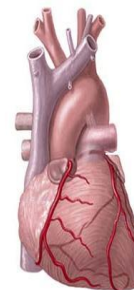


KEY FACTS

- Cardiovascular diseases, including acute myocardial infarction (AMI) or heart attack, are among the top ten killers in Singapore.
- Men are at higher risk of AMI as compared to women.
- Indians have the highest rates of AMI.
- Awareness of AMI symptoms is important as early treatment of AMI can reduce complications and save lives.
- AMI can be prevented by adopting a healthy lifestyle e.g. quit smoking, exercise, early detection of and complied with the treatment for diabetes, hypertension and high blood lipid etc.



OBJECTIVES

This information paper provides an overview of the trends of acute myocardial infarction (AMI) for the period of 2007 to 2008 among Singapore residents, its associated risks factors and preventive measures in reducing the risk of developing the disease.

INTRODUCTION

Cardiovascular diseases (CVD), include coronary heart diseases, cerebrovascular diseases (stroke), hypertension (high blood pressure), heart failure, and are the world's largest killer, claiming an estimated 17.1 million globally in 2004. Of these deaths, 7.2 million deaths were due to AMI.¹ In Singapore, ischaemic heart diseases were the 2nd leading cause of death (20.1%) after cancer and 3rd leading cause of hospitalisation (3.5%) after accidents, poisoning and violence; and cancer in 2008.²

Acute myocardial infarction (AMI), also commonly known as heart attacks occurs when the blood vessel supplying nutrients and oxygen to the heart are blocked. This can lead to damage or death (infarction) of the affected heart tissue if not treated promptly. A build-up of fatty deposits in the inner walls of blood vessels (atherosclerosis) or plaque formation causes the arteries that supply the heart to narrow. When the plaque ruptures, it causes a blood clot (thrombus) to form in the coronary artery and blocks blood from flowing to the heart muscle, leading to a heart attack.

AMI are divided into two types: **STEMI** (ST-segment Elevation Myocardial Infarction) and **NSTEMI** (Non-ST-segment Elevation Myocardial Infarction). The types are determined by an electrocardiogram (ECG). STEMI is characterised by ST segment elevation in the ECG as a large portion of the heart tissue has been damaged following the complete blockage of the coronary artery supplying the affected tissue. In NSTEMI, the artery is partially blocked; a smaller portion of heart tissue is damaged or dead.

TRENDS OF AMI IN SINGAPORE, 2007 – 2008³ (Epidemiological data from the Singapore Myocardial Infarction Registry for Singapore residents aged 18 years and above)

New episodes

- New AMI episodes increased marginally from **6806** in 2007 to **7143** in 2008.
- Age-standardised incidence rate⁴ remained stable at **212.0** and **212.2** per 100,000 population in 2007 and 2008.
- Incidence rates amongst males were approximately twice higher that of females.
- Indians had the highest incidence rates of AMI in both genders followed by Malays and Chinese.

¹ Fact Sheet, World Health Organization

² Health Facts Singapore, MOH

³ The data presented in this paper refer to the statistics as they stood on 20th November 2009.

⁴ Department of Statistics, Singapore. Singapore Census of Population 2000.

Deaths from AMI

- The number of AMI patients who died in 2007 and 2008 were **1349** and **1523** respectively.
- The corresponding age-standardised death rates were **41.4** and **44.6** per 100,000 population.
- Death and age-standardised death rates were higher in males as compared to females.
- Indians had the highest age-standardised death rates.

Severity of AMI (Case Fatality – Proportion of death within 28 days)⁵

- This is the proportion of people who are likely die due to AMI within 28 days of suffering from an AMI, also commonly known as the severity of the disease.
- This proportion was consistent in the 2 year period at **15.9%** and **16.3%** in 2007 and 2008.

Annexes A & B contains the statistics on Acute Myocardial Infarction for 2007 & 2008.

SYMPTOMS OF ACUTE MYOCARDIAL INFARCTION

58.7% of patients presented with chest pain⁶ as a common symptom of heart attack in the 2-year period. (Figure 1).

Common AMI symptoms include:

- Chest Pain
- Breathlessness
- Profuse sweating (Diaphoresis)
- Light-headed or faint (Syncope)
- Pain of the shoulder, back, jaw and/or epigastric.

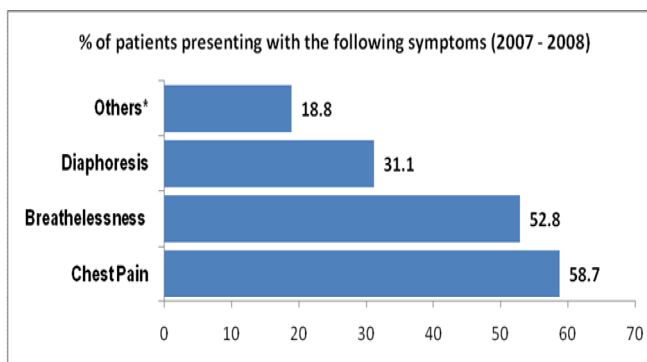


Figure 1: % of patients presenting with AMI symptoms from 2007 to 2008

*Others: Symptoms such as feeling faint and light-headed; and pain i.e. back, epigastric, jaw and shoulder pain.

It is essential for the public to be aware on the symptoms of AMI and seek medical treatment early. Damage to the heart caused by heart attacks can lead to serious consequences such as heart failure, fatally abnormal heart beats, weakening of heart muscles, potential risk of heart rupture and damage to the heart valves.

In the 2-year period, 39% of patients (during first episodes of heart attack) presented to the hospital within 2 hours of onset of heart attack symptoms.

⁵ Ref: Tunstall-Pedoe H. MONICA "Monograph and Multimedia Sourcebook. World's largest study of heart disease, stroke, risk factors, and population trends 1979 – 2002." World Health Organization.

⁶ Described as severe pain, crushing, squeezing or pressure in the chest and/or typically radiating to the left arm or left side of the neck.

PRESENCE OF RISK FACTORS AMONG ACUTE MYOCARDIAL INFARCTION PATIENTS

Hypertension was found to be the commonest risk factor in 70.9% of AMI episodes registered. (Figure 2)

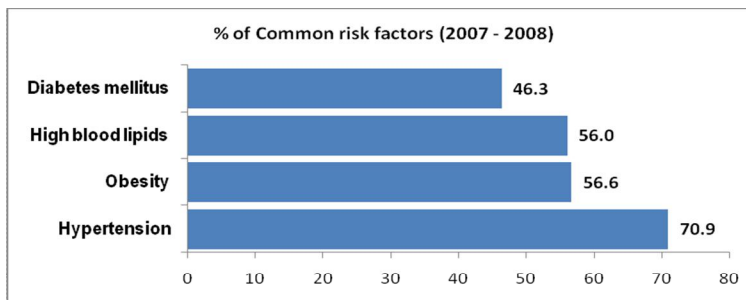


Figure 2: % of common risk factors (2007 . 2008)

Other risk factors for Acute Myocardial Infarctions include:-

- Stress
- High blood lipids
- Diabetes
- Obesity, Physical inactivity
- Smoking, excessive alcohol consumption

PREVENTION OF ACUTE MYOCARDIAL INFARCTION

AMI can be prevented by adopting healthy practices and habits such as eating a healthy diet, maintaining a healthy weight, engaging in regular physical activity, managing stress and quitting smoking.

Regular medical check-ups are necessary so that early interventions can be implemented for risk factors such as high blood pressure, high blood lipids and diabetes mellitus, if they exist in individuals.

INFORMATION

The Health Promotion Board (HPB) has instituted programmes to promote a healthier lifestyle among Singaporeans. Details on these programmes and information on heart attack can be obtained in the Health Promotion Board's website: <http://www.hpb.gov.sg/diseases/article.aspx?id=530>

The Singapore Heart Foundation also plays an important role in saving lives and promoting heart health in Singapore through its various programmes. Details on these programmes can be obtained in the Singapore Heart Foundation's website: <http://www.myheart.org.sg/>

The following are other relevant websites for information on heart attacks:

World Health Organization: http://www.who.int/cardiovascular_diseases/en/

American Heart Association: <http://www.americanheart.org/presenter.ihtml?identifier=4726>

Annex A: AMI among Singapore Residents aged 18 years and above admitted to restructured hospitals, 2007.

2007	Chinese			Malay			Indians			Total		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
Number of new cases	2916	1699	4615	766	402	1168	624	255	879	4411	2395	6806
Age standardised incidence rates (per 100,000 population)	232.7	129.2	180.5	412.6	200.1	304.1	558.2	200.7	385.1	282.4	144.1	212.0
Number of deaths	518	425	943	134	85	219	115	49	164	780	569	1349
Age standardised mortality rates (per 100,000 population)	40.5	32.2	36.3	73.5	41.1	56.7	104.4	37.1	71.0	49.2	34.0	41.4
Case fatality rates (%)	14.8	19.3	16.5	14.2	14.7	14.4	15.1	15.3	15.1	14.6	18.2	15.9
STEMI												
Number of new STEMI cases	1038	350	1388	264	88	352	234	60	294	1572	504	2076
Age standardised STEMI incidence rates (per 100,000 population)	84.8	26.6	55.3	140.8	43.0	91.2	188.4	50.7	125.8	101.6	30.5	65.5
Number of deaths due to STEMI	129	96	225	26	25	51	24	12	36	182	133	315
Age standardised STEMI mortality rates (per 100,000 population)	10.0	7.2	8.6	14.6	11.8	13.2	19.7	9.7	15.4	11.5	7.9	9.7
STEMI Case fatality rates (%)	10.8	26.0	14.6	8.7	25.0	12.8	9.0	15.0	10.2	10.1	24.2	13.5
NSTEMI												
Number of new NSTEMI cases	1707	1273	2980	455	309	764	349	180	529	2574	1793	4367
Age standardised NSTEMI incidence rates (per 100,000 population)	134.3	96.8	115.5	246.3	154.7	199.3	332.0	138.1	234.3	163.8	107.8	135.2
Number of deaths due to NSTEMI	223	253	476	58	53	111	46	20	66	331	334	665
Age standardised NSTEMI mortality rates (per 100,000 population)	17.3	19.2	18.2	32.1	26.1	28.8	42.0	14.3	27.8	20.6	20.0	20.2
NSTEMI Case fatality rates (%)	9.3	13.2	11.0	9.0	10.7	9.7	9.5	8.3	9.1	9.1	12.5	10.5

Annex B: AMI among Singapore Residents aged 18 years and above admitted to restructured hospitals, 2008.

INFORMATION PAPER ON ACUTE MYOCARDIAL INFARCTION IN SINGAPORE, 2007-2008



2008	Chinese			Malay			Indians			Total		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
Number of new cases	3014	1723	4737	886	463	1349	641	302	943	4616	2527	7143
Age standardised incidence rates (per 100,000 population)	228.3	124.5	176.1	459.7	227.1	339.9	575.2	217.5	400.1	282.6	144.2	212.2
Number of deaths	610	468	1078	158	103	261	101	69	170	881	642	1523
Age standardised mortality rates (per 100,000 population)	45.8	33.6	39.7	85.2	50.2	66.6	94.7	48.1	73.6	53.3	36.2	44.6
Case fatality rates (%)	15.9	20.3	17.5	13.7	17.7	15.0	12.5	13.6	12.8	14.9	18.8	16.3
Number of new STEMI cases	1008	329	1337	328	79	407	233	56	289	1592	467	2059
Age standardised STEMI incidence rates (per 100,000 population)	78.3	23.9	50.8	164.1	42.0	101.8	196.0	40.7	120.3	98.8	27.0	62.4
Number of deaths due to STEMI	138	86	224	33	21	54	24	14	38	197	121	318
Age standardised STEMI mortality rates (per 100,000 population)	10.2	6.2	8.2	17.7	10.6	14.0	20.3	9.1	15.0	11.8	6.8	9.3
STEMI Case fatality rates (%)	12.5	24.6	15.5	8.8	21.5	11.3	8.2	12.5	9.0	11.1	22.5	13.6
Number of new NSTEMI cases	1856	1310	3166	520	361	881	381	236	617	2807	1942	4749
Age standardised NSTEMI incidence rates (per 100,000 population)	138.4	94.4	116.4	276.0	175.0	223.3	355.2	170.1	264.3	170.4	110.5	139.8
Number of deaths due to NSTEMI	314	294	608	84	59	143	50	44	94	454	399	853
Age standardised NSTEMI mortality rates (per 100,000 population)	23.4	21.0	22.2	46.7	29.3	37.3	51.1	31.4	42.8	27.3	22.5	24.8
NSTEMI Case fatality rates (%)	11.3	14.4	12.5	10.6	11.9	11.1	9.4	10.2	9.7	10.7	13.2	11.7