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REVIEW ARTICLE

Management of older adults with DM: Perspective from geriatric medicine

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Introduction

- Prevalence DM is increasing world-wide, especially in older population.
- In particular, type 2 DM is more common than type 1 in older adults.
- This specific type of DM Manifests as hyperglycemia due to a deterioration of insulin secretion and elevated insulin resistance of varying degrees.
- Two conditions tend to progress with aging, increasing number of older adults living with DM

Introduction

- One study estimated prevalence of DM peaks in individuals in their late 70s in high-income countries.
- Advances in treatment and management of DM, particularly type 2, have led to longer survival of individuals with DM.
- Consequently, population of older adults with DM and other long-term conditions is growing

Introduction

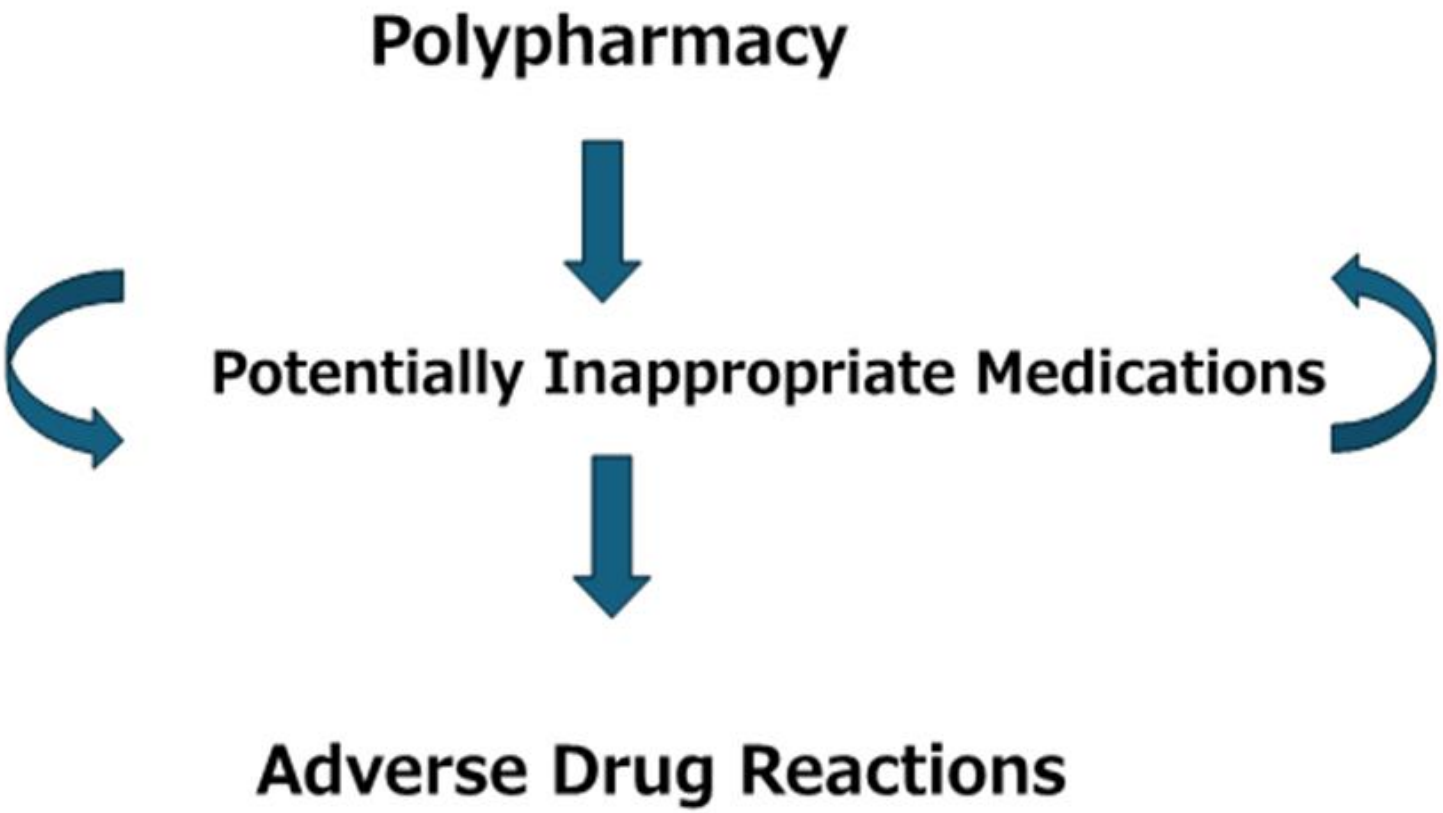
- DM management primarily focuses on avoiding diabetes-related complications through glycemic control, the approach becomes complex in frail older adults
- Clinical guidelines recognize importance of setting lower limits for glycemic control to prevent severe hypoglycemia and to maintain QOL
- Geriatric perspective in DM management not focus on single diseases but instead considers overall management of multimorbidity taking into account functional status & social circumstances

Multimorbidity

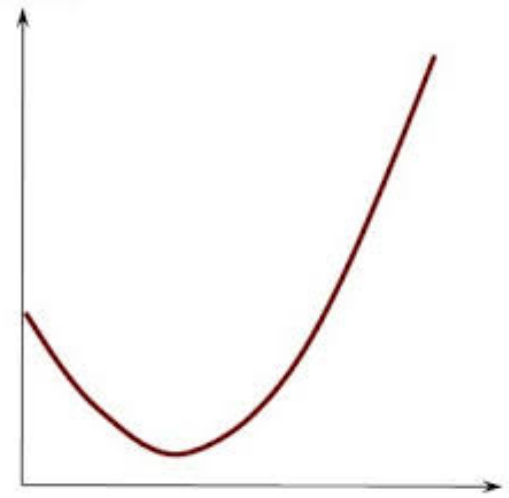
- ❖ Multimorbidity: coexistence of two or more chronic diseases.
- ❖ associated with:
  - ➢ elevated risk of death and disability,
  - ➢ reduced QOL,
  - ➢ high utilization of health care services
  - ➢ increased costs
- Multimorbidity affects more than 90% of older adults with T2DM, increasing disability, hospitalization, and mortality.
- Common comorbidities: HTN, dyslipidemia, CKD, CVD.

Polypharmacy

- Polypharmacy (>5 medications) leads to adverse drug events, drug-drug interactions, and hypoglycemia
- 64% prevalence of polypharmacy in older patients with diabetes
- Not very practical combined treatment of single diseases in multi-morbid older adults
- Multimorbid patients are likely to develop organ damage due to reduced renal function and to have adverse drug reactions due to drug interactions
- Potentially inappropriate medications (PIMs) are medications that should be avoided due to their high risk of adverse drug reactions


Polypharmacy
Potentially Inappropriate Medications
Adverse Drug Reactions

Cognitive Dysfunction & Dementia



- ❖ D M is a major risk factor for dementia (risk ratio ~1.5).
- ❖ Mechanisms include:
  - ➢ affect amyloid-b metabolism and tau phosphorylation,
  - ➢ chronic inflammation and oxidative stress
  - ➢ worsens vascular lesions due to arteriosclerosis,
- Optimal glycemic range for dementia prevention remains uncertain.
- Several studies suggest U-shaped relation with HbA1c.
- **Both very high and very low HbA1c levels may worsen cognitive decline.**
- Hypoglycemia episodes are linked to faster progression to dementia.
- Caregiver support is essential for safe management in cognitively impaired patients.

FUNCTIONAL DECLINEA

- DM is risk factor for mobility and ADLs & IADL disability
- Consequences of decline in ADL in older adults with DM significant & multifaceted.

❖ **Functional decline may lead to:**

✓ Poor self-care and predispose patients to poor disease control or hypoglycemia.

✓ Risk factor for falls

✓ Restricts social activities, which may lead to social isolation.

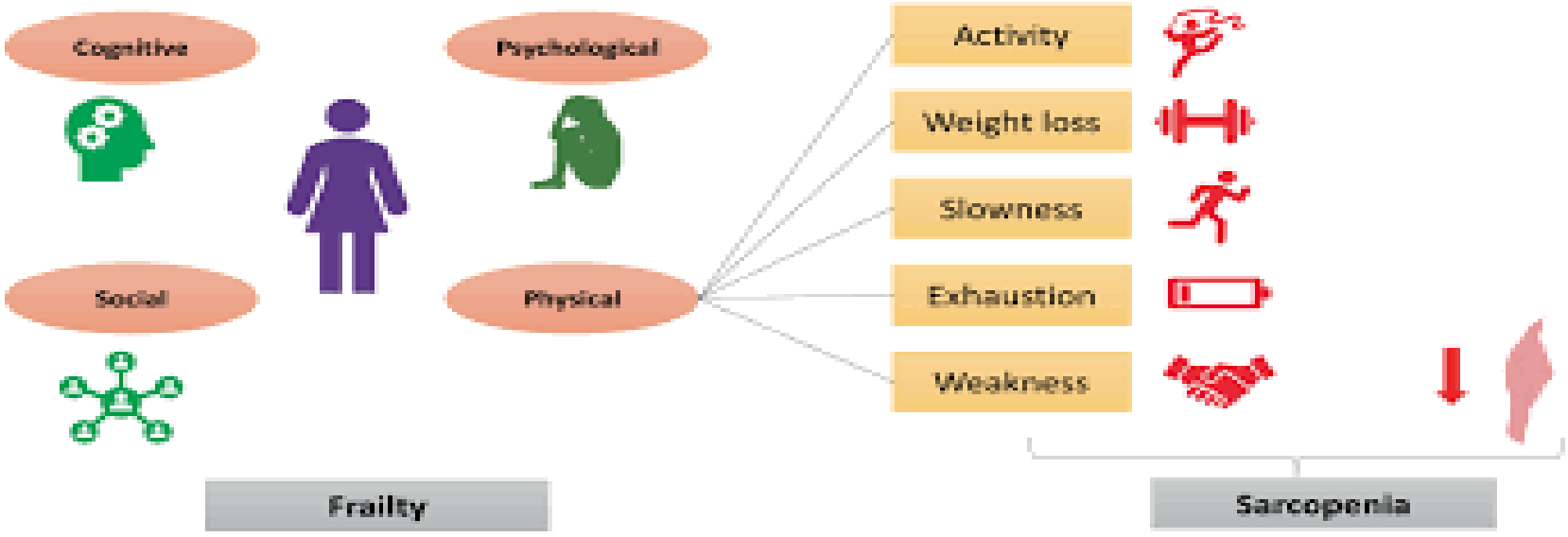
✓ Restricts patients' ability to perform essential tasks of daily life, lead to reduced QOL

✓ Greater level of dependency is risk factor for hypoglycemia.

- Cinical guidelines recommend overtreatment **avoided** in older adults with a functional decline.

Frailty & Sarcopenia

- Frailty : reduced physiologic reserve, making patients more vulnerable to stressors.
- Sarcopenia: loss of muscle mass/strength
- closely related and worsened by DM.



clinical frailty scale

Frailty & Sarcopenia

- In older adults with DM prevalences of
- Prefrailty: 20.1%
- and frailty 49.1%

❖ Frailty and sarcopenia increase risk of:

❖ Falls and fractures,

❖ Disability,

❖ Hospitalization, and death.

Frailty & Sarcopenia

- Several possible reasons why frailty and sarcopenia predispose DM.

1. Insulin resistance increased in diabetes. ⟹ protein anabolism reduced, leading to a fall in Muscle synthesis.
2. Mitochondrial function is impaired in diabetic patients, resulting in decreased muscle performance.
3. Chronic inflammation and oxidative stress associated with diabetes promote development of sarcopenic frailty.

Frailty & Sarcopenia

- Intensive glycemic control was found to be ineffective in preventing diabetic complications and death among frail subjects
- HbA1c levels lower than ~5.9% associated with higher **mortality** in frail older
- Clinical guidelines emphasize avoiding overtreatment.

Geriatric syndrome

- ❖ A group of multifactorial health conditions rooted in biological aging and multimorbidity
- ✓ Falls,
- ✓ Cognitive impairment,
- ✓ Urinary incontinence,
- ✓ Dizziness
- ❖ Polypharmacy is associated with geriatric syndrome because medications are frequently prescribed to manage its symptoms ,and linked to diminished QOL

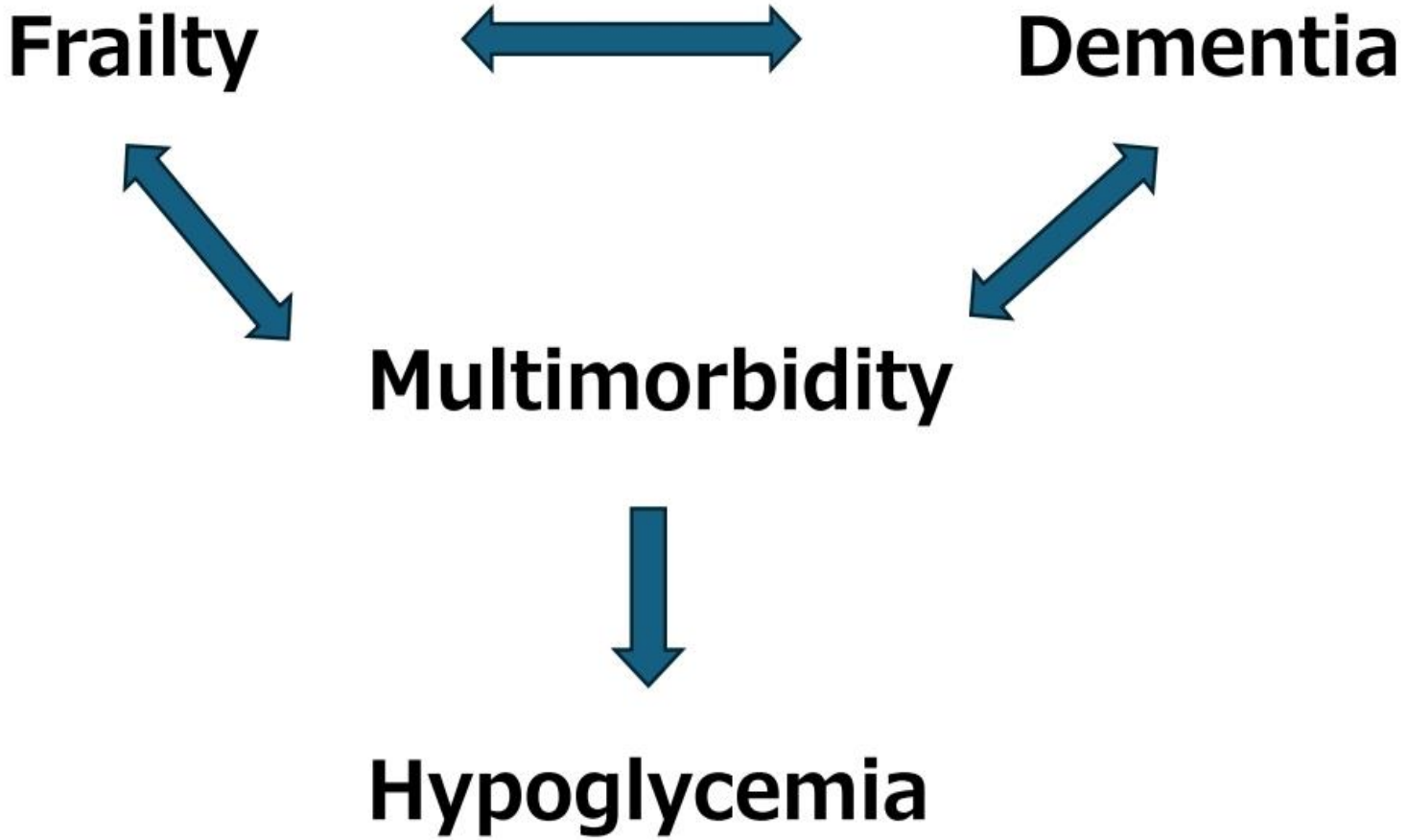
COMPREHENSIVE GERIATRIC ASSESSMENTS

- Multidimensional process involving various disciplines aimed identifying medical, social, and functional needs of older
- Helps to provide **holistic and patient-centered care** by understanding

✓ social support networks,
✓ identifying caregiver strain,
✓ addressing family dynamics,
✓ assessing social determinants of health,
✓ And promoting social engagement

Hypoglycemia

- ❖ Older adults are highly vulnerable to hypoglycemia due to:
- ✓ Impaired renal clearance of medications
- ✓ Cognitive decline
- ✓ Use of sulfonylureas or insulin
- ❖ Consequences:
- ✓ delirium,
- ✓ seizures,
- ✓ falls,
- ✓ hospitalization,
- ✓ dementia,
- ✓ Cardiovascular events.


Frailty
Dementia
Multimorbidity
Hypoglycemia

Hypoglycemia

- **Avoiding DM overtreatment** to prevent hypoglycemia by setting lower limits for glycemia levels in older patients with complex backgrounds

❖ Endocrine Society recommends HbA1c targets between **8 % and 8.5% for individuals with**

➢ Declined ADLs in two or more domains,

➢ Moderate-to-severe dementia,

➢ End-stage illness,

- Glycemic control levels in multimorbid frail older subjects, particularly those in long-term care facilities, should be carefully considered

Conceptual framework for considering overall health and patient values in determining clinical targets in adults aged 65 and older

OVERALL HEALTH CATEGORY		GROUP 1: GOOD HEALTH	GROUP 2: INTERMEDIATE HEALTH	GROUP 3: POOR HEALTH
Patient characteristics		No comorbidities **or** 1–2 non-diabetes chronic illnesses[a] **and** No ADL[e] impairments and ≤1 IADL impairment	3 or more non-diabetes chronic illnesses[a] **and/or** Any one of the following: Mild cognitive impairment or early dementia ≥2 IADL impairments	Any **one** of the following: End-stage medical condition(s)[b] Moderate to severe dementia ≥2 ADL impairments Residence in a long-term nursing facility
		Reasonable glucose target ranges and HbA1C by group **Shared decision-making: individualized goal may be lower or higher**		
Use of drugs that may cause hypoglycemia (eg, insulin, sulfonylurea, glinides)	No	Fasting: 90–130 mg/dL Bedtime: 90–150 mg/dL <7.5%	Fasting: 90–150 mg/dL Bedtime: 100–180 mg/dL <8%	Fasting: 100–180 mg/dL Bedtime: 110–200 mg/dL <8.5%[d]
	Yes[c]	Fasting: 90–150 mg/dL Bedtime: 100–180 mg/dL ≥7.0 and <7.5%	Fasting: 100–150 mg/dL Bedtime: 150–180 mg/dL ≥7.5 and <8.0%	Fasting: 100–180 mg/dL Bedtime: 150–250 mg/dL ≥8.0 and <8.5%[d]

Pharmacotherapy

- Intensive treatment may be less beneficial in frail older patients with complex backgrounds and predispose vulnerable patients to hypoglycemia.
- Several guidelines recommend individualized glycemic control levels based on patients' health backgrounds
- Recommendations are currently primarily based on expert opinions, and additional clinical evidence is required to support them.

Pharmacotherapy

- ✓ Metformin: **First-line** unless contraindicated (monitor eGFR >30 mL/min).
- ✓ DPP-4 inhibitors: Well tolerated, minimal hypoglycemia risk.
- ✓ SGLT-2 inhibitors: Benefit heart failure and kidney outcomes, but monitor for dehydration and infections.
- ✓ GLP-1 RAs: weight loss benefit, caution in frail/malnourished patients.
- ✓ Sulfonylureas (esp. long-acting): **avoid** due to high hypoglycemia risk.
- ✓ Insulin: **Simplify regimen**, use basal-only strategies if possible
- ✓ involve caregivers to prevent dosing errors.

Pharmacotherapy

- Complex pharmacotherapy sometimes leads to a large burden in frail older adults with multimorbidity and cognitive impairment, which may reduce these patients' QOL
- The aim of the treatment should be carefully reviewed with assessment of patients' capacity and consideration of their opinions

Non-Pharmacologic Therapy

- Medical nutrition therapy: avoid undernutrition, ensure adequate calories and protein.
- Resistance and aerobic exercise: improve insulin sensitivity, muscle strength, and physical function.
- Physical activity should be adapted to patient capacity and comorbidities.
- Multicomponent interventions (nutrition + exercise + medication review) reduce frailty and improve independence.

Conclusion

- Older adults with DM represent a complex, heterogeneous group.
- Management should balance glycemic control with prevention of hypoglycemia and functional decline.
- Clinical decisions must be **individualized** based on comorbidities, cognition, frailty, and patient preferences.
- Main goal: maintain independence, prevent complications, and improve quality of life.