USING A WEB-BASED PLATFORM TO DRIVE COMPREHENSIVE DIABETES CARE MODEL - LESSONS LEARNT FROM THE JADE PROGRAM AND THE RAMP-DM PROGRAM

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Diabetes care: challenges and strategies

- Silent disease
- Complex protocol
- Clinical inertia
- Poor adherence
- Frequent relapse
- Psychosocial stress

- Early detection
- Team-based care
- Risk assessment
- Decision support
- Feedback and self efficacy
- Ongoing support
Key questions for physicians

How can we treat to multiple targets?
How can we motivate behavioral change?
How can we identify unmet needs?
How can we measure our performance?
How can we diagnose patients early?
How can we prevent diabetes early?
A diabetes journey: modifiable versus non-modifiable risk factors and consequences

Chan JC et al Diabetes Care 2019
Data-driven multicomponent integrated care model

Attain multiple targets
- Early use of organ protective drugs
- Change behavior
- Reduce complications and improve QoL

Data Register
- Quality Assurance
- Benchmarking
- Care triage
- Tracking

Measure
Monitor
Manage

Educate
Empower
Engage
Meta-analysis of QI initiatives: largest effect size on A1c, BP, LDL-C with task delegation, self-care, provider-patient communication

Lim LL et al Diabetes Care 2018
Chan JC et Lancet 2020
Monitoring the Targets of the St Vincent Declaration and the Implementation of Quality Management in Diabetes Care: the DIABCARE Initiative

K. Piwernetz, P.D. Home, O. Snorgaard, M. Antsiferov, K. Staehr-Johansen, M. Krans, for the DIABCARE Monitoring Group of the St Vincent Declaration Steering Committee
1993: Reform diabetes care by integrating research and practice using diabetes centre as the action point

Delivery of Diabetes Care — The Experience at the Prince of Wales Hospital


Prince of Wales Hospital

1993 Rebecca Wong
Visit to Joslin Clinic, NIDDK, UCSF

Figure 1. Summary of the PWH shared care programme

Chan JC et al HA Quality Bulletin Vol 2 No 2 page 3-21
Change setting, design protocol, use case report form and train a trio team (nurse, HCA and clerk) to set up the Hong Kong Diabetes Register (HKDR)
# Registers ≠ EMR

**Design, implementation, evaluation, impact**

Combining practice and data analytics to drive actions

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HKDR: Risk equations and factors for CVD, CKD and ESKD in Chinese patients with T2D

- **CHD**
  - Age
  - Male
  - Current smoking
  - Duration of disease
  - eGFR
  - ACR
  - Non-HDL-C
  
  *Yang XL et al Am J Cardiol 2008*

- **Stroke**
  - Age
  - HbA1c
  - ACR
  - History of CHD

  *Yang XL et al Diabetes Care 2007*

- **Heart failure**
  - ACR
  - BMI
  - HbA1c

  *Yang XL et al Cardiovas Diabetologia 2008*

- **CKD**
  - Age
  - Duration of disease
  - Smoking
  - HbA1c
  - Retinopathy
  - Low BMI
  - eGFR
  - ACR
  - Metabolic syndrome
    - Triglyceride
    - Hypertension
    - High Waist

- **ESRD**
  - ACR
  - Haematocrit

*Yang XL et al Diabetologia 2009*
Joint Asia Diabetes Evaluation (JADE®) Platform
Risk categories and annual event rate

Age, sex, disease duration, risk factors, CKD (eGFR, ACR) complications, risk scores

Chan JC et al. Diabetic Medicine 2009
From design to implementation - The Joint Asia Diabetes Evaluation (JADE) program: A descriptive report of an electronic web-based diabetes management program

- Role-based access:
  - Local – Clinic / Hospital
  - Sub-region – City
  - National – multi-country

- Phased Web Portal (JADE Program portal)
  - Data input

- Patient Registry
  - (governed by access control rules)
  - Built-in portal features included prompts, triggers & recommendations and estimated future risk of diabetic
  - Reporting Risk Engine
    - Protocol guidance
    - Risk assessments
    - Ad hoc queries

- Data Mining
- Risk Engine
- Structured care protocol rules

Other functions:
- Printable doctors’ summary & patients’ report; raw data download

Ko G et al BMC medical informatics and decision making 2010
Chan JC et al JAMA Int Med 20145
2007: web-based Joint Asia Diabetes Evaluation (JADE®) Technology
Digitalization of protocol with data collection, interpretation & visualization

Ko G et al BMC medical informatics and decision making 2010
Chan JC et al JAMA Int Med 20145
Personalized JADE® report complete with risk categories, targets, trends, decision support and risk of future events

Risk category based on modifiable risk factors, risk scores and complications

Age, gender, disease duration and occupations

Trends of risk factor control (blood glucose, blood pressure, blood cholesterol (ABC) and body weight) with decision support

Summary of risk factors & complications

5-year probability of critical illness based on validated risk equations

Summary of medication

Ko G et al BMC medical informatics and decision making 2010
Chan JC et al JAMA Int Med 20145
JADE® Report: Personalized information reduced clinical inertia, non-adherence and negative emotions

Effects of Telephone-Based Peer Support in Patients With Type 2 Diabetes Mellitus Receiving Integrated Care
A Randomized Clinical Trial

Diabetes distress and NO peer support

Chan JC et al JAMA IM 2014
2000: A territory-wide Risk Assessment & Management Program (RAMP)

26,718 RAMP vs non-RAMP with propensity score matching in patients with no complications
Age 53, Male 47%; disease duration 7.8 years; median FU 4.5 years

7.5 million people, Universal health coverage, 50% doctor in public sector. >500,000 patients exposed to RMP

Wan E et al Diabetes Care 2017
Public private partnership: Self-funded university-affiliated nurse-coordinated Diabetes Centre supports private doctors reduced all events by 50% versus usual care

JADE-PPP Group (PPP setting) n=3436

- JADE-guided assessment
- JADE report
- Endocrinologist written comments
- Personalized explanation
- Yearly telephone reminder

Lim LL et al PLoS Med 2020
Implementing JADE® Program in Asia
using the JADE portal to train HCPs, create register and inform decision making

**Assessment**
- 4-6

**Booking, data entry & print report**
- Mon: 4-6
- Tues: 4-6
- Wed: 4-6
- Thurs: 4-6
- Fri: 4-6

**Group education & give report**
- Mon: 10-15
- Tues: 10-15

**Individual consultation**
- Mon: ✓
- Tues: ✓
- Wed: ✓
- Thurs: ✓
- Fri: ✓

**Liaison between patient and doctor**
- Mon: ✓
- Tues: ✓
- Wed: ✓
- Thurs: ✓
- Fri: ✓

**Special programs**
- Mon: e.g. injection class, peer support program, YOD, DKD

- **Say Bye bye to chaos**
  - Small room
  - Simple tools (monofilament, tuning fork, Snellen eye chart)
  - Office equipment (computer, printer)
  - Structured assessment
    - Blood
    - Urine
    - Eye
    - Feet

- **Usual clinic visit**
- **Prescribe medications**
- **Refer for education**
- **Refer for assessment**
- **Provide on-job training**
- **Support nurses / HCA**

- **1 nurse-HCA team supervised by a doctor: ~600-800 patients**

Chan JC et al Lancet 2020
High prevalence of albuminuria and CKD in Asia

- JADE Asia cross-sectional cohort of 28,110 people with type 2 diabetes in Asia
- 1 in 5 adults with T2D diagnosed before the age of 40

Proportion of people with type 2 diabetes with albuminuria and CKD

- Frequency of albuminuria ranged from 29% in China to 63% in Philippines
- Frequency of CKD ranged from 3% in China to 40% in India
- In Hong Kong, 10% of people with type 2 diabetes had CKD and 40% had albuminuria

Low proportion of patients with CKD attained glucose and blood pressure targets in Asia

- 36% in CKD vs 42% in non-CKD reached HbA1c target
- 21% in CKD vs 35% in non-CKD reached BP target
- 50% in CKD vs 46% in non-CKD reached LDL-C target

Target definition: HbA1c <7.0% (53 mmol/mol), blood pressure <130/80 mmHg, LDL-cholesterol <2.6 mmol/L

4% in CKD vs 8% in non-CKD reached all three targets

Under-utilisation of RAAS inhibitors, anti-hypertensive drugs and statins in patients with CKD

- 51% of patients with albuminuria were prescribed RAAS inhibitors
- 62% of patients with hypertension were prescribed anti-hypertensive drugs
- 64% of patients with dyslipidaemia were prescribed statins

Asia: 300 healthcare professionals from 11 countries to systematically collect data during routine practice to promote QI and gather RWE

Using a doctor-nurse-clerk trio team to set up a register in 10 regions (China, Taiwan, Thailand, Singapore, Malaysia, Vietnam, Hong Kong, India, Indonesia, Korea)

Over 120,000 patients enrolled by over 300 doctor-nurse pairs

A multicentre demonstration project to evaluate the effectiveness and acceptability of the web-based Joint Asia Diabetes Evaluation (JADE) programme with or without nurse support in Chinese patients with Type 2 diabetes

Effect of a Web-Based Management Guide on Risk Factors in Patients With Type 2 Diabetes and Diabetic Kidney Disease
A JADE Randomized Clinical Trial

Tutino G et al Diabetic Med 2017

Chan JC et al JAMA Network Open 2022

Effects of a Technology-Assisted Integrated Diabetes Care Program on Cardiometabolic Risk Factors Among Patients With Type 2 Diabetes in the Asia-Pacific Region
The JADE Program Randomized Clinical Trial

Lim LL et JAMA Network Open 2022

Association of technologically assisted integrated care with clinical outcomes in type 2 diabetes in Hong Kong using the prospective JADE Program: A retrospective cohort analysis

Lim LL et PLoS Medicine 2018
RCT: Effect of a Web-Based Management Guide on Risk Factors in Patients With Type 2 Diabetes and Diabetic Kidney Disease

**POPULATION**
1267 Men, 1126 Women
Adults with type 2 diabetes and diabetic kidney disease
Mean age, 67.7 y

**INTERVENTION**
2393 Patients randomized and analyzed
795 Usual care (UC)
Joint Asia Diabetes Evaluation (JADE) technology-guided structured assessment
802 Empowered care (EC)
UC, a personalized JADE report, and 3 monthly nurse telephone calls
796 Team-based empowered care (TEC)
EC care and 3 monthly face-to-face reviews by a physician-nurse team

**FINDINGS**
The TEC group was more likely to attain ≥3 treatment targets than either the UC or EC groups

**PRIMARY OUTCOME**
Proportion of patients treated to multiple targets at 12 mo, defined as ≥3 targets: HbA1c <7%, blood pressure <130/80 mm Hg, LDL-cholesterol level <1.8 mmol/L, triglyceride level <1.7 mmol/L, and/or persistent use of renin angiotensin system inhibitors.

TEC vs UC: RR, 1.17 (95% CI, 1.00-1.37); P = .04
EC vs UC: RR, 0.94 (95% CI, 0.79-1.11); P = .45
TEC vs EC: RR, 1.25 (95% CI, 1.06-1.49); P = .007
Declining incidence of all-cause death and major complications in Hong Kong (2001-2016)

Wu HJ et al Diabetologia 2020
Wu HJ et al. Cardiovasc Diabetol 2020
1995-2016: Hong Kong and Asia have the largest decrement in diabetes-associated death rate (>70%) amongst 0.5 billion patient-years from 16 high income countries/areas

Public health policy, universal health coverage, public awareness, PPP, registers, data-driven team-based care, self management support program, surveillance and feedback ......

Magliano DJ et al, Lancet D and E 2022
Using Register to link patient to multiple care providers  
Empower patient with their own health records  
showing risks, targets, trends, decision support

Family members  
• Opportunities for screening

Patient

Personal check list
✓ Age, sex, age of onset
✓ ABC, BW, WC
✓ eGFR, ACR
✓ CVD, cancer
✓ Organ protective drugs
✓ Metformin, insulin, RASi, statin, SGLT2i...
✓ Self care

Trained family doctor
• Test, track and treat
• Maintain stable condition
• Opportunistic screening  
  (e.g. FH, obesity, metabolic syndrome, GDM, PCOS....)

Cardiologist
• Symptomatic IHD or PCA
• Atypical cases

Research and discovery
• Register
• EMR
• Cohorts
• Biobanks

Endocrinologist
• Educate
• Empower
• Engage
• Structured assessment
• Quality assurance
• Difficult and atypical cases  
  (e.g. YOD, DKD, severe obesity)

Nurse

Nephrologist
• Advanced CKD or ESKD
• Atypical cases

Maintenance for

google image