

Research paper

Gender differences in cardiovascular disease risk management for Pacific Islanders in primary care

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ABSTRACT

Objectives To assess gender differences in cardiovascular disease risk (CVR) assessment and management for Pacific people in New Zealand.

Methods New Zealand guidelines indicate CVR assessment from age 35 years for Pacific men and from age 45 years for Pacific women. Using general practice electronic medical records from 16 practices in New Zealand, the rate of CVR screening, treatment patterns and physiological measures for high-CVR ($\geq 15\%$ five-year) patients were assessed for Pacific patients ≥ 20 years of age by gender.

Results Records for 10 863 Pacific patients showed a higher proportion of indicated women screened for CVR (65 vs 56%), but a lower proportion of assessed women with high CVR (28% for Pacific women vs 40% for Pacific men). Many of these high-CVR patients had physiological measures well above desirable levels based on their most recent readings. In the high-CVR group, women had similar CVR levels to men, but higher systolic blood

pressure and HbA_{1c} level, and a higher proportion of women were treated with antihypertensive and oral antidiabetic medication. There were substantial levels of poor medication adherence, particularly for cholesterol-lowering medication. Women and men were equally likely to adhere to treatment. Those adhering to relevant medications had lower blood pressure, total-to-HDL cholesterol ratio and HbA_{1c} than non-adherers.

Conclusions Pacific men were less likely than Pacific women to have their CVR assessed when indicated, more likely once assessed to have high CVR and equally likely to adhere to treatment. Medication adherence was associated with better control of risk factors and should be further promoted in this population.

Keywords: antihypertensive, blood pressure, cardiovascular diseases (CVD), HbA_{1c}, medication adherence, primary care

How this fits in with quality in primary care

What do we know?

Pacific Islanders living in New Zealand have higher cardiovascular disease (CVD) risk and a higher CVD mortality rate. But data on the proportion of Pacific people who receive a cardiovascular disease risk (CVR) assessment through their general practice, their subsequent treatment for CVD and medication adherence are limited. This work investigates gender differences in their CVR assessment and management.

What does this paper add?

The findings have highlighted that Pacific men were less likely to have a CVR assessment undertaken than women, when they were assessed they were more likely to have a high CVR, and they were equally likely to adhere to treatment.

Introduction

Diseases of the heart and circulatory system (cardiovascular diseases or CVD) are the leading causes of death and disability in the world, with an estimated 17.3 million people having died from CVD in 2008.¹ In New Zealand, CVD accounted for 40% of all deaths in 2001 (22% due to coronary heart disease, 10% to stroke and 8% to other vascular causes).² New Zealand data indicate that there are clear gender, ethnic and social class differences in the identification and treatment of CVD, and in cardiovascular disease risk (CVR) factors, with Pacific people living in New Zealand (Cook Islander, Fijian, Niuean, Samoan, Tongan, Tokelauan and other Pacific Islanders, not including indigenous New Zealand Māori) disproportionately affected.^{3,4} In New Zealand, Pacific people have the highest mortality and hospitalisation rate for stroke and are more likely to experience more severe forms of diabetes and CVD than the overall New Zealand population.^{2,5} Pacific men aged 45–64 years have almost twice and Pacific women almost three times the mortality rate for CVD compared with the total New Zealand population (men and women respectively of the same age).⁶ The 2011–12 New Zealand Health Survey reported a higher prevalence of CVR factors among Pacific people aged 15 years and over than the total New Zealand population (aged 15+), specifically higher smoking rates (Pacific men: 28%; Pacific women: 25%; total population: 18%), higher obesity rates (Pacific men: 59%; Pacific women: 64%; total population: 28%) and relatively high rates of diabetes (Pacific men: 11%; Pacific women: 10%; total population: 5%).⁷

In 2006, 7% (266 000) of the New Zealand total population consisted of Pacific people;⁸ by 2010, New Zealand had the biggest population (350 000) of Pacific ethnicity or ancestry living outside Pacific countries, followed by the USA (300 000), Australia (150 000) and Canada (50 000);⁹ yet, data on the proportion of Pacific people living in New Zealand who receive a

CVR assessment through their general practice, their subsequent treatment for CVD and medication adherence are limited. The Caring Does Matter (CDM) initiative is a programme to improve adherence to CVD medication amongst high-CVR Pacific people.¹⁰ The CDM programme has identified high-CVR patients and their CVD medication adherence status by examining their electronic medical record (EMR) in general practice. Analysis of baseline data in the EMR informed the participating general practitioners (GPs) to implement an intervention, taking a targeted structured care approach, for their Pacific patients who were identified with high CVR and poor CVD medication adherence, as well as to assess CVR for unassessed indicated patients (that is, 'indicated' for CVR screening from age 35 years for Pacific men and 45 years for Pacific women).¹¹ This paper investigates whether there are differences in CVR management by gender for Pacific patients from the CDM baseline (i.e. pre-intervention) data.

Methods

Data were collected on Pacific adults aged ≥ 20 years from 14 general practices in Auckland and two in Northland between May and September 2012. General practices were selected on the basis of high Pacific caseload, willingness to participate in the CDM programme and use of either MedTech32 or MyPractice EMR systems. Data collected included: ethnicity (considered Pacific if any of the three ethnicity codes were of a Pacific people, e.g. Samoan), age and gender; CVR screening results in the past five years (calculated using a range of products including Predict and bestpractice, based on variations of the Framingham model, 'high CVR' constituting a five-year CVR of $\geq 15\%$, in accordance with New Zealand CVD guidelines);^{11–14} prescriptions over the past two years; and physiological measures of CVR factors, including blood

pressure (BP, using the mean of the three most recent readings in the past five years), lipids and HbA_{1c} (both using the most recent result over the past five years). When a patient had multiple CVRs within the five-year period of data analysed, the most recent CVR was used in the analysis.

Medication adherence was measured in terms of a medication possession ratio (MPR), a measure of medication availability, commonly dichotomised such that $MPR \geq 80\%$ is considered adherent.¹⁵ In our case, 'poor' or 'low' adherence to CVD medication was defined as fewer than four prescriptions, each for a 90-day supply of medication, in the past five quarters (i.e. insufficient for an MPR of 80%) or with no prescription in the past six months. Adherence was calculated for antihypertensive, cholesterol and oral antidiabetic medications for patients with at least one prescription of that class over nine months (a three-quarter 'run in' period) prior to the most recent five quarters. Patients without a prescription in the 'run in' period were excluded from judgement as 'low' or 'high' adherers, and were either considered as 'not treated' or a 'recent start' for a given medication class (the latter code was used if there were some prescriptions of that class in the recent 15 months).

Patient data were de-identified for the analysis presented in this paper, and examined to determine whether there were gender differences in rate of CVR screening, CVR scores, treatment patterns (including rates of medication adherence) and physiological measures, including systolic blood pressure (SBP), diastolic blood pressure (DBP), HbA_{1c} and total-to-HDL cholesterol ratio results, for those with high CVR.

We used the SAS statistical software package, version 9.2 (SAS Institute Inc., Cary, NC, USA) for statistical analysis, including normality tests (on all data sets), Fisher's exact tests (to check differences between sexes in terms of CVR assessment rate, treatment and adherence status) and Wilcoxon–Mann–Whitney tests

(to compare age, CVR and physiological measures between sexes in high-CVR groups, and to compare physiological measures of high-CVR patients according to their treatment and adherence status). The significance level used in these analyses is 0.05. Means and standard deviations (SD) are reported for normally distributed data; median and interquartile range (IQR) are reported for non-normally distributed data; and *P*-value is reported for all significance tests.

Results

A total of 10 863 Pacific adults, including 5890 women (54%, median age: 39, IQR = 23.0) and 4973 men (46%, median age: 40, IQR = 22.0), were included in the analysis. Overall 3495 (32%) patients had had a CVR assessment in the last five years, with 1201 (34% of all assessed) in the high-CVR group.

CVR by gender

A lower proportion of women than men had an assessed CVR in the ≥ 20 years of age group (1698 women, 29%, compared with 1797 men, 36%, Fisher's exact test $P < 0.0001$) and for the ≥ 45 years age group (1487 women, 65% of 2289, and 1326 men, 68% of 1942; Fisher's exact test $P = 0.0241$), and assessed men were younger than assessed women (median age: men = 52 years, IQR = 17.0, women = 56 years, IQR = 16.0, Wilcoxon–Mann–Whitney test $Z = 9.8116$, $P < 0.0001$, see also Figure 1). Considering the New Zealand guideline-recommended CVR assessment age (≥ 35 for Pacific men and ≥ 45 for Pacific women), only 56% (1735 of 3106) of men aged ≥ 35 years had had their CVR assessed, compared with 65% (1487 of 2289) of women age ≥ 45 years (Fisher's exact test

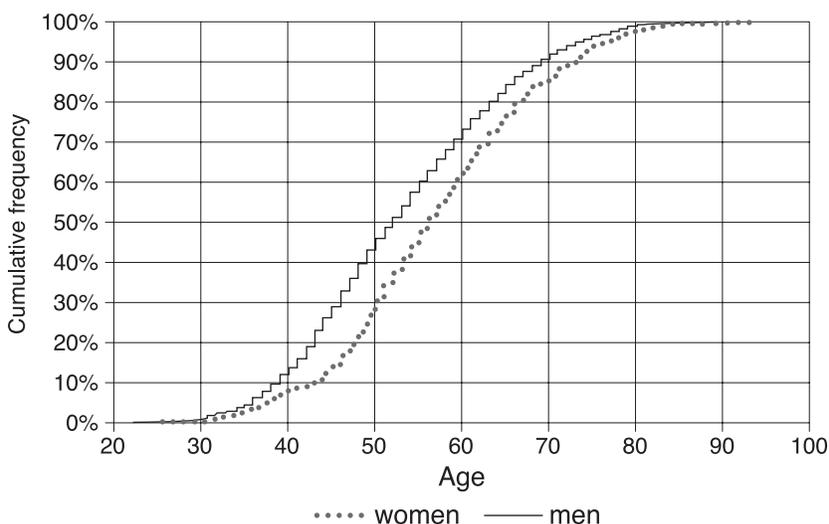


Figure 1 Age distribution of Pacific adults (age 20+) with a CVR in last five years

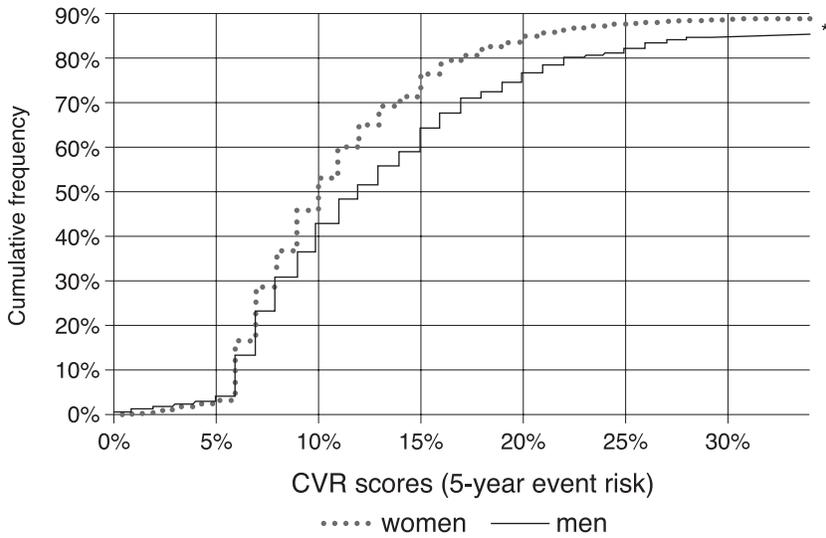


Figure 2 Most recent assessed CVRs in Pacific adults. * 10.3% of women and 13.9% of men had a CVR score $\geq 35\%$ or 'clinically high'

Table 1 CVR profile for enrolled Pacific adults

Age group (years)	Gender	High CVR <i>n</i> (%)	Low CVR <i>n</i> (%)	No CVR recorded in last five years <i>n</i> (%)	Total (%)
20–34	Female	6 (0)	40 (2)	2266 (98)	2312 (100)
	Male	9 (0)	53 (3)	1805 (97)	1867 (100)
	Total	15 (0)	93 (2)	4071 (97)	4179 (100)
35–44	Female	11 (1)	154 (12)	1124 (87)	1289 (100)
	Male	42 (4)	367 (32)	755 (65)	1164 (100)
	Total	53 (2)	521 (21)	1879 (77)	2453 (100)
≥ 45	Female	459 (20)	1028 (45)	802 (35)	2289 (100)
	Male	674 (35)	652 (34)	616 (32)	1942 (100)
	Total	1133 (27)	1680 (40)	1418 (34)	4231 (100)
Total (≥ 20)	Female	476 (8)	1222 (21)	4192 (71)	5890 (100)
	Male	725 (15)	1072 (22)	3176 (64)	4973 (100)
	Total	1201 (11)	2294 (21)	7368 (68)	10863 (100)

$P < 0.0001$). Of those who had had their CVR assessed, a higher proportion of men (40%) than women (28%) had high CVR (Fisher's exact test $P < 0.0001$); and men had a higher CVR overall than women (median CVR: men = 12%, IQR = 11%, women = 10%, IQR = 8%, Wilcoxon–Mann–Whitney test $Z = -6.9441$, $P < 0.0001$), irrespective of age (see Figure 2 and Table 1). Furthermore, the Pacific men in the high-CVR group were significantly younger than the high-CVR women (median age: men = 61 years, IQR = 14.0, women = 65 years, IQR = 15.5, Wilcoxon–Mann–Whitney test $Z = 5.1393$, $P < 0.0001$), but had similar median CVR (men = 22%, IQR = 82%, women = 21%, IQR = 83%, Wilcoxon–Mann–Whitney test $Z = -1.0909$, $P = 0.2753$).

Treatment by gender

Table 2 shows the treatment pattern and adherence status for antihypertensive, oral antidiabetic and cholesterol-lowering medications by gender in the high-CVR group. A higher proportion of women than men in the high-CVR group were being treated with antihypertensive (86% women compared with 78% men, Fisher's exact test, $P = 0.0025$) and oral antidiabetic medication (57% women compared with 45% men, Fisher's exact test, $P < 0.0001$). There was no significant gender difference in treatment with cholesterol-lowering medication (73% women compared with 69% men, Fisher's exact test, $P = 0.0926$). There was no significant gender difference in the rates of adher-

Table 2 Treatment and medication adherence profile for high CVR patients

Drug class	Gender	Not treated* n (%)	Low adherence n (%)	High adherence n (%)	Recent start† n (%)
Anti-hypertensive medication	F (476)	69 (14)	118 (25)	231 (49)	58 (12)
	M (725)	156 (22)	155 (21)	314 (43)	100 (14)
	Total (1201)	225 (19)	273 (23)	545 (45)	158 (13)
Cholesterol medication	F (476)	127 (27)	150 (32)	143 (30)	56 (12)
	M (725)	227 (31)	215 (30)	196 (27)	87 (12)
	Total (1201)	354 (29)	365 (30)	339 (28)	143 (12)
Oral antidiabetic medication	F (476)	207 (43)	87 (18)	134 (28)	48 (10)
	M (725)	398 (55)	93 (13)	162 (22)	72 (10)
	Total (1201)	605 (50)	180 (15)	296 (25)	120 (10)

* No prescriptions in the relevant medication class in last two years. † If there were some prescriptions in the last 15 months, but none in the first 9 months of the last two years, no further judgement about medication adherence was made.

ence to the three CVD medications for those high-CVR patients prescribed to in both the 'run in' period and the most recent five quarters, with 66% of women and 67% of men who had high CVR and were on antihypertensive medication having MPR \geq 80% (Fisher's exact test, $P = 0.8225$); 49% of women and 48% of men on cholesterol-lowering medication having MPR \geq 80% (Fisher's exact test, $P = 0.8185$); and 61% of women and 64% of men on oral antidiabetic medication having MPR \geq 80% (Fisher's exact test, $P = 0.5697$).

Physiological measures and gender

Among the 1201 high-CVR patients, 1167 (97%) had at least three SBP and DBP readings in the past five years and 84% had three BP readings within a window of 15 months (i.e. the latest BP measurement was taken no later than 15 months after the first of three more recent BP readings), 1179 (98%) had total-to-HDL cholesterol ratio results and 1057 (88%) had HbA_{1c} results. The majority of the latest measurements were taken within the last 12 months (94% of BP readings, 75% of lipid results and 76% of HbA_{1c} results). Within the high-CVR group, compared with men, women had a significantly higher SBP and higher HbA_{1c}; no significant gender difference in the DBP or total-to-HDL cholesterol ratio was observed (median SBP: men = 131.3 mmHg, IQR = 16.67, women = 135.0 mmHg, IQR = 19.67, Wilcoxon–Mann–Whitney test $Z = 3.7394$, $P = 0.0002$; median HbA_{1c}: men = 50.0 mmol/mol, IQR = 18.83, women = 53.0

mmol/mol, IQR = 21.86, Wilcoxon–Mann–Whitney test $Z = 3.6385$, $P = 0.0003$; median DBP: men = 80.0 mmHg, IQR = 12.00, women = 80.0 mmHg, IQR = 13.33, Wilcoxon–Mann–Whitney test $Z = -0.8310$, $P = 0.4060$; median total-to-HDL ratio: men = 4.30, IQR = 1.50, women = 4.20, IQR = 1.80, Wilcoxon–Mann–Whitney test $Z = -0.6984$, $P = 0.4849$).

Physiological measures and medication adherence

The high-CVR patients who were prescribed anti-hypertensive, cholesterol-lowering, and/or oral antidiabetic medication in the last two years (irrespective of their adherence status) were found to have a higher SBP (with no significant difference in DBP) and higher HbA_{1c} than those not on treatment, but a lower mean total-to-HDL cholesterol ratio than those not on treatment (median SBP: treated = 133.3 mmHg, IQR = 18.67, not treated = 130.0 mmHg, IQR = 18.17, Wilcoxon–Mann–Whitney test $Z = -2.6450$, $P = 0.0082$; median DBP: treated = 80.0 mmHg, IQR = 13.33, not treated = 80.0 mmHg, IQR = 11.33, Wilcoxon–Mann–Whitney test $Z = 0.3924$, $P = 0.6947$; median total-to-HDL ratio: treated = 4.00, IQR = 1.60, not treated = 4.70, IQR = 1.60, Wilcoxon–Mann–Whitney test $Z = -6.4139$, $P < 0.0001$; median HbA_{1c}: treated = 60.0 mmol/mol, IQR = 21.09, not treated = 44.3 mmol/mol, IQR = 6.56, Wilcoxon–Mann–Whitney test $Z = -20.5009$, $P < 0.0001$). Those patients who adhered to medication had better results (lower SBP, DBP, total-to-HDL cholesterol and

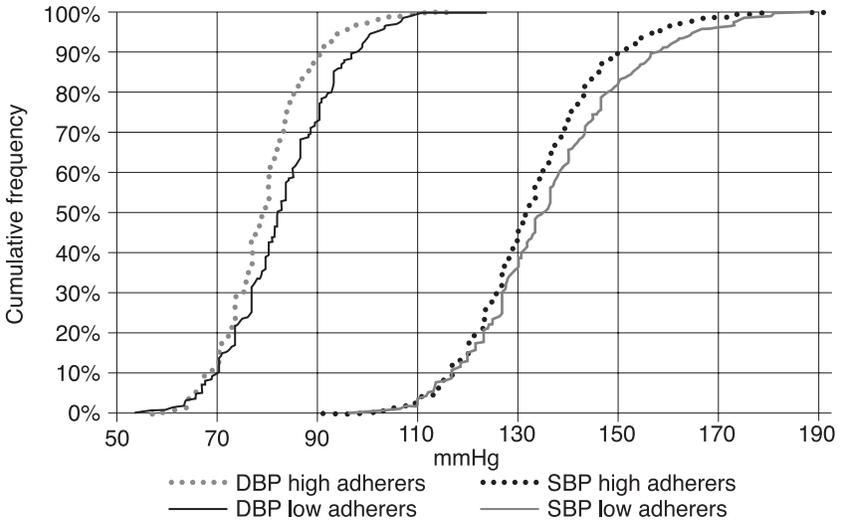


Figure 3 Blood pressure profile by medication adherence status for high-CVR patients

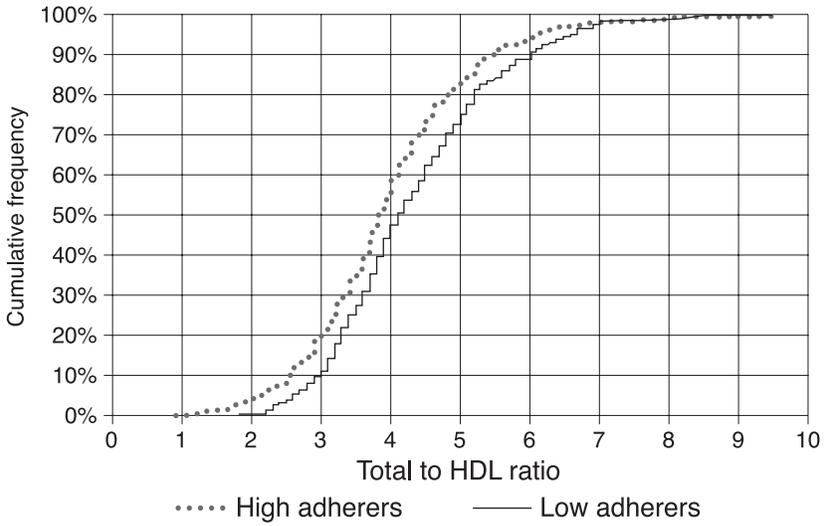


Figure 4 Cholesterol profile by medication adherence status for high-CVR patients

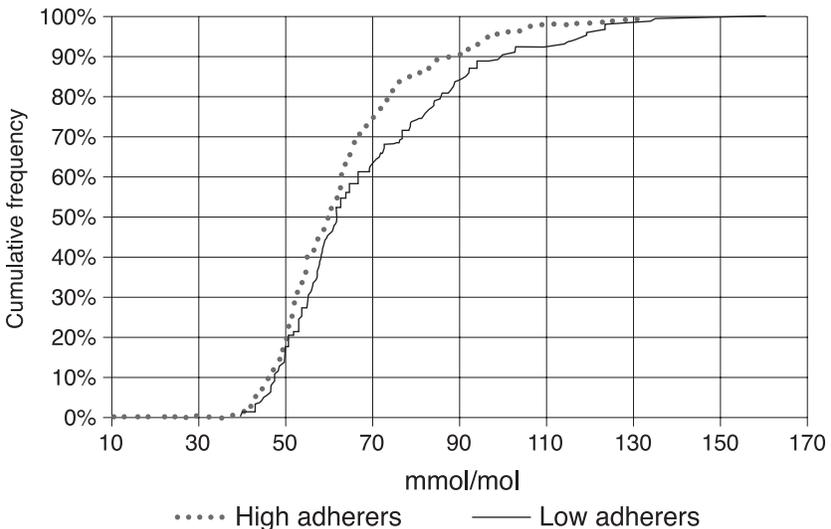


Figure 5 HbA_{1c} profile by medication adherence status for high-CVR patients

Table 3 Physiological profile for high CVR patients by medication adherence status

Drug class	Physiological measures	Gender	Median (IQR) for high adherers <i>n</i> (%)	Median (IQR) for low adherers <i>n</i> (%)	Mann–Whitney test
Anti-hypertensive medication	SBP (mmHg)	F	133.3 (18.67)	136.7 (23.67)	<i>Z</i> = 1.8465, <i>P</i> = 0.0648
		M	130.7 (16.00)	133.3 (16.67)*	<i>Z</i> = 2.1709, <i>P</i> = 0.0299
		Total	131.7 (17.33)	135.2 (19.33)	<i>Z</i> = 2.8022, <i>P</i> = 0.0051
	DBP (mmHg)	F	78.3 (10.33)	80.7 (12.67)	<i>Z</i> = 2.5234, <i>P</i> = 0.0116
		M	79.3 (10.33)	83.3 (14.00)†	<i>Z</i> = 4.4636, <i>P</i> < 0.0001
		Total	78.7 (10.00)	82.0 (13.67)‡	<i>Z</i> = 4.9929, <i>P</i> < 0.0001
Cholesterol medication	Total/HDL ratio	F	3.90 (1.40)	3.90 (1.70)	<i>Z</i> = -1.1935, <i>P</i> = 0.2327
		M	3.80 (1.40)	4.30 (1.40)	<i>Z</i> = -4.0465, <i>P</i> < 0.0001
		Total	3.80 (1.40)	4.10 (1.60)	<i>Z</i> = -3.8437, <i>P</i> < 0.0001
Oral antidiabetic medication	HbA _{1c} (mmol/mol)	F	59.0 (18.00)	63.9 (27.32)	<i>Z</i> = 2.9255, <i>P</i> = 0.0034
		M	60.7 (20.00)	61.0 (28.42)	<i>Z</i> = 0.7903, <i>P</i> = 0.4293
		Total	60.0 (19.09)	61.7 (28.51)	<i>Z</i> = 2.5754, <i>P</i> = 0.0100

All figures in bold are statistically significant values.

* The data set is normally distributed (mean = 134.8 mmHg, SD = 15.11). † The data set is normally distributed (mean = 83.7 mmHg, SD = 11.16). ‡ The data set is normally distributed (mean = 83.0 mmHg, SD = 11.09).

HbA_{1c}) than non-adherers (see Figures 3–5 and Table 3). This effect was also seen when the data were assessed for each gender separately (although not statistically significant for HbA_{1c} in men, or for SBP or total-to-HDL cholesterol in women).

Discussion

In an opportunistic assessment of a large cohort of Pacific people in Auckland and Northland, New Zealand we found substantial opportunities for improved management of CVR. One area for improvement is in CVR assessment: 36% of women and 45% of men who were indicated for CVR assessment lack an identifiable CVR within the past five years. CVR

assessment finds a large percentage of Pacific adults with high CVR, particularly among Pacific men, with 28% of assessed Pacific women and 40% of assessed Pacific men having a five-year CVR $\geq 15\%$. Amongst those patients who were assessed and found to have a high CVR, (unsurprisingly) many patients had physiological measures well above desirable levels based on their most recent readings. For example, fewer than half of patients assessed with a high CVR had achieved an SBP of under 130 mmHg averaged over the last three readings as recommended by New Zealand guidelines.¹⁶ Moreover, there were substantial levels of poor medication adherence based on sufficiency of prescriptions to support a high ($\geq 80\%$) MPR, particularly for cholesterol-lowering medication. Again, not surprisingly, people who had poor medication adherence had significantly worse physiological measures.

With respect to gender, Pacific men were more likely to have a high CVR but were treated less aggressively, despite being equally likely to adhere to their prescribed medication as women. However, within the high-risk group, women had a higher median SBP and HbA_{1c} than men, suggesting general practices may be treating according to individual physiological measures rather than total CVR. The New Zealand guidelines recommend that treatment should be based on an individual's five-year absolute CVR, not the level of individual risk factors.^{11,16} Research suggests that moderate reductions in several risk factors can be more effective than major reductions in just one.¹⁷ According to the Framingham model on which the CVR calculation was based, the overall CVR score would be higher for men than women with equal BP, cholesterol and HbA_{1c}, which warrants more 'aggressive' treatment decisions for men.¹⁴ Moreover, the association between CVD medication adherence and levels of physiological measurements associated with CVR factors (BP, cholesterol and HbA_{1c}) suggests that practices should further promote medication adherence as part of improved CVR management.

There have been a number of studies both in New Zealand and internationally regarding treatment and adherence of CVD medications, but few have focused on Pacific people. The 2011–12 New Zealand Health Survey reported that more people, compared with 2006–07, took medication for high BP (16% of people aged ≥ 15 years compared with 13.6% in 2006–07) and high cholesterol (10% compared with 8.4% in 2006–07); Pacific people were more likely to be taking medication for high BP and high cholesterol than other ethnic groups; and the survey also found that women were more likely to be taking medication for high BP (17%) than men (14%) and men were more likely to be taking medication for high cholesterol (12%) than women (9%).^{7,18} We found a higher proportion of Pacific women than Pacific men being treated with antihypertensive and oral antidiabetic medication, but no significant difference in cholesterol medication treatment in the high-CVR group. We also found no significant gender difference in the rates of adherence to the three CVD medications for those high-CVR patients prescribed to. This agrees with two American studies, both on older populations of diverse race/ethnicity and a recent systematic review which included 76 studies mostly based in Africa, Asia or Central and South America.^{19–21} However, there have been studies that reported a gender difference in CVD medication adherence. For instance, a New Zealand study found much better statin adherence in women than men when discharged from hospital after an acute coronary heart disease event and not dispensed statin preadmission.²² A recent patient interview study in Malaysia also found female hypertension patients are more likely to adhere to

their medication regime than men.²³ Furthermore, parallel to the challenge to improve management of elevated CVR in Pacific people, the New Zealand Māori population face a similar problem, as New Zealand Māori are significantly more likely to have high CVR than non-Māori.²⁴

The strength of this study lies in the fact that it involved analysis of a large number of Pacific general practice patients. In addition, there was only a low level of missing data for the physiological measures in the general practice EMRs. However, the data used in this analysis are limited to records collected as part of usual care (e.g. there was no systematic collection of outcome measures apropos to our study timeframe). Moreover, in analysing patients during the course of their usual care, our analysis timeframe has swept in patients at various stages in their CVD management; we have not investigated, for instance, the prevalence of cases previously assessed with high CVR, but subsequently having responded to treatment and which are now below the 15% risk threshold. It should also be acknowledged that the study involved a convenience sample of practices, and thus may not be generalisable to Pacific people enrolled at other general practices in New Zealand or Pacific people who live in the other Pacific countries, the USA, Australia or elsewhere, or to other health systems. In particular, results may not generalise to those health systems with less reliable subsidisation of CVD medication since restriction of medication use due to cost has been reported for some population groups.²⁵ However, elevated CVR in Pacific people is not a phenomenon restricted to New Zealand.^{26,27}

A further limitation of this study is that there are possible distortions of the data due to either patients' going to several general practices and/or hospitals and subsequently getting their prescriptions there or out-of-date patient enrolment information in the EMRs, including the potential for some patients to be counted more than once if they were enrolled at more than one practice. This suggests a research opportunity to investigate the rate of such occurrences; however, it should be noted that only one primary care provider in New Zealand can successfully claim the enrolment subsidy for a given patient in a given quarter, which provides some incentive for practices to keep enrolment information up to date. Furthermore, the improved control on the physiological measures with adherence suggests that at least some of our non-adherence as measured from the individual GP EMRs is due to actual under-supply, as compared with being simply gaps in the data due to alternate supply. Moreover, MPR itself is an indirect measure of adherence; and in our case the use of prescribing rather than dispensing data is even more indirect. However, in the New Zealand setting, having strong subsidy on CVD-related medications, prescription possession

has been found to be a relatively reliable indicator of medication possession, with prescription of long-term medication followed by a dispense within a week in 93% of cases, and with improvement in rates of prescription-based adherence corresponding to improvement in dispensing-based adherence for general practices with large Pacific caseload.^{28,29} Another limitation is that we did not include smoking status in the analysis, which, given the high smoking rate in some groups of Pacific men, is likely to account for some of the tendency for men to score higher CVR beyond risk inherent in gender per se. Furthermore, we have not compared the findings among Pacific ethnic sub-groups (Samoan, Tongan, etc.).^{7,30}

The New Zealand Ministry of Health has set a target for district health boards to achieve 90% CVR assessment of indicated adults by July 2014.³¹ Beyond simply increasing the assessment rates, there will need to be an emphasis on gender equity of assessment, and on monitoring and promoting adherence for those assessed as in need of CVD medication. Among the interventions targeting low adherence, there is some evidence supportive of self-monitoring and self-management, simplified dosing and interventions directly involving pharmacists, as well as less consistent evidence on reminders, education combined with self-management skills training, counselling or support, financial incentives and lay health worker interventions; however, no interventions have been found to be effective to improve all medicines use across all diseases, populations or settings.³² It is possible to improve anti-hypertensive adherence in Pacific patients through practice staff follow-up based on the MPR as indicated in the practice EMR;²⁹ however, such intervention requires additional resourcing. Creating tailored adherence promotion interventions with models that are sustainable in terms of cost and staffing is an on-going challenge.

In conclusion, general practice EMRs have enabled assessment of the state of, and identification of gaps in, the management of CVR in Pacific patients. The findings have highlighted that Pacific men were less likely to have a CVR assessment undertaken than women, and when they were assessed they were more likely to have a high CVR. Men were equally likely to adhere to treatment as women. More active CVR assessment, treatment and promotion of medication adherence in Pacific people, particularly Pacific men, attending general practices is justified given their high mortality rate from CVD compared with the overall New Zealand population.^{2,5}

ETHICAL APPROVAL

The study was approved by the Northern X Regional Ethics Committee (NTX/12/EXP/102).

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