Regional Symposium on Diabetes - Current Science and Multi-Stakeholder Approaches to Prevention & Management

“Lessons Learnt for Diabetes Prevention Programs: Replicating Principles from Successful Case Studies”
4 October 2017

Prof James Best
Dean, Lee Kong Chian School of Medicine

Diabetes prevalence is increasing in Asia

CONCLUSIONS AND RELEVANCE Among adults in China, the estimated overall prevalence of diabetes was 10.9%, and that for prediabetes was 35.7%.


Diabetes prevalence is high in Singapore

Increase in obesity is a major factor in increased diabetes prevalence
Diabetes has different characteristics in Asian populations

- Low body mass index
- Increase body fat especially visceral fat
- Insufficient beta cell response in normal weight T2DM
- Low rate of autoimmune type 1 diabetes
- High rate of young-onset type 2 diabetes
- High rate of gestational diabetes
- High rate of renal disease

Yabe D et al., Curr Diab Rep 15: 36, 2016

Central obesity is associated with multiple metabolic abnormalities

The Metabolic Syndrome

- Heart Disease
- Lipid Problems
- Hypertension
- Type 2 Diabetes
- Dementia
- Cancer
- Polycystic Ovarian Syndrome
- Non-Alcoholic Fatty Liver Disease

Proactive medicine framework for disease prevention

Convergence of principles from Eastern and Western medicine

Eastern medicine, like P4 medicine and systems medicine, considers human biological systems as a cohesive whole. Eastern medicine also considers the human body as a holistic entity of harmonious organs and approaches health from this framework. Eastern medicine principles are mainly derived from Chinese and Indian cultures, with long-term practical experience in the prevention, diagnosis and treatment of chronic diseases.
Levels of intervention for prevention of diabetes

Level I Global and population-based interventions
Level II Community-based interventions
Level III Individual and family unit interventions
Level IV System-specific interventions


Finnish diabetes prevention study

Age 40+ (mean 55 years), BMI 25 or more (mean 31.3), IGT
7 sessions with nutritionist and then each 3 mths for rest of study, support for exercise
Wt reduction >5%, fat intake <30% of calories, saturated fat <10% of calories, fibre intake ≥15g per 1000kcal, exercise >4hr per week
Wt loss 4.2kg, diabetes reduction by 58% over 4 years

Diabetes prevention study (USA)

Age 25+ (mean 50.6 years), BMI 24 or more (mean 34.0), IFG + IGT
Individual approach with 16 sessions in 24 weeks, then monthly individual sessions for rest of study and group sessions
Goal 7% body weight reduction and 150 min exercise per week
Wt loss 4kg, diabetes reduction by 58% over 2.8 years, 31% with metformin
Da Qing IGT and diabetes study

Effects of Diet and Exercise in Preventing NIDDM in People With Impaired Glucose Tolerance

The Da Qing IGT and Diabetes Study

Diabetes Care 20: 537-44, 1997

Age 25+ (mean 45 years), IGT (screened 100,000), BMI 25.8 (40% <25)
Individual and group counselling on standard diet, with weight reduction if BMI ≥25 to BMI 23, increase exercise by 1-2 units per day
Sessions weekly for 1 month, monthly for 3 months and then 3 monthly
Diabetes reduction by 31% (diet), 46% (exercise), 42% (diet plus exercise) over 6 years

Intervention effects were sustained

Intervention for 4 years, 39% reduction over 13 years
Intervention for 2.8 years, continued 34% reduction over 10 years in lifestyle group and 18% in metformin group
Intervention for 6 years, 43% reduction over 20 years 3.5 fewer years with diabetes

Do clinical trial results translate into real world settings?

Pathways for scaling up public health interventions

BMC Public Health

Implementation trials in the real world setting

Prevention of Type 2 Diabetes by lifestyle intervention in an Australian primary health care setting: Greater Green Triangle (GGT) Diabetes Prevention Project

Tiina Laatikainen1, James A Dunbar1, Anna Chapman1, Annamari Kilkkinen4, Erkki Vartiaimen5, Sami Heistaro1,2, Ben Phlipot1, Piliška Abetz1, Stephen Bunke1, Adrienne O’Neill1, Prasuna Reddy1, James D Best1 and Edward D James1

BMC Public Health 7: 249, 2007

Mean weight loss 2.52 kg over 12 months
Estimated 40% reduction in diabetes risk
Systematic reviews of real world diabetes prevention programs

Diabetes Prevention in the Real World: Effectiveness of Pragmatic Lifestyle Interventions for the Prevention of Type 2 Diabetes and the Impact of Adherence to Guidelines Recommendations: A Systematic Review and Meta-analysis

A systematic review of real-world diabetes prevention programs: learnings from the last 15 years

Zahra Ates*, Philippe Henry†, John Ockene‡ and Brian Oldenburg

25 studies
Mean weight loss 2.32 kg

Effectiveness varies substantially between programs but can be improved by maximising guideline adherence.

Program intensity plays a major role in weight loss outcomes

Challenges for small scale implementation in real world setting

- Financial resources are more limited
- Screening and referral of at-risk participants occurs in context of busy clinical practices
- Problems with recruiting, training and monitoring lifestyle coaches
- Retention of participants more difficult

Do clinical trial results translate into population level interventions?

Pathways for scaling up public health interventions

The Challenge of Scaling up a DPP

Challenges of diabetes prevention in the real world: results and lessons from the Melbourne Diabetes Prevention Study

James A. D'arco†, Jonathan L. Homer*, Edward O. Ancoli†, Liane J. Vranjes†, Andrea L. Mall*, Panos K. Draper†, Jessica M. Gall†, Gisela M. Jones*, Paul A. Sorrells†, Carl S. Smart†, Matthew W. Grant†, David E. Paterson†, James G. Malpas†, Alejandro Pena†, John R. Myer* and the Melbourne Diabetes Prevention Study (MDPS) research group

Scaling Up Diabetes Prevention in Victoria, Australia: Policy Development, Implementation, and Evaluation

ITT: 0.85 kg weight loss in 12 mths
PPS: 1.13 kg weight loss in 12 mths
Scaling up the Finnish diabetes prevention study

Population-level effects of the national diabetes prevention programme (FIN-D2D) on the body weight, the waist circumference, and the prevalence of obesity

To translate the scientific evidence for prevention of type 2 diabetes into daily practice and public health, the first large scale national programme was carried out in Finland, covering three concurrent strategies: the population strategy, the high-risk strategy and the strategy of early diagnosis and treatment.

Challenges in scaling up to population level program

- **Voltage drop** – recruitment of lower risk individuals
- **Staffing** – drop in quality and commitment of lifestyle coaches
- **Programme drift** – fidelity of the intervention may not be maintained
- **Data collection** – little incentive for rigorous evaluation of outcomes
- **Quality** – lack of quality control and continuous improvement

CDC National Diabetes Prevention Program

A CDC-recognized lifestyle change program—in person or online—developed specifically to prevent type 2 diabetes. A trained lifestyle coach leads the program to help you change certain aspects of your lifestyle, like eating healthier, reducing stress, and getting more physical activity. The program also includes group support from others who share your goals and struggles. It’s a year-long program focused on long-term changes and lasting results.

NHS Diabetes Prevention Programme: Healthier You

The NHS Diabetes Prevention Programme started in 2016 with 27 areas covering 26 million people and making up to 20,000 places available. This will roll out to the whole country by 2020 with an expected 100,000 referrals available each year after. Those referred will get tailored, personalised help to reduce their risk of Type 2 diabetes including education on healthy eating and lifestyle, help to lose weight and bespoke physical exercise programmes.
Challenges in operating national programmes for diabetes prevention

Co-investigator Professor Kamlesh Khunti: ‘The lesson here for the national programme is, we haven’t thought through how we retain people who attend the programme. We may need to tailor our programmes – for example, not everyone wants to come to face-to-face sessions.’

The epidemic of pre-diabetes: the medicine and the politics
John S Yudkin emeritus professor of medicine, Victor M Montori professor of medicine

We need a shift in perspective. It is critically important to slow the epidemic of obesity and diabetes. Rather than turning healthy people into patients with pre-diabetes, we should use available resources to change the food, education, health and economic policies that have driven this epidemic.

System specific interventions

The New England Journal of Medicine

The Fight Against Diabetes: 1 bowl, 2 cans

Public health and health policy approach

Should we be identifying higher risk individuals for more intensive intervention?

Identifying higher risk individuals
Change existing algorithms
Genomics and epigenomics
Metabolomics
Dynamic network biomarkers

More intensive interventions
Individual lifestyle coaching
Emphasis on retention
Consider pharmacological therapy
Lessons learned for diabetes prevention programmes

- Efficacy of intensive lifestyle intervention for diabetes prevention is proven in multiple studies
- Effectiveness in the real world setting is significantly less than efficacy in trial settings
- Scaling up to population level presents major challenges and rigorous evaluation is important
- Identifying very high risk individuals for intensive lifestyle intervention and possibly pharmacotherapy is an approach consistent with a predictive, preventive, personalised and participatory continuum for promoting healthspan

Acknowledgements

James Dunbar
Rob Carter
Sharleen O’Reilly
Andrea Herman
Vincent Versace
Kevin McNamara
Catherine Bennett
Michael Coates
Elizabeth Stewart

James Best
Edward Janus
Douglas Boyle

Tiina Laatikainen
Erkki Vartiainen