



Risk Factors

High Blood Pressure

Stage 3

Epidemiological Series Report # 2011 - 17

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Department of Health



Introduction

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

Measurement and definition of high blood pressure

Blood pressure was measured in the study clinic using a standard, calibrated blood pressure sphygmomanometer. Two blood pressure measurements were recorded, five to ten minutes apart, while the participant was relaxed and seated. The average of these two recorded measures was used in the analyses. High blood pressure (hypertension) was defined as systolic blood pressure greater than or equal to 140 mmHg and/or diastolic blood pressure greater than or equal to 90 mmHg¹.

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

The proportion of participants with high blood pressure for Stages 1, 2 and 3 is shown in Table 1.

Overall, **29.0%** (95% CI 27.5-30.7) in Stage 1 and **33.2%** (95% CI 31.3-35.2) in Stage 2 and **32.7%** (95% CI 30.5-35.0) in Stage 3 of study participants have high blood pressure.

Table 1: Proportion of those with high blood pressure (≥140/90mmHg)

	Stage 1		Stage 2		Stage 3	
	n	%	n	%	n	%
Normal blood pressure	2878	71.0	2122	66.8	1673	67.3
High blood pressure	1178	29.0	1056	33.2	813	32.7
Total	4056	100.0	3178	100.0	2486	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 National Heart Foundation of Australia. *Risk Factor Prevalence Study. Survey No 3 – 1989.*

Tables 2 and 3 present the incidence rate per 1000 person years among those participants who did not have high blood pressure at baseline Stage 1 (551 incident cases).

Demographic profile of those with high blood pressure

The risk of developing high blood pressure among study participants without high blood pressure at baseline was statistically significantly higher among those aged 50 years and over, or those earning a gross annual household income of \$20,001 to \$40,000, and statistically significantly lower among females, adults living alone, and those who were part-time/casual employed, undertaking home duties or retired (Table 2).

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

Variable	n	New Cases (N) [†]	Incidence rate (1000 person yrs) [†]	HR (95%CI)**	p value**
Sex					
Male	1079	282	43.0	1	
Female	1214	269	34.5	0.79 (0.66-0.94)	0.008
Age group					
Up to 49 years	1627	230	21.7	1	
50 to 59 years	327	135	67.9	3.31 (2.65-4.13)	<0.001
60 years and over	338	186	106.2	5.39 (4.38-6.63)	<0.001
Highest education level obtained*					
Secondary	920	245	43.3	1	
Trade/apprenticeship/cert/diploma	932	212	35.9	0.94 (0.78-1.14)	0.547
Bachelor degree or higher	342	77	34.7	1.17 (0.88-1.55)	0.272
Gross annual household income*					
Up to \$20,000	387	149	66.0	1	
\$20,001-40,000	537	141	40.8	1.33 (1.04-1.69)	0.021
\$40,001-60,000	572	115	31.6	1.28 (0.96-1.71)	0.092
More than \$60,000	686	119	27.3	1.17 (0.87-1.57)	0.294
Family structure*					
Family & children, two biological/ adoptive parents	874	168	30.2	1	
Adult living with partner, no children	493	160	51.3	0.81 (0.63-1.03)	0.088
Adult living alone	249	89	61.4	0.75 (0.56-0.99)	0.040
Adults – related/unrelated, living together	212	62	51.9	1.04 (0.73-1.47)	0.831
Step/sole/shared parenting & other	258	51	31.8	0.89 (0.62-1.24)	0.458
Marital status*					
Married or living with partner	1478	400	43.2	1	
Separated/divorced	187	52	45.6	1.02 (0.80-1.29)	0.896
Widowed	81	45	110.7	0.95 (0.67-1.34)	0.771
Never married	538	52	14.9	0.86 (0.60-1.23)	0.395
Work status*					
Full time employed	1005	213	33.2	1	
Part time/casual employed	432	74	25.7	0.76 (0.58-1.00)	0.047
Unemployed	104	15	22.7	0.88 (0.51-1.51)	0.648
Home duties/retired	539	218	71.6	0.76 (0.60-0.96)	0.021
Student/other	189	27	23.3	1.00 (0.63-1.60)	0.992

* 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 blood pressure

The risk of developing high blood pressure among study participants without high blood pressure at baseline was statistically significantly higher among those who had cardiovascular disease, or those who were overweight or obese, and statistically significantly lower among those who were current smokers, than those without these risk factors (Table 3).

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

Variable	n	New Cases (N) [†]	Incidence rate (1000 person yrs) [†]	HR (95%CI)**	p value**
Cardiovascular disease					
No	2215	502	35.9	1	
Yes	75	48	142.7	1.57 (1.18-2.10)	0.002
Diabetes					
No	2199	507	36.6	1	
Yes	93	44	85.0	1.20 (0.85-1.70)	0.291
Arthritis					
No	1776	373	33.1	1	
Yes	387	164	72.2	1.11 (0.92-1.34)	0.287
Current mental health condition					
No	1976	478	38.8	1	
Yes	305	70	35.8	0.97 (0.74-1.27)	0.827
Alcohol risk					
Non-drinker/ No risk	1145	315	45.8	1	
Low Risk	997	203	31.4	0.85 (0.71-1.01)	0.071
Intermediate to High Risk	141	32	34.4	1.19 (0.74-1.92)	0.472
Physical activity					
Sedentary	568	144	40.2	1	
Undertakes some exercise	1562	353	36.1	0.94 (0.76-1.17)	0.569
BMI[^]					
Underweight/Normal (under 25)	974	118	18.1	1	
Overweight (25 to 29.9)	818	242	49.6	2.20 (1.76-2.75)	<0.001
Obese (30 and over)	499	188	64.9	3.08 (2.40-3.96)	<0.001
High total cholesterol (≥5.5mmol/L)[^]					
No	1506	317	33.7	1	
Yes	756	230	48.7	1.08 (0.90-1.29)	0.431

* 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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