Andhra Pradesh: Type 2 Diabetes Mellitus Treatment Protocol

All confirmed DM Type 2 cases

Step 1

Tab. Metformin 500 mg OD or BD after food

Step 2

Review after One month

If not within targets, continue LSM, Increase Tab. Metformin 1000 mg/day twice daily

If under control & no complications, follow up with FPG and 2 hrs PPPG every 3 mths and continue same

Step 3

Review after One month

If not with in target, Add Glimepiride 1 mg/day once daily ½ hr before breakfast, if hypoglycemia occurs, reduce to 0.5 mg

Step 4

Review One month

If not with in target, Increase Glimepiride to 1 mg twice daily

Step 5

Review every One month

If not with in target, Titrate Glimepiride up-to 4 to 6 mg per day

If PPPG is high increase morning Glimepiride dose, if FPG is high increase evening dose

1. FPG ≥ 250 mg/dL at presentation
2. Symptoms including Visual, frothing of urine, Pain, Foot ulcer, repeated infection, sepsis.
3. Any complications

Step 6

Review after One month

If plasma glucose not under control after two drugs with maximum dose

Refer to higher centre, to start Insulin and further management

Hypoglycaemia

Symptoms - Cold sweats, trembling of hands, hunger, palpitation, confusion etc
Treatment – Give 15 gms of glucose i.e. 1 tablespoon sugar or high carbohydrate containing foods. Recheck blood sugar after 15 mins. Repeat if Hypoglycaemia continues.

Recommended Investigations – Creatinine, e GFR, Urine micro-albumin, Lipid profile, Fundoscopy.

LIFESTYLE MANAGEMENT ADVICE FOR ALL PATIENTS

1. Avoid tobacco and alcohol.
2. Exercise regularly 150 minutes per week.
3. If overweight, lose weight.
4. Diet-Decrease Quantity of Cereals by 25%, Increase fruits & vegetables by 25%.
5. Restrict salt, eat less than one teaspoon of salt per day, and avoid papads, chips, chutneys/dips and pickles.
6. Reduce fat intake by changing how you cook – remove the fatty part of meat; use vegetable oil; boil, steam or bake rather than fry; limit reuse of oil for frying.
7. Restrict oil usage, avoid intake of fried foods.
8. Avoid packed and stored foods (avoid trans-fats).
9. Avoid excess sugar, Carbonated/ packaged drinks.

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GOVERNMENT OF ASSAM

National Health Mission, Assam

Assam
Diabetes Management Protocol

Measure blood glucose of all adults over 30 years of age

Parameter (any one of these)	Pre-Diabetes	Diagnosis of diabetes	Treatment targets
Fasting Blood Glucose (FBG)	100-125 mg/dl	≥126 mg/dl	<126 mg/dl
Random Blood Glucose (RBG)	-	≥200 mg/dl (with symptoms)	<200 mg/dl
Post-prandial Blood Glucose (PPBG)	140-199 mg/dl	≥200 mg/dl*	<200 mg/dl
HbA1c	5.7-6.4%	≥6.5%	<7%
Actions to be taken	*Counsel on LSM# and review after 3 months*	*Counsel on LSM# and initiate treatment*	*Counsel on LSM# and continue same treatment*

**PPBG cut off should be 220 mg/dl when using capillary blood glucose*

If (FBG≥126 mg/dl and <400 mg/dl) OR (RBG/PPBG≥200 and <400 mg/dl) OR (HbA1c≥6.5% and <11%):

Step 1

FBG: 126 – 249 mg/dl
PPBG: 200 – 400 mg/dl
RBG: 200 – 400 mg/dl
→ Tab Metformin 500 mg SR one tablet once daily

FBG: 250 – 400 mg/dl
PPBG: 200 – 400 mg/dl
RBG: 200 – 400 mg/dl
→ Tab Metformin 1000 mg SR one tablet once daily

Review after 1 month and if BG above target

Step 2

Tab Metformin 1000 mg SR one tablet once daily

Tab Metformin 1000 mg SR one tablet twice daily

Review after 1 month and if BG above target

Step 3

Add Tab Glimepiride 1 mg once daily to Tab Metformin (1000mg/2000mg

Review after 1 month and if BG above target

Step 4

Add Tab Glimepiride 2 mg once daily to Tab Metformin (1000mg/2000mg)

Review after 1 month and if BG above target

Step 5

Refer to specialist

All diagnosed patients to do follow-up FBG and PPBG monthly. Drugs are to be provided for 30 days.

Important considerations:

- If BG>400 mg/dL or HbA1c >11%, refer directly to specialist.
- At the time of diagnosis, advise the baseline investigations of serum creatinine, lipid profile, liver function tests, CBC, urine for ketones and R/E urine. Serum creatinine to be repeated every 6 months, and the others to be repeated annually.
- HbA1c to be advised every 6 months.
- If patient cannot tolerate Metformin, refer to specialist.
- Patients to be counselled on the correct timing of medications to prevent complications:
  - **Metformin:** to be taken after meal.
  - **Glimepiride:** to be taken 20 mins before meal
- If patient has uncontrolled infection or co-morbid conditions like CAD, CKD, diabetic foot ulcer or urine ketones, refer directly to specialist.
- If patient is pregnant or conceives during treatment, refer directly to O&G specialist.
- Review medication adherence prior to escalating drug.
- **When starting Glimepiride:**
  - Monitor for hypoglycaemic symptoms at all visits and stop Glimepiride if present.
  - **Provide counselling to watch for hypoglycemic symptoms:** sweating, confusion, palpitations,dizziness and take sugar orally. Advise not to take Glimepiride on fasting days/ skipping meals.
- **Diabetic retinopathy:** screen retina annually, refer if any eye symptoms or positive exam.
- **Diabetic neuropathy:** examine feet annually, refer if abnormal exam.
- **Diabetic nephropathy:** screen urine protein and serum creatinine annually, refer if proteinuria++ and Creatinine ≥1.5.
- If patient has uncontrolled infection or comorbid CAD, CKD, diabetic foot ulcer or urine ketones, refer directly to specialist.

#Lifestyle management (LSM):

Avoid alcohol and tobacco
Weight reduction for obese and overweight patients
Eat healthy diet
Reduce carbohydrate (rice, potato, etc.) intake and take more vegetables. Take 3 major meals (breakfast, lunch, dinner) and 2 small snacks in between.
Avoid items with added sugars (cakes, cookies, sweets, fizzy drinks, etc.). Limit oil usage to 60ml/person/day.
Eat peas, whole grains, food rich in fibre like spinach and leafy vegetables, fruits, etc.
Eat less salt (less than 5 mg/day)

DIABETES PROTOCOL

Type 2 diabetes management protocol

बिहार सरकार

TEST ADULTS who have symptoms of diabetes with FPG or RPG, **TEST ADULTS** who are 30+ years old/with BMI >25 with FPG

FPG between 126 and 325 mg/dl or RPG between 200 mg/dl and < 325 mg/dl #

Counsel on diet & physical activity

REVIEW IN 3 MONTHS
If goal not achieved
BEGIN METFORMIN 500 mg once daily.
Counsel on diet and physical activity and adherence at ALL visits

REVIEW IN 3 MONTHS
If goal not achieved **increase dose of Metformin to 500 mg BD**

REVIEW IN 3 MONTHS
If goal not achieved **increase dose of Metformin** to 1000 mg BD

REVIEW IN 3 MONTHS
If goal not achieved, **ADD gliclazide 80 mg** OD.
Counsel on Hypoglycaemia on all visits

REVIEW IN 3 MONTHS
If goal not achieved increase dose of **gliclazide** to 80 mg BD daily

REVIEW IN 3 MONTHS
If goal not achieved, despite adherence to medication, healthy diet and physical activity, REFER to higher-level health care facility for starting insulin*

FPG/RPG > 325 mg/dl)

TEST urine ketones

if ketones present

REFER to higher level of care

if ketones absent

BEGIN Metformin 500 mg + **gliclazide 40 mg OD** & counsel on diet modification, physical activity and adherence to medicines

REVIEW weekly for 4 weeks

No improvement

Review in month
If goal not achieved **increase metformin 500 BD & gliclazide to 80 mg OD**

Review in month
If goal not achieved **Refer to higher level for care**

Improvement

CONTINUE Metformin 500 mg+ 40 mg OPD gliclazide and diet and physical activity

REVIEW in 2–3 months

If goal not achieved REFER to higher level of care

- Measure blood pressure at every scheduled visit, review medication as per hypertension protocol
- REFER for dilated-pupil retinal exam upon diagnosis, and every two years thereafter, or as per ophthalmologist recommendation
- Examine feet for ulcers at every visit. REFER to higher level of care if ulcer present
- Assess risk of lower limb amputation annually (foot pulses, sensory neuropathy by monofilament, presence of healed or open ulcers, calluses). REFER to higher level of care if ulcer present or pulse absent
- Test for proteinuria annually.
REFER to higher level of care if positive.

MANAGEMENT OF ACUTE COMPLICATIONS

Severe hypoglycaemia (plasma glucose <50 mg/dl) or signs:

- If conscious, give a sugar sweetened drink
- If unconscious, give 20–50 ml of 50% glucose (dextrose) IV over 1–3 minutes.

Severe hyperglycaemia (plasma glucose > 325 mg/dl) and urine ketone present) or signs and symptoms of severe hyperglycaemia:

Set up intravenous drip 0.9% NaCl 1 litre in 2 hours; continue at 1 litre every 4 hours, REFER to hospital.

Diagnostic value#	
Test	Mg/dl
Fasting Plasma Glucose (FPG)	≥ 126
Random Plasma Glucose (RPG)	≥ 200
Plasma glucose two hours after a 75 g oral glucose load-OGTT	≥ 200
Haemoglobin A1c	≥ 6.5%

Goal for Glycaemic control	Plasma glucose**
Fasting	≤ 126mg/dl)

#: refer to table on diagnostic values for other tests which can be used to diagnose diabetes.

** HbA1c should be used where available.

Department of Health & Family Welfare

TREATMENT PROTOCOL FOR TYPE 2 DIABETES MELLITUS

Screen all individuals above 30 years annually
All symptomatic individuals
Patients with strong family history of Diabetes Mellitus
(Measure Height, Weight & BMI)
Advice Life Style Modifications (LSM) & assess for complications
FBG ≥ 126 PPBG /RBG ≥ 200 mg/dl after LSM

1
- ***Start* T. Metformin 500mg half BD / if uncontrolled then 500mg BD**
- Monitor FBG/PPBG monthly
- (FBG review in 1 month, if FBG, PPBG values are high*)

2
- ***Intensify* T. Metformin 750 or 1000mg BD Along with LSM**

Review in 1 month, if FBG,PPBG values are high*

3
- ***Add* T.Glimepiride 1 mg OD if uncontrolled then 1mg BD**

(½ hour before breakfast and reduce to 0.5 mg/day depending if there is hypoglycemia) Along with LSM,T.Metformin 1000mg BID. Give hypoglycemia training.

4
- ***Intensify* T.Glimepiride 2 mg OD if uncontrolled then 3 mg**
- **Followed by maximum of 2mg BD**(Monitor hypoglycemia) (½ hour before meals),Along with LSM, T.Metformin 1000 mg/day BID ,assess FBG/PPBG monthly

- **If plasma glucose not under control after second drug and if any complications present refer to district hospital/tertiary care**
- If there is no complications, Continue LSM, Metformin 1 gm BD, Tab. Glimepiride 2mg BD

5
- ***Add* T.Pioglitazone 7.5 mg OD if uncontrolled then BD/Teneligliptin 20 mg OD (DDP-4 inhibitor)**
- Avoid in cardiac failure, fluid overload patients. If plasma glucose not under control after third drug

6
- ***Start* Insulin**

7
- **If plasma glucose not under control *refer* to district hospital /higher tertiary care**
- Gliptin/Glitazones to be reserved for medical specialists after rulling out cardiac and other ailments

- **If the sugar is under control by any of the above steps continue same treatment**
- **If no complication is identified and follow up shall be done every month with FBG and two hour PPBG**

Detection, prevention, or management of diabetes-related complications, including:
- Diabetes-related eye examination (annual or biannual)
- Diabetes-related foot examination (1–2 times/year by provider; daily by patient)
- Diabetes-related neuropathy examination (annual)
- Diabetes-related kidney disease testing (annual)
- Manage or treat diabetes-relevant conditions, including:
- Blood pressure (assess quarterly) Lipids (annual)
- Consider Antiplatelet therapy (*Cardiac Disorder)
- Influenza/ pneumococcal/ hepatitis B immunizations

***Target mg/dl**
FBG: 80-130
PPBG: <180

Diagnosed Diabetes with symptoms and RBG >250 mg/dl at presentation

Start LSM + T. Metformin500 mg BD & Tab Glimepiride 1mg OD,
Monitor weekly and titrate the dose.
Refer to higher center for evaluation and starting insulin

Hypoglycaemia
RBG ≤70 mg/dl

Symptoms
Cold, Sweat, trembling of hands, hunger, palpitation, confusion, loss of consciousness

Treatment
Ingestion of glucose carbohydrate containing food.(Consume 15 grams of glucose i.e. one tablespoon of sugar ,fruits, next meal and recheck blood glucose after 15 minutes, repeat if hypoglycaemia continues.

If loss of consciousness immediately refer to hospital for IV glucose
Single episode of Hypoglycemia should refer to specialist/higher center.

If any of the following complications are present, *refer* to higher centre
- Uncontrolled plasma glucose with symptoms
- Visual symptoms
- Foot ulcer
- Nephropathy/ frothing of urine
- Painful neuropathy
- Infections/sepsis
- Tuberculosis

Life Style Modification (LSM)
- ✓ Restrict sugar & sweets
- ✓ Restrict fried and oily foods
- ✓ Increase fiber in diet (green leafy vegetables, lentils or peas, whole grains, apple etc)
- ✓ Regular consumption of seasonal vegetables- 4 to 5 servings/day
- ✓ Brisk walking for 30 minutes daily
- ✓ 5 minutes warm up
- ✓ 5 minutes cool down
- ✓ Avoid fasting /skip medication while fasting
- ✓ Avoid Tobacco and Alcohol
- ✓ Maintain ideal body weight

State NCD Cell

4.5 Protocols for treatment of Diabetes Mellitus:

Classify patient in one of the following categories based on HbA_{1C} and BMI.

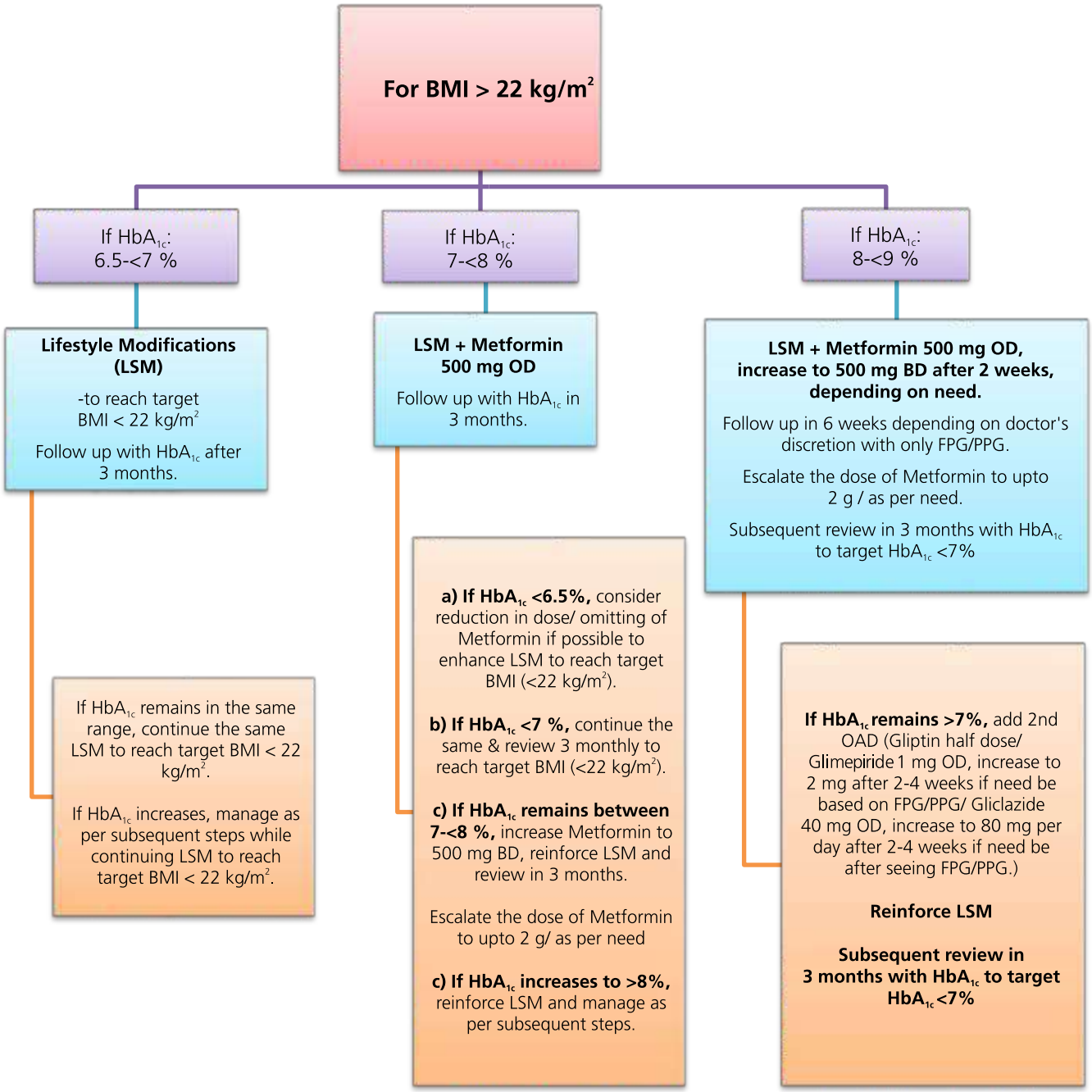


Figure 4.2: Algorithm for management of T2DM with BMI >22 kg/m² & HbA_{1c} <9%

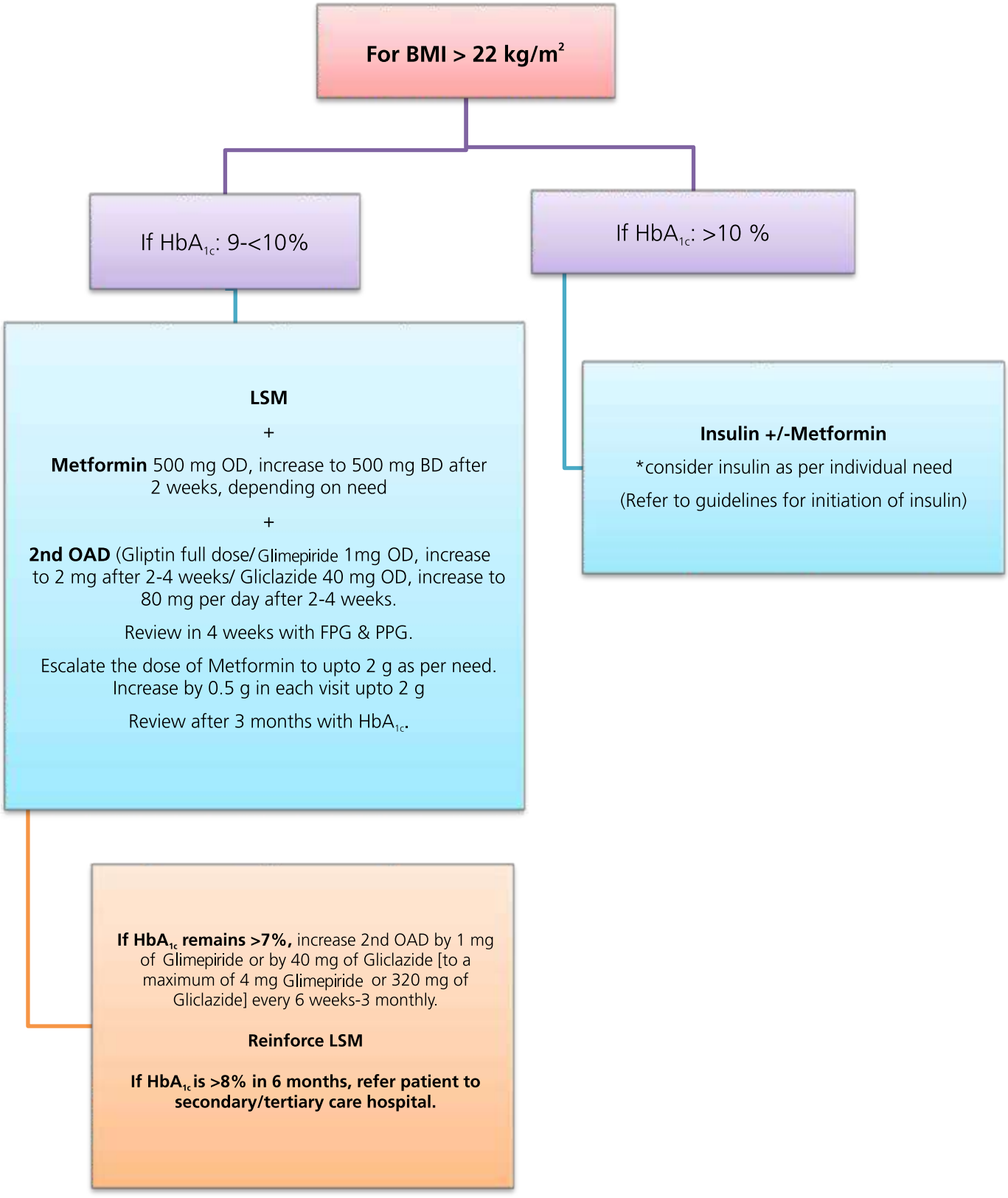


Figure 4.3: Algorithm for management of T2DM with BMI >22 kg/m2& HbA1c ≥9%

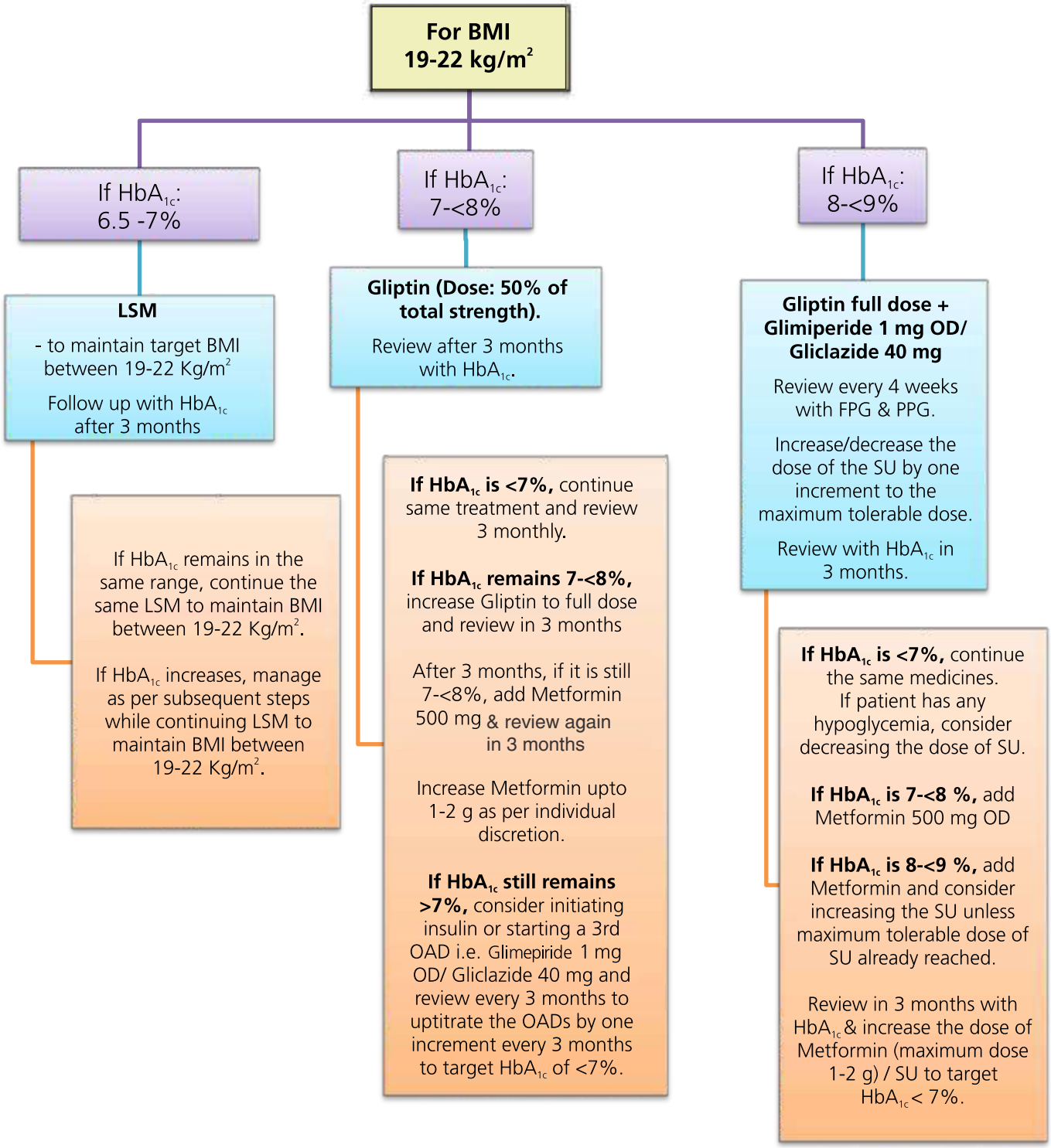


Figure 4.4: Algorithm for management of T2DM with BMI 19 - 22 kg/m² & HbA_{1c} < 9 %

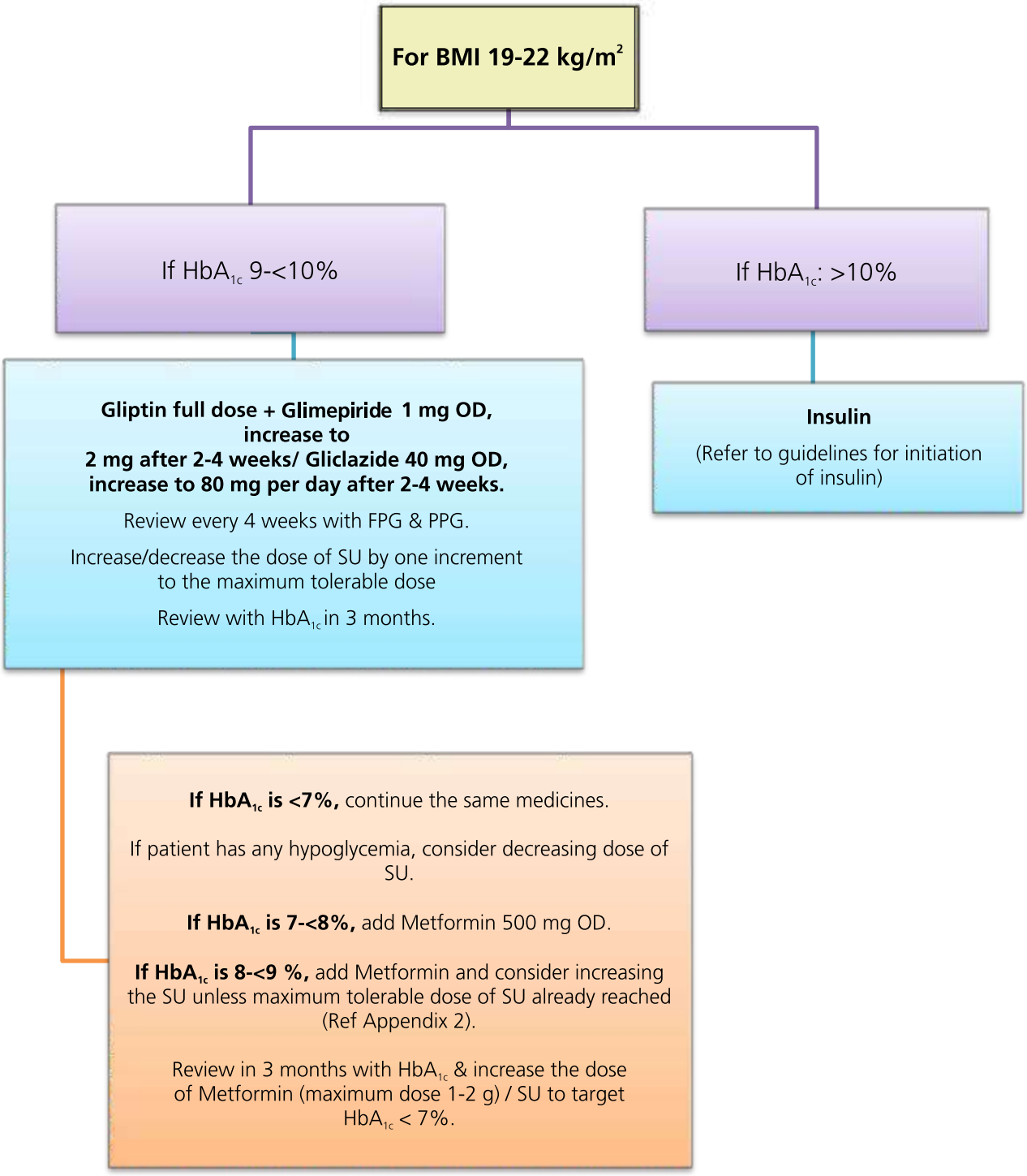


Figure 4.5 Algorithm for management of T2DM with BMI 19 - 22 kg/m^2 & HbA_{1c} ≥9%

4.6 Selecting insulin regimens for Type 2 Diabetes Mellitus

A. Start Insulin in the following conditions:

Table 4.3: Groups to initiate insulin therapy

Group	Description
Group 1	BMI < 19 kg/m^2 irrespective of HbA1c at diagnosis
Group 2	HbA1c >10 % irrespective of BMI at diagnosis
Group 3	HbA1c remaining > 7 % despite full dose of OAD combinations as above at follow up.
Group 4	Acute conditions like severe infection/ any acute illness/ hospitalization/ surgery/ pregnancy.
Group 5	T1DM
Group 6	Consider initiating insulin for women with pre-existing or newly detected DM planning pregnancy soon or not using contraception.

B. Types of Insulin Regimens:

1) Group 1:

a) If HbA_{1c} >9%, use either premix or basal bolus regimen

b) If HbA_{1c} is 7-9%, perform SMBG

- If FPG > 120 mg/dL & PPG >180 mg/dL consider premix insulin
- If FPG alone is >120 mg/dL & PPG < 180 mg/dL then add only basal insulin
- If FPG < 120 mg/dL & any PPG > 180 mg/dL then use only bolus insulin for that meal after dietary modification is reinforced

2) Group 2:

Use either premix or basal bolus insulin. Metformin to be given as indicated.

3) Group 3:

If HbA_{1c} is 7-10%, perform SMBG.

- If FPG >120 mg/dL & PPG> 180 mg/dL consider premix insulin. If FPG alone is >120 mg/dL & PPG<180 mg/dL then add only basal insulin
- If FPG<120 mg/dL & any PPG > 180 mg/dL then use only bolus insulin for that meal after dietary modification is reinforced.

4) Group 4: Basal-bolus regimen

5) Group 5: Basal-bolus regimen

4.7 Initiating and titrating insulin in Type 2 Diabetes Mellitus

General guidelines for all patients on insulin:

1. Every patient started on insulin should perform SMBG.
2. He/she should learn insulin injection technique from the diabetes educator. The instructions should be reviewed periodically, involving the person who administers insulin (in cases where self-administration is not done).
3. Every patient started on insulin should check 3 AM capillary glucose at least once in 2 weeks to rule out nocturnal hypoglycaemia.
4. If the total amount of insulin is nearing 1 U/kg, the patient should be referred to a tertiary care centre.

A. Initiation of Basal Insulin (NPH/ Degludec/ Glargine/ Detemir)

a) Start at 0.2 U/kg /day to a max starting dose of 10 U/day.

b) NPH- at bedtime, preferably with bedtime snack; Degludec- at any time of the day (5 PM-11 PM)

c) Monitor FPG every 2 days with a glucometer and titrate the dose of insulin once weekly by no more than 2-4 units at a time to target FPG < 120 mg/dL(lowest reading).

d) If FPG is < 70 mg/dl or there are symptoms of hypoglycemia then the dose has to be reduced by 2-4 units.

e) Target HbA_{1c} to less than 7%.

f) Note that the above should preferably be achieved with no episodes of hypoglycemia (refer section 6 for hypoglycemia care).

g) Patients can be empowered to titrate a maximum 2 units every week based on their competencies - maximum 4 titrations.

h) If HbA_{1c} is >7% and FPG is within target, monitor PPGs and add one or more bolus insulin to achieve PPG targets or consider shifting to premix insulins or co-formulations.

B. Initiation of Premix Insulin (biphasic human insulin/ biphasic analogue 30/70 or 25/75) or insulin co-formulation

a) If HbA_{1c} is between 7-10%, then start 0.2-0.5 U/kg/day of premix insulin in divided doses: 2/3rd of the total dose before breakfast and 1/3rd before dinner.

b) Uptitrate each dose to target FPG to < 120 mg/dL and PPG (Post - breakfast, lunch & dinner) to <180 mg/dL.

c) If PPG (post lunch) is >180 mg/dl while other targets are met, consider adding a bolus insulin before lunch.

d) Increase the night time premix dose (by 2-4 units every week) to target the FPG and post-dinner values and the morning dose to target the post-breakfast, post-lunch and pre-dinner values (the lowest of the readings can be considered).

e) If FPG < 70 mg/dL or PPG < 100 mg/dL or there are symptoms of hypoglycemia then the dose of the corresponding insulin has to be reduced by 2-4 units.

f) Target HbA_{1c} to less than 7%.

g) Note that the above should preferably be achieved with no episodes of hypoglycemia.

h) Patients can be empowered to titrate maximum 2 units every week based on his competencies- maximum 4 titrations.

i) PPG should be done 2 hours after the corresponding meal.

j) For Group 3 patients: Once the target HbA_{1c} is achieved, if the patient is a long standing diabetic (around 10 years), consider reducing/ omitting the secretagogues. (In others, the insulin doses may be reduced to target FPG & PPG values.)

k) If HbA_{1c} is uncontrolled, consider shifting to basal-bolus regimen.

C. Initiation of Basal-Bolus Insulin

a) Start with 0.5 units/kg/day (total dose)- 50% as basal and 50% as bolus if analogue insulins are used.

b) If human insulins are used, then 75% should be bolus and 25% should be basal.

c) Perform SMBG 2-6 times/day and adjust insulin doses accordingly every 2-3 days based on the lowest corresponding reading. The bolus doses have to be increased by 1-2 units, basal by 2-4 units.

d) FPG should be used to change the basal insulin dose; the post-breakfast and pre-lunch capillary glucose for the morning bolus; post-lunch and pre-dinner capillary glucose for the afternoon bolus and bedtime for the pre-dinner.

e) Patient has to follow up with a monitoring chart every 1-2 weeks.

f) Target FPG/ pre-meal capillary glucose value should be < 120 mg/dL and target PPG should be < 180 mg/dL.

4.8 Referral criteria for all visits

a) All diabetics requiring advanced care for any complications or comorbidities have to be referred to a tertiary care hospital.

b) T1DM.

c) PwD who becomes pregnant.

d) GDM patients requiring insulin.

e) Acute hyperglycaemic emergencies.

f) Critical illness such as acute infections, acute cerebro vascular and cardiac events, surgeries.

सत्यमेव जयते
Health & Family Welfare Department
Government of Gujarat

Gujarat Type 2 Diabetes Mellitus Treatment Protocol

Optimal treatment targets to be achieved

Fasting Blood Sugar (FBS)	Post Prandial blood Sugar (PPBS)	Glycosylated Hemoglobin (HbA1C)
80-126mg/dl (C/V)	< 180mg/dl (C/V)	< 7%

(C = Capillary sample, V = Venous Sample)

Check for treatment compliance, diet & exercise adherence at each step before titration of dose and/or addition of drug

STEP 1 If Patient is diagnosed as DM
Start Tab. Metformin 500mg OD

STEP 2 Review after 1 month, if Blood Sugar Is Higher than target
Increase to Tab. Metformin 500mg BD

STEP 3 Review after 1 month, if Blood Sugar is Higher than target
Increase to Tab. Metformin 1000mg BD

STEP 4 Review after 1 month, if Blood Sugar I Higher than target
Add Tab. Glimepiride 1mg OD to Tab. Metformin 1000mg BD

STEP 5 Review after 1 month, if Blood Sugar is Higher than target
Add Tab. Glimepiride 1mg BD to Tab. Metformin 1000mg BD

STEP 6 Review after 1 month, if Blood Sugar is Higher than target
Check patient is taking medicine correctly and regularly,

Refer to specialist for consultation

Note- Insulin must not be initiated at PHC, but If patient is on insulin, it can be continued

Important consideration

- Hypertensive patients
    1. Treat as per hypertension protocol
- If age more than 40 years, start Atorvastatin 10 mg OD HS
- If fasting blood sugar (FBS) is ⩾200 mg/dl or post-prandial blood sugar (PPBS) is ⩾300 mg/dl or HbA1c is ⩾ 9%, treatment is to be initiated immediately and reviewed **in a week** for starting dual therapy if uncontrolled
- Medicines must be taken around specified meal of the day.
- Monitor for symptoms of **Hypoglycemia** at all visits
- **Hypoglycemia symptoms**: Sweating, Confusion, Palpitations, Dizziness
    1. Advice to keep simple sugar item
    2. In case of such symptoms, take sugar orally and reach to nearby health facility
- Advice not to skip meal/ not to take medicine when fasting
- Monitor Renal Function Tests at every 6 months
- Diabetic nephropathy: Annual Screening, refer if Serum Creatinine ⩾1.5 mg/dl, Urine Proteins ++
- Diabetic neuropathy: Examine feet for unhealing ulcers during routine visits
- Diabetic Retinopathy: Annual screening, refer in case of ocular symptoms
- Examine all peripheral pulsations

Ensure adherence to lifestyle modification for all patients at all stages

Alternative medicine

Protocol step	Tab. Glimepiride	Tab. Glipizide
Step 4	1mg OD	5mg OD
Step 5	1mg BD	5mg BD

Treatment protocol for for Type 2 Diabetes Mellitus

Measure Random BSL of all adults

If RBSL > 140 mg/dl

F- BSL and PP-BSL and counselling

PRISCRIBE DEPENDING ON BSL

Target BSL to be achieved

F-BSL: 90-120 mg/dl

PP-BSL: 110-140 mg/dl

Step 1

IF F-BSL >126 & PP-BSL<200 mg/dl
Start Metformin 500mg OD

OR

IF F-BSL >126-180 & PP-BSL ≥ 200 mg/dl
Start Metformin 500mg BD

OR

IF F-BSL > 200 & PP-BSL ≥ 200 mg/dl
Start Metformin 500mg TDS

Step 2 — **Review after 1 month** — **If target BSL is not achieved INTENSIFY Metformin 500 mg BD**

Step 3 — **Review after 1 month** — **If target BSL is not achieved INTENSIFY Metformin 500 mg TDS**

Step 4 — **Review after 1 month** — **If target BSL is not achieved ADD Glimepiride 1mg OD**

if develop hypoglycaemia, stop medications, and refer for emergency treatment

Step 5 — **Review after 1 month** — **If target BSL is not achieved INTENSIFY Glimepiride 1mg BD**

if develop hypoglycaemia, stop medications, and refer for emergency treatment

Step 6 — **Review after 1 month** — **If target BSL is not achieved CHECK that patient has been taking drugs regularly and refer to specialist**

Hypoglycaemia

Symptoms - Cold sweats, trembling of hands, hunger, palpitation, confusion etc

Treatment – Give 15 gms of glucose i.e. 1 tablespoon sugar or high carbohydrate containing foods. Recheck blood sugar after 15 mins. Repeat if Hypoglycaemia continues.

LIFESTYLE MANAGEMENT ADVICE FOR ALL PATIENTS

1. Avoid tobacco and alcohol.
2. Exercise regularly 150 minutes per week.
3. If overweight, lose weight.
4. Diet-Decrease Quantity of Cereals by 25%, Increase fruits & vegetables by 25%.
5. Restrict salt, eat less than one teaspoon of salt per day, and avoid papads, chips, chutneys/dips, and pickles.
6. Reduce fat intake by changing how you cook – remove the fatty part of meat; use vegetable oil; boil, steam or bake rather than fry; limit reuse of oil for frying.
7. Restrict oil usage, avoid intake of fried foods.
8. Avoid packed and stored foods (avoid trans-fats).
9. Avoid excess sugar, Carbonated / packaged drinks.

- Patient with FBSL<110-125 and PPBSL 140 -199, start lifestyle modifications.
- Recommended investigations: Serum creatinine, Urine routine, Lipid profile, Urine ketone if proteinuria ++. Sr Creatinine ≥ 1.5mg% refer to specialist.
- Patient with uncontrolled infections, co-morbid conditions e.g. Hypertension, CAD, COPD CKD, unresponsive UTI, and deep-seated infections, start treatment

Karnataka

Diabetes Treatment Protocol

Measure blood glucose of **all adults** over 30 years

Parameter	Pre-Diabetes	Criteria for Diagnosis (WHO/ADA 2020 Guidelines)	Treatment Targets (ADA 2020 Guidelines)
Fasting Blood Glucose (FBG)	100 – 125 mg/dL	≥ 126 mg/dL	80-130 mg/dL
Post-Prandial Blood Glucose (PPBG)	140 – 199 mg/dL	≥ 200 mg/dL	< 180 mg/dL
Random Blood Glucose (RBG)	140 – 199 mg/dL	≥ 200 mg/dL twice (confirm again on different day)	< 180 mg/dL
Glycated Hemoglobin (HbA1c)	5.7 – 6.4%	≥ 6.5%	< 7%
Actions	**Counsel on LSM and review after 3 months**	**Counsel on LSM and initiate treatment**	

Step 1

If Blood Glucose (BG) is high

Prescribe **Metformin SR 500 mg OD**

Step 2

Review after 1 month and if BG above target

Increase to **Metformin SR 1000 mg OD**[1]

Step 3

Review after 1 month and if BG above target

Increase to **Metformin SR 1000 mg BD**

Step 4

Review after 1 month and if BG above target

Add **Glimeperide 1 mg OD**[2] with **Metformin SR 1000 mg BD**

Step 5

Review after 1 month and if BG above target

Increase to **Glimeperide 2 mg OD** with **Metformin SR 1000 mg BD**

Step 6

Review after 1 month and if BG above target

Refer to specialist

Note: Insulin is never started at PHC but if patient is already taking then it can be continued

Important considerations

- If Blood Glucose (BG) ≥ 200 mg/dL and individual < 30 years of age, then test for urine ketones
- If FBG ≥ 200 mg/dL or PPBG ≥ 300 mg/dL or HbA1c ≥ 9%, initiate treatment and review in a week for dual therapy
- If patient has BG ≥ 400 mg/dL or HbA1c ≥ 11% or uncontrolled infection or co-morbidities like CAD, CKD, foot ulcer or urine ketones, refer directly to specialist
- If patient is pregnant, refer directly to obstetrician
- Review medication adherence prior to increasing step
- When starting glimeperide:
  - Monitor for hypoglycemic symptoms at all visits and stop glimeperide if present
  - Provide counseling to watch for hypoglycemic symptoms: sweating, confusion, palpitations, dizziness and take sugar orally. Advise not to take glimeperide on fasting days/skipping meals
- Diabetic retinopathy: screen retina annually, refer if any eye symptoms or positive exam
- Diabetic neuropathy: examine feet annually, refer if abnormal exam
- Diabetic nephropathy: screen urine protein and serum creatinine annually, refer if proteinuria++ and Cr ≥ 1.5
- Provide lifestyle advice for all patients

Footnotes

1. Once daily (OD), metformin SR tablets are recommended. If these are unavailable, the same total dosage may be delivered as twice daily IR tablets. For example, at protocol Step 2, 1000 mg daily dose given as metformin 500 mg BD.
2. Glimeperide is only one of several sulfonylurea drugs. Equivalent doses of other types may be substituted in Steps 4 and 5:

Protocol step	Glimeperide	Gliclazide	Glipizide
Step 4	1 mg OD	40 mg BD	2.5 mg OD
Step 5	2 mg OD	80 mg BD	2.5 mg BD

**BG – Blood Glucose; SR – Sustained Release; OD – Once Daily; BD – Twice Daily; IR – Immediate Release; LSM – Life Style Modification;*

Health In Your Hands — National Program for Prevention and Control of Diabetes, Heart Disease & Stroke

National Health Mission — राष्ट्रीय स्वास्थ्य मिशन

Department of Health & Family Welfare

TREATMENT PROTOCOL FOR TYPE 2 DIABETES MELLITUS

Screen all individuals above 30 years and if diagnosed

1. Advice Lifestyle Modifications (LSM) & Assess for complications

   Start T. Metformin 500mg OD or BD

   Monitor FPG/PPPG monthly

2. Review in 1 month, if FPG, PPBG values are high,

   Intensify T. Metformin 1000mg BD

   Along with LSM

3. Review in 1 month, if FPG, PPBG values are high

   Add T. Glimepiride 1 mg OD

   (½ hour before breakfast and reduce to 0.5 mg/day depending if there is hypoglycemia.)
   Along with LSM, T.Metformin 1000mg BID. Give hypoglycemia training.

4. Give hypoglycemia training.

   Intensify T.Glimepiride 1 mg BD up to 2mg BID

   (½ hour before meals)
   Along with LSM, T.Metformin 1000 mg/day BID.

If plasma glucose not under control after second drug and if any complications present,
Refer to District hospital

5. If there is no complications, Continue LSM, Metformin 1 gm BD, Tab. Glimepiride 2mg BD,

   Add T.Pioglitazone 7.5 mg OD

   (to a maximum 15 mg once daily)
   Avoid in cardiac failure, fluid overload patients

6. If plasma glucose not under control after third drug,

   Start Insulin

7. **If plasma glucose not under control**

   Refer to District hospital

If patient is under control by any of the above steps, continue same treatments if no complications is identified and follow up shall be done every month with FBG and 2hour PPBG

Diagnosed diabetes with symptoms & FPG ≥ 250 mg/dL at presentation.

Repeat testing once a week and start combination therapy with Tab. Metformin 500 mg BD & Tab Glimepiride 1mg daily, up titrate , monitor weekly and to start Insulin if not getting controlled. Refer if not controlled

Hypoglycemia

Symptoms
Cold sweat, trembling of hands, hunger, palpitation, confusion etc
Treatment
Ingestion of glucose or carbohydrate containing foods. Consume 15 gms of glucose i.e. 1 tablespoon sugar, fruits, next meal & recheck blood glucose after 15 minutes, repeat if hypoglycemia continues

If any of the following complications are present, ***refer*** to higher centre.

- Uncontrolled plasma glucose with symptoms
- Visual symptoms
- Foot ulcer
- Nephropathy/ frothing of urine
- Painful neuropathy
- Infections/sepsis.

LIFESTYLE MODIFICATIONS

- Restrict sugar & sweets
- Restrict fried and oily foods
- Increase fiber in diet (green leafy vegetables, lentils or peas, whole grains, apple, banana)
- Regular consumption of seasonal vegetables
- Brisk walking for 30 minutes daily
- 5 minutes warm up
- 5 minutes cool down
- Avoid Tobacco and Alcohol

Base Line Lab Investigations
Urine Albumin
Blood Urea
Serum Creatinine

Target mg/dL
FPG: 80-130
PPPG: <180

STATE NCD DIVISION

Madhya Pradesh

Treatment Protocol for type II Diabetes Mellitus

Check Blood Sugar level for
- All person ≥ 30 years,
- All symptomatic adults,
- Person with family history of DM

- **RBS < 140 mg/dl:** Reassess every 1 year or earlier, if symptoms appear
- **RBS ≥ 140 mg/dl:** Call patient again with fasting and post prandial plasma glucose test on another day

Target Blood sugar level:
- Fasting: <130 mg/dl
- PPBS: <180mg/dl

A

FBS: >126 mg/dl
PPBS: <200 mg/dl

Counselling for Diet and LSM

After 1 month, if uncontrolled, **start** Tab. Metformin-SR 500mg od

After 1 month, if uncontrolled, **intensify to** Tab. Metformin-SR 1000 mg od

After 1 month, if uncontrolled, **intensify to** Tab. Metformin-SR 1000 mg bd

After 1 month, if uncontrolled, **add** Tab. Glimepiride 1 mg od

After 1 month, if uncontrolled, **intensify to** Tab. Glimepiride 2 mg od

After 1 month, if uncontrolled, **add** Tab. Pioglitazone 15 mg od*

After 1 month, if uncontrolled, **REFER** to higher centre

B

FBS: > 126 mg/dl
PPBS: > 200 mg/dl

Start

C

FBS: > 200 mg/dl
PPBS: > 300 mg/dl

Check for Urine Ketone

< 2+

Start Tab. Metformin-SR 1000 mg od + Tab. Glimepiride 2 mg od

Review after 5 days

Improvement (Ketone -ve)

Continue the same treatment

After 1 month, if uncontrolled, **intensify to** Tab. Metformin-SR 1000 mg bd + Tab. Glimepiride 2 mg od

No improvement (Ketone + ve)

REFER to higher centre

≥ 2+

REFER to higher centre

If complications are present:
- Uncontrolled plasma glucose with symptoms
- Visual symptoms
- Foot ulcer
- Nephropathy/ frothing of urine
- Painful neuropathy
- Infections/sepsis

REFER to higher centre

Life style modification advices for all:
- Avoid fasting, advice to skip medication of fasting
- Avoid sugar, sweets and added sugar
- Avoid all type of tobacco & alcohol use
- Increase physical activity to equivalent of brisk walking of 150 minutes per week
- If overweight, loss weight
- Eat healthy diet, avoid deep fried foods
- Eat >= 5 servings of vegetables per day
- Use healthy oils (ground nut oils, Sunflower oils)

* Pioglitazone to be avoided in following conditions 1. Severe oedema 2. Renal Failure 3. Heart Failure 4. Post-menopausal woman

Urine albumin must be checked annually for all patients diagnosed with Diabetes Mellitus type-II, REFER to higher centres of care if positive

MAHARASHTRA DIABETES PROTOCOL

Step 1 Measure BSL(R) of ALL ADULTS

IF BSL(R) ≥150 mg/dl

Step 2 Check BSL (F) & BSL (PP) + Adherence counseling

TARGET BSL TO BE ACHIEVED*
BSL (F) : 90 - 120 mg/dl
BSL (PP) : 110-140 mg/dl

Step 3 PRESCRIBE DEPENDING ON BSL

IF BSL(F)>126-180mg/dl & BSL (PP) <200mgdl	OR	IF BSL(F)>126-180mg/dl & BSL(PP) ≥200mgdl	OR	IF BSL(F)> 200 mg/dl & BSL (PP) ≥300mgdl
Start Metformin 500 mg OD		Start Metformin 500 mg BD		Start Metformin 500 mg TDS

Step 4 Review after 1 month → IF Target BSL not achieved **INTENSIFY Metformin 500 mg BD**

Step 5 Review after 1 month → IF Target BSL not achieved **INTENSIFY Metformin 500 mg TDS**

Step 6 Review after 1 month → IF Target BSL not achieved **ADD Glimeperide 1 mg OD**

If develops hypoglycemia, stop medication immediately. Refer after emergency treatment

Step 7 Review after 1 month → IF Target BSL not achieved **INTENSIFY Glimeperide 1 mg BD**

If develops hypoglycemia, stop medication immediately. Refer after emergency treatment

Step 8 Review after 1 month → IF still Target BSL not achieved **CHECK that patient has been taking drugs regularly & correctly. IF so, REFER patient to specialist**

- *Patients found with FBS<110-125mg/dl and or PPBG 140-159 start on lifestyle management for one month prior to initiation of medications*
- *Patients with uncontrolled infections, co-morbid conditions e.g. Hypertension, CAD, COPD, CKD etc, Severe cellulitis, Unresponsive UTI or other deep seated infection (diabetic foot), Presence of ketones in urine start treatment and refer to specialist immediately.*
- *Recommended investigations at initiation of therapy: Blood Pressure, serum creatinine, Urine Routine, lipid profile, ECG, Foot examination. If Proteinuria ++, and Sr. Creatinine≥ 1.5 mg% refer to specialist.*
- ***At every monthly review - Ensure treatment adherence prior to stepping up treatment at each step. If adherence is suboptimal, continue the same regimen with rigorous adherence counseling***
- **In Elderly patient (age >65yrs glycemic targets will be BSL(F)≥140mg/dl and BSL(PP) ≥180mg/dl*

WATCH, TREAT & REFER

Hypoglycemic Symptoms:
- Watch for Sweeting, Confusion, palpitation, giddiness, tremors, irrelevant talk, and unconsciousness
- Stop OAA, and treat with 10% Dextrose IV or sugar/ sweet orally, if patient is conscious.
- Refer immediately after first line of treatment.

Diabetic Retinopathy:
- Examine Retina/ fundus every year if no eye symptoms
- Eye symptoms: Spots or dark strings in vision, blurred vision, fluctuating vision, impaired color vision, dark or empty areas in vision, vision loss
- Refer immediately

Diabetic Neuropathy:
- Examine feet for sensation and circulation; also for calluses, dryness, sores, infection, injuries. Refer for neuropathy cellulitis, gangrene immediately
Treat infection with antibiotics. Refer if not cured

LIFESTYLE MANAGEMENT ADVICE FOR ALL PATIENTS

- Avoid fasting and advice to skip medication if fasting
- Avoid sugar, sweets and added sugar
- Stop all tobacco use, avoid second hand tobacco smoke.
- Avoid alcohol intake.
- Increase physical activity to equivalent of brisk walk 150 minutes per week.
- If overweight, lose weight.
- Eat healthy diet, avoid fried food
- Eat ≥ 5 servings of vegetables per day. Avoid fruits like banana, mango, grapes, chikoo,fig (anjeer) and sitaphal (custard apple)
- Use healthy oils (e.g. groundnut, safflower).

Meghalaya Diabetes Treatment Protocol

Measure Blood Sugar of all adults above 30yrs of age

Check for treatment compliance at each visit before titration of dose or addition of drugs
If RBS >= 140 mg/dl, confirm diagnosis of diabetes using below cut offs. If RBS <140 mg/dL, re-screen after one year.

Parameter	Criteria for Diagnosis	Treatment Targets
Fasting Blood Glucose (FBG)	>=126 mg/dl (Capillary/Venous)	<126mg/dl (C/V)
Post Prandial blood Glucose (PPBG)	>=200mg/dl (V) >=220mg/dl (C)	< 200mg/dl (C/V)
Random Blood Glucose (RBS)	>=200 mg/dl (C/V, in the presence of symptoms)	< 180mg/dl
Glycated Hemoglobin (HBA1C)	>=6.5%	< 7% (to be done after atleast 3 months of initiating treatment and repeated with minimum 3 months interval)
Actions	Lifestyle counselling and initiate treatment	

Steps:

1. **If Blood Glucose is High**
   Start Metformin SR 500mg OD

2. **Review after 1 month, if Blood Glucose is High**
   Increase to Metformin SR 1000mg OD
   - If SR (Sustained release) tablets are not available, then Metformin SR 500 mg to be given twice daily

3. **Review after 1 month, if Blood Glucose is High**
   Add Teneligliptin 20mg to Metformin SR 1000mg OD

4. **Review after 1 month, if Blood Glucose is High**
   Check patient is taking medicine correctly and regularly,
   Refer to specialist for consultation

Condition	Treatment Modification
Hypertension	Treat HT as per protocol
Pregnancy	Refer to specialist
Baseline investigations	Blood pressure, HbA1C, S. creatinine, S. urea, Urine protein, lipid profile, ECG followed by annual evaluation.
Diabetic Retinopathy	Annual screening Refer in case of ocular symptoms
Diabetic neuropathy	Examine feet for unhealing ulcers during routine visits.

Prescribe Atorvastatin 20mg to all diabetic patients

Notes for treatment

- If BG > 400 mg/dL or HbA1c >=11%, directly refer to specialist
- Provide Lifestyle Modification counselling to all patients.
- Monitor HbA1C every 3 months

Advice for Lifestyle Modification –


Avoid Alcohol and Tobacco including second hand Smoke


Eat less salt (less than one teaspoon or 5gm/day)


Obese- weight reduction


Eat healthy diet –


Exercise regularly for at least 30 minutes per day or 150 minutes per week

a) Eat atleast 5 servings of vegetables and fruits
b) Reduce carbohydrate content in diet by reducing consumption of rice, potatoes etc
c) Use healthy oils such as Sesame, Sunflower, safflower etc.,
d) Avoid added sugars in cakes, cookies , sweets, fizzy drinks, etc.
e) Eat fish or food rich in omega3 fatty acids,
f) Limit red meat,
g) Limit consumption of foods containing high amounts of saturated fats,
h) Reduce fat intake by changing the way food is cooked- remove the fatty part of meat, use vegetable oil for cooking, steam or bake instead of frying.

National Programme for Prevention and Control of Non-Communicable Diseases, NHM, Meghalaya

Greater Chennai Corporation

Diabetes Management Protocol

Parameter	Diagnosis of diabetes	Treatment targets
Fasting Blood Sugar (FBS)	≥126mg/dL	<126mg/dL
Random Blood Sugar (RBS)	----------	<200mg/dL
Post-Prandial Blood Sugar (PPBS)	≥200mg/dL	<200mg/dL
HbA1c	≥6.5%	<7%

If (FBS ≥126 and <400 mg/dL) OR (RBS or PPBS≥200 and <400mg/dl) OR (HbA1c≥6.5% and <11%)

Step 1
Metformin sustained release one 500 mg tab daily

Step 2
Review after 1 month and if BS above target
Metformin sustained release[1] one 1000 mg tab daily

Step 3
Review after 1 month and if BS above target
Metformin sustained release two 1000 mg tabs daily (2000 mg total)

Step 4
Review after 1 month and if BS above target
Metformin sustained release two 1000 mg tabs daily plus glimeperide 1 mg daily[2]

Step 5
Review after 1 month and if BS above target
Metformin sustained release two 1000 mg tabs daily plus glimeperide 2 mg daily

Step 6
Review after 1 month and if BS above target
Refer to specialist

Note: Insulin is generally not started at PHC but if patient is already taking then it can be continued

Important considerations

- If BS >400 mg/dL or HbA1c >11%, refer directly to specialist
- If patient has uncontrolled infection or co-morbid CAD, CKD, diabetic foot ulcer or urine ketones, refer directly to specialist
- If patient is pregnant, refer directly to Ob-Gyn
- Review medication adherence prior to increasing step
- When starting glimeperide:
  - Monitor for hypoglycemic symptoms at all visits and stop glimeperide if present
  - Provide counseling to watch for hypoglycemic symptoms: sweating, confusion, palpitations, dizziness and take sugar orally. Advise to take with food and not to take glimeperide on fasting days/skipping meals
- Diabetic retinopathy: screen retina annually, refer if any eye symptoms or positive exam
- Diabetic neuropathy: examine feet annually, refer if abnormal exam
- Diabetic nephropathy: screen urine protein and serum creatinine annually, refer if proteinuria++ and Cr ≥1.5
- Provide lifestyle advice for all patients

Notes

1. Once daily (OD), sustained release ("SR") metformin tablets recommended. If these are unavailable, the same total dosage may be delivered as twice daily immediate release ("IR") tablets. For example, at protocol Step 2, 1000 mg daily dose given as metformin 500 mg twice daily (BD).
2. Glimeperide is only one of several sulfonylurea drugs. Equivalent doses of other types may be substituted in Steps 4 and 5:

Protocol step	glimeperide	gliclazide	glipizide
Step 4	1.0 mg daily (OD)	40mg daily (OD)	2.5 mg daily (OD)
Step 5	2.0 mg daily (OD)	80 mg daily (OD)	5.0 mg daily (OD)

DIABETES TREATMENT PROTOCOL

Measure Random Blood Sugar of all adults

If Random blood Sugar level ≥150 mg/dl

Check FBS & PPBS +adherence counseling

FBS– Fasting Blood Sugar
PPBS - Postprandial Blood Sugar
Target Blood Sugar Level (BSL) to be achieved -
 # FBS : 90-140 mg/dl
 # PPBS :110-180 mg/dl

Step 1

Prescribe depending on Blood Sugar level

IF FBS >126-180mg/dl & PPBS < 200mgdl **Start Metformin 500 mg OD**	OR	IF FBS >126-180mg/dl & PPBS ≥200mgdl **Start Metformin 500 mg BD**	OR	IF FBS >180mg/dl & PPBS ≥300mgdl **Start Metformin 500 mg TDS**

Step 2	Review after 1 month	If target BSL not achieved **INTENSIFY Metformin 500 mg BD**
Step 3	Review after 1 month	If target BSL not achieved **INTENSIFY Metformin 500 mg TDS**
Step 4	Review after 1 month	If target BSL not achieved **ADD Glimepiride 1 mg OD**
		If develops hypoglycemia, stop medication immediately. Refer after emergency treatment
Step 5	Review after 1 month	If target BSL not achieved **INTENSIFY Glimepiride 1 mg BD**
		If develops hypoglycemia, stop medication immediately. Refer after emergency treatment
Step 6	Review after 1 month	1.If target PPBS not achieved, **ADD Voglibose 0.3mg BD** to be taken during Breakfast & Lunch 2. If target FBS not achieved , refer the patient after checking compliance
Step 7	Review after 1 month	**If still Target BSL not achieved Check that patient has been taking drugs regularly and correctly. If so, Refer Patient to specialist**

WATCH, TREAT & REFER

Hypoglycemia Symptoms:

- Watch for sweating, confusion, palpitation, giddiness, tremors, irrelevant talk, and unconsciousness
- Stop OAD, and treat with 10 % Dextrose IV or sugar/sweet orally, if patient is unconscious.
- Refer immediately after first line of treatment.

Diabetic Retinopathy :

- Examine Retina/fundus every year if no eye symptoms
- Eye symptoms: Spots or dark strings in vision, blurred vision, fluctuating vision, impaired color vision, dark or empty areas in vision, vision loss
- Refer Immediately

Diabetic Neuropathy :

- Examine feet for sensation and circulation ; also for calluses, dryness, sores, infection, injuries.
- Refer for neuropathy , cellulitis, gangrene immediately
- Treat infection with antibiotics. Refer if not cured

LIFESTYLE MANAGEMENT

- Avoid fasting and advice to skip medication if fasting
- Avoid sugar, sweets and added sugar in Diet
- Stop all tobacco use, avoid second hand smoking
- Avoid alcohol intake
- Increase physical activity to 150 minutes per week
- If overweight, loose weight
- Eat Healthy diet, avoid fried food
- Eat ≥5 servings of vegetables per day
- Avoid fruits like banana, mango, grapes, chikoo, fig (anjeer) and sitaphal (Custard apple)
- Use healthy oils e.g. groundnut, mustard oil, sunflower

- Patient found with FBS <110-125mg/dl and or PPBG 140-199 start on lifestyle management for one month before initiation of medications
- Recommended investigations at initiation of therapy: Blood Pressure, Serum Creatinine, Urine RE, Lipid Profile, ECG, Foot examination. If Proteinuria ++, and Sr. Creatinine > 1.5 mg% refer to specialist
- At every monthly review-Ensure treatment adherence prior to stepping up treatment at each step. If adherence in suboptimal, continue the same regimen with rigorous adherence counselling
- In Elderly patient (age >65yrs glycemic targets will be FBS <140mg/dl and PPBS)<200mg/dl

Indication of Insulin:

If FBS > 150 or 2hr PPBS 200 mg/dl despite treatment with 2 or 3 OAD drugs , Systemic infections, Sepsis, Acute MI, Unstable Angina, Diabetic keto Acidosis, Pregnancy, Peri operative care , Diabetic Renal disease.

Comprehensive Stepwise Approach for Diabetes Management at Primary care level

மக்களைத் தேடி மருத்துவம்

Door-step screening
≥ 18 years

Not a known DM
Measure RBS
≥140 mg/dl

Yes → **Suspected DM**

No → **Non-diabetic**
Repeat screening after 1 year

Known DM
Measure RBS
<140 mg/dl

Yes → **Controlled**
≥45 yrs: issue drugs for 2 months & follow-up
<45 yrs: review & follow-up once in 3 months

No → **Uncontrolled**

Motivate to avail services at HWC
1. Wellness activities including Yoga
2. Tele-consultation 3. Patient Support Group

Refer to PHC

Refer to PHC

Screening by SN
Evaluation by MO
- ☑ Brief History
- ☑ Wt, Ht, WC
- ☑ BP, RBS, FBS, PPBS
- ☑ BMI

FBS <100 mg/dl
PPBS <140 mg/dl
Non-diabetic
- -LSM Counselling
- -Repeat screening after one year

FBS 100 - 125 mg/dl
Impaired Fasting Glucose

PPBS 140- 199 mg/dl
Impaired Glucose Tolerance

- -LSM Counselling
- -Annual follow-up or Report if symptoms develop

FBS ≥126 mg/dl
PPBS ≥200 mg/dl
Diabetic
- ☑ Detailed H/O Complications
- ☑ Ur. albumin
- ☑ Foot exam
- ☑ Sr. Cholesterol
- ☑ ECG
- ☑ Sr. Creatinine
- ☑ BP

(Review every month)

≥45 yrs: Once in 3 months follow-up at PHC
<45 yrs: Monthly follow-up at PHC

Controlled
FBS <120 mg/dl
PPBS <180 mg/dl

Refer to Higher Centers

Uncontrolled
FBS ≥120 mg/dl
PPBS ≥180 mg/dl

LSM Counselling

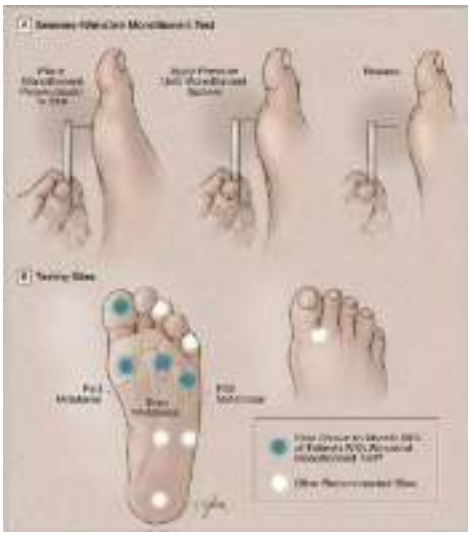
Avoid tobacco and alcohol | Exercise 2.5 hours/week | Reduce weight, if overweight | Reduce salt, under 1 tsp/day | Eat less fried foods

Screening for Complications

Annually or Whenever required

- ☑ Ur. albumin
- ☑ Sr. Creatinine
- ☑ Eye exam.
- ☑ TB Screen
- ☑ Sr. Cholesterol
- ☑ ECG
- ☑ Foot exam.
- ☑ Dental Screen

Diabetic Foot Examination using Monofilament



Detecting 8/10 sites: Neuropathy Absent
Detecting ≤ 7/10 sites: Neuropathy present

Diabetes treatment protocol

Without complications | Non-pregnant ≥18 years

Step 1 **Prescribe Metformin 500 mg BD**
Review after 30 days, If BS above target

Step 2 **Increase to Metformin 1000mg BD**
Review after 30 days, If BS above target

Step 3 **Add any of the second drugs**
- **Glimepride start with 1 mg & increase to max 4 mg (single/divided doses) OR**
- **Glipizide start with 5 mg & increase to max 15 mg (single/divided doses) OR**
- **Glibenclamide start with 5 mg & increase to max 10 mg(single/divided doses)**

Review after 30 days, If BS above target

Step 4 **Add Vildagliptin 50 mg**

Check if the patient has been taking medications regularly and correctly. If yes, refer to higher centres.

Treatment Targets
FBS <120 mg/dl | PPBS <180 mg/dl

Follow-up of complication management under MTM

Doorstep services
- ☑ Physiotherapy
- ☑ Palliative care
- ☑ CAPD bag distribution

Note
- If Blood sugar >400 mg/dl, refer patient to Higher centers directly
- If uncontrolled infection, CAD, CKD, diabetic foot ulcers, refer to higher centers directly
- Calibrate glucometer once in 3 months
- Dispense drugs for 30 days at PHCs

RBS: Random Blood Sugar; FBS: Fasting Blood Sugar; PPBS: Postprandial Blood Sugar; LSM: Lifestyle Modifications; Wt: Weight; Ht: Height; WC: Waist Circumference; BP: Blood Pressure; BMI: Body Mass Index; Hb: Haemoglobin; CAPD: Continuous Ambulatory Peritoneal Dialysis; BD: Twice daily; CAD: Coronary Artery Disease; CKD: Chronic Kidney Disease

Non Communicable Diseases Program
Govt. of Telangana

Type II Diabetes Management Protocol

Parameter	Diagnosis of diabetes	Treatment targets
Fasting Blood Sugar (FBS)	≥126mg/dL	<126mg/dL
Random Blood Sugar (RBS)	≥200mg/dL	<200mg/dL
Post-Prandial Blood Sugar (PPBS)	≥200mg/dL	<160mg/dL
HbA1c	≥6.5%	<7%

If (FBS ≥126 and <400 mg/dL) OR (RBS or PPBS≥200 and <400mg/dl) OR (HbA1c≥6.5% and <11%)

STEP 1

Tab. Metformin 500 mg OD or BD after food

STEP 2

Review after 1 month and if BS above target

Increase Tab. Metformin 1000 mg/day twice daily

STEP 3

Review after 1 month and if BS above target

Add Glimepiride 1 mg/day once daily ½ hr before breakfast, if hypoglycemia occurs, reduce to 0.5 mg

STEP 4

Review after 1 month and if BS above target

Increase Glimepiride to 1 mg twice daily

STEP 5

Review after 1 month and if BS above target

Titrate Glimepiride up-to 4 to 6 mg per day

STEP 6

Review after 1 month and if BS above target

Refer to specialist

Note: Insulin is generally not started at PHC but if patient is already taking then it can be continued

Important considerations

- If BS >400 mg/dL or HbA1c >11%, refer directly to specialist
- If patient has uncontrolled infection or comorbid CAD, CKD, diabetic foot ulcer or urine ketones, refer directly to specialist
- If patient is pregnant, refer directly to Ob-Gyn
- Review medication adherence prior to increasing step
- When starting glimeperide:
- Monitor for hypoglycemic symptoms at all visits and stop glimeperide if present
- Provide counseling to watch for hypoglycemic symptoms: sweating, confusion, palpitations, dizziness and take sugar orally. Advise to take with food and not to take glimeperide on fasting days/skipping meals
- Diabetic retinopathy: screen retina once in 6 months, refer if any eye symptoms or positive exam
- Diabetic neuropathy: examine feet on every visit, refer if abnormal exam
- Diabetic nephropathy: screen urine protein and serum creatinine once in every 6 months, refer if proteinuria++ and Cr 1.5
- Lipid profile once in every 6 months for cardiovascular risk Provide lifestyle advice for all patients

If PPPG is high increase morning dose, if FPG is high increase evening dose

Notes

1. Once daily (OD), sustained release (“SR”) metformin tablets recommended. If these are unavailable, the same total dosage may be delivered as twice daily immediate release (“IR”) tablets. For example, at protocol Step 2, 1000 mg daily dose given as metformin 500 mg twice daily (BD).

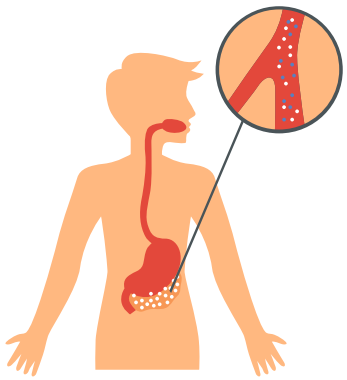
Hypoglycaemia

Symptoms-Cold sweats, trembling of hands, hunger, palpitation,confusion etc
Treatment – Give 15 gms of glucose i.e. 1 tablespoon sugar or high carbohydrate containing foods. Recheck blood sugar after 15 mins. Repeat if Hypoglycaemia continues.

Commissioner
Health and Family Welfare
Govt. of Telangana

TRIPURA
DIABETES TREATMENT PROTOCOL

Parameter	Pre -Diabetes	Diagnosis of Diabetes	Treatment Targets
Fasting Blood Sugar (FBS)	100 -125 mg/dl	≥126 mg/dl	90-130 mg/dl
Random Blood Sugar (RBS)	140 -199 mg/dl	≥200 mg/dl	140-180 mg/dl
Post Prandial Blood Sugar (PPBS)	140 -199 mg/dl	≥200 mg/dl	140-180 mg/dl
HbA1C (if available)	5.7-6.4%	≥6.5%	≤7%



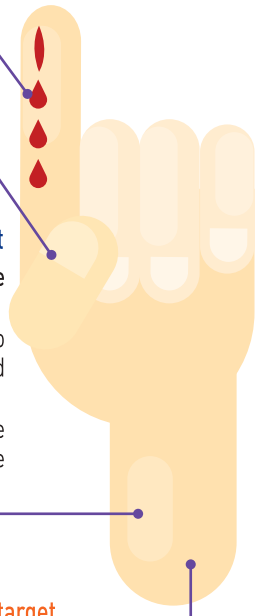
If FBS ⩾126 and ⩽300 mg/dl or PPBS ⩾200 and ⩽400mg/dl or HbA1C ⩾6.5% and <10%, then start with

STEP 01 Prescribe Metformin SR 500mg once daily

STEP 02 Review after 6 to 8 weeks and if blood glucose is above target, increase to Metformin SR 1000mg once daily

STEP 03 Review after 6 to 8 weeks and if blood glucose is still above target

- If facility for testing creatinine is available and within normal range, increase the dose of Metformin SR to 1000 mg twice daily
- If facility for testing creatinine is not available, then also it is better not to increase the dose of Metformin and start the Glimiperide 1 mg once daily and continue Metformin SR 1000 mg once daily
- If facility for testing creatinine is available and above normal, don't increase the dose of Metformin and start the Glimiperide 1 mg once daily and continue Metformin SR 1000 mg once daily



STEP 04 Again, review after 6 to 8 weeks and if blood glucose is above target

- If facility for testing creatinine is available and it is within normal range, increase the dose of Metformin SR to 1000 mg twice daily and continue Glimiperide 1 mg once daily which may be up titrated to Glimiperide 2 mg once daily
- If facility for testing creatinine is not available, don't increase the dose of Metformin and increase the dose of Glimiperide 2 mg once daily and continue Metformin SR 1000 mg once daily
- If facility for testing creatinine is available and it is above normal range, continue the dose of Metformin SR to 1000 mg once daily and continue Glimiperide 1 mg once daily which may be up titrated to Glimiperide 2 mg once daily if there is no recurrent hypoglycemia symptoms

STEP 05 Review after 6 to 8 weeks again and if blood glucose is above target refer to a specialist in nearest health care (Preferable MD, Medicine)

IMPORTANT CONSIDERATIONS

- Measure blood glucose of all adults over 30 years. If diagnosis is done based on RBS, ideally two readings on two different days to be taken. Review medication adherence prior to increasing step. Provide lifestyle advice to all patients. Once daily Metformin SR tablets are recommended. If these are unavailable, the same total dosage may be delivered as twice daily IR tablets. For example, at protocol Step 2, 1000 mg SR once daily dose may be given as Metformin IR 500 mg twice daily.
- When starting sulphonylureas, monitor for hypoglycemic symptoms at all visits and stop sulphonylureas if present. Provide counseling to watch for hypoglycemic symptoms: sweating, confusion, palpitations, dizziness and take sugar orally. Advise to take in relation to food and not to take glimeperide on fasting days/skipping meals. If FBS ⩾300 mg/dl, PPBS ⩾400 and or HbA1C >10% with individual is having symptoms of hyperglycemia (i.e. polyuria, polydipsia or weight loss), refer directly to Medicine Specialist and better to initiate insulin therapy. Insulin is generally not started at PHC but if patient is already taking then it can be continued.
- If patient is having suspected features of type 1 diabetes, refer directly to Medicine Specialist. If patient has uncontrolled infection or co-morbid CAD, CKD, diabetic foot ulcer or presence of urine ketones, refer directly to Medicine Specialist. If patient is having diabetes and pregnant, refer directly to Gynecologist and Medicine Specialist
- Diabetic retinopathy: screen retina annually if available, refer if any eye symptoms or positive exam.
- Diabetic neuropathy: examine feet annually, refer if abnormal exam
- Diabetic nephropathy: screen urine protein and serum creatinine annually if available, refer if proteinuria ++ and creatinine ⩾1.5

[SR - Sustained Release; IR - Immediate Release, CAD - Coronary Artery disease, CKD - Chronic Kidney disease]

Developed by : National Health Mission, Tripura

Uttarakhand

Diabetes Management Protocol

उत्तराखण्ड शासन

Parameter (Venous Blood)	Diagnosis of diabetes	Target to Achieve
Fasting Blood Sugar (FBS) Random	≥126 mg/dL	<126 mg/dL
Blood Sugar (RBS)*	≥200 mg/dL	<180 mg/dL
Post-Prandial Blood Sugar (PPBS)	≥200 mg/dL	<200 mg/dL
HbA1C	≥ 6.5%	< 7%

If (FBS ≥ 126 and < 400 mg/dL) OR (RBS or PPBS ≥ 200 and < 400mg/dl) OR (HbA1C ≥ 6.5% and <11%)

Step 1

Start With

Metformin sustained release[1] 500 mg tab OD

Step 2

Review after 1 month and if BS above target

Metformin sustained release 1000 mg tab OD

Step 3

Review after 1 month and if BS above target

Metformin sustained release 1000 mg tabs plus Glimipride 1 mg OD

Step 4

Review after 1 month and if BS above target

Metformin sustained release 1000 mg tabs BD plus glimeperide[2] 1 mg OD

Step 5

Review after 1 month and if BS above target

Metformin sustained release 1000 mg tabs BD plus glimeperide 2 mg OD

Step 6

Review after 1 month and if BS above target

Refer to specialist

Important considerations

- If BS > 400 mg/dL or HbA1C > 11%, refer directly to specialist
- If patient has uncontrolled infection or co-morbid CAD, CKD, diabetic foot ulcer or urine ketones, refer directly to specialist
- If patient is pregnant, refer directly to Ob-Gyn
- Review medication adherence prior to increasing step
- When starting glimeperide:
  - Monitor for hypoglycemic symptoms at all visits and stop glimeperide if present
  - Provide counseling to watch for hypoglycemic symptoms: sweating, confusion, palpitations, dizziness and take sugar orally. Advise to take with food and not to take glimeperide on fasting days/skipping meals
- Diabetic retinopathy: screen retina annually, refer if any eye symptoms or positive exam
- Diabetic neuropathy: examine feet annually, refer if abnormal exam
- Diabetic nephropathy: screen urine protein and serum creatinine annually, refer if proteinuria++ and Cr ≥1.5
- Provide lifestyle advice for all patients

**** Fixed Drug Combination (FDC) is to be used if available**

Notes

*** Weight < 45 kg, urine dip test if ketone Positive – Teleconsultation**

*** If diagnosis is done based on RBS, two reading on two different days to be taken**

*** Insulin is generally not started at PHC but if patient is already taking then it can be continued**

1. Once daily (OD), sustained release ("SR") metformin tablets recommended. If these are unavailable, the same total dosage may be delivered as twice daily immediate release ("IR") tablets. For example, at protocol Step 2, 1000 mg daily dose given as metformin 500 mg twice daily (BD).
2. Glimeperide is only one of several sulfonylurea drugs. Equivalent doses of other types may be substituted in Steps 3, 4 and 5:

Protocol step	Glimeperide	Gliclazide	Glipizide
Step 3, 4	1.0 mg daily (OD)	40mg daily (OD)	2.5 mg daily (OD)
Step 5	2.0 mg daily (OD)	80 mg daily (OD)	5.0 mg daily (OD)

Uttar Pradesh

Diabetes (Type 2) Treatment Protocol

Parameter	Criteria for Diagnosis	Treatment Targets
Fasting Blood Sugar (FBS)	≥126 mg/dL	80-125 mg/dL
Post-Prandial Blood Sugar (PPBS)	≥200 mg/dL	< 200 mg/dL
Random Blood Sugar (RBS)	≥200 mg/dL twice (On two different days)	< 200 mg/dL
Glycated Hemoglobin (HbA1c)	≥6.5%	< 7%
Actions	**Counsel on LSM and initiate treatment**	

If: FBS ≥ 126 and <400 mg/dL, RBS or PPBS ≥ 200 and <400mg/dL, or HbA1c ≥ 6.5 and <11%*

Start with Step 1

Step 1

Metformin 500 mg half BD[1]

Step 2

Review after 1 month and if BS above target

Increase **Metformin to 500 mg BD**

Step 3

Review after 1 month and if BS above target

Add **Glimepiride 1 mg OD** with **Metformin 500 mg BD**[2]

Step 4

Review after 1 month and if BS above target

Increase **Metformin 1000 mg BD** with **Glimepiride 1 mg OD**[2]

Step 5

Review after 1 month and if BS above target

Increase **Glimepiride to 2 mg OD** with **Metformin 1000 mg BD**[2]

Step 6

Review after 1 month and if BS above target

Refer to specialist

Note: Insulin is never started at PHC but if patient is already taking then it can be continued

Monitor Blood Sugar at every 15 days while changing step

NOTES

When to Refer:

- If BS ≥400 mg/dL or Urine/Blood Ketones present or HbA1c ≥11%, refer directly to specialist
- *HbA1c >9% with symptoms or FBS >270 refer to specialist
- If patient has uncontrolled infection or co-morbid CAD, CKD, diabetic foot ulcer or urine ketones, refer directly to specialist
- If patient is pregnant, refer directly to Ob-Gyn
- Review medication adherence prior to increasing step

Annual Checkup:

- Diabetic retinopathy: screen retina annually, refer if any eye symptoms or positive exam
- Diabetic neuropathy: examine feet annually, refer if abnormal exam
- Diabetic nephropathy: screen urine protein and serum creatinine annually, refer if proteinuria++ and Cr ≥ 1.5
- Provide lifestyle advice for all patients

When starting glimepiride:

- Monitor for hypoglycemic symptoms at all visits and stop glimepiride if present
- Provide counseling to watch for hypoglycemic symptoms: sweating, confusion, palpitations, dizziness and take sugar orally. Advise not to take glimepiride on fasting days/skipping meals

[1] If Sustained Release ("SR") Metformin Tablets are available then Once daily (OD) dose is recommended for 500 mg and 1000 mg.

[2] Glimepiride is only one of several sulfonylurea drugs. equivalent doses of other types may be substituted in Steps 4 and 5.

Protocol Step	Glimepiride	Gliclazide	Glipizide
Step 3, 4	1.0 mg OD	40 mg OD	5 mg OD
Step 5	2.0 mg OD	80 mg OD	10 mg OD

BG – Blood Glucose; SR – Sustained Release; OD – Once Daily; BD – Twice Daily; IR – Immediate Release; LSM – Life Style Modification;

Health In Your Hands
National Program for Prevention and Control of Diabetes, Heart Disease & Stroke

NATIONAL HEALTH MISSION
राष्ट्रीय स्वास्थ्य मिशन

Hypertension Protocol

Measure blood pressure of **all persons** over 30 years

High BP: SBP ≥ 140 and/or DBP ≥ 90 mmHg

Check for compliance at each visit before titration of dose or addition of drugs

Step 1 — If BP is high:*
Prescribe Amlodipine 5mg

Step 2 — After 30 days measure BP again. If still high:
Increase to Amlodipine 10mg

Step 3 — After 30 days measure BP again. If still high:
Add Telmisartan 40mg

Step 4 — After 30 days measure BP again. If still high:
Increase to Telmisartan 80mg

Step 5 — After 30 days measure BP again. If still high:
Add Chlorthalidone 6.25mg**

Step 6 — After 30 days measure BP again. If still high:
Increase to Chlorthalidone 12.5mg**

... After 30 days measure BP again. If still high:
Check if the patient has been taking medications regularly and correctly. If yes, refer to a specialist.

Pregnant women and women who may become pregnant
- DO NOT give Telmisartan or Chlorthalidone
- Statins, ACE inhibitors, angiotensin receptor blockers (ARBs), and thiazide/thiazide-like diuretics should not be given to pregnant women or to women of childbearing age not on effective contraception
- Calcium channel blocker (CCB) can be used. If not controlled with intensification dose, refer to a specialist

Diabetic patients
- Treat diabetes according to protocol
- ARB / ACEI may be preferred
- Aim for a BP target of < 140/90 mmHg

Heart attack in last 3 years
- Add beta blocker/ARB/ACEI to Amlodipine with initial treatment

Heart attack or stroke, ever
- Begin low-dose aspirin (75mg) and statin

People with high CVD risk
- Consider aspirin and statin

Chronic kidney disease
- ACEI or ARB preferred if close clinical and biochemical monitoring is possible
- Aim for a target BP of 125/ 75 mmHg

Referral criteria for patients
- Uncontrolled hypertension (non-response to protocol), Cardiovascular disease, chronic kidney disease, and difficult-to-control diabetes
- Suspected secondary hypertension
- Adverse events with protocol medications
- Woman who are pregnant

*** If SBP ≥ 180 or DBP ≥ 110, refer patient to a specialist after starting treatment**

If SBP 160-179 or DBP 100-109, start treatment on the sameday

If SBP 140-159 or DBP 90-99, check on a different day and if still elevated, start treatment

Recommended investigations at initiation of therapy: Haemoglobin, blood glucose, urine analysis for proteinuria, serum creatinine, lipid profile & ECG (if available)

**** Hydrochlorothiazide can be used if Chlorthalidone not available (12.5mg starting dose, 25mg intensification dose)**

Lifestyle advice for all patients

Reduce salt, < 5 gm/day

Avoid tobacco and alcohol

Exercise at least 30 min. per day for 5 day a week

Reduce weight, if overweight

Eat less fried/fatty foods (Trans fats <2.2 g/day for a 2,000 cal. diet)

- ✓ Eat sufficient quantity of fruits and vegetables per day.
- ✓ Avoid papads, chips, pickles etc.
- ✓ Use healthy oils like , mustard sunflower, or groundnut.
- ✓ Reduce weight if overweight. (BMI <23 Kg/m²
- ✓ Limit consumption of foods containing high amounts of trans fatty acid/ saturated fats.
- ✓ Reduce fat intake by changing how you cook:
  - ✓ Remove the fatty part of meat
  - ✓ Use vegetable oil
  - ✓ Boil, steam, or bake instead of fry
  - ✓ Limit reuse of oil for frying
- ✓ Avoid processed foods containing trans fats.
- ✓ Avoid added sugar.

- Dispense drugs for 30 days and give appointment after 28 days
- Medications should be taken at the same time each day

IHCI

PROTOCOL FOR TYPE 2 DIABETES MELLITUS

Screen: (any 1)
- Age ≥30 years
- BMI ≥23 kg/m²
- H/O Prediabetes (annually)
- H/O GDM (every 3 years)
- Symptoms of DM: polyuria, polydipsia, polyphagia, unexplained weight loss
- Any other NCD

Advise Life Style Modifications & assess for complications.

Primary Tier

If Initial FPG 200-250mg/dl or PPPG 300-350mg/dl, consider starting dual drug therapy (Metformin + Teneligliptin)

1 ***Start* T. Metformin 500 mg OD** or BD

Monitor FPG/ PPPG monthly.

Review in 1 month, if FPG/ PPBG values are high.

1A ***Intensify* T. Metformin 1000 mg BD**
Along with LSM (up titrate to maximally tolerated gastrointestinal side effects).

Review in 1 month, if FPG/ PPBG values are high.

2 ***Add* T. Teneligliptin 20 mg OD**

Along with LSM, T. Metformin 1000 mg BID.

Secondary tier

3 *Add third drug**

DRUG	INDICATIONS	CAUTION
Glimepiride	Robust glucose lowering	Weight gain, hypoglycemia
Dapagliflozin (generic)	Heart failure or at risk of heart failure, reno-protection, established atherosclerotic cardiovascular disease	Catabolic state, recurrent genitourinary tract infection, H/O upper urinary tract infections, severely insulinopaenic
Pioglitazone	Atherosclerotic cardiovascular disease	Heart failure, oedema
Voglibose	Prandial glucose regulator at any stage	Gastrointestinal side effects

*Priority of choice of third line drug, to be decided based on associated compelling co-morbidities

If initial FPG>250mg/dl or PPPG>350 mg/dl, especially with severe osmotic symptoms or co-existent infection or presence of any complications or uncontrolled glucose with three drug therapy consider referring to District Hospital/SDH for consideration of insulin initiation.

If plasma glucose is under control by any of these steps and no complications are identified, same treatment should be continued. Follow-up should be done every 1-3 monthly on the basis of FBG and 2 hour PPBG.

Life Style Modifications:

1. Avoid tobacco and alcohol.
2. Exercise regularly 150 minutes per week.
3. If overweight/ obese, lose weight.
4. Diet- decrease quantity of cereals by 25%, encourage fruits and vegetables.
5. Eat less than one teaspoon of salt per day.
6. Reduce fat intake by changing how you cook – remove fatty part of meat, boil, limit reuse of oil for frying.
7. Avoid packed and stored foods.
8. Avoid excess sugar, carbonated/ packaged drinks.

Glycemic Goals for most patients:
- Pre Prandial Plasma Glucose- 80-130 mg/dl
- 2 hour Post Prandial Plasma Glucose-<140-150 mg/ dl
- HbA1c- <7% (to be checked atleast twice a year)

Screen for co-morbidities and complications: (atleast annually)
Hypertension- Blood pressure (preferably every visit)
Dyslipidemia- Fasting lipid profile
Cardiovascular disorders- ECG
Retinopathy- Dilated Fundus examination
Nephropathy- Serum creatinine, urinary albumin: creatinine ratio
Neuropathy- Monofilament test
Peripheral arterial disease- Distal pulses ± ABI (Ankle Brachial Index)

Hypoglycemia
- Symptoms:

Cold sweat, trembling of hands, hunger, palpitation, confusion.
- Treatment:

Give 15 gms of glucose and consume complex carbohydrate (starchy food). Recheck blood glucose after 15 minutes and repeat if hypoglycemia continues.
- Review: Current anti-diabetic medication.

Government of West Bengal, Department of Health and Family Welfare