

Your topic: Assignment One: Nutritional management for people with type 2 diabetes along with comorbidities (Cardiovascular diseases, Obesity and Nephropathy)

Your desired style of citation: Harvard Referencing

Your educational level: Guaranteed 2:2 Standard

Referencing Style: Harvard Referencing

Number of page: 20

Words: 5000

Nutritional management for people with type 2 diabetes along with comorbidities
(Cardiovascular diseases, Obesity and Nephropathy)

[Writer's Name]

[Institute's Name]

Table of Contents

Aim	4
Objectives	4
Literature Review.....	4
The search process	5
The search question.....	5
Overview of Diabetes Mellitus (DM)	6
Risk Factors	8
DM and the case of Jordan.....	9
Classification of Diabetes	13
Type 1 DM.....	13
Type 2 DM.....	16
Gestational diabetes mellitus (GDM)	19
Co-morbidities	20
Cardiovascular diseases (CVD)	21
Obesity	21
Nephropathy.....	22
Nutritional management to control type 2 diabetes along with comorbidities	22
Recommendations.....	25
References.....	29
Appendix.....	34

Nutritional management for people with type 2 diabetes along with comorbidities
(Cardiovascular diseases, Obesity and Nephropathy)

Aim

This literature review aims to give an overview of the nutritional management for people with type 2 diabetes (T2DM) along with comorbidities, mainly cardiovascular diseases, obesity or nephropathy.

Objectives

In achieving the overall aim, the following objectives have been identified:

- ◆ To provide the definition of diabetes.
- ◆ To categorise diabetes
- ◆ To explain comorbidities preceded by diabetes.
- ◆ To demonstrate the significance of nutritional therapy on management of people with T2DM.
- ◆ To discuss the current nutritional management of people with T2DM relating to specific comorbidities.

Literature Review

The purpose of the literature review is to provide detailed information about the topic. I will move in to getting details regarding each objective that is stated above in relation to the topic. As the topic of the literature review is nutritional management for people with type 2 diabetes along with comorbidities (cardiovascular diseases, obesity, and nephropathy), so the main

idea here to understand in what ways nutritional management for people with type 2 diabetes is affecting the cardiovascular diseases, obesity, and nephropathy aspect.

The search process

In this section, I will describe the detailed process of how I went about accessing diverse articles for literature review. The diverse search engines that I used for the report were Google Scholar, Summon Search, OAJSE, and ScienceDirect. There were diverse reasons for choosing the mentioned search engines. To begin with, I chose Google Scholar because being the biggest search engine with journals and articles available on every field, I was confident that I would get some material on my topic as well. There was no doubt that I got good amount of results on my topic. The purpose of choosing Summon Search was because it mainly offered results from the UK and European region which is an equally significant aspect because it provided me with knowledge about those areas as well. Open Access Journals Search Engine (OAJSE) was used because this particular search engine stated that it provided article from all over the world, India being the exception. Lastly, ScienceDirect was the search engine that I used. The main purpose of choosing this search engine was because it provided me with only medical related article which was easier to sort out. The key words that I used were Nutritional management, people with type 2 diabetes, comorbidities (Cardiovascular diseases, Obesity and Nephropathy). I made sure to avoid as much Boolean Operators as possible, as most of the time it was irrelevant to add them (See Appendix 1).

In total, after going through the articles on rough bases from each search engine, a total of 15 articles were chosen of which 10 were qualitative studies and 5 were systematic reviews.

The search question

In this section, the main idea is to understand what the question that is being searched and why I became interested in it. The main question that is the focus of the report is

understanding the nutritional management for people with type 2 diabetes along with comorbidities (cardiovascular diseases, obesity, and nephropathy). The reason I became interested in this topic is because I wanted to explore what type 2 diabetes is all about. I have heard a lot about type 2 diabetes, but how it actually affects the comorbidities which are cardiovascular diseases, obesity, and nephropathy is an area that I want to explore and understand. In order to understand the search question in a better way, I have utilised the PICO principle. PICO principle is basically a way to understand a question in such a way that it is easy to answer. In PICO principle, P stands for population or participants; I stands for intervention or indicator; C stands for comparator or control; and O stands for outcome of the intervention. In this way:

P	Type 2 Diabetes
I	Comorbidities (cardiovascular disease, obesity, and nephropathy)
C	N/A
O	Nutritional Management

Table 1 - PICO Principle

Overview of Diabetes Mellitus (DM)

This section will provide a general overview of diabetes together with its related categories and management. Diabetes is a gathering of metabolic illnesses portrayed by hyperglycaemia coming about because of deformities in insulin emission, insulin activity, or both (Currie, et.al, 2012). The endless hyperglycaemia of diabetes is connected with long haul harm,

brokenness, and disappointment of distinctive organs, particularly the eyes, kidneys, nerves, heart, and veins.

A few pathogenic procedures are included in the advancement of diabetes. These extent from immune system devastation of the b-cells of the pancreas with subsequent insulin lack to anomalies that outcome in imperviousness to insulin activity. The premise of the variations from the norm in starch, fat, and protein digestion system in diabetes is inadequate activity of insulin on target tissues (Pergola, et.al, 2011). Insufficient insulin activity results from deficient insulin emission and/or decreased tissue reactions to insulin at one or more focuses in the complex pathways of hormone activity. Hindrance of insulin discharge and deserts in insulin activity every now and again coincide in the same patient, and it is frequently misty which variation from the norm, if either alone, is the essential driver of the hyperglycaemia.

Side effects of stamped hyperglycaemia incorporate polyuria, polydipsia, weight reduction, once in a while with polyphagia, and obscured vision. Disability of development and vulnerability to specific diseases might likewise go with ceaseless hyperglycaemia. Intense, life-undermining outcomes of uncontrolled diabetes are hyperglycaemia with ketoacidosis or the nonketotic hyperosmolar disorder (TODAY Study Group, 2012). Long haul complexities of diabetes incorporate retinopathy with potential loss of vision; nephropathy prompting renal disappointment; fringe neuropathy with danger of foot ulcers, removals, and Charcot joints; and autonomic neuropathy creating gastrointestinal, genitourinary, and cardiovascular side effects and sexual brokenness. Patients with diabetes have an expanded rate of atherosclerotic cardiovascular, fringe blood vessel, and cerebrovascular sickness. Hypertension and variations from the norm of lipoprotein digestion system are regularly found in individuals with diabetes (Cohen, et.al, 2012).

Risk Factors

In contrast with the common belief that DM is a disease of high income countries, globalisation has made major changes in the life style and behaviours of people in low income countries which leads to worrying rise in diabetes mellitus. Lifestyle and behaviour decisions are vital components in affecting weight status. Undesirable eating regimens and physical idleness are significant danger variables for overweight and stoutness and in addition various perpetual wellbeing conditions including cardiovascular ailment, diabetes, a few tumours and hypertension (Look AHEAD Research Group, 2013). Physical action incorporates all types of action, for example, strolling or cycling for ordinary voyages, dynamic play, business related action, dynamic diversion, (for example, working out in a rec centre), moving, swimming, planting or playing recreations and in addition aggressive and non-focused game.

Physical movement is a key determinant of vitality consumption and a crucial piece of vitality adjust and weight control. Consistent physical action can decrease the danger of stoutness, and also numerous ceaseless conditions including coronary illness, stroke, sort 2 diabetes, disease, emotional wellness issues and musculoskeletal conditions. Inactive conduct is likewise connected to overweight and weight and liable to be freely connected with all-reason mortality, type 2 diabetes, a few sorts of malignancy and metabolic brokenness (Hordern, et.al, 2012). Stationary practices in grown-ups are affected by age, sex, financial conditions, occupation, weight status and a few qualities of the physical environment. These connections are autonomous of the level of general physical action. For instance, investing a lot of energy being stationary may expand the danger of some wellbeing results, even among individuals who are dynamic at the prescribed levels. The aggregate expense of dormancy in England, including both direct expenses of treatment for the significant way of life related maladies, and the aberrant expenses brought about through infection nonattendance has been

evaluated at £8.2 billion a year. This does exclude the commitment of inertia to stoutness which in itself has been evaluated to cost £2.5 billion every year: £0.5 billion in NHS expenses and a further £2 billion over the economy all in all. (It is evaluated that corpulence represents 18 million days of affliction for each year) (Scirica, et.al, 2013).

DM and the case of Jordan



Figure 1 - Map of Jordan

Jordan is basically an Arab kingdom in the Western Asia, on the East Bank of the Jordan River. The country is bordered by Saudi Arabia to the south and east, Iraq to the north-east, Syria to the north, and Israel and Palestine to the west. The population of Jordan is 8 million which were last estimated in 2015. The main income for economic growth in the country has been through trade and finance combined which is nearly 1/3 of GDP. This is followed by transportation and communication, public utilities, and construction which sums up 1/5; with mining and manufacturing comprising the same amount as well. The categories of people are a mixture with some being rich and some being poor. There is also a group which is known as middle-class. The country has all kinds of ethnic and religious group living there; with

Muslims being 94%, and Christian being 6%. The main occupation in Jordan is mainly agriculture. Food and food consumption in Jordan deals with the measure of sustenance accessible for human utilisation as evaluated by the FAO Food Balance Sheets. However the genuine sustenance utilisation may be lower than the amount appeared as nourishment accessibility relying upon the extent of wastage and misfortunes of sustenance in the family unit, e.g. amid capacity, in planning and cooking, as plate-waste or amounts sustained to household creatures and pets, discarded or given. ii) Food utilisation per individual is the measure of nourishment, regarding amount, for every person in the aggregate populace. Figures are appeared for nutrition classes. iii) This incorporates the amount of everything and its determined items, accessible for human utilisation, amid the reference period. Nourishment from milk identifies with the amount of milk, and to the new drain likeness dairy items, aside from butter.

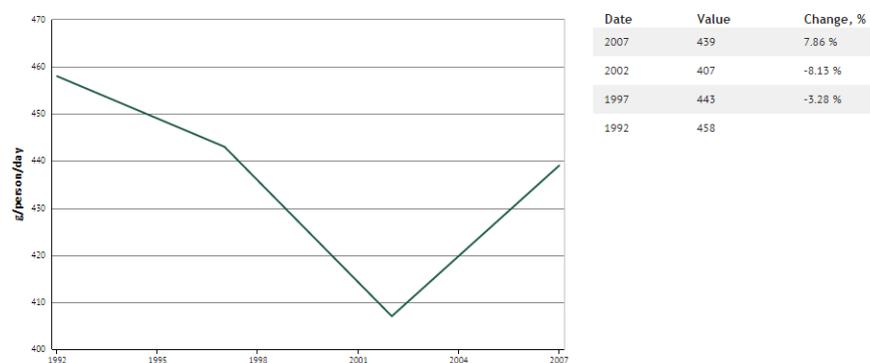


Figure 2 - Jordan – Food Consumption – Cereals – Excluding Beer

Source - Irshaid, 2014

There are several fast food chains available in Jordan, both local and international. However Jordan has made certain that each fast food chain, whether local or international, adheres to the safe food rules which is keeping the area cleaned at all costs.

Despite the fact that the sickness profile in Jordan is changing, irresistible infections are still real reasons for dreariness. Diarrheal illnesses, intense respiratory contaminations and hepatitis are the main sources of bleakness reported from wellbeing offices in Jordan, particularly among kids. There has been an emotional drop in the occurrence of immunisation preventable sicknesses. No instances of polio were accounted for in the nation since the flare-up of 1991 (Jarab et.al, 2012). There is an expanding pattern in the number and seriousness of non-transmittable sicknesses, especially cardiovascular illnesses, malignancy, diabetes and incessant respiratory conditions. Hypertension, coronary illness and stroke are pervasive. In 2010, 26% of the populace smoked cigarettes consistently (47% guys and 6% females) and in 2008, pervasiveness of raised circulatory strain was 28.8%, raised blood glucose was 14.4%, overweight was 64.1, weight was 30.0% and raised cholesterol was 46.4%, adding to the aggregate non-transferable ailments mortality load which at 74% is moderately high because of urbanisation, its instigated way of life and dietary propensity (Alkhateeb, et.al, 2013). In order to seek help, people usually go to hospitals, both private and public; whichever suits their needs in a better way. The private hospital administration is viewed as being of better quality than that gave by public hospitals; fulfilment of the patients is by all accounts the most vital component for both private and public medicinal services suppliers. Since the quality of care is superior in private hospital service, there is no doubt in the fact that private care is not easily affordable by all. One of the major problems affecting the health of the Jordanian people is diabetes mellitus.

The development in diabetes' rates, regularly considered as a "rich nation disease," has been especially disturbing. From 2002 to 2004, the reported rate of analysed diabetes moved from 6.3% to 7.4%. Current aggregate assessments range from 16% to 30% contingent upon the age run and characterised glucose levels (Irshaid, 2014). The commonness of diabetes in Jordan constitutes the most astounding in the district, as well as one of the most elevated on

the planet. A Finnish study evaluated that Type 2 diabetes, most normally known as grown-up onset, can be averted in 58% of cases; a startling measurement demonstrating the requirement for activity.

Diabetes perpetrates substantial financial expenses for nations with high rates of the ailment (Jarab et.al, 2012). Like in numerous nations, a high rate, around 40%, of individuals with diabetes in Jordan have not been analysed. Late revelation likewise adds to the noteworthy weight, as a rule requiring more costly and included medicines. The yearly direct expenses of diabetes treatment, including medicine, approach JD654 million, and are coordinated by the roundabout, predominantly social, costs (Alkhateeb, et.al, 2013). Diabetes additionally delivers mental expenses for patients. As per one investigation of female Palestinian displaced people in Jordan:

Living with an incessant ailment and endless displaced person status under consistently disintegrating wellbeing and living conditions made the ladies continually mindful that they confronted constant vulnerability and unconventionality about their future (Irshaid, 2014). A percentage of the rising topics from the information included sadness, inward enduring, instability, and absence of control over diabetes.

An example of a low economical developing country is Jordan, and with 37,8300 cases (it should be noted that this figure is only representing the middle class and lower class of people residing in the country) of diabetes in 2014 presented by the International Diabetes Foundation (2015), the prevalence in Jordan is considered to be one of the highest in region (Jordan – International Diabetes Foundation, 2015). Funnell, et.al., (2009) projected that the prevalence of diabetes is expected to affect 30% of the Jordanian population by 2050. People with diabetes create large cost on the economy of countries, so low income countries will be much more affected and burdened by this condition than its high income counterparts.

Classification of Diabetes

In 1980, diabetes was first classified by the World Health Organisation (WHO) to two main types which are Insulin dependent Diabetes mellitus (IDDM) and Non-Insulin dependent Diabetes Mellitus (NIDDM). However this classification terminology was modified in the late 90s into type 1 diabetes mellitus (T1DM), type 2 diabetes mellitus (T2DM) and gestational diabetes mellitus (GDM) (Wermeling, et.al, 2012). There are also several subcategories of this condition which will not be included within this assignment. An overview of each category will be provided.

Type 1 DM

Type 1 diabetes, once known as adolescent diabetes or insulin-subordinate diabetes, is an unending condition in which the pancreas delivers next to zero insulin, a hormone expected to permit sugar (glucose) to enter cells to create vitality. With type 1 diabetes, the body's invulnerable framework assaults some portion of its own pancreas. Researchers are not certain why. Be that as it may, the invulnerable framework erroneously sees the insulin-creating cells in the pancreas as outside, and demolishes them. This assault is known as "immune system" illness (Copeland, et.al, 2013). These phones – called "islets" (affirmed EYE-lets) – are the ones that sense glucose in the blood and, accordingly, deliver the fundamental measure of insulin to standardise blood sugars. Insulin serves as a "key" to open one's cells, to permit the glucose to enter - and permit one to utilise the glucose for vitality. Without insulin, there is no "key" (Springer, et.al, 2013). Along these lines, the sugar stays - and develops - in the blood. The outcome: the body's cells keep from the need from glucose. What's more, if left untreated, the abnormal state of "glucose" can harm eyes, kidneys, nerves, and the heart, and can likewise prompt extreme lethargies and passing.

In the UK, more than 1 in 20 individuals are thought to have either analysed or undiscovered diabetes. Around 90% of those influenced have type 2 diabetes, with other 10% having type 1

diabetes (NHS Choices, 2015). This type of diabetes is characterised by insulin hormone deficiency caused by the destruction of the pancreatic β -cell (beta-cell) which requires the person to rely on a lifelong daily injection of subcutaneous insulin. And since insulin injections can't regulate blood glucose constantly like the normal pancreas would do, it is harder to keep glycaemic balance. In such instances blood glucose imbalances occurs in the form of hyperglycaemia (high blood sugar) or hypoglycaemia (low blood sugar), and sometimes more life threatening conditions like diabetes keto-acidosis (DKA) and comas (Lawson and Muirhead, 2001). These events require emergency management of the individual concerned.

Prevention

Presently there is no real way to avert type 1 diabetes, yet progressing studies are investigating approaches to avoid diabetes in the individuals who are well on the way to get it. Individuals who have type 1 diabetes can anticipate or postpone the improvement of complexities by keeping their glucose in an objective reach (Kahn, Cooper, & Del Prato, 2014). They likewise require customary therapeutic check-ups to distinguish early indications of confusions. On the off chance that confusions are dealt with ahead of schedule, the harm may be ceased, impeded, or perhaps turned around.

Diagnosis

In order to diagnose diabetes, there are three types of tests which are taken. These tests are Glycated haemoglobin (A1C) test, random blood sugar test, and fasting blood sugar test.

Glycated haemoglobin (A1C) test

This blood test demonstrates the normal glucose level for as long as a few months. It works by measuring the rate of glucose connected to haemoglobin, the oxygen-conveying protein in red platelets (Currie, et.al, 2012). The higher the glucose levels, the more haemoglobin one

will have with sugar appended. An A1C level of 6.5 per cent or higher on two separate tests shows the individual has diabetes.

Random blood sugar test

A blood test will be taken at an arbitrary time. Glucose qualities are communicated in milligrams per decilitre (mg/dL) or millimoles per litre (mmol/L). Notwithstanding when the individual last ate, an arbitrary glucose level of 200 mg/dL (11.1 mmol/L) or higher recommends diabetes, particularly when combined with any of the signs and indications of diabetes, for example, successive pee and compelling thirst (Pergola, et.al, 2011).

Fasting blood sugar test

A blood test will be taken after an overnight quick. A fasting glucose level under 100 mg/dL (5.6 mmol/L) is typical. A fasting glucose level from 100 to 125 mg/dL (5.6 to 6.9 mmol/L) is considered prediabetes. On the off chance that it's 126 mg/dL (7 mmol/L) or higher on two separate tests, the individual has diabetes (TODAY Study Group, 2012).

Treatment

The incidence and prevalence of diabetes has been described as an epidemic with no sign of abatement (Atkinson, Eisenbarth, & Michels, 2014). According to the Insulin-Free World Foundation States (Am J Health Syst Pharm, 2000), there is currently approximately 135 million people affected by diabetes, while Wild at el. (2004) estimates that globally the number of people with diabetes will reach 360 million by 2030. However the recent estimate by the IDF (2013) suggests that if the rise of diabetes continues at its current pace then by 2035 this figure will peak to 592 million.

Type 2 DM

Diabetes mellitus type 2 (in the past noninsulin-subordinate diabetes mellitus (NIDDM) or grown-up onset diabetes) is a metabolic issue that is portrayed by hyperglycaemia (high glucose) in the setting of insulin resistance and relative absence of insulin. With type 2 diabetes, the body either opposes the impacts of insulin — a hormone that directs the development of sugar into the cells — or doesn't sufficiently deliver insulin to keep up a typical glucose level (Cohen, et.al, 2012). More regular in grown-ups, type 2 diabetes progressively influences kids as adolescence stoutness increments.

As indicated by the IDF, more than 371 million individuals over the globe have diabetes and this figure is anticipated to ascend to more than 550 million by 2030. Of the aggregate worldwide diabetes rate, 90% are living with type 2 diabetes yet it is assessed that up to half of these individuals are uninformed of their condition (undiscovered diabetes). In the UK, more than 2.7 million individuals are determined to have type 2 diabetes whilst a further 750,000 individuals are accepted to have the manifestations yet will be yet to be determined to have the illness (Inzucchi, et.al, 2012). This condition accounts for approximately 90% of the cases. Mainly, it results from the resistance of cells to insulin which sometimes develops to insulin deficiency because the pancreas cannot over compensate adequate amounts. This type mostly occurs among people who are over the age of 40 with central obesity, often with a family history of diabetes and frequently among those of Afro-Caribbean or South Asian background (Diabetes UK, 2012). Although, historically T2DM mainly affected adults; however, recently children as young as 8 have been diagnosed with this type of diabetes.

Prevention

Type 2 diabetes can be prevented by simple changes in lifestyle. To begin with, one can change his diet, increase exercise in his daily routine, and make certain that the weight is under control. It is important to understand that the mentioned 3 areas work simultaneously

and requires utmost care from the individual, himself (Look AHEAD Research Group, 2013). Several studies have shown that individuals who have maintained their weight, had proper diet and did exercise regularly, has decreased their type 2 diabetes risk significantly.

Diagnosis

There are 4 ways to diagnose diabetes. The 4 tests are the fasting plasma glucose test, oral glucose tolerance test, random plasma glucose test, and the A1C test.

The Fasting Plasma Glucose Test

This test is led on blood drawn after the individual has not eaten for around eight hours. The blood is regularly attracted the morning before breakfast (Hordern, et.al, 2012). This test can analyse diabetes and prediabetes — a circumstance in which the glucose levels are high, yet they're not exactly at indicative level. How high the glucose levels are demonstrates whether the individual has diabetes:

- ◆ Normal glucose is up to 99 milligrams for each decilitre (mg/dL).
- ◆ Prediabetes (debilitated fasting glucose) is analysed if glucose is from 100 to 125 mg/dL.
- ◆ Diabetes is analysed if glucose is 126 mg/dL or higher.

Oral Glucose Tolerance Test (OGTT)

The OGTT test is likewise performed after the individual has not eaten for around eight hours. The specialist will take an example of the blood and after that give the individual an arranged sugary beverage containing 75 mg of glucose (Scirica, et.al, 2013). After the individual consumes it, the blood will be taken again in two hours, to quantify how the insulin reacted to that drink. This test likewise can analyse diabetes and prediabetes. Conceivable results are:

- ◆ Normal glucose at two hours subsequent to testing is 139 mg/dL or beneath.
- ◆ Prediabetes (debilitated glucose resilience) is 140 to 199 mg/dL.
- ◆ Diabetes is 200 or above (yet your specialist will need you to retake the test on one more day to affirm this result).

Random Plasma Glucose Test

This test may be done whenever to gauge glucose levels. It is not sufficiently exact to analyse prediabetes, but rather it can prompt a diabetes determination if the glucose is no less than 200 mg/dL and there are different manifestations, for example (Wermeling, et.al, 2012):

- ◆ The individual is urinating more.
- ◆ The individual is drinking more than he normally does.
- ◆ The individual has lost weight when he didn't mean to.

The A1C Test

Another kind of glucose test that is utilised to analyse type 2 diabetes is the haemoglobin A1C test. This test assesses how well the glucose levels have been controlled over a timeframe. The A1C is a decent pointer of the normal glucose in the course of recent months. Individuals with diabetes ought to get their A1C test results in any event twice every year in light of the fact that this is the best measure of glucose control (Copeland, et.al, 2013). Individuals whose outcomes show prediabetes have a 40 per cent danger of creating diabetes inside of five years in the event that they don't roll out improvements to their way of life and general wellbeing.

Treatment

In order to treat type 2 diabetes, the individual can begin by having good and healthy food. Even though, there is no proper diet to follow, it is important that high-fibre; low-fat foods

(fruits, vegetable, whole grains) is maintained. Moving on, physical activity is another aspect that has to be maintained by a diabetic patient (Springer, et.al, 2013). Regular aerobic exercise for 30 minutes, along with stretching and strength training will keep the individual fit and healthy. It is important that the individual monitor blood sugar equally so that he has an idea of how his diabetes aspect is going. Keeping a record of blood sugar level is equally important.

Gestational diabetes mellitus (GDM)

GDM is characterised as any level of glucose narrow mindedness with onset or first acknowledgment amid pregnancy. The definition applies whether insulin or just eating routine alteration is utilised for treatment and regardless of whether the condition continues after pregnancy (Kahn, Cooper, & Del Prato, 2014). Around 7% of all pregnancies are convoluted by GDM, bringing about more than 200,000 cases every year. The commonness may go from 1 to 14% of all pregnancies, contingent upon the populace examined and the analytic tests utilised.

Diagnosis

Hazard evaluation for GDM ought to be attempted at the first pre-birth visit. Ladies with clinical attributes steady with a high danger of GDM (stamped heftiness, individual history of GDM, glycosuria, or a solid family history of diabetes) ought to experience glucose testing (see underneath) when doable (Currie, et.al, 2012). On the off chance that they are found not to have GDM at that starting screening, they ought to be retested somewhere around 24 and 28 weeks of growth. Ladies of normal danger ought to have testing attempted at 24–28 weeks of development. Okay status requires no glucose testing, however this classification is restricted to those ladies meeting the greater part of the accompanying attributes:

- ◆ Age <25 years

- ◇ Weight ordinary before pregnancy
- ◇ Member of an ethnic gathering with a low commonness of GDM
- ◇ No known diabetes in first-degree relatives
- ◇ No history of strange glucose resilience
- ◇ No history of poor obstetric outcome

A fasting plasma glucose level >126 mg/dl (7.0 mmol/l) or an easy-going plasma glucose >200 mg/dl (11.1 mmol/l) meets the limit for the conclusion of diabetes, if affirmed on a resulting day, and blocks the requirement for any glucose challenge.

Co-morbidities

Co-morbidities are diseases or conditions that coexist with primary diseases, but also stand on its own, (Leonetti, et.al, 2012) uncontrolled hyperglycaemias can cause damage in body tissues overtime in addition to dysfunction and failure of organs specially nerves and vessels. When people are diagnosed with diabetes his/her risks of developing further micro and macro complications immediately increases (Meetoo and Allen, 2010 cited in Li, Drury, & Taylor, 2013).

The micro and macro vascular complications are well recognised in people with longstanding diabetes (Pergola, et.al, 2011). Macro vascular complications include coronary artery disease, myocardial infarction, stroke, congestive heart failure, and peripheral vascular disease. Micro vascular complications include retinopathy, nephropathy, and neuropathy) which are conventionally linked to hyperglycaemia.

According to the Medical Expenditure Panel Survey, most adults with diabetes have at least one comorbid chronic disease and as many as 40% have at least three (Piette and Kerr, 2006). Major studies have demonstrated an association between poor glycaemic control and the development of micro- and macro vascular complications in T2DM. For example, a study by

Stratton, et.al., (2000) has shown a clear association between the reduction of the HbA1c and reducing the risk of comorbidities and complications.

Cardiovascular diseases (CVD)

CVD is a noteworthy entanglement of diabetes and the main source of ahead of schedule demise among individuals with diabetes—around 65 for every penny of individuals with diabetes kick the bucket from coronary illness and stroke (TODAY Study Group, 2012). Grown-ups with diabetes are two to four times more inclined to have coronary illness or endure a stroke than individuals without diabetes. High blood glucose in grown-ups with diabetes builds the danger for heart assault, stroke, angina, and coronary vein sickness. Individuals with sort 2 diabetes likewise have high rates of hypertension, lipid issues, and heftiness, which add to their high rates of CVD. Smoking pairs the danger of CVD in individuals with diabetes.

Obesity

There is a nearby relationship in the middle of heftiness and type 2 diabetes. The probability and seriousness of sort 2 diabetes are firmly connected with body mass index (BMI). There is a seven times more serious danger of diabetes in fat individuals contrasted with those of solid weight, with a triple increment in danger for overweight people (Cohen, et.al, 2012). Whilst it is realised that muscle to fat ratio ratios dispersion is an essential determinant of expanded danger of diabetes, the exact instrument of affiliation stays misty. It is likewise indeterminate why not all individuals who are stout create type 2 diabetes and why not all individuals with type 2 diabetes are fat. Statistics reveal (Drong, Lindgren, & McCarthy, 2012):

- ◆ 62% of grown-ups were overweight or large in England in 2012
- ◆ 6% of individuals matured 17 years or more seasoned had analysed diabetes in England in 2013

- ◆ Prevalence of both heftiness and diabetes is ascending in England
- ◆ 90% of grown-ups with sort 2 diabetes matured 16-54 years are overweight or large
- ◆ In England, 12.4% of individuals matured 18 years and over with stoutness have analysed diabetes, five times that of individuals with a sound weight
- ◆ Men with a raised waist outline are five times more inclined to have analysed diabetes than those without a raised waist periphery; ladies are more than three times more likely

Nephropathy

Diabetic nephropathy (or diabetic kidney ailment) is a dynamic kidney malady brought on by harm to the vessels in the kidneys' glomeruli. It is described by nephrotic disorder and diffuse scarring of the glomeruli. It is because of longstanding diabetes mellitus, and is a prime purpose behind dialysis in numerous created nations. It is named a little vein confusion of diabetes (Look AHEAD Research Group, 2013). The precise reason for diabetic nephropathy is obscure, yet different hypothesized components are hyperglycaemia (bringing on hyper filtration and renal harm), propelled glycation items, and actuation of cytokines. Numerous specialists now concur that diabetes is an immune system issue, with covering pathophysiology adding to both type 1 and type 2 diabetes; and late research highlights the essential part of intrinsic resistance (toll-like receptors) and administrative T-cells (Treg) (Hordern, et.al, 2012).

Nutritional management to control type 2 diabetes along with comorbidities

MNT is vital in anticipating diabetes, overseeing existing diabetes, and averting, or if nothing else abating, the rate of improvement of diabetes difficulties. MNT is likewise a necessary part of diabetes self-administration instruction (or preparing) (Scirica, et.al, 2013). Accomplishing nourishment related objectives requires a planned collaboration that

incorporates the individual with diabetes and includes him or her in the choice making procedure.

As reported in the American Diabetes Association Standards of Medical Care, "Individuals with pre-diabetes or diabetes ought to get individualised MNT as expected to accomplish treatment objectives, ideally gave by an enlisted dietician acquainted with the parts of MNT".

The viability of MNT is very much recorded. Randomised controlled nourishment treatment results studies have archived reductions of A1C of 1% in recently analysed sort 1 diabetes (Alkhateeb, et.al, 2013). 2% in recently analysed sort 2 diabetes and 1% in sort 2 diabetes with a normal length of time of four years. Also, the viability of MNT in the avoidance of sort 2 diabetes was shown in the Diabetes Prevention Program, in which there was a 58% relative danger lessening in the movement to diabetes with serious way of life change (unassuming weight reduction and expanded physical action).

On the other hand, it is much of the time recognised that patients discover after an eating routine the most difficult piece of the diabetes regimen. Additionally, doctors are regularly ineffectively prepared in nourishment and don't have room schedule-wise to furnish patients with an individualised feast arrangement (Atkinson, Eisenbarth, & Michels, 2014). In a diabetes instruction needs evaluation review, 107 essential consideration doctors and 521 clinical office staff reported that, of six diabetes subjects, nourishment and activity are taught slightest well to patients. What's more, just 28% reported often alluding patients to a diabetes instructor. In another study assessing doctor's trust in their insight and viability in regards to guiding in danger diminishment practices, 36% of 255 doctors reacting fell learned about weight administration procedures contrasted with 3% who were sure they succeeded in their practice (Cohen, et.al, 2012). So also, 36% felt sure about sustenance learning, while just 8% felt they succeeded in their practice.

Along these lines, not just does a crevice exist between supplier information and saw adequacy of sustenance related practices, the constantly expanding monetary and time imperatives in an occupied doctor practice limit what is sensible to finish in a brief office visit, Despite great aims, patients may be given a preprinted eating routine remove sheet and told "watch what you eat," or "lose some weight." This guidance definitely brings about poor consistence and "eating regimen disappointment." in the meantime; the patient may go to the doctor with a rundown of inquiries in regards to the most recent eating routine craze or daily paper article on some new association in the middle of eating regimen and wellbeing, searching for answers (Copeland, et.al, 2013,). In this manner, given the significance of MNT, the conveyance of confirmation based data can improve the adequacy of treatment and right nourishment deception.

The inability of the body to utilize glucose as a source Preferred energy, by lack of insulin leads to catabolism heavy organic hand, with the breakdown of proteins and fats to use as an energy source (Currie, et.al, 2012). This metabolic disorder progresses often with weight loss and compromised state nutrition, may result in severe hyperglycemia frame, ketosis and eat.

Since the resistance of peripheral tissues to insulin action causes state of hyper insulin, increased glucagon with stimulating proteolysis and lipolysis, and as a consequence also hyper- glucose. However, ketosis rarely encountered and the state nutrition is maintained or in the overweight range and obesity.

The lack of clinical patient with diabetes control leads to amended rations of metabolic homeostasis and may occur rising calorie and protein needs induced catabolism (Leonetti, et.al, 2012). In addition, changes in medication or appetite suppression can lead to decompensated disease 2. Hyperglycemia can lead to an impaired immune system and risk increased to infections with increased morbidity and mortality of these patients.

Studies involving patients with diabetes types 1 and 2 demonstrated between that a primary factor to avoid complications microvascular tions in these patients is to maintain The intensive glucose control (Li, Drury, & Taylor, 2013). There is also the relationship between hyperglycemia and increased risk for the development of cardiovascular disease. Thus, the blood glucose blood of patients with DM, both in level when outpatient in hospitals, should be kept under control.

Recommendations

Recommendations for patients dealing with type 2 diabetes along with specific comorbidities (Wermeling, et.al, 2012):

Obesity – patients should make certain that their weight is under control and that they are having food that is high nutritional value, such as fruits, vegetables and fibre.

CVD – for patients with CVD, intake of foods high in fruits, vegetables, whole grains, and nuts will reduce the risk significantly of a heart attack.

Nephropathy – there are no specific research that suggests that nutritional management affect diabetic nephropathy in anyway.

Nutritional status affects both the developed development as the disease progresses. Overweight and obesity are risk factors for the development of type 2 diabetes in patients overweight and insulin resistance, loss weight is recommended, because it leads to reduction insulin resistance.

A. Nutrition Guidelines

1. Stress consistent timing of meals, snacks, and portion control. Review the number of servings needed per meal and snacks.
2. Eat a variety of foods every day including fruits and vegetables.

3. Achieve or maintain a desirable weight.
4. Reduce total calories if overweight or obese to lose weight.
5. Read nutrition facts labels.
6. Eat foods high in fiber (whole grain products, vegetables, raw fruit, beans, and legumes).
7. Eat the least amount of saturated fats and trans fats.

B. Carbohydrate (CHO) Intake Low carbohydrate diets, restricting total CHO to less than 130 grams per day, are not recommended.

1. Total grams of carbohydrate should be individualized based on glucose control, medication and physical activity.
2. Consume more complex (unrefined) carbohydrates with fiber.
3. Eat 2 servings of fruits each day, preferably with lunch and dinner. One serving equals: $\frac{1}{2}$ c. canned fruit or juice, or 1 c. fresh fruit. Avoid juices (except when hypoglycemic) which may cause the blood glucose to rise very rapidly. Focus on fresh fruits that have more fiber, but no more than 2–3 servings per day.
4. Eat 4–6 servings of non-starchy vegetables each day. One serving equals: $\frac{1}{2}$ c. cooked vegetable, $\frac{1}{2}$ c. vegetable juice, or 1 c. raw vegetable.
5. Other CHO choices include: 1 tortilla, 1 slice of bread, $\frac{1}{3}$ c. cooked pasta, rice, garbanzo beans, $\frac{1}{2}$ c corn, peas, potatoes, beans, or 6 saltine crackers. Limit CHO choices to 2–3 per meal.
6. Sucrose containing foods can be substituted for other CHO choices in the meal plan, if added to the meal plan.

C. Fiber Intake

1. Eat 14 grams per 1,000 calories. Example: 22 grams for 1,500 calories, 28 grams for 2,000 calories a day.
2. Major sources: raw fruits, unpeeled vegetables, beans, legumes, whole grain breads, pastas, and fiber-rich cereals (≥ 5 grams per serving).

D. Protein Intake

1. 15-20% of total calories per day; approximately 4-6 ounces per day (3 oz. = the size of a deck of cards).
2. Restrict to 0.8–1.0 gram protein/kg of body weight for adults with onset of early nephropathy. Restrict to 0.8gram protein/kg of body weight for adults with onset of later stages of nephropathy
3. One serving is: 1 oz. lean beef, chicken, turkey, pork, lamb or fish, 1 c. skim milk, yogurt, 1 oz. cheese, 1 egg, 1 T. peanut butter
4. Adjustments should be made for conditions such as renal failure, hypertension, or hyperlipidemia.

E. Fat Intake

1. Limit dietary cholesterol to less than 200 mg per day
2. Limit saturated fat to less than 7% of total calories per day Sources: Animal fats (found in fatty meats, poultry skin, hydrogenated shortenings and fats, some vegetable oils (coconut, palm, palm kernel, cocoa butter), whole milk, whole milk products, butter, and most commercially baked products.
3. Minimum intake of trans fatty acids (found in most commercially baked products)
4. Use more mono-unsaturated fats, i.e., olive oil and poly-unsaturated fats, i.e., canola or corn oils.

5. Two or more servings of fish per week (with the exception of commercially fried filets)

References

- Alkhateeb, A., Al-Azzam, S., Zyadine, R., & Abuarqoub, D., 2013, Genetic association of adiponectin with type 2 diabetes in Jordanian Arab population, *Gene*, 512(1), pp.61-63
- Am J Health Syst Pharm, 2000, Insulin-free World Foundation, *PubMed*, 57(16):1542
- Atkinson, M.A., Eisenbarth, G.S., & Michels, A.W., 2014, Type 1 diabetes, *The Lancet*, 383(9911), pp.69-82
- Cohen, R.V., Pinheiro, J.C., Schiavon, C.A., Salles, J.E., Wajchenberg, B.L., & Cummings, D.E., 2012, Effects of gastric bypass surgery in patients with type 2 diabetes and only mild obesity, *Diabetes Care*, 35(7), pp.1420-1428
- Copeland, K.C., Silverstein, J., Moore, K.R., Prazar, G.E., Raymer, T., Shiffman, R.N., Springer, S.C., Thaker, V.V., Anderson, M., Spann, S.J., & Flinn, S.K., 2013, Management of newly diagnosed type 2 diabetes mellitus (T2DM) in children and adolescents, *Pediatrics*, 131(2), pp.364-382
- Currie, C.J., Poole, C.D., Jenkins-Jones, S., Gale, E.A., Johnson, J.A., & Morgan, C.L., 2012, Mortality after incident cancer in people with and without type 2 diabetes impact of metformin on survival, *Diabetes care*, 35(2), pp.299-304
- Diabetes in the UK, 2011-2012, Key statistics on diabetes, Last accessed on December 15, 2015 <<http://www.diabetes.org.uk/diabetes-in-the-uk-2012>>

- Drong, A.W., Lindgren, C.M., & McCarthy, M.I., 2012, The genetic and epigenetic basis of type 2 diabetes and obesity, *Clinical Pharmacology & Therapeutics*, 92(6), pp.707-715
- Ford, E.S., Li, C., & Sattar, N., 2008, Metabolic Syndrome and Incident Diabetes Current state of the evidence, *Diabetes care*, 31(9), pp.1898-1904
- Funnell, M.M., Brown, T.L., Childs, B.P., Haas, L.B., Hoseney, G.M., Jensen, B., Maryniuk, M., Peyrot, M., Piette, J.D., Reader, D., & Siminerio, L.M., 2009, National standards for diabetes self-management education, *Diabetes care*, 32(Supplement 1), pp.S87-S94
- Hordern, M.D., Dunstan, D.W., Prins, J.B., Baker, M.K., Singh, M.A.F., & Coombes, J.S., 2012, Exercise prescription for patients with type 2 diabetes and pre-diabetes: a position statement from Exercise and Sport Science Australia, *Journal of Science and Medicine in Sport*, 15(1), pp.25-31
- Inzucchi, S.E., Bergenstal, R.M., Buse, J.B., Diamant, M., Ferrannini, E., Nauck, M., Peters, A.L., Tsapas, A., Wender, R., & Matthews, D.R., 2012, Management of hyperglycemia in type 2 diabetes: a patient-centered approach position statement of the American Diabetes Association (ADA) and the European Association for the Study of Diabetes (EASD), *Diabetes care*, 35(6), pp.1364-1379
- Irshaid, F., 2014, PREVALENCE OF INSULIN-TREATED TYPE 2 DIABETES MELLITUS IN NORTHERN JORDAN: LIFE STYLE, FAMILIAL INHERITANCE AND MATERNAL INFLUENCE, *European Scientific Journal*, 10(12)

Jarab, A.S., Alqudah, S.G., Mukattash, T.L., Shattat, G., & Al-Qirim, T., 2012, Randomized controlled trial of clinical pharmacy management of patients with type 2 diabetes in an outpatient diabetes clinic in Jordan, *J Manag Care Pharm*, 18(7), pp.516-26

Jordan – International Diabetes Foundation, 2015, Last accessed on December 15, 2015 <
www.idf.org/Membership/mena/jordan>

Kahn, S.E., Cooper, M.E., & Del Prato, S., 2014, Pathophysiology and treatment of type 2 diabetes: perspectives on the past, present, and future, *The Lancet*, 383(9922), pp.1068-1083

Kahn, S.E., Cooper, M.E., & Del Prato, S., 2014, Pathophysiology and treatment of type 2 diabetes: perspectives on the past, present, and future, *The Lancet*, 383(9922), pp.1068-1083

Lawson, M.L., & Muirhead, S.E., 2001, What is type 1 diabetes, *Evidence-based diabetes care*, pp.124-150

Leonetti, F., Capoccia, D., Coccia, F., Casella, G., Baglio, G., Paradiso, F., Abbatini, F., Iossa, A., Soricelli, E., & Basso, N., 2012, Obesity, type 2 diabetes mellitus, and other comorbidities: a prospective cohort study of laparoscopic sleeve gastrectomy vs medical treatment, *Archives of Surgery*, 147(8), pp.694-700

Li, J., Drury, V., & Taylor, B., 2013, 'Diabetes is nothing': The experience of older Singaporean women living and coping with type 2 diabetes, *Contemporary nurse*, 45(2), pp.188-196

Look AHEAD Research Group, 2013, Cardiovascular effects of intensive lifestyle intervention in type 2 diabetes, *The New England journal of medicine*, 369(2), p.145

NHS Choices, 2015, Type 1 diabetes, Last accessed on December 15, 2015 <

www.nhs.uk/conditions/diabetes-type1/Pages/Introduction.aspx>

Pergola, P.E., Raskin, P., Toto, R.D., Meyer, C.J., Huff, J.W., Grossman, E.B., Krauth, M., Ruiz, S., Audhya, P., Christ-Schmidt, H., & Wittes, J., 2011, Bardoxolone methyl and kidney function in CKD with type 2 diabetes, *New England Journal of Medicine*, 365(4), pp.327-336

Piette, J.D. and Kerr, E.A., 2006, The impact of comorbid chronic conditions on diabetes care, *Diabetes care*, 29(3), pp.725-731

Scirica, B.M., Bhatt, D.L., Braunwald, E., Steg, P.G., Davidson, J., Hirshberg, B., Ohman, P., Frederich, R., Wiviott, S.D., Hoffman, E.B., & Cavender, M.A., 2013, Saxagliptin and cardiovascular outcomes in patients with type 2 diabetes mellitus, *New England Journal of Medicine*, 369(14), pp.1317-1326

Springer, S.C., Silverstein, J., Copeland, K., Moore, K.R., Prazar, G.E., Raymer, T., Shiffman, R.N., Thaker, V.V., Anderson, M., Spann, S.J., & Flinn, S.K., 2013, Management of type 2 diabetes mellitus in children and adolescents, *Pediatrics*, 131(2), pp.e648-e664

Stratton, I.M., Adler, A.I., Neil, H.A.W., Matthews, D.R., Manley, S.E., Cull, C.A., Hadden, D., Turner, R.C., & Holman, R.R., 2000, Association of glycaemia with macrovascular and microvascular complications of type 2 diabetes (UKPDS 35): prospective observational study, *Bmj*, 321(7258), pp.405-412

TODAY Study Group, 2012, A clinical trial to maintain glycemic control in youth with type 2 diabetes, *The New England journal of medicine*, 366(24), p.2247

Wermeling, P.R., Gorter, K.J., van Stel, H.F., & Rutten, G.E., 2012, Both cardiovascular and non-cardiovascular comorbidity are related to health status in well-controlled type 2 diabetes patients: a cross-sectional analysis, *Cardiovasc Diabetol*, 11(1), p.121

Wild, S., Roglic, G., Green, A., Sicree, R., & King, H., 2004, Global prevalence of diabetes estimates for the year 2000 and projections for 2030, *Diabetes care*, 27(5), pp.1047-1053

Appendix

Database	Keywords	Hits	Exclusion/Inclusion Criteria	Final Hits after narrowing the articles
Google Search	Nutritional management+people with type 2 diabetes+comorbidities (Cardiovascular diseases, Obesity and Nephropathy)	13,100	The search was made to limit after 2010; only English language; No patents included	5,990
Summon Search	Nutritional management for people with type 2 diabetes along with comorbidities (Cardiovascular diseases, Obesity and Nephropathy)	2,183	Limited to article from scholarly publications, including peer-review; including journal article only; limited to diabetes, obesity, cardiovascular	5

			disease; limited from 2011 to 2015; and English language only.	
Open Access Journals Search Engine (OAJSE)	Nutritional management for people with type 2 diabetes along with comorbidities (Cardiovascular diseases, Obesity and Nephropathy)	24,600	No inclusion or exclusion criteria available here.	0
ScienceDirect	Nutritional management for people with type 2 diabetes along with comorbidities Cardiovascular diseases, Obesity and Nephropathy.	142	Limited to 2011-2016; including diabetes and obese; including journal only; and English only	14