet. This program is more liberal in its carbohydrate allowance than the Atkins diet. In addition, the South Beach diet distinguishes between what are considered to be good and bad carbohydrates on the basis of their glycemic index. Although the relevance and importance of the glycemic index is controversial, the diet encourages increased fiber intake, which is associated with lowered weight even when total caloric intake is relatively unchanged. Low glycemic index diets are better at helping to maintain weight loss than diets with a higher glycemic index; the same is true of diets with modestly increased protein intake, versus standard protein intake. Persons who decide to use a low-carbohydrate diet should choose heart-healthy sources of fat, including monounsaturated fats, polyunsaturated fats, and fats rich in omega 3 fatty acids, rather than saturated fat. Protein sources should be fish, nuts, legumes, and lean poultry rather than pork chops, steak, and mutton (Larsen TM, et al, 2010).

2.6.13.5 Comparison of Diet Programs

Dansinger and colleagues compared the Zone, Ornish, and Atkins diets to each other and to a typical balanced, calorie-restricted (Weight Watchers) diet and found them all to have a similar impact on weight. (Dansinger ML, et al 2005).

The Ornish diet (a very-low-fat diet) and the Atkins diet had the poorest compliance rates. At 1 year, the researchers observed no significant differences in weight loss among the 4
diets. Compliance and caloric deficits were more important predictors of weight loss and improvement in cardiovascular risk surrogates than was specific dietary composition.

A 2-year study found low-carbohydrate and low-fat diets to be equally efficacious in inducing weight loss. However, the study also found that a low-carbohydrate diet is associated with favorable changes in cardiovascular disease risk factors. Nevertheless, better achievement of sustained weight loss is seen with low-fat diets than with low-carbohydrate diets, probably because of generally higher compliance. (Foster GD, et al, 2010)...

2.6.13.6 Very-Low-Calorie Diets

Very–low-calorie diets (VLCDs) are best used in an established, comprehensive program. VLCDs involve reducing caloric intake to 800 kcal/day or less. When used in optimal settings, they can achieve a weight loss of 1.5-2.5 kg/wk (3.3-5.5 lb/wk), with a total loss of as much as 20 kg over 12 weeks. No good-quality evidence suggests that a daily calorie intake of less than 800 kcal/day achieves any additional weight loss in the long-term. (Very low calorie diets. DrugTher Bull. May 2012).

VLCDs are associated with profound initial weight loss, much of which is from loss of lean mass in the first few weeks. However, this loss rapidly ceases, and weight-loss velocity then flattens. Such rapid weight loss is frequently followed with weight regain due to reduction in basal energy expenditure secondary to the loss of fat free mass. Use special caution whenever VLCDs are prescribed to children, adolescents, or elderly patients. Use of VLCDs is contraindicated in the following settings:

- Pregnancy
- Protein-wasting states
- Clinically significant cardiac, renal, hepatic, psychiatric, or cerebrovascular disease
- Any other chronic disease

Although VLCDs are associated with notable short-term weight loss and improved blood pressure and glycemic control, they cannot be sustained for longer than 3-6 months.
Compliance beyond a few weeks is poor, and close supervision is required to avoid mishaps.

Among the major complications to monitor are hair loss, skin thinning, hypothermia, cholelithiasis, and electrolyte derangement. VLCDs have little or no utility in long-term weight management and are probably best used as stopgap measures before bariatric surgery or a long-term, comprehensive weight-loss program in patients with very severe or morbid obesity and associated co morbidities (body mass index [BMI] ≥50). Preoperative VLCDs have been postulated to decrease surgical risk by enhancing visualization during laparoscopic bariatric surgery. In a multicenter, randomized, controlled trial involving 298 morbidly obese patients who underwent gastric bypass surgery, van Nieuwenhove et al reported a significantly lower rate of intraoperative complications among those who had undergone a 14-day VLCD before the procedure. In addition, the surgeons’ perception of the procedure’s difficulty was lower in the VLCD patients. There were, however, no significant differences in operative time or intraoperative complications between the control and VLCD groups. (Van Nieuwenhove Y, et al, 2011).

### 2.6.14 Water Drinking

Dennis et al found that in overweight and obese middle-aged and older adults on a hypo caloric diet, drinking water before each main meal aided weight loss. In 48 adults aged 55-75 years with a BMI of 25-40 kg/m², those who consumed 500 mL of water prior to each daily meal had a 44% greater decline in weight over 12 weeks than did individuals on a hypo-caloric diet without pre-meal water consumption. (Dennis EA, et al, 2010).

Water drinking could assist weight loss in overweight children. Drinking 10 mL/kg of cold water could result in an additional weight loss of about 1.2 kg/y. This is achieved primarily through a water-induced increase in resting energy expenditure. (Dubnov-RazG, et al, 2011).

### 2.6.15 Exercise Programs

Before prescribing an intensive exercise program, clinicians should screen patients for cardiovascular and respiratory adequacy. Any clinically significant anomalies found require
full evaluation by appropriate specialist physicians, and only after these issues have been adequately managed and stabilized should the patient begin an active exercise program. In contrast, patients starting a program of moderate exercise (e.g., walking) do not require prescreening (Wiesner S, et al, 2010).

Aerobic isotonic exercise is of the greatest value for persons who are obese. The ultimate minimum goal should be to achieve 30-60 minutes of continuous aerobic exercise 5-7 times per week. Increased physical activity and exercise 300 min/week is associated with significant weight reduction and longer maintenance of the weight loss. (Jakicic JM, et al, 2008).

Anaerobic isometric exercise, including resistance training, can be cautiously added as an adjunct after the aerobic goal described above is achieved. Resistance training is valuable in minimizing muscle mass loss and is particularly beneficial in patients with diabetes, as it increases glucose uptake by muscles. Since approximately 27% of the diet-induced weight loss is from loss of muscle, the addition of exercise to caloric restriction is important. Studies have shown that muscle mass loss is reduced to approximately 13% of the total weight loss when diet and exercise are combined. (Goodpaster BH, et al, 2010).

Exercise also increases metabolic activity and reduces body fat. Although most patients may be unable to sustain enough regular exercise to achieve weight loss, consistent, moderate exercise is important in maintaining weight and in improving overall cardio respiratory fitness. Shorter bouts of exercise of around 10 minutes are associated with better adherence and more weight loss than are longer bouts of exercise. (Villareal DT, et al, 2011).

A study by Goodpaster et al showed that patients with severe obesity who introduced exercise concurrently with or after dietary intervention had significant weight loss and modification of cardio metabolic risk factors (Goodpaster BH, et al, 2010).

Furthermore, a study by Hankinson et al indicated that benefits of exercise in young age may translate into benefits beyond, particularly in young women. This information is useful for patients and physicians who may be discouraged by the patients’ initial inability to engage in exercise (Hankinson AL, et al, 2010).
A study by Rejeski et al indicated that community weight-loss and physical activity programs can have a positive impact on mobility in elderly people who are overweight or obese and are in poor cardiovascular health. In this study, participants with poorer mobility at baseline benefited the most from these interventions (Rejeski WJ, et al, 2011).

### 2.6.16 Behavioral Changes

Behavioral modification for weight loss addresses learned behaviors that contribute to excessive food intake, poor dietary choices or habits, and sedentary activity habits. Although this approach can yield improved results, it is inherently challenging and time-consuming. (Van Dorsten B, et al 2011).

Effecting behavioral change starts with taking a detailed inventory of the patient’s daily activities, in order to identify activities, cues, circumstances, and practices that favor non-meal eating and snacking. A trained professional must then have an in-depth discussion with the patient to develop an individualized plan to change these practices. The effectiveness of this modality depends on a highly motivated patient and a dedicated counselor who is willing to maintain long-term follow-up. (Morgan PJ, et al, 2011), (Mozaffarian D, et al, 2011).

A sufficient amount of sleep favorably impacts the maintenance of fat-free mass during times of decreased energy intake. In contrast, insufficient sleep undermines the body's ability to limit expansion of fat mass. A healthy sleep pattern is therefore important to harness weight loss benefits from other interventions. Seven to 8 hours of sleep are optimal. Shorter (< 6 h) or longer (>9 h) sleep duration is associated with increased total body weight. Treatment of obstructive sleep apnea, if present, also helps in weight reduction. (Nedeltcheva AV, ET al 2010).

### 2.6.17 Antiobesity Medications

Few medications are available for the treatment of obesity. At present, the only FDA-approved drugs for the long-term treatment of obesity are orlistat (Xenical), lorcaserin (Belviq), and the combination of phentermine and extended-release topiramate (Qsymia).
The FDA has issued a consumer alert about over-the-counter weight-loss pills that contain undeclared, active pharmaceutical ingredients. These products, which are promoted and sold on Web sites and in retail stores, may be marketed as “dietary supplements.” They have not been approved by the FDA, are illegal, and may be potentially harmful. (FDA, 2013).

2.6.17.1 Orlistat

Orlistat blocks the action of pancreatic lipase, reducing triglyceride digestion and, thus, absorption. Two major clinical trials showed sustained weight loss of 9-10% over 2 years. Orlistat’s effectiveness in producing weight loss does not depend on systemic absorption. The drug may reduce absorption of some fat-soluble vitamins (A, D, E, and K) and beta-carotene, as well as absorption of some medications. Adverse effects include flatulence, fatty/oily stool, increased defecation, and fecal incontinence (US Food and Drug Administration, 2012).

2.6.17.2 Lorcaserin

Lorcaserin was approved by the FDA in June 2012 as an adjunct to a reduced-calorie diet and exercise for long-term weight management in individuals with an initial BMI of 30 kg/m² or higher (obese) or 27 kg/m² or higher (overweight) with at least 1 weight-related comorbid condition (e.g., hypertension, dyslipidemia, type 2 diabetes mellitus). (US Food and Drug Administration, 2012).

Lorcaserin will not be available on the US market until the first quarter of 2013, while the Drug Enforcement Administration (DEA) determines scheduling. The DEA has proposed controlling lorcaserin as a schedule IV substance, since it has potential for abuse. (Schedules of Controlled Substances: Placement of Lorcaserin Into Schedule IV. (Drug Enforcement Administration, 2013).

Lorcaserin is thought to decrease food consumption and promote satiety by selectively activating 5-HT2C receptors on anorexigenic pro-opiomelanocortin neurons in the hypothalamus. Approval of lorcaserin was based on 3 double-blind, randomized, placebo-controlled trials that found lorcaserin (along with diet and exercise) to be more effective
than diet and exercise alone at helping patients lose 5% or more of their body weight after 1 year and managing the weight loss for up to 2 years. (Smith SR, et al, 2010).


Required post marketing studies of lorcaserin will include a long-term trial to assess the risk for major adverse cardiac events. Lorcaserin should be used with caution in patients with heart failure, and it has not been studied in patients with serious valvular heart disease. (US Food and Drug Administration, 2012).

### 2.6.17.3 Phentermine and Topiramate

The combination of phentermine and extended-release topiramate was approved by the FDA in July 2012 as an adjunct to a reduced-calorie diet and exercise for long-term weight management in individuals with an initial BMI of 30 kg/m² or higher (obese) or 27 kg/m² or higher (overweight) with at least 1 weight-related co morbid condition (e.g., hypertension, dyslipidemia, type 2 diabetes mellitus). Use during pregnancy is contraindicated. Topiramate, which was first licensed as an adjunctive antiepileptic agent, has been associated with profound weight loss (an average of 5-7% of initial weight). The amount of weight loss appears to be greater with higher baseline weights. The exact mechanism of this effect is being actively studied. Although the degree of efficacy is exciting, the propensity for adverse effects, especially CNS effects such as drowsiness, paresthesias, memory loss, and confusion, is cause for concern. (Serretti A, et al, 2010).

Qsymia contains an extended-release form of topiramate. In addition, the dose of topiramate in this product (46 mg, although a 92-mg dose form is available for select patients) is lower than those used for seizure management (usually 200 mg twice daily). (ZZZ PLACEHOLDER).
2.6.17.4 Drugs for Short-term Treatment

Four agents are available in the United States for short-term (8-12 weeks) treatment of obesity: diethylpropion, phendimetrazine, benzphetamine, and phentermine. Any of these drugs may be used as an adjunct in a regimen of weight reduction based on caloric restriction in patients with an initial BMI of 30 kg/m² or higher who have not responded to appropriate weight-reducing regimen (Goldfield GS, et al, 2007).

2.6.17.5 Medications used off-label

Several medications that are approved for other indications but that may also promote weight loss have been used off-label for obesity. These include several antidepressants, such as selective serotonin reuptake inhibitors (SSRIs) and bupropion. Bupropion, which is licensed for use as an antidepressant and in smoking cessation, is associated with minimal to moderate weight loss. (Gadde KM, et al, 2007). Other medications used off-label for obesity includes the following:

- Methylphenidate - Not approved by the FDA for obesity management, but several anecdotal reports have described it as having variable success for this purpose (Goldfield GS, et al, 2007).
- Zonisamide - Gadde and colleagues reported that randomized use of the antiepileptic drug zonisamide in a cohort of 60 obese subjects was associated with a weight loss of about 6% of baseline weight, with few adverse effects.
- Octreotide - Lustig and colleagues reported the potential utility of octreotide in ameliorating the distinct subclass of hypothalamic obesity. (Desilets AR, et al 2008).

2.6.17.6 Diabetes Medications

Metformin does not have an indication for obesity, but it is useful in preventing diabetes and improving insulin resistance in conditions such as polycystic ovary syndrome. Its use was associated with weight neutrality or mild weight loss.

The first glucagonlike peptide (GLP)-1 analogue, exenatide (Byetta), although not FDA approved for obesity management, has been associated with modest weight loss in subjects with
type 2 diabetes. A similar effect was seen with liraglutide (Victoza) and long-acting exenatide (Bydureon), which also are not approved by the FDA for obesity management. Higher liraglutide doses of 2.4 mg and 3 mg/day were found to be significantly more effective than orlistat for the management of obesity in no diabetic patients. A systematic review and meta-analysis by Vilsbøll et al found that treatment with GLP-1 receptor agonist’s results in weight loss among overweight or obese patients with or without type 2 diabetes. GLP-1 agonist regimens reviewed included exenatide twice daily, exenatide once weekly, and liraglutide once daily at clinically relevant doses for at least 20 weeks. (Desilets AR, et al, Jun 2008).

2.6.17.7 Antidepressants

Although not FDA approved for this purpose, several SSRIs may cause anorexia as one of their major adverse effects. Some of these medications have been used as adjuncts in the medical management of obesity, with variable success. A meta-analysis of antidepressants and body weight found that fluoxetine was associated with some weight loss, although this effect appeared to be limited to the acute phase of treatment. (Vilsbøll T, et al, 2012).

Bupropion is licensed for use as an antidepressant and in smoking cessation. It is associated with minimal to moderate weight loss in obese patients.

A combination of bupropion and naltrexone (Contrave) showed significant weight loss in clinical trials but it is not yet approved by the FDA (Gadde KM, et al, 2007).

2.6.17.8 Ephedrine and Caffeine

Ephedrine and caffeine are second-line options in the medical management of obesity. They both act by increasing energy expenditure, but they are associated with the potential for tachycardia, hypertension, and palpitations. These medications are associated with greater weight loss when used in combination than when used alone. They cause 25-40% of their weight loss by inducing thermo genesis, but they also decrease food intake, which accounts for 60-75% of the weight-loss effect. Currently, the evidence for the efficacy of these 2 drugs in promoting weight loss is inconclusive. Neither substance has an FDA-approved indication for the treatment of obesity (Makowski CT, ET al2011).
2.6.17.9 Cannabinoid-receptor Antagonists

The central cannabinoid system has an increasingly recognized role in appetite and feeding disorders. In particular, activation of the cannabinoid type 1 (CB1) receptor is associated with increased appetite and appears to be the basis for the effectiveness of dronabinol in enhancing diet in patients with acquired immunodeficiency syndrome (AIDS) and other wasting syndromes.

CB1-receptor antagonists showed great potential for weight management in several human trials. Rimonabant, the most-developed CB1-receptor antagonist, caused a mean weight loss of 3-6 kg over a 1-year follow-up at doses of 5-20 mg/day. Adverse effects were most prevalent at high doses, included dizziness, depression and suicidal ideation, headaches, nausea, vomiting, and diarrhea. The drug was rejected by the FDA because of side effects of depression and suicidal ideation; in Europe, it was approved but later recalled (Cox SL., 2005).

2.6.17.10 Catechin

A Japanese study found evidence that beverages containing high amounts of catechin, a flavonoid found in green tea, may aid in preventing obesity. Patients in the investigation, all of whom had type 2 diabetes mellitus, ingested either 582.8 mg or 96.3 mg of catechins per day by drinking green tea. By the 12th week, participants receiving the higher catechin dose had undergone a significantly greater reduction in waist circumference than did patients receiving the lower dose. (Nagao T, et al, 2009).

2.6.17.11 Other Potential Anti-obesity Agents

The increasing knowledge that has come on the heels of the discovery of leptin by Friedman and colleagues in 1994 has spurred a whirlwind of research that has identified several potential pharmaceuticals. However, safety standards for obesity medications are necessarily high. Tolerance for adverse effects is limited; most persons who are obese are fairly healthy in the short term, but the risk for adverse drug effects is enhanced because patients must take antiobesity medications for extended periods (possibly for the rest of their lives).(Dunican KC, et al, 2010).
Agents in early phases of investigation that may yet prove useful against obesity include the following:

- Ghrelin antagonists,
- Alpha–melanocyte-stimulating hormone analogs
- Enterostatin
- Neuropeptide YY antagonists
- Beta3-adrenergic agonists

In addition, various nutraceuticals and herbal products have shown promise. For example, an extract from the African cactus *Hoodia gordonii* may cause clinically significant appetite suppression. The diabetes drug pramlintide (Symlin), which is a synthetic analogue of the pancreatic hormone amylin, does not have an FDA indication for obesity management. However, this drug is clearly associated with variable weight loss in people with type 1 or 2 diabetes, while improving overall glycemic control. Higher doses (240 mcg before main meals) than those approved for the management of type 2 diabetes (60-120 mcg before main meals) have produced modest weight loss in obese or overweight patients with and without diabetes. (Dunican KC, et al, 2010).

Peptide YY (3-36) is being developed as a nasal inhaler. Ongoing, preliminary phase 1 and 2 trials yielded encouraging results. (BoggianoMM, et al, 2005). Leptin is still used in cases of the rare obesity subclass of leptin-deficient obesity and lipodystrophy, but a study of the leptin analogue metreleptin in obese patients with diabetes found that metreleptin did not alter body weight. The combination of metreleptin with pramlintide, however, led to enhanced weight loss in one study, but a more recent randomized clinical trial on the combination of these 2 drugs was stopped because of safety concerns. Preliminary reports suggest the potential utility of agents that impede dietary carbohydrate absorption. Tagatose is one of the compounds in this class that is undergoing trials. (Tam CS, et al, 2011).

### 2.6.17.12 Drugs No Longer Used or Efficacy not Proven

The history of obesity medications is replete with disasters that have taught caution in the use of this group of medicines. For example, among the initial medications used for obesity management were amphetamine, methamphetamine, and phenmetrazine. These were all
withdrawn because of their high potential for abuse. The combination of fenfluramine and phentermine (“fen-phen”) was used in some long-term trials with excellent results. However, fenfluramine was withdrawn in 1997 (along with D-fenfluramine) because of the potential for adverse cardiac, valvular, and pulmonary hypertensive effects in patients taking this drug. (Tam CS, et al, 2011).

Other former anti-obesity medications, and the reasons for their abandonment, include the following:

- Thyroid hormone - Hyperthyroidism, with its attendant sequelae
- Dinitrophenol - Cataracts and neuropathy
- Rainbow pills (a mixture of digitalis and diuretics) - Fatal arrhythmias and electrolyte derangements
- Aminorex - Pulmonary hypertension
- Phenylpropanolamine - Increased risk of myocardial infarction and stroke

Other drugs withdrawn from the US market include phendimetrazine, benzphetamine, and mazindol.

Some agents that initially showed promise were later demonstrated to be poor prospects in rigorous randomized intervention trials. These include the following:

- Guar gum
- Chitosan
- Axokine - Or ciliaryneurotrophic factor, the use of which was associated with the development of auto antibodies and marked reduction in anorexiant potency in about 30% of subjects
- St. John's wort
- Psyllium
- Conjugated linoleic acid
- Chromium

Currently, the 3 major groups of drugs used to manage obesity are as follows:
- Centrally acting medications that impair dietary intake
- Medications that act peripherally to impair dietary absorption
- Medications that increase energy expenditure

Treatment of obesity starts with comprehensive lifestyle management (i.e., diet, physical activity, behavior modification), which should include the following:

- Self-monitoring of caloric intake and physical activity
- Goal setting
- Stimulus control
- Nonfood rewards

2.7 Nursing Diagnosis for Obesity:

Altered Nutrition, More than Body Requirements may be related to Food intake that exceeds body needs; Psychosocial factors; and Socioeconomic status possibly evidenced by Weight of 20% or more over optimum body weight; excess body fat by anthropometric measurements; Reported/observed dysfunctional eating patterns; intake more; than body requirements( 528 unit v / responses to altered nutrition chart 20–1 nanda, nic, and noc linkages obese clients nursing diagnoses nursing interventions nursing outcomes _website2012).

2.7.1 Goals:

1. Healthy pattern for eating and weight control identified.
2. Weight loss toward desired goal established.
4. Plan in place to meet needs for future weight-control( 528 unit v / responses to altered nutrition chart 20–1 nanda, nic, and noc linkages obese clients nursing diagnoses nursing interventions nursing outcomes _website2012).
2.7.2 Desired Outcomes:

1. Identify inappropriate behaviors and consequences associated with overeating or weight gain.
2. Demonstrate change in eating patterns and involvement in individual exercise program.
3. Display weight loss with optimal maintenance of health (528 unit v / responses to altered nutrition chart 20–1 nanda, nic, and noc linkages obese clients nursing diagnoses nursing interventions nursing outcomes _website2012).

2.7.3 Nursing Intervention with Rationale:

1. Review individual factors for obesity (e.g., organic or nonorganic). Rationale: Identifies/influences choice of interventions.

2. Implement/review daily food diary (e.g., caloric intake, types of food, eating habits). Rationale: Provides the opportunity for the individual to focus on/internalize a realistic picture of the amount of food ingested and corresponding eating habits/feelings. Identify patterns requiring changes and/or a base on which to tailor the dietary program.

3. Discuss emotions/events associated with eating. Rationale: Helps to identify when client is eating to satisfy an emotional need rather than physiological hunger.

4. Formulate an eating plan with the client. Rationale: Although there is no basis for recommending one diet over another, a good reducing diet should contain foods from all food groups with a focus on low-fat intake. It is helpful to keep the plan as similar to client’s usual eating pattern as possible. A plan developed with and agreed to by the client is more apt to be successful. Note: It is important to maintain adequate protein intake to prevent loss of lean muscle mass.

5. Develop nutritional plan using knowledge of individual’s height, body build, age, gender, individual patterns of eating, and energy and nutrient requirements. Rationale: Standard tables are subject to error when applied to individual situations, and circadian rhythms / lifestyle patterns need to be considered.
6. Emphasize the importance of avoiding fad diets.

Rationale: Elimination of needed components can lead to metabolic imbalances (e.g., excessive reduction of carbohydrates can lead to fatigue, headache, instability and weakness, and metabolic acidosis [ketosis] interfering with effectiveness of weight loss program).

7. Discuss need to give self-permission to include desired/craved food items in dietary plan. Rationale: Denying self by excluding desired/favorite foods results in a sense of deprivation and feelings of guilt/failure when individual succumbs to temptation. These feelings can sabotage weight loss. Knowing that it is important to include small portions of these foods can prevent negative feelings and promote cooperation with weight loss program.

8. Reassess caloric requirements every 2–4 weeks to determine need for adjustment. Be aware of plateaus when weight remains stable for periods of time. Rationale: Changes in weight and exercise will necessitate changes in diet. As weight is lost, changes in metabolism occur. Plateaus can create distrust and accusations of “cheating” on caloric intake, which are not helpful. Client may need additional support at this time.

9. Consult with dietitian to determine caloric/nutrient requirements for individual weight loss.

Rationale: Individual intake can be calculated by several different formulas, but weight reduction is based on the basal caloric requirement for 24 hours, depending on client’s sex, age, current/desired weight, and length of time estimated to achieve desired weight.

10. Provide medications as indicated: Appetite-suppressant drugs, e.g., diethylpropion (Tenuate), mazindol (Sanorex).

Rationale: May be used with caution/supervision at the beginning of a weight loss program to support client during stress of behavioral/lifestyle changes. They are only effective for a few weeks and may cause problems of tolerance/dependence in some people. (528 unit v / responses to altered nutrition chart 20–1 nanda, nic, and noc linkages obese clients nursing diagnoses nursing interventions nursing outcomes _website2012).
2.8. Previous Studies:

This study was done by Mrs HS Kruger and Prof AM van Aardat about obese black women’s knowledge of and attitude to weight control in South Africa. A case study in 2008.

Study design: qualitative study

Study population: this study was carried out in 130 females at the out patient clinic of Tshepong hospital in North West province.

Method of data collection: Data were mainly collected by demographic questionnaire and interviewed over a period of 2 months.

Results: Respondents

The demographic data is summarized in table 2 all the subjects live in settlements near the hospital. Most of the respondents had never consulted a dietitian. More than one third of the respondents were being treated for hypertension, 13.1% for diabetes, and 4.6% for respiratory diseases. The rest of the subjects were healthy persons who accompanied patients to the outpatient clinic. Mean BMI of 36.9 kg/m2 was calculated, with a weak and statistically insignificant positive correlation between age and BMI (r = 0.152, p = 0.0845). The BMI ranged from 27.8 kg/m2 to 52.4 kg/m2, indicating that all the subjects were overweight or obese.

Knowledge test

The mean knowledge score on the causes of obesity (subsection A) was 70.4%. Most of the subjects (89%) related obesity to high intake of fats and oils in food. The mean score of (subsection B) knowledge on the relationship between obesity and health was 73%, and the (subsection C) the treatment of obesity was 67.5%.

The responses of the subjects are presented in table 3. Mean score of 14.03 out of a maximum of 20 was calculated for the total knowledge test.

Another study was done by Eden R Cardozo et al (2013). This prospective survey study assessed the knowledge of reproductive outcomes that are affected by obesity among women in an urban community. A total of 207 women attending a community fair on the
south side of Chicago participated in the study. A survey assessing knowledge of BMI and of the effects of obesity on general, cardio-metabolic and reproductive health outcomes was administered. Subjects ranged in age from 18 to 70 years (mean ± SD, 48.6 ± 12.9 years) and ranged in BMI from 17.3 to 52.1 kg/m² (mean ± SD, 31.2 ± 6.7 kg/m²). The following percentages of women were aware that obesity increases the risk of miscarriage (37.5%), irregular periods (35.8%), infertility (33.9%), cesarean section (30.8%), breast cancer (28.0%), birth defects (23.7%), stillbirth (14.1%), and endometrial cancer (18.1%). This study found that while women in an urban community are aware of the cardio-metabolic risks associated with obesity, they demonstrate limited knowledge of the effects of obesity on reproductive outcomes. Public education is needed to increase knowledge and awareness of the reproductive consequences of obesity. Women of reproductive age may be uniquely responsive to obesity education and weight loss intervention. (Eden R Cardozo et al, 2013).

A study done by Penny (2012), the objectives: to examine relationships between knowledge, attitudinal and behavioral factors, and obesity and to determine how these factors influence obesity status in west Philadelphia female adolescents. Research Methods and Procedures: A matched-pairs study was conducted with 32 stature- and age-matched pairs of obese (body mass index and triceps skinfold ≥ 95th percentile of National Health and Nutrition Examination Survey I) and non-obese (body mass index and triceps skin fold between the 15th and 85th percentiles of National Health and Nutrition Examination Survey I) female African American adolescents (aged 11 to 15 years), selected from a school-based study sample, based on obesity status and matching criteria. Adolescents were compared on the following measures: physical activity, inactivity, dietary intake, eating attitudes, health behavior knowledge, and body image, self-esteem, and maturation status. Differences between obese and non-obese females were tested using paired T-tests and Wilcoxon matched-pairs signed-rank tests.

Results: Physical activity, inactivity, and perception of ideal body size emerged as the most important contributory factors to obesity status. There were no statistically significant matched-pair differences in macronutrient and micronutrient intakes, self-esteem, eating attitudes, health behavior knowledge, or maturation status of these adolescents. Obese adolescents had significantly lower levels of physical activity, higher inactivity, and a larger perception of ideal body size than non-obese adolescents.
Discussion: Knowledge and attitudinal factors (with the exception of perception of ideal body size) had far less association with obesity than activity-related behavioral factors. These findings suggest that future intervention strategies should pay particular attention to physical activity, inactivity, and body image attitudes (Penny, 2012).

This study was designed to find out the extent of the problem of obesity and people's awareness about risk factors and complications of obesity. A cross sectional survey was conducted in Coimbatore district between March and September 2003 in which 537 urban women and 661 rural women aged 20 years and older in Coimbatore were randomly selected, interviewed and the BMI was assessed. The prevalence of overweight in urban area was 43.9% and in rural area was 23.6%. 43% of women failed to recognize that obesity can lead to Diabetes and 37% failed to do so regarding its contribution to Heart attack. In general, awareness was found to be higher in the overweight group compared to normal weight. Age, Education, Occupation, Standard of living, and Place of residence were found to be associated with the knowledge about obesity as a risk factor for Diabetes and Heart attack. When asked about the causes, being happy was suggested as a cause by 60%, whereas 30% failed to mention excess eating and 26% failed to mention lack of exercise. Among the overweight women a large proportion of them (36%) did not consider themselves to be overweight. The concordance between Self-perception and BMI using Kappa index was 0.552 corresponding to only a moderate degree of agreement. The percentage of misperceived as not overweight was higher for those having BMI less than 30 kg/m2. Erroneous perception of body weight has important health and corrective behavioral implications. (Sekar, V., et al, 2003)
Chapter (3)

Materials and methods
3. Materials and Methods

3.1 Study Design:

The design of study is a descriptive analytical community-based aiming at assessing and evaluating the women’s knowledge regarding obesity at al-Hamadab North at al-Shegara locality, Khartoum State, Sudan in September (2014).

3.2 Study Area:

The research was conducted at al-Shegara area. It is an area located in Khartoum city, consisting of al-Hamadab North and al-Hamadab South. The area comprises about 2000 households, with public services including health center, schools, shopping center, electricity station, pharmacies and mosques.

3.3 Study Population:

The target population of the study consists of all women who are aged 18 years and above and who live in the study area: at al-Shegara locality, Khartoum State, Sudan.

3.3.1 Inclusion Criteria:

The study population includes all women whose ages are 18 years and above who live in al-Shegara locality.

3.3.2 Exclusion Criteria:

The study population excludes all women who do not live in al-Shegara locality and who are less than 18 years.

3.4 Sample Size:

The sample was selected using the Random Sampling Method. A total of 100 women living in the study area during the study period were randomly selected to represent the study population.
3.5 **Method of Data Collection:**

The study used the questionnaire as a tool for primary data collection. Data were collected during a period of three weeks by a closed-ended questionnaire written in Arabic language during the period of study. Various secondary data sources were used including books, references and articles from libraries and from the Internet.

3.6 **Sampling Technique:**

The study used the random sampling technique to select a sample from the study population which comprises women who are 18 or over and who live in. The study sample consisted of 100 randomly selected women from a total of 2000 households.

3.7 **Data Analysis:**

Data were analyzed using the Statistical Packages for Social Sciences (SPSS) program. The collected data were first checked for consistency and then entered into the computer for analysis. Descriptive statistics was mainly used for displaying the results. This included frequencies, percentages and other statistical values. Diagrams including bar charts and pie charts were also used to display results of the analysis.
Chapter (4)

Results
4. Results and Discussion

4.1 Results:

Figure (1). Distribution of the study sample according to age

Figure (1) shows that the highest percentage (29%) of the study sample was at age 36 years and more.
Figure (2) shows that more than half of study sample (54%) was married.
Figure (3) Distribution of study sample according to nationality

Figure (3) shows that almost all women of study sample were Sudanese. The remaining women were Egyptians.
Figure (4) Distribution of study sample according to tribe

Figure (4) show that the highest percentage (40%) of study sample belongs to Shaigia tribe.
Figure (5) Distribution of study sample according to educational level

Figure (5) shows that the majority (64%) of study sample were at university level.
Figure (6) Distribution of the study sample according to religion

Figure (6) shows that all members of the study sample are Muslim.
Figure (7) Distribution of the study sample according to job

Figure (7) shows that the highest percentage (41%) of the study sample is housewife.
Figure (8) Distribution of the study sample according to height and weight

Figure (8) shows that the highest percentage (39%) of the respondents knew their height and weight.
Table (1) Distribution of the study sample according to knowledge regarding the definition of obesity:

<table>
<thead>
<tr>
<th>Items</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increase in weight</td>
<td>30</td>
<td>30%</td>
</tr>
<tr>
<td>Increase in weight unorganized with tall</td>
<td>20</td>
<td>20%</td>
</tr>
<tr>
<td>Abnormal or excessive accumulation of fat that may impair health</td>
<td>50</td>
<td>50%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

Table (1) shows that half of the study sample (50%) responded with correct answers regarding the definition of obesity: “an abnormal or excessive accumulation of fat that may impair health”.

Table (2) Distribution of the study sample according to “if they think that obesity is a disease”:

<table>
<thead>
<tr>
<th>Items</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
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<td>88</td>
<td>88%</td>
</tr>
<tr>
<td>No</td>
<td>12</td>
<td>12%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

Table (2) shows the vast majority of the respondents (88%) think that obesity is a disease.

Table (3) Distribution of the study sample according to the measure unit of obesity

<table>
<thead>
<tr>
<th>Items</th>
<th>✓</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
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<td>4%</td>
</tr>
<tr>
<td>Kilogram</td>
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<td>94%</td>
</tr>
<tr>
<td>Joule</td>
<td>2</td>
<td>2%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

Table (3) shows that the knowledge of women about the measuring unit of obesity is high, as 94% of the respondents gave the right answer.
Table (4) Distribution of the study sample according to relation of weight to height:

<table>
<thead>
<tr>
<th>Items</th>
<th>Yes</th>
<th>78</th>
<th>78%</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>22</td>
<td></td>
<td>22%</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td></td>
<td>100%</td>
</tr>
</tbody>
</table>

Table (4) shows that most of study sample (78%) knew that there is a relation between weight and height.

Table (5) Distribution of the study sample regarding knowledge about the reasons of obesity

<table>
<thead>
<tr>
<th>Items</th>
<th>No</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Psychological factors</td>
<td>3</td>
<td>3%</td>
</tr>
<tr>
<td>Genetic factors</td>
<td>15</td>
<td>15%</td>
</tr>
<tr>
<td>Bad dietary habits</td>
<td>10</td>
<td>10%</td>
</tr>
<tr>
<td>Race, sex and age factors</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Socioeconomic factors</td>
<td>12</td>
<td>12%</td>
</tr>
<tr>
<td>All above</td>
<td>60</td>
<td>60%</td>
</tr>
<tr>
<td><strong>total</strong></td>
<td>100</td>
<td>100%</td>
</tr>
</tbody>
</table>

Table (5) shows that the majority of women (60%) in the study area are knowledgeable about reasons of obesity.
Table (6) Distribution of the study sample regarding knowledge of diseases caused by obesity: coronary artery disease, hypertension and diabetes.

<table>
<thead>
<tr>
<th>Items</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>95</td>
<td>95%</td>
</tr>
<tr>
<td>No</td>
<td>5</td>
<td>5%</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100%</td>
</tr>
</tbody>
</table>

Table (6) shows that almost all the study sample (95%) responded with correct answers regarding coronary artery disease, hypertension, and diabetes caused by obesity.

Table (7) Distribution of the study sample regarding to their knowledge about medications that increase the activity as weight-loss treatments, that exercises help losing weight and burn fat, and that lifestyle and behavior can affect one’s weight

<table>
<thead>
<tr>
<th>Items</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>50</td>
<td>50%</td>
</tr>
<tr>
<td>No</td>
<td>50</td>
<td>50%</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100%</td>
</tr>
</tbody>
</table>

Table (7) show that (50%) of the respondents were knowledgeable about medications that increase the activity and act as weight loss treatments,(96%) were knowledgeable that exercises help to lose weight and burn fat, and most of them (78%) they did not know that lifestyle and behavior can affect one’s weight.
Table (8) Distribution of the study sample according to knowledge about if obesity is more among males or females or they if they have a similar ratio

<table>
<thead>
<tr>
<th>Items</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>In females</td>
<td>16</td>
<td>16%</td>
</tr>
<tr>
<td>In males</td>
<td>7</td>
<td>7%</td>
</tr>
<tr>
<td>The same ratio</td>
<td>77</td>
<td>77%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

Table (8) shows that only 16% of study sample arrived to the correct answer that obesity is more among women than men.

Table (9) Distribution of the study sample according to women’s knowledge about viewing obesity is a big problem that can lead to death

<table>
<thead>
<tr>
<th>Items</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>agree</td>
<td>5</td>
<td>5%</td>
</tr>
<tr>
<td>not agree</td>
<td>95</td>
<td>95%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

Table (9) shows that most of the study sample (95%) did not know that obesity is a big problem that can lead to death

Table (10) Distribution of study sample according to knowledge about signs and symptoms of obesity

<table>
<thead>
<tr>
<th>Items</th>
<th>√</th>
<th>%</th>
<th>×</th>
<th>%</th>
<th>Total</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Obstructive sleep apnea and strider</td>
<td>66</td>
<td>66%</td>
<td>34</td>
<td>34%</td>
<td>100</td>
<td>100%</td>
</tr>
<tr>
<td>Excess fat around the abdomen and hips</td>
<td>94</td>
<td>94%</td>
<td>6</td>
<td>6%</td>
<td>100</td>
<td>100%</td>
</tr>
<tr>
<td>Body mass index more than 30%</td>
<td>43</td>
<td>43%</td>
<td>57</td>
<td>57%</td>
<td>100</td>
<td>100%</td>
</tr>
<tr>
<td>Height to weight ratio less than 20%</td>
<td>10</td>
<td>10%</td>
<td>90</td>
<td>90%</td>
<td>100</td>
<td>100%</td>
</tr>
</tbody>
</table>
Table (10) shows that (66%) of respondents knew that obstructive sleep apnea and strider are symptoms of obesity, 94% of them knew that excess of fat around the abdomen and hips is one of obesity signs, only 43% of respondent knew that a body mass index of more than 30% is considered as a sign of obesity, only 10% of them matching with in-correct answer height to weight ratio of less than 20% is a sign of obesity.

Table (11) Distribution of the study sample according to knowledge about complications of obesity.

<table>
<thead>
<tr>
<th>Items</th>
<th>✓</th>
<th>%</th>
<th>×</th>
<th>%</th>
<th>total</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypertension and hyperglycemia</td>
<td>88</td>
<td>88%</td>
<td>12</td>
<td>12%</td>
<td>100</td>
<td>100%</td>
</tr>
<tr>
<td>An ovulation, early puberty and infertility</td>
<td>68</td>
<td>68%</td>
<td>32</td>
<td>32%</td>
<td>100</td>
<td>100%</td>
</tr>
<tr>
<td>Osteoarthritis specially legs</td>
<td>84</td>
<td>84%</td>
<td>16</td>
<td>16%</td>
<td>100</td>
<td>100%</td>
</tr>
<tr>
<td>Venous varicosities</td>
<td>68</td>
<td>68%</td>
<td>32</td>
<td>32%</td>
<td>100</td>
<td>100%</td>
</tr>
<tr>
<td>Deep venous thrombosis post-surgery</td>
<td>55</td>
<td>55%</td>
<td>45</td>
<td>45%</td>
<td>100</td>
<td>100%</td>
</tr>
<tr>
<td>Association with endometrial prostate, colon, breast, gall bladder and possibly lung cancer</td>
<td>26</td>
<td>26%</td>
<td>74</td>
<td>74%</td>
<td>100</td>
<td>100%</td>
</tr>
<tr>
<td>Dehydration</td>
<td>14</td>
<td>14%</td>
<td>86</td>
<td>86%</td>
<td>100</td>
<td>100%</td>
</tr>
</tbody>
</table>

Table(11) shows that 88% of study sample knew that hypertension and hyperglycemia are complications of obesity, 68% of them knew an ovulation, early puberty, and infertility are considered as complications of overweight. A high percent of study sample (84%) arrived to the correct answer that osteoarthritis specially in legs is consider as one of obesity complications,68% knew that venous varicosities is a complication of overweight, 55% of respondents were knowledgeable about deep venous thrombosis post-surgery complication of obesity, just 26% of them knew that obesity is associated with endometrial, prostate, colon, breast, gall bladder, and possibly lung cancer, while 86% of respondents arrived tithe correct answer that dehydration is not consider as a complication of obesity.
Table (12) Distribution of the study sample according to knowledge about when to say that someone is obese and how he or she can lose the excessive weight

<table>
<thead>
<tr>
<th>Items</th>
<th>√</th>
<th>%</th>
<th>×</th>
<th>%</th>
<th>Total</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Approximation</td>
<td>39</td>
<td>39%</td>
<td>61</td>
<td>61%</td>
<td>100</td>
<td>100%</td>
</tr>
<tr>
<td>Measure the circumference of the abdomen</td>
<td>63</td>
<td>63%</td>
<td>37</td>
<td>37%</td>
<td>100</td>
<td>100%</td>
</tr>
<tr>
<td>Weight in kilogram divided by the square of the height of the body</td>
<td>75</td>
<td>75%</td>
<td>25</td>
<td>25%</td>
<td>100</td>
<td>100%</td>
</tr>
<tr>
<td>By dividing weight in pounds by the square of height in inches and multiplying in 703</td>
<td>19</td>
<td>19%</td>
<td>81</td>
<td>81%</td>
<td>100</td>
<td>100%</td>
</tr>
</tbody>
</table>

Table (12) shows that 39% of respondents can say that someone is obese by approximation, 63% of them by measure of the circumference of the abdomen, 75% said by weight in kg divided by the square of the height of the body, and only 19% said by dividing weight in pounds by the square of height in inches and multiplying in 703.

Table (13) Distribution of the study sample according to knowledge about how can lose excessive weight

<table>
<thead>
<tr>
<th>Items</th>
<th>√</th>
<th>%</th>
<th>×</th>
<th>%</th>
<th>Total</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chang the style of food and activities</td>
<td>94</td>
<td>94%</td>
<td>6</td>
<td>6%</td>
<td>100</td>
<td>100%</td>
</tr>
<tr>
<td>Medications that act peripherally to impair dietary absorption</td>
<td>45</td>
<td>45%</td>
<td>55</td>
<td>55%</td>
<td>100</td>
<td>100%</td>
</tr>
<tr>
<td>Bariatric surgery</td>
<td>37</td>
<td>37%</td>
<td>63</td>
<td>63%</td>
<td>100</td>
<td>100%</td>
</tr>
<tr>
<td>Drink water</td>
<td>36</td>
<td>36%</td>
<td>64</td>
<td>64%</td>
<td>100</td>
<td>100%</td>
</tr>
</tbody>
</table>

Table (13) shows that 94% of the study sample population can change the style of food and activities to lose the excess weight, 55% of them disagree with take drugs impede the absorption of food, 37% resort to surgery, most of them 64% gave answers that matched with the correct answer that drinking water cannot lose the excessive weight.
4.2 Discussion

Obesity occurs over time when you eat more calories than you use. The balance between calories-in and calories-out differs for each person. Factors that might affect weight include genetic makeup, overeating, eating high-fat foods, and not being physically active. Being obese increases the risk of diabetes, heart disease, stroke, arthritis, and some cancers. If a person is obese, losing even 5 to 10 percent of their weight can delay or prevent some of these diseases. For example, that means losing 10 to 20 pounds if a person weighs 200 pounds. Obesity has become a serious health threat for women at every stage of life.

This study was conducted aiming at assessing women’s knowledge regarding obesity at Al-al-Shegara in Khartoum state Sudan (2013). Data were collected using a questionnaire designed for the purpose of the study. Data were analyzed using the Statistical Packages for Social Sciences (SPSS). The results showed that most of the respondents (88%) knew that obesity is a disease. The study revealed that 94% knew the measure unit of obesity (kilogram).

Only 20% of women in study area were knowledgeable about reasons of obesity, but 80% did not know the causes of obesity. This represents a big problem which leads to increasing of obesity percentage in the Sudanese society. Most of the respondents (96%) were knowledgeable about that exercises that help to lose weight and burn fat, but most of them (78%) did not know that lifestyle and behavior can affect a person’s weight, therefore, women need more health education about their lifestyle.

The study showed that only 16% knew that the biggest ratio of obesity is among women more than among men, and 95% did not know that obesity is considered as a big health problem that can lead to death. More than half (57%) of the study population did not know that BMI of more than 30% is considered as a sign of obesity.

Vast majority (88%) of respondents were knowledgeable about complications of obesity such as hypertension and hyperglycemia, and 68% of them knew that an ovulation, early puberty, and infertility are complications of obesity, but only 26% of the study sample knew that obesity is associated with endometrial, colon, prostate, breast, gall bladder, and possibly lung cancer. These results similar to that of a study designed to find out the extent of the problem of obesity and people's awareness about risk factors and complications of obesity. A cross sectional survey was conducted in Coimbatore district between March and
September 2003 in which 537 urban women and 661 rural women aged 20 years and older in Coimbatore were randomly selected, interviewed and the BMI was assessed. The prevalence of overweight in urban areas was 43.9% and in rural areas was 23.6%. Also, 43% of women failed to recognize that obesity can lead to diabetes and 37% failed to do so regarding its contribution to heart attack. In general, awareness was found to be higher in the overweight group compared to normal weight. Age, education, occupation, standard of living, and place of residence were found to be associated with the knowledge about obesity as a risk factor for diabetes and heart attack. When asked about the causes, being happy was suggested as a cause by 60%, whereas 30% failed to mention excess eating and 26% failed to mention lack of exercise. Among the overweight women a large proportion of them (36%) did not consider themselves to be overweight. The concordance between self-perception and BMI using Kappa index was 0.552 corresponding to only a moderate degree of agreement. The percentage of misperceived as not overweight was higher for those having BMI less than 30 kg/m2. Erroneous perception of body weight has important health and corrective behavioral implications. (Sekar, V., et al, 2003).

The study also showed that 63% of the study population did not know that one cannot say someone is obese by measuring circumference of the abdomen, and only 19% were knowledgeable about dividing weight in pounds by the square of height in inches and multiplying by 703 and say that someone is obese if BMI is more than 30%. They need to be provided with more information about BMI. The study released that 37% agreed that bariatric surgery is one of the ways to lose the excess weight.
Chapter (5)

Conclusion and recommendations
5. Conclusion and Recommendations

5.1 Conclusion

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).

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.

In this research, it was found that women are not knowledgeable about obesity definition, reasons for obesity, effective lifestyles, exercises that can help in weight loss that the biggest ratio of obesity is among women; obesity is life-threatening and can cause death. In addition, they have no idea about BMI and about association of obesity with some kinds of cancers. A lot of them were less knowledgeable about surgical intervention to lose the excessive weight.
5.2 Recommendations

The study recommended to:

1) Provide health education for women about definition of obesity and its reasons
2) Training women to change their food style and to do exercise and activities in order to lose weight because obesity is more common in women than in men.
3) Training women about how to calculate BMI, and how to know that someone is obese or overweight.
4) Give women more information about how to manage obesity as a disease in order to lose excessive weight and keep their body more healthy.
5) Provide monthly record of weight, height, hip circumference and abdominal circumference.
References


US Food and Drug Administration. FDA approves Belviq to treat some overweight or obese adults. June 27, 2012.


528 UNIT V / Responses to Altered Nutrition CHART 20–1 NANDA, NIC, AND NOC LINKAGES Obese Clients NURSING DIAGNOSES NURSING INTERVENTIONS NURSING OUTCOMES _website2012_
بسم الله الرحمن الرحيم

جامعة الجزيرة
كلية العلوم الطبية التطبيقية
قسم التمريض
ماجستير تمريض صحة المجتمع
الدفعة (2)

استبيان للتحقق عن مدى معرفة النساء بالسمنة (البدانة)


الحالة الاجتماعية: أ- عازبة ب- متزوجة ج- مطلقة د- أرملة ه- غير ذلك

الجنسية: ___________________________
القبيلة: ___________________________

مستوى التعليم: أ- لم أتعلم ب- محو الأمية ج- ابتدائي د- ثانوي ه- جامعي و- فوق الجامعي

الديانة: أ- مسلمة ب- مسيحي ج- غير ذلك

المهنة: ___________________________

الطول: ______ سم
الوزن: ______ كجم

ضعيفاً علامة صاح أمام الإجابة الصحيحة وعلامة خطأ أمام الإجابة الخطأ:

1- هل السمنة تعني؟
أ- زيادة الوزن ب- زيادة الوزن مع عدم تناسقه مع الطول ج- تراكم غير طبيعي للدهون يؤدي боتي في الصحت
2- هل تعتقد أن السمنة هي مرض؟
أ- نعم      ب- لا
3- ما هو معيار قياس السمنة؟
أ- المتر         ب- الكيلو جرام         ج- الجول
4- هل للوزن علاقة بالطول؟
أ- نعم      ب- لا
5- في اعتقادك ما هي أسباب السمنة؟
أ- عوامل نفسيه  ب- عوامل وراثية(جينيه)  ج- عادات غذائية خاطئة  د- عامل السن والجنس أو العرق
6- هل السمنة سبب في إنسداد شرايين القلب وزيادة ضغط الدم والسكر في الجسم؟
أ- نعم      ب- لا
7- هل تعتبر الأدوية التي تزيد من نشاطنا إحدى العلاجات في إنقاص الوزن؟
أ- نعم      ب- لا
8- هل ممارسة الرياضة تساعد في إنقاص الوزن وحرق الشحوم؟
أ- نعم      ب- لا
9- هل تعتقد أن أسلوب حياتنا وسلوكنا يؤثر على أوزاننا؟
أ- بالتأكيد      ب- للاعتقاد ذلك
10- على حسب ملاحظاتك هل البدانة أكثر لدى النساء ب- لدى الرجال  ج- النسبة متساوية بينهم
11- هل توافقين الرأي الذي يقول أن زيادة الوزن أو البدانة مشكلة تهدد حياتنا وربما مماتنا؟
أ-وافق      ب- لا أوافق
12- من علامات وأعراض السمنة:
أ- ضيق التنفس عند النوم والشعور ب- زيادة الدهون حول البطن والأرداف  ج- مؤشر كتلة الجسم يزيد عن 30%
نسبة الطول للوزن أقل من 20% من مضاعفات السمنة:

أ- ارتفاع ضغط الدم وظهور نزاهه في السكر
ب- إضطراب في الدورة الشهري والعقم وتكيس المبايض
ج- التهاب المفاصل ولام العظام وخصوصًا عظام الأرجل
د- الظهور الدوالي
ه- الجلطات بعد العمليات الجراحية
و- سرطان الثدي، البروستات، القولون، المرارة، ربما سرطان الرئة
ز- فقدان السوائل الذي يؤدي للجفاف

14- متى نقول أن شخصًا ما سمين؟
أ- بالتقريب
ب- بقياس محيط البطن
ج- بقسمة الوزن بالكجم على مربع الطول بالمتر
د- بقسمة الوزن بالرطل على مربع الطول بالبوصة وضرب الناتج في 703

15- كيف ننقص الوزن الزائد؟
أ- تغيير نمط حياتنا من غذاء ونشاطات أخرى
ب- تناول أدويه تعطى من امتصاص الغذاء
ج- نلجأ للجراحه (إزالة الدهون جراحيا)
د- شرب الماء