

Diabetes mellitus is a complex metabolic disorder characterized by chronic hyperglycemia resulting from defects in insulin secretion, insulin action, or both.

Diagnostic criteria for Diabetes Mellitus (ADA, 2019)

- Random plasma glucose value of $\geq 200\text{mg/dl}$ ($\geq 11.1\text{mmol/l}$)
- Fasting plasma glucose (FPG) value of $\geq 126\text{mg/dl}$ ($\geq 7.0\text{mmol/l}$)
- 2-h Plasma glucose (2-h PG) $\geq 200\text{ mg/dL}$ (11.1 mmol/L) during Oral glucose tolerance test (OGTT)
- HbA1c $\geq 6.5\%$ (48 mmol/mol).

BIOCHEMICAL PARAMETERS	NORMAL	PREDIABETES	DIABETES
HbA1c	Less than 5.7%	5.7% to 6.4%	$\geq 6.5\%$
Fasting plasma glucose (FPG)	less than 100 mg/dl	100 mg/dl to 125 mg/dl	126 mg/dl or higher
Oral glucose tolerance test (OGTT)	Less than 140 mg/dl	140 mg/dl to 199 mg/dl	200 mg/dl or higher

Prediabetes is a serious health condition where blood sugar levels are higher than normal, but not high enough yet to be diagnosed as diabetes. Prediabetes puts you at increased risk of developing type 2 diabetes, heart disease, and stroke.

TYPES OF DIABETES

Diabetes Mellitus is a chronic disorder which is accompanied by hyperglycemia due to deficiency of insulin or the body's sensitivity to insulin (Reddy, 2018). There are different types of diabetes- gestational diabetes, type 1 and type 2 diabetes, LADA, MODY.

Type 1 diabetes is caused by an autoimmune reaction in which the body's immune system attacks the insulin-producing beta cells of the pancreas. As a result, the body produces very little or no insulin.

Type 2 diabetes is the most common type of diabetes. Initially, hyperglycemia (high blood glucose levels) is the result of the inability of the body's cells to respond fully to insulin, a situation termed 'insulin resistance'(Ndisang, et al. 2017.)

Gestational diabetes (GDM) is characterized by high blood glucose levels during pregnancy. It may occur at any time during pregnancy (although most likely after week 24) and usually disappears after the pregnancy (Falavigna et al 2012).

LADA (latent autoimmune diabetes in adults) is associated with a slow loss of β cell function. A rapid failure of oral antidiabetics can be expected with LADA. Upon suspicion of LADA: test for GAD-antibodies is recommended.

Maturity Onset Diabetes of the Young (MODY) is an inherited form of diabetes mellitus. It is caused by a change in one of eleven genes. Up to 5% of all diabetes cases may be due to MODY. Just like other people with diabetes, people with MODY have trouble regulating their blood sugar levels.

COMMON SYMPTOMS

- Blurry vision, Fatigue, Increased thirst, Frequent urination, Blurred vision, Slow-healing sores
- Frequent infections, Numbness or tingling in the hands or feet
- Increased hunger (especially after eating)

- Unexplained weight loss

Obesity:

World Health Organization (WHO) defines Overweight and obesity as “abnormal or excessive fat accumulation that presents a risk to health”

$$Body\ Mass\ Index\ (BMI) = \frac{Weight\ (kg)}{Height\ (m^2)}$$

CLASSIFICATION OF BMI

CATEGORY	WHO	ASIAN
UNDERWEIGHT	<18 kg/m ²	
NORMAL BMI	18- 24.9 kg/m ²	
OVERWEIGHT	≥ 25.0 kg/m ²	
Pre-obese	25.0-29.9 kg/m ²	
OBESE	≥30.0 kg/m ²	
Obese class I	30.0 - 34.9 kg/m ²	
Obese class II	35.0 – 39.9 kg/m ²	
Obese class III	≥40.0	

Case An individual age 35 years, recently diagnosed with pre-diabetes, non-smoker, drinks occasionally, works in a senior management role, with limited sleep and altered food patterns. He has a height of 5'7" and weighs 78kg. The individual is a pure vegetarian and is obese and wants not only to lose weight but also wants to manage a lifestyle including diet and physical activity before starting the medication. He has a follow-up in 6 months.

study

- What type of information you will gather from the individual will help you to create an individualized nutrition plan?
- Outline all the steps and show what the nutrition plan will look like.
- What type of additional information tips you will provide to an individual to help them manage their diet so that he gets better and does not become diabetic?

1. STEP 1

PATIENT PROFILE

1. Name: Mr. XYZ
2. Gender: Male
3. Age: 35 Years
4. Occupation: Senior Manager

5. Economic status (Income):
6. Mobile number: 123456789
7. Address: ABC
8. Marital status:
9. Ethnicity:

NUTRITIONAL ASSESSMENT:

ANTHROPOMETRY:

Height: 170.18 cm

Weight: 78 kg

BMI: 26.93 (Overweight/ Pre- Obese)

Waist Circumference:

Hip Circumference:

Waist to hip ratio:

Lifestyle: Sedentary

Occasional alcoholic

Food Preference: Vegetarian

Food allergies:

BIOCHEMICAL PARAMETERS:

Random Blood glucose:

Fasting Blood glucose:

Hb A1c:

Lipid profile:

Serum Cholesterol:

HDL (High-density lipoprotein):

LDL (Low-density lipoprotein):

Serum Triglycerides:

CLINICAL DATA:

Present complaint:

Family history:

Past Medical history:

Final Medical diagnosis: Prediabetes

Medications/ treatment:

DIETARY HISTORY:

1. 24hrs - Home recall

Timings	Meal	Menu

2. Food frequency questionnaire

Nutritional calculation of home diet recall:

- Energy: ____Kcal (kcal/kg body weight)
- Proteins: ____g (g/kg body weight)
- Carbohydrates: __g (%)
- Fats: ____g (%)
- Empty calories: ____kcal
- Fluid intake: ____ml
- Other relevant nutrients (e.g. Calcium, iron, sodium, potassium, fiber)

Step 2

Principles of diet: Low calorie, moderate to high protein, low fat, low carbohydrate, high fiber diet with adequate vitamins, minerals, and fluids

1. Broka's Index:

Ideal Body Weight (IBW) = Height (cm) – 100

IBW = 170 – 100

= 70 kg

2. BMI = 26.93 (Overweight/ Pre- Obese)

3. Energy = 20 kcal/kg IBW

= 70×20

= 1400 kcal/day

4. Carbohydrates = 65% of Total Energy

$$= 65 \times \frac{1400}{100}$$

$$= 910 \text{ kcal}$$

1 g of carbohydrate => 4 kcal

$$910 \text{ kcal} = \frac{910}{4}$$

$$= 227.5 \text{ g}$$

5. Protein = 20% of Total Energy

$$= 20 \times \frac{1400}{100}$$

$$= 280 \text{ kcal}$$

1 g of protein => 4 kcal

$$280 \text{ kcal} = \frac{280}{4}$$

$$= 70 \text{ g}$$

6. Fat = 15% of Total Energy

$$= 15 \times \frac{1400}{100}$$

$$= 210 \text{ kcal}$$

1 g of fat => 9 kcal

$$210 \text{ kcal} = \frac{210}{9}$$

$$= 23.3 \text{ g}$$

S.No	NUTRIENT	NORMAL RDA	MODIFIED RDA
1.	Energy	2110 kcal	1400 kcal
2.	Carbohydrate	350-400 g	227.5 g
3.	Protein	54 g	70 g
4.	Fat	25 g	23.33 g
5.	Dietary Fiber	32 g	35-40 g

Exchange	Number of exchanges	Energy (kcal)	Protein (g)	Carbohydrates (g)	Fat (g)
Milk	2	100	5	4.5	
Meat(white)	1	70	10		
Pulse	4	400	24	60	
Cereals	5	500	10	100	
Roots/Tubers					
Veg A (GLV)	1				
Veg B (Others)	4	200		40	
Fruits	2	100		20	
Fats(oil)	2 & 1/2	120			11
Sugar					
Total	18& 1/2	1400	48.5	235	

Exchanges	Number of exchanges	Breakfast	Mid-morning	Lunch	Evening Tea	Dinner	Post-Dinner
Milk	2	1					1
Meat							
Pulse	4	1		1	1	1	
Cereals	5	2		2		1	

Roots/Tubers							
Veg A (GLV)	1			1			
Veg B (Others)	4	1		1		2	
Fruits	2		1				1
Fats(oil)	2 1/2	1/2		1		1	
Sugar							

		Usual eating time	Foods you eat	Portion size you eat	Ideal Eating time	Foods you should eat	Portion size you should eat	Foods You should avoid	Comments
Monda y	Breakfast	9.00 am	Idly, puri, vada, left over rice, chapati	7 5 3 2 cups 4 or 5	7.00-9.00am	Bottle gourd/ beetroot uthappam/paneer dosa/carrot Oats idly/ poha idly/ pessarettu Pumpkin chutney/sambhar cucumber chutney/mint chutney/ flax seeds powder	2 ½ (75g) 1(30g)	<ul style="list-style-type: none"> Boiled rice, maida, Samosa, spring rolls, fritters, pan cakes(maida) Sweetend yoghurt, pastries, ice creams ketchup, Processed foods, canned foods, instant foods, Sweetened cereals/museli/corn flakes/salted biscuits/ Potato/desserts/ Honey/sugar/refined products like polished rice(in excess amounts)/maida/artificial sweetners/candies/choclates/ banana/custard apple/mango/chiku/ 	<ul style="list-style-type: none"> Meals must be short and frequent. Avoid consumption of coffee or tea with excess sugar/ limit such beverages. Avoid foods which have high glycemic index- custard apple, mango, chiku, papaya Avoid sweet preparations, Sweetend beverages, cola beverages, carbonated beverages Include seeds which add fibre in the diet like flax seeds, fennel
	Mid meal	11.00 am	Mostly nothing, sometimes fritters, coffee/tea	1 cup (100 ml)	10.00-11.30 am	Curd/ buttermilk with chia seeds/veg salad/ apple/ orange	1 (100 g)		
	Lunch	2.00 pm	chapati, veg curry, rice, plain curd	4 1 cup 1 cup	1.00-2.00 pm	Bajra/jowar/whole-wheat flour roti Brown rice/ normal boiled rice/ Tomato/ bottle gourd/ plain dhal with garlic tempering	2 (60 g) 1 (30 g) 1 (30 g) 1 (100 g)		

						Cauliflower/cabbage/ladies finger curry/ginger chutney Salad/curd with veg	1 (100 g)		seeds, chia seeds, pumpkin seeds.
	Evening	4.00 / 5.00 pm	Coffee/ biscuits or homemade fritters, any fruit/ order food(junk)	1 large cup / 2 or 3 packets / 1 glass	4.00 pm	Boiled sweet potato/ apple/herbal tea/ veg salad	1 (100 g/ ml)		
	Late evening	7.00 pm	Chips/ wafers/ any fruit or buttermilk	1 / 100 ml	6.00 pm	Oat meal with cinnamon/ barley upma/ flavored yoghurt/ ragi malt/lobiya chat/ jowar flakes, bajra flakes upma	1 (30 g)		
	Dinner	9.00/10.00 pm	Roti, Rice, veg curry/dhal, curd	5 1 cup 1 cup	7.00-8.00 pm	Daliya moong dal kichidi/ curd rice/ pongal/	1 (cereals = 30 g) (curd = 50 g)		
	After dinner	11.30/12.00	Milk	1 glass (100 ml)	9.00 pm	Curd with mint leaves Salad	Yoghurt=(1)100g m; mint leaves=50g		
Tuesday	Breakfast	8.00 am	Kichidi Curd	75gms 100g	7.00 – 9.00 am	Veg daliya/semolina upma/ buckwheat dosa/ vermicelli upma/ Ginger chutney/curd/ tomato rasam	2(60gms) 1(50g)	<ul style="list-style-type: none"> Boiled rice, maida, Samosa, spring rolls, fritters, pan cakes(maida) Sweetend yoghurt, pastries, ice creams ketchup, Processed foods, canned foods, instant foods, Sweetened cereals/museli/corn flakes/salted biscuits/ Potato/desserts/ Honey/sugar/refined products like polished 	<ul style="list-style-type: none"> Meals must be short and frequent. Avoid consumption of coffee or tea with excess sugar/ limit such beverages. Avoid foods which have high glycemic index- custard apple, mango, chiku, papaya
	Mid meal	11.00 am	Coffee	1 cup	10 – 11.30 am	Orange chia seeds pudding with cinnamon(no sugar)/ veg salad/ corn chared/soya cutlets	1 (100 g)		
	Lunch	1.00 / 2.00 pm	Roti Khichidi Curd	4 1 bowl 100 g	1.00 – 2.00 pm	Millet kichidi/soya pulao/dal rice/sambhar rice/green rice/ paneer pulao/lemon rice	2 ½(75gm) 1(100g)		

						Bottle gourd curry/ tomato chutney/ pumpkin chutney Curd with beetroot Vegetable salad	1(50g=curd, 50gm=beetroot) 1(100g)	rice(in excess amounts)/maida/artificial sweetners/candies/chocolates/ banana/custard apple/mango/chiku	<ul style="list-style-type: none"> • Avoid sweet preparations, Sweetend beverages, cola beverages, carbonated beverages • Include seeds which add fibre in the diet like flax seeds, fennel seeds, chia seeds, pumpkin seeds.
Evening	4.00 pm	Sprouts / fruit / salad	1 bowl	4.00 pm	Herbal tea/ decoction/apple/orange/bu ttermilk	1 (100 g)			
Late evening	6.00 pm	Coffee	1 cup	6.00 pm	Barley upma/ sautéed soya chunks/ porridge/lemon juice/ginger ale/ buttermilk with chia seeds	Barley/sauteesoya chunks=30g			
Dinner	9.00 pm	Roti Rice Veg curry	4 1 (40 – 50 g) 1 (200 g)	7.00 – 8.00 pm	Jowar/bajra/ragi/wheat roti Varagu upma with moong dal and vegetables/ millet upma/kichidi/ sambhar rice/ dhal rice/ Ladies finger curry/onion kurma/flax seeds powder Curd with mint leaves/ grated carrot	2(60g) 1 ½ (45g) 1(100gm) 1(50g= curd; 50gm= mint leaves, 5g flaxseeds powder			
After dinner	11.00 pm	Milk	1 glass (200 ml)	9.00 pm	Salad/soup Milk with cinnamon/turmeric/ soup/ ragi malt/barley porridge/ curd with chia seeds/	1(100g/ml) 1(100ml)(chia seeds=5g)			
Wedne sday	Breakfast	9.00 – 10.00 am	Idli Dosa Puri Uttapa Poha Upma	5 4 6 4 2 cups (60 g) 2 cups (60 g)	8.00 am	Milk Idli , sambar Dosa , chutney	1 glass 4 , 2 k 4 , 1k	<ul style="list-style-type: none"> • Deep fried foods , sweetened foods , simple carbohydrates • Fried snacks , beverages • Low fibre ,low protein foods , sweets 	
	Mid morning	11.30 am – 12 .00 pm	Nothing , at times tea / cool drinks	100 ml	11 am	Orange / apple / guava	1 in number		

	Lunch	2.00 – 3.00 pm	Rice Veg curry Dal , chutney Curd	2 cups 1 cup 1 cup 2 tbsp 1 cup	12.30 – 1.30 pm	Rice / methi chapathi / jowar roti Broad beans / fieldbeans/ soya chunks /ladies finger curry Dal with greens Curd	2 cup / 2 in number 1 cup 1 cup 1 cup	<ul style="list-style-type: none"> • Bakery foods, biscuits • Heavy foods high in calories • High calorie ,low protein foods • Fried foods ,processed foods 	
	Evening	6.00 pm	Tea / coffee	100 ml	4.30 pm	Moong sprout cutlet / fruit salad / fruit juice	1 cup		
	Late evening	7.00 pm	Chips	1 cup	6.30 pm	Veg salad / milk	1 cup		
	Dinner	9.00 pm	Rice / roti Veg curry Tomato / bottlegourd chutney	1cup/2 1 cup 2 tbsp	8.00 – 8.30 pm	Ragi roti / phulka / multigrain chapathi Tomato dal Paneer / veg curry Cucumber/carrot raita	2 cup / 2,3 in number 1 cup 1 cup 1 cup		
	After dinner	-----	Nothing	-----	10 pm	Buttermilk with fenugreek seeds Pomegranate / any fruit	100 ml 1 in number		
Thursd ay	Breakfast	9.00 am	Idly, puri, vada, rice,	7 5 3 2 cups	7.00- 9.00 am	Multigrain /millet roti French bean foogath Vegetable raita	2 (60 g) 1 (30g) 1 (100 g)	<ul style="list-style-type: none"> • Boiled rice, maida,puri Samosa, and otherfried foods • cakes(maida) pastries, bakery products • Processed foods, canned foods, instant foods, Sweetened cereals/refined products like polished rice(in excess amounts). • museli/corn flakes/salted biscuits/ Potato/desserts/ Honey/sugarartificial sweetners/candies/choclat 	<ul style="list-style-type: none"> • Fiber rich millets or vegetables are used to give satiety and helps to maintain blood glucose levels. • Oats are loaded with fiber and the flax seeds add healthy fats • All vegetables to be included in a meal. Salad and curd should be a part of every meal. • Good source of protein and fiber
	Midmeal	11.00 am	coffee	1 cup (100 ml)	10.00 – 11.30 am	vegetable oats butter milk with flaxseeds	1 (30 g) 1 (100 ml)		
	Lunch	2.00 pm	chapati, veg curry, rice, plain curd	4 1 cup 1 cup 1 cup	1.00 – 2.00 pm	Bajra/jowar/whole-wheat flour roti Brown rice/ vegetable khichdi palak dal/rajma ladies finger curry Salad/curd with veg	2 (60 g) 1(30 g) 1 (30 g) 1 (100 g) 1 (100 g)		
	Evening	4.00 / 5.00 pm	Coffee/ biscuits	1 large cup	4.00 pm	Sprouts salad	1 (30 g)		

	Late evening	7.00 pm	Bhel chat & orange	1	6.00 pm	Orange	1 (100 g)	<ul style="list-style-type: none"> • es/ banana/custard apple/mango/chiku • whole pulses at dinner to be minimized as they can cause flatulence • Avoid refined sugar 	<ul style="list-style-type: none"> • One fruit per day is necessary and orange is a good source of antioxidants • Protein and fiber rich foods are included • The added powders may help in reducing blood glucose
	Dinner		Roti, Rice, veg curry/dhal, curd	4 1 cup 1 cup	7:00 to 8:00 pm	Multigrain /millet roti Matar paneer curry Cluster bean curry Vegetable Salad	2 (60g) 1(100g) 1(100g) 1(100g)		
	After dinner		milk	1 glass(250ml)	9:00-10:00pm	Skim Milk with fennel seeds/ cinnamon/fenugreek powder	1 (100ml)		
Friday	Breakfast	9-10 am	Dosa /idly/upma Chutney	1 serv, 1	7-8 :30 am	Phulka Ladies finger curry Curd	1 1 1	Sweetened breakfast cereals to avoid as it contains more carbs and sugars. Starchy foods to be avoided as it raises blood glucose levels.	Avoid tea on empty stomach. Healthy breakfast which meets the requirements of carbs, protein and fats to be included.
	Mid meal	11 -12 pm	milk	1 glass	10.00 am	Buttermilk	1 glass	Fried and bakery items as snacks to be avoided	Milk products are rich in calcium so must be included
	Lunch	2 – 3 pm	Roti, rice, tomato curry, broad beans curry	2 in number 2 cup 1 cup 1 cup	12-2pm	Phulka Rice Palak dal Ladies finger curry raita	2 1 1 1 1	White bread, pasta and rice to be avoided as they are high in carbohydrates, and are processed foods.	All vegetables to be included in a meal. Salad and curd should be a part of every meal
	Evening	4:30pm	Tea (with milk)	1 + 1	4 pm	Veg oats upma	1	Caffeinated drinks or sweetened drinks to be avoided as they provide empty calories & raise blood glucose levels.	Tea and caffeinated drinks to be avoided and replaced with healthy ones like buttermilk
	Late evening	6 -7pm	Bhel chat & orange	1 ,1	6 pm	Orange	1	Too much spices and portion size to be kept in mind	Including vitamin c rich foods helps in meeting fibre rda also helps with iron absorption
	Dinner	9: 30 -10pm	Rice, roti with	1, 2 , 1,1	8-9:30 pm	Phulka Bitter gourd fried Paneer curry	2 1 1	Fried chapatis, white rice and trans fats including beef and mutton to be avoided.	Probiotics to be included and lean meat which are low in fat content.

			any GLV and dal.			salad	1		
	After dinner	11 pm	Apple	1	10 pm	Warm milk	1	Avoid refined sugar.	Warm milks induce sleep.
Saturday	Breakfast	9.00 am	Orange juice	1 glass	8.00 am	Oats porridge\Dosa/ragi idli with mint chutney/sambar	2 (60 g) 1	<ul style="list-style-type: none"> • Packed fruit juices must be avoided • Avoid adding sugar to the tea • Fruits like custard apple, mango, pineapple, sapota and grapes. • White rice must be substituted with brown rice. • White rice must not be consumed in the dinner. • Simple carbohydrates must be avoided. • Alcohol must be strictly avoided. 	<ul style="list-style-type: none"> • Breakfast should not be skipped it is the most important meal of the day. • Consume high fibre foods like whole grains, oats, raw fruits and vegetables. • Protein rich foods like fatty fish, chicken and eggs can be included in the diet. • Sweet potato can be included in the diet. • Green leafy vegetables like spinach,kale amaranth should be included in the diet
	Mid meal	11.30 am	Tea with rusk /samosa	1 glass 2 in number	11.00 am	Fruit bowl (guava,apple,papaya)\soya cutlets	1 (100 g) 1 (30 g)		
	Lunch	1.00 pm	Rice Dal Gobi sabzi\or any vegetable curry	3 cups 1 cup 1 cup	12.30 pm	Veg salad (carrot,beetroot,cucumber) Multigrain phulka Brown rice Tadka dal Cauliflower curry	1 (100 g) 2 (60 g) 1 (30 g) 1 (30 g) 1 (100 g)		
	Evening	4.30 pm	Pakodi\veg puff	2	4.00 pm	Buttermilk/ sauteed makhana	1 (100 ml)		
	Late evening	6.00 pm	Buttermilk\lassi	1 glass	6.00 pm	Poha\ fruit (apple\papaya)	1 (30 g) 1 (100 g)		
	Dinner	10.00 pm	Rice Tomato chutney Beetroot \ veg curry	3 cups 1 cup 1 cup	8.00 pm	Phulka Stir fried vegetables Paneer bhurji	1-2 (30- 60 g) 1 (100 g) 1 (100 g)		
	After dinner	11.30 pm	Wine\ dessert like kheer or pudding	1-2 cups	10.00 pm	Warm milk	1 (100 ml)		
Sunday	Breakfast	8:00-9:00	Dosa with chutney/ Corn flakes with milk/	2 1	7:30-8:30	Idli with sambar/ Veg oats upma/ Veg dhalia/ Methi paratha	1		

		Tomato rice/ Maggi	1		with tomato chutney/ pumpkin chutney			
Mid Meal	11 -12 am	Coffee/Tea with biscuits	1 2	10:00- 11:00	Sprouts salad/ boiled corn chat/ roasted makhana/ Fruit bowl +Buttermilk with 1 tsp fenugreek seed powder	1 1glass	Excess caffeine beverages/ sweetened beverages/Chips/ french fries/ spicy snacks	Include atleast 2 tsps of Fenugreek seeds which help in blood glucose control
Lunch	2-3pm	Rice with veg curry and dal Veg Biryani With raitha	2 1 1 2 1	1:00-2:00	Multigrain phulka/Jowar phulka/ ragi phulka Veg rice / soya pulav/ Mint corn rice Veg curry/ paneer curry/ tofu curry Veg raitha / onion raitha/ cucumber raitha	1 1 1 1 1	White rice/ fried rice/ any junk foods like biryani,pizza, burger, spring rolls,or any other fried foods.	Fiber rich foods like vegetables(clusterbeans, drumsticks, broad beans), pulses should be included to be protein.
Evening	4-5pm	Tea with biscuits	1	4-5pm	Ragi Malt/ Plain Unsweetened yogurt with a pinch of cinnamon powder/ Sattu drink	1	Candies, chocolates,biscuits, white bread,	Healthy homemade snacks like makhana, sprouts, veg salads, veg rolls should be included
Late evening	6-7pm	Potato chips/ French fries/ Veg Manchuria	1 1 1	6-7pm	Veg salad/ Veg poha/ Veg sago upma/ Veg soup/ Corn soup	1	cakes, white bread,bakery products / manchuria	Vitamin-C rich foods like guava , lemon, amla should be included to prevent infections and iron absorption
Dinner	9-10pm	Rice with paneer /veg curry/ fried rice with raitha	1 1	8-9pm	Multigrain phulka/ Palak paratha/ Veg paratha Veg dhalia/ Veg pulav/ Veg khichdi Clusterbeans / broadbeans/ brinjal/ ridgegourd curry Bottlegourd / drumstick dal	1 1 1 1 1	Potato, fried foods, white rice, biryani, butter naan	Dry roasted foods should be preferred instead of deep fried ones. Green leafy vegetables of atleast 2 portions should be included

						Veg salad(tomato+broccoli + radish)			
After Dinner	11 pm	Kheer / milk	1	10pm	Plain Milk without sugar	1	Kheers/ halwas	Portion size should be controlled, every meal should contain vegetables, salads, and fluids	

General guidelines/additional tips for diabetes management.

- Diabetes is a chronic, metabolic disease characterized by elevated levels of blood glucose (or blood sugar). The most common is type 2 diabetes, usually in adults, which occurs when the body becomes resistant to insulin or doesn't make enough insulin.
- About 422 million people worldwide have diabetes, the majority living in low-and middle-income countries.
- Diet and exercise are fundamental in the treatment of diabetes.
- Dietary recommendations must be customized for each individual to achieve the general objectives of treatment. It should be remembered that obesity is common in type 2 diabetics so one of the main objectives should be weight reduction.
- The calorie content of the diet should be adjusted in each individual in accordance with the body mass index and regular physical activity.
- With regard to carbohydrates, emphasis should be placed on total intake rather than on their origin, although rapidly absorbed carbohydrates should be avoided
- Proper meal timings and also sleep timings to be maintained.
- Self monitoring of blood glucose level also place a major role.
- Physical exercise, aside from constituting a mainstay of the treatment of diabetic patients, helps to prevent the development of diabetes in adult life.
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