ORIGINAL ARTICLE

Prevalence, awareness, treatment and control of Hypertension among the elderly: the 2006 National Health and Morbidity Survey III in Malaysia

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SUMMARY

Introduction : The objective of this study was to determine the prevalence and factors associated with the awareness, treatment and control of hypertension among the elderly population in Malaysia.

Methods: Analysis of secondary data from a cross-sectional national population based survey using stratified multistage sampling conducted from April to August 2006 throughout Malaysia National Health and Morbidity Survey III(NHMS III). Adults aged 60 and older who had participated in the survey were included in the study.

Results: A total of 4954 respondents (14.3%) were elderly from the 34,539 respondents aged 18 years and above for hypertension module in NHMS III. A total of 4933 elderly had their blood pressure examined (giving a response rate of 99.6%). The overall prevalence of hypertension among elderly was 74.0%, more in elderly female (77.4%) than men (70.1%). Only 49.3% of them were aware of their hypertensive status, 42.4% were currently treated and 22.6% of those being treated were under control. The results of multiple logistic regression showed factors associated with higher awareness and treatment rates were similar i.e. females, young-old age group (age 60-74), urban residents, Chinese ethnic group and higher education. For those elderly who were on treatment, determinants associated with controlled hypertension were Chinese and Indians ethnic groups and higher educational level.

Conclusions: There was a high prevalence of hypertension among the elderly in Malaysia but with poor awareness, treatment and control rate. Reliable information on these aspects is important for the development of patient education programs, health policies to improve disease management and overall health care resource allocation especially among the elderly in Malaysia.

KEY WORDS:
hypertension, awareness, treatment, control, elderly, Malaysia

INTRODUCTION

Hypertension is an important public health problem and its prevalence increases with age [1,2]. It is also an important risk factors for cardiovascular diseases (CVD) [3-5]. Therefore, management and control of hypertension is essential for the overall reduction of cardiovascular morbidity and mortality[6-13].

There is a clear trend of increasing prevalence of hypertension among the adult population in Malaysia from 32.9% in adults aged 30 years and above reported in National Health and Morbidity Survey II (NHMS II)[14] to 42.6% in the NHMS III survey [15]. This rise in prevalence is consistent with other recent surveys in Malaysia [16, 17].

In Malaysia, the elderly population aged 60 years and older has been rapidly increasing, from a total of 1.40 million (6.3% of total population) in 2000 to an estimated of 2.13 million (7.4%) in 2010. This is expected to increase to 3.44 million (9.9%) in 2020 [18]. Similarly, population aging is the most important demographic change worldwide. Therefore, the burden due to hypertension is likely to rise steadily in future due to population aging [1,19,20].

Despite the important and benefit of blood pressure control, the detection and control rates of the hypertension is still suboptimal [15,21,22]. For hypertension in older persons, only a limited number of population-based studies have focused exclusively on the elderly population especially in Malaysia. Hence, the objectives of this study were to estimate the prevalence of hypertension and to determine factors associated with awareness, treatment and control among the elderly population aged 60 years and older in Malaysia. Reliable information on these aspects is crucial to enable plans to be made to further improve the awareness, treatment and control rate especially among the elderly with hypertension, as part of the overall strategy to combat the impending epidemic of cardiovascular disease worldwide[5,23].

MATERIALS AND METHODS

NHMS III 2006 was conducted by the Institute for Public Health, National Institutes of Health and sponsored by Ministry Of Health, Malaysia. The study was approved by the Ministry Of Health ethical committee and details description of the sampling methods was described in NHMS III Protocol[15]. Briefly, sample design was a cross-sectional national population based survey, using stratified multistage

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sampling conducted from April to August 2006 throughout Malaysia. The estimated sample size at the national level was based on stratification of respondents by urban/rural and by states. We managed to analyse the sample of older persons (60 years of age or older) participating in NHMS III 2006 survey and a total of 4954 elderly were included in the analysis.

A combination of a face-to-face interview using a structured questionnaire on demographic characteristics and objective measurement of the blood pressure level was employed for the hypertension module. All eligible respondents aged 18 years and above were interviewed and examined by a trained nurse after obtaining verbal permission. There were a total of 8 questions in this module including the blood pressure measurement. The blood pressure measurement was carried out by trained nurses by using the automated blood pressure measurement device, the Omron HEM-907 which has been validated[24]. Blood pressure was taken twice with a 15 minutes gap in between the two readings. The average of the two readings was then taken for analysis.

Hypertension is defined as systolic BP of 140mmHg or greater and/or diastolic BP of 90mmHg or greater, or the taking of antihypertensive medication[25]. Blood pressure results were obtained and immediately noted in the questionnaire. Respondents were informed of the results and if found to be undesirable (systolic blood pressure of ≥140 or a diastolic blood pressure of ≥90mmHg), were referred to the nearest health facility for further evaluation and management.

The definition of hypertension was based on felt and unfelt needs of the population. Felt needs was reflected when those who reported to have been told to have hypertension by a medical doctor or paramedic in the last 12 months. They were classified as known hypertensives. Unfelt needs in the population was defined as an average of two blood pressure readings measured twice with a 15 minutes gap at single occasion with SBP ≥140mmHg or DBP ≥90mmHg among those who did not report as known hypertensives. They were classified as undiagnosed hypertensives. Awareness of hypertension was defined as having been told to have hypertension by a medical doctor or paramedic (known hypertensives). Known hypertensives were further inquired about their treatment status. Currently on drug treatment for hypertension was defined as a self-report of respondents currently taking any form of allopathic treatment (not including traditional medicine) for the condition. Controlled hypertension was defined as having a desirable blood pressure level (<140/90 mmHg) among respondents who are hypertensive and currently treated for hypertension.

Statistical analysis

Prevalence of hypertension among persons aged 60 or older was calculated by using STATA version 9. Other data analysis was done using SPSS for windows version 16.0 (SPSS Inc. Chicago, USA). Simple logistic regressions were used to show socio-demographic factors associated with awareness, treatment and control of hypertension among Malaysian elderly aged 60 years and older in NHMS III 2006. To estimate independent association factors, multiple logistic regressions were used to determine the association of sociodemographic factors with the levels of awareness, treatment and control of hypertension among the elderly Malaysian. The odd-ratio and 95% confidence interval were calculated.

RESULTS

The principal findings in this survey report regarding estimates for prevalence of hypertension are derived from elderly Malaysian aged 60 years and above, who had their blood pressure examined during the NHMS III 2006.

From the 34,539 respondents aged 18 years and above for hypertension module in NHMS III, 4954 respondents were elderly aged 60 years and above (14.3%). From the 4954 elderly respondents in NHMS III survey, a total of 4933 elderly subjects had their blood pressure examined; giving a response rate of 99.6%.

Table I shows the socio-demographic characteristics of elderly aged 60 and older in Malaysia. Based on NHMS III in 2006, majority of the elderly Malaysian (81.6%) was in the 60 – 74 years-old age group, more than half (68%) of all elders were married.

The overall prevalence of hypertension (Table II) among elderly was 74.0% (CI:72.8-75.2). The prevalence of hypertension in elderly female; [77.4% (CI: 75.8-79.0)] was significantly higher than elderly men [70.1% (CI: 68.2-72.0)]. Among the main races, the overall prevalence of hypertension for elderly Malays [77.0% (CI: 75.4-78.6)] was significantly higher than Chinese [71.8% (CI: 69.5-74.2)] and Indians [70.0% (CI: 65.0-75.1)].

Table III shows the distribution of hypertensive Malaysian elderly by awareness, treatment and control status. Rate of awareness differs by sex, with a higher proportion of females being aware of their hypertension as compared to males (53.2% vs 44.3%, p<0.001). Among the hypertensive Malaysian elderly, only less than half (42.4%) of them were currently treated, with the higher proportion of females being currently treated as compared to males (46% vs 37.7%, p<0.001). Only less than a quarter of elderly (22.6%) with hypertension are having their hypertension under control.

Factors associated with hypertension awareness

Table IV shows that for older person with hypertension, females were more likely than men to be aware for hypertension (OR=1.43) and young-old age group was associated with significantly higher rates of awareness [OR=1.48 (age 60-74) vs old-old (age ≥ 75)]. Among the main ethnic groups, Chinese and Indians had significantly higher rates of awareness (OR=1.33 and 1.52, respectively) as compared to Malays. Primary and Secondary education was positively associated with awareness (OR=1.19 and 1.54, respectively). Elders who stayed in urban area were more likely to be aware (OR=1.37) of their hypertension.

The results of multiple logistic regression (Table V) showed determinants associated with higher rates of awareness were females, young-old age group (age 60-74), Chinese ethnic

Table I: Socio-demographic characteristics of respondents for hypertension module amongst elderly Malaysian residents aged 60 years and above in NHMS III 2006 (n=4954)

Characteristic	n	%
Sex		
Male	2295	46.3
Female	2659	53.7
Age groups (y)		
60 – 74	4042	81.6
≥ 75	912	18.4
Ethnicity		
Malays	2611	52.7
Chinese	1409	28.4
Indian	317	6.4
Other bumis	527	10.6
Others	90	1.8
Education		
None	1978	39.9
Primary	2259	45.6
Secondary	571	11.5
Tertiary	80	1.6
Unclassified	66	1.3
Urban/ rural		
Urban	2513	50.7
Rural	2441	49.3
Marital status		
Not married	90	1.8
Married	3369	68.0
Divorcee	245	4.9
Widow/Widower	1212	24.5
Unclassified	38	0.8

Table II: Prevalence of hypertension among the elderly Malaysian residents aged 60 years and above in 2006 (n=4933)

Characteristic	Prevalence (CI)
Sex	
Total	74.0 (72.8 - 75.2)
Male	70.1 (68.2 - 72.0)
Female	77.4 (75.8 - 79.0)
Age groups (y)	
60 – 74	73.5 (72.1 - 74.8)
≥ 75	76.5 (73.7 - 79.3)
Ethnicity	
Malays	77.0 (75.4-78.6)
Chinese	71.8 (69.5- 74.2)
Indian	70.0 (65.0-75.1)
Other bumis	68.1 (64.1-72.1)
Others	71.1 (61.7-80.5)
Education	
None	74.9 (73.0-76.8)
Primary	74.9 (73.1-76.7)
Secondary	69.5 (65.7-73.3)
Tertiary	63.8 (53.1-74.4)
Unclassified	68.4 (56.2-80.6)
Urban/ Rural	
Urban	72.4 (70.6 – 74.1)
Rural	75.7 (74.0 – 77.4)
Marital status	
Not married	79.8 (71.4 - 88.2)
Married	71.9 (70.4 - 73.4)
Divorcee	74.9 (69.4 - 80.4)
Widow/Widower	79.2 (76.9 - 81.5)
Unclassified	74.3 (59.6 - 89.0)

Notes: CI=confidence interval

Table III: Percentages of awareness, treatment and control status among the elderly Malaysian with hypertension

Variables	Total population (n)	Males (n)	Females(n)	p value
Hypertensives	(3651)	(1603)	(2048)	<0.001
Aware	49.3%	44.3%	53.2%	
Unaware	50.7%	55.7%	46.8%	
Hypertensive	(3651)	(1603)	(2048)	<0.001
Currently treated	42.4%	37.7%	46.0%	
Not currently treated	57.6%	62.3%	54.0%	
Currently treated & under control	(1548)	(605)	(943)	<0.05
Controlled	22.6%	25.6%	20.7%	
Uncontrolled	77.4%	74.4%	79.3%	

group, higher (primary and secondary educated) and urban residents, as compared to their counterparts.

Factors associated with treatment among elderly with hypertension
Table IV presents that for elders with hypertension, females were more likely than men to be treated for hypertension (OR=1.39), young-old age group (age 60-74) was associated with significantly higher treatment rates (OR=1.55) as compared to the old-old age group (age > 75). Among the major ethnic groups, Chinese and Indian had significantly higher rates of treatment (OR=1.44 and 1.60, respectively) as compared to Malays. As for educational level, elders with Primary and Secondary education was associated with significantly higher rates of treatment (OR=1.21 and 1.67, respectively). Elders who stayed in urban area were more likely than those who stayed in the rural area to be treated (OR=1.46).

Table V shows that for those elderly with hypertension, determinants associated with higher treatment rates were females, young-old age group (age 60-74), Chinese and Indians ethnic groups and higher education (primary and secondary) education and urban residents.

Factors associated with hypertension control among treated elderly
Table IV shows that for those elders with hypertensive treatment, female on treatment were less likely to have their blood pressure controlled (OR=0.76). Among the major ethnic groups, Chinese and Indians were associated with higher rates of control (OR=1.72 and 2.07, respectively). There were significant associations between education (Tertiary and Primary) and control of hypertension (OR=2.88 and 1.34 respectively). Elders who stayed in urban were more likely than those who stayed in rural to be controlled (OR=1.43) for their hypertension.

Table IV: Logistic Regression showing factors associated with awareness, treatment and control of hypertension among Malaysian elderly aged 60 years and older in NHMS III 2006

Variable	Awareness, OR (95% CI) (n=3651)	Treatment, OR (95% CI) (n=3651)	Control among treated, OR (95% CI) (n=1548)
Sex			
Male	1.00	1.00	1.00
Female	1.43 (1.25-1.63)++	1.39 (1.22-1.59) ++	0.76 (0.60-0.96)*
Age groups (y)			
60 – 74	1.48 (1.25-1.75) ++	1.55 (1.30-1.84) ++	1.02 (0.73-1.42)
≥ 75	1.00	1.00	1.00
Ethnicity			
Malays	1.00	1.00	1.00
Chinese	1.33 (1.14-1.55) ++	1.44 (1.24-1.68) ++	1.72 (1.31-2.25) ++
Indian	1.52 (1.15-2.02)*	1.60 (1.21-2.12) ++	2.07 (1.34-3.20) ++
Other bumis	1.05 (0.84-1.32)	1.07 (0.85-1.34)	1.68 (1.11-2.54)*
Others	0.64 (0.38-1.07)	0.64 (0.38-1.10)	0.54 (0.12-2.37)
Education			
None	1.00	1.00	1.00
Primary	1.19 (1.03-1.37)*	1.21 (1.05-1.40)*	1.34 (1.03-1.76)*
Secondary	1.54 (1.23-1.93) ++	1.67 (1.34-2.09) ++	1.29 (0.89-1.89)
Tertiary	0.95 (0.54-1.67)	1.08 (0.61-1.89)	2.88 (1.20-6.91)*
Unclassified	0.46 (0.23-0.92)*	0.26 (0.11-0.62)*	0.00 (0.00)
Strata			
Urban	1.37 (1.20-1.56) ++	1.46 (1.28-1.66) ++	1.43 (1.12-1.83)*
Rural	1.00	1.00	1.00
Marital status			
Not married	1.00	1.00	1.00
Married	1.31 (0.81-2.10)	1.23 (0.76-1.99)	0.66 (0.28-1.54)
Divorcee	1.73 (0.99-3.02)	1.66 (0.95-2.91)	0.56 (0.21-1.51)
Widow/Widower	1.34 (0.83-2.19)	1.24 (0.76-2.03)	0.65 (0.28-1.55)
Unclassified	0.85 (0.34-2.14)	0.68 (0.26-1.78)	0.37 (0.04-3.65)

Notes: OR=odds ratio; CI=confidence interval
*p < 0.05; ++p< 0.001

Table V: Factors associated with awareness, treatment and control of hypertension among elderly Malaysian

Variable	Awareness, Adj. OR (95% CI) (n =3651)	Treatment, Adj. OR (95% CI) (n=3651)	Control among treated, Adj. OR (95% CI) (n=1548)
Sex			
Male	1.00	1.00	---
Female	1.68 (1.44-1.96)++	1.66 (1.42-1.94) ++	
Age groups (y)			
60 – 74	1.38 (1.16-1.65) ++	1.44 (1.20-1.72) ++	---
≥ 75	1.00	1.00	
Ethnicity			
Malays	1.00	1.00	1.00
Chinese	1.23 (1.04-1.46)*	1.31 (1.11-1.55)*	1.73 (1.32-2.27) ++
Indian	1.30 (0.97-1.75)	1.35 (1.00-1.81)*	2.07 (1.33-3.21) ++
Other bumis	1.25 (0.99-1.59)	1.28 (1.01-1.63)*	1.92 (1.25-2.93)*
Others	0.63 (0.37-1.06)	0.62 (0.36-1.07)	0.55 (0.13-2.40)
Education			
None	1.00	1.00	1.00
Primary	1.30 (1.11-1.53) ++	1.32 (1.12-1.55) ++	1.42 (1.08-1.87)*
Secondary	1.63 (1.27-2.09) ++	1.71 (1.33-2.20) ++	1.22 (0.82-1.74)
Tertiary	1.00 (0.56-1.79)	1.09 (0.61-1.95)	2.93 (1.21-7.11)*
Unclassified	0.49 (0.24-1.01)	0.28 (0.11-0.67)*	0.00 (0.00)
Strata			
Urban	1.21 (1.04-1.41)*	1.25 (1.07-1.45)*	---
Rural	1.00	1.00	
Marital status			
Not married	1.00	1.00	---
Married	1.57 (0.96-2.57)	1.51 (0.92-2.47)	
Divorcee	2.11 (1.19-3.73)*	2.10 (1.18-3.74)*	
Widow/Widower	1.45 (0.88-2.40)	1.40 (0.84-2.33)	
Unclassified	1.18 (0.46-3.05)	1.02 (0.38-2.77)	

Notes: Adj. OR=adjusted odds ratio; 95% CI=95% confidence interval
*p < 0.05; ++p< 0.001
aWald test
---variable (s) removed

For those who were on treatment, determinants associated with controlled hypertension were Chinese and Indians ethnic groups and higher education (Tertiary and Primary), as compared to their counterparts (as shown in Table V).

DISCUSSION

This study demonstrated that the prevalence of hypertension in Malaysian elderly aged 60 years and older was much higher than the adult population. The overall prevalence of hypertension among elderly was 74%. The prevalence of hypertension was more common among elderly female and Malay ethnic group. Our result is consistent with previous study of prevalence of this condition in older person in US with the overall prevalence of 70.8%[2]. Our prevalence of hypertension in elderly population is much higher than the Ontario Survey in 2008 and Thailand National Health Examination Survey III in 2004 (i.e. 51.6% and 51.1% respectively)[1,26]. Higher prevalence rate of hypertension was reported in Latin America and the Caribbean while the lowest prevalence occurred in Asia and Pacific Islanders worldwide.21 The higher prevalence of hypertension in elderly female than in men is consistent with other study[2].

In our study, the overall awareness and treatment rate are 49.3% and 42.4% respectively. The proportion of awareness of hypertension was much higher than those adults population aged 30 years and above in NHMS III with the awareness rate of 35.8%. Similar, the proportion of elderly treated for hypertension was higher as compared to the adult population. In NHMS III, the treatment rate among the adults hypertensive population was only 31.4%. In our study, the higher awareness and treatment rates are mainly among the elderly females, young-old age group, urban residents, Chinese ethnic group and elderly with higher education as these groups of elderly might be more health-conscious and have better access to medical care and treatment.

However, the overall control rates for hypertension in this study are still low i.e. only about a quarter (22.6%) of all elderly treated for hypertension achieved blood pressure control. Similarly, in NHMS III survey about a quarter (26.3%) of the adults hypertensive population under current treatment had their blood pressure under control. For those elderly who were on treatment, factors associated with better control were Chinese and Indians ethnic groups and higher educational level as these groups of elderly population has better access to quality medical care and are usually more health-conscious. Despite of having higher prevalence, awareness and treatment rates, elderly female equally less likely to have their blood pressure controlled even though on treatment. Generally, the rate of control is poor globally and it is even worse in the developing countries[27]. However, recent studies showed a positive trend of increasing blood pressure control among older adults (age > 60)[2,28]. Our control rate of hypertension among elderly was much lower than the Ontario Survey i.e. more than two-third of subjects aged 60-79 years with good blood pressure control[26]. The low rate of hypertensive control among elderly in Malaysia may be due to the poor patients' compliance to treatment[29] and blood pressure usually getting more difficult to control with the increasing age[30].

This study provides evidence that quality of care in elderly hypertensive need to be improved further in order to achieve target blood pressure control among the elderly and subsequently to reduce the overall cardiovascular risk[31,32]. In our study, the overall awareness, treatment and control rates for hypertension in elderly are still suboptimal. More efforts are needed to motivate physician to improve treatment and control rates. The improvement can be achieved by more intensive physician education especially on the importance of initiating treatment early based on the latest hypertensive guidelines[6,25].

By using the NHMS III data, these analyses of secondary data provide precise estimates of prevalence, awareness, treatment and control of hypertension among elderly aged 60 and older in Malaysia. In view of high prevalence of hypertension among elderly Malaysian, such information is helpful to the health care policy maker and the Ministry of Health to establish and strengthen the existing Hypertension programme to improve the awareness, treatment and control rates of hypertension among elderly. Moreover, the knowledge on gender differences in awareness and treatment rates may be useful in the effort to improve quality care. In addition, our study provides insight into a number of socio-demographic factors affecting the Malaysia's elderly population. By understanding the factors affecting awareness can lead to improved awareness, treatment and control rate. In view of rapid growth in this elderly population in Malaysia, patient and physician education and efforts to improve overall hypertensive management are indicated. It is also important to improve the accessibility and quality of hypertensive care, especially to improve the overall control of blood pressure among the elderly. All these efforts must be accompanied by primary prevention strategies, for example, promoting low salt diet and increasing physical activity in order to reduce the overall prevalence rate of hypertension among elderly. Contributions of non-government organizations in hypertension controlled program should be enhanced to complement that of the Ministry of Health to implement various strategies to reduce the hypertension prevalence, to increase the awareness and treatment rate among hypertensive patients.

The limitation in this study is likely that we might overestimate the prevalence of hypertension. As blood pressure was measured at one setting, this might result in an overestimation due to white coat hypertension and underestimation of hypertensive control[1].

CONCLUSION

This study has documented a high prevalence of hypertension among the elderly in Malaysia with low control rate. Despite the higher prevalence, awareness and treatment rates, elderly female equally less likely to have their blood pressure controlled. Reliable knowledge of factors associated with awareness, treatment and control is crucial in the development of health policies to improve disease management and patient education programs especially among the elderly population in Malaysia. There is an urgent need for more holistic public health interventions to improve the awareness, treatment and control rate among

the elderly hypertensive patients. This survey also serves as an important benchmark for further efforts towards the better management of elderly hypertensive patients in Malaysia. More research on hypertensive elderly must be directed in light of these findings. Reasons for the low control rate need to be explored and the study will have to include both patients and doctors as study subjects.

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