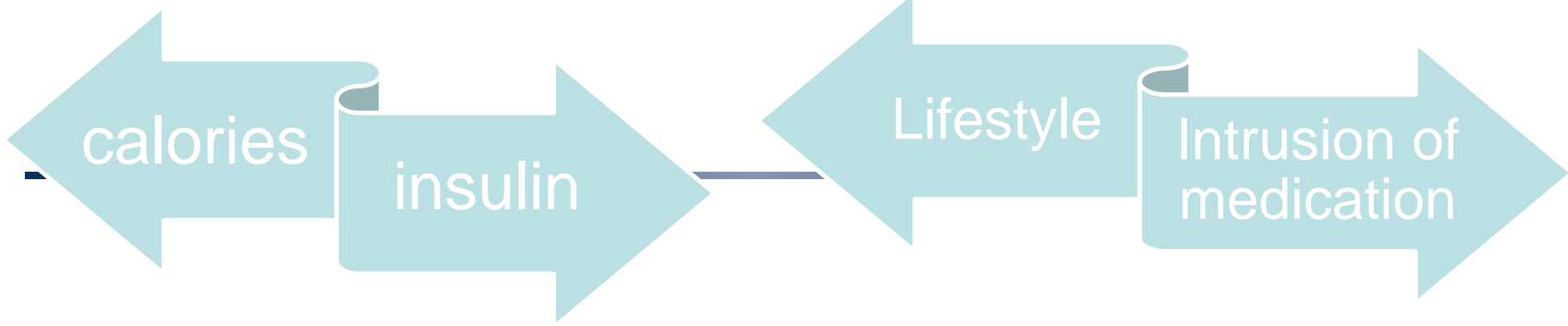
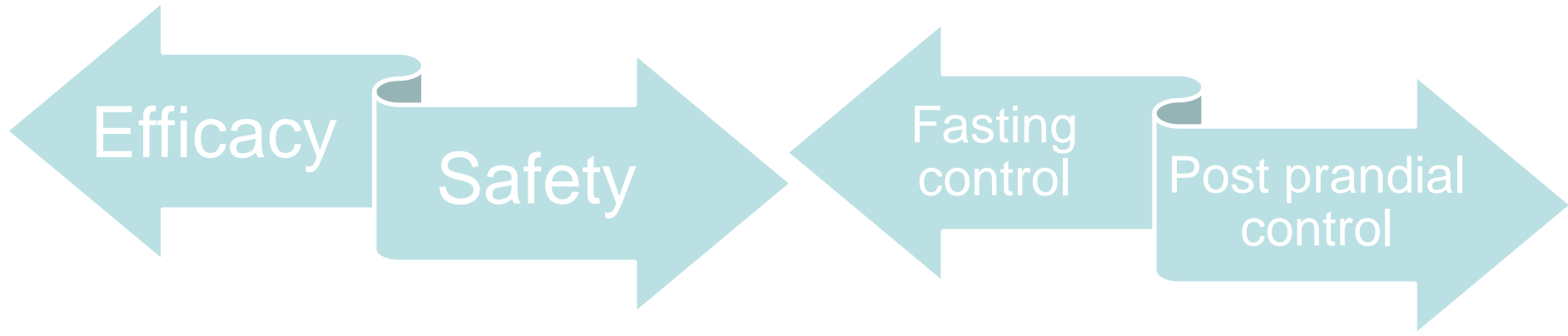


Insulin in developing countries

Sanjay Kalra
Karnal, India



finding a balance



The middle path



အလတ်တန်းစား
အလတ်တန်းစား:

The middle path



Mizzma Padipadar
အလတ်တန်းစား

အလတ်တန်းစားအား ဖြစ်ပေါ်

အလတ်တန်းစား ဖြစ်ပေါ်

Insulin: The 5 Ms that Matter

Editorial Diabetes

Table 1: The five 'M's of Insulin therapy

1. Match: insulin to patient
2. Motivate: patient to accept insulin
3. Method: of injection technique
4. Monitor: glycemic and other parameters
5. Modify: dose, preparation, and regime as indicated

Table 2: Matching insulin to the patient

Regime	Basal	Premixed or basal plus	Basal-bolus
Frequency	Once daily	1–3 times daily	4–5 times daily
Glucophenotype	Fasting hyperglycemia	Fasting and postprandial hyperglycemia	Fasting and postprandial hyperglycemia
Risk of hypoglycemia	Low	Low-moderate	High
Ability/willingness to monitor	Low	Low-moderate	High

Table 3: Motivational interviewing—the WATER approach

W: welcome with warmth

A: ask and assess complaints, medical status

T: tell the truth, while counselling

E: explain, with empathy, the need for insulin

R: reassure and ensure return

Table 4: Insulin technique—seven messages

1. Ensure clean injection site and hands
2. Prefer abdomen, upper thighs, and upper arms for injection
3. Prefer 4 mm pen needles, and 6 mm syringe needles
4. Encourage self-inspection of injection sites and screen for lipohypertrophy (LH)
self insulin site examination (Self IE).
5. Inspect, palpate injection sites at least once a year, more often if LH is detected
6. Do not reuse needles, or share insulin pens, cartridges, and vials
7. Ensure safe disposal of needles and ancillary supplies

Table 5: Monitoring of insulin therapy

Glucose monitoring

- Laboratory-based blood glucose
- Self-monitoring blood glucose
- Ambulatory glucose monitoring
- Continuous glucose monitoring system (CGMS)
- Fructosamine
- 1,25-anhydroglucitol
- HbA_{1c} (glycosylated hemoglobin)

Patient-reported outcomes

- Quality of life
- Treatment satisfaction

Table 6: Modification of insulin

Modification	Indication
Dose titration	<ul style="list-style-type: none">• Mild deviation from glycemic target• Newly begun regime
Change of preparation, e.g., <ul style="list-style-type: none">• Human to analogue• Long-acting to ultra-long acting• Premixed to dual action co-formulation• Low dose premix to high mix	<ul style="list-style-type: none">• Mild deviation from glycemic target• Patient unwilling to increase dose frequency• Glycemic variability
Change of injection frequency, e.g., <ul style="list-style-type: none">• Basal plus 1 to basal plus 2	<ul style="list-style-type: none">• Gross deviation from glycemic target• Isolated postprandial hyperglycemia
Change of regime, e.g., <ul style="list-style-type: none">• Basal to basal plus• Basal to premixed• Premixed to basal plus	<ul style="list-style-type: none">• Gross deviation from glycemic target• Postprandial hyperglycemia

Conversation plan

- Match the insulin to the patient

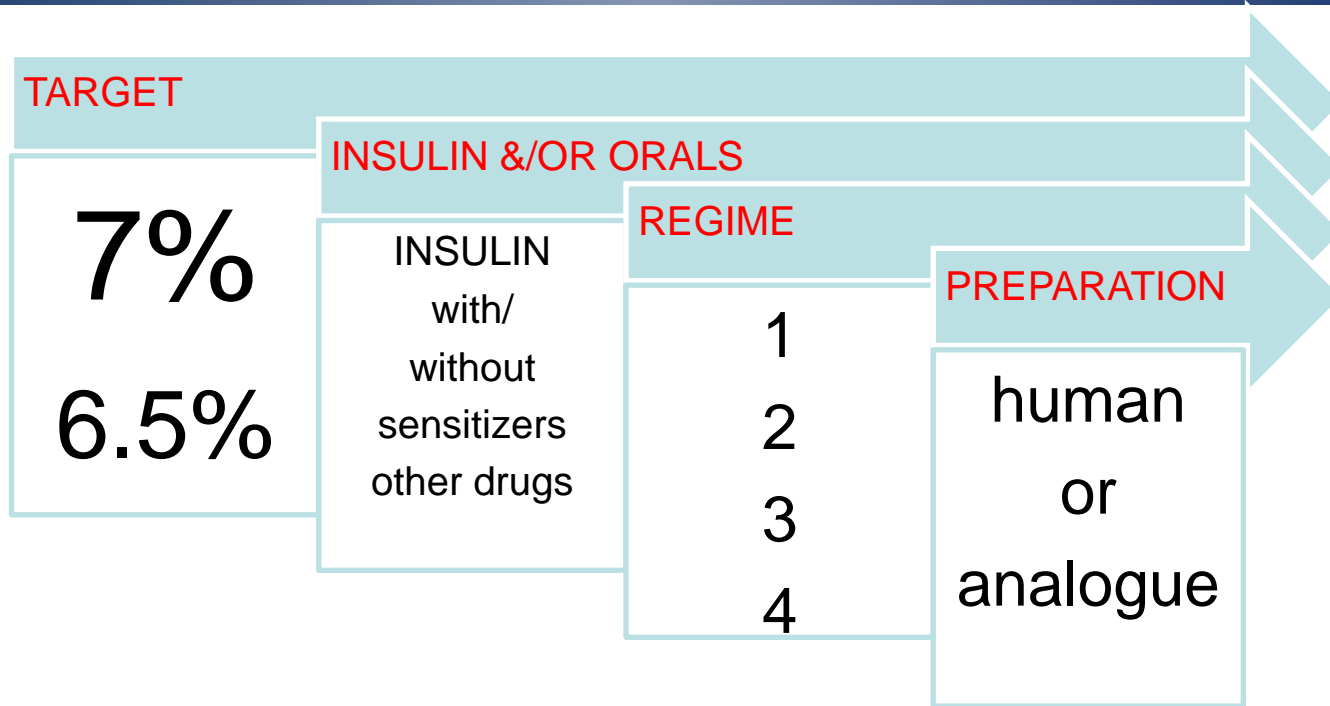
Targets and strategies

- Define a target
- Plan a strategy
- Pick your tools

Master strategist, master nation builder



Targets and strategies



Types of regimes

basal

- Usually once daily
- May be twice daily

premixed

- Usually twice daily
- May be once or thrice daily

intensive

- Thrice daily or more often
- Usually four doses [basal bolus]



Types of regimes

1

- Basal
- Premixed

2

- Premixed
- Basal
- Basal plus

3+

- Basal bolus
- Basal plus
- Rapid –rapid- premixed

REVIEW

Number-Based Approach to Insulin Taxonomy

Sanjay Kalra · Yashdeep Gupta

Number-based approach to insulin taxonomy

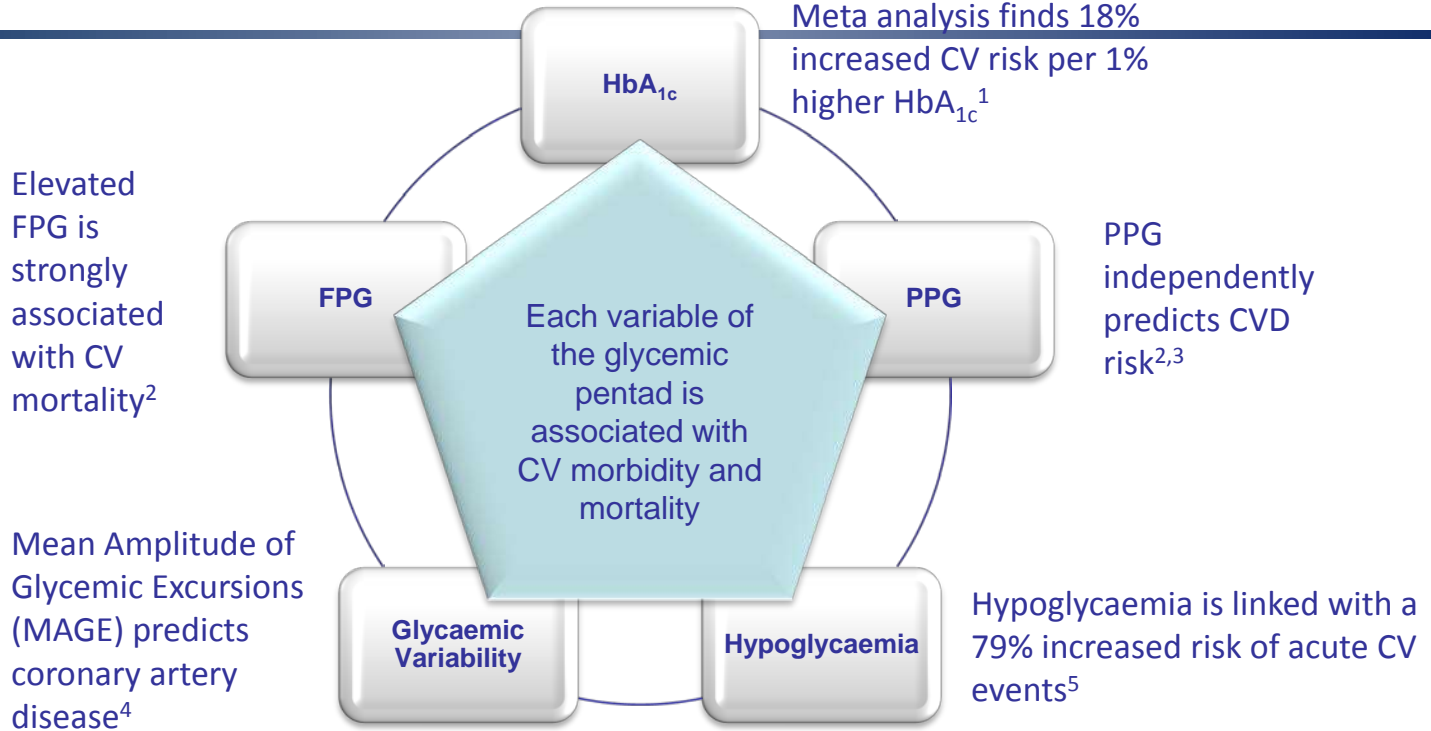
Frequency of injection	Name of regimen	Insulin preparations Used*	Timing of administration
1 x daily	Basal Basal Premixed Coformulation Basal+GLP1RA	NPH, IDet, IGlarg, Iglar U300 IDeg BIAsp LisproMix IDegAsp Ideg + liraglutide Iglar + lixisenatide	At bedtime or same time everyday At any time of the day With major meal With major meal At any time of the day At any time of the day
2 x daily	Basal Premixed Coformulation Basal plus	NPH, IDet, Iglar BHI, BIAsp, LisproMix IDeg Asp Basal + prandial	At bedtime and in the morning With major meal ^a With major meal ^b At bedtime + with major meal
3 x daily	Prandial Bolus–bolus–premixed Premixed–bolus–premixed Bolus-bolus–coformulation	Regular, aspart, lispro, glulisine Prandial + premixed Prandial + premixed Aspart + IDegAsp	With meals With meals With meals With meals
4-5 x daily	Basal-bolus	Any combination of basal and bolus	With meals (3) and at bedtime or 2x daily
CSI (continuous insulin infusion pump)	Alternative to multiple injection		

^a Antipodal meal (meals spaced roughly 12 hours apart)

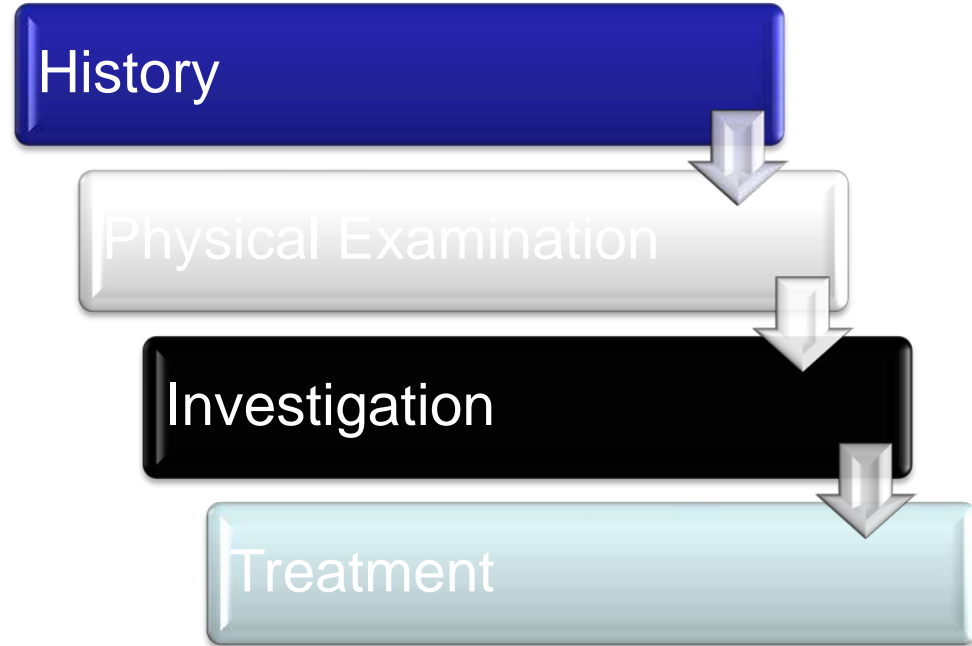
^b Minimum 8-hour gap between 2 doses

* Supported by RCTs

Glycaemic pentad



Hierarchy of Management



Gluco-phenotype

History

Age/
Duration

Diet
Pattern

Physical
Activity

Physical
Examination

Weight

Co-
morbidities

Hypo-
glycemia
Risk

Investigation

FPG

PPG

A1c

Treatment

Basal
Insulin

Premixed
Insulin

Intensive
Insulin

Clinical factor/choice of regime	Basal ¹	Premixed ²	Intensive ³
Fasting hyperglycaemia alone	++	+	++
Postprandial hyperglycaemia alone	—	+	++
Both fasting and postprandial hyperglycaemia	—	++	++
High HbA _{1c} at presentation (>8.5%)	—	++	++
Low HbA _{1c} at presentation (<8.5%)	+	++	—
Acute comorbidity requiring euglycaemia for management, e.g. infection, trauma	—	+	++
High risk of hypoglycaemia	+	+	—

Choosing an insulin regime: a developing country perspective

S Kalra and Y Gupta

Insulin is a frequently prescribed drug in diabetes practice. Considered the most effective glucose-lowering intervention, insulin replacement therapy is a key component of effective diabetes management, irrespective of the stage of the condition.¹ Used as monotherapy, in combination with oral anti-diabetic drugs, and with incretin-based therapy, insulin is the most potent glycaemia-lowering therapy available.¹

Insulin is available in a range of preparations and delivery devices, and can be used to craft a variety of combinations and regimes.² All these regimes are backed by evidence in the form of randomised controlled trials

Association of Clinical Endocrinologists guidelines, for example, reinforce the validity of this assumption when they classify persons seeking anti-diabetic therapy in to three categories, based upon their initial HbA_{1c}. The mid-range HbA_{1c} of 7.5% to 9.0% is perhaps thought to be the glycaemic status of the average person presenting for treatment in the United States.³

The developing world: diabetes as an acute or chronic disease

Most of the world's population, however, live in developing countries. So too, do 80% of the world's people

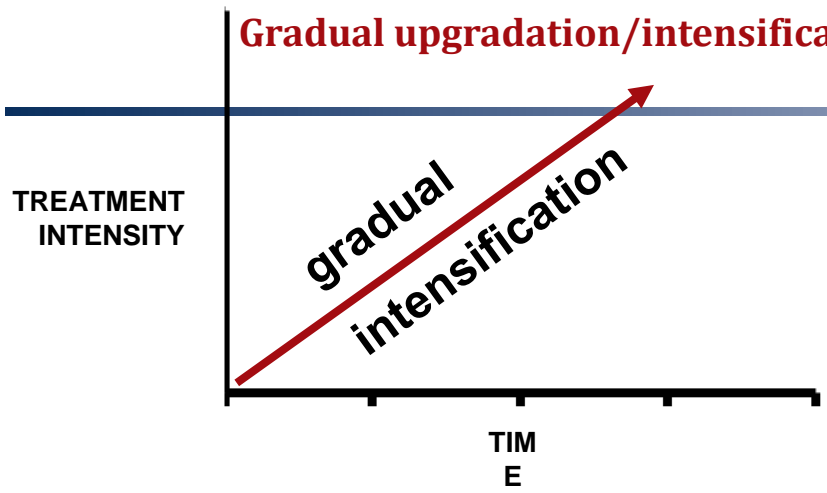


patient-centred care in diabetology
strategy for improving diabetes care in Nigeria
management for diabetic patients with kidney disease
choosing an insulin regime in developing countries
diabetic peripheral neuropathy in diabetic amputees

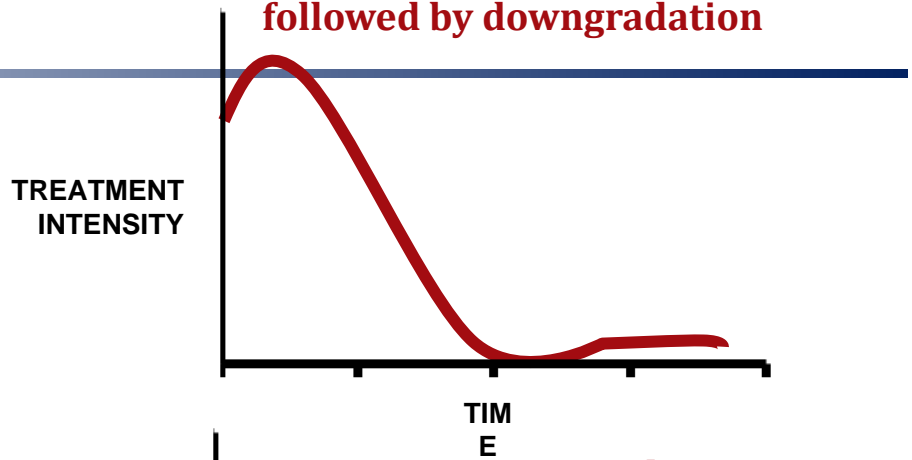
Health care-seeking behaviour

- Escalation
- De-escalation
- Yo-yo
- Linear

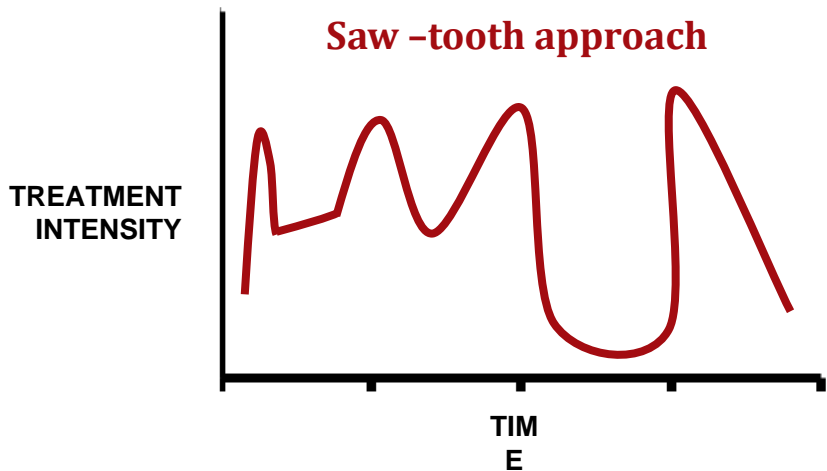
Gradual upgradation/intensification



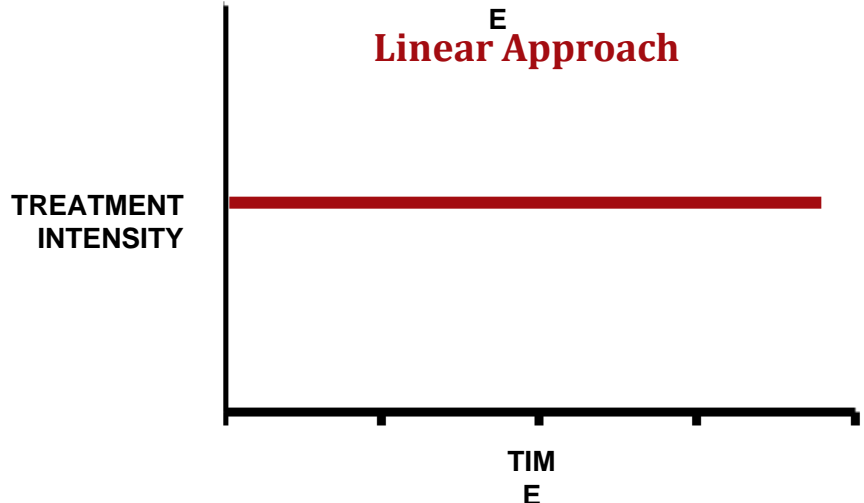
Initial intensive therapy, followed by downgradation



Saw-tooth approach



Linear Approach



Ethnopharmacy

Racial and ethnic differences in

- insulin resistance,
- dietary pattern,
- glucose metabolism, and
- genetic variation



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Recommendations for insulin initiation based on ethnicity

M. John ^{a,*}, S. Kalra ^b, A.G. Unnikrishnan ^c, B. Ganapathy ^d, M.P. Baruah ^e, R.K. Sahay ^f

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^b Bharti Hospital, Karnal, India

^c Amrita Institute of Medical Sciences, Cochin, India

^d St. John's Medical College, Bangalore, India

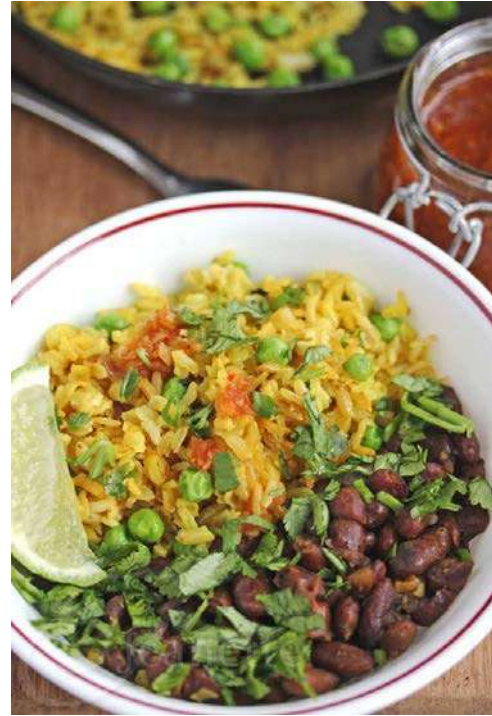
^e Excel Care Hospital, Guwahati, India

^f Osmania Medical College, Hyderabad, India

“We postulate that certain ethnic characteristics of populations will decide the best form of insulin therapy rather than blanket recommendations on starting every patient on basal insulin.”

Myanmar cuisine

- Rice based
- Post prandial load
- Match the medicine to the meal pattern, and to the meal



Match the medicine to the meal,
not the meal to the medicine

Match the insulin regime to the lifestyle,
not the lifestyle to the regime

Conversation plan

- Motivate the patient

Attributes of a good diabetologist

- Confident Competence
- Authentic Accessibility
- Reciprocal Respect
- Expressive Empathy
- Straightforward Simplicity

Table 3: Motivational interviewing—the WATER approach

W: welcome with warmth

A: ask and assess complaints, medical status

T: tell the truth, while counselling

E: explain, with empathy, the need for insulin

R: reassure and ensure return

3I Approach

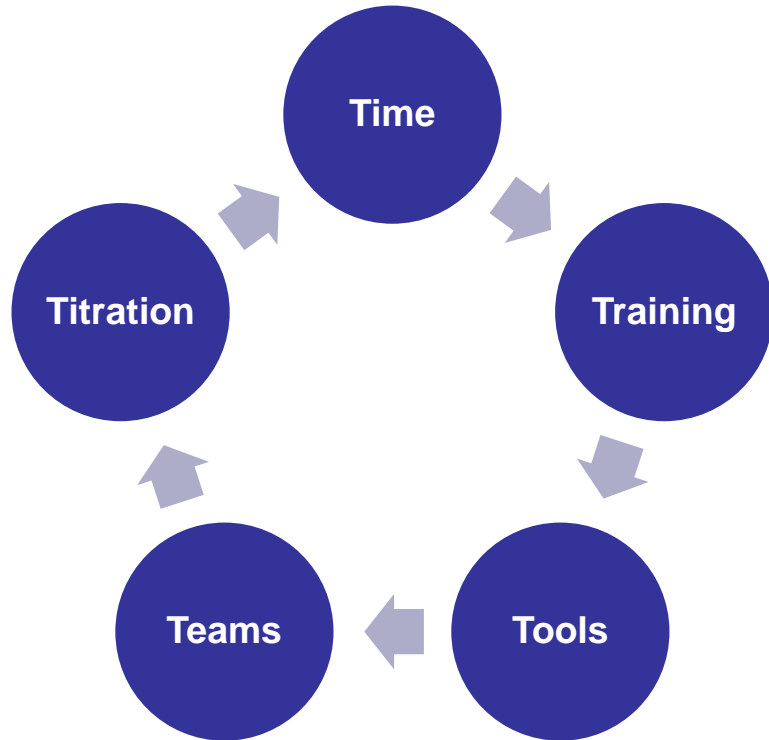
- Inform
- Incubate
- Initiate

Conversation plan

- Method of injection technique

Issues with insulin therapy in Asia

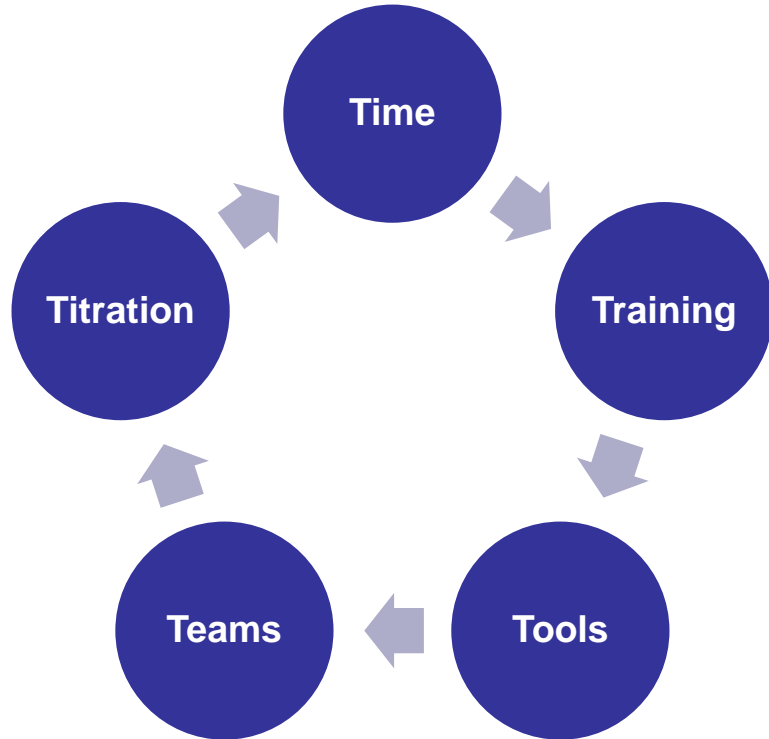
Absence of 5 "T"s



Issues with insulin therapy in Asia

Absence of 5 "T"s

5T = Time Taken To Teach Technique



**Convenience offered
by premixed insulin
regimens can
probably address
these issues**

Flexibility in insulin prescription

Sanjay Kalra, Yashdeep Gupta¹, Ambika Gopalakrishnan Unnikrishnan²

Department of Endocrinology, Bharti Hospital, Kamal, Haryana, ¹Department of Endocrinology, All India Institute of Medical Sciences, New Delhi, ²Department of Endocrinology, Chellaram Diabetes Institute, Pune, Maharashtra, India

A B S T R A C T

This communication explores the concept of flexibility, a propos insulin preparations and insulin regimes used in the management of type 2 diabetes. The flexibility of an insulin regime or preparation is defined as their ability to be injected at variable times, with variable injection-meal time gaps, in a dose frequency and quantum determined by shared decision making, with a minimal requirement of glucose monitoring and health professional consultation, with no compromise on safety, efficiency and tolerability. The relative flexibility of various basal, prandial and dual action insulins, as well as intensive regimes, is compared. The biopsychosocial model of health is used to assess the utility of different insulins while encouraging a philosophy of flexible insulin usage.

Key words: Biphasic aspart, biphasic lispro, degludec, degludec aspart, detemir, glargine, glulisine, hypoglycemia, insulin aspart, lispro, neutral protamine Hagedorn, type 2 diabetes

Flexibility

The ability of an insulin regime/preparation to be injected:
at variable times

with variable injection-meal time gaps

in a dose frequency and quantum determined by shared decision
making

with minimal requirement of glucose monitoring and HCP consultation
with no compromise on safety, efficiency and tolerability

Table 4: Insulin technique—seven messages

1. Ensure clean injection site and hands
2. Prefer abdomen, upper thighs, and upper arms for injection
3. Prefer 4 mm pen needles, and 6 mm syringe needles
4. Encourage self-inspection of injection sites and screen for lipohypertrophy (LH)
self insulin site examination (Self IE).
5. Inspect, palpate injection sites at least once a year, more often if LH is detected
6. Do not reuse needles, or share insulin pens, cartridges, and vials
7. Ensure safe disposal of needles and ancillary supplies

Conversation plan

- Monitoring of insulin therapy

Hypoglycemia

1. In the past week, did you ever have morning headaches?

- No
 Yes
 Don't know

Items (using the same format as above):

1. In the past week, did you ever have morning headaches?
2. In the past week, did you ever have nightmares?
3. In the past week, did you ever have night sweats?
4. In the past week, did you ever have lightheadedness?
5. In the past week, did you ever have shakiness or weakness?
6. In the past week, did you ever have intense hunger?
7. In the past week, did you ever have times when you passed out, fainted, or lost consciousness, even for a short time?

Scoring

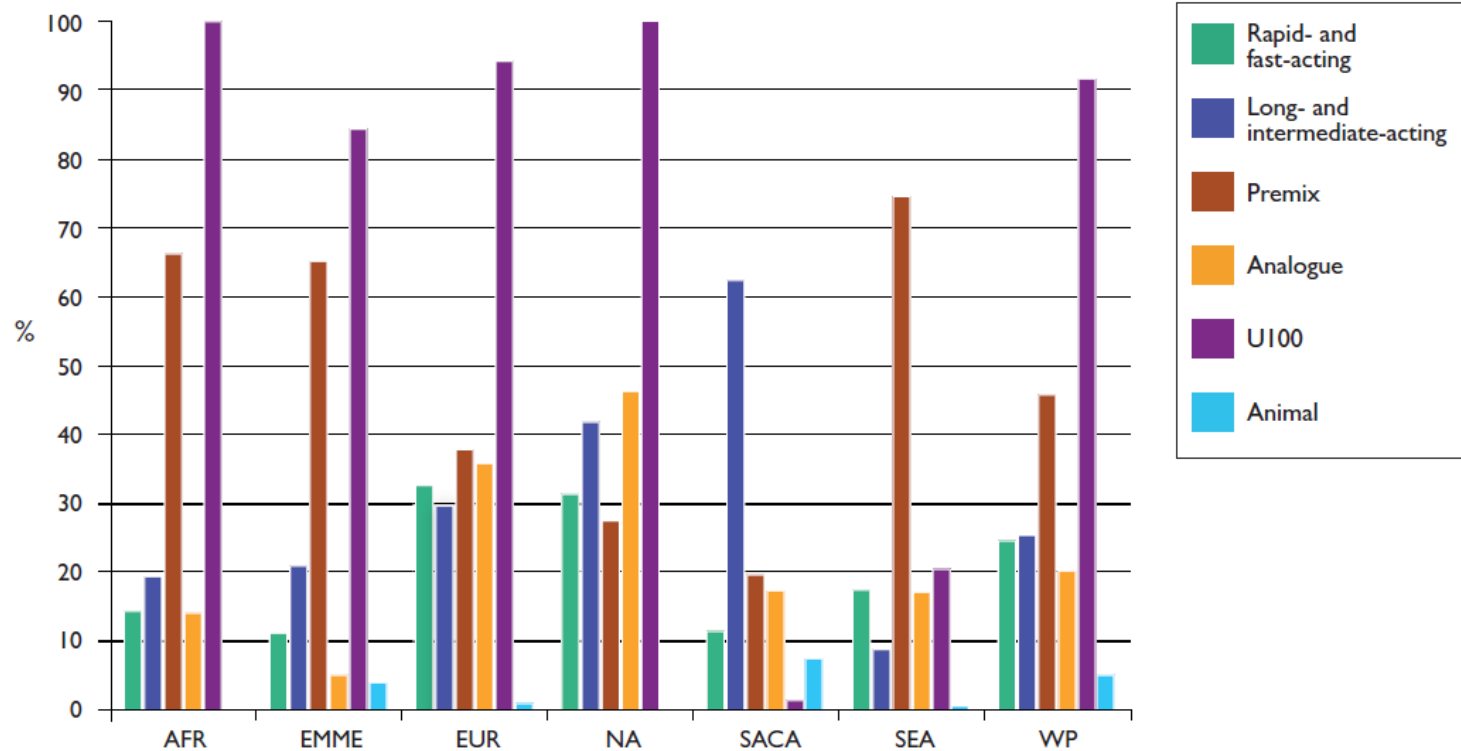
Code as follows: No="0", Yes="1", Don't know=blank. Score is the sum of the seven items, higher score indicating more hypoglycemia symptoms.

Characteristics

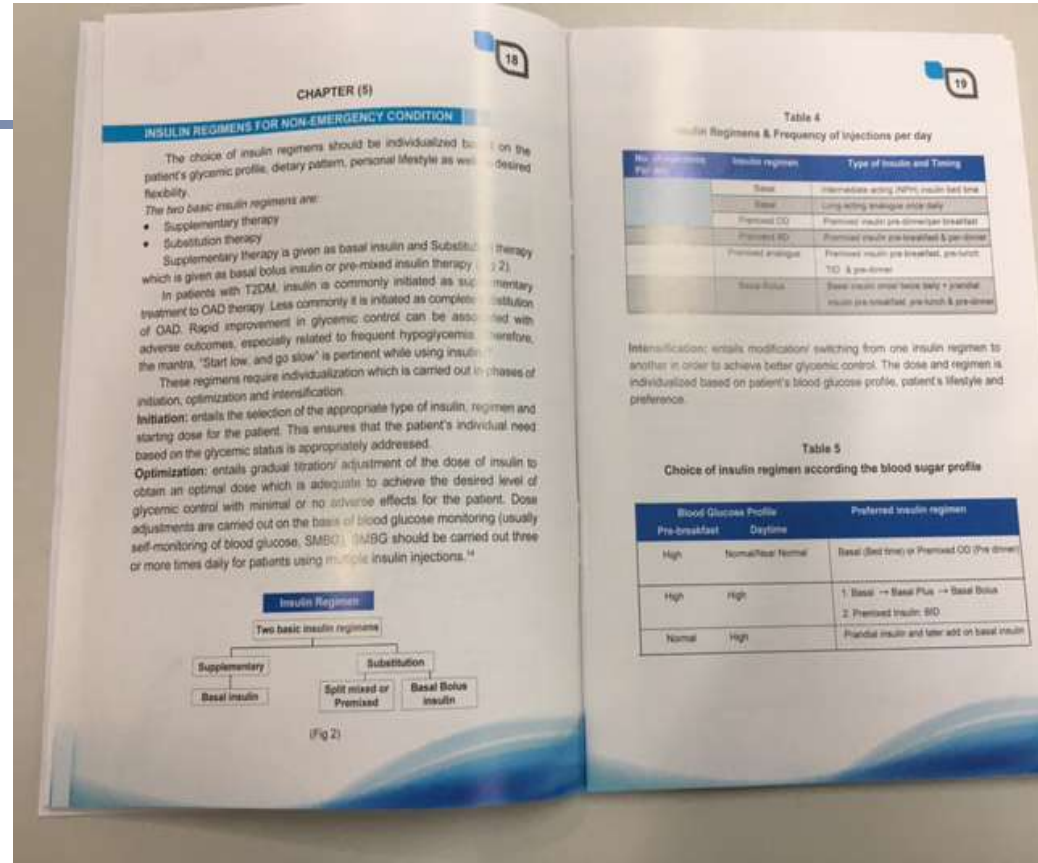
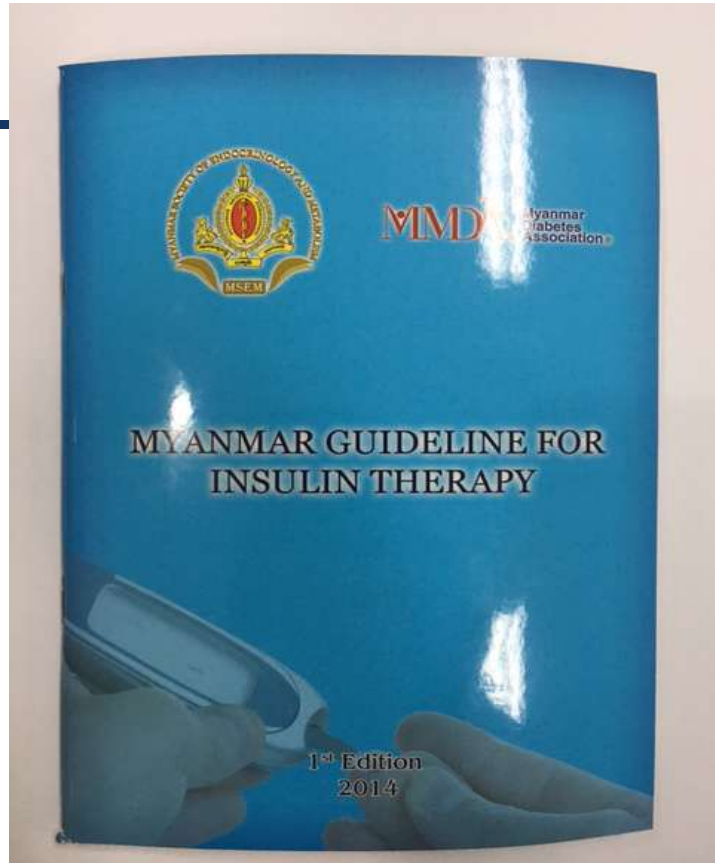
Conversation plan

- Guidelines and suggestions

Usage of insulin type by IDF Regions

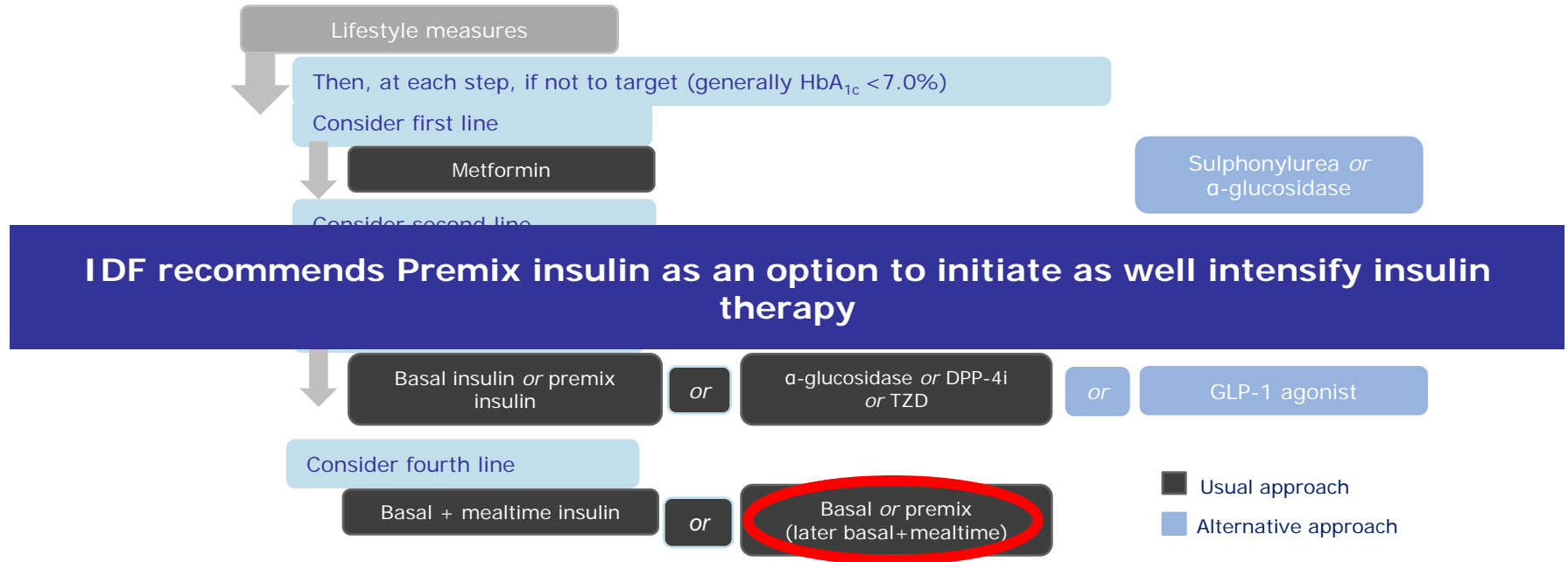


Source: IDF, Diabetes Voice, 2006

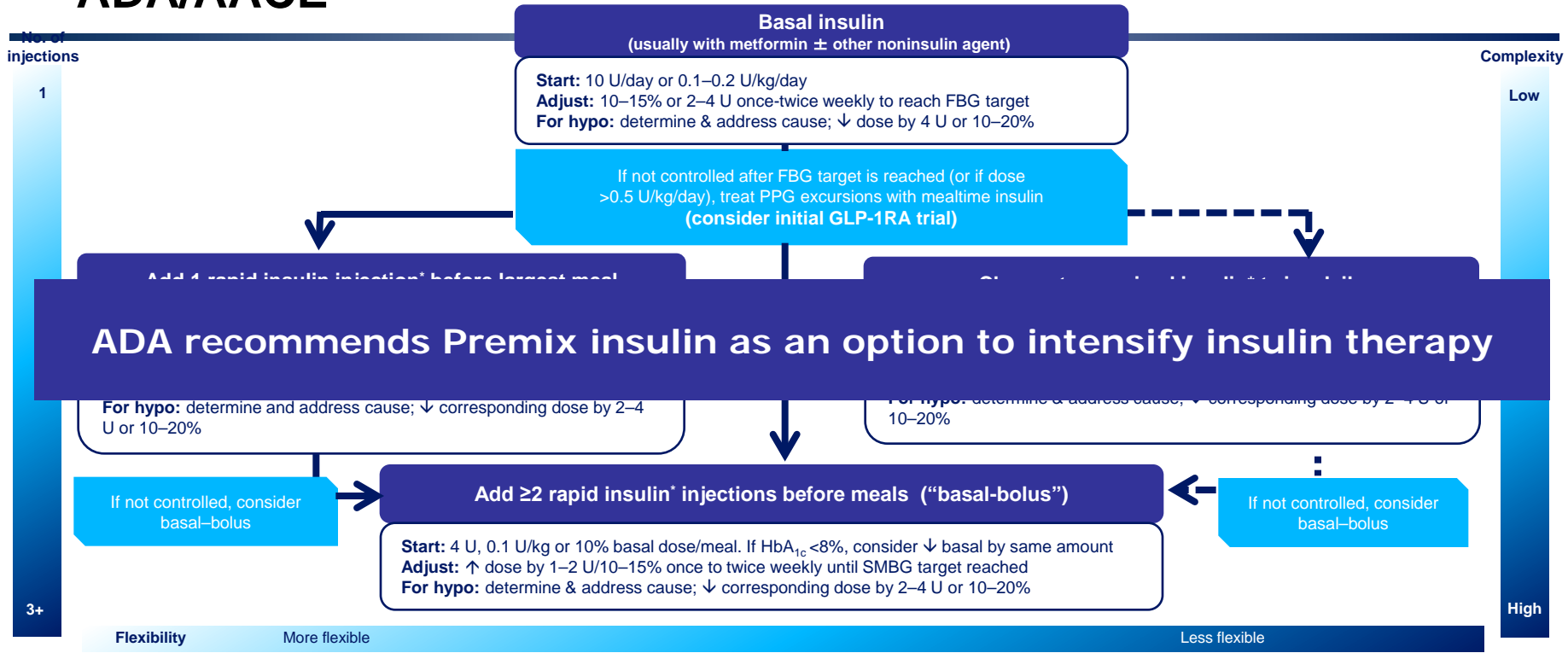


Guidelines and Intensifying Insulin therapy

IDF



Guidelines and Intensifying Insulin therapy ADA/AACE



*Regular human insulin and human NPH-regular premixed formulations (70/30) are less costly alternatives to rapid-acting insulin analogues and premixed insulin analogues, but their pharmacodynamic profiles make them suboptimal for the coverage of postprandial glucose excursions. ADA, American Diabetes Association; EASD, European Association for the Study of Diabetes; FBG, fasting blood glucose; GLP-1RA, glucagon-like peptide-1 receptor agonist; PPG, postprandial glucose; SMBG, self-monitoring of blood glucose



GLYCEMIC CONTROL ALGORITHM



LIFESTYLE THERAPY

(Including Medically Assisted Weight Loss)

Entry A1C < 7.5%

Entry A1C ≥ 7.5%

Entry A1C > 9.0%

MONOTHERAPY*

- ✓ Metformin
- ✓ GLP-1 RA
- ✓ SGLT-2i
- ✓ DPP-4i
- ⚠ TZD
- ✓ AGi
- ⚠ SU/GLN

If not at goal in 3 months proceed to Dual Therapy

DUAL THERAPY*

- MET**
or other 1st-line agent
- ✓ GLP-1 RA
 - ✓ SGLT-2i
 - ✓ DPP-4i
 - ⚠ TZD
 - ⚠ Basal Insulin
 - ✓ Colesevelam
 - ✓ Bromocriptine QR
 - ✓ AGi
 - ⚠ SU/GLN
- +

If not at goal in 3 months proceed to Triple Therapy

TRIPLE THERAPY*

- MET**
or other 1st-line agent + 2nd-line agent
- ✓ GLP-1 RA
 - ✓ SGLT-2i
 - ⚠ TZD
 - ⚠ Basal insulin
 - ✓ DPP-4i
 - ✓ Colesevelam
 - ✓ Bromocriptine QR
 - ✓ AGi
 - ⚠ SU/GLN

If not at goal in 3 months proceed to or intensify insulin therapy

SYMPTOMS

NO

YES

DUAL Therapy

OR

TRIPLE Therapy

INSULIN ± Other Agents

ADD OR INTENSIFY INSULIN

Refer to Insulin Algorithm

LEGEND



Few adverse events and/or possible benefits



Use with caution

* Order of medications represents a suggested hierarchy of usage; length of line reflects strength of recommendation

PROGRESSION OF DISEASE

Guidelines and Intensifying Insulin therapy

Summary

Guideline	Initiation	Intensification
ADA/EASD 2015 position statement update ¹	<ul style="list-style-type: none"> Basal 	<ul style="list-style-type: none"> Add GLP-1RA Basal-plus then basal-bolus Premix BID then basal-bolus
IDF ²	<ul style="list-style-type: none"> Basal OD Premix OD/BID 	<ul style="list-style-type: none"> Basal-plus or basal-bolus
International guidelines recommend both initiation as well a intensification with Premixed Insulins		
Association ⁴	<ul style="list-style-type: none"> Premix OD/BID 	<ul style="list-style-type: none"> Premix BID
NICE ⁵	<ul style="list-style-type: none"> Basal insulin OD or BID Basal insulin + prandial Premixed insulin 	<ul style="list-style-type: none"> Basal-plus Basal-bolus or premix Add GLP-1RA or SGLT-2i
AACE ⁶	<ul style="list-style-type: none"> Basal 	<ul style="list-style-type: none"> Add GLP-1RA or prandial insulin (premix among other options)

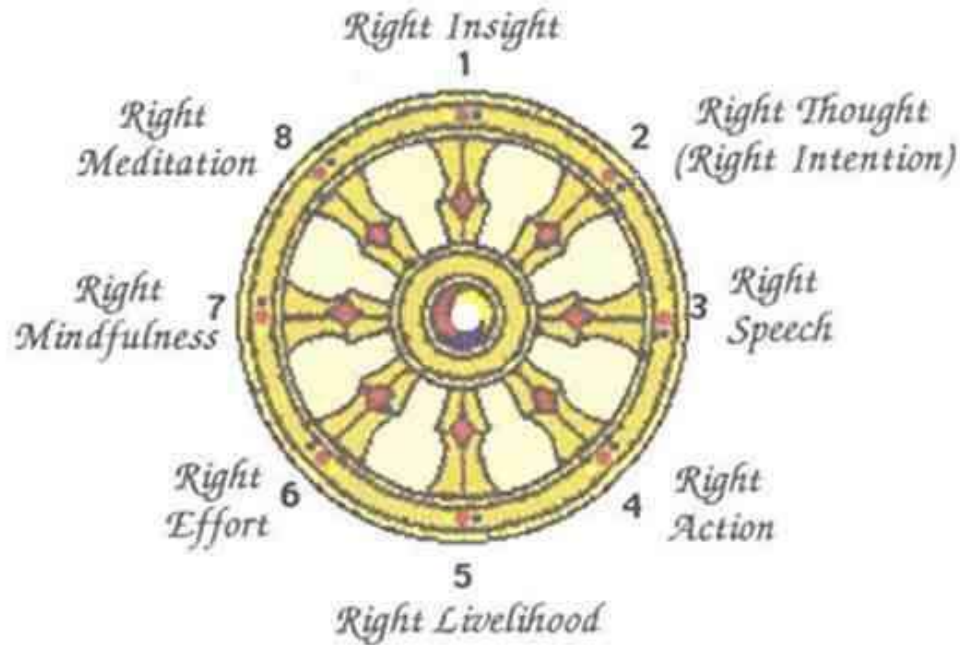
AACE, American Association of Clinical Endocrinologists; ADA, American Diabetes Association; BID, twice daily; EASD, European Association for the Study of Diabetes; GLP-1RA, glucagon-like peptide 1 receptor agonist; IDF, International Diabetes Federation; NICE, UK National Institute for Health and Care Excellence; OD, once daily; SGLT-2i, sodium-glucose cotransporter 2 inhibitor; TID, three times daily; T2D, type 2 diabetes



Table 6: Modification of insulin

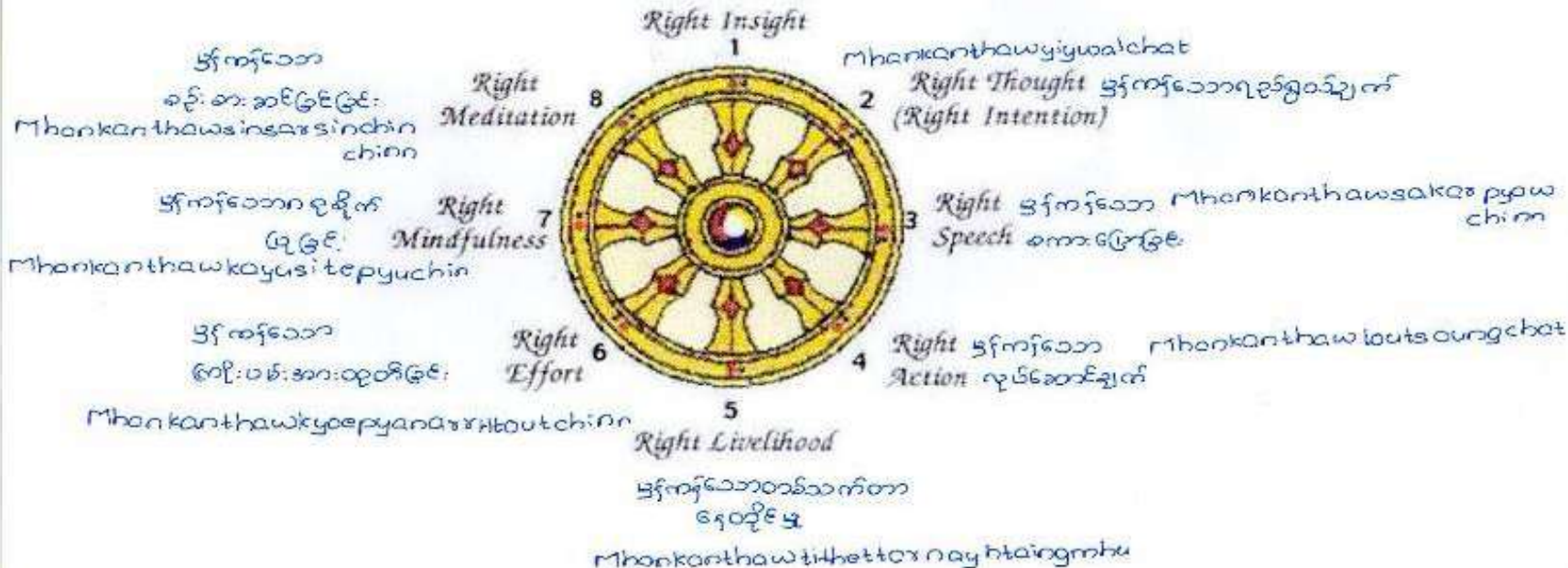
Modification	Indication
Dose titration	<ul style="list-style-type: none">• Mild deviation from glycemic target• Newly begun regime
Change of preparation, e.g., <ul style="list-style-type: none">• Human to analogue• Long-acting to ultra-long acting• Premixed to dual action co-formulation• Low dose premix to high mix	<ul style="list-style-type: none">• Mild deviation from glycemic target• Patient unwilling to increase dose frequency• Glycemic variability
Change of injection frequency, e.g., <ul style="list-style-type: none">• Basal plus 1 to basal plus 2	<ul style="list-style-type: none">• Gross deviation from glycemic target• Isolated postprandial hyperglycemia
Change of regime, e.g., <ul style="list-style-type: none">• Basal to basal plus• Basal to premixed• Premixed to basal plus	<ul style="list-style-type: none">• Gross deviation from glycemic target• Postprandial hyperglycemia

8 Rights that Matter

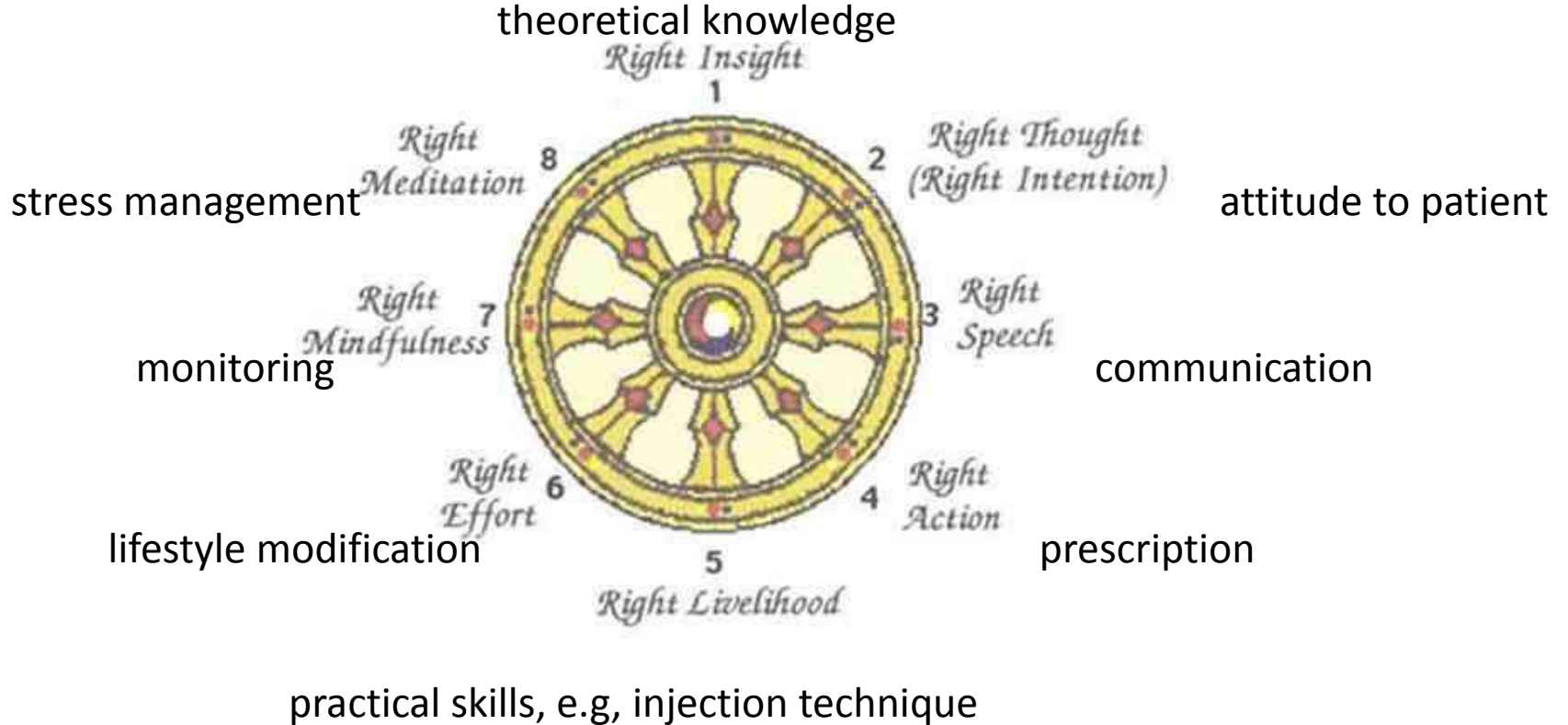


8 Rights that Matter

mhanthawhntohtiun thimyi tatchian
 မှန်ကန်သောတရားဝင်အခြေတင်ခြင်း



8 Rights that Matter



8 Rights that Matter

Ayuasasaingyo:pyinyo:bahuthuta

အယုဒ္ဓါသိပ္ပံနိဒါန်း ယုဒ္ဓါသိပ္ပံနိဒါန်း

theoretical knowledge

Right Insight

1

Satesheythowtabawthakhan

Right Thought
(Right Intention)

စိတ်စွဲညီသောသဘောသဘာဝ
attitude to patient (နေထိုင်ပုံစံ)

Phisichin kinag pyumukyintkyanpon
stress management

Right
Meditation

ဟိဒိဇာ: ဂင်: ခာမာဇယ ဣတုဇာနိယ

monitoring
Right
Mindfulness

ဘေးဇာနိယခင်စော: ဇာနိယ

Sounkyitsitsaychin

lifestyle modification

ဘဝနေထိုင်ပုံစံပြောင်းလဲရေး: ငယ်(ယု)ဇာနိယ

Right
Effort

5

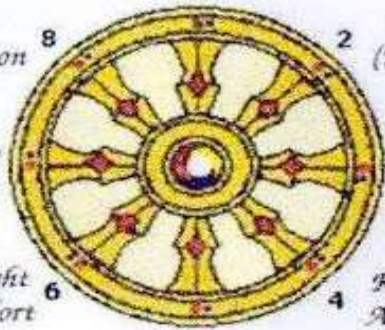
Right Livelihood

Bawanyhtinmuanaengepyu
pyaung lahtaschin

practical skills, e.g, injection technique

ယုဒ္ဓါသိပ္ပံနိဒါန်း ယုဒ္ဓါသိပ္ပံနိဒါန်း ယုဒ္ဓါသိပ္ပံနိဒါန်း, ၁ ယုဒ္ဓါ: ခာမာ: ဇာနိယ: ယုဒ္ဓါ: ယုဒ္ဓါ: ယုဒ္ဓါ

Pyuloutnadingchinnyintsoing the w tattilainmarchin, namunara: soyhtoochin nino: nitaya



communication
waimybachin

Right
Speech

prescription ဥပုဇာနိယ

nyounpyachin

