Ethnic Differences in Young Adults with Non-Insulin Treated 2 Diabetes

Kanchana Perera M.Sc[1], John Baker MBChB[2,3], Karen Pickering MPH[3], Richard Cutfield MBChB[2,4], Brandon J Orr-Walker MBChB[2,3], Gerhard Sundborn[5], Dahai Yu PhD[6], and David Simmons FRACP MD (Cantab)[1,7]

[1]School of Medicine, Western Sydney University, Sydney, Australia; [2]Diabetes Foundation Aotearoa, Otara, New Zealand; [3]Department of Diabetes and Endocrinology, Counties Manukau Health, Auckland, New Zealand; [4]Department of Diabetes and Endocrinology, Waitemata District Health Board, Auckland, New Zealand; [5]Section of Pacific Health, University of Auckland, Auckland, New Zealand; [6]Primary Care Centre versus Arthritis, School of Medicine, Keele University, Keele, UK; [7]Translational Health Research Institute, Western Sydney University, Sydney, Australia

BACKGROUND

- In New Zealand, there is increasing evidence that Type 2 diabetes (T2DM) in young adults is becoming more frequently observed, particularly amongst those aged 30-39 years, where this prevalence nearly doubles.
- The risks associated with T2DM amongst young adults of Māori or Pasifika descent show prevalence that are approximately 2-3 times higher than those of NZ European descent[1].
- Given the ethnic differences in the risks of T2DM, it remains to be determined if the natural history and tempo of progression differ amongst these ethnic groups.
- Ethnic differences in risk factors for complications need to be understood in order to help guide interventions that targets the prevention of avoidable morbidity and premature mortality[2-4].

AIM

To compare baseline characteristics (socio-demographic and clinical) of young New Zealand Europeans (NZE), Māori or Pasifika descent with non-insulin treated diabetes.

METHODS

- This is a secondary analysis of young adults, aged 18-40 years, with non-insulin treated diabetes (to exclude those with T1DM) enrolled into the Diabetes Care Support Service (DCSS) study
- The DCSS is a longitudinal primary care diabetes primary care audit program spanning South and West Auckland from 1994-2018.
- GLP-1 receptor agonists & SGLT2 inhibitors were unavailable in New Zealand at the time of data collection.
- Statistical analyses to compare ethnic differences in baseline socio-demographic and clinical data, utilized Chi-square analyses for categorical variables, and ANOVA with post-hoc Tukey for the continuous variables.
- Logistic regression analysis was conducted to ascertain the effects of socio-demographic factors on the likelihood of participants having a high HbA_{1c} (based on an HbA_{1c} cut-off > 8.0%).

RESULTS

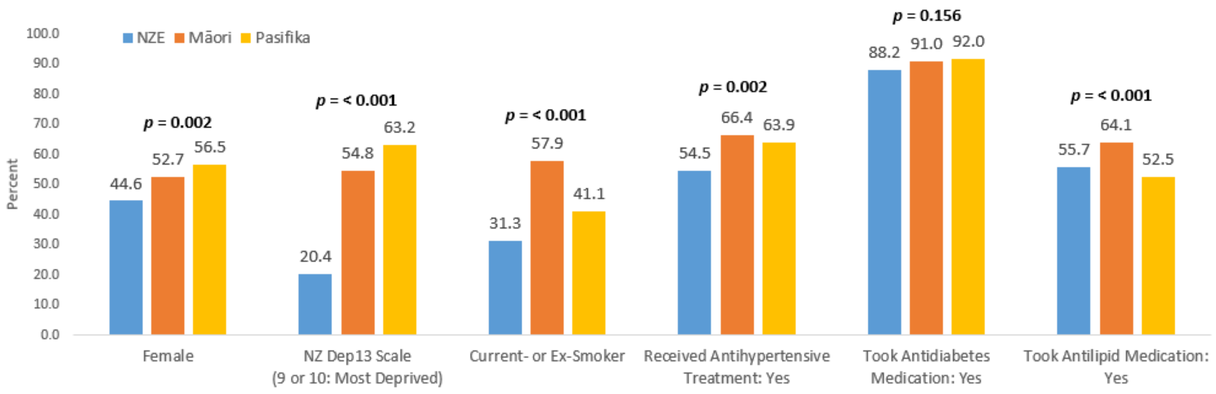
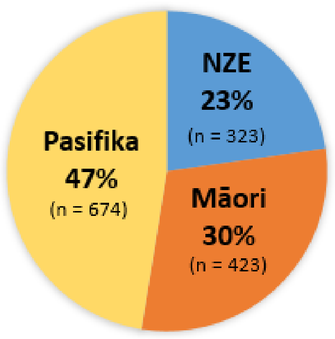


Figure 1: Baseline Characteristics of Young Adults (18-40 Years Old) in DCSS – Categorical Variables

Figure 1 shows that in comparison to NZE, participants of Māori or Pasifika descent were **significantly** more likely to be:

- Female
- More socioeconomically deprived
- A current- or ex-smoker
- Receiving antihypertensive treatment
- Taking anti-lipid medication (Māori only)



The pie-chart (inset) shows the ethnic breakdown of the 1,420 young adults in the DCSS data.

Data presented as Mean (SD)	Overall (N = 1420)	NZE (n = 323)	Māori (n = 423)	Pasifika (n = 674)	*p*
Age at Diagnosis, Mean (SD), Years	32.9 (5.2)	33.7 (4.7)[a]	32.3 (5.6)[b**]	32.8 (5.1)[c*]	**
Duration of T2D, Mean (SD), Years	1.2 (2.3)	1.0 (2.0)	1.3 (2.5)	1.3 (2.3)	NS
Body Mass Index, Mean (SD), kg/m^2	38.9 (8.7)	36.1 (8.1)[a]	39.8 (8.6)[b***]	39.7 (8.7)[c***]	***
Blood Pressure, Mean (SD), mmHg					
Systolic	128.0 (15.6)	129.6 (14.5)[a]	128.5 (16.5)	127.0 (15.4)[b*]	*
Diastolic	82.3 (11.1)	82.3 (10.1)	83.3 (11.8)	81.8 (11.0)	NS
Cholesterol, Mean (SD), mmol/l					
Total Cholesterol	5.0 (1.2)	5.0 (1.3)	5.1 (1.1)	4.9 (1.1)	NS
Triglyceride	2.4 (1.9)	2.2 (2.2)[b***]	2.9 (2.2)[a]	2.2 (1.6)[c***]	***
Low-Density Lipoprotein (LDL)	2.8 (1.1)	2.8 (1.0)	2.9 (1.3)	2.8 (1.0)	NS
High-Density Lipoprotein (HDL)	1.1 (0.2)	1.1 (0.3)[b*]	1.1 (0.2)[a]	1.1 (0.2)[c***]	***
HbA1c, Mean (SD), mmol/mol	64 (21)	55 (19)[a]	64 (20)[b***]	67 (22)[c***]	***
HbA1c, Mean (SD), %	8.0 (1.9)	7.2 (1.7)[a]	8.0 (1.8)[b***]	8.3 (2.0)[c***]	***
Estimated Glomerular Filtration Rate (eGFR), $ml/min/1.73m^2$	104.3 (22.1)	101.8 (19.9)[b***]	107.7 (23.6)[a]	103.3 (22.0)[c**]	***

Table 1: Baseline Characteristics of Young Adults (18-40 Years Old) in DCSS – Continuous Variables
[a]Group differs significantly from type (in row) where [b] or [c] is indicated
* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$; NS = Not Significant

Table 1 highlights that:

- Compared with NZE, participants of Māori or Pasifika descent were **significantly** more likely to be: younger, more obese, with higher HbA_{1c}
- Compared with NZE and Pasifika, participants of Māori descent had **significantly** higher: Triglycerides, eGFR

Variable	OR (95% CI)	AOR (95%CI)[1]	AOR (95%CI)[2]
Ethnicity			
NZE	Reference		
Māori	2.28 (1.65-3.16)***	2.29 (1.62-3.22)***	2.28 (1.61-3.21)***
Pasifika	2.76 (2.04-3.74)***	2.84 (2.05-3.91)***	2.85 (2.06-3.93)***
eGFR^			
G1[§]	Reference		
G2[†]	-	-	0.89 (0.69-1.15)[NS]

Table 2: Logistic Regression Analysis on HbA1c Based on Socio-Demographic Characteristics
OR = Odds ratio; CI = Confidence Interval; AOR = Adjusted Odds Ratio; [§] G1: Normal; [†] G2: Mildly-Severely Decreased
[1] Adjusted for socio-demographic variables: Age at T2DM diagnosis, gender, NZ deprivation scale, smoking status, and BMI
[2] Adjusted for socio-demographic variables specified above plus eGFR to see if renal disease is associated with lower HbA_{1c}
* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$; NS = Not Significant; ^ Measured as <90 ml/min/1.73 m^2

Table 2 highlights that:

- Participants of Māori or Pasifika descent were **at least twice more likely** to exhibit higher HbA_{1c} than NZE.
- Each socio-demographic variable was insignificant in the model.

CONCLUSIONS

- Among young adults with non-insulin treated diabetes, Māori or Pasifika, compared to NZE, were more likely to have risk factors for diabetes complications, and more likely to be prescribed medication for high BP, and lipids.
- Despite similar prevalence of anti-diabetes medications, levels of HbA_{1c} remained higher amongst Māori or Pasifika participants.
- A higher HbA_{1c} was associated with ethnicity but not socio-demographic factors.
- Studies to investigate any related disparities in long-term outcomes are warranted.

IMPLICATIONS

- Despite greater treatment and achievement of similar blood pressure & lipid concentrations, Māori and Pasifika, compared to NZE tend to have increased hyperglycaemia.
- Further strategies are needed in order to reduce hyperglycaemia in these minority ethnic groups.

REFERENCES

1. A rising tide of type 2 diabetes in younger people: what can primary care do? www.bpac.org.nz/2021/diabetes-younger.aspx (Accessed Nov. 2022)
2. Huo X, et al. The Lancet Diabetes and Endocrinology 2016; 4:115–24.
3. Dabelea D, et al. JAMA 2017; 317:825–35.
4. Al-Saeed AH, et al. Diabetes Care 2016; 39:823–9.

ACKNOWLEDGMENTS

Funding for this research, including the opportunity to travel & present at NZSSD 2023 has been provided by the University of Western Sydney.

A special thank you also goes out to the team at Diabetes Foundation Aotearoa as well as my advisors for their support and guidance in this research.

The DCSS was funded by the NZ Ministry of Health through Counties Manukau Health.

CORRESPONDENCE

Distinguished Professor David Simmons
School of Medicine
Western Sydney University
Campbelltown, NSW 2560, Australia
E: da.simmons@westernstydney.edu.au
P: +61 4842 4679

WESTERN SYDNEY UNIVERSITY

Diabetes Foundation Aotearoa