



Ministry of Health
Directorate of Public Health
Nutrition Section



Together for Better Life

Nutrition Clinics Management & Prevention of Obesity



Prepared by :

Dr. Nadia Gharib

Mrs. Mariam Al Amer

Dr. Saniya Al-Salehi

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Introduction

Obesity is now so common within the world's population that it is beginning to replace under nutrition and infectious disease as the most significant contributor to ill health. Major advances in the understanding of overweight & obesity have confirmed that they constitute an important medical condition.

Obesity is a complex multi-factorial chronic disease that develops from an interaction of genotype and the environment. However the primary causes of the rapid rise in obesity rates lie in the profound environmental and societal changes related to modernization and changing the occupational structures in Bahrain. This rapid transition has created a society with low physical activity alongside the increased availability of high fat, energy dense foods.

The assessment of available data on the weight status and obesity-related health problems of the population in Bahrain clearly indicates the need for urgent actions toward preventing the situation from deteriorating further and to ensure those within the population with an existing weight problem are treated appropriately. Overweight and obesity are major causes of ill-health within Bahrain and create a huge burden on health care resources and the national economy.

A recently published National Non-communicable Diseases Risk Factor Survey (2007)⁽¹⁾ from an adult sample of around 2037 found that the total proportion of the population with Body Mass Index (BMI) > 25kg/m² was 69.2%, where 32.9% were overweight (BMI 25-29.9) and 36.3% were obese (BMI > 30). Prevalence of high rate of blood pressure was 38.2%, impaired fasting blood sugar was 25.5% and high cholesterol was 40.6%. The recently published health statistics (2008)⁽²⁾ indicates the extent of morbidity and mortality from obesity related diseases. The major causes of premature deaths in Bahrain are the non-communicable disease with cardiovascular disease, endocrine/metabolism and neoplasm accounting for 40%, 20.3% and 23.1% deaths per 100,000 populations respectively.

Bahrain government demonstrated increased awareness towards the growing obesity epidemic with widespread interest among health professionals and policy makers in MOH to tackle this public health problem. In response, a "Comprehensive National Action Plan for Prevention and Management of Overweight and Obesity" was drafted in 2005

Nutrition Clinics

The nutrition clinic project aims to provide high standards obesity management to all overweight and obese adults in the Kingdom of Bahrain in the primary care set-up and to ensure that the huge number of patients in our society who suffer from weight related problems will receive early, appropriate and a long-term management of obesity and its associated morbidities. The Nutrition Clinic strategic plan explains in details the steps in launching the service, the resources needed and is supplemented by the estimated budget.

The first nutrition clinic has been established in National Bahrain Banks (NBB) –Arad Health Centre in Muharraq Governorate. Among the reasons encouraged to open the first Nutrition Clinic in Muharraq was due to the high prevalence rate of overweight and obesity in this region that served by this centre.

After a successful results of the pilot phase nutrition section encouraged opening the second nutrition clinic in September, 2009 in Al-Dair health centre. The third one was in Hamad Kanoo health centre in January 2010.



Strategic Goals

1. To reduce prevalence of overweight and obesity among the community.
2. To reduce prevalence and mortality rate of obesity related non-communicable diseases (CVDs, cancer, D.M).

Objectives

1. Deliver early and comprehensive long-term care to obese patient based on high quality updated services, in order to decrease its prevalence and the associated morbidity and mortality factors.
2. Assess the risk factors associated with overweight and obesity e.g. hypertension, dyslipidemia and diabetes and give priority to the improvement in general health and a reduction in health risk factors rather than to the promotion of major weight loss.
3. Provide weight management programs, which include dietary changes, general exercise advices and behaviour modification.
4. Ensure that approved drug are used when appropriate and under medical supervision.
5. Provide effective referral policy for specialists care toward management of high risk obese patients.
6. Evaluate the care of patients in weight management programs at regular intervals and maintain a surveillance system.

Protocol and Guideline Development

For this purpose a national task force was established to develop Obesity Clinical Guidelines. The taskforce comprised of members representing different specialties and expertise in Ministry of Health (**Nutrition Section, Primary & Secondary Health Care**)

“The National Evidence-based clinical Guidelines for Assessing and Managing Overweight and Obesity in the Kingdom of Bahrain” was developed based on an extensive review of published literature while considering the local situation and the available resources.

The clinical guidelines manual provide a detailed reference that covers all aspects of patient’s assessment and management with the emphasis on lifestyle therapies and behavioural modification. It highlights the importance of various motivational skills and explains the role of diet and anti-obesity drugs.

Clinic Protocol

Clinic protocol on the other hand describes the role of different health professionals involved in delivering the care to overweight patients, i.e. the role of family physician, nurse, nutritionist, and clerk. It also provides clear follow-up plan i.e. appointment system, duration and frequency of visits and guidance for referral to other health specialist. Also, explains how to use different related educational tools and materials.

Through the pilot phase the protocol was subjected to extensive revision and changes based on real life experience.

Management Guidelines^(3,4)

Assessment of patient included;

- a. Clinical assessment include taken different blood tests (Hb, FBS, S.Creatinine, Uric Acid, Total Cholesterol, LDL, HDL, Triglyceride, Thyroid Function Test, ...)
- b. Blood Pressure (BP)
- c. General Physical examination
- d. Dietary history
- e. Lifestyle Assessment
- f. Anthropometrics (height, weight) (Appendix3)

$$\text{BMI} = \frac{\text{Wt (kg)}}{\text{Ht (m)}^2}$$

1. Risk Status

Assessment of risk factor will include the following:

- a. Determine the relative risk status.
- b. Identify cardiovascular risk factors.
- c. Assess the presence of underlying disease and conditions.
- d. Assess other risk factors.

2. Patient Motivation

Patient motivation is a principal factor in any successful weight loss program.

- a. Try to predict patient's readiness for weight loss and willingness to make the necessary lifestyle changes.
- b. Identify potential variables associated with weight loss success
- c. Explain to patient the negative health effect of overweight or obesity and enumerate the dangers that accompany persistent obesity such as hypercholesterolemia, hypertension, diabetes, etc.

The Clinic Tools and Materials (Appendix 1,2)

The nutrition section has developed a number of patient assessment tools and educational materials. These also have been reviewed by the clinic team and were tested during the pilot phase and have been changed accordingly.

These include the following:

- Patient Assessment Sheet
- Food frequency Questionnaire
- 7-days menu plans
- Patient Educational booklet: Obesity Management Guide and Food Composition booklet
- Patient self-care booklet
- Nutrition education package (flip chart and educator manual guide)
- Posters and flyers
- Appointments card

Blood Analysis

- Haemoglobin
- Fasting Blood Sugar
- Serum Creatinine
- Uric acid
- Lipid profile (Cholesterol: Total, LDL, HDL and Triglyceride)
- TSH

Management

Treatment Algorithm (Appendix4)

The algorithm applies only to the assessment for overweight and obesity and sub-sequent decisions based on the assessment. It does not reflect any initial overall assessment for other cardiovascular risk factors that are indicated.

Dietary Therapy

Objective

Moderate reduction in caloric intake, which is designed to achieve a slow, but progressive, weight loss.

Obese and overweight therapy

Obese patient

Initial Goal is to lose 10% of body weight over 6 months with calorie deficit of 500-1000 kcal/day to produce a weight loss at rate of 0.5 – 1 kg/week.

Overweight patient

Initial goal is to lose 8% of body weight over 6 months with calorie deficit of 300- 500 kcal/day. Rate of weight loss: 0.25-0.5 kg/wk.

Greater rates of weight loss do not achieve better long-term results. After 6 months of weight loss, the priority should be to maintain the achieved weight loss and further weight loss should be only considered after a period of weight maintenance.

Implementation

Nutrition clinic was launched on 27th Nov 2007 in NBB-Arad HC. The pilot phase lasted 6 months from Dec 2007 to May 2008 to test the clinical guidelines for clarity and convenience and examine the practicality and feasibility of the clinic protocols. It was also an opportunity to improve and validate patient assessment tools and educational materials through direct and interactive feedback from patients and clinic staff.

The target population included all adult patients with overweight problems referred from the same HC. However a number of patients were also seen in the clinic for other medical problems that required dietary intervention like underweight, overweight children, diabetes and hypertension.

During the period of active weight loss, regular visits of at least once per month and preferably more often for the purposes of reinforcement, encouragement, and monitoring will facilitate weight reduction for 6-12 months.

The amount of time spent with the patient favorably affects weight change in overweight adults given dietary therapy.

Phases of Management

There are 3 main phases of management:

1. Active weight loss phase (6 – 12 months)
2. Weight maintenance phase (up to 2 years)
3. Long-term follow-up phase (5 years)

1. Active Weight Loss Phase

The patient will be seen monthly during the period of active weight loss for reinforcement, encouragement and monitoring. The active weight loss may last 6-12 months. This will be done alternately by a nurse, nutritionist and physician (Table). More frequent visits may be needed based on clinical judgment particularly if the patient had any medical complications.

Referring family physician should order the basic lab investigations for all referred patients at the time of referral. Forms that carry clinic stamp and code can be prepared beforehand and distributed in physician rooms to ease the process. If the patient blood results are available on the first visit, he/she will be seen by the whole team on the same day to save time, effort and improve patient's satisfaction.

The following are the baseline investigations:

- Haemoglobin
- Fasting Blood Sugar
- Serum Creatinine
- Uric acid
- Lipid profile (Cholesterol: Total, LDL, HDL and Triglyceride)
- TSH

If any of these investigations has been done during the last 3 months, obtain a copy of the results and repeat the abnormal results only.

Table. Patient Follow Up During Weight Loss Program

Visit No	1 st	2 nd	3 rd	4 th	5 th	6 th	7 th
Interval from the previous visit	0	1mo	1mo	1 mo	1mo	1mo	1 mo
Health professional	Family Physician Nutritionist Nurse	nutritionist	nutritionist	Family Physician Nurse	nutritionist	nutritionist	Family Physician Nurse
Activity	Assessment and Preparation Start of treatment	Follow - up					

1. Weight Maintenance Phase

After achieving adequate weight loss, the patient will enter a weight maintenance phase to promote the prevention strategies actively with emphasis on diet modification quantity, physical activity promotion, and general behaviour therapy. Also maintenance counselling can be offered to a patient who has a history of overweight and reached an appropriate body weight or for patients who are overweight or obese, and they are not ready to lose weight and only wish to focus on maintaining their current weight.

The Patient will be followed mainly by the nutritionist during this phase and by the family physician.

2. Long-term Follow up

After an average follow up of 2 years, patient should have periodic assessment and monitoring for five years The patients need to be guided and supported during this period with advice for further weight loss management if still obese/overweight. The follow up interval will be according to their current BMI. If patient's BMI is 25 or more then patient may be seen every 3-6 months but if his/her BMI is less than 25 then he/she can he can be seen yearly.

Roles of Management Care

First visit

Assessment and Preparation

Nurse

Duration: 20 min.

Patient will be seen and assessed by the nurse as the following:

1. Take comprehensive history according to the patient assessment sheet. Appendix (1)
2. Perform the following physical assessment and record the data:
 - a) Measure weight, height and obtain the BMI electronically from special scale.
 - b) Measure waist circumference.
 - c) Measure blood pressure.
 - d) Measure % body fat from bioelectrical impedance device.
3. Make sure that the baseline investigations are ready and filed. The nurse can order any of these tests if were not done recently in 3 months period.
4. Arrange for the patient to be seen by the physician and nutritionist on the same day or as soon as the blood results are ready if not requested earlier.

Start of Treatment

The patient will be seen by a Physician and nutritionist to agree with the patient on the major goals and develop dietary, physical activity and behavioral plans.

Physician

Consultation time: 15 min

1. Review the patient history as taken by the nurse.
2. Perform thorough physical examination.
3. Review the blood results & indicate if any other investigations are required.
4. Assess the patient for presence of:
 - a) Underlying cause of overweight.
 - b) Any other weight related health problems as in the management guidelines, and make sure that these are taken care of by the patient's family physician in a joined patient care.
 - c) Assess patient for any CAD risk factor.

5. Discuss the weight loss goals with patient's : the amount and the speed of weight loss .Explain the health benefits of moderate weight loss (losing 10 % weight in 6-12 months) and adopting healthy lifestyle
6. Refer patients to the other specialties if needed.
7. Record all the above clearly in the patient assessment sheet and fill in the case summery.
8. Indicate in the appointment notes if patient is to follow the routine appointment or if needed to be seen earlier.

Physicians are usually very loaded by their busy schedules which make it very difficult to appoint a physician for a full day so it was agreed that one physician will attend the clinic half a day and will see patients less frequently i.e. at 3 and 6 months.

Nutritionist

The nutritionist is responsible for performing detailed lifestyle and motivational assessment in order to provide individualized therapeutic plan and to tailor nutrition education to patients needs.

Consultation time: 30 min

1. Perform detailed dietary and physical activity assessment and discuss the patient current practices in non-judgemental approach to help the patient identify areas of potential changes in their dietary and lifestyle pattern that can impact health.
2. Agree with patients on a specific dietary and physical activity goals based on patient's needs and preferences.
3. Calculate the total daily energy requirement to achieve the recommended weight loss and translate the energy prescription into individualized dietary plan based on patient dietary habits and preferences.
4. Incorporate various behavioural strategies in patient management, like self- monitoring using the "Guide for self-care" booklet. The patient should be encouraged to keep weekly diary of his diet and physical activity, to write down goals which he agreed to achieve and record his weight, waist circumference and BMI.
5. Provided the necessary educational materials (appendix2)
6. Record all of the above clearly and indicate whether patient is to follow the routine appointment or need to be seen earlier.

Second Visit

Patient will be seen after 2 weeks of starting treatment by the Nurse or /and nutritionist in order to monitor patient compliance and to look for any side effects.

Duration: 15 min

The following illustrate the role of the nurse during 2nd and subsequent visits:

1. Measure and record patient's weight.
2. Review the patient's progress in terms of:
 - Adequacy of weight loss according to the guidelines.
 - Adherence with the dietary, physical activity and lifestyle plans by reviewing the patient's weekly diet and physical activity diary.
3. Provide reinforcement, guidance and support.
4. Enquire about any side effect, record it clearly and refer to physician if patient develops side effects from the diet or exercise or from medication.

Follow up Visits

The patient will be seen monthly during the period of active weight loss (first 6-12 months) this will be done alternately by a nurse, nutritionist and physician

Nurse

Duration: 15 min

On the follow up visit the nurse will monitor patient compliance, progress and look for any side effects as described in the second Visit. In fact most of the follow up visits (5 out of 7) the nurse will see the patients.

Physician:

Duration: 15 min

Physician will see patient every 3 months. In the same visit the patient will be seen first by the nurse who will repeat step 1 and 2 as in the second visit.

The physician then will do the following:

1. Review the patients' progress in terms of
 - Adequacy of weight loss
 - Adherence with the dietary, physical activity and lifestyle plans
 - Achievement of lifestyle modification
 - Continue/modify or develop new sets of dietary, physical activity and behavioral goals that should be agreed with patient.

2. Look for any side effects and intervene appropriately.
3. Provide reinforcement, guidance and support.
4. Consider drug therapy if indicated.

In addition, repeat step 8 and 9 as in the first visit.

Nutritionist

Duration: 20 min

In view of the long time required for each new consultation the nutritionist could see a limited number of patients and most of the follow up visits is done by the caring nurse unless the patient has problem. However the nutritionist will see patients at the beginning of treatment and for another two visits: at 1 month and 3 month from the start of treatment. The patient who failed to comply with dietary management or failed to achieve adequate progress in weight loss will be evaluated by the nutritionist and might be seen more frequently.

Weight Maintenance Phase

After achieving adequate weight loss, the patient will enter a weight maintenance phase to promote the prevention strategies actively, with enhanced attention to diet, physical activity, and behaviour therapy. Maintenance counselling can also be offered to patients who have a history of overweight, and now at an appropriate body weight or for patients who are overweight or obese, who are not ready to lose weight and wish to focus on maintaining their current weight.

The Patient will be followed mainly by the nurse during this phase. Physician and nutritionist will see the patient at the beginning of this phase and whenever the nurse refers the patient to them as indicated.

First Visit

Nurse

Duration: 20 min

Patient will be seen by the nurse who will repeat steps 1 to 4 as in the first visit of 'Active Weight Loss Phase'. The blood investigations will be ordered for all new patients as in the active weight loss phase, but for patient already on follow up the physician will decide based on the new guidelines set by the Non-communicable Diseases committee.

Physician

Duration: 15 min

Physician will repeat steps 1 to 8 as in the first visit of ‘Active Weight Loss Phase’, in addition to provision of reinforcement, guidance and support and considering drug therapy if indicated.

Nutritionist

Duration: 30 min

Nutritionist will repeat steps 1, 2, 4 and 6 to 10, as explained in the first visit of ‘Active Weight Loss Phase’, in addition to:

- Prescription of individualized dietary plan to maintain the recommended weight goals and translate the energy into menu plan based on patient dietary habits and preferences.
- Encourage the use of “Guide for self-care” booklet to enhance self-monitoring and self-care skills and attitude.

Subsequent Visits

Less frequent visits are required during the maintenance phase that is every three to six month for a total of 2 years from the start of treatment. However more frequent visits can be arranged based on patient needs.

Patient will be seen by the nurse at 3-6 monthly intervals who will repeat steps 1, 2 and 6 to 8 as in the second visit.

In addition to the following:

- Reviewing the patient’s diet and physical activity diary to evaluate the patient’s progress in adopting healthier lifestyle. And help the patient to set or modify more specific dietary, physical activity goals according to his/her circumstances.
- Encourage the patient to undergo another cycle of weight loss after a period of successful weight maintenance(3-6 months)

Long-term Follow up

After an average follow up of 2 years, patient should have periodic assessment and monitoring for five years. The patients need to be guided and supported during this period with advice for further weight loss management if still obese/overweight. The follow up interval will be according to their current BMI. If patient's BMI is 25 or more then patient may be seen every 3-6 months but if his/her BMI is less than 25 then he/she can be seen yearly.

Evaluation of Obesity Treatment Program: Participating, Safety, and Effectiveness

1. Participation and Effectiveness

Continuous monitoring and evaluation is an essential mandate toward establishing Surveillance system and to ensure quality care and service development. The patient information will be recorded electronically in order to accomplish this ongoing task. This will allow for easy retrieval of patients results and save time and efforts. Data will be collected in standardized way at the time of program initiation and follow-up. The collected data will provide valuable information about the program which will include:

1. Percentage of all participants who completed the program and the percentage of the drop out and the reasons for dropping out.
2. Duration of the weight loss and weight maintenance phases of the program
3. Percentage of those completing the weight loss phase of the program, including the mean and range of weight loss values for the program
4. Percentage of participants in the structured weight maintenance program
5. Percentage of participants who maintain weight loss at 1, 2, and 5 years
6. Percentage of participants with improved cardiovascular disease risk factor status at 1, 2, and 5 years
7. Percentage of participants who experience adverse medical or psychological effects and the nature and severity of these effects.

Information about a program's characteristics will include:

1. Type of intervention: diet, exercise, and behaviour components, drugs
2. Data on the number and type of referrals to specialist

The success of a program is ultimately reflected by long-term maintenance of weight loss and healthy lifestyle habits. Achievement of a desirable body weight is not realistic for all participants; therefore, maintaining a reasonable weight loss, rather than achieving an ideal body weight, should be equated with success. If a patient can achieve the recommended 10% reduction in body weight within 6 months to 1 year, this can be considered a good progress during the acute weight loss period. Successful weight maintenance is defined as a regain of weight that is less than 6.6 pounds (3kg) in 2 years and a sustained reduction in waist circumference of at least 1.6 inches (4cm).

2. The Program Safety: Evaluating the Patient for Side Effects

Health professional should ask the patient for any side effects at each visit, through a brief, general health inquiry. Indicate it clearly in the patient record and take the appropriate action. Persons who experience complications must be referred to their physicians.

Negative sequel of excessive weight loss can be indicated by the following:

- Any changes in health, mood, or physical or mental performance.
- The presence of persistence symptoms like:
 - Headaches
 - Fatigue
 - Muscle aching
 - Palpitations
 - Changes in menstrual cycle
 - Hair loss
 - Abdominal discomfort.
 - Postprandial symptoms
 - Emotional distress
- Physical examination that indicate loss of lean muscle mass or development of edema
Data should be collected at baseline to determine long- and short-term complications of weight loss.

Monitoring and Supervision

A strong monitoring system is very constructive mechanism that leads to better service. The nutrition section in public health is responsible to monitor the implementation of obesity management guidelines in primary care through continuous feedback from service users.

Nutrition clinic coordinator from Public Health has the responsibility to manage and guide the team through direct supervision and meeting the clinic team and clients on regular basis. However, a nutrition clinic facilitator from primary health care will be needed to cross the major communication gaps and resolve any other logistic or technical obstacles related to the work in primary care setup besides providing overall guidance and advice.

Results

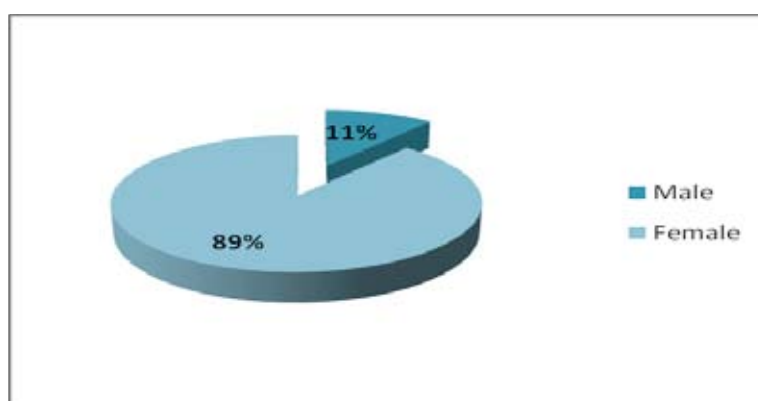
Pilot Study Data

Background

The nutrition clinic was launched on 27th Nov 2007 in NBB-Arad HC. The pilot phase lasted 6 months from December 2007 to May 2008 to test the clinical guidelines for clarity and convenience and examine the practicality and feasibility of the clinic protocols.

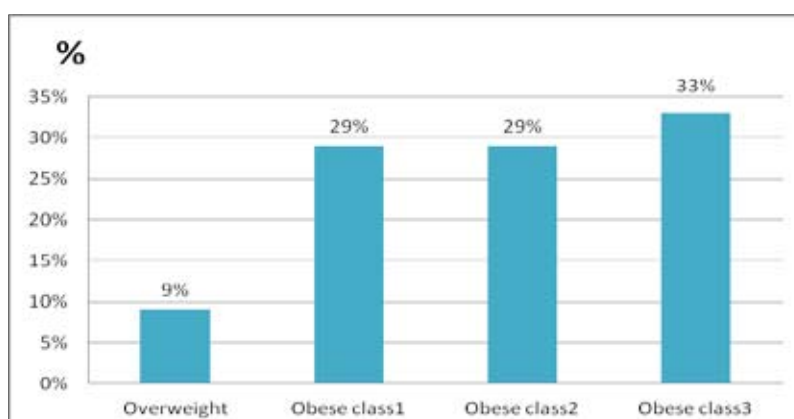
By the end of May there were 186 patients followed up in the clinic. The following sections describe the characteristics of patients who have been on treatment for at least four weeks or longer (130 patients).

Figure 1. Patients Distribution by Gender



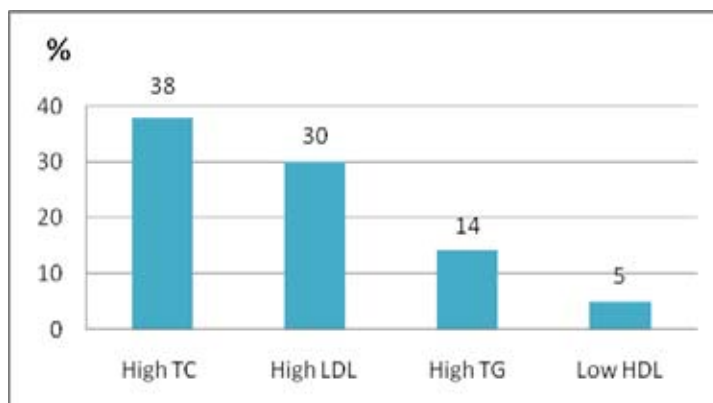
Female patients constitute the majority (115 patients -88.5%)

Figure 2. Patients Distribution by Body Mass Index (BMI)



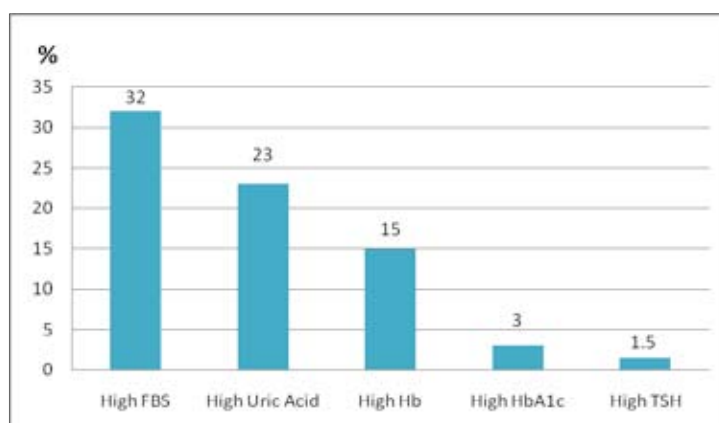
Nine percent of the patients were overweight and 91% were obese.

Figure 3. Laboratory Investigation Results for Serum Lipids



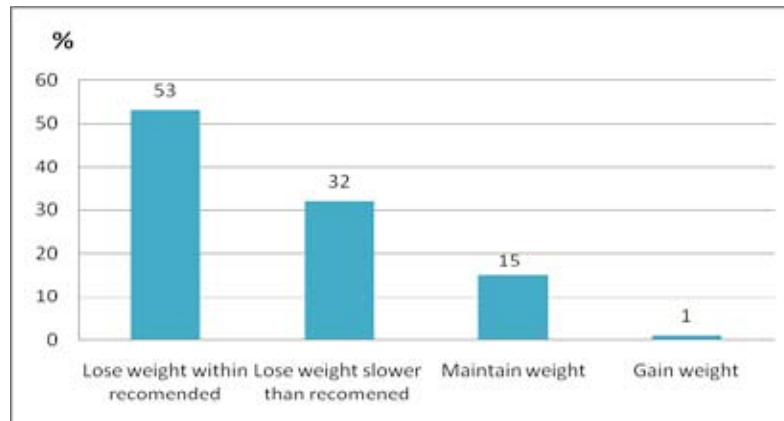
The majority of patients (49 patients -38%) had high total cholesterol, thirty percent had high LDL-cholesterol (39 patients- 30%) and five percent (6 patients) had low HDL-cholesterol while 14% (18 patients) had high serum triglycerides.

Figure 4. Other Laboratory Investigation Results



Nearly one third of patients (41 patients-32%) had high FBS while about one fifth (30 patients- 23%) had high uric acid and fifteen percent (20 patients) had low haemoglobin (Hb).

Figure 5. Progress Rate of Weight Loss



In this program the majority of patients have lost weight (110 patients- 85%). Nearly half (69 patients-53%) have lost weight within the recommended rate and one third (41 patients-32%) has lost weight at slower rate. Twelve percent (20 patients) had their weight maintained and only one patient has his weight increased.

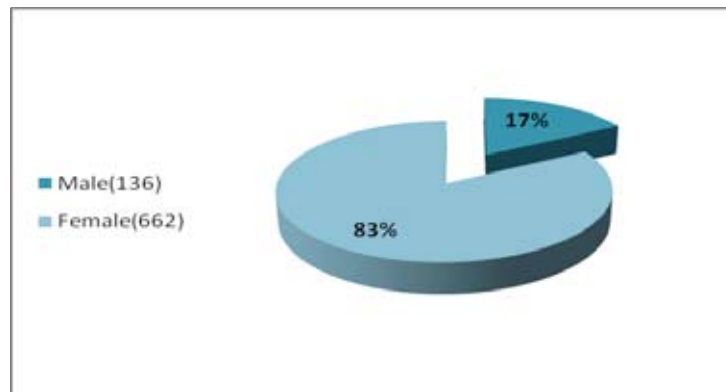
Baseline Data

This study reports and analyzed data of patients who were involved in Nutrition Clinics at health centres of National Bahrain Banks (NBB)-Arad, National Bahrain Banks (NBB)-Al-Dair and Hamed Kanoo. Number of patients participated in the clinics program from these centres were 588, 128 and 88 respectively, for the period of January 2008 till end of 2010.

Statistical data was analysed by using Statistical Package of the Social Sciences (SPSS version 18) and Microsoft Office Excel 2007.

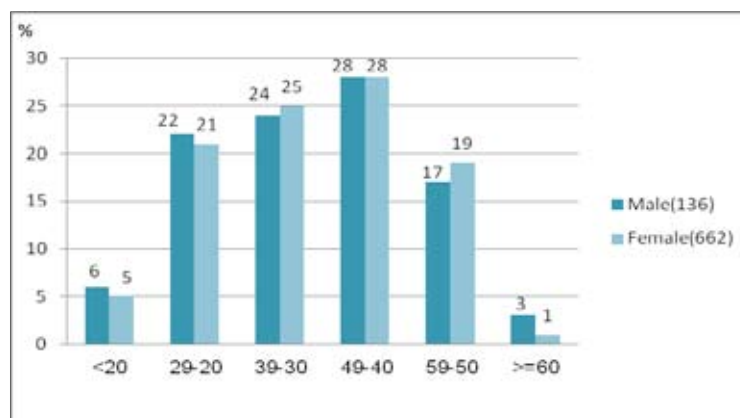
1. Socio Demography and Medical History Data

Figure 1.1. Patient's Distribution by Gender



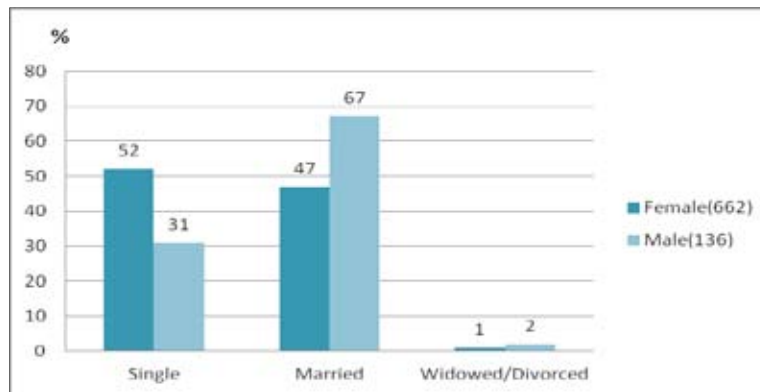
Female participation was higher in Nutrition Clinics in all health centres.

Figure 1.2. Patients Distribution by Age Group



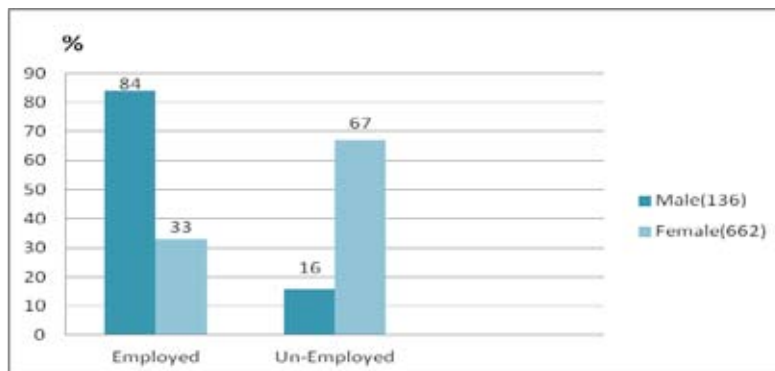
Patients aged between 20 and 50 were among the highest participants in this intervention program (74%).

Figure 1.3. Patients Distribution by Marital Status



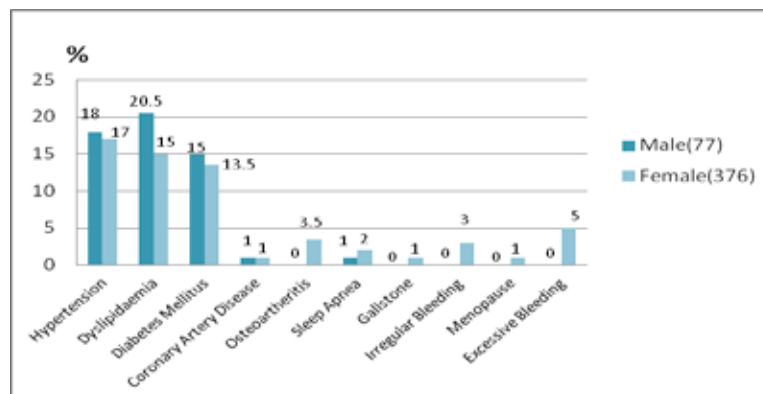
Social status data of the patients showed that 67% of the females were married compared to their male counterparts (47%)

Figure 1.4. Patients Distribution by Occupation



Majority of the female patients were housewife's compared to the male majority who were employed.

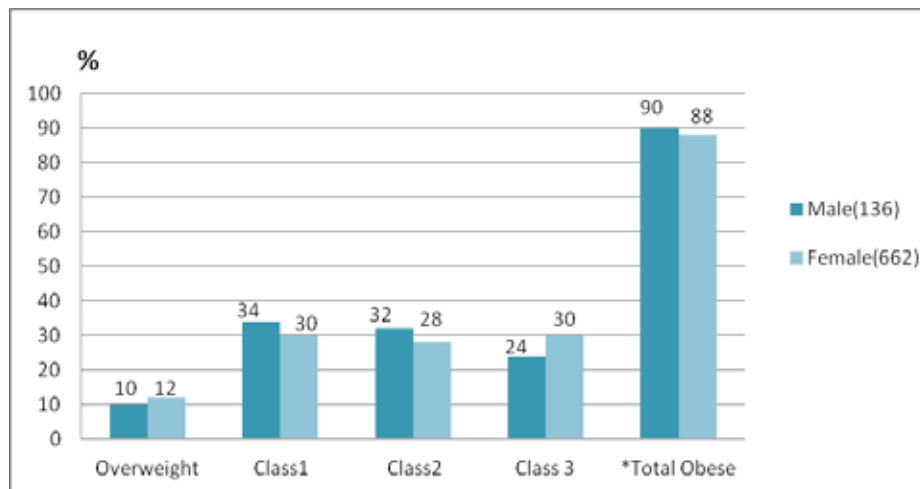
Figure 1.5. Patients Medical History



Out of 798 patients 57% of them reported to suffer from at least one type of illness such as hypertension, dyslipidaemia, and diabetes mellitus.

2. Weight Status and Biochemical Results Data

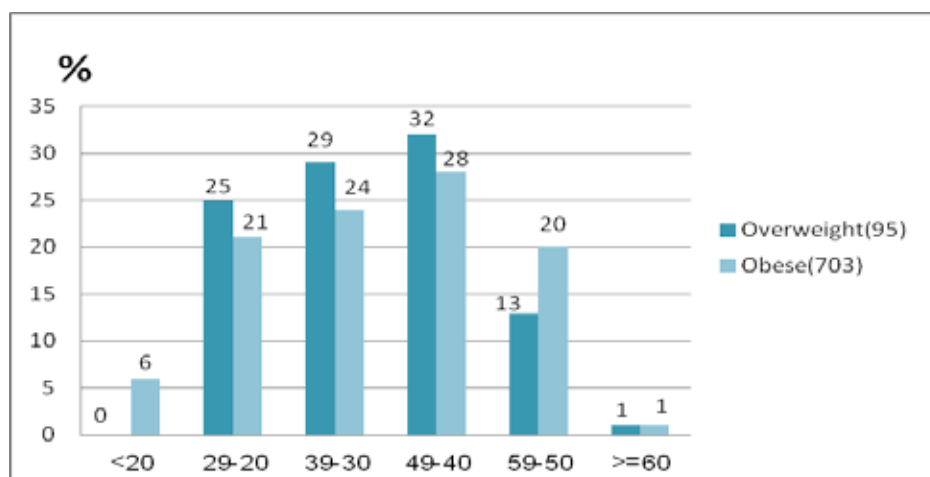
Figure 2.1. Patients Distribution of BMI by Gender



*Total obese = class1 + class 2 + class 3

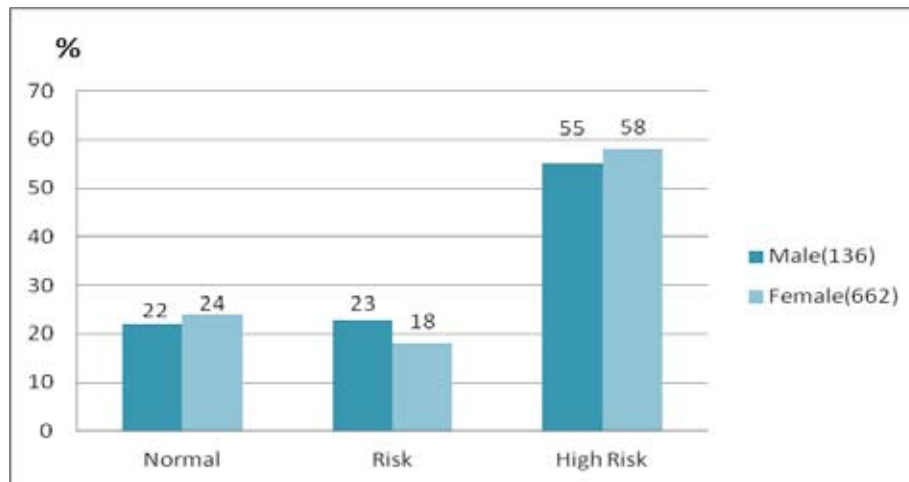
According to BMI status⁽⁵⁾ 90% were found to be obese compared to 10% overweight. Obesity prevalence varied between class 1, 2, or 3.

Figure 2.2. Patients Distribution by BMI & Age Group



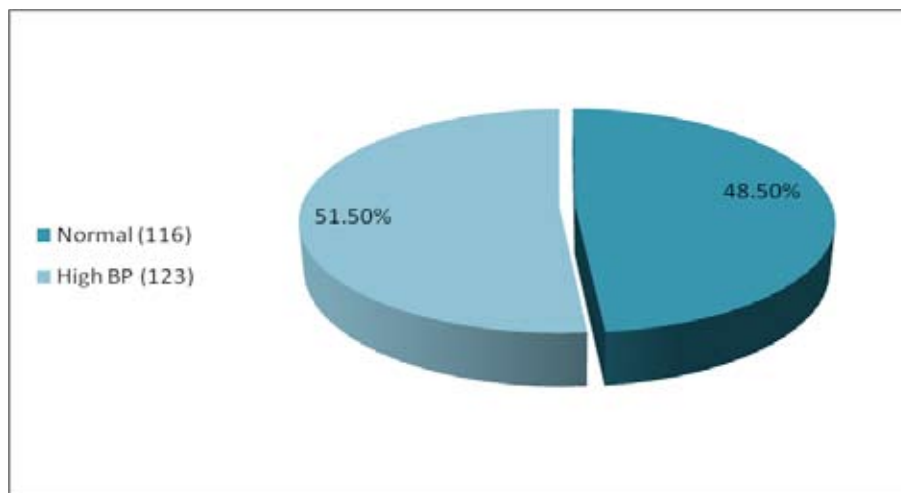
Overall high prevalence of overweight and obesity were found among early and middle adult stages (20-50 years).

Figure 2.3. Waist Circumference Distribution by Gender



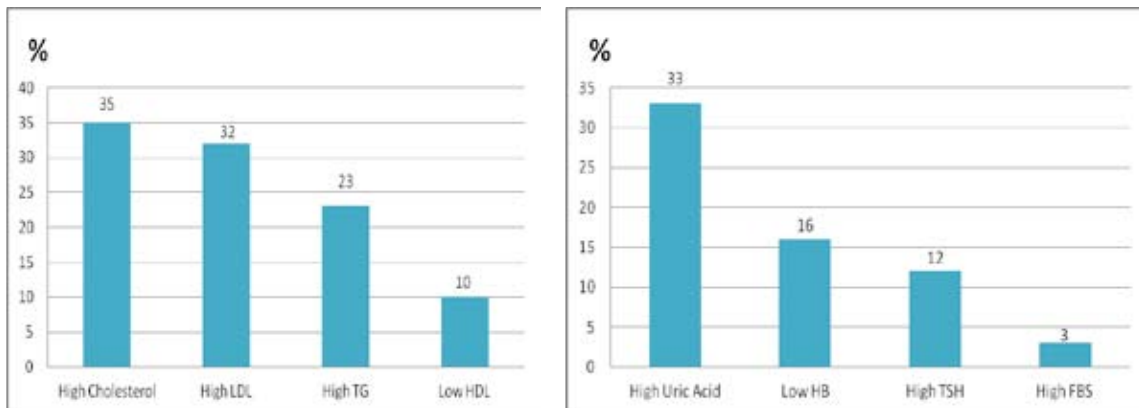
Majority of patients (58% males and 55% females) to have high waist circumference according to WHO classification⁽⁵⁾.

Figure 2.4. Prevalence of High Blood Pressure among Patients



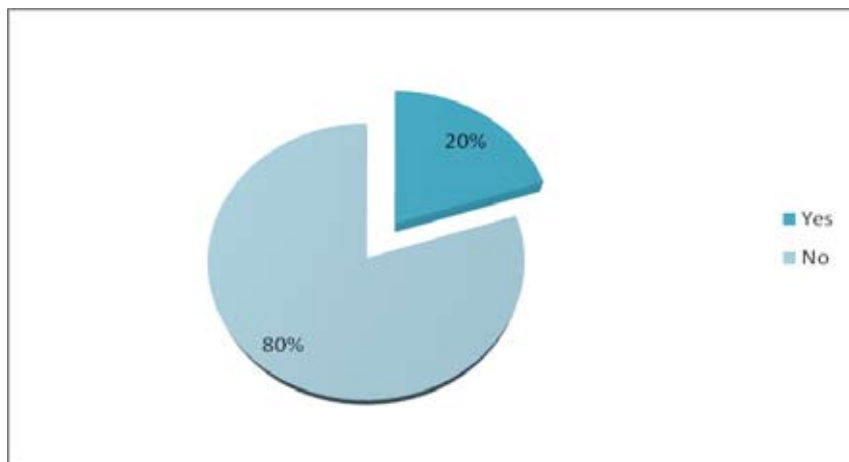
Almost half of the patients were reported high blood pressure⁽⁶⁾.

Figure 2.5. Distribution of Serum Lipid Profile and Other Blood Tests Among the Patients



Blood test data showed dyslipidemia (high cholesterol, LDL, TG, and low HDL), high uric acid, low haemoglobin (Hb), high TSH and FBS ^(8,9).

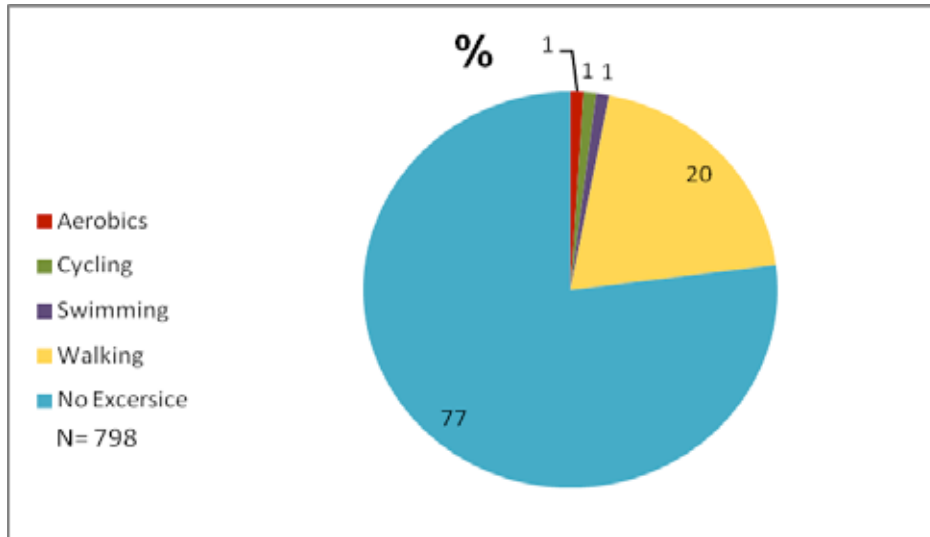
Figure 2.6. Patients Prescribed Medications



20% of the patients reported to receive some type of drugs prescription for treatment of non-communicable diseases such as; anti-hypertensive and lipids, diabetic type 2, thyroxin drugs and iron supplement.

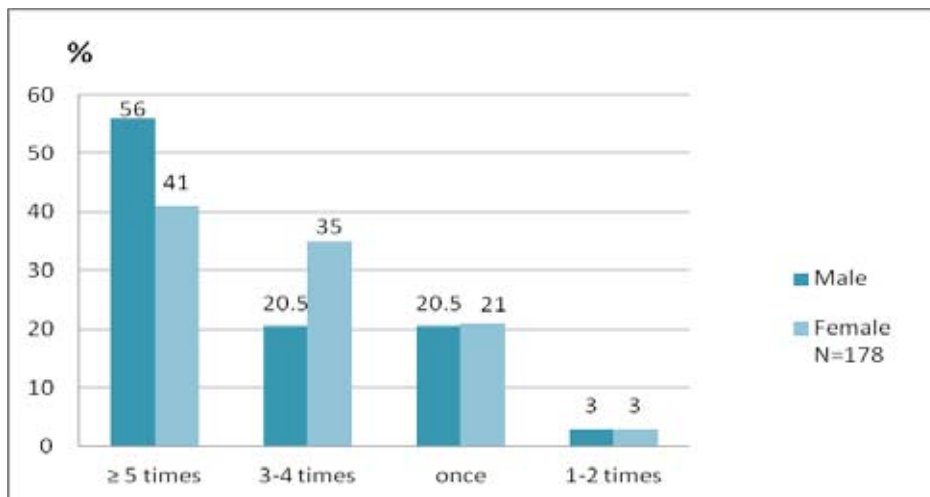
3. Lifestyle Data

Figure 3.1. Types of Practiced Physical Activities



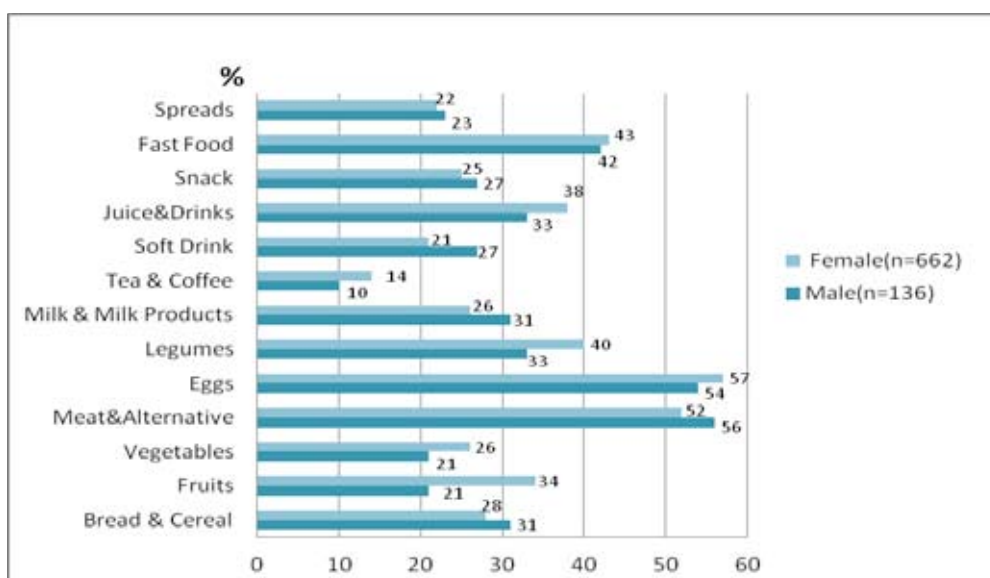
Majority of the patients reported not practicing any form of physical activity while 20% of them showed to practice walking as regular exercise.

Figure 3.2. Frequency of Practicing Physical Activity



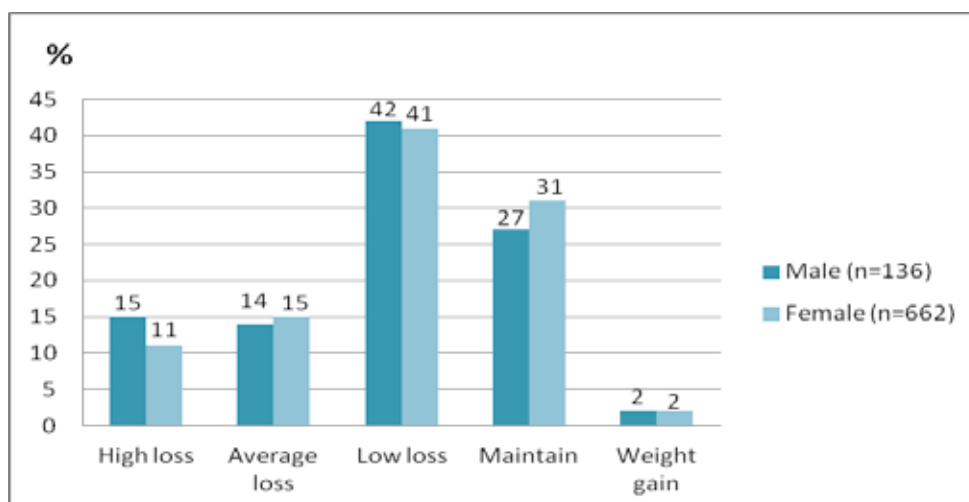
Among the patients who regularly practice some form of physical activity (23%) almost half of them reported to have a daily practice of some physical activities form and the rest do it less than 3 times a week.

Figure 3.3 . Food Frequency Intake by Gender



Food items such as meat and alternative, eggs and fast food at the high side of frequency consumption compared to fruits and vegetables.

Figure 4. Weight Loss Progress by Gender for the Whole Program Duration



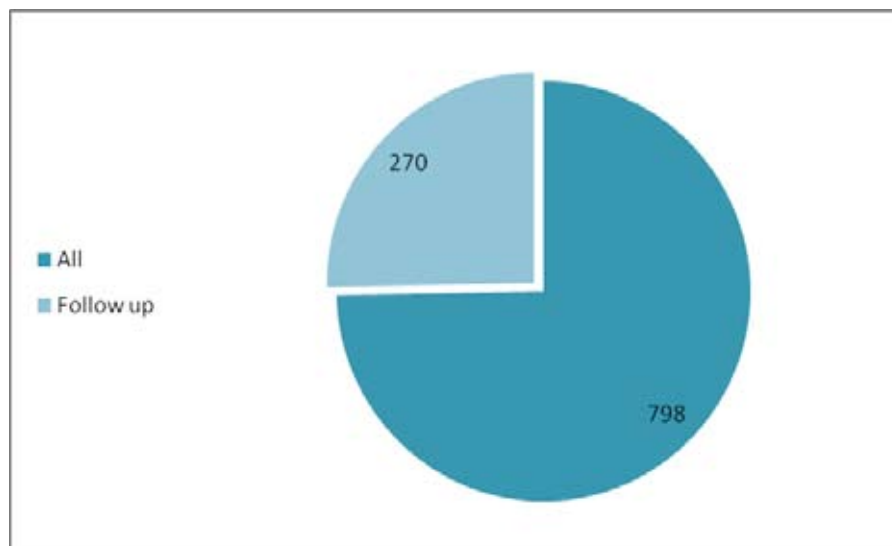
Majority of the patients (69%) showed weight loss. Range of losing weight was high (15% males, 11% females), average (14% males, 15% females) to Low (42% males, 41% females). While 29% maintained the weight status, however, only 2% continued gaining weight.

Follow Up Data

Out of total patients of Nutrition Clinics 270 (34%) patients were successfully continued Obesity Management Program for a period of 4 months and followed up for 1 visit per month. Follow ups and care were handled by the clinic theme: family physician and nutritionist.

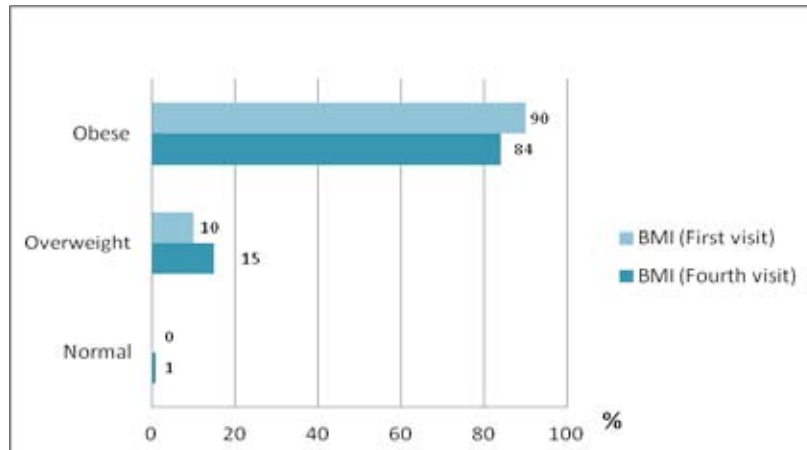
The following results illustrate the information related to different variables (weight, BMI, waist circumference, blood pressure and blood test results)

Figure 5. Number of Patients Follow up from Total Number



4. Weight Loss Program Outcome Data

Figure 4.1. Changes of BMI through Visits



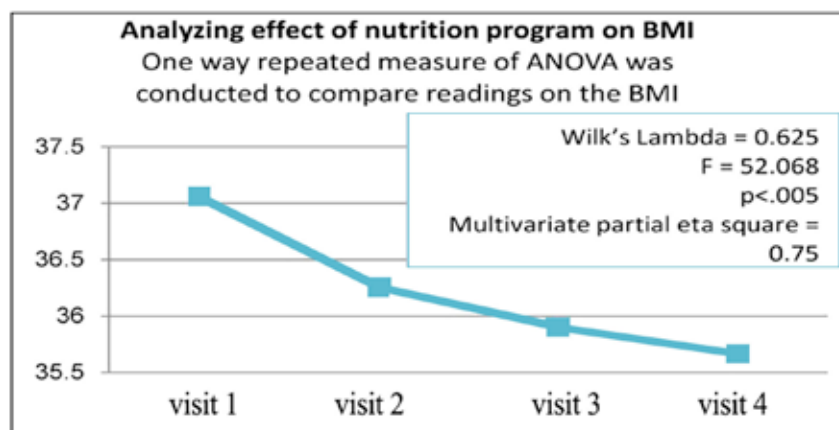
Data show that prevalence of obese patients has reduced in the fourth visit compared (84%) to that in the first (90%) and this might reflected as the increase of overweight patients in the fourth visit (15%).

BMI value has changed in visit 4 compared to that in visit 1. Among the obese patients there was a slight drop in their BMI values, which supposed shifted toward overweight (15%).

When BMI values were studied among different visits (visit 1 to visit 4) for different categories of obesity. It was found that percentage of obesity group has been slightly reduced and a patient has been successfully managed to change his BMI to normal category.

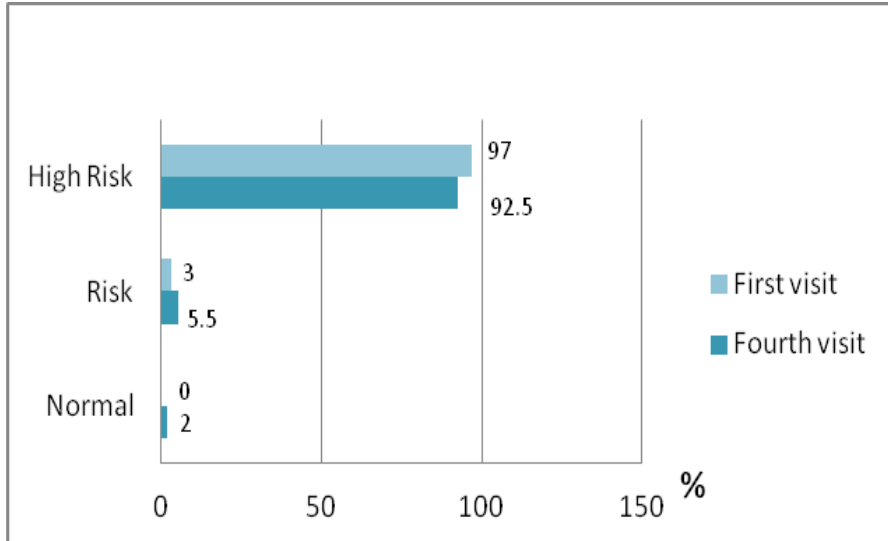
In addition, there was a slight increase of overweight patients in the fourth visit compared to that of first visit (from 10% to 15%)

Figure 4.2. Distribution Pattern of BMI through Visits



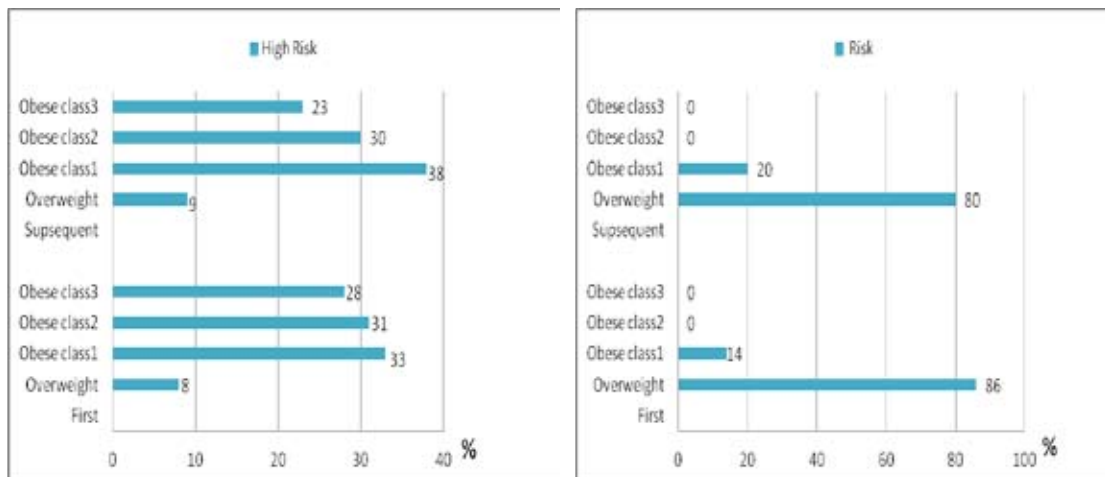
Further statistical analysis showed that the BMI values measured in the fourth visit were significantly reduced compared to that in the first visit ($p < 0.005$).

Figure 4.3. Changes in Waist Circumference Measurements between first and fourth visit



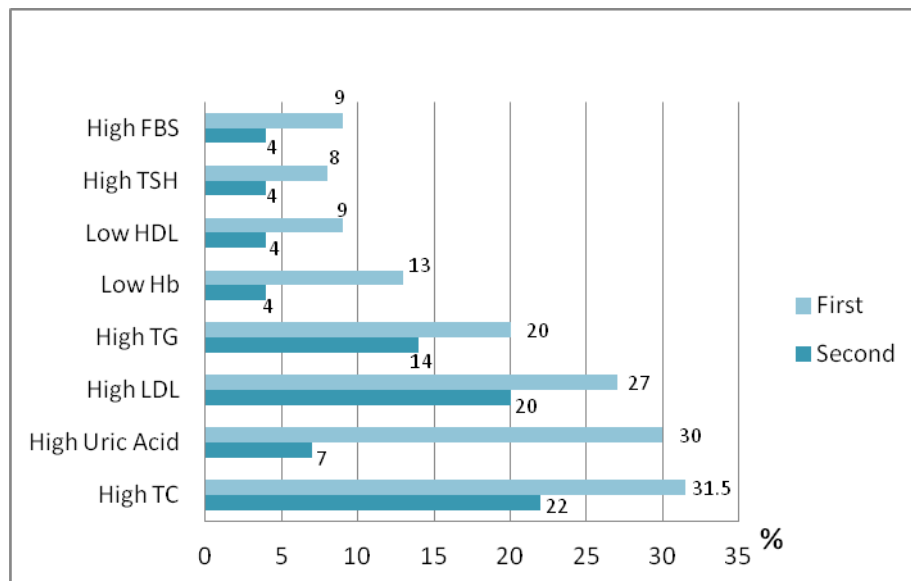
Analysis of waist circumference values of the visits for various categories of high risk patients showed a slight reduction in the values of fourth visit compared to those of the first.

Figure 4.4. Changes of Waist Circumferences Measurements & BMI between Visits



Percentage of waist circumference obese patients classes 2 and 3 were reduced and shifted toward class 1 among high risk patients.

Figure 4.5. Changes of Blood Test Results between Visits



Almost all blood test values of the patients show reduction in the second visit compared to that of first, especially those of high Total Cholesterol (TC) and high Uric Acid values^(7,8).

1. Dietary Habits Data

Dietary habits of the patients have been studied for a group of patients who have been maintained at least two visits.

For practical purpose food guide pyramid tool was utilized and number of food serving of the patients were studied according to food groups: (Bread and cereals, fruits, vegetables, meat and alternatives, milk and its products, fast food, and snack) number of serving were estimated and categorized as follows:

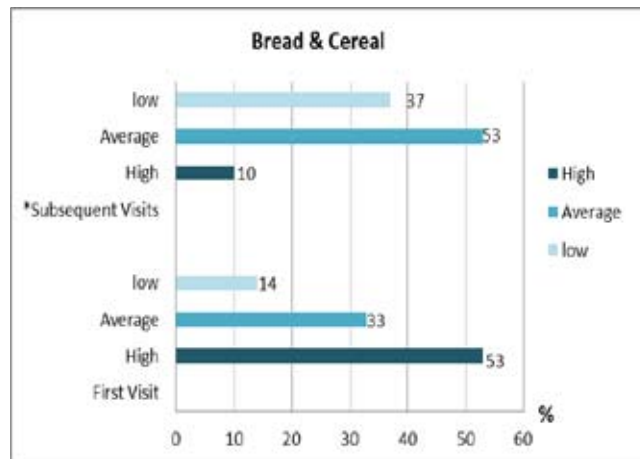
High: if consumption exceed the recommended number of servings from the food group (e.g. Meat & Alternative group >3servings)

Average: if consumption was almost equal to the recommended number of portions from the food group (e.g. Meat & Alternative group 2-3servings)

Low: if consumption is less than recommended number of portions from the food group (e.g. Meat & Alternative group <2 servings)

The following results illustrate the different rates of consumption pattern of different food groups among first and subsequent visits (1, and average of 2+ visits)

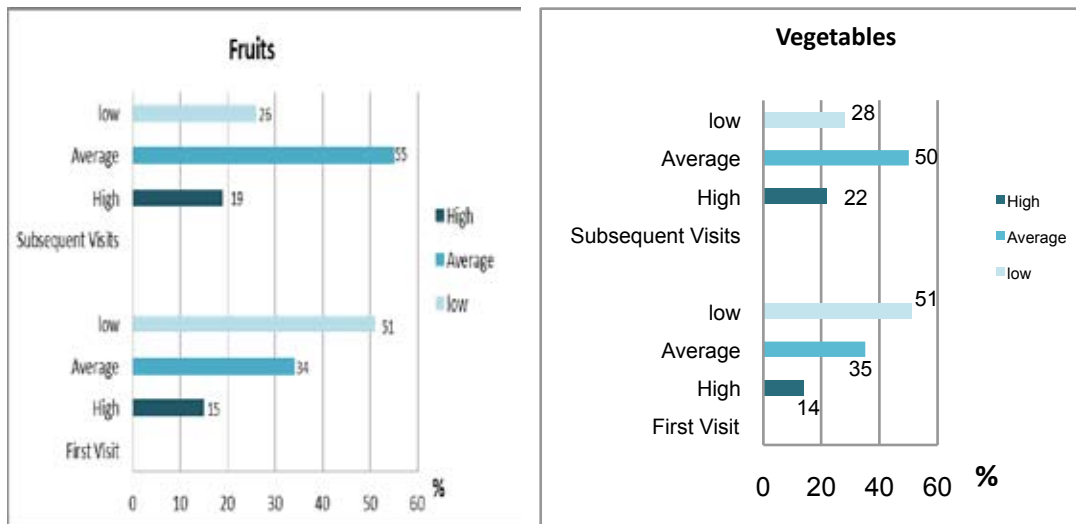
Figure 5.1. Consumption of Bread & Cereals through Visits



*Subsequent visits = 2-4 visits

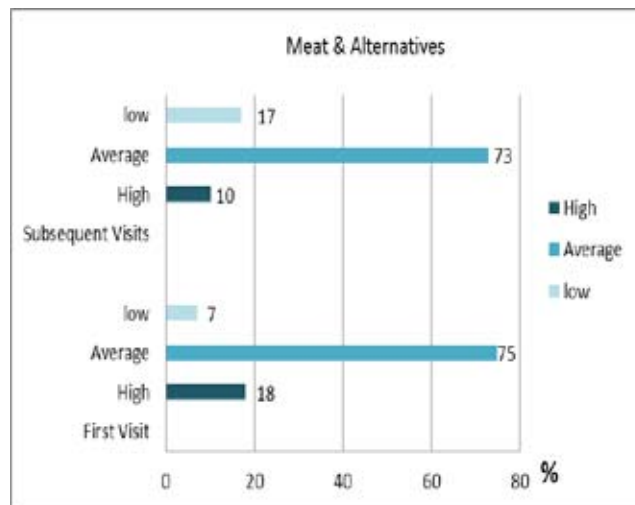
High consumption of bread and cereal group (53%) in the first visit has been shifted toward the average consumption in the subsequent visit. Low consumption has increased in the subsequent visit compared to first visit.

Figure 5.2. Consumption of vegetables and Fruits through Visits



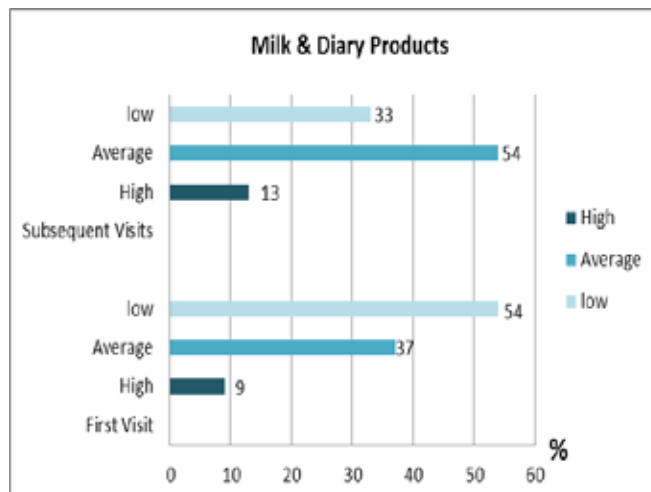
Overall consumption of vegetables and fruits has increased in the subsequent visit compared to that of first visit. This change has been reflected among all three categories.

Figure 5.3. Consumption of Meat & Alternatives through Visits



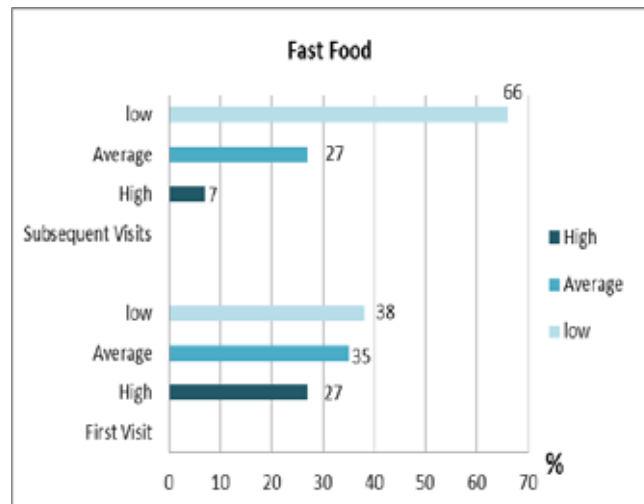
Patients have maintained the average of consumption of meats. While there was a slight shift in the high and low categories in the first visit compared to subsequent ones (18 to 10%)

Figure 5.4. Consumption of Milk & Dairy Products through Visits



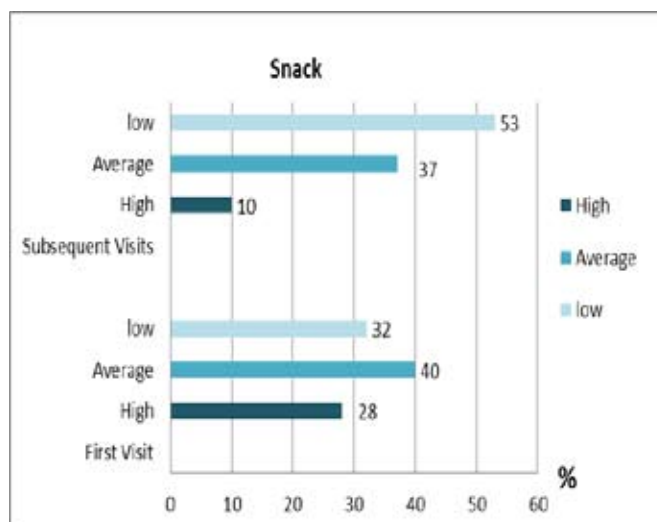
Milk consumption has been improved toward high and average levels and most of patients (69.5%) consumed low fat milk.

Figure 5.5. Consumption of Fast Food through Visits



High consumption of fast food in the first visit has been shifted toward average | the subsequent visits.

Figure 5.6. Consumption of Snacks



Snaking habits has been reduced and shifted towards low consumption in the subsequent visits.

Results Analysis

Results describe all nutrition clinics patients, patients who were enrolled for at least two months (798) as well as patients who successfully continued the treatment program for at least 4+ months (270).

Majority of patients were females (83%), more than half of patients were in the third and fourth decade of age (53%) and 88% of patients were considered as obese (BMI \geq 30)⁶. Most of patients had a history of high blood pressure (BP) (51.5%), high total cholesterol (35%), high uric acid (33%), high LDL- cholesterol (32%), high triglyceride (23%), low haemoglobin (Hb) (16%), high Thyroid Stimulating Hormone (TSH) (12%), low HDL-cholesterol (10%), and high fasting blood glucose (3%).

69% of the patients showed average weight loss. Classifying weight loss from high to low, 13% of the patients showed high loss compared to 14.5% and 41.5% from average to low weight loss, respectively.

Data analysis of Figure 4.2 show a significant drop in BMI values between the first and second visit and it also show a continuous loss of BMI following the subsequent visits (visit intervals is between 4-6 weeks). This result indicates a positive association between reduction of BMI values and maintaining the active enrolment in the intervention program.

Figures 5.1 - 5.6 reflect the improvements of the patients' dietary habits. Main observations are that the consumption of carbohydrate sources (bread and cereals, snacks) have reduced compared to an increase toward fibre based food sources (fruits and vegetables).

Further, consumption of meats, fast foods and snacks showed reasonable decreased during the program period.

It is worth to be noted that the improvement in dietary habits was not just toward selecting healthier food items, however, it was also and to great extent due to cutting down food portion sizes. This observation is found to be valid for total number of 300 patients.

Results of dietary habits and intake (portion size) may assist in accuracy of consumption, monitoring and therefore might be important for those people who are actively monitoring their intake. It is possible that portion controlled foods can initially help with intake amounts and weight management until the person has learned to regulate and limit her/his own portions accordingly⁽¹⁰⁾. In addition, strategies that limit the amount of food available, such as eating at restaurants that offer smaller portion sizes, setting aside part of the serving at the beginning of the meal, or serving smaller amounts of food when eating at home, can help consumers avoid excess energy intake. Research indicates that the addition of portion-controlled meals to an energy restricted, weight-loss diet increased the amount of weight that was lost.⁽¹¹⁾

Portion sizes seem to be a valid starting point for the development of various environmental interventions directed at the prevention and treatment of obesity.⁽¹²⁾

Following Cohen and Farley's concept of eating behaviour as an automatic behaviour, shaping the food environment by reducing portion size might be one potentially successful approach to fight today's obesity epidemic.⁽¹³⁾

Blood test results (figure 4.5) show reduction in the blood test parameters, total cholesterol from 31.5% to 22%, high LDL from 27% to 20%, high triglycerides from 20% to 14%, high uric acid from 30% to 7%, fasting blood glucose levels from 9 to 4%.

It is well established that weight loss has a positive effect on lowering elevated blood pressure and hypertension, levels of total cholesterol, LDL-cholesterol, and triglycerides, and to raise low levels of HDL-cholesterol (serum/plasma lipid concentrations), and fasting blood glucose and fasting insulin.

Weight loss not only helps to lower total cholesterol and LDL cholesterol, but it also can improve high-density lipoprotein levels. High-density lipoprotein, or HDL cholesterol, scavenges excess cholesterol from the bloodstream, carrying it to the liver where it can then be removed from the body. Losing just 3kg can raise HDL by 1 milligram per deciliter, or mg/dl. The higher the HDL, the more effective it is at removing LDL from the blood, which further helps to improve your total cholesterol and LDL levels.⁽¹⁴⁾

Research findings indicate that weight reduction, even as little as 4.5kg reduces blood pressure in a large percentage of overweight persons with hypertension, makes blood pressure medications more effective and reduces cardiovascular risk factors⁽¹⁵⁾. Losing weight can increase insulin sensitivity and help stabilize blood sugar. Following a healthy diet, paying attention to both calories and portion control and regular exercise can help you lose weight and regulate glucose and insulin⁽¹⁶⁾.

Findings & Observations

Obesity is becoming a global epidemic in both children and adults. It is associated with numerous comorbidities such as cardiovascular diseases (CVD), type 2 diabetes, hypertension, certain cancers, and sleep apnea/sleep-disordered breathing. In fact, obesity is an independent risk factor for CVD, and CVD risks have also been documented in obese children. Obesity is also associated with an increased risk of morbidity and mortality as well as reduced life expectancy.

- Obesity prevention and treatment interventions must focus on both **physical activity and nutrition behaviours**. In nutrition behaviours aspects for increased fruit and vegetable consumption, decreased fat intake, decreased consumption of carbonated drinks, adequate consumption of water and restricting portion sizes are important aspects. There is need for all interventions to be based on behavioural changes. Therefore, it is also necessary to develop instruments that measure these changes that could help in understanding which components work and to what extent.
- Behavioural changes need to be achieved by targeting the whole population in attempt to increase the **nutrition awareness** in general and to enhance individual's ability toward making healthier food choices.
- Data from nationally representative sample suggest a high incidence of obesity and overweight during the transition from adolescence to adulthood⁽¹⁷⁾. The clinical implications of these observed trends are of concern given the comorbidities and chronic disease associated with severe obesity. Therefore, we believe the need for interventions prior to adulthood to prevent the progression of obesity to severe obesity, which may reduce severe obesity incidence and it's potentially life threatening consequences. Serious attempts should be considered toward integrating nutrition subjects in **school education curriculum with specific focus on obesity prevention**.
- Make the necessary adjustments and the required enhancements for the existing **nutrition and health policies** toward combating obesity and consider it as the most critical risk factor related to health in Bahrain.
- Experience showed that there are high demands for enrolment in nutrition clinics program, however, due to the limitations of existing resources and challenges in effectively treating obesity in the primary care settings, it is suggested at this stage to consider the potential of using **on line communication system** for the purpose of designing a tailored and interactive nutrition health information.

- As a good number of the patients of nutrition clinics are at age of **50 and above**, it is important to stress on the fact that weight loss therapy might have some adverse effects on muscle and bone masses. Therefore, a parallel and **special diet therapy** needs to be considered.
- An important intervention point that is being missed by many physicians is the need to discuss with their patients regarding their overweight problem and associated health risks of obesity. This could ring important bells in the **psychology of the patients** to deal with obesity as serious health problem and encourage them to take necessary actions.
- Data of this program produce information needed toward establishing **surveillance program** such as BMI changes, blood analysis data and comparing them with different obesity intervention programs. This information forms the basis of ‘mapping’ procedures which pinpoint those deemed most important changes, and thus where intervention should be focused.

Drawback of the Intervention Program

It is noted that the major drop out of the program happened often the first visit. One possible explanation is a mass referral of patients without proper selection of those who are really ready and motivated for weight control program. It was felt that other patients were under the pressure of their colleagues and relatives while some were just more curious to know about the program. Besides studying the characteristics of this group of patients, several steps were taken to overcome this resource wasting problem. First: the physicians were reminded to assess their patients’ motivations and readiness level and to select patients who are really willing to participate. Second: the clinic staff arranged several group sessions for new patients in waiting list to explain the nature and objectives of the program and to discuss the patients’ worries and expectations. Only patients who still feel committed will enter the program. Third: whenever possible several reminder calls were given for new and follow up patients.

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Appendices

Appendix 1

Patient Assessment Sheet – Nutrition Clinic

Date: / /

Telephone:

I. PERSONAL DATA

Marital status: Single Married Divorced/Widowed

Occupation: Employed (Sedentary /light manual/heavy manual).

Unemployed

Housewife (Sedentary /light manual/heavy manual).

Educational Status: Illiterate Primary/Intermediate /Secondary University

II. MEDICAL HISTORY

History of Recent changes in bodyweight over the last few months:

No recent changes

Increased/ Decreased weightkg over Month

Please tick ✓ if yes and indicate its duration

History of the following medical problems:

Diabetes Mellitus (Type 1 / Type 2)

Hypertension

Dyslipidaemia

Sleep Apnea

Endocrine disease. Type

Others

Coronary artery disease

Stroke

Gallstone and Liver Disease

Osteoarthritis

Women History:

Amenorrhea

Irregular Bleeding

Infertility

Menopause

Excessive Bleeding

Others

Symptoms suggestive of mood or eating disorders: (To be filled by Doctor)

Symptoms of depression

Symptoms suggestive of bulimia nervosa.

Other Psychological complaints

Symptoms of Anxiety

Symptoms suggestive binge eating

Medication/Herbs use:

.....
.....

History of Smoking and Alcohol drinking:

If smoker, what type of smoking and how frequent per day?

.....

If alcohol drinker, what type and How many drinks per day/week?

.....

III. FAMILY HISTORY

(Please tick ✓ if yes for the first degree relative only)

Obesity

Hypertension

Coronary artery disease

Stroke

Diabetes

Hyperlipidaemia

Premature Cardiovascular Disease

Endocrine disease. Type

Anthropometrics:

Height _____ cm Weight _____ kg Body Mass Index _____ kg/m²
Waist Circumference _____ cm

General Physical Examination:

BP: _____
Neck: _____ N A
Chest: _____ N A
CVS: _____ N A
Abdomen: _____ N A
Lower limb: _____ N A
Skin: _____ N A

Routine Biochemical Tests

Tests Date: / /	Results	Please tick ✓ for the required investigations
Hb		<input type="checkbox"/> Electrolyte
FBS		
S. Creatinine		<input type="checkbox"/> HBA1C
Uric Acid		
Total Cholesterol		<input type="checkbox"/> Cortisol level
LDL		
HDL		<input type="checkbox"/> Fasting Insulin
Triglyceride		
Thyroid Function Test		<input type="checkbox"/> ECG

Clinical Summary

Degree of overweight Overweight (25.0-29.9) Obese Class I (30.0-34.9)
 Obese Class II (35.0-39.9) Obese Class III (≥ 40.0)

Cardiovascular Risk factors DM/IFG Dyslipidemia HTN
 Premature Heart Disease Smoking
 Others _____

Other complications OA Sleep Apnea
 Hyperuricemia Gallstone/ Liver Disease
 Others _____

Weight Management Goals
 Weight Loss (10% body weight over 6 months) Weight Maintenance

Target body weight _____ Kg

Drug Therapy Anti-obesity _____
 Other drugs _____

Referral Physiotherapy
 Others _____

Risk factor management Yes, follow up in the general side
 No, Reasons: _____

Name of Doctor & Signature

Date:/...../.....

Assessment of patient's readiness and motivation

Whose idea was it to lose weight?

- Patients own Family or friends Health personal

Others.....

Indicate the patient's main reasons to lose weight now?

- Health benefits Cosmetic Social

Others.....

Did the patient try any weight loss regime before? (Yes / No)

If Yes, discuss the details (type, duration, results, complications, reasons for failure)

.....
.....

Are there any expected limitations/barriers for implementing life style changes? (Yes / No)

If yes, specify

.....
.....

Does the patient expect support from family/friends? (Yes / No)

Discuss

.....
.....

LIFESTYLE ASSESSMENT (most of the time)

Please tick (✓) if frequently:

- Have regular main meal (s)
 Snack constantly or at midnight
 Eat while watching the T.V
 Prefer fast foods or foods prepared outside the house
 Keep high energy food available at home
 Eat in response to stress
 Use car or machineries whenever possible
 Use escalators/lifts instead of stairs

Meals are prepared by:

- patient parents spouse cook restaurants others

Physical activity:

- none
 light (walking at usual pace, no increase in heart rate, e.g. shopping and light chores)
 moderate (brisk walking, gardening, dancing, tennis, golf, bicycling<10miles/hr, weight training, car washing)
 vigorous (running, jogging, bicycling>10miles/hr, swimming, aerobics, heavy yard work, weight lifting, basketball)

Duration of physical activity per day:

- <15 minutes 15-<30 min 30-<60 min 60-<90 min =>90 min

Frequency of physical activity per week: 1-2 3-4 5 or more

AGREED LIFESTYLE CHANGES

Dietary _____

Physical activity _____

Behavioral therapy _____

- Materials given Educational material (Obesity booklets/food composition tables/Diabetic leaflet/Gout Leaflet/Cholesterol Leaflet)
 Self-care booklets

Notes:

.....
.....
.....

Name of Nutritionist & Signature

.....
.....

Follow – up Sheet

Initial weight: _____

Visit No Date	Weight	BMI	Waist Circumference	Percent body Fat	Blood Pressure & Lab investigations	Diet	Physical Activity	Behaviour therapy	Progress & % Improvement	Comments Or Side effects	Date & Signature
2 nd visit Nurse											
3 rd visit Nutritionist											
4 th Visit Nurse											
5 th Visit Nutritionist											
6 th visit Doctor											
7 th visit Nurse											
8 th visit Nurse											
9 th visit Doctor											
10 th visit Nurse											
11 th visit Nurse											

Appendix 2

Education Materials



Appendix 3

Criteria and Cut-offs

BMI

Internationally accepted ranges of BMI used to define degrees of overweight

WHO classification	BMI (kg/m ²)	Risk of co-morbidities
▪ Underweight	< 18.5	Low (but risk of other clinical problems increased)
▪ Normal range	18.5-24.9	Average
▪ Overweight	25.0-29.9	Mildly increased
▪ Obese	≥ 30.0	
Class I	30.0-34.9	Moderate
Class II	35.0-39.9	Severe
Class III	≥ 40.0	Very severe

Ref: World Health Organization (WHO). (2000) Obesity: Preventing and Management the Global Epidemic, Report of a WHO Consultation, Geneva.

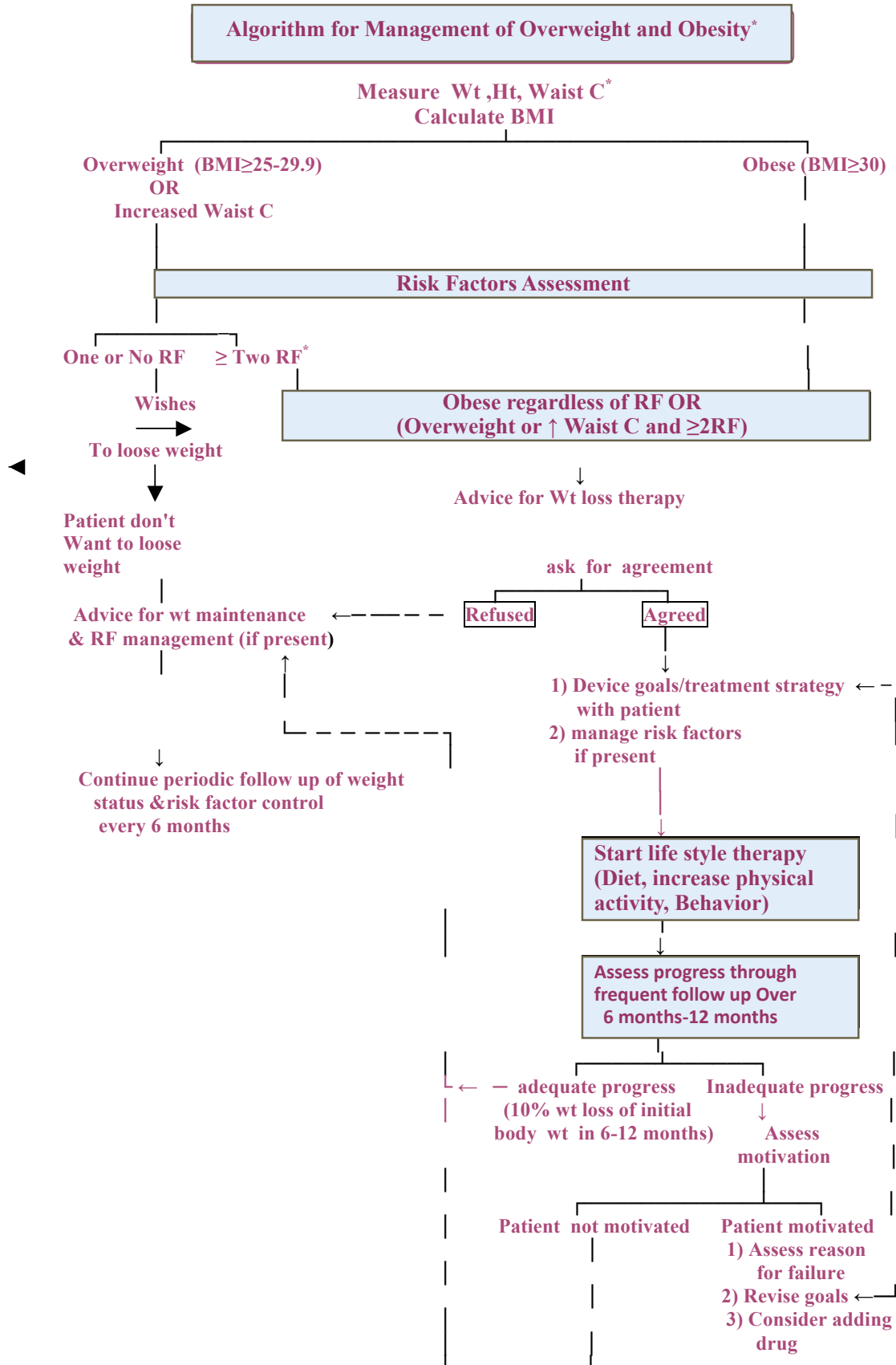
Waist Circumference

Sex specific waist circumference and risk of metabolic complications.

Risk of metabolic complications	Male	Female
Increased risk	≥ (94cm) ≥37 inches	≥ (80cm) ≥32 inches
significantly increased risk	≥ (102cm) ≥40 inches	≥ (88cm) ≥35 inches

Adapted from WHO consultation report Series 894. Obesity: Preventing and Managing the Global Epidemic. Geneva -2000.

Appendix 4



Note:* details refer to the document

*Waist C: Waist Circumference. Increased if \geq 35 inches (88cm) for female or \geq 40 inches (102cm) for male.

* RF: Risk Factor

Adapted from National Institutes of Health, National Heart, Lung, and Blood Institute. Clinical guidelines on the identification, evaluation, and treatment of overweight and obesity in adults—the evidence report. *Obes Res* 1998;6:464]

Key Words

BMI	Body Mass Index
NBB	National Bahrain Bank
CVD	Cardiac Vascular Disease
DM	Diabetic
Wt	Weight
Ht	Height
Kg	Kilogram
M	Meter
Cm	Centimetre
HC	Health Centre
LDL	Low Cholesterol
HDL	High Cholesterol
WHO	World Health Organization
TG	Triglyceride
Bp	Blood Pressure
Hb	Haemoglobin
TSH	Thyroid Stimulating Hormone
FBS	Fasting Blood Sugar
TC	Total Cholesterol

