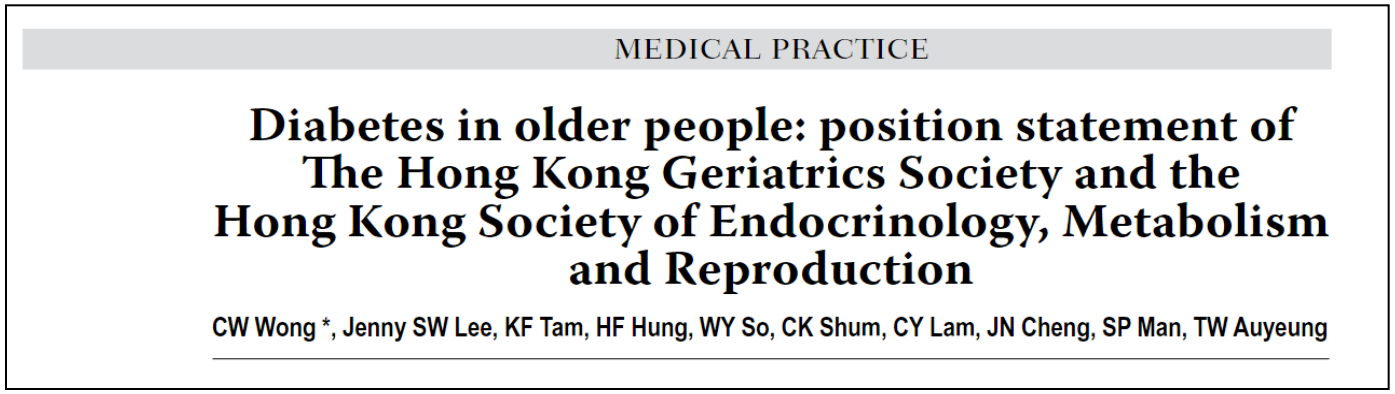
A review of preventive care for older people with type 2 diabetes at risk of hypoglycemia



Jessica HUANG
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Sau-Yee HO
May CHAN*
Grace LIN
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(Leader)*

Background



MEDICAL PRACTICE

Diabetes in older people: position statement of The Hong Kong Geriatrics Society and the Hong Kong Society of Endocrinology, Metabolism and Reproduction

CW Wong *, Jenny SW Lee, KF Tam, HF Hung, WY So, CK Shum, CY Lam, JN Cheng, SP Man, TW Auyeung

- A retrospective study in Hospital Authority – AED
- Hypoglycemia was a significant problem among older people with diabetes with hypoglycemia-related AED attendances in a period of 12 months (2013–2014)
- In 2,416 patients were identified with 78.2% patients were aged ≥ 65 and 81.1% of them required hospitalization
- The 12-month mortality rate for all AED attendance was 16.3%

(Wong et al, 2017)

Background



Convention ID: 228
Submitting author: Ms May CHAN
Post title: Nurse Specialist, CMC, KWC

Hypoglycemia Initiative: A Retrospective Review on Diabetic Patients Hospitalized for Hypoglycaemia in A Regional Centre
Lam PKE, Chan MT, Wong CL, Tam HKV
Department of Medicine and Geriatrics, Caritas Medical Centre

- Another retrospective review in a local hospital
- Examined the clinical profiles of 218 hospitalized people with diabetes for severe hypoglycemia in a period of 12 months (2015-2016)
- The result also found a high prevalence of 12-month mortality rate (17.4%)
- The number of co-morbidities were positively associated with mortality at 1 year ($X2=10.1$, $p=0.038$)

(Lam et al, 2018)

Clinical Trigger

- Hypoglycemia is common in older people with diabetes and need medical intervention / AED attendance.
- The 12-month mortality rate is significant
- These numbers alarmed our group to focus our EBP review on the preventive care of hypoglycemia in older people with Type 2 Diabetes (OPWT2D).

Evidence-Based Practice Question

"What is the preventive care for OPWT2D at risk of hypoglycemia?"

Objectives

- To identify the risk factors associated with hypoglycemia in OPWT2D
- To find evidence that can inform the future development of nursing interventions on preventive care of hypoglycemia in OPWT2D in Hong Kong

Search strategies

- Five electronic databases, i.e. Cochrane, CINAHL, EMBASE, MEDLINE and PUBMED, were selected.
- Articles in English, from 2000 to 2018, with full text and meeting the inclusion criteria.

Inclusion Criteria

- Subjects with age 65 or above with Type 2 diabetes
- Studies related to hypoglycemia

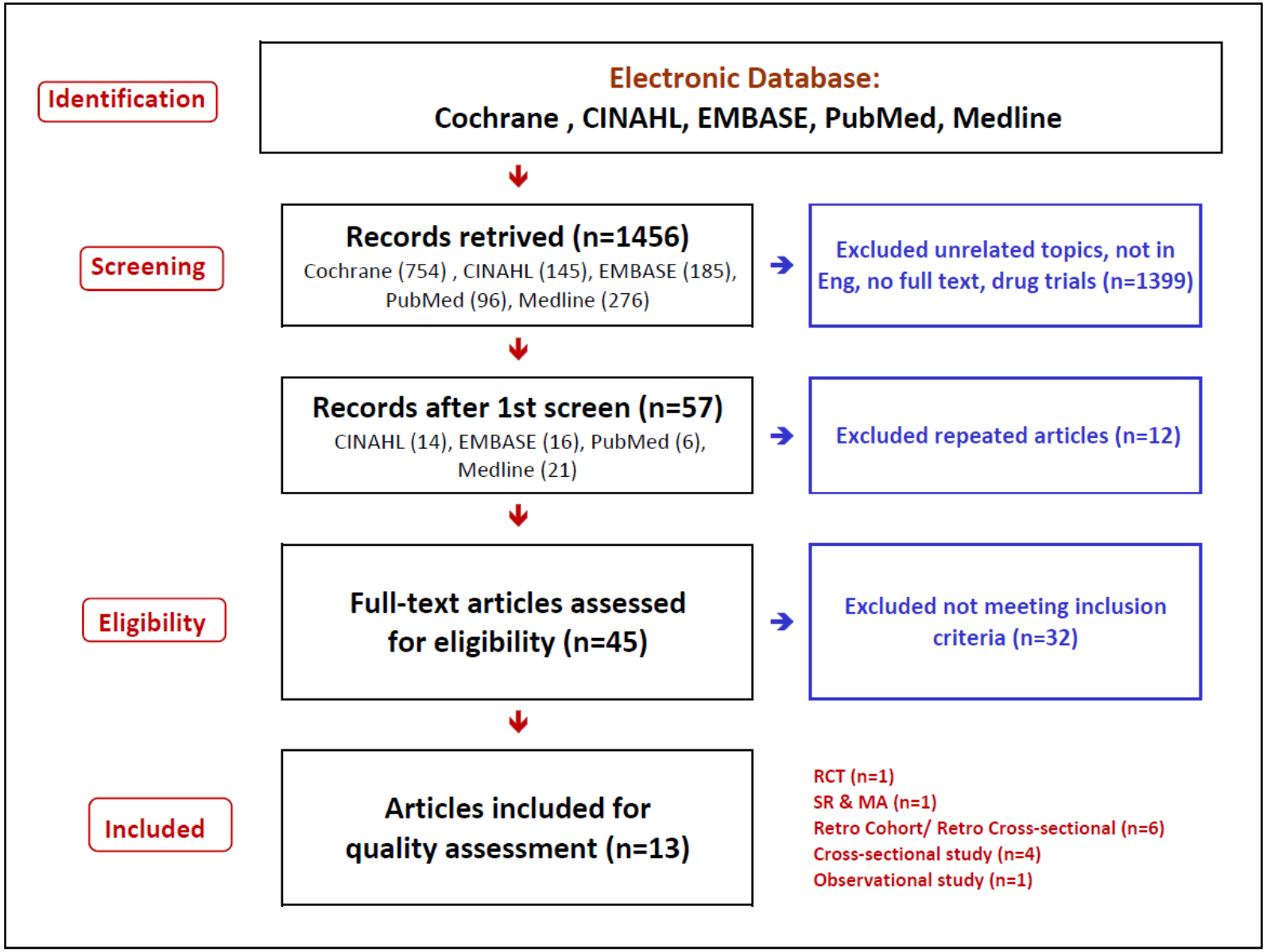
Exclusion Criteria

- Not related to the topic
- Drug trials
- Duplicate

Keywords

P	**Older people with Type 2 diabetes, aged 65 or above** *(elder* / old* / geri* / Type 2 diabet* / non-insulin dependent*)*
I	**Prevention of hypoglycemia** *(checklist* / intervent* / prevent* / measure* / care* / caring / nurs* / manage* / pract* / assess*)*
C	**No preventive measure** *Usual care, attention control*
O	**Hypoglycemia** *(hypoglyc?m* / low blood glucose / low blood sugar)*

Flow Diagram



Quality Appraisal

- These 13 articles were further assessed with the "Johns Hopkins Nursing Evidence-Based Practice-Synthesis and Recommendations Tool"
- Each article was appraised by two members of our group
- One article with level IIIC quality removed from the list for further analysis *(Noale et al, 2016)*

Summary of literature review

Author & Year	Study Design	Sample & Sample Size	Setting	Study findings that help answer the EBP question	Evidence Level & Quality
Miller et al, 2014	RCT	10,251 T2DM, aged 40-79	Outpatients, multicenter in U.S.	- The older diabetes subgroup (≥65 years old) with early cognitive impairment or dementia who are at greatest risk of severe hypoglycemia - The older subgroup with intensive treatment experienced higher annualized rates of severe hypoglycemia	IA
Mattishent & Loke, 2016	Systematic review & Meta-analysis	1,439,818 T2DM, mean aged 75 & cognitive impairment from 9 meta-analysis	In-/out-patients in various countries	- A bi-directional relationship between cognitive impairment and hypoglycemia in older patients. - Glucose-lowering therapy should be carefully tailored and monitored in older patients who are susceptible ed Hypoglycemic	IIIB
Muller et al, 2016	Retrospective cross-sectional study	7597 DM (4459 T2DM aged ≥65)	In ambula France, Be Netherlar Sweden, Ireland & Germany GUIDANCE study	≥ 65 years if and treatment - The lower mean of HbA1c levels (<7%) of elderly patients with diabetes and co-existing cardiovascular disease increased risks of severe hypoglycemia events	IIIB
Schejter, Turvall & Ackerman, 2012	Retrospective study	155 T2DM with mean age 71.8	In-patient	- Elderly fragile patients with multiple comorbid situations including renal failure and tight glycemic control	IIIB
Thorpe et al, 2015	Retrospective cohort study	15,880 T2DM, aged >=65 with dementia from Veterans Affairs (VA) who were treated with OAD	Outpatier national administr data and	intense s. , Renal failure	IIIB
Davis et al, 2014	Retrospective cross-sectional analysis	583 T2DM aged >=65, with insulin -treated, long term care for 3 months or more	107 Nursi United States	ol. - Need for individualized glycemic control among elderly patients.	IIIB
Zhong et al, 2017	Retrospective cohort study	264,687 DM who needed hospitalization (23,246 T1DM with young age-middle age & 241,441 T2DM aged 18-64 & >=65)	Inpatients in England (via Clinical Practice Research Datalink)	- The incidence of hypoglycemia hospitalization remained high in spite of the recent decline in elderly adults with T2DM. lycemia	IIIB
Arnold et al, 2018	Cross-sectional	42,669 T2DM, aged >=75	151 outpa Diabetes Registry	tions that fforts to	IIIB
Hewitt et al, 2010	Cross-sectional	1047 T2DM aged 75 years and over	Joint care professio (GP & hospi	ng how to glycemia - Further education on diabetes management may be helpful - Home glucose testing should be performed regularly	IIIB
Nicolucci et al, 2015	Cross-sectional	1,323 T2DM with mean age 70	Community of 12 Italian regions	- Hypoglycemia is associated with strong negative influence on quality of life and social activities in elderly people with type 2 diabetes. - Minimizing the risk of hypoglycemia is a priority for the treatment of diabetes in the elderly.	IIIB
Pornet et al, 2011	Cross-sectional	1766 T2DM aged 65 years and over	Community in France	- Perform better screening for complications in elderly people with type 2 diabetes. - Monitor the risks for hypoglycaemia, hypotension, malnutrition and contraindications related to renal function.	IIIB
Abbatecola et al, 2015	Observational study	2258 patients with Type 2 DM aged 65 to 110 years	150 Nursing homes in Italy	- Severe hypoglycemia was more prevalent in patients with dementia (18%) compared with patients without dementia (8%) - Patients with dementia who experienced a severe hypoglycemia event were older, had more comorbidities, higher HbA1c levels, greater ADL impairments and a shorter nursing home stay - Patients with dementia using rapid- and long-acting insulin analogs were less likely to experience a severe hypoglycemic event	IIIB

Total 1,761,650 of OPWT2D

Aged 40-110
(subgroup: aged ≥65)

More hypoglycemia in those who were dementia/cognitive decline, and treated with OAD or insulin

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Muller et al, 2016	Retrospective cross-sectional study	7597 DM (4459 T2DM aged ≥65)	In ambulatory Care from France, Belgium, Italy, Netherlands, UK, Sweden, Ireland & Germany GUIDANCE study	- strategies and to involve patients in decision making. - The lower mean of HbA1c levels (<7%) of elderly patients with diabetes and co-existing cardiovascular disease increased risks of severe hypoglycemia events	IIIB
Schejter, Turvall & Ackerman, 2012	Retrospective study	155 T2DM with mean age 71.8	In-patient	- Eld trol	IIIB
Thorpe et al, 2015	Retrospective cohort study	15,880 T2DM, aged >=65 with dementia from Veterans Affairs (VA) who were treated with OAD	Outpatients in U.S. (via national Veterans Affairs administrative/ clinical data and Medicare claims)	- -	IIIB
Davis et al, 2014	Retrospective cross-sectional analysis	583 T2DM aged >=65, with insulin -treated, long term care for 3 months or more	107 Nursing homes in the United States	- -	IIIB
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Arnold et al, 2018	Cross-sectional	42,669 T2DM, aged >=75	151 outpatient sites in the Diabetes Collaborative Registry	- Older adults with type 2 diabetes mellitus are tightly controlled with glucose-lowering medications that have a high risk of hypoglycemia. - Potential overtreatment of a substantial proportion of people and should encourage further efforts to translate guidelines to daily practice.	IIIB
Hewitt et al, 2010	Cross-sectional	1047 T2DM aged 75 years and over	Joint care of healthcare professional (GP & hospital doctor	- Approximately one quarter of people with cognitive impairment were significantly not knowing how to manage hypoglycemia - People from lower social economic groups gave incorrect responses in the presence of hypoglycemia - Further education on diabetes management may be helpful - Home glucose testing should be performed regularly	IIIB
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A mixed cases of outpatients and inpatients

Multi-centres, in various countries, in ambulatory care settings, nursing homes, and community settings

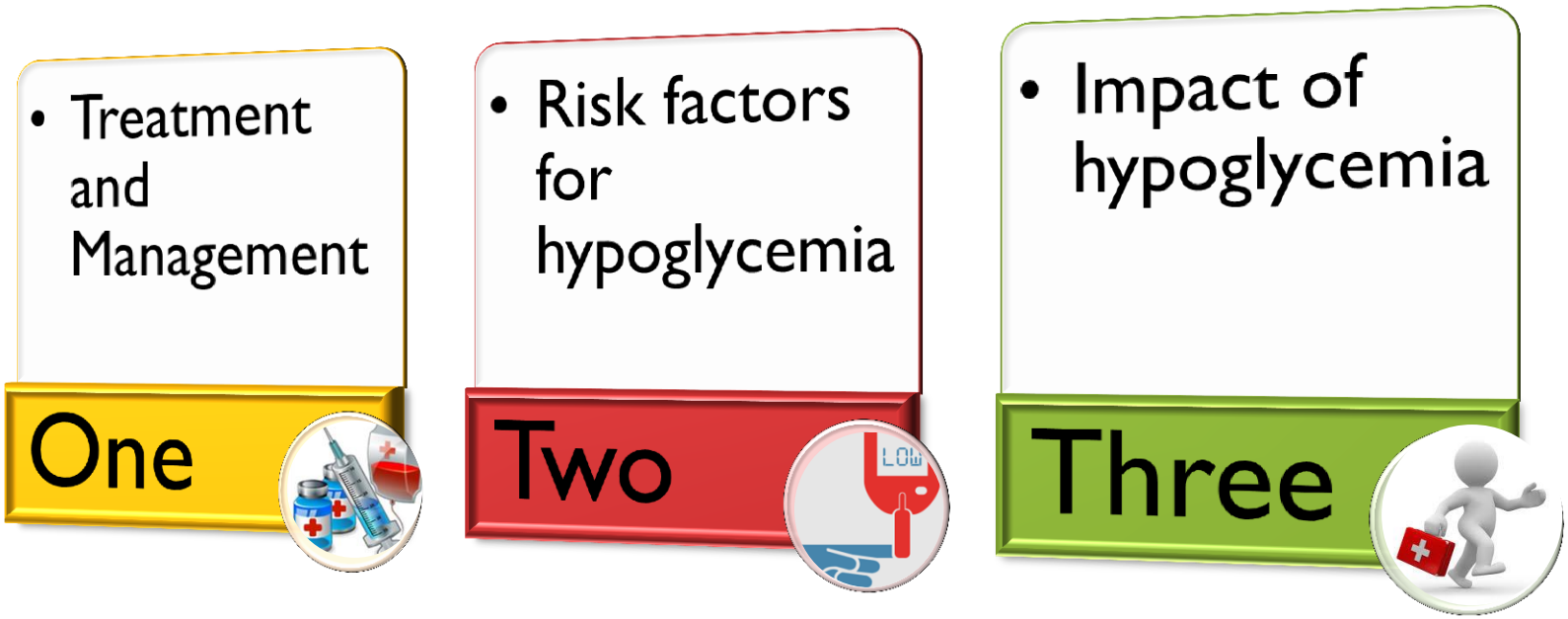
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Mattishent & Loke, 2016	Systematic review & Meta-analysis	1,439,818 T2DM, mean aged 75 & cognitive impairment from 9 meta-analysis	In-/out-patients in various countries	- A bi-directional relationship between cognitive impairment and hypoglycemia in older patients. - Glucose-lowering therapy should be carefully tailored and monitored in older patients who are susceptible to cognitive decline. - Hypoglycemic adverse events are a particular problem in older patients because of impaired Hypoglycemic awareness.	IIIB
Muller et al, 2016	Retrospective cross-sectional study	7597 DM (4459 T2DM aged ≥65)	In ambulatory Care from France, Belgium, Italy, Netherlands, UK, Sweden, Ireland & Germany GUIDANCE study	- A possible overtreatment of glycaemia occurred in a relevant number of the person aged ≥ 65 years if considered according to the new recommendations: individualization of treatment targets and treatment strategies and to involve patients in decision making. - The lower mean of HbA1c levels (<7%) of elderly patients with diabetes and co-existing cardiovascular disease increased risks of severe hypoglycemia events	IIIB
Schejter, Turvall & Ackerman, 2012	Retrospective study	155 T2DM with mean age 71.8	In-patient	- Elderly fragile patients with multiple comorbid situations including renal failure and tight glycemic control are prone to develop Sulphonurea-induced hypoglycemia (SUIH)	IIIB
Thorpe et al, 2015	Retrospective cohort study	15,880 T2DM, aged >=65 with dementia from Veterans Affairs (VA) who were treated with OAD	Outpatients in U.S. (via national Veterans administrative/ cl data and Medicar	- Diabetes in older patients with dementia are at high risk for hypoglycemia associated with intense re	IIIB
Davis et al, 2014	Retrospective cross-sectional analysis	583 T2DM aged >=65, with insulin -treated, long term care for 3 months or more	107 Nursing home United States		IIIB
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Quality level: 1A (n=1), IIIB (n=11)

Findings

- The key messages of the 12 articles were categorized into three domains:



Treatment & Management

- Incidence of hypoglycemia in the elderly population is associated with tight glycemic control and overtreatment of glucose lowering agent like insulin or sulphonylurea *(Davis et al, 2014; Muller et al, 2017; Arnold et al, 2018)*
- Avoid overtreatment and tailored practical approaches for hypoglycemia management to reverse the increasing trend of hospitalization are critically needed in OPWT2D particularly in susceptible to cognitive decline *(Mattishent & Loke, 2016; Muller et al, 2017; Zhong et al, 2017; Arnold et al, 2018)*
- Rapid- and long-acting insulin analogs seem safer in older patients with dementia *(Abbatecola et al, 2015)*



Treatment & Management

- Minimize the risk of hypoglycemia by improving patients' self-management and optimizing their therapy to achieve individualized glycemic control are the priority in treating diabetes in elderly such as appropriate deintensification and alteration of medications *(Davis et al, 2014; Nicolucci et al, 2015; Thorpe et al, 2015)*
- Further education of diabetes management, regular and frequent monitoring of glycaemia may be helpful in older people with dementia , hypoglycemic unawareness , and those have incorrect responses to hypoglycemia *(Hewitt et al, 2010; Pornet et al, 2011)*



Risk factors of hypoglycemia

- The incidence of hypoglycemia requiring hospitalization remained high in spite of the recent decline in OPWT2D *(Muller et al, 2017; Zhong et al, 2017)*
- High risk factors induced hypoglycemia included OPWT2D especially aged >70, cognitive impairment, tight glycemic control with lower mean of HbA1c (<7%), impaired hypoglycemic awareness, CVD, CHF, RF and PVD. There is a bi-directional relationship between cognitive impairment and hypoglycemia in older patients

(Pornet et al, 2011; Abbatecola et al, 2015; Thorpe et al, 2015; Mattishent & Loke, 2016; Muller et al, 2017; Zhong et al, 2017)



Impact of hypoglycemia

- Hypoglycemia is an important event in the life of OPWT2D, with a strong negative influence on quality of life and social activities *(Nicolucci et al, 2015)*



Conclusion

- Cognitive assessment should be offered
- Risk factors for hypoglycemia among OPWT2D included: those with cognitive impairment, comorbidities or conditions such as tight glycemic control with lower mean of HbA1c (<7%), impaired hypoglycemic awareness, CVD, CHF, RF and PVD
- Periodic reinforcement on proper hypoglycemic management and blood glucose monitoring should be made, especially for those with risk factors

Conclusion

- Anti-diabetic agents with low risk of hypoglycemia should be given priority, the algorithm of anti-diabetic treatment for those at high risk should take into account of the risk of hypoglycemia, and minimize hypoglycemia in addition to optimizing the control of hyperglycemia
- Individualized glycemic goals setting and patient education can minimize the incidence of hypoglycemia

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