

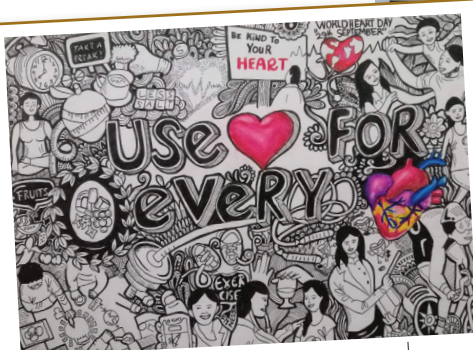


*In this issue*

Artificial Valves for Heart Patient

Ward Beds and Belian Benches for Sarawak Heart Centre

pg. 3



Name: JAYDEN CHONG YAN EN  
Category: St. Joseph's Private Primary School

1<sup>st</sup> PRIZE



**CHAIRMAN**

TYT Tun Pehin Sri Haji Abdul Taib Mahmud

**DEPUTY CHAIRMAN**

YB Dato Sri Prof Dr Sim Kui Hian

**BOARD OF TRUSTEES**

YBhg Datin Patinggi Datuk Amar Hajah Jamilah Binti Haji Anu

YB Datuk Dr Annuar Rapa'ee

YBhg Tan Sri Dato Sri Empiang Jabu

YBhg Dato Anne Teng

YBhg Dato Sri Fong Joo Chung

YBhg Datuk Prof Dr Chew Peng Hong

Ms Pauline Kon Suk Khim

Mr Eric Lim Swee Khoon

**MEDICAL ADVISOR**

Dr. Yii Kie Sing

**EDITORIAL**

Editor Mr. Eric Lim Swee Khoon

Member Ms Lee Siew Hoon

**CONTENTS**

From the Editor	2
Artificial Valves for Heart Patient	3
Defibrillator Machines, Ward Beds for Sarawak Heart Centre	3
Fund Drive for MRI Machine for Sibu Hospital	4-5
Lundu Heart Day	4-5
World Heart Day	6-8
Health Screening	8-9
Christmas Cheer for Patients of Sarawak Heart Centre	9
Case Study on Characteristics of Patients with Myocardial Infarction and their Outcomes: A Rural Primary Healthcare Setting in Lubok Antu District, Sarawak	10-14
Transthyretin Amyloidosis Patients Awareness Day	15-16

2022 was a year of collaboration with other agencies as the Foundation got back into action, so to speak, after the lull during the pandemic over the last two years.

It started with a rural health screening project initiated by Kuching City Lions Club and supported by Sarawak Heart Centre, Sarawak Breast Cancer Support Group, St Joseph's Private School Leo Club and National Population and Family Development Board in Kampung Mujat, Serian in May.

Then there was the two-day Lundu Heart Day, held in conjunction with Sarawak Day on 21 July. A successful event, thanks to the cooperation of Sarawak Heart Centre, Sarawak Breast Cancer Support Group, Lembaga Kemajuan Agama Islam, Lundu District Office, Lundu District Council, Lundu Hospital and N.03 Tanjung Datu Service Centre.

The Foundation together with Sarawak Heart Centre and Pfizer Malaysia were involved in a Transthyretin Amyloidosis Patients Awareness Day in July where the patients shared their stories to further raise awareness of the rare disease. The patients are recipients of a fund for genetic testing for inherited cardiovascular disease set up by Heart Centre with a sponsorship of RM50,000 from the Foundation. Read more about Transthyretin Amyloidosis on Page 4.

World Heart Day was back with a bang and an unexpected turnout of about 2,000 people on 25 September. This year, a new partner - Swinburne University of Technology, Sarawak Campus - introduced the first Sarawak Combat Against Cardiovascular Disease Cartoon and Doodle Art Competition. With the objective to tap local talent in cartoon and doodle art and to increase awareness of healthy heart living among our youth, the competition attracted a total of 231 participants from throughout Malaysia and Scotland. Swinburne held another event to celebrate World Heart Day at its campus the following weekend.



In October, the Foundation gave financial assistance amounting to RM100,000 for artificial valves for a heart patient in the Sarawak Heart Centre. Transcatheter Bicaval Valves (TRICVALVE) is a new treatment that involves the introduction of artificial valves through the vein in the groin and implantation of these valves in the heart, without the need for open heart surgery. The implant is the first ever done in a government hospital in the country. Report is on Page 3.

We gratefully acknowledge the contributions of the companies who responded to our fund-raising appeal for the purchase of a RM2.6 million Magnetic Resonance Imaging machine for Sibu Hospital. We thank them for their trust in the Foundation and their support towards complementing the State's efforts in improving heart health care for the people in Sarawak.

For the year ahead, we look forward with high anticipation to more collaborations in advocating for cardiovascular health for everyone in Sarawak. Together, we can achieve heart health for all.

With best wishes for a happy and healthy year.

Eric Lim Swee Khoon

**ARTIFICIAL VALVES FOR HEART PATIENT**

Sarawak Heart Foundation sponsored Transcatheter Bicaval Valves (TRICVALVE) for a heart patient in the Sarawak Heart Centre in October 2022. The valves cost RM100,000.

Wilson ak Nyarum, 55, from Serian who has severe tricuspid regurgitation (a leaking valve), suffers from ascites (swollen tummy due to fluid accumulation) and oedema (swollen legs). Medication did not help and his right heart was too weak for surgery.

TRIVALVE is a new treatment that involves the introduction of artificial valves through the vein in the groin and implantation of these valves in the heart, without the need for open heart surgery. The new valves will take over the function of the patient's leaking valve and prevent backflow of blood to the rest of the body.



The implant is the first ever done in a government hospital in the country.

Foundation Deputy Chairman YB Dato Sri Prof Dr Sim Kui Hian and Board Trustees Datin Patinggi Datuk Amar Hajah Jamilah Binti Haji Anu, Dato Anne Teng and Ms Pauline Kon visited Wilson on 13 December 2022.

**DEFIBRILLATOR MACHINES, HOSPITAL HI-LOW DOUBLE FOWLER WARD BEDS AND BELIAN BENCHES FOR SARAWAK HEART CENTRE**



Sarawak Heart Foundation has donated three units of Defibrillator machines and 10 units of Hospital Hi-Low Double Fowler Ward Beds to Sarawak Heart Centre. The Defibrillator machines costing RM69,000 replaced the existing old ones and the beds costing RM32,500 are for the use of elderly patients.

The machines and beds were handed over at a simple ceremony at Sarawak Heart Centre on 13 December 2022. Present at the ceremony were Foundation Deputy Chairman YB Dato Sri Prof Dr Sim Kui Hian and Board Trustees Datin Patinggi Datuk Amar Hajah Jamilah Binti Haji Anu, Dato Anne Teng and Ms Pauline Kon.



They also handed over two belian benches to the Centre, donated by Stanley Ngu King Hieng of Solo Timber Sdn Bhd.

**Sarawak Heart Foundation • Member of World Heart Federation**

No.11, 1<sup>st</sup> Floor, Lot 2343, Block 10 KCLD Bormill Estate Commercial Centre, Jalan Tun Ahmad Zaidi Aducci 93150 Kuching  
Tel: 082-233 784 / 012-886 8491 Fax: 082-258 303 Email: sarawakheartfoundation8@gmail.com  
Website: sarawakheartfoundation.org.my

Printed by: Infografik Press Sdn. Bhd.

No.107, Lot 1484, Blk 12, Muara Tabuan Light Industrial Park, Off Jalan Setia Raja, 93350 Kuching. SARAWAK. Tel : 082-502 225 / 365 261 Fax : 082-360 076



# WORLD HEART DAY 29 SEP



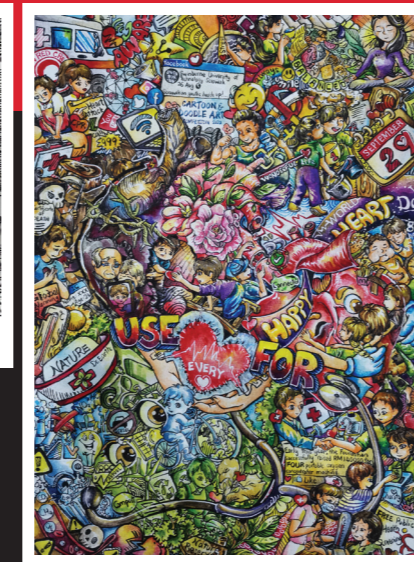
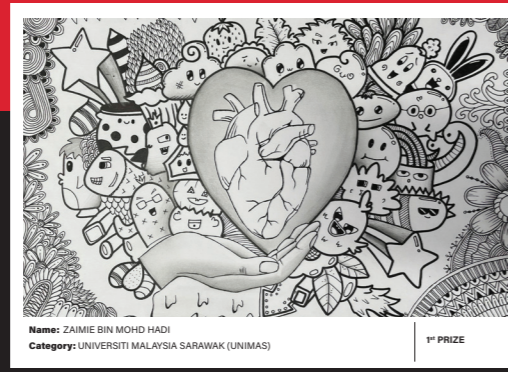


**Public forum by Heart Specialists**  
 (in conjunction with World Heart Day 2022)  
 "Risk factors for a heart attack"  
 "Heart attack and heart rhythm disorder"  
 Saturday, 01 Oct 2022 | Lecture Theatre, Swinburne Sarawak  
 • 8.00am – 9.30am (Opening ceremony)  
 • 9.30am – 10.30am (Public forum)  
 Scan QR Code to Register  
 (Work for us with us!)

DR HO RIAN HUI  
 Consultant Cardiologist and Electrophysiologist

DR JUSMA CHING  
 BUI KWONG  
 Clinical Cardiologist

DR ALAN FONG  
 (MEDICINE)  
 Consultant Cardiologist



**World Heart Day @ Swinburne University of Technology Sarawak Campus 1 Oct**



**21 May @Kampung Mujat, Serian** *Health*



*Screening* **12 Nov @ Farley, Kuching**



# A DESCRIPTIVE STUDY ON CHARACTERISTICS OF PATIENTS WITH MYOCARDIAL INFARCTION AND THEIR OUTCOMES: A RURAL PRIMARY HEALTHCARE SETTING IN LUBOK ANTU DISTRICT, SARAWAK

<sup>1,5</sup>Caryn Tsujean Lim MB BCH BAO, <sup>2,5</sup>Yik Hon Ho MBBS, <sup>3</sup>Stephenie Ann Albart MD, <sup>4</sup>Jie Ping Schee MBBS MRCP AM, <sup>3</sup>Irene Looi MBBS FRCP, <sup>5</sup>Alan Yean Yip Fong MBChB, FRCP

## \*Corresponding Author:

Ho Yik Hon, Department of Cardiology, Sarawak Heart Center, Kota Samarahan, Sarawak, Malaysia.  
Tel: +60178998983, Email: richardho920825@gmail.com

DOI: <https://doi.org/10.32896/cvns.v4n1.42-48>

Published: 31.03.2022

Article History: Received Sept 26, 2021; Revised Feb 25, 2022; Accepted Mar 23, 2022

## ABSTRACT

**Introduction:** Myocardial infarction (MI) is the leading cause of death worldwide. More studies are needed to provide insight of rural MI care in Malaysia.

**Objective:** This study aims to explore patient and non-patient factors in MI and mortality outcomes.

**Methods:** We conducted an observational study involving secondary data collection through medical records review of whom presented to rural primary healthcare facilities before being referred to regional secondary and/or tertiary centres. We explored their inpatient and 30-day cardiac-related mortality outcomes. All MI patients from the locality were included, excluding those whose final diagnosis were not MI.

**Results:** Nine patients were included. Eight (88.9%) experienced STEMI. Eight (88.9%) were male. Median age was 53 (Q1:40.5–Q3:64.5) years. Median duration from symptoms onset to presentation was 2 (1.125 – 35.250) hours. Median time from presentation to aspirin delivery was 45 (12.5 – 86.0) minutes. The median door-to-needle time was 190 (163.0 – 212.5) minutes. Five (55.6%) received medical thrombolysis in secondary hospital prior to elective percutaneous coronary intervention (PCI). Inpatient mortality was 11.1% corresponding to 30-day mortality.

**Conclusions:** Logistic challenges and local healthcare limitations pose difficulties for rural MI care. Better equipped healthcare facilities is essential for prompt diagnosis and interventions for MI patients.

**KEYWORDS:** Myocardial infarction, rural, primary healthcare, Malaysia

## INTRODUCTION

Myocardial infarction (MI) is the leading cause of death worldwide [1]. 17.9 million people died of cardiovascular disease each year, with an estimation of 32% of all deaths worldwide [2]. More than 75% of cardiovascular deaths occurs in low-income and middle-income countries [3]. Acute occlusion of coronary artery causing ST segment elevated myocardial infarction (STEMI) commonly leads to early mortality and myocardial damage [4]. In the UK, between the year of 2013-2014, there were 187,421 hospital visits due to MI.

This is translated into the fact that there was a patient being diagnosed

with MI every 3 minutes on average [5]. According to National Cardiovascular Disease, Acute Coronary Syndrome (NCVD-ACS) Registry in Malaysia, there were a total of 17,771 patients diagnosed with acute coronary syndrome (ACS) throughout the country from 2014-2015, with 46.1% being STEMI, 25.2% being NSTEMI, 28.7% being unstable angina [6]. This translates into 0.03% of Malaysian population being diagnosed with ACS per year, considering a population of 32.7 million [7].

According to a study done in a rural hospital in Bangladesh, the in-hospital mortality rate of STEMI is high despite adherence to published guidelines and thrombolysis,

highlighting the multifactorial contribution to cardiac mortality, including prolonged pain-to-door time, poor coverage of ambulance service, low community awareness of acute coronary syndrome, and lack of emergency medical services in rural settings [8]. Another study undertaken in north of Scotland looking at the discrepancy between the treatment of STEMI in remote compared to central locations, had identified the potential challenges to this discrepancy to include staffing availability and training, public awareness and inter-hospital communication [9].

Malaysia is a middle-income country with limited resources, especially in rural settings [10].

In rural areas of Malaysia, most patients with STEMI have limited or delayed access to thrombolysis or primary cutaneous intervention. Cardiac catheterisation laboratories are not readily available in rural hospitals. Moreover, long distances to the nearest hospitals limiting accessibility to thrombolysis, causes a delay in treatment. Great efforts are needed to overcome these challenges in rural settings in order to provide better care and outcome for patients with MI. There remain significant opportunities to improve STEMI care in rural setting of Malaysia. Limited studies are available to provide insight of cardiovascular disease and MI care in rural settings in Malaysia. This study aims to explore patient and non-patient related factors among myocardial infarction patient population and their in-hospital and 30-day cardiac mortalities.

## METHODS

### Study type and design

This is a descriptive study involving retrospective data collection. We included patients who presented to primary healthcare facilities in a rural setting and subsequently referred to secondary or tertiary healthcare centers for further investigation and management.

Through a review of medical records from 7 primary healthcare facilities in Lubok Antu District, all consecutive study subjects who were

diagnosed with myocardial infarction from 1 January to 30 June 2021 were included, subsequently being followed up on their status of in-patient cardiac mortality and 30-day cardiac mortality. Data collected from primary healthcare centers included patients' demographics, risk factors for cardiovascular disease, prior history of ischaemic heart disease, vital signs upon presentation, duration of symptoms prior to presentation, distance from place of onset to nearest clinics, treatment received in primary healthcare centers, and transportation journey from primary healthcare centers to secondary or tertiary healthcare facilities. Data on the level of cardiac enzymes and duration of hospital stay were obtained from secondary hospital, namely Sri Aman Hospital. Subsequently, in-hospital cardiac mortality and 30-day cardiac mortality post-MI were recorded for each patient through review of their inpatient records and medical records during their follow-ups in primary healthcare clinics after discharge. Patients who failed to present to primary healthcare clinics after discharge were contacted via phone calls to assess their post-discharge mortality status. No subject was lost to follow-up.

### Study population, inclusion, and exclusion criteria

All consecutive patients diagnosed with myocardial infarction from 1 January 2021 till 30 June 2021 in

primary healthcare clinics within Lubok Antu District, Sri Aman Division, were included; namely Lubok Antu Health Clinic, Engkelili Health Clinic, Batang Ai Health Clinic, Merindun Health Clinic, Nanga Kesit Health Clinic, Nanga Stamang Health Clinic, Nanga Delok Health Clinic, and Nanga Patoh Health Clinic, were included. Patients who did not have a final diagnosis of a myocardial infarction were excluded.

### Primary and secondary outcomes

The primary outcome of this study was in-hospital cardiac mortality. The secondary outcome was 30-day post MI cardiac mortality.

### Ethics consent

This study was approved by Medical Review and Ethics Committee (MREC), Ministry of Health Malaysia (MOH) in 2021 (Approval Code: NMRR-21-285-58514). MREC waived informed consent for this study.

### Statistical analysis

The data analysis was done using the SPSS version 22. Continuous variables were expressed as median with inter-quartile range as these data were skewed. Categorical variables were described as frequency and percentages.

## RESULTS

**Table 1: Characteristics of Patients with Myocardial Infarction and Their Outcomes**

Characteristic	Total (n=9)	(Q1 ; Q3)	(min ; max)
Median age (IQR) – yr	53 (24)	(40.5;64.5)	37;79
Age < 55 yrs - no. (%)	5(55.6)		
Age > 55 yrs - no. (%)	4(44.4)		
Sex – no. (%)			
Male	8(88.9)		
Female	1(11.1)		
Race or ethnic groups - no. (%)			
Iban	8(88.9)		
Chinese	1(11.1)		
Types of MI – no. (%)			
STEMI	8 (88.9)		
NSTEMI	1 (11.1)		

<sup>1</sup>Lubok Antu Health Clinic, Lubok Antu, Sri Aman, Sarawak, Malaysia

<sup>2</sup>Batang Ai Health Clinic, Lubok Antu, Sri Aman, Sarawak, Malaysia

<sup>3</sup>Clinical Research Centre, Seberang Jaya Hospital, Penang, Malaysia

<sup>4</sup>Department of Medicine, Faculty of Medicine, University of Malaya, Kuala Lumpur, Malaysia

<sup>5</sup>Department of Cardiology, Sarawak Heart Center, Kota Samarahan, Sarawak, Malaysia

Risk factors – no. (%)			
Hypertension	6(66.7)		
Diabetes mellitus	2(22.2)		
Dyslipidaemia	5(55.6)		
Family history of premature CVD	4(44.4)		
Smoking	6(66.7)		
Ex-smoker	1(11.1)		
Alcoholic	5(55.6)		
Ex-alcoholic	1(11.1)		
Past history of coronary revascularization	0		
Anti-platelet usage			
Anti-platelet usage	2(22.2)		
Other variables – median (IQR)			
		Q1 : Q3	Min ; Max
Onset of symptoms to presentation – hour	2(34.13)	1.125;35.25	0.75;144
Duration from place of onset to primary healthcare facility – minutes	10(12.5)	5.0;17.5	2;20
Time from presentation to aspirin given – minutes	45(73.5)	12.5;86.0	10;102
Time from departure to arrival – minutes	80 (25)	75.0;100	70;105
Systolic BP – mmHg	114(39)	101;140	85;144
Diastolic BP – mmHg	78(15.5)	70.5;86	64;94
Heart rate – bpm	95(71.5)	83;154.5	74;240
SpO2 - %	97(9)	89.5;98.5	80;100
Respiratory rate – breath per minute	20 (4)	18;22	18;28
Random capillary blood sugar – mmol/L	10.4(4.27)	7.3;11.58	6.5;11.6
TIMI score	4 (4)	3;7	1;13
Treatment – no. (%)			
Medical thrombolysis	5(55.6)		
PCI	7(77.8)		
Hospitalization duration (days) - median (IQR)			
Hospitalization duration (days) - median (IQR)	4(3)	4;7.25	3;8
Door to needle time (min) - median (IQR)	190(49.5)	163;212.5	146;225
Total ischaemic time (min) - median (IQR)	270(92)	243;335	231;340
Outcomes (in-hospital) – no. (%)			
Alive	8(88.9)		
Death	1(11.1)		

IQR = Interquartile range  
Q1= Lower quartile or First quartile  
Q3= Upper quartile or Third quartile

Nine adult patients were included (refer Table 1). Eight (88.9%) patients experienced STEMI. Eight (88.9%) were male, and 8 (88.9%) were Iban. Median age was 53 (Q1: 40.5 – Q3: 64.5) years, the youngest being 37 years old. Median duration from onset of symptoms to presentation was 2 (1.125 – 35.250) hours. Median time from presentation to aspirin delivery was 45 (12.5 – 86.0) minutes. Median duration of the journey from place of onset to primary healthcare facilities was 10 (5.0 – 17.5) minutes.

Median duration of the journey from primary healthcare to secondary hospital was 80 (75 – 100) minutes, the longest being 6 days. Median door-to-needle time was 190 (163.0 – 212.5) minutes. Median total ischaemic time was 270 (243 – 335) minutes. Five (55.6%) received medical thrombolysis in secondary hospital prior to elective percutaneous coronary intervention (PCI). In-patient mortality was 11.1% while 30-day mortality was correspondingly 11.1% as well.

## DISCUSSION

Lubok Antu District in Sarawak consists of a population of 27,984 people, with the majority being Iban (indigenous group)/Malay (90.4%). Chinese occupied 5.8% of the population while Indian and others occupied 0.4% [11]. Hence, 88.9% of our study population consisted of Iban. National statistics show 1.4% incidence of ACS among Iban [6]. It is however, unable to conclude that Iban has higher prevalence of

myocardial infarction from this study as the cohort population comes from an Iban predominant area.

Majority of the patients who experienced MI in this setting were relatively young compared to national data (median age groups of this study and national data were 53 and 58.6 years respectively). They were male predominant which was consistent with the national data from NCVDACS Registry (79.3% male) [6]. Eight (88.9%) of the study patients experienced STEMI. The alarming proportion of study population with STEMI is an area of concern, which deserves further exploration as to factors which might be associated with the higher incidence of STEMI compared to 46.1% from national data [6]. However, there is also the possibility of underreporting of NSTEMI due to non-presentation to healthcare facility, or death at home due to MI, which render further exploration in future study. Logistic challenge is also an issue in most rural settings in Malaysia which might affect the true reflection of incidence and prevalence of MI in rural.

Study shows that patient delay accounts for the time taken from onset of symptoms to first medical contact (FMC). FMC is defined as the time of first assessment by a healthcare professional who has the knowledge of obtaining and interpreting a 12-lead electrocardiogram (ECG) and administer initial treatment [12]. The longest duration from symptom onset to FMC in our study population was 144 hours which shows much room of improvement for early presentation. Early presentation and early initiation of treatment are the central goal in AMI management which have influence on the outcome of AMI [13]. Although exact factors which causes late presentation have yet to be established, patients who stayed in impoverished area are more likely to present late after symptoms onset [14]. Hence, further study is needed to investigate the factors which contribute to late presentation which might include patient's awareness, education level and socioeconomic background for subsequent measure to be taken to address the issue.

Another point that worth highlighting is the median time from presentation to aspirin delivery, which took 45 minutes, with the longest received aspirin only after more than 1 hour of presentation. The reason of delay in delivery of initial treatment needs to be explored in future study, which might include prompt recognition of the diagnosis by healthcare workers. This is important as it could potentially influence the cardiac-related outcome of MI patients and quality of MI care in rural settings.

Among the 8 (88.9%) patients presented with STEMI, only 5 (55.6%) received fibrinolytic therapy, as compared to national data of 69.2%. None of the patients in the study received primary PCI. The median door-to-needle time of 190 minutes in the study was longer compared to 45 minutes in the national data [6]. Late presentation had resulted in patients missing the thrombolysis window. Logistic challenges, particularly long distance and journey time to the nearest hospitals, had also resulted in long door-to-needle time in our setting. There was no Cardiac catheterisation laboratories available in the vicinity hospital for primary PCI even if patients presented within the appropriate thrombolysis window.

The overall in-patient and 30-day mortality rates from our study were 11.1% and 11.1% respectively. National data from NCVDACS Registry shows figures of 7.4% and 9.2% for in-patient and 30-day mortality respectively [6]. However, direct comparison of the statistics of our study's primary and secondary outcomes might not be valid due to the low power of study which is the main limitation of this study. The single mortality of this study was a gentleman of Chinese ethnicity with multiple cardiovascular risk factors of hypertension, dyslipidaemia and active smoker while taking aspirin for the past 7 days. Although he presented within 2 hours from symptoms onset and initial treatment was given within 15 minutes of FMC, he eventually succumbed with the diagnosis of STEMI. He had symptoms of severe angina which is defined as more than 2

angina episodes within 24 hours prior to presentation. Further study on the association between ethnicity or severe angina, and mortality outcome need to be carried out to ascertain the relationship between the factors and outcomes. Due to the low number of recruits of study population, analysis on association between different factors and the inpatient and 30-day mortality outcomes cannot be performed. However, it can be postulated that the mortality outcomes among patients in rural setting may be multifactorial, including long journey time from primary to secondary healthcare settings, delay in the delivery of antiplatelet therapy, nonavailability of primary PCI, and lower thrombolysis rate. Measures should be undertaken to address logistic challenges and rural primary healthcare limitations in order to improve the standard of care for MI patients. Short duration of study is another limitation of this study. If a longer duration study is conducted, a larger sample size can be recruited to increase the power of the study and to explore the mortality outcome at longer interval.

More studies are needed to explore the regional epidemiology as the demography of the local population might be different from the national data for focus effort to be instituted to overcome local healthcare limitations. Larger power study will be useful to investigate factors which are associated with cardiac-related outcome.

## CONCLUSION

The standard of MI care in rural setting still below the par of national standard due to logistic challenges and local healthcare limitations. These imply that more resources eg. laboratory cardiac enzyme markers need to be more readily available and widely accessible for prompt diagnosis of MI while enabling early intervention. Infrastructure in rural areas needs to be improved in order to overcome the logistic challenges faced by the remote community to present to healthcare to seek medical attention in the event of potentially lifethreatening diagnosis. Furthermore, the high mortality

rate of MI among young patients translates into a worrying fact that we are losing these productive individuals who could otherwise significantly contribute to the economy and growth of our country. It is a healthcare issue that should not be overlooked or undermined as it carries a significant impact to the community and the country. Therefore, concerted efforts are needed in raising awareness among the community on importance of early presentation to healthcare centres once developing symptoms

suggestive of MI. In addition, facilities to bridge the gap in logistic challenges can be life-saving for the community, especially those from more remote area. More local secondary hospitals and cardiac catheterisation laboratories are needed to support the large population in rural settings. If patients in rural settings were able to get to the nearest, adequately-equipped hospitals in a timelier manner with prompt and accurate diagnosis of acute MI was made, this potentially enables their outcomes

to be comparable to those in urban and suburban settings in Malaysia. With the improvement of MI care in rural setting, the benefit will translate into greater quality of life among the community, potentially longer lifespan and undeniably a considerable growth of the country's economy from the contribution of the productive group of individuals who enjoy better health while reducing the healthcare burden of dealing with morbidities and mortalities in long run.

#### ACKNOWLEDGEMENTS

We would like to thank the Director General of Health Malaysia for his permission to publish this article. This study was made possible with the help of many individuals who were involved in the data collection process. With this, the authors would like to thank Dr Choo Zi Yi and Dr Tan Chin Ning from Sri Aman Hospital, Dr Almond Chin Vui Jin and Dr Joshua Joel Lim Yung Chern from Lubok Antu Health Clinic for their contribution in this study.

#### CONFLICTS OF INTEREST

All authors of the study have no conflicts of interest to declare.

#### REFERENCES

- Lozano R, Naghavi M, Foreman K, et al. Global and regional mortality from 235 causes of death for 20 age groups in 1990 and 2010: a systematic analysis for the Global Burden of Disease Study. *Lancet*. 2010; 380: 2095-2128.
- World Health Organization, Cardiovascular Diseases. Available at: [https://www.who.int/newsroom/fact-sheets/detail/cardiovascular-diseases-\(cvds\)](https://www.who.int/newsroom/fact-sheets/detail/cardiovascular-diseases-(cvds)). Accessed June 2021.
- Chan MY, Du X, Eccleston D et al. Acute coronary syndrome in the Asia-Pacific region. *Int. J. Cardiol*. 202;861-869, (201).
- Piérard LA. ST elevation after myocardial infarction: what does it mean? *Heart*. 2007 Nov;93(11):1329-30. doi: 10.1136/hrt.2007.119131. PMID: 17933986; PMCID: PMC2016926.
- Townsend N, Bhatnagar P, Wilkins E, et al. Cardiovascular disease statistics. 2015. London: British Heart Foundation.
- Annual Report of the NCVD-ACS Registry 2014-2015. Retrieved from: [http://www.crc.gov.my/wp-content/uploads/documents/report/report\\_NCVD\\_2014\\_2015.pdf](http://www.crc.gov.my/wp-content/uploads/documents/report/report_NCVD_2014_2015.pdf). Accessed June 2021.
- Department of Statistics Malaysia (2020). Available at: [https://www.dosm.gov.my/v1/index.php?r=column/cthemByCat&cat=155&bul\\_id=OVByWjg5YkQ3MWFZRTN5bDJiaEVhZz09&menu\\_id=L0pheU43NWJwRWVSZkIwZzQ4TihUUT09](https://www.dosm.gov.my/v1/index.php?r=column/cthemByCat&cat=155&bul_id=OVByWjg5YkQ3MWFZRTN5bDJiaEVhZz09&menu_id=L0pheU43NWJwRWVSZkIwZzQ4TihUUT09). Accessed June 2021.
- Kim DY, Wala Z, Islam S, et al. Clinical characteristics and outcomes of ST-segment elevation myocardial infarction in a low income setting in rural Bangladesh. *Int J Cardiol Heart Vasc*. 2019 May 17; 23:100376. doi: 10.1016/j.ijcha.2019.100376. PMID: 31193421; PMCID: PMC6527896.
- Kamona A, Cunningham S, Addison B, et al. Comparing ST-segment elevation myocardial infarction care between patients residing in central and remote locations: a retrospective case series. *Rural and Remote Health* 2018; 18: 4618. <https://doi.org/10.22605/RRH4618>
- Perkins DH. Malaysia: the challenge of avoiding the middle income trap. Available at: <https://www.ehm.my/publications/articles/malaysia-the-challenge-of-avoiding-the-middle-income-trap>. Accessed February 2021.
- City Population: Lubok Antu District, Malaysia (2010). Available at: [https://www.citypopulation.de/en/malaysia/admin/sarawak/1308\\_\\_Jubok\\_antu/](https://www.citypopulation.de/en/malaysia/admin/sarawak/1308__Jubok_antu/). Accessed June 2021.
- Somarathne JB, Stewart JT, Ruygrok PN, Webster MW. ST-Elevation Myocardial Infarction Networks and Logistics: Rural and Urban. 2018 Jul 14. In: Watson TJ, Ong PJL, Tcheng JE, editors. *Primary Angioplasty: A Practical Guide [Internet]*. Singapore: Springer; 2018. Chapter 4. PMID: 31314433.
- Weaver WD. Time to thrombolytic therapy: factors affecting delay and their influence on outcome. *J Am Coll Cardiol*. 1995;25(suppl):3S-9S.
- Sheifer SE, Rathore SS, Gersh BJ, Weinfurt KP, Oetgen WJ, Breall JA, Schulman KA. Time to Presentation With Acute Myocardial Infarction in the Elderly: Associations With Race, Sex, and Socioeconomic Characteristics. *Circulation*. 2000; 102: 1651-1656. Available at: <https://doi.org/10.1161/01.CIR.102.14.1651>.



## TRANSTHYRETIN AMYLOIDOSIS PATIENTS' AWARENESS DAY

23 Jul

Sarawak Heart Foundation joined Sarawak Heart Centre and Pfizer Malaysia for a Transthyretin Amyloidosis (ATTR Amyloidosis) Patients' Awareness Day at Sarawak Heart Centre on 23 July 2022.

The event, organised by Sarawak Heart Centre, brought together patients and family members who have benefitted from the genetic testing for inherited cardiovascular disease sponsored by the Foundation.

While Dr Oon, neurologist Dr Abby Hoo and Nuclear Medicine specialist Dr Mohammad Fitri Bin Khalil spoke about the disease, who are at risk and the importance of early screening, the

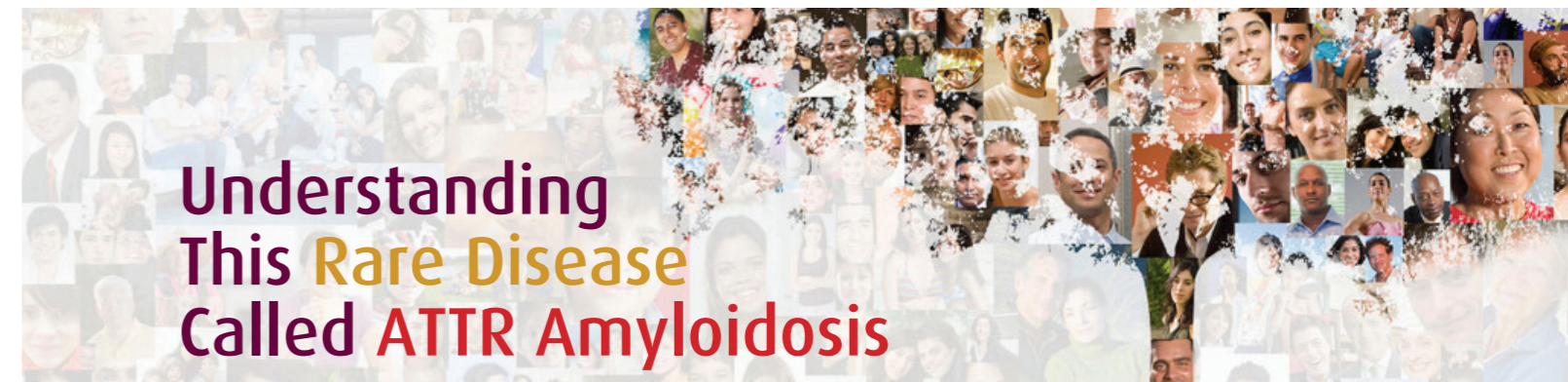
patients shared their stories on living with the disease.

The Foundation contributed RM50,000 to set up the fund for genetic testing for inherited cardiovascular disease, initiated by consultant cardiologist Dr Oon Yen Yee of Sarawak Heart Centre in 2021. To date, 37 patients and family members have benefitted from the genetic testing.

The fund is to assist the lower income group to pay for the genetic testing, which at the same time, helps the treating cardiologists to diagnose rare inherited heart problems such as transthyretin amyloid cardiomyopathy and Fabry disease.



Supported by  
   
 Organised by  

You probably know someone with heart failure, gastrointestinal (GI) problems, or nerve pain. They are all common problems. But in rare cases, these could be caused by a life-threatening disease called *transthyretin amyloidosis* (or ATTR amyloidosis, for short).

Although ATTR amyloidosis is currently considered rare, there is growing evidence that it may be more common than once thought. Some experts believe that the disease is underdiagnosed due to a lack of awareness. ATTR amyloidosis is not easily diagnosed because its symptoms are similar to those of other, more common conditions.

#### What is ATTR amyloidosis?

*Amyloidosis* refers to a disease caused by a buildup of abnormal proteins, called *amyloid*, in the body's organs and peripheral nerves. These protein deposits can cause organs to not function properly and lead to nerve damage. Often, symptoms of amyloidosis are not specific or may seem similar to symptoms caused by other conditions.

ATTR amyloidosis is caused by a protein called transthyretin, or TTR, that changes its shape and forms

into fibrous clumps. These clumps of misshapen protein are deposited into various organs and peripheral nerves, which can cause them to function abnormally.

ATTR amyloidosis can be caused in 2 different ways. It can be hereditary, meaning passed from a person's mother or father. In the hereditary form, mutations in the TTR gene are thought to cause the protein to destabilize and to change its shape. Or, it can be related to destabilization of TTR due to aging.

*continue on the next page*



## Effects on the heart and nerves

While there are various forms of amyloidosis, ATTR amyloidosis most commonly affects the heart and/or the nerves, though other organs may also be affected.

**ATTR cardiomyopathy (ATTR-CM).** ATTR-CM primarily affects the heart, as clumps of amyloid are deposited in the heart tissue. This affects the heart's ability to function properly. Symptoms are often similar to those of other heart conditions such as heart failure and enlarged heart. They also may include:

- Fatigue.
- Leg, ankle, or abdominal swelling.
- Shortness of breath with activity.
- Sudden drop in blood pressure upon standing.
- Trouble breathing when laying down.
- Irregular heart beat (arrhythmia).

This condition may be inherited from a parent but may also occur in people without a family history of the disease. People with the hereditary form typically experience symptoms in their 50s or 60s. Some people, however, may not have symptoms until their 70s, or even later. The non-inherited form is more common in Caucasian men over age 65.

**ATTR amyloidosis polyneuropathy (ATTR-PN).** ATTR-PN is a disease that primarily affects the peripheral nerves and is caused by mutations in the TTR gene passed from an affected mother or father. The buildup of amyloid happens primarily in the nerves that detect touch, pain, and heat. It can cause a loss of sensation, tingling, numbness, or pain in the hands and feet (also known as peripheral neuropathy). People with this disease also often have damage to the autonomic nervous system (nerves that affect how organs work), digestive tract, and other vital organs, sometimes including the heart. People with ATTR-PN may experience symptoms such as:

- Diarrhea, constipation, or both at different times.
- Nausea, vomiting.
- Loss of appetite.
- Sexual dysfunction.
- Muscle weakness.
- Various eye problems.
- Sudden drop in blood pressure upon standing.
- Carpal tunnel syndrome.

Symptoms of ATTR-PN generally occur in adulthood at widely varying ages, as early as in the 20s or as late as in the 70s or later. This condition affects both men and women.

## What's new for people with ATTR amyloidosis, and what can you do if you think you or someone you know may have it?

It is a promising time for people with ATTR amyloidosis. Treatments for certain patients with ATTR amyloidosis have become available, and other treatments are being investigated in clinical trials. Ask your healthcare provider. For more information about available clinical trials for amyloidosis, go to [clinicaltrials.gov](http://clinicaltrials.gov).

It is important to get an accurate diagnosis as soon as possible, because treatments may be more successful if started early. If you suspect someone in your family may have had ATTR amyloidosis, or if you suspect you may suffer from symptoms of this disease, speak with your healthcare provider. A number of tests (such as a noninvasive imaging test or tissue biopsy and genetic testing) may need to be performed in order to determine a correct diagnosis. It's also important to work with a healthcare team who specializes in diagnosing amyloidosis.

An extract from [https://www.pfizer.com/news/articles/understanding\\_this\\_rare\\_disease\\_called\\_attr\\_amyloidosis](https://www.pfizer.com/news/articles/understanding_this_rare_disease_called_attr_amyloidosis)



## SARAWAK HEART FOUNDATION

REGISTRATION NO. 199601011149 (383498-P)  
(Foundation Incorporated in Malaysia)

## DONATION FORM

Full Name
Address
Tel.
Fax
Email

**Cheque No.** ..... RM .....

Cheque payable to: **Sarawak Heart Foundation**

**Bank Draft** ..... RM .....

**Direct Remittance** : Our Bank details

Name : **Sarawak Heart Foundation**

Bank : **RHB Bank**

A/C No. : **21104350033342** (Please fax or email the bank-in slip to us)

### Sarawak Heart Foundation

No.11, 1<sup>st</sup> Floor, Lot 2343 Bormill Estate Commercial Centre, Jalan Tun Ahmad Zaidi Adruce, 93150 Kuching Sarawak

Tel: 082-233784, 012 8868491 Fax: 082-258303

Email address: [sarawakheartfoundation8@gmail.com](mailto:sarawakheartfoundation8@gmail.com)

Website: [sarawakheartfoundation.org.my](http://sarawakheartfoundation.org.my)

Facebook: [SarawakHeartFoundation](https://www.facebook.com/SarawakHeartFoundation)