



Risk Factors

High Cholesterol

Stage 3

Epidemiological Series Report # 2011 - 19

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Introduction

The following overview presents information about high cholesterol among the participants of the North West Adelaide Health Study, and the demographics, chronic conditions and risk factors associated with high cholesterol. Stage 1 of the study was conducted between 2000 and 2003, with Stage 2 conducted from 2004 to 2006, and Stage 3 conducted from 2008 to 2010.

Measurement and definition of high total blood cholesterol

A fasting blood sample taken at the study clinic was used to measure total blood cholesterol levels (TBC). High cholesterol can be determined using a number of different measurements; this summary is based on high cholesterol being defined as TBC being greater than or equal to 5.5 mmol/L¹.

Proportion of those with high total blood cholesterol – Stage 1, Stage 2 & Stage 3

The proportion of participants with high total blood cholesterol for Stages 1, 2 and 3 is shown in Table 1. Overall, **36.1%** (95% CI 34.3-37.9) in Stage 1 and **40.6%** (95% CI 38.4-42.9) in Stage 2 and **37.3%** (95% CI 34.7-40.0) in Stage 3 of study participants have high total blood cholesterol.

Table 1: Proportion of those with high total blood cholesterol (TBC)

	Stage 1		Stage 2		Stage 3	
	n	%	n	%	n	%
Normal total blood cholesterol	2548	63.9	1891	59.4	1547	62.7
High total blood cholesterol (≥5.5mmol/L)	1440	36.1	1292	40.6	921	37.3
Total	3988	100.0	3183	100.0	2468	100.0

* Note: The weighting of data can result in rounding discrepancies or totals not adding.

Explanation of statistical terms used in this report

Incident rate is a measure of risk of developing a condition or risk factor within a specified period of time, often one year but in this report per 1000 person years. This allows for different amounts of observation times among participants between the baseline and Stage 3 results (ranging from 2000-2003 to 2008-2010). The incident rates were calculated without adjusting for age in this report. *For example, in a population of 1000 people, if 28 people develop a disease over two years, this would be expressed as 14 incident cases over 1000 person years (28 cases per 1000 divided by 2 years).*

Hazard ratio (HR) is the ratio of the hazard rates corresponding to a chronic condition or risk factor developing in the different groups over time – in this case, the time since the baseline examination (between 2000 and 2003). This allows for different amounts of observation times among participants between the baseline and Stage 3 results (ranging from 2000-2003 to 2008-2010). *For example, looking at cardiovascular disease, a hazard ratio of 2 for overweight or obese people implies that twice as many people with this risk factor have developed cardiovascular disease in this time compared to the reference group (those who are underweight or who have a healthy weight with a hazard ratio of 1).*

Adjusting for age is a technique used to better allow populations to be compared when the age profiles of the populations are quite different.

¹ Australian Institute of Health and Welfare and National Stroke Foundation of Australia. *Heart, Stroke and Vascular Disease Australian Facts 2001*. Canberra, AIHW 2001.

Tables 2 and 3 present the incidence rate per 1000 person years among those participants who did not have high cholesterol at baseline Stage 1 (611 incident cases).

Demographic profile of those with high total blood cholesterol

The risk of developing high cholesterol among study participants who did not have high cholesterol at baseline was statistically significantly higher among those aged 50 to 59 years, or those who earn a gross annual household income of more than \$40,001, and statistically significantly lower among those widowed or never married, or those undertaking home duties or retired (Table 2).

Table 2: Hazard ratios for demographic variables associated with high total blood cholesterol

Variable	n	New Cases (N) [†]	Incidence rate (1000 person yrs) [†]	HR (95%CI) ^{**}	p value ^{**}
Sex					
Male	1024	278	45.8	1	
Female	1039	333	52.8	1.13 (0.93-1.36)	0.220
Age group					
Up to 49 years	1294	385	48.4	1	
50 to 59 years	265	113	75.2	1.65 (1.32-2.07)	<0.001
60 years and over	503	114	38.9	0.81 (0.64-1.01)	0.058
Highest education level obtained*					
Secondary	845	242	48.2	1	
Trade/apprenticeship/cert/diploma	862	261	49.9	1.04 (0.85-1.27)	0.716
Bachelor degree or higher	263	85	54.0	1.17 (0.87-1.57)	0.299
Gross annual household income*					
Up to \$20,000	452	116	43.4	1	
\$20,001- 40,000	488	151	50.1	1.32 (1.00-1.74)	0.052
\$40,001- 60,000	452	138	50.2	1.43 (1.06-1.93)	0.020
More than \$60,000	562	183	55.0	1.57 (1.16-2.11)	0.003
Family structure*					
Family & children, two biological/ adoptive parents	687	213	52.0	1	
Adult living with partner, no children	505	171	56.2	0.93 (0.70-1.23)	0.600
Adult living alone	248	73	49.2	0.78 (0.57-1.07)	0.128
Adults – related/unrelated, living together	195	60	56.4	1.03 (0.74-1.45)	0.849
Step/sole/shared parenting & other	205	71	58.1	1.07 (0.77-1.47)	0.702
Marital status*					
Married or living with partner	1320	423	53.6	1	
Separated/divorced	157	59	63.8	1.17 (0.91-1.52)	0.218
Widowed	119	27	38.3	0.66 (0.44-0.99)	0.045
Never married	461	100	35.2	0.62 (0.44-0.88)	0.007
Work status*					
Full time employed	788	260	54.4	1	
Part time/casual employed	381	115	48.5	0.87 (0.68-1.11)	0.268
Unemployed	75	24	54.7	1.21 (0.71-2.05)	0.484
Home duties/retired	643	162	42.8	0.55 (0.42-0.73)	<0.001
Student/other	169	50	50.8	1.05 (0.69-1.61)	0.819

* Don't know/ refused/ not stated category not reported

** All variables adjusted for age (except for age group) to calculate hazard ratio

† Not adjusted for age

Chronic condition and risk factor profile of those with high total blood cholesterol

The risk of developing high cholesterol among study participants who did not have high cholesterol at baseline was statistically significantly higher among those who were undertaking some exercise, and statistically significantly lower among those who had cardiovascular disease, diabetes or high blood pressure, than those without these risk factors (Table 3).

Table 3: Hazard ratios for chronic conditions and risk factors associated with high total blood cholesterol

Variable	n	New Cases (N) [†]	Incidence rate (1000 person yrs) [†]	HR (95%CI)**	p value**
Cardiovascular disease					
No	1898	591	51.7	1	
Yes	162	19	19.9	0.31 (0.19-0.49)	<0.001
Diabetes[^]					
No	1903	587	51.4	1	
Yes	160	24	24.9	0.41 (0.26-0.65)	<0.001
Smoking*					
Non-smoker	966	278	48.9	1	
Ex-smoker	638	197	51.5	1.03 (0.84-1.26)	0.777
Current smoker	453	134	47.4	0.95 (0.73-1.24)	0.728
Alcohol risk					
Non-drinker/ No risk	1108	312	47.7	1	
Low risk	830	263	51.5	1.07 (0.88-1.31)	0.478
Intermediate to very high risk	112	32	48.0	1.05 (0.63-1.75)	0.842
Physical activity					
Sedentary	501	124	40.0	1	
Undertakes some exercise	1393	436	52.6	1.39 (1.11-1.76)	0.005
BMI[^]					
Underweight/Normal (under 25)	795	241	49.9	1	
Overweight (25 to 29.9)	742	220	50.4	0.99 (0.79-1.25)	0.963
Obese (30 and over)	523	150	47.5	0.91 (0.72-1.17)	0.469
High waist/hip ratio (>1.0 men, >0.85 women)[^]					
No	1746	510	48.3	1	
Yes	317	102	55.4	1.10 (0.87-1.40)	0.410
High blood pressure (≥140/90mmHg)[^]					
No	1511	470	51.9	1	
Yes	551	141	42.5	0.67 (0.53-0.85)	0.001

* Don't know/ refused/ not stated category not reported

** All variables adjusted for age (except for age group) to calculate hazard ratio

† Not adjusted for age

[^] Biomedical measurement

This document is one of a series of reports concerning Stage 3 of the North West Adelaide Health Study. Please see the website for other reports in the series - www.health.adelaide.edu.au/pros/data/nwahs/.

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