

# Prevalence of Asymptomatic Atrial Fibrillation in Malaysian Patients with Hypertension

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## SUMMARY

Atrial fibrillation (AF) is usually asymptomatic and often associated with established cardiovascular risk factors such as hypertension. The prevalence atrial fibrillation in patients admitted to Malaysian hospitals has been determined, but asymptomatic atrial fibrillation (AAF) in hypertensive patients in the primary care setting is not established. This study reports the prevalence of AAF in hypertensive patients in Malaysia, in a primary care setting. The overall prevalence of AAF was 0.75% with no differences between the gender. The prevalence of AAF increases with age – in the age groups of 30-39, >40-49, >50-59, >60-69, 70-79 and >80 years old were 0%, 0.17%, 0.35%, 2.32%, 2.59%, and 0% respectively. Hypertensive patients with age of  $\geq 61$  year old were associated with a probability of 10.6 times higher for AAF. We suggest the age threshold to screen for AAF to be age of 60. It is estimated that there are 49,029 Malaysians with AAF in 2010. A large population is at risk of AAF-related complications. There is justification for an even greater emphasis on diagnostic, primary and secondary prevention strategies.

## KEY WORDS:

*Atrial fibrillation, primary care, prevalence, Malaysia*

## BACKGROUND

Atrial fibrillation (AF) is usually asymptomatic and often associated with established cardiovascular risk factors such as hypertension. AF is an important risk factor for stroke<sup>1</sup>. Early detection and treatment of AF even in the asymptomatic stage is important as AF carries the risk of serious complications<sup>2</sup>. Stroke from AF is associated with significant morbidity and mortality<sup>3,4</sup>.

The prevalence of hypertension in Malaysia is 42.6% in adults above age of 30<sup>5</sup>. Hypertension in most patients is not well controlled<sup>6</sup>. Hypertension is responsible for more AF in the population than any other risk factors<sup>7</sup>. The prevalence atrial fibrillation in patients admitted to Malaysian hospitals is 2.8%<sup>8</sup>, but asymptomatic atrial fibrillation (AAF) in hypertensive patients in the primary care setting is not established.

The aim of this paper was to ascertain the prevalence of AAF in hypertensive patients in Malaysia, in a primary care setting.

Sarawak is the largest state in the Federation of Malaysia in terms of land area. The population is distributed to a few main urban centres and many smaller rural towns and settlements. The medical records of patients in the public health sector are generally kept by patients, and this is termed as the “home based health records”. This system allows the same health record to be accessible to any health care provider when patient presents for a consultation and ensure a continuity of care in rural areas.

## MATERIALS AND METHODS

This is a retrospective audit of consecutive patients aged  $\geq 30$  years attending a hypertensive clinic who have no typical symptoms of atrial fibrillation. The study was conducted over 45 working days between 6/8/2011-12/10/2011. Hypertension was defined as current treatment for hypertension. This study excluded patients who are already diagnosed with AF or who had prior thromboembolic events.

Patients had vital signs recorded and electrocardiography (ECG) was done routinely as part of their annual assessment. We collected clinical and ECG data from the home based health records and a copy of the 12-lead ECG was obtained. The diagnosis of AAF was made based on a single recording of AF captured on ECG done during the study period.

Weight and height of patients were recorded as per routine practice in the clinic. Blood pressure was measured using an automatic blood pressure monitor using a standard adult size cuff (model HEM-7111, Omron, Japan). ECG was captured on a standard 12 lead format (electrocardiogram model ECG-1112 Carewell electronics, Shenzhen).

Prevalence of hypertension in Malaysian adults aged above 30 is available from published data from the National Health and Morbidity Survey III (NHMS III). We used statistics from the national census 2010 (Department of Statistics in Malaysia) to estimate the number of patients with AAF in Malaysia.

## Statistical methods

All data were analysed using SPSS (version 20; SPSS, IBM, Chicago, IL). Data was tested for normality using Kolmogorov-Smirnov Test. All parametric or normally distributed data were reported as Mean and standard deviation (SD) and comparison of the means were performed using t-test or ANOVA. Non-parametric data was reported as

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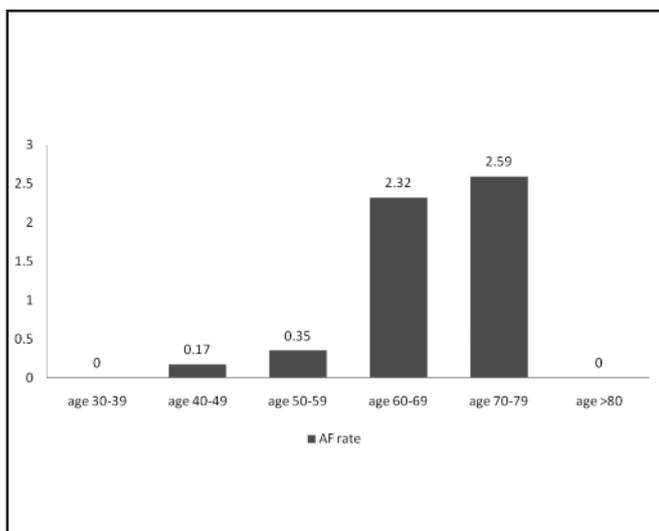
**Table I: Patient demographics in terms of age, gender and ethnicity**

Age group n= 1998	Male	Female
30-39	68	153
40-49	191	410
50-59	236	348
60-69	176	193
70-79	74	96
>80	22	31
Ethnic group n=1852	Male	Female
Bumiputera Sarawak	535	913
Malay/Melanau	81	156
Chinese	83	84

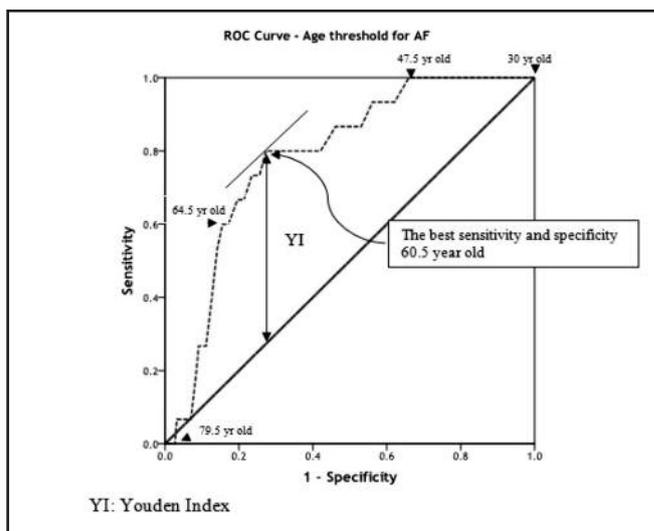
**Table II: ROC curve analysis for the best sensitivity and specificity thresholds of the tests to predict AAF**

Age (year)	Sensitivity (%)	Specificity (%)	Youden Index	AUC <sup>a</sup>	p-value
50.5	93.3	43.1	0.37	0.78	<0.001
55.5	80.0	61.2	0.41		
<b>60.5*</b>	<b>80.0</b>	<b>66.7</b>	<b>0.53</b>		
64.5	66.7	80.2	0.47		

AUC: area under the curve  
<sup>a</sup> 95% asymptotic confident interval  
 \* threshold value (in BOLD)



**Fig. 1 :** AAF rate according to age group.



**Fig. 2 :** ROC curve for age threshold as predictor of AAF.

median and interquartile range (IQR) (25%–75%) and comparison of the median were performed using Mann-Whitney U test.

The area under the Receiver Operator Characteristic (ROC) curve was used in order to assess the threshold of age with the best sensitivity and specificity to predict AAF. A P value < 0.05 was considered statistically significant.

**RESULTS**

There were consecutive 3,789 patients attending the hypertension clinic during the study period. Only 1,998 patients had complete clinical and ECG data which were included for analysis. 767 (38.4%) of our patients were male and significantly older, (median 55 (47-64) years old), compared to female, (median 51 (44-60) year old, p-value <0.001).

There were 1,852 (92.7%) patients who could be assigned ethnic groups. Bumiputera Sarawak makes up 78.2% (1447 cases) of the study population with the remainder being the Malay/Melanau (12.8%) and Chinese ethnicity (9%). This reflects the background ethnicity of the population of the area where the study was conducted. This is shown in table 1.

Fifteen out of 1,998 patients had AAF confirmed on ECG, giving an overall prevalence of 0.75% in this study. They were no significant difference on AAF prevalence between the gender, 6 (0.78%) and 9 (0.73%), male and female respectively, with p-value of 0.897.

The prevalence of AAF increases with age – in the age groups of 30-39, >40-49, >50-59, >60-69, 70-79 and >80 years old years old were 0%, 0.17%, 0.35%, 2.32%, 2.59%, and 0% respectively, a significant trend was observed, p-value 0.001. This is shown in Figure 1.

In our study population, patient with AAF were significantly older compared to patients with sinus rhythm (SR); with median of 68 (46-72) and 52 (45-62) years old, in AAF and SR patients, respectively,  $p$ -value  $< 0.001$ .

Using Receiver Operator Characteristic (ROC) curve analysis, figure 2, the threshold values with the best specificity and sensitivity to predict occurrence of AAF were determined for patient's age. The ROC curve analysis showed area under the curve (AUC) of 0.78 : 95% confidence interval (CI) of 0.695 to 0.876 with  $p$ -value of  $< 0.001$ . The threshold value for age to predict AAF was 60.5 years old. The threshold value and other age value with corresponding sensitivities and specificities are shown in table II.

The result of logistic regression analysis showed that hypertensive patients with age of  $\geq 61$  years old were associated with a probability of 10.6 times higher for AAF, odds ratio (OR) 10.6 ; 95% CI : 2.99 – 37.83,  $p$  value  $< 0.001$ .

## DISCUSSION

Our AAF prevalence of 0.75% is consistent with other reports. Prevalence of AF in Asian countries ranges between 0.4 to 2.8%, and is generally lower in Asian countries as compared to Caucasian data<sup>10</sup>.

We observe that the prevalence of AAF increase significantly after age of 60, however the prevalence drops again after the age of 80 (shown in Figure 1). The reason for the drop in prevalence would need further study. One possible explanation could be due to our study methodology which excluded patients with known AF or those with previous thromboembolic complications. They could have been diagnosed with AF when presenting to medical staff for other non-cardiac conditions. The sample size of hypertensive patients age  $>80$  years old in this study were small ( $n=43$ ) and, any conclusions inferred from the data and may represent biases. Further study is needed to determine the prevalence of AAF in the elderly age group.

The NHMS III revealed that 42.6% of adult Malaysians  $\geq 30$  years old had hypertension<sup>5</sup>. Estimating that 50% of the 26.8 million population in Malaysia in 2006 were  $\geq 30$  years old, the number of those having hypertension would be 5.7 million, and the number of people with AAF would be 42,813 patients. Extrapolating to 28.3 million population in Malaysia in 2010, the corresponding number of people with AAF would be 49,029.

This has significant local implications suggesting hypertensive Malaysians should be screened for AAF when they retire at the age of 60. This is important as AF is an independent predictor of mortality and associated with embolic stroke<sup>11</sup>. Patients with AF above the age of 60 are at risk of thromboembolism and would warrant anticoagulation therapy<sup>12</sup>.

## LIMITATIONS

This study is conducted in Sarawak and the ethnic composition of the study population does not reflect the ethnic composition of Malaysia. The diagnosis of AAF is made based on a single 12-lead ECG recording which was performed on consecutive asymptomatic patients attending a hypertension clinic. A 24 hour Holter recording would be a more sensitive tool for diagnosis of AAF in such individuals. But in the context of this study, it was not a practical measure as patients resided in a large geographical area. Hence it could be possible that we could have missed pre-existing paroxysmal atrial fibrillation and therefore under-estimate the true prevalence of AAF in our population.

## CONCLUSION

The prevalence of AAF in hypertensive patients  $\geq 30$  years old at the primary care setting in Malaysia is 0.75%. The estimated number of Malaysians with AAF in 2010 would be 49,029. The age threshold to screen for AAF would be age of 60. A large population is at risk of AAF-related complications, including strokes. There is justification for an even greater emphasis on diagnostic, primary and secondary prevention strategies.

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