Original Article

Cardiovascular risk factors in elderly Koreans in Australia and Korea

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Koreans are a recent but relatively small ethnic minority group in Australia. This descriptive cross-sectional, comparative intercountry study examines the effect of Australian acculturation among elderly Koreans on cardiovascular disease (CVD) risk factors, compared with their counterparts in Korea. Fifty-one (72.4 ± 8.7 years) Australian Koreans (AK) and 48 (75.7 ± 6.9 years) Koreans (K) living in Seoul participated in the study. Diabetes was reported by 10.2% of AK and 17.4% of K and hypertension by 38.8 and 29.8% of AK and K, respectively. Significantly, more AK (85.7%) than K (53.2%) reported undertaking physical activity ($P = 0.0005$) and fewer AK were current smokers (6% *vs* 26.1%; $P = 0.0077$). After controlling for age, body mass index and waist-to-hip ratio no differences were found in lipid profiles between AK and K men or women. The effect of acculturation may be reflected among Australian Koreans by increased physical activity and reduced smoking levels and increased levels of abdominal obesity.

Key words: acculturation, cardiovascular disease, risk factors, Australian Korean, Korean, elderly, lipid profile, dietary intake.

Introduction

Cardiovascular disease (CVD) is a major cause of mortality and morbidity among the elderly in Western nations, although there are potentially modifiable risk factors including dyslipidaemia, diabetes, hypertension, obesity, smoking and physical inactivity. Despite the fact that detailed studies of disease risk factors in Asian countries are limited, anecdotally, mortality from coronary heart disease (CHD) is low in Asia. Lipid profiles reported in China[1] and India[2] are generally less atherogenic than they are in Western societies; however, other risk factors such as cigarette smoking and a tendency to central fat distribution are greater.[3,4] Weight gain, and particularly increased abdominal fat, are related to deterioration in the blood lipid profile[5] and increased risk of CHD and diabetes.[6,7] Those migrating from less developed to industrialized nations may and do develop the disease patterns of the host country.[8] Furthermore, the effect of acculturation on the health of migrants may have an impact on the emerging health needs of an overall ageing population and on public health policy.[9]

Changes in diet and lifestyle due to Western acculturation have been documented.[10–13] Coupled with these observations, large studies in the UK and USA show an increase of both prevalence and mortality from CHD among Asian immigrants (compared with aged matched subjects or siblings from their countries of origin).[8,14] Australia has experienced increased immigration from Asia in the last two decades. Increased bodyweight and dietary changes are associated with length of residence in Australia for Asian men and women.[10] Weight gain and diet changes have been reported among urban Vietnamese women.[11] In a study of CHD risk factors in an Australian Vietnamese population, total cholesterol (while lower than the Australian average) had increased with time in Australia.[15]

Koreans are a recent, relatively small Asian immigrant group in Australia. There are approximately 20 000 Koreans living in Sydney, the majority of whom have emigrated from Korea in the past 15 years.[16] The older members of this group are heavily clustered within certain inner suburbs of Sydney. Data on cardiovascular risk factors for Koreans living in

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Korea or abroad is limited. However, a cross-sectional study (by random cluster sampling) conducted in Korea of residents over 30 years of age found that the average cholesterol level of Koreans was 4.9 mmol/L. The prevalence of hypercholesterolaemia (definition ≥ 6.5 mmol/L) was only 1.2%, whereas that of hypertriglyceridaemia was 11.3%, and 42.6% of the population smoked.[17] Another study by Kim *et al*. 1997[18] found that the prevalence of hypertension and diabetes in a Korean population was 28 and 2.8%, respectively. Studies on psychological health of Korean immigrants to Canada and the USA have been undertaken[19–21] but only one study has considered cardiovascular disease risk factors in elderly Koreans living in USA.[22] Little is known of the current health status of Koreans who have migrated to Australia and no studies have been undertaken of elderly Koreans living in Australia.

The aim of this cross-sectional study was to investigate cardiovascular disease risk factors in an urban population of elderly Koreans living in an inner suburb of Sydney, Australia and a similar population living in Seoul, South Korea.

Methods

Study population

The study population comprised elderly (> 60 years) Korean immigrants living in the Sydney metropolitan area and elderly (> 60 years) Koreans (K) living in the metropolitan area of Seoul, South Korea. Australian Korean (AK) subjects were recruited from a population base of less than 600 elderly (> 60 years) Koreans living within the Central Sydney Area Health Service. In 1996 the reported total Korean population living within this area was approximately 6500.[16]

Australian Korean subjects were recruited from a Korean community neighbourhood centre. It was estimated that 95% of the elderly Koreans living in the area attended this community centre, at least on an occasional basis. Korean (K) subjects were recruited from three community centres in the inner suburbs of Seoul. Recruitment of subjects in both Australia and Korea was undertaken by the same Korean researcher (JRK). Approval for the study was obtained from the University of Sydney Ethics Committee. All subjects had the study explained to them individually in Korean and their voluntary participation was made clear. They were given a subject information sheet in Korean. All of the subjects signed informed consent forms. Anthropometric measurements were undertaken by the same investigator (JRK) using identical methodology and instruments in both Australia and Korea.

Demographic information

Information was collected by interview and questionnaire on age, marital status, comorbidities, potentially modifiable risk factors of CVD, current smoking status, alcohol consumption, previous place of residence (city or rural dwellers in Korea prior to migration) and the number of years living in Australia. The potentially modifiable CVD risk factors were diabetes, hypertension, total cholesterol > 5.5 mmol/L,[23] waist-to-hip ratio (WHR) ≥ 0.90 for men and > 0.85 for women, smoking and physical inactivity.

Anthropometric measurements

Height was measured with a free-standing stadiometer. Bodyweight and per cent body fat were recorded using portable bio-electrical impedance body fat analyser scales (Tanita 501; Tanita Corporation of America Inc., Skokie, IL, USA). Subjects (in light clothing) were asked to stand on the device with bare feet, gender and height were manually entered and a reading of the subject's weight and per cent body fat was obtained. Body mass index (BMI; kg/height in m^2) was calculated from measured height and weight. Waist and hip circumference were measured with a non-stretch tape measure accurate to 0.1 cm. The waist was measured at the narrowest circumference between the lower border of the rib cage and the iliac crest and the hip circumference was measured at the maximal gluteal protrusion; waist-to-hip ratio (WHR) was then calculated.[7]

Biochemistry

Fingerprick capillary blood sample (non-fasting) for total cholesterol (TC) and high density lipoprotein (HDL) cholesterol (HDL-C) was collected from each subject into 2 mL plastic tapered EDTA tubes. The tube was placed in a second larger tube which was stored in ice for transport to the laboratory. The blood samples in Korea were spun down, stored appropriately, transported in dry ice and analysed with those taken in Australia in the laboratory of the Department of Biomedical Sciences, University of Sydney, Lidcombe, New South Wales. The Reflotron 'Dry Chemistry' Reflectance Photometric analyser (Boehringer Mannheim, Germany) was used to determine TC and HDL-C concentrations. Coefficients of variation for repeated measurements of plasma were 2.9% for TC and 3.2% for HDL-C. The accuracy of the Reflotron used in this study is regularly assessed through participation in the Australian College of Pathologists' Standardization Programme. The reflotron method has been shown to be accurate and reliable.[24,25]

Dietary assessment

Both the Australian Korean and the Korean subjects were interviewed by the same dietitian (JRK) who obtained 24-h dietary recall on all subjects. Dietary portion sizes were estimated from standard household measures. Dietary analysis was performed on the information gained using Nuttab nutrient database (SERVE Dietary Analysis Package, SERVE Nutrition Management System for Microsoft Windows; M & H Williams Pty Ltd, St Ives, NSW, Australia). Estimates of total daily energy intake, macronutrient intake and dietary cholesterol were obtained.

Physical activity assessment

A questionnaire adapted from the Australian National Heart Foundation's Risk Factor Prevalence Study, 1990 was used to assess regular physical activity level as well as alcohol consumption and smoking status.[23] Physical activity was assessed in terms of vigorous activity, less vigorous activity, walking and work/housework. Subjects were asked to determine the number of sessions and the time spent performing the activities in an average 2-week period. Total exercise sessions and total exercise time on an average 2-week period were calculated by simple aggregation of the responses. The responses to all of the physical activity questions were then

incorporated into a single activity index (0–18). Vigorous activity and vigorous task responses were weighted more than less vigorous activity and regular walking categories; for example, regular vigorous exercise scored three, and if the duration of the vigorous exercise was greater than the median then the subject scored a further four points. No regular vigorous exercise scored zero. Regular walking scored one, and if the duration of walking was greater than the median the subject scored a further two points. No regular walking scored zero.

Statistical analysis

The Statview statistical software package (Statview 1992; Abacus Concepts Inc., Berkeley, CA, USA) and Minitab 8.0 (Minitab Reference Manual Release 8 MacIntosh, 1994; Minitab Inc., PA, USA) were used for statistical analysis. Data were analysed using Student's *t*-test, simple linear correlation, χ^2 test, analysis of variance and multiple linear regression. A value of $P < 0.05$ was taken to indicate statistical significance. All results are given as mean ± SD unless otherwise indicated.

Results

Study populations

The study group comprised 51 elderly Koreans living in Australia (AK) and 48 elderly Koreans living in Seoul, South Korea (K). Demographic and anthropometric information is given in Table 1. Twenty-three (45.1%) AK and 20 (42.6%) K had a BMI ≥ 25 kg/m^2. Six (11.7%) AK were obese (BMI ≥ 30) but none of the K population were obese. Twenty-four (63.1%) AK and 14 (36.9%) K subjects was married (P = 0.055). Mean length of residency in Australia for AK was 11.8 ± 6.2 years (range 2 months–24 years). Mean proportion of life spent in Australia was 13.7 ± 1.5% for AK women and 20.1 ± 2.0% for AK men. Thirty-one (63.3%) AK had been rural dwellers prior to migrating to Australia, whereas 41 (87.2%) K had lived in rural areas prior to living in the metropolitan area of Seoul ($\chi^2 = 7.35$, $P = 0.0067$).

Anthropometry

A significant difference in waist circumference, WHR and per cent body fat was observed between men and women both in Australia and Korea. Both men and women in Australia had significantly greater waist circumferences and WHR than did their Korean counterparts (Table 1).

Lipid profile

No differences were found between either crude or adjusted (age, BMI, WHR) lipid profiles of women in Australia and Korea (Table 2). The prevalence of moderately high TC (> 6.5 mmol/L) was similar in AK and K women (24.1% *vs* 20.7%), respectively. Borderline high TC (> 5.5 mmol/L) in women was 51.7% in Australia and 65.5% in Korea. In men, crude TC levels were higher in Australia, but the difference disappeared on adjustment for confounding (Table 2). However, 45.5% of men in Australia had TC > 5.5 mmol/L and 9.1% had TC > 6.5 mmol/L while no men in Korea had values above 5.5 mmol/L.

Dietary intake

Korean women and Korean men reported significantly less total energy intake, less total dietary fat, less saturated fat and dietary cholesterol, and a significantly greater percent contribution of carbohydrate to total energy intake compared to their Australian counterparts. Women from both Australia and Korea reported less total energy intake, dietary fat, saturated fat and dietary cholesterol, and higher carbohydrate intake than their male counterparts. Protein intake was similar for all four groups (Table 3). There was a significant correlation ($r = 0.52$, $P = 0.0314$) between BMI and per cent saturated fat in Korean men only. Correlations between total energy and macronutrient intake and years of residency in Australia were not observed for AK men or women.

Cardiovascular disease risk factors

There was no significant difference between the two populations in the prevalence of hypertension and diabetes; 38.8% of AK and 29.8% of K reported hypertension whereas 10.2% of AK and 17.4% of K reported diabetes. Significantly more

Table 1. Two-way factorial analysis of variance for demographic and anthropometric variables for Australian Korean and Korean subjects

	Australian Korean		Korean		*P*-value		
	Female	Male	Female	Male	Main effects		Interaction
					Country	Gender	Country*Gender
Age (years)	71.7 ± 7.9	73.4 ± 9.8	76.1 ± 6.8	75.1 ± 7.3	0.65	0.86	0.40
	n = 29	*n* = 22	*n* = 29	*n* = 19			
BMI (kg/m^2)	24.4 ± 3.2	25.3 ± 2.8	24.1 ± 2.7	23.4 ± 3.5	0.09	0.88	0.19
	n = 29	*n* = 22	*n* = 29	*n* = 19			
Waist (cm)	85.7 ± 7.7	93.9 ± 6.4	81.6 ± 7.6	88.2 ± 8.1	0.002	< 0.0001	0.62
	n = 28	*n* = 22	*n* = 28	*n* = 19			
WHR (waist/hip)	0.87 ± 0.05	0.93 ± 0.04	0.84 ± 0.05	0.91 ± 0.05	0.024	< 0.0001	0.63
	n = 28	*n* = 22	*n* = 28	*n* = 19			
Body fat* (%)	33.9 ± 7.7	19.7 ± 5.5	35.7 ± 6.5	16.2 ± 6.5	0.52	< 0.0001	0.054
	n = 29	*n* = 21	*n* = 29	*n* = 19			
Activity index score	2.9 ± 2.6	3.7 ± 4.5	1.3 ± 1.7	1.7 ± 1.8	0.003	0.338	0.723
	n = 28	*n* = 21	*n* = 29	*n* = 18			

*% body fat measured by bioelectrical impedance; *n* = number of observations (some subjects did not have observations recorded for all variables). BMI, body mass index; WHR, waist-to-hip ratio.

AK (85.7%) than K (53.2%) reported currently undertaking some form of physical activity ($\chi^2 = 12.04$, $P = 0.0005$). A significantly greater ($P = 0.003$) activity index score was observed in the immigrant group (Table 1). Significantly fewer AK (6.1%) than K (26.1%) were current smokers ($\chi^2 = 7.11$, $P = 0.0077$). Seven K and 10 AK were ex-smokers. The majority ($n = 6$) of AK ex-smokers had quit since migration to Australia. Thirty (61.2%) AK and 37 (78.7%) K did not drink alcohol.

In terms of the number of potentially modifiable risk factors of CVD both AK and K were similar. The mean number of CVD risk factors per individual was 2.0 ± 1.1 (range 0–6) for AK and 2.1 ± 1.2 for K populations. Six AK and five K had none of the selected CVD risk factors, while four AK and seven K had four or more of the CVD risk factors. Significantly more AK (39.2%) than K (2.1%) had both elevated total cholesterol and high WHR ($\chi^2 = 20.4$, $P < 0.0001$).

Acculturation

Among AK women, significant correlations were observed between years of residency in Australia and BMI ($r = 0.51$, $P = 0.0052$), WHR ($r = 0.38$, $P = 0.0475$) and number of CVD risk factors ($r = 0.45$, $P = 0.0154$). Body mass index was correlated with the number of CVD risk factors ($r = 0.57$, $P = 0.0012$). When compared on the basis of ≥ 5 years and < 5 years of residency, women who had lived in Australia for ≥ 5 years had a greater BMI ($P = 0.0587$) and significantly ($P = 0.0302$) more CVD risk factors than did women who had resided in Australia for < 5 years. Body mass index was 25.2 ± 3.1 kg/m^2 versus 22.5 ± 2.9 kg/m^2 and number of CVD risk factors were 2.4 ± 1.2 versus 1.1 ± 1.4 for ≥ 5 and < 5 years residency, respectively.

In AK men years of residency in Australia was correlated with WHR ($r = 0.45$, $P = 0.0394$) but not with BMI or number of CVD risk factors. Waist-to-hip ratio was significantly higher (0.94 ± 0.03 *vs* 0.87 ± 0.08, $P = 0.0191$) and HDL-C significantly lower (1.03 ± 0.37 mmol/L *vs* 1.70 ± 0.71 mmol/L, $P = 0.0372$) in men who had lived in Australia ≥ 5 years compared with those who had lived in Australia < 5 years. These associations were not evident in women. Correlations between years of residency in Australia and total dietary energy intake, macronutrient intake and activity index score were not observed for AK men or AK women.

Table 2. Adjusted total and high density lipoprotein-cholesterol (HDL-C) cholesterol for Australian Korean and Korean subjects

	Australian Korean	Korean	*P* value
Total cholesterol (mmol/L)*			
Female	5.5 (5.0–6.0)	6.0 (5.6–6.5)	0.126
Male	5.2 (4.9–5.5)	4.8 (4.5–5.2)	0.129
HDL cholesterol (mmol/L)*			
Female	1.07 (0.95–1.19)	1.03 (0.91–1.15)	0.692
Male	1.11 (0.95–1.28)	0.98 (0.80–1.15)	0.255
Cholesterol/HDL-C ratio*			
Female	5.6 (4.8–6.3)	6.2 (5.4–7.0)	0.301
Male	5.5 (4.5–6.4)	5.2 (4.2–6.3)	0.750

*Adjusted for age, body mass index and waist-to-hip ratio by multiple regression. Note: 95% confidence intervals are given in parentheses. AK female: $n = 29$, AK male: $n = 22$; K Female: $n = 29$; K male: $n = 19$.

Discussion

There are limited studies of migrant Korean populations and even fewer of elderly migrant Koreans. This study is the first to report on cardiovascular disease risk factors in elderly Koreans living in Australia, and most importantly, compares this population to a similar population of elderly Koreans living in South Korea. Although the sample size of the current study was small, the population base is also small. The study reported on a total sample estimated as 8% of elderly Koreans living within the Central Sydney Area Health Service. This is relatively a larger sample size than a similar study from USA which reported on approximately 0.3% of the American Korean population base.[22] Overall diabetes and hypertension prevalence were similar in populations in Australia and Korea. Australian Koreans were healthier in terms of activity levels and smoking habits, and less healthy in terms of dietary intake and central adiposity compared with a similar population in Korea. The effect of acculturation within this elderly population may be reflected in these changes in cardiovascular disease risk factors.

Total cholesterol is less predictive of CHD in elderly persons[26] than in younger age groups and numerous studies report no association between TC and CHD in persons over 70 years of age.[27–29] The only Australian population-based data on CHD in the elderly found no association between TC and CHD in elderly Australians.[28] In contrast, the level of HDL-C has been found to be particularly useful in predicting CHD in the elderly.[29,30] In the current study, TC was found to be higher in women than in men in both countries, with the difference greater in Korea. In contrast, HDL-C was similar in men and women in both countries. The TC : HDL-C ratio, which is frequently used as a general measure of atherogenicity, was higher in men than in women in the two reported Australian studies but not in the current study.[23,31]

Table 3. Two-way factorial analysis of variance for total energy and macronutrient intake for Australian Korean and Korean subjects

	Australian Korean		Korean		*P*-value		
	Female ($n = 29$)	Male ($n = 22$)	Female ($n = 29$)	Male ($n = 19$)	Main effects Country	Gender	Interaction Country*Gender
Total energy intake (kJ)	4723 ± 1275	5988 ± 1063	4036 ± 969	5040 ± 1300	0.001	<0.0001	0.59
Carbohydrate (%)	69.4 ± 8.9	61.3 ± 10.2	72.8 ± 10.7	69.3 ± 13.0	0. 0119	0.0103	0.30
Protein (%)	14.7 ± 3.0	16.5 ± 4.4	13.8 ± 4.1	15.3 ± 4.5	0.19	0.052	0.85
Total fat (%)	15.8 ± 7.4	22.2 ± 8.9	13.2 ± 7.7	15.4 ± 9.7	0.008	0.0156	0.23
Saturated fat (%)	5.6 ± 4.4	8.0 ± 4.9	2.8 ± 2.2	4.2 ± 3.7	<0.0001	0.0226	0.54
Cholesterol (mg)	74.9 ± 97.1	157.1 ± 137.5	30.4 ± 42.5	101.2 ± 131.2	0.0222	0.0006	0.80

This finding suggests that men in the current study are at slightly reduced risk of CHD by comparison with the Australian population as a whole.

The Australian Korean population in this study was similar to elderly American Korean immigrants surveyed by Lee *et al.* 1993.[22] Length of residency in the host country, age, prevalence of smoking and hypertension, and self-reported participation in physical activity were identical in the two populations. Interestingly, more than 40% of both the Australian Korean and native Korean populations were overweight (BMI > 25 kg/m^2); this is higher than the 30% reported by Lee *et al.*[22] Caucasian standards to define obesity may not be appropriate for use in Asian populations. It has been suggested that a lower BMI may apply to define overweight in Asian populations and correlate better with CVD risk.[32] Nevertheless, prevalence of overweight in both the Australian Korean and American Korean[22] populations was less than that reported in an Australian national population study where more than 60% of men and 58% of women aged 65–69 years were reported to be overweight or obese.[33]

The frequency of diabetes in elderly Australians is approximately 9% of men and 7% of women.[31,34] The prevalence of diabetes in the Korean study population was higher than among the Australian Korean population (although not significantly) and the prevalence of diabetes in both populations was much less than that reported by Lee *et al.* in elderly American Koreans.[22] Conversely, the prevalence of diabetes in the native Korean and Australian Korean elderly was higher than that of Korea generally (2.8%).[18] The frequency of elevated cholesterol in the current study was much higher than that reported in the study by Lee *et al.*[22] of elderly Koreans in the USA (8%), although the criteria used to define elevated cholesterol were not reported. However, the frequency of elevated cholesterol in the Australian Korean population was lower than that reported in other studies of the 60–69 years age group in Australia. In a national study,[23] 95% of women and 58% of men had total cholesterol levels of more than 5.5 mmol/L, while Simons *et al.*[28] reported 81% of women and 63% of men in a rural study with these elevated levels.

There are several important issues to consider when interpreting the nutrient intake data in this study. The dietary assessment used in the study of 24-h dietary recall may not give a true indication of dietary intake.[35] In Western societies, under-reporting of dietary intake has been well documented.[36,37] Under-reporting of dietary intake has been reported to be twice as common among women and increases with age in both men and women.[38] The extent to which under-reporting of dietary intake occurs in Asian cultures has not been established. Conversely, the collection and recording of dietary intake was consistent in both study populations with both Australian Korean and native Korean subjects interviewed by the same dietitian using identical methodology, thus increasing the robustness of the findings.

Even considering the limitations of the dietary intake data, the reported daily energy intake of both Australian Korean and native Korean subjects was considerably less than the Recommended Dietary Intakes for total daily energy intake for Australians over 60 years of age (7600 kJ for elderly women and 8700 kJ for elderly men); Australian Koreans reported higher daily energy intakes than did native Koreans. Both Australian Korean and native Korean study populations reported carbohydrate intakes approximately 10% in excess of the USA and international recommendation of 55% of total energy intake,[39,40] and 15% above levels in elderly Australians.[41] Both Korean men and women reported higher carbohydrate intakes than did their Australian Korean counterparts.

The reported dietary fat intake of Koreans in both Australia and Korea (around 15%) was well below the Australian national target of a maximum of 30% of total energy, in contrast to studies in older populations where the mean contribution of fat to energy intake is reported to be 31 and 38%.[41,42] Although men from both Australia and Korea reported consuming more saturated fat than women, saturated fat intakes were still below the maximum recommended level of 10%[23,39] and were less than the 13% reported in the CSIRO Australian Elderly Study.[41] The mean dietary cholesterol intake in men and women from both Australia and Korea was much less than the recommended maximum of 300 mg per day,[23,39] with the dietary cholesterol intake reported for Korean women almost nine times less than that reported by women in a study of elderly Australians.[42]

This study found that both Australian Koreans and native Koreans consumed diets that followed the recommended dietary guidelines. Both populations consumed diets that were more nutritionally sound than those reported in other studies of elderly Australians.[41,42] No relationship between dietary intake and adiposity (BMI) was evident in either Koreans or Koreans who had migrated to Australia. Although Australian Koreans reported consuming a typically Korean diet, intakes of dietary fat were higher and carbohydrate lower relative to total energy intake than those reported by native Koreans. Even so, a relationship between total dietary energy and macronutrient intake and length of residency in Australia was not observed for either male or female Korean migrants.

Australian Koreans were more active than were native Koreans; however, estimation of physical activity by questionnaire is a very indirect method of assessing activity levels. The frequency of self-reported physical activity in both populations was similar to other studies of elderly populations.[22,23,43] Smoking in the Australian Korean population was significantly less than reported in the native Korean population but identical to that of elderly Korean migrants living in the USA.[22] Overall, it appears that Australian Koreans are smoking less and exercising more than their Korean counterparts.

Among elderly Korean immigrants, even though there was an association between central adiposity and years of residency in Australia, associations (which might have been expected) between dietary intake, self-reported activity levels and years of residency in Australia were not observed. This could simply be a limitation of the small sample size or bias due to survivor effect.

In summary, even though elderly Koreans had resided in Australia for relatively short periods of time, the effect of acculturation is evident in increased cardiovascular disease risk factors such as increased adiposity, increased prevalence of higher cholesterol levels in men, and dietary intakes higher in fat and lower in carbohydrate composition when compared

to their Korean counterparts. However, Australian Koreans reported greater physical activity and fewer were smokers. Elderly Australian Koreans were not more obese than elderly native Koreans but more Australian Koreans had levels of abdominal obesity (measured by WHR) above the CVD risk threshold.

There was no difference in adjusted biochemical risk factors between these two population samples from Australia and Korea; however, the increase in the prevalence of abdominal obesity in the Australian population may be a precursor to future increase in biomedical risk. Even though differences were found between the Korean immigrants and native Koreans, both groups of elderly people still had favourable cardiovascular profiles compared to the general Australian population and those of other developed countries.

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