COST-EFFECTIVENESS ON THE IMPLEMENTATION OF GUIDELINE-DIRECTED MEDICAL THERAPIES IN DIABETES AND CKD

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No conflicts to declare
Scope of talk

• Overview of the trends of healthcare expenditure in managing the burden of diabetes and CKD globally
• Evaluate the cost-effectiveness in implementing guideline-directed medical therapies (GDMT) (especially new drugs) and how this calculation may or may not facilitate implementation of GDMT
Background

• International Diabetes Federation’s (IDF) Diabetes Atlas 2021:
  • One in 10 adults has diabetes (537 million people)
  • One in two adults undiagnosed with diabetes
  • 11.5% of global health expenditure (USD$966 billion p.a.) is spent on diabetes
• In the US $1 out of every $4 in US health care costs is spent on diabetes care (US CDC)
Background

- Substantial burden of costs for CKD
- 31 country study
- Mean annual costs of CKD increase substantially by disease stage
  - Stage G3a – US$ 3,070
  - Haemodialysis – $ 57,334 ; Peritoneal dialysis $49,490
  - Transplant – $75,326 (incident); $16,672 (ongoing)
- Compared to other diseases
  - $18,294 p.a. for myocardial infarction
  - $8463 p.a. for heart failure
  - $5975 p.a. for acute kidney injury
Background

- Practice Guidelines:
  - Structured diabetes self-management education programs improve self-efficacy and clinical outcomes
  - First line treatment for diabetes and CKD should include metformin and an SGLT2 inhibitor to improve CVD outcomes and limit CKD progression
  - Backed by strong evidence of clinical effect on eGFR, CKD progression, CVD events, mortality
  - Cost-effectiveness?
Yoshida et al, 2020:

- Cost-effectiveness of SGLT2 Inhibitors for T2DM
- 24 studies, good quality
  - SGLT2i vs dipeptidyl peptidase-4 inhibitors (DPP-4i) (n=7 studies);
  - SGLT2i vs sulfonylureas (SU) (n=3 studies);
  - SGLT2i vs glucagon-like peptide-1 receptor agonist (GLP-1 RA) (n=3 studies);
  - SGLT2i vs SGLT2i (n=2 studies);
  - SGLT2i vs other antidiabetic therapies including TZD, AGI or insulin (n=3 studies);
  - SGLT2i vs standard care/metformin.
- Almost all showed SGLT2i was cost effective vs comparator except 2 studies showed GLP-1 RA to be cost-effective.
Reifsnider et al 2021

- Cost effectiveness of Empagliflozin in patients with diabetic kidney disease in the USA
- Modelled cost-effectiveness analysis based on EMPA-REG OUTCOME trial from payer perspective
  - Empagliflozin on top of standard care vs standard care alone
- Findings: ICER: $25,974 (cost-effective)
- Results sensitive to rates of CV death, non-fatal MI and HF hospitalisation; drug costs and time horizon.
Recent cost-effectiveness studies

Tisdale et al (2022)
- Cost-effectiveness of **Dapaliflozin** for **non-diabetic CKD** in USA
- Modelled cost-effectiveness analysis based on DAPA-CKD trial – lifetime horizon and health sector perspective
  - Dapaliflozin plus standard care vs standard care
- Increased QALYs from 6.75 to 8.06 and lifetime costs $245,900 to $324,900
- ICER: **$60,000 per QALY gained** (deemed cost-effective)
- 1 year budget impact on all US non-diabetic CKD population up to $21 billion.
Recent cost-effectiveness studies

Sim et al (2023)

- Cost effectiveness of **various glucose lowering therapies** as add-on to standard care for T2DM in Malaysia
  - Standard care, SGLT2i, DPP-4i, GLP-1 RA
  - Modelled cost-effectiveness analysis from health sector perspective
  - Costs of medicines based on publicly available sources for reimbursement rates in Malaysia
- Findings: **SGLT2i was the most cost-effective treatment**
  - ICER of RM 12,279 per QALY gained
- Robust to numerous assumptions in sensitivity analysis and consistent with previous findings.
McEwan et al 2021
- Cost-effectiveness of **Dapagliflozin** in treating *high-risk patients with T2DM* in UK
- Modelled economic evaluation using data from DECLARE-TIMI 58 trial (Industry funded)
  - Dapagliflozin vs placebo
  - Lifetime: costs and outcomes in trial population and subgroups
- Finding: **Dapagliflozin dominant** – increase in QALYs (0.06) and cost saving (2,552 pounds)
  - Most cost-effective in the prior heart failure subgroup
Recent cost-effectiveness studies

McEwan et al 2023

- Cost-effectiveness of SGLT2i in the management of type 2 diabetes in UK.
- Modelled economic evaluation: Cost effectiveness of intensification points associated with updated 2022 NICE T2DM guidelines (from 2015) – industry-funded
  - “advocate the use of SGLT2i in those with atherosclerotic CVD, chronic heart failure or at high risk of CVD.”
  - Previous guidelines placed “less emphasis of cardiorenal benefits of therapies such as SGLT2 inhibitors”
  - T2DM at high risk of CVD
  - T2DM with atherosclerotic CVD
  - T2DM with co morbid heart failure
  - T2DM with co morbid CKD

- Results:
  - New guidelines dominated new (lower costs and improved outcomes (0.58 to 1.12 QALY gain) in all 4 sub-populations
  - Although pharmacy costs higher, offset by HF hospitalisations and CKD costs.
Recent cost-effectiveness studies

McEwan et al (2022)

- Cost effectiveness of Dapagliflozin for CKD in UK, Germany and Spain
- Modelled economic evaluation from health sector perspective: Dapagliflozin plus standard therapy vs standard therapy (industry funded)
- ICERs – cost per QALY gained
  - $8280 UK
  - $17,623 Germany
  - $11,687 Spain
- Factors that influence cost-effectiveness
  - Drug acquisition costs, cost of CKD management (given that individuals with longer survival will experience greater costs for lifetime CKD management) and differences in complication rates.
Conclusions

- **High and growing burden** of CKD and diabetes, particularly in LMICs
- New treatments offer promise, are generally cost effective but expensive and substantial budget impact given large treatment population.
  - High out of pocket costs on top of other factors such as clinical inertia and lack of patient awareness in some settings pose major barrier to treatment
  - Cost-effectiveness will improve with competition pushing down drug prices and reductions in costs of long-term treatment of CKD.
- Ultimately measures to substantially address the global burden need to go beyond medical therapies and address prevention and public health including inter-sectoral programs.