Prevalence of hypertension among the elderly Malays living in rural Malaysia

Rashid AK[1] Azizah AM[2]

1. Penang Medical College
2. Penang State Health Department

RESEARCH

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Corresponding Author:
Name Abdul Rashid Khan
Address Penang Medical College, 4 Sepoy Lines, 10450 Georgetown, Penang
Malaysia
Email: drrashid10@gmail.com

Abstract

Background
We are living in an ageing world. The prevalence of hypertension which is an established risk factor for cardiovascular disease and stroke increases with age. The aim of the study was to determine the prevalence of hypertension among the elderly Malays living in rural parts of north Malaysia.

Method
This cross-sectional study was conducted among the elderly (aged ≥60) Malay residents living in 22 villages in a north-western state called Kedah in Malaysia from 2007 to 2009. Kedah has one of the highest rates of elderly population in the country. Data was collected by trained research assistants. Besides the baseline demographic information, blood pressure was measured using standardised methods using a manual sphygmomanometer.

Results
The response rate was 97.7%. The prevalence of hypertension among the elderly in these villages was 54.5% (228), 118 (28.2%) were known to be hypertensive and were on medication and an additional 110 (26.3%) respondents were newly diagnosed. Elevated mean systolic (146.17 ± 25.23) and diastolic (89.68 ± 15.60) blood pressure was noted among the known hypertensive. There was an almost fourfold risk (OR 3.64) of having uncontrolled blood pressure among the known hypertensive on treatment. Those with malnutrition were at an almost twofold at risk of being hypertensive (OR 1.73). Binary logistics regression showed occupation (OR 1.65), marital status (OR 2.32) and body mass index (BMI) (OR 1.62) as significant predictor variables.

Conclusion
Screening the elderly for hypertension will benefit this group of people by reducing the morbidity and mortality associated with this condition

Key Words
Elderly, hypertension, rural, Malaysia.

What this study adds:
1. There is a high prevalence of undetected cases of hypertension among the elderly Malays living in rural communities.
2. There is a high prevalence of uncontrolled blood pressure among the elderly Malays with known hypertension.
3. Employment is an important factor associated with hypertension among the elderly Malays.

Background
The proportion of older persons rose to 10% of the world population in the year 2000 and it is projected that in the next 50 years this figure will double.[1] The population of Malaysia is 25 million and is made up of several ethnic groups, comprising mostly of Malays and other indigenous groups.[2] Due to improved health, longer life expectancy,

low mortality as well as declining fertility, it is expected that by the year 2020, almost 10% of Malaysia's population will be 60 years and above.[3]

Although ageing is a natural process it would be wrong to conclude that the diseases that accompany it are also natural and should be excluded from medical attention. Ageing is neither a disease nor disability. The prevalence of many diseases increases with age and many are asymptomatic at least in the early stages, hence it is not surprising that there is a large burden of undetected disease in the elderly.[4,5] Cardiovascular diseases, and especially hypertension, are major public health problems among older adults. Prevalence of hypertension, including isolated systolic hypertension, increases with age. More than half of the population aged 65 or older has hypertension, defined as blood pressure ≥140/90mmHg.[6] Elevated blood pressure particularly systolic pressure is an established risk factor for cardiovascular disease, stroke and renal failure. It represents a pathophysiologic manifestation of altered cardiovascular physiology and structure morbidity, ultimately manifesting as increased cardiovascular morbidity and mortality.[5,7]

Although hypertension is common among the elderly, geriatrics is an emerging specialty in Malaysia, thus there has been relatively little research in this area to date. However there is evidence from other countries that hypertension is an important problem in the elderly causing a large amount of morbidity and mortality in this group. Therefore the objective of this study was to determine the prevalence of hypertension among the elderly Malays living in rural parts of north Malaysia because there has not been a similar study conducted on elderly Malays in rural Malaysia. This study is an extension of an earlier study conducted in 14 villages in north Malaysia.[8]

Method

Background place of study: Twenty-two villages were selected from a north-western state in Malaysia called Kedah. Kedah has one of the highest rates of elderly population in the country. All the villagers were Malay Muslims and most were working as fishermen and farmers due to the proximity of these villages to the sea and the foothill of a mountain.

Study Design: A cross-sectional study design was chosen to achieve the objective of the research. The study was conducted from 2007–2009.

Sampling: A purposive convenience sampling was done where all the elderly (aged ≥60) residents of these 22 villages who consented and who were able to communicate effectively were eligible to participate.

Tools: The data was collected by trained research assistants using a questionnaire especially designed for this study. The volunteer research assistants were fourth year medical students who had undergone training on the data collection methods before going into the field. The interviews were conducted in the participants' homes. Besides the baseline demographic information, blood pressure was measured using a manual sphygmomanometer with the respondent sitting, having rested for 15 minutes. Korotkoff Phase V (complete disappearance of sounds) was considered to be the cut-off for diastolic pressure, except where the sounds never disappeared (which can happen in the elderly) then it was acceptable to use Korotkoff Phase IV. Blood pressure was measured on any three different days and the blood pressure was more than 140 mmHg systolic or more than 90 mmHg diastolic on all three occasions before a positive diagnosis of hypertension was made. This is in line with the criteria for diagnosis of hypertension in all adults (including the elderly) from the World Health Organization (WHO) and the American Heart Association Guidelines.[6]

The Elderly Cognitive Assessment Questionnaire (ECAQ) and Geriatric Depression Scale (GDS) were used to screen the participants for cognitive impairment and depression. In addition, the Barthel index which is a well-established and commonly used nursing tool was used to assess the functional independence in activities of daily living (ADL) of the respondents. The respondents were categorised as

independent and dependent according to this index. BMI which is well-recognised as an easy and relatively accurate way to determine a person's nutritional status was also measured.

Analysis: This was done using SPSS version 13. Chi square test was used to analyse the relationship between the variables. A p value of <0.05 was considered statistically significant. Odds ratio was used to estimate risk of hypertension.

Ethics: The study had received the approval of the institutional ethics committee before commencing. All respondents were asked to give an informed verbal consent before starting the interview. The anonymity of the respondents is assured.

Results

Out of a total of 428 eligible villagers, 418 (97.7%) responded. There were more female (56.7%) respondents compared to males (43.3%), most were within the ages of 60 to 70 (66.5%), married (76.1%), and living with family members (83.9%). There were almost equal numbers of employed (51.7%) and unemployed (48.3%) respondents. The majority (72.7%) had a family income of less than RM 600 (US$ 187) a month. Most were independent (96.7%) and had a normal BMI (48.6%).

Table 1 shows the distribution of the mean systolic and diastolic blood pressure of the respondents. The mean systolic blood pressure was 134.50 (± 21.56) and the mean diastolic blood pressure was 82.43 (± 13.68). Elevated mean systolic (146.17 ± 25.23) and diastolic (89.68 ± 15.60) blood pressure was noted among the known hypertensive.

Table 1: Mean systolic and diastolic blood pressure profile

	Systolic (± SD)	Diastolic (± SD)
Sex		
Female	134.55 (± 21.88)	82.67 (± 12.54)
Male	134.44 (± 21.19)	82.10 (± 15.08)
Age		
60–70	135.47 (± 21.98)	83.03 (± 13.63)
71–80	134.15 (± 21.31)	82.76 (± 13.92)
>80	127.03 (± 17.28)	75.84 (± 11.82)
Marital Status		
Married	134.05 (± 22.03)	82.49 (± 13.87)
Unmarried	135.97 (± 20.01)	82.23 (± 13.13)
Employment		
Employed	135.89 (± 21.22)	83.31 (± 13.45)
Unemployed	133.21 (± 21.73)	81.60 (± 13.88)
Income		
≤ RM 600	133.41 (± 21.712)	81.97 (±13.99)
>600	137.29 (± 21.00)	83.58 (± 12.83)
Dependency		
Dependent	136.29 (± 20.38)	81.36 (± 17.69)
Independent	134.44 (± 21.62)	82.46 (± 13.55)
Cognitive Impairment		
Normal	134.62 (± 20.35)	82.42 (± 13.53)
Probable dementia	133.54 (± 24.84)	82.07 (± 15.89)
Depression		
Normal	134.80 (± 21.24)	82.62 (± 12.53)
Depressed	134.24 (± 21.05)	80.70 (± 23.36)
Living Arrangement		
Alone	134.81 (± 22.89)	82.63 (± 13.33)
Family	134.44 (± 21.33)	82.39 (± 13.77)
BMI		
Normal	135.93 (± 21.63)	81.76 (± 12.85)
Malnutrition	132.98 (± 21.49)	85.05 (± 14.59)
Known Hypertension		
No	129.91 (± 18.01)	79.57 (± 11.70)
Yes	146.17 (± 25.23)	89.68 (± 15.60)

The prevalence of hypertension in these villages was 54.5% (228). There were 118 (28.2%) respondents with known hypertension on medication and an additional 110 (26.3%) newly diagnosed with hypertension. As shown in Table 2, there was an almost fourfold risk of having uncontrolled blood pressure among the known hypertensive on treatment.

Table 2: Uncontrolled blood pressure among the known hypertensive

	Hypertension (190) f (%)	Normal (228) f (%)	Total (418) f (%)
Known Hypertensive			
Yes	80 (67.8)	38 (32.2)	118 (100)
No	110 (36.7)	190 (63.3)	300 (100)
Known Hypertensive	χ2 / p	OR (95%CI)	
	33.102/<0.001	3.64 (2.31;5.71)	

As shown in Table 3, those with malnutrition were at an almost twofold risk of being hypertensive. Sex, age, marital status, employment, income, dependency, cognitive impairment, depression and living arrangement did not show a statistically significant finding.

Table 3: Factors associated with hypertension

	Hyper-tension (228) f (%)	Normal (190) f (%)	χ2 / p	OR (95% CI)
Sex			0.021/0 .885	
Female	130 (54.9)	107 (45.1)		
Male	98 (54.1)	83 (45.9)		
Age			1.273/0 .529	
60-70	155 (55.8)	123 (44.2)		
71-80	59 (54.1)	50 (45.9)		
>80	14 (45.2)	17 (54.8%)		
Marital Status			1.052/0 .305	
Unmarried	59 (59)	41 (41)		
Married	169 (53.1)	149 (46.9)		
Employment			3.725/0 .054	
Employed	108 (50)	108 (50)		
Unemployed	120 (59.4)	82 (40.6)		
Income				
≤ RM 600	159 (52.3)	145 (47.7)	2.262/0 .133	
>600	69 (60.5)	45 (39.5)		
Dependency			1.665/0 .197	
Dependent	10 (71.4)	4 (28.6)		
Independent	218 (54)	186 (46)		
Cognitive Impairment			1.649/0 .199	
Normal	21 (45.7)	25 (54.3)		
Probable dementia	207 (55.6)	165 (44.4)		
Depression				
Normal	143 (54.8)	118 (45.2)	0.945/0 .624	
Depression	21 (63.6)	12 (36.4)		
Living Arrangement			0.015/0 .903	
Alone	37 (55.2)	30 (44.8)		
Family	191 (54.4)	160 (45.6)		
BMI*			7.680/0 .006	1.73(1.17; 2.56)
Malnutrition	129 (60.8)	83 (39.2)		
Normal	96 (47.3)	107 (52.7)		

Table 4 shows the result of a binary logistics regression which was attempted using occupation, living arrangement, depression, income, age, sex, marital status and BMI as predictor variables. Occupation (OR 1.65. 95% CI 1.05;2.61), Marital status (OR 2.32. 95% CI 1.27;4.25) and BMI (OR 1.62. 95% CI 1.06;2.47) were found to be significant predictor variables for hypertension. The model had a -2 likehood ratio of 490.909, Cox and Snell R squared 0.051 and Nagelkerke R square 0.068.

Table 4: Logistic regression

Risk factors	B	S.E.	Wald	df	Sig.	Exp(B)	95% CI for EXP(B)	
							Lower	High
Occupation* Unemployed Employed	.503	.233	4.664	1	.031	1.65	1.05	2.61
Living Arrangement Alone Family	.256	.334	.588	1	.443	1.29	.67	2.48
Depression yes no	-.266	.243	1.198	1	.274	.77	.48	1.23
Income ≤600 >600	.237	.248	.912	1	.340	1.27	0.78	2.06
Age 60-70 71-80 >80	-.123	.185	.443	1	.506	.88	.62	1.27
Sex Female Male	.114	.228	.252	1	.616	.89	.57	1.39
*Marital status Married Unmarried	.845	.307	7.556	1	.006	0.43	0.40	0.944
*BMI Abnormal Normal	.482	.216	4.967	1	.026	1.62	1.06	2.47

Discussion

The prevalence of hypertension in this study was very high and the control of blood pressure among the known hypertensive was poor. Generally the prevalence of hypertension in an urban adult population is between 15–35% but it is lower in rural Asian populations.[9] Prevalence of hypertension in the Asia Pacific region ranges from 5–47% in men and 7–38% in women.[10] Based on the Malaysian National Health and Morbidity survey III (NHMS III)[11] the national prevalence of hypertension was 32.3%. In the same survey it was noted that most were unaware they were hypertensive while the blood pressure of the known hypertensive was not controlled.

In general, the prevalence of hypertension increases with age.[12] The high prevalence of hypertension in the elderly may be attributed to age-related poor vascular compliance of the large arteries, which subsequently contributes to isolated systolic hypertension and widened pulse pressure.[13] The high prevalence of hypertension among the elderly was also noted in studies conducted abroad. In Singapore, the prevalence of hypertension in the elderly was reported as 73.9%[14] which was close to the figures reported in the United States (70.8%).[15] In a study in France, 62.0% of the elderly population were found to be hypertensive.[16] Similar high prevalence rates were reported in other European countries such as England (80.5%)[12] and Greece (89.0%).[17] In central Malaysia the prevalence of hypertension among those aged 55 years and above living in a community was shown to be 25.6%[18] and 51.1% among those living in an old folks home.[19] The prevalence of hypertension in this study is comparable with the finding of another study which was conducted in northern Malaysia where the prevalence of hypertension among the elderly was shown to be 58.3%.[8] This difference in the prevalence rates in different regions of the country is similar to a Chinese study where the prevalence of hypertension was found to be higher in northern regions than in southern regions.[20] The blood pressure variations could possibly be due to the economic development and affluence in different regions.

In this study, 37.6% of those diagnosed with hypertension were unaware of their condition. This finding is similar with that of the NHMS III[11], which found that most patients were unaware they had hypertension. Hypertension is not usually detected due to a lack of screening and the absence of overt symptoms.[21] Health screening is an important aspect of health promotion and disease prevention in people over 60 years. Screening for hypertension can decrease morbidity and improve quality of life in an ageing population.[22] Older people gain greater absolute benefits from effective treatments because of the higher risk. Early pharmacological treatment of hypertension in the elderly can effectively reduce morbidity and mortality from cardiovascular diseases and stroke.[7, 23]

Inadequate control of blood pressure found in this study is similar to the findings of the NHMS III[11] where only 26.3% of those diagnosed with hypertension had adequate control of their blood pressure. Blood pressure control was shown to

range from 34.4% to 48.1% in central Malaysia[17,18] and 27.5% to 41.4% in north Malaysia.[8,24] The reason for this could be due to poor compliance to treatment. A study conducted in an outpatient clinic in Malaysia found that 55.8% of patients on hypertension medication were not compliant to treatment.[25]

Malnutrition, especially that resulting in obesity, is a recognised risk factor for hypertension. The risk of hypertension has even been associated with BMI as low as 23 to 25kg/m2.[9,26,27] In a study in Taiwan, a logistic regression model showed a higher probability of hypertension among elderly Taiwanese with greater BMI.[28] However, because the study design is cross-sectional it is unclear if the malnutrition is a cause of hypertension or secondary to it.

Socioeconomic factors are known risk factors for cardiovascular diseases. Hypertension has been associated with social class which can best be measured using occupation.[29] Employment history[30,31] has been shown to be associated with hypertension. It is possible that better occupational opportunities provide better health access. Most of those with better occupations are those with higher education which can influence lifestyle, dietary habits and physical exercise by increasing the awareness of the effects of good health. Marriage has been shown to be a protective factor towards hypertension. This is consistent with some reports that indicate psychosocial factors affecting biological, neuroendocrine and immune systems.[32] Studies have shown that being single or a widow as one of the cardiovascular risk factors.[33,34]

Conclusion

There are high rates of undetected hypertension among the elderly. Screening the elderly for hypertension will benefit this group of people by reducing the morbidity and mortality associated with this condition and improving their quality of life

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CONFLICTS OF INTEREST

The authors declare that they have no competing interests

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Institutional Ethics and Research Committee approved the study.