EOH3401 Principles of Health

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CHAPTER 1

Public health threats: Present and future challenges

Introduction

What is defined by public health?

- Public health has been defined as the art and science of preventing disease, prolonging life and promoting health through the organized efforts of society (WHO, 2011).
- It is concerned with threats to health based on population health analysis. The population can be as small as a handful of people or as large as all the inhabitants of several continents.
- The dimensions of health not merely the absence of disease or infirmity but it also encompass a state of complete physical, mental and social well-being.
- Public health incorporates the interdisciplinary approaches of epidemiology, biostatistics and health services, environmental health, community health behavioural health, health economics, occupational health etc.
- The focus of public health intervention is to improve health and quality of life through the prevention and treatment of disease and other physical and mental health conditions, through surveillance of cases and the promotion of healthy behaviour.
- Example of public health measures: promotion of hand washing, breastfeeding, delivery of vaccinations and distribution of condoms to control the spread of sexually transmitted disease.

Public Health threats

a) Globalization

- Globalization is the process of international integration arising from the interchange of world views, products, ideas, and other aspects of culture.
- In particular, advances in transportation and telecommunications infrastructure, including the rise of the internet, are major factors in globalization.
- Swedish journalist Thomas Larsson indicates that globalization is the process of world shrinkage, of distances getting shorter, things moving closer. It pertains to the increasing ease with which somebody on one side of the world can interact, to mutual benefit, with somebody on the other side of the world.
- The impact of globalization on populations’ health is inevitable: since globalization will change trade process and also social and cultural shift.
- The impact of globalization on public health;
  - Changes in trade laws affecting worker’s health
  - Effect on agriculture & food security - There has been a trend over decade in many countries towards greater concentration and intensity of foodstuffs production. Modern production methods have involved practices such as widespread usage of pesticide, antibiotic, hormone, genetic modification in farming. This is one potential public health risk.
  - Shifting behaviour pattern (diet & smoking). The rising incidence of heart disease, cancer and diabetes are closely related to poor nutrition and sedentary lifestyle.
  - Shifting disease patterns as a consequence of the increased mobility of humans, plants and animal across national borders (Lee, 2000)
  - Greater worldwide mobility of people through business, tourism, rural-urban migration and displacement, the risk of importing and exporting communicable diseases increase.
b) Urbanization

• Urbanization is the physical growth of urban areas as a result of rural migration and even suburban concentration into cities, particularly the very largest ones.

• Urbanization is closely related to modernisation, industrialisation and the sociological process of rationalisation. Urbanisation can describe a specific condition at a set time, i.e. the proportion of total population or area in cities or towns, or the term can describe the increase of this proportion over time. The term urbanisation can represent the level of urban relative to overall population, or it can represent the rate at which the urban proportion is increasing.

• Cities offer the lure of better employment, education, health care, and culture; and they contribute disproportionately to national economies. However, rapid and often unplanned urban growth is often associated with poverty, environmental degradation and population demands that outstrip service capacity. These conditions place human health at risk (Moore et al., 2003).

• The percentage of the global population residing in urban areas has increased from 32% in 1955 to 38% in 1975 and 45% in 1995 (WHO, 1998). Developing countries experienced the greatest growth in number of cities with greater than 1 million population: between 1970 and 1996, from 83 to 221, compared with 82 to 115 in more developed countries. Megacities (greater than 10 million population) have also been on the rise in the past half century.

• Rapid, and often unplanned, urban growth is the source for many of the environmental hazards faced by cities. For instance, substandard housing on marginal land, crowding, increasing levels of air pollution, water pollution and overusage, inadequate sanitation services, inadequate solid waste collection, and motor vehicle traffic and traffic injuries are all associated with rapid growth of urban centres.

• Crowding - increases the contact with the air and surfaces that other people breathe and touch. Diseases transmitted through respiratory and fecal-oral routes are more frequent in situations involving crowding, for example tuberculosis (TB). Stress also common of living with limited privacy.

• Air pollution is a major cause of morbidity and mortality in the developing world, and its effects are mainly felt where air pollution is worst cities.

• Excess demand and over usage of water from municipal water sources. Water treatment plants for municipal water supplies are sometimes inadequate to meet the demand.

• Solid waste collection is a major problem in cities in the developing world. Inadequate waste collection services present a variety of hazards, Industrial facilities that are no longer functioning, but are too costly to clean up, are increasingly common within the developing world.

• Motor vehicle traffic, and the associated noise and air pollution, is a major hazard in the urban areas of both the developed and developing world.

Industrialization

• Industrialization refers to a process which has occurred in the history of all economically ‘developed’ nation states and which remains an aspiration for most of the governments of those many populations which remain today relatively undeveloped.

• Through industrialization the economy of a country is dramatically transformed so that the means whereby it produces material commodities is increasingly mechanized since human or animal
labour is increasingly replaced by other, predominantly mineral sources of energy in direct application to the production of useful commodities (Szreter, 2012).

- It is a part of a modernization process, where social change and economic development are closely related with technological innovation. Industrialisation also introduces a form of philosophical change where people obtain a different attitude towards their perception of nature, as well as sociological changes.

- The first country to industrialise was the UK during the Industrial Revolution in 18th century. By the end of the 20th century, East Asia had become one of the most recently industrialised regions of the world.

- Apart from Japan, where industrialisation began in the late 19th century, a different pattern of industrialisation followed in East Asia. One of the fastest rates of industrialisation occurred in the late 20th century across four countries known as the Asian tiger (Hong Kong, Singapore, South Korea and Taiwan). They have stable governments and well structured societies, strategic locations, heavy foreign investments, a low cost skilled workforce, a competitive exchange rate and low custom duties.

- In the case of South Korea, the largest of the four Asian tigers, a very fast paced industrialisation took place as it quickly moved away from the manufacturing of value added goods in the 1950s and 60s into the more advanced steel, shipbuilding and automobile industry in the 1970s and 80s, focusing on the high-tech and service industry in the 1990s and 2000s. As a result, South Korea became a major economic power.

- China and India are following this development pattern. They made adaptations in line with their own histories and cultures, their major size and importance in the world, and the geo-political ambitions of their governments (etc.).

- India’s government is investing in economic sectors such as bioengineering, nuclear tech, informatics, pharmaceutics, and technologically-oriented to conquer foreign markets.

- Both China and India have also started to make significant investments in other developing countries, making them significant players in today's world economy.

- A few countries in Latin America, Asia, and Africa, such as Indonesia, Turkey, South Africa, Malaysia, Philippines, Mexico, Costa Rica and El Salvador have experienced substantial industrial growth, fuelled by exporting to countries that have bigger economies such as the United States, China, India and the EU. They are called as newly industrialized countries.

Figure 1: Newly industrialized countries. The dark green (China and India) may not fit the human development index, but they hold the status of great power and are emerging economic powerhouses.
• The pollution of water, air, atmosphere and noise are the by-products of economic development, particularly industrialisation and urbanisation. For example, green house effects, global warming and acid precipitation.

• Environmental degradation often tends to become irreversible and imposes damaging costs on the economy resulting in output and human losses, loss of labour productivity from ill-health and loss of crop output.

• The ecological and social costs of such unrestrained pollution and degradation have put a big question mark on the perceived notion of industrialisation as a way of economic development.

• Industrialisation is on the increase. The industrial pollution due to its nature has the potential to cause irreversible reactions in the environment and hence is posing a major threat to human.

• Since the carrying capacity of the environment is not unlimited and some areas or ecosystems are more susceptible to adverse environmental impacts than others, unplanned and haphazard industrialisation has substantially increased the risk to the environment.

• Global health situation has improved:
  - Eradication of small pox
  - Reduction in childhood mortality
  - Longer life expectancies

• However, with some major reversals it cause a community health threats such as;
  - Increase adult mortality cause by HIV/AIDS
  - Emerging & re-emerging diseases
  - Non-communicable diseases
  - Injuries and cancers
  - Malaria

### Disease burden

• Disease priorities – non communicable and communicable disease

<table>
<thead>
<tr>
<th>Non communicable</th>
<th>Communicable disease</th>
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<tr>
<td>1.Ischemic heart disease</td>
<td>1.Tuberculosis</td>
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<td>2.Mental illness</td>
<td>2.Dengue &amp; DHF</td>
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<td>4.Road traffic injuries</td>
<td>4.HIV/AIDS</td>
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<td>5.Cancer</td>
<td>5.Viral hepatitis</td>
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<td>7.Diabetes</td>
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• Risk factor priorities

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<th>Modify risk factor</th>
<th>Adapt healthy lifestyle</th>
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<tr>
<td>Ischemic heart disease</td>
<td>Tobacco</td>
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<td>Diabetes</td>
<td>Blood pressure</td>
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<tr>
<td>Cancer</td>
<td>Overweight</td>
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<tr>
<td>Stroke</td>
<td>Cholesterol</td>
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<tr>
<td>Road traffic injuries</td>
<td>Physical inactivity</td>
</tr>
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<td></td>
<td>Stress</td>
</tr>
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<td></td>
<td>Alcohol</td>
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a) Communicable diseases

- **Dengue fever** is a critical epidemic. An estimated 50 to 100 million people contract dengue each year in over 100 countries. Patients may experience haemorrhage and shock which leading to death.

- **Tuberculosis (TB)** is an ancient disease. TB remains one of the major causes of disability and death worldwide. In 2010, according to the World Health Organization an estimated 8.8 million people fell ill with TB, including 1.1 million cases among people with HIV. Of the 1.4 million deaths, 95 percent occurred in developing countries.

- **Severe acute respiratory syndrome (SARS)** is an infectious disease first identified in humans in early 2003. SARS is caused by a newly described coronavirus, called SARS-associated coronavirus (SARS-CoV). Previously identified human coronaviruses (named for their spiky, crown-like appearance) were known to cause only mild respiratory infections.

- SARS typically begins with flu-like symptoms, including high fever that may be accompanied by headache and muscle aches, cough, and shortness of breath. Up to 20 percent of infected people may develop diarrhea. Most people with SARS subsequently develop pneumonia.

- In the 2003 outbreak, there were more than 8,000 probable cases of SARS and 774 deaths (approximately 9 percent mortality), according to the World Health Organization. Eight confirmed cases were identified in the United States, with no deaths. Of the 774 deaths attributed to SARS, more than 50 percent occurred in people 65 years of age or older. Susceptibility decreased significantly with age, with children the least likely to acquire the disease.

- The virus spreads primarily by close human contact. SARS-CoV-containing droplets can be released into the air when an infected person coughs or sneezes. Some specific medical procedures performed on SARS patients also can release virus-containing droplets into the air. Touching a SARS-CoV-infected surface and subsequently touching the eyes, nose, or mouth also may lead to infection.

- **Nipah virus (NiV)** is an emerging zoonotic virus (a virus transmitted to humans from animals). In infected people, Nipah virus causes severe illness characterized by inflammation of the brain (encephalitis) or respiratory diseases. It can also cause severe disease in animals such as pigs, resulting in significant economic losses for farmers.

- Nipah virus is closely related to Hendra virus. Both are members of the genus Henipavirus, a new class of virus in the Paramyxoviridae family.

- Although Nipah virus has caused only a few outbreaks, it infects a wide range of animals and causes severe disease and death in people, making it a public health concern.

- The outbreak of Nipah virus was first recognized in 1999 among pig farmers in Malaysia. Since then, there have been another 12 outbreaks, all in South Asia.

- During the initial outbreaks in Malaysia and Singapore, most human infections resulted from direct contact with sick pigs or their contaminated tissues. Transmission is thought to have occurred via respiratory droplets, contact with throat or nasal secretions from the pigs, or contact with the tissue of a sick animal.

- **Avian flu or bird flu** caused by viruses adapted to birds. Of the greatest concern is highly pathogenic avian influenza (HPAI). Bird flu is a phrase similar to swine flu, dog flu, horse flu or human flu in that it refers to an illness caused by any of many different strains of influenza viruses that have adapted to a specific host. All known viruses that cause influenza in birds belong to the species influenza A virus adapted to birds, which is why for many purposes avian flu virus is the influenza A virus.

- The most highly pathogenic strain is H5N1 had been spreading throughout Asia since 2003, avian influenza reached Europe in 2005, and the Middle East, as well as Africa, the following year.
January 22, 2012, China reported its second human death due to bird flu in a month following other fatalities in Vietnam and Cambodia.

- **Swine flu - Influenza A (H1N1) virus** is the subtype of Influenza A virus that was the most common cause of human influenza in 2009. Some strains of H1N1 are endemic in humans and cause a small fraction of all influenza like illness.

- H1N1 strains caused a small percentage of all human flu infections in 2004–2005. Other strains of H1N1 are endemic in pigs (swine influenza) and in birds (avian influenza).

- In June 2009, the WHO declared the new strain of swine origin H1N1 as a pandemic. This strain is often called swine flu by the public media. This novel virus spread worldwide and had caused about 17,000 deaths by the start of 2010.

- As of 26 April 2011, an H1N1 pandemic preparedness alert has been issued by the World Health Organisation (WHO) for the Americas. The affected areas have included the Chihuahua region of Mexico where its severity and work load have been high. It is reported by the aforementioned Recombinomics source that the current vaccine (California/7/2009) for H1N1 influenza lost its effectiveness in 2011. This point is all the more significant since it is the current virus target for the northern hemisphere’s flu vaccine, and is the intended choice for the southern hemisphere.

![Prevalence of Oseltamivir-resistant H1N1 viruses, as of 01 July 2008](image)

Figure 2: The prevalence of H1N1 resistant by country as of 1 July 2008.

- The emerging infectious diseases by year:

  - Anthrax 2001
  - Meningitis / Nipah disease 2002
  - Conjunctivitis C24 deviant 2002
  - SARS 2003
  - Avian influenza 2003
  - SWINE FLU (Influenza H1N1) 2009/2010

- Chronic diseases are diseases of long duration and generally slow progression. Chronic diseases, such as heart disease, stroke, cancer, chronic respiratory diseases and diabetes, are by far the leading cause of mortality in the world, representing 63% of all deaths. Out of the 36 million people who died from chronic disease in 2008, nine million were under 60 and ninety per cent of these premature deaths occurred in low- and middle-income countries.
Table 1: Number of new HIV infections, AIDS cases and AIDS deaths by gender per year reported in Malaysia

<table>
<thead>
<tr>
<th>YEAR</th>
<th>HIV INFECTION</th>
<th>AIDS CASES</th>
<th>AIDS DEATH</th>
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<tr>
<td></td>
<td>Male Female</td>
<td>Male Female</td>
<td>Male Female</td>
</tr>
<tr>
<td>1988</td>
<td>3 0</td>
<td>1 0</td>
<td>1 0</td>
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<tr>
<td>1989</td>
<td>2 0</td>
<td>0 0</td>
<td>0 0</td>
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<tr>
<td>1990</td>
<td>7 2</td>
<td>2 0</td>
<td>2 0</td>
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<tr>
<td>1991</td>
<td>1741 53</td>
<td>1794 58</td>
<td>10 9</td>
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<tr>
<td>1992</td>
<td>2443 69</td>
<td>2521 70</td>
<td>4 2</td>
</tr>
<tr>
<td>1993</td>
<td>2441 64</td>
<td>2507 64</td>
<td>15 2</td>
</tr>
<tr>
<td>1994</td>
<td>3289 104</td>
<td>3393 98</td>
<td>7 105</td>
</tr>
<tr>
<td>1995</td>
<td>4037 161</td>
<td>4198 218</td>
<td>15 233</td>
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<tr>
<td>1996</td>
<td>4406 191</td>
<td>4597 247</td>
<td>259 12</td>
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<td>1997</td>
<td>3727 157</td>
<td>3924 528</td>
<td>449 24</td>
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<tr>
<td>1998</td>
<td>4327 257</td>
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<td>4312 380</td>
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<tr>
<td>2000</td>
<td>4626 401</td>
<td>5107 1071</td>
<td>825 57</td>
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<tr>
<td>2001</td>
<td>4572 406</td>
<td>5938 1188</td>
<td>900 75</td>
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<td>6349 629</td>
<td>6978 1068</td>
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<td>6756 939</td>
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<td>2004</td>
<td>5731 696</td>
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<td>2005</td>
<td>5383 737</td>
<td>8120 1044</td>
<td>882 102</td>
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<tr>
<td>2006</td>
<td>4955 875</td>
<td>5830 1620</td>
<td>896 80</td>
</tr>
<tr>
<td>2007</td>
<td>3804 745</td>
<td>4549 937</td>
<td>1048 131</td>
</tr>
<tr>
<td>TOTAL</td>
<td>74,104</td>
<td>8,634</td>
<td>13,635</td>
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Figure 3: Malaria cases in Malaysia from 1995 to 2010

b) Non-communicable disease (NCD)

- An estimated 2.6 million adult Malaysians living with diabetes, 5.8 million with hypertension, 6.2 million with hypercholesterolaemia and 2.5 million with obesity (The Malaysian Insider, 2012).
- According to the Second National Health and Morbidity survey it is estimated that 3.4 million Malaysians are diabetes sufferers in 2010.
- Results of the two latest National Health and Morbidity Surveys showed a dramatic increase in the prevalence of diabetes from 8.3% in 1996 to 14.9% in 2006 for Malaysian adults aged 30
years and above - an increase of 80% over a period of just 10 years. More worryingly, about a third (or 36%) of the diabetic population are undiagnosed.

- The same surveys showed that the prevalence of obesity had increased from 4.4% in 1996 to 14.0% in 2006 for adult Malaysians aged 18 years and above -- an increase of over 200% in just 10 years (Figure 4).

- Malaysia has the most number of overweight and obese people in Asia, obesity is a main cause of diabetes 54% of the adult population is either obese or overweight, compared to only 24.1% 10 years ago. As a result 7 out of 10 Malaysian adults suffer from chronic diseases.

- High sugar intake (which also causes obesity) among Malaysians is one of the contributing factors to the high incidence of diabetes. We consume 26 teaspoons of sugar a day and are the eighth highest sugar users in the world.

![Prevalence of Diabetes, ≥18 years, by age groups](image)

Figure 4: The prevalence of Diabetes by age groups

- Diabetes and end stage renal failure is a big health problem in Malaysia. It is estimated that there are 13,000 kidney patients undergoing dialysis and every year 2,500 people join the ranks of end-stage renal failure patients.

- Another major health concern is that 4 out of 5 people with diabetes will die of heart disease (the number 1 killer in the country). Six new cases of stroke occur every hour in Malaysia.

- According to the latest WHO data published in April 2011 Coronary Heart Disease Deaths in Malaysia reached 22,701 or 22.18% of total deaths. The age adjusted Death Rate is 138.75 per 100,000 of population ranks Malaysia number 57 in the world.

- According to the latest WHO data published in April 2011 Hypertension Deaths in Malaysia reached 1,251 or 1.22% of total deaths. The age adjusted Death Rate is 7.60 per 100,000 of population ranks Malaysia number 62 in the world.

- According to the latest WHO data published in April 2011 Lung Cancers Deaths in Malaysia reached 3,309 or 3.23% of total deaths. The age adjusted Death Rate is 17.93 per 100,000 of population ranks Malaysia number 4 in the world.

c) Diseases Related To Smoking

- In the United States, nearly one in five deaths, or an estimated 440,000 deaths per year, are related to tobacco use. Approximately half of all Americans who continue to smoke will die due to smoking-related complications.
• Second-hand smoke / passive smoker alone causes 150,000 to 300,000 lower respiratory tract infections, such as bronchitis and pneumonia, in young children each year. Of these, between 7,500 and 15,000 result in hospitalization. A pregnant woman can harm or kill her unborn child by smoking.

• Of the more than 4,000 chemicals that are emitted by a lit cigarette, 43 are known to cause cancer. Tar that can cause cancer in the tissues it reaches, highly addictive nicotine which affects the nervous system and carbon monoxide that reduces the ability of blood to carry oxygen throughout the body are the most dangerous chemicals. When the chemicals come into direct contact with tissues or organs, such as the mouth, throat, or lung, the rate for cancer is from twice to 14 times as high as that for non-smokers. Although most people are well aware of the risk of cancer from smoking, few people realize the damage smoking causes throughout the body’s vascular system.

• Smoking damages the blood vessels and smokers are at risk for all vascular diseases including peripheral arterial disease, stroke, heart attack, abdominal aortic aneurysm and subsequent death.

• Death caused by smoking in Malaysia, nearly 40,000 people died of smoking-related diseases in the last 5 years, now around 10,000 a year.

d) Cancer in Malaysia

• A total of 21,773 cancer cases were diagnosed among Malaysians in Peninsular Malaysia in the year 2006 and registered in the National Cancer Registry. It comprises of 9,974 males and 11,799 females.

• The Age standardised Incidence Rate (ASR) for all cancers in the year 2006 regardless of sex was 131.3 per 100,000.

• Five most common cancer among population of Peninsular Malaysia in 2006 were breast, colorectal, lung, cervix and nasopharynx (Figure 5).

![Figure 5: Cancer cases by percentage in Malaysia in 2006 (Source: MOH, 2006)](image-url)
e) Occupational diseases

• Exposure to asbestos, arsenic, solvents, chromium, iron oxide, petroleum products, radiation, non-ergonomic working conditions

![Graph showing occupational disease trends from 1995 to 2005 reported by SOCSO.]

Figure 6: Occupational disease in Malaysia from 1995 to 2005 reported by SOCSO

![Pie chart showing occupational disease by type reported by DOSH.]

Figure 7: Occupational disease by type reported by DOSH

f) Motor vehicle accidents

• According to the latest WHO data published in April 2011, Road Traffic Accidents Deaths in Malaysia reached 8,031 or 7.85% of total deaths. The age-adjusted Death Rate is 34.53 per 100,000 of population ranks Malaysia number 20 in the world.

g) Haze

• Haze is traditionally an atmospheric phenomenon where dust, smoke, and other dry particles obscure the clarity of the sky. Sources for haze particles include farming (ploughing in dry weather), traffic, industry, and wildfires.
• Since 1991, haze has been a particularly acute problem in Southeast Asia, Indonesian forest fires burnt to clear land being the reason. In response, the 1997 Southeast Asian haze, the ASEAN countries agreed on a Regional Haze Action Plan (1997) and later signed the Agreement on Transboundary Haze Pollution (2002). However the pollution is still a problem today.

• In 1997, Malaysia was badly hit by the haze. The number of tourists fell 13% from 7.1 in 1996 to 6.2 million in 1997.

• In 2005, Malaysia experienced a severe haze situation again. Port Klang and Selangor were declared a haze emergency state on 11 August. The Air Pollution Index (API)in Port Klang was 424 on 10 August 2005. This was just 76 short of the “Dangerous” mark on the API. Visibility dropped so low (less than 1300 feet) that flights at Subang airport near Kuala Lumpur were suspended.

• Some government hospitals and clinics were seeing a 150 per cent rise in respiratory complaints. A state of emergency would be declared if the API reading went over the 500 mark. The only time such an event occurred was in the 1997 haze, in Sarawak.

• The situation in 2006 was also similar. Haze shrouded most parts of Malaysia such as Eastern Sarawak and West and South Malaysia. The visibility was so bad that it posed a threat to ships without navigation devices. An API reading of 171 was taken from Putrajaya, considered to be unhealthy (101 -200).

Haze and health effects

• Recent studies in Malaysia have examined the possible health effects of the 1997 forest fires. Asthma cases increased from only 912 in June to more than5000 in September. Apart from that, the total number of acute respiratory infection cases increased from about8000 cases to more than30,000 during the same period(Rafia et al., 2003). Effects were found to be greatest in children, the elderly and people with pre-existing respiratory problem.

• A study conducted by Nasir et al.,(2000), suggested that in the 1997 haze episode the total health effects were estimated to include 285,227 asthma attacks and 118,804 cases of bronchitis in children. Local study found that 13.8% of primary school children in Kuala Lumpur are asthmatic (Omar, 1990).

• The air pollutants in term of PM10 which may contain pollen were higher in the urban and industrial areas. Study by Zailina (2012) provides confirmatory evidence that the asthmatic children who live in urban and industrial areas have greater risk of developing severe asthma.
Waste management

• Growing of waste amounts are clearly an issue of concern. Municipal solid waste (MSW) generation increases rapidly with economic activities and population growth (UNEP, 2004) (see Figure 8).

Figure 8: Municipal waste generation in OECD countries compared with trends in GDP and population (Source: UNEP, 2004).

• The rates of waste generation between world regions are notably different. For example, amongst European countries, Denmark appears to have the highest per capita waste generation (Figure 9). The developed Asian countries (i.e. Japan and Korea), on the other hand, have a similar rate to European countries. In contrast, developing Asian countries (i.e. Malaysia and Indonesia) produce less waste compared with developed Asia and Europe. Notably, although Hong Kong is categorised as being a developed Asian country, it has the highest per capita waste generation rate in the world. This is likely related to the economic growth and population density in this region (McDougall et al., 2001). Furthermore, waste generation globally is expected to double during the next 50 years, as waste production in 2000 was 12.5 billion tonnes, and is expected to increase to over 25 billion tonnes in 2050 (Yoshizawa, 2007).

Figure 9: The generation of MSW in European and Asian countries (Source: Terazono et al., 2005; SOER, 2010a)
In many parts of the world, organic materials (i.e. food and garden waste) and paper are recognised as being the main contributors to MSW, whilst plastic, glass and metals occur at much lower levels (McDougall et al., 2001). However, the composition of these fractions varies geographically (Table 2).

### Table 2: Geographical variations in MSW composition

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<th>United Kingdom</th>
<th>Spain</th>
<th>Asia (Middle income countries)</th>
<th>Asia (Middle income countries year 2025)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organic waste</td>
<td>19 %</td>
<td>44 %</td>
<td>58 %</td>
<td>50 %</td>
</tr>
<tr>
<td>Paper / board</td>
<td>37 %</td>
<td>21 %</td>
<td>15 %</td>
<td>20 %</td>
</tr>
<tr>
<td>Plastic</td>
<td>10 %</td>
<td>11 %</td>
<td>11 %</td>
<td>9%</td>
</tr>
<tr>
<td>Glass</td>
<td>9 %</td>
<td>7 %</td>
<td>2 %</td>
<td>3%</td>
</tr>
<tr>
<td>Metals</td>
<td>7%</td>
<td>4%</td>
<td>3%</td>
<td>5%</td>
</tr>
<tr>
<td>Other</td>
<td>18 %</td>
<td>13%</td>
<td>11%</td>
<td>13%</td>
</tr>
</tbody>
</table>

(Source: * McDougall et al., 2001; * World Bank, 1999)

Municipal solid waste (MSW) generation in Malaysia has steadily increased each year: 6.1 million tonnes of waste was produced in 1998, which increased to 6.4 million tonnes in 2000, with an expected rise to 7.7 million tonnes in 2007 (Table 3). The rate of waste generation per capita has increased from 0.67 kg in 1998 to 0.8 kg in 2000 (Tarmudi et al., 2009) and is expected to increase further to 1.4 kg in 2025 (Lau, 2004). Selangor—including the Federal Territory of Putrajaya—and the Federal Territory of Kuala Lumpur are the major waste producers in the country (Tarmudi et al., 2009), creating approximately one-third of the total waste. According to Hassan et al., (2000), the waste generation rate in Selangor is 1.26 kg/cap/day and 1.57 kg/cap/day in Kuala Lumpur, which is associated with high populations and rapid developments in these areas.

### Table 3: Waste generation by state (‘000 tonnes per year)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Southern Region</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Johor</td>
<td>927</td>
<td>856</td>
<td>1,005</td>
<td>1,321</td>
<td>4.5</td>
</tr>
<tr>
<td>Northern Region</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kedah</td>
<td>569</td>
<td>569</td>
<td>631</td>
<td>873</td>
<td>5.5</td>
</tr>
<tr>
<td>Perak</td>
<td>719</td>
<td>719</td>
<td>763</td>
<td>926</td>
<td>3.1</td>
</tr>
<tr>
<td>Perlis</td>
<td>28</td>
<td>28</td>
<td>29</td>
<td>33</td>
<td>1.8</td>
</tr>
<tr>
<td>Penang</td>
<td>611</td>
<td>611</td>
<td>648</td>
<td>785</td>
<td>3.0</td>
</tr>
<tr>
<td>Central Region</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Melaka</td>
<td>208</td>
<td>216</td>
<td>225</td>
<td>293</td>
<td>4.3</td>
</tr>
<tr>
<td>N. Sembilan</td>
<td>267</td>
<td>278</td>
<td>291</td>
<td>387</td>
<td>4.7</td>
</tr>
<tr>
<td>Selangor †</td>
<td>1,165</td>
<td>1,204</td>
<td>1,240</td>
<td>1,504</td>
<td>3.0</td>
</tr>
<tr>
<td>Kuala Lumpur</td>
<td>1,058</td>
<td>1,070</td>
<td>1,082</td>
<td>1,168</td>
<td>1.1</td>
</tr>
<tr>
<td>Eastern Region</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kelantan</td>
<td>123</td>
<td>128</td>
<td>120</td>
<td>110</td>
<td>-1.2</td>
</tr>
<tr>
<td>Pahang</td>
<td>202</td>
<td>206</td>
<td>210</td>
<td>239</td>
<td>1.9</td>
</tr>
<tr>
<td>Terengganu</td>
<td>119</td>
<td>122</td>
<td>125</td>
<td>147</td>
<td>2.5</td>
</tr>
<tr>
<td>Total</td>
<td>6,000</td>
<td>6,137</td>
<td>6,378</td>
<td>7,655</td>
<td>2.9</td>
</tr>
</tbody>
</table>

Note: † Includes Putrajaya, * estimated by Tarmudi et al., based on the average growth rate (1998–2000) (Source: Tarmudi et al., 2009)
At present, landfilling is the major waste disposal method which serves 60–90% of the area in the country, and is expected to remain the major waste disposal system in the future (Tarmudi et al., 2009). Landfills in Malaysia are classified as ranging from Level 0 (open dumping) to Level 4 (sanitary landfill) (Hassan et al., 2006).

Landfilling represents a potential pollution problem if it is implemented regardless of environmental safety. The adverse environmental impacts from landfilling activities are highly significant.

For instance, the contaminations of soil and groundwater are triggered by leachate in landfills (Lisk, 1991; McDougall et al., 2001). Leachate is produced over time, and with the percolation of rain water, the degradable fractions of the waste decompose and the resulting products are diluted and dispersed into the underlying soil if a site is not contained. Leachate production begins shortly after the process of landfilling begins, and may continue on for a period of hundreds or possibly thousands of years. On a small scale, this process (dilute and disperse) is effective, as soils have a natural capacity to further decompose organic material and to adsorb many inorganic residues. However, with the general increase in landfill size over time, and also when considering the high volume of waste, dilution and dispersion are no longer considered to be effective ways of dealing with landfill site emissions (McDougall et al., 2001).

Other threats

- Environmental carcinogens – can cause DNA damage and gene mutation, immunosuppressant
  - CHEMICAL SUBSTANCES: high dose exposure (jobs, treatment & large accidental)
  - IONIZING RADIATION: radiotherapy, radioisotope, radon (radon decay product)
  - SOLAR RADIATION:
    - Ratinoblastoma (Wilms' tumor)
    - Leukemia
    - Skin cancer
    - Mesothelioma (asbestos)

- Natural disasters – tsunami, earthquake, floods, volcanic eruptions

- Man-made disasters – nuclear radiation, wars, terrorist attack, transportation hazard, bioterrorism laboratory accidents

- The disease burden is more severe among:
  - Poverty (unemployed, displaced and disadvantaged socially & insecure)
  - Poor environmental sanitation: (socio-economically poor, natural disaster, ecological destruction: wars)
  - Poor nutrition
Brief history of medicine and public health

Starting point of Medicine

- All human societies have MEDICAL beliefs that provide explanations for:
  I. Birth
  II. Death, and
  III. disease.

- Throughout history, illness has been attributed to WITCHCRAFT, devil, unpleasant ASTRAL (Planetary) influence, or the will of the GODS.

- These ideas still retain some power, with FAITH HEALING and SHRINES (Place of Worship) still used in some places, although the rise of SCIENTIFIC MEDICINE over the past millennium has altered or replaced mysticism in most cases.

- MEDICINE by definition - the word MEDICINE is derived from the Latinars medicina, meaning - THE ART OF HEALING. It encompasses a variety of health care practices evolved to maintain and restore health by:
  I. preventing disease and damage to the body or mind
  II. Treatment of illness

- Contemporary medicine applies health science, biomedical research, and medical technology to diagnose and treat injury and disease, through:
  I. Medication
  II. Surgery
  III. Psycho-therapy
  IV. Herbalism
  V. Physiological healing (i.e. Homeopathy)

Historical Records on Medicine

a) Ancient Egyptian Medicine (2500 B.C)
b) Classical Chinese Medicine (Predecessor to the modern Traditional Chinese Medicine)
c) Ayur-vedic Indian Medicine (Yoga / Herb / Aromatherapy / Music therapy)
d) Greek physician Hippocrates (400 B.C)- the father of Western medicine
e) Medicine in Ancient Rome (by 27 B.C)
f) Medicine in the middle age (By the 14th Century)
g) Islamic Medicine: Islamic civilization rose to primacy in medical science as Muslim physicians contributed significantly to the field of medicine, including anatomy, ophthalmology, pharmacology, pharmacy, physiology, surgery, and the pharmaceutical sciences.
h) Christian Medicine (Anatomy Lesson of Dr. Nicolaes Tulp" by Rembrandt van Rijn, 1632)
i) Modern Medicine has its roots in the 1600s; during the early seventeenth century the English doctor William Harvey made important advances in medicine by understanding the workings of the human body.
Microbes and their Discoverers

<table>
<thead>
<tr>
<th>Year</th>
<th>Microbe discovered</th>
<th>Discoverer</th>
</tr>
</thead>
<tbody>
<tr>
<td>1880-82</td>
<td>Typhoid</td>
<td>Carl Joseph Eberth from Germany</td>
</tr>
<tr>
<td>1883</td>
<td>Cholera</td>
<td>Team lead by Robert Koch in Germany</td>
</tr>
<tr>
<td>1884</td>
<td>Tetanus</td>
<td>Arthur Nicolaier from Germany</td>
</tr>
<tr>
<td>1886</td>
<td>Pneumonia</td>
<td>Albert Fraenkel from Germany</td>
</tr>
<tr>
<td>1894</td>
<td>Plague</td>
<td>Shibasaburo Kitasato from Japan and Emile Yersin working at the Pasteur Institute in Indo-China. Both worked independently of the other</td>
</tr>
<tr>
<td>1949</td>
<td>Polio</td>
<td>David Bodian from America identified three different strains of polio virus.</td>
</tr>
</tbody>
</table>

Modern medicine

- Modern medicine was revolutionized in the 19th Century.
  - by advances in chemistry and laboratory techniques and equipment, old ideas of infectious disease epidemiology were replaced with the scientific field of microbiology
  - As science and technology developed, medicine became more reliant upon medications.

- The main characteristics of modern medicine:
  a) Clinical Practice: doctors personally assess patients in order to diagnose, treat, and prevent diseases using clinical judgement
  b) Conducted within health care systems through
     I. Universal Health Care that aims to guarantee care for all through a single-payer-health care system, or
     II. compulsory private or co-operative Health Insurance.
  c) Delivered through primary, secondary, and tertiary care by physicians, physician assistants, nurse practitioners,

Health Care System

- A health care system is the organization of people, institutions, and resources to deliver health care services to meet the health needs of target populations.
- What is the function of health care system?
• The **ULTIMATE GOAL** is the provision of Comprehensive Health Care Services:
  a. To promote high level of wellness
  b. To promote satisfaction with environment
  c. To prolong life through preventing premature death
  d. To minimize departures from physiological norms
  e. To minimize discomfort (diseases)
  f. To minimize disability

**History of Health Services in Malaysia**

- **HOSPITAL DEVELOPMENT**:
  1514: 1st. 2 Hospitals In Malacca were built by Portuguese
  1872: District Hospital in JalanPahang, KL was built
  1883-1910: General Hospitals were established in all state capitals
  1900: Institute of Medical Research (IMR) was established; to research causes and control of infectious diseases
  1920: Hospital KL was designated as National General Hospital

- **PUBLIC HEALTH DEVELOPMENT**:
  1880: A “Sanitary Board” was set up in KL by British (Bangsar)
  1910: Permanent Health department was established
  1956: Rural health Infrastructure & the 3tier system were established
  1961-1995: Establishment of Primary health care services & Programs( 2 Tier Health Care System )
  1996 –Now: Integrating primary health care services –Linking the three levels of health care service in KDs –KKs –Hospitals
  1956: Medical & health Services became Federal Gov. Responsibility

- **MEDICAL EDUCATION**:
  1963: 1st. Medical school was established in U.M
  1972: Medical Faculty UKM was established
  1997: Faculty Medicine & Health Sciences in UPM was built
Figure 10: Health care system in Malaysia

<table>
<thead>
<tr>
<th>Type of Health care services</th>
<th>People not at risk</th>
<th>People at risk</th>
<th>Undiagnosed disease</th>
<th>Confirmed disease</th>
<th>Chronic disease</th>
</tr>
</thead>
<tbody>
<tr>
<td>Integration of Health Care services in hospitals, health clinics and GPs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Health promotion</td>
<td>Disease prevention</td>
<td>Early diagnosis prompt treatment</td>
<td>Acute hospital care</td>
<td>Chronic and extended care</td>
<td></td>
</tr>
<tr>
<td>Primary care (promotive and preventive)</td>
<td>Secondary care (curative)</td>
<td></td>
<td>Tertiary care (rehabilitative)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 11: Type of health care services in Malaysia

- **Managing risk behaviour through:**
  - Risk Screening;
  - Inactivating infectious agent
  - Sanitation / Contraception
  - Healthy diet / Immunization
  - Isolation / Disinfection
  - Breaking Transmission Chain
  - Healthy Life Style Promotion (i.e. stop Smoking / Drug abuse)
  - Mass Media Campaign / IEC

- **Provision of comprehensive management of the disease:**
  - Effective screening & management of risk factors.
  - Effective early diagnosis
  - Case finding
  - Proper case management
Appropriate Treatment
Appropriate follow-up
Appropriate referral system
Public education

- Prevent complication;
  - Rehabilitation
  - Patient education
  - Community Care and Support

- PUBLIC HEALTH is the science and art of promoting health, preventing disease, and prolonging life, through organized efforts for:
  a. the sanitation of the environment (i.e. clean water / safe waste disposal / safe workplace)
  b. the control of communicable and non-communicable diseases,
  c. the education and empowering the individuals about health issues
     i. Principles of personal hygiene and
     ii. Healthy behaviors.... Non-risk behaviors
  d. the organization of medical services for preventing illness, early diagnosis and treatment of diseases
  e. the development of rule and regulations to ensure a healthy life for every individual in the community

- In public health, we are just like a Doctor with his/her patient. We assess the HEALTH of a Population, diagnose its PROBLEMS, seek the CAUSES of these problems, and devises Strategies to CURE the problems. We are not just treating the illness, but rather preventing the illness of the entire population.

- The core function:
  - Diagnostic Function: Monitor population Health Status / Investigate & Diagnose Health Problem
  - Policy Development: For improving and protecting people's health;
    - Health information, education / community empowerment, partnership / Quality of health care
  - Law and regulation enforcement: Assuring appropriate and adequate health services
    - The responsibility of assuring the acceptable, affordable, available and accessible services to where people live and work (i.e. safe and healthy environment)

1.1.1 History of public health

- Supernatural explanations of disease did not evoke or require an environmental origin for disease.

- It was the demand of urban living, not considerations of health and disease, that necessitated sanitary engineering.

- **It was in Germany** – *(1779-1816)* that the first major contribution to public health occurred, by proposing governmental regulations and programs to protect the population against diseases.

- **In England** - *(1842)*: sewerage, portable water supply, refuse disposal, proper ventilation of residences and places of work, supervision of public works by qualified professionals, and legislative authorization of health measures were put forward. Cholera Outbreak LONDON *(1853)*; Thames River heavily polluted by sewage of London's slum areas
• **By mid-20th. Century:** Basic Public health Programs had been widely recognized in the industrialized world. Namely; communicable diseases control, environmental sanitation, maternal and child health services, health education, occupational and industrial hygiene, nutrition.

**References**

9. Sirajoon N.G., Hematram Y. (2008), Health Care in Malaysia, University Malaya Press
CHAPTER 2
The natural history of disease and application of principles of prevention

Introduction
A disease is disorder of structure or function in a human, animal, or plant, esp. one that produces specific signs or symptoms or that affects a specific location and is not simply a direct result of physical injury.

It is often regarded as an illness, sickness or ailment and is often characterized by a typical patient problems (symptoms) and physical findings (signs). This may be the result of genetic or developmental errors, and/or exposure to infection, poisons, nutritional deficiency or imbalance, toxicity, or unfavorable environmental factors resulting in a disordered or malfunctioning organ, part, structure, or system of the body.

This abnormal state causes the organ or body incapable of responding to or carrying on its normally required functions. There is also a failure of the adaptive mechanism to counteract adequately the invasion of the body by a foreign substance resulting in a disturbance in the function or structure of some part of the organism.

Diseases can generally be divided into non-communicable disease and communicable disease (Table 1).

A non-communicable disease, or NCD, is a medical condition or disease which is non-infectious and non-transmissible between persons.

World Health Organisation states that non-communicable diseases are linked to a cluster of major risk factors such as tobacco use, unhealthy diets, physical inactivity, obesity, high blood pressure, cholesterol and glucose levels that are measurable and largely modifiable. Chronic non-communicable diseases which includes cardiovascular diseases, cancers, chronic obstructive pulmonary disease and diabetes are the biggest cause of death in the South-East Asia.

Communicable diseases are diseases that have a potential of transmission from one person or species to another. It is carried by microorganisms and transmitted through people, animals, surfaces, foods, or air to cause disease in animals and/or plants.
Table 1: Examples of NCD and communicable disease

<table>
<thead>
<tr>
<th>Non communicable disease</th>
<th>Communicable disease</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heart disease</td>
<td>Tuberculosis</td>
</tr>
<tr>
<td>Hypertension</td>
<td>Dengue</td>
</tr>
<tr>
<td>Diabetes</td>
<td>Malaria</td>
</tr>
<tr>
<td>Cancer</td>
<td>Measles</td>
</tr>
<tr>
<td>Stroke</td>
<td>Mumps</td>
</tr>
<tr>
<td>Arthritis</td>
<td>Diphtheria</td>
</tr>
</tbody>
</table>

Epidemiology

Epidemiology is the study of the distribution and determinants of health-related states and events in specified populations and the application of this study to the control of health problems.

By identifying and understanding the distribution of a disease or a health event (by Persons, Place and Time) and its determinants in human populations a programme for prevention of that particular disease may be formulated.

Basics of epidemiology

Diseases and health have a distribution. A disease is not randomly distributed in a population. Diseases and health do not occur at random but have causal and preventive factors. Disease causation is multi-factorial and multiple factors interact to create an environment in which the disease occurs. Epidemiology focuses on populations rather than individual persons, tissues or organs. There are measurable factors that influence the pattern of disease and the underlying causes of disease.

DISEASE CAUSATION

Web of causation model

The occurrence and spread of a disease is usually not a simple cause and effect factor. It is usually caused or affected by multiple factors. The web causation model represents the complex group of subjects and relationships that can contribute to occurrences and spread of a disease.

For example, the spread of tuberculosis is usually due to multiple social and medical factors affecting various individuals. Interaction between these factors leads to more cases of tuberculosis seen in certain population especially those with pre-disposing factors i.e. migrants, immuno-compromised population (Figure 1).
Figure 1: Web of causation model for tuberculosis

SOCIAL FACTORS
- Overcrowding
- Migration: unimmunized community

SUSCEPTIBLE HOST
- Reduced immune system: diabetes, HIV, Malnutrition
- No immunisation

EXPOSURE TO MYCOBACTERIUM

INFECTION
- Tissue Invasion and Reaction

TUBERCULOSIS
1.1.2 Epidemiologic triangle model of disease causation

A common model used in public health illustrates the relationships among an agent, a host and the environment (Figure 2). It applies to biological, chemical and physical agents. For a disease or injury to occur, the basic elements of disease or injury causation and an adequate chain of transmission (i.e. environmental pathway) must be present.

Disease occurs when an outside agent capable of causing the disease or injury meets a host that is vulnerable to the agent in an environment that allows the agent and host to interact. These basic concepts help guide the selection of health strategies to prevent health problems.

![Epidemiologic Triangle Model](image)

**Agent**

An entity that causes the injury or disease. For example, salmonella bacteria in contaminated food is an agent; toxic chemical waste in a factory water waste is an agent and; cigarette smoke is an agent.

**Host**

A host is the human or organism that is susceptible to the agent. Some human are more susceptible than others. For example children are more susceptible to some illness compared to adults and immuno-compromised patients may be more susceptible to infection. The susceptibility differs due to various factors as sex, age, race and family history (i.e. genetic profile); immune status (e.g. cancer and AIDS patients).

The response of a host to an agent varies from no effect, sub-clinical disease, mild illness and severe illness.

**Environmental factors**

The environment are not part of the host or the agent but influence their interaction. Environment are influenced by physical, biologic, climatic, social and economic factors.

The following disease illustrates the epidemiologic triangle. Cholera infection causes outbreak watery diarrhoea. It is caused by the bacteria Vibrio cholerae (agent). V. cholerae enters the host via
contaminated food or water. Large epidemics are often related to fecal contamination of water supplies (environment) or street vended foods.

Table 2: Factors influencing each component of the health or disease equilibrium

| Host factors | • Age  
|             | • Sex  
|             | • Race  
|             | • Occupation  
|             | • Genetic profile  
|             | • Marital status  
|             | • Family background  
|             | • Previous disease  
|             | • Immune status  

| Agent | • Biologic (bacteria, viruses, parasites)  
|       | • Chemical (poison, alcohol, smoke, lead)  
|       | • Physical (trauma, radiation, fire)  
|       | • Medication / allergen (drugs)  
|       | • Psychological (stress)  

| Environment Factors | Physical  
|                     | Biologic  
|                     | Climatic (extreme conditions e.g winter, floods)  
|                     | Social, political and economic factors  
|                     | • Crowded homes, premises, institutions  
|                     | • Poor restaurant sanitation  
|                     | • Occupation  
|                     | • Exposure to chemicals, noise, microbes  
|                     | • Disruption  
|                     | • War, floods  
|                     | • Socio-economy  
|                     | • Poverty, economic downturn  
|                     | • Industrialization  
|                     | • Urbanization  

**Natural history of a disease**

The modern understanding of a disease process is as a result of the historical and scientific documentation by early physicians and historians of what they see over time. The way a disease progresses or evolves from the earliest stage of its pre-pathogenesis phase to its termination as recovery, disability or death, in the absence of treatment or prevention is called the natural history of that disease.

Understanding the characteristic evolution of the symptoms and signs as a disease runs its course and is not treated from exposure to causal agents through to its progression and final outcomes (i.e. characteristic natural history) enables physicians to anticipate prognosis and to identify opportunities for prevention and control (Figure 3).
Majority of diseases are initiated by multiple causal factors. Ideally, prevention occurs before people contract a disease, so preventive programs are often delivered to currently healthy people in the general population. By identifying and changing any or all of the factors contributing to the disease it is possible to prevent the onset of the illness.

**The disease process**

The development of a disease goes through a process from the host exposure to the agent(s) to the resolution or termination of the disease/host. The disease itself would not be apparent during the initial stage and would only be seen when the patient shows clinical signs and symptoms.

In an infectious disease the time from exposure to the agent to the onset of the clinical disease is called the incubation period. During this period there are two possible outcomes depending on the host tissue response. In a host where the tissue response is able to overcome the infectious process, the disease would not manifest. However, in cases where the infectious process overwhelms the host tissue responses the disease would then become apparent i.e. the clinical disease with obvious signs and symptoms.

Prior to becoming apparent the disease goes through a sub-clinical phase. During this phase the disease is usually diagnosed by screening investigations such as serologic (antibody) response or culture of the organisms.

**The Iceberg Concept of Epidemiology**

By understanding the natural history of disease, clinicians know that a disease may be initiated by several factors. Whether the disease would progress in an individual would depend on the risk and protective factors that are present at the time of initiation or exposure. The disease would then go through an ‘invisible’ or in-apparent phase called the sub-clinical phase. The duration of this phase varies and would depend on the disease itself and the host’s response. At this point, the disease is not apparent and would only be detected by screening examination and investigations (Figure 4).
In the 1960s epidemiologic studies revealed that for every apparent case of a disease there is a larger population who are at the pre or sub-clinical phase of that disease. The term ‘The Iceberg’ was coined during that era to reflect the actual prevalence of an illness in the general population.
Communicable Diseases: The Infection Model (Figure 5)

Figure 5: The infection model
<table>
<thead>
<tr>
<th>Exit routes</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oro-faecal routes</td>
<td>Saliva on solids and liquids (fomites)</td>
</tr>
<tr>
<td></td>
<td>Saliva direct to new host</td>
</tr>
<tr>
<td></td>
<td>Faeces on solids and liquids</td>
</tr>
<tr>
<td></td>
<td>Aerosolised faeces in dust</td>
</tr>
<tr>
<td></td>
<td>Vomitus</td>
</tr>
<tr>
<td>Respiratory</td>
<td>Excessive nasal/salivary secretion</td>
</tr>
<tr>
<td></td>
<td>Lacrimal</td>
</tr>
<tr>
<td></td>
<td>Aerosolised droplets</td>
</tr>
<tr>
<td>Urogenital</td>
<td>Organism established in urinary tract</td>
</tr>
<tr>
<td></td>
<td>leptospirosis</td>
</tr>
<tr>
<td></td>
<td>splash droplets</td>
</tr>
<tr>
<td></td>
<td>meat works</td>
</tr>
<tr>
<td></td>
<td>Ova (Salmonella enteritidis)</td>
</tr>
<tr>
<td></td>
<td>Venereal organisms often not resilient in environment</td>
</tr>
<tr>
<td></td>
<td>Treponema pallidum (syphilis)</td>
</tr>
<tr>
<td></td>
<td>Neisseria gonorrhoeae</td>
</tr>
<tr>
<td>Skin and/or hair</td>
<td>Direct contact - skin and hair</td>
</tr>
<tr>
<td></td>
<td>Lice, mites</td>
</tr>
<tr>
<td></td>
<td>Skin vesicles, scabs</td>
</tr>
<tr>
<td></td>
<td>Pox viruses</td>
</tr>
<tr>
<td></td>
<td>Herpes simplex</td>
</tr>
<tr>
<td></td>
<td>Secondary skin contamination</td>
</tr>
<tr>
<td></td>
<td>Vector-borne transfer</td>
</tr>
<tr>
<td></td>
<td>Malaria</td>
</tr>
<tr>
<td></td>
<td>Dengue</td>
</tr>
</tbody>
</table>
For example: Transmission of dengue

![Transmission of dengue](image)

REFERENCES

CHAPTER 3
COMMUNICABLE DISEASE CONTROL

Introduction

Communicable disease (CD) is due to a specific infectious agent or its toxic products. Diseases are developing after transmissions of these agents or their toxic products from an infected person, animal or reservoir to a susceptible host, either directly or indirectly through an intermediate plant or animal host, vector or inanimate environment. Controls of communicable disease (CDC) are required to break the chain of transmission.

CDs occur as sporadic cases or in outbreaks or epidemic, or sometimes it is constantly presents in a population or known as endemic. Some of CDs has been eradicated, for example smallpox. However, cholera outbreak is still occurring. CDs can be classified in various ways:

1) Way of transmission and entry to human host (person-to-person, by insect vectors, from animal to human)

2) Alphabetical order

3) Type of infecting organism (bacteria, virus)

Infectivity

Persons harboring infectious organisms can transmit the organism at various stages of the infection, depending on the organism and its effect on the host. Many common infectious diseases are most infectious in the prodormal or incubation periods, before they declare themselves by causing symptom or sickness, for example, measles disease.

Some conditions once acquired remain infective to others more or less permanently, for example, Sexually Transmitted Disease (STD). Some remain infectious to others after the host becomes apparently well again, the convalescent carrier state, for example, typhoid. However, some important infectious diseases may not incapacitate the host completely, so enabling the host to remain at large in the community to infect others, for example, tuberculosis (TB).

Figure 1 shows the gradient of infection in human. There is inversely relationship between severity and infectivity of infection. The gradient of infection is variation in individual response to organisms, from lethal to in titer antibodies.
In apparent infections ensure its survival and further propagation, it means, if the affected individual apparently well and continues normal activities especially remaining in contact with others who may be susceptible to infection, the organism will be most likely to be passed on, and thus infect others, not all of whom escape unscathed. Many infection produce clinical signs and symptoms in only a small minority of those who are invaded by the infectious agent, but many of those who have no signs or symptoms are infectious to others for short or sometimes prolonged periods. It means, they have sub clinical infections but they are carriers of disease and capable of infecting others. Therefore, sub clinical cases are the most significant among all who become infected.

The more serious, the symptoms and sign of infection, the more likely it is the infected person will be confined to bed or to the house, in contact with relatively small numbers and therefore less likely to infect others.

Seroepidemiology is the use of serologic test to identify infections. It is a valuable way to determine the distribution of susceptibility and resistance to infection in populations and to observe how these changes over time and in response to occurrence of infection, which may be acquires by far higher proportions of the people than those with symptoms and signs. Seroepidemiology measures the immune status of the population, whether the immunity is naturally or artificially acquired.

Control of communicable disease

In general, to control the communicable diseases are dependent on type of infections. Control of respiratory infections can be made by reducing the possibility for direct contact, isolate the patient if it is a serious infection, by giving a chemoprophylaxis and apply the face mask.

Control measures for gastrointestinal infections are by sanitary measures, food hygiene, fly control and personal hygiene. To control sexually transmitted diseases are by avoid the promiscuity, using condoms and advice on sexual cleanliness.
Controls of vector-borne diseases can be made by vector control, for examples by ecologic measures and pesticides. Chemoprophylaxis also can be used to control the vector-borne disease. Zoonoses can be controlled by controlling the animal hosts.

Specific measures are applied to many CDs, for example by immunization. Table 1 shows the recommended schedule for active immunization.

Table 1: Recommended schedule for active immunization

<table>
<thead>
<tr>
<th>Recommended age</th>
<th>Vaccine*</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 mo</td>
<td>DPT, OPV</td>
<td>Earlier start in endemic area</td>
</tr>
<tr>
<td>4 mo</td>
<td>DPT, OPV</td>
<td>2-mo interval for OPV to avoid interference</td>
</tr>
<tr>
<td>6 mo</td>
<td>DPT (OPV)</td>
<td>OPV optional where polio might be imported</td>
</tr>
<tr>
<td>12 mo</td>
<td>Tuberculin test</td>
<td>Can be given with MMR at 15 month or as indicated</td>
</tr>
<tr>
<td>15 mo</td>
<td>MMR</td>
<td></td>
</tr>
<tr>
<td>19 mo</td>
<td>DPT, OPV</td>
<td>Consider as part of primary series; DPT essential</td>
</tr>
<tr>
<td>24 mo</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 – 6 yr</td>
<td>DPT, OPV</td>
<td>Booster doses</td>
</tr>
<tr>
<td>14 – 16 yr</td>
<td></td>
<td>Repeat every 10 yr</td>
</tr>
</tbody>
</table>

**Modes of transmission of infection**

The infection can be transmitted by person-to-person spread either by direct or indirect contact. The direct contact is usually by sexually transmitted and indirect are by droplet spread, fomites and airborne desiccated droplets.

The common vehicle spreads are by water, food and milk, air and biologic product for examples blood and serum. Vector-borne are transmitted by biologic life cycle transfer and passenger transfer. The mode of transmission of infection can be by zoonoses and other such as soil saprophytes.

**Surveillance**

Surveillance means collection, analysis and dissemination of all data pertinent to control of disease. Reporting or notification of certain infectious disease is a form of data collection. The purposes of surveillance are to facilitate control of disease, to evaluate the control program and to learn more about emerging problems.

Regular routine reports enable us to detect when epidemic disease occur and reports of some diseases, for examples epidemic influenza and poliomyelitis are transmitted to WHO.

**General principles of control**

There are some general principles to control the communicable disease. Firstly, enhance the host resistance by active or passive immunization and to improve the nutrition. Secondly, by interrupt the transmission. This can be done by detect and treat cases, isolate cases (and contact when necessary), chemoprophylaxis, vector control, environmental (ecologic measures), aseptic techniques, sanitation and pure water supplies and food hygiene.

Personal measures are also important aspect to control the disease by personal hygiene, protective covering (for example, condoms) and avoid situations likely to transmit infection. Lastly by
inactivating the infectious agent by physical measures (heat, cold, radiation) or by chemical measures (chlorination, disinfection).

**Specific infectious diseases**

1) **Acute respiratory diseases**

   Acute respiratory diseases are caused by virus, bacteria and mycoplasma. It is the most difficult infection to control. It is because, virus can undergo mutation or change their immunologic structure, infected person has short lived acquires immunity and people infected with trivial infection remains active and spread infection to others.

   Influenza is an acute respiratory disease that caused by virus. Influenza can cause pneumonia or initiate bacterial pneumonia. It also cause severe toxemia in infants, elderly and poor health person. Influenza can be spread and cause pandemic with high mortality rate. However, epidemic influenza can be prevented by giving influenza vaccine.

2) **Sexually transmitted diseases**

   There are 25 types of sexually transmitted disease. The highest and important numbers are gonorrhea and Chlamydia. Syphilis is used to be the most important due to its social stigma, prolonged course, widespread and serious side effects on the nervous system and cardiovascular systems. However, the spirochete is a delicate organism and sensitive to antibiotics, so the disease can be control successfully. Disease is refractory among promiscuous homosexual and heterosexual groups.

   Gonorrhea is a highly infectious disease. It is difficult to control because the widespread sexual promiscuity especially among young people. The use of OCP has increased the risk of transmission because vaginal mucosa become more hospitable to gonococcus and no mechanical barrier can be used to control the disease. Gonorrhea is difficult to notice due to insignificant signs and symptoms. The incidence has reached pandemic proportions in many countries due to resistance to antibiotics, patient default from treatment and reluctance to identify contacts. This disease can be control by sex education and this control measure is proved to reduce the prevalence of promiscuous sexual activity.

3) **Nosocomial infections**

   A Nosocomial infection is also known as hospital-acquired infections. It was discovered by connection between exposure to sepsis and fever made by Oliver Wendell Holmes in Boston in 1843 and by Ignace Semmelweis in Vienna. It used to killed huge numbers of women after childbirth and wounded soldiers. The infections include by streptococcal and staphylococcal contamination, gas gangrene and tetanus.

   Usually, nosocomial infections are abundant in high risk patients for example, debilitated patients and patients with devitalized tissues by injuries or operation. The incidence by be reduced by antiseptic, prophylactic immunization against tetanus and gangrene and use of antibiotics especially for staphylococcal and streptococcal infections.

   The organisms that cause nosocomial infection have changed over the past half century due to development and influence of increasingly powerful broad spectrum antibiotics. Furthermore, infections with yeast and spores become more common.

   The principle methods of spread of nosocomial infections are by direct contact and contaminated vehicles, including surgical instruments especially during endoscopic procedures. It can be controlled by recognizing problems, establish the infection control committee, environmental
measures and staff education, good hospital housekeeping, use of disposable equipment and centralized sterilizing services.

4) Food poisoning

Food poisoning can be contaminated by bacteria or its toxins, viral, parasite or fungal. Contamination can occur between production and consumption of food. It can cause vomiting, diarrhea and may cause death in infants, children, debilitated adult and the frail elderly. The outbreak of food poisoning is common and investigation needs to be made.

5) Infectious diseases of children

The examples of infectious diseases among children are measles, diphtheria, whooping cough, trachea-bronchitis and croup or infections diarrhea. The mortality of these diseases is reduced due to better living conditions, smaller family size and improved nutritional status. The incidence is also reduced by specific vaccines. However, increase in use of daycare centre, has increased many kind of infections among infants and many children die due to infectious diseases in childhood. Therefore, immunization is an important control measure to combat this problem.

6) Viral hepatitis

Hepatitis A also known as infectious hepatitis is transmitted via fecal-oral transmission. However, hepatitis B (syringe jaundice or serum hepatitis) is a blood-borne and transmitted by inadequately sterilized hypodermic needles. Hepatitis B is found in human blood or serum products and can be sexually transmitted. The virus also can be found in saliva, semen and breast milk. Hepatitis B is widely distributed in many developing countries and associated with cancer of the liver. Vaccine is available for protection from hepatitis virus.

REFERENCES

Global health situation and trends 1955-2025

- Population
  The global population was 2.8 billion in 1955 and is 5.8 billion now. It will increase by nearly 80 million people a year to reach about 8 billion by the year 2025. In 1955, 68% of the global population lived in rural areas and 32% in urban areas. In 1995 the ratio was 55% rural and 45% urban. By 2025 it will be 41% rural and 59% urban (Figure 1). The number of people aged over 65 will rise from 390 million now to 800 million by 2025 - reaching 10% of the total population. By 2025, increases of up to 300% of the older population are expected in many developing countries, especially in Latin America and Asia.

- Life expectancy
  Average life expectancy at birth in 1955 was just 48 years; in 1995 it was 65 years; in 2025 it will reach 73 years. By the year 2025, it is expected that no country will have a life expectancy of less than 50 years. More than 50 million people live today in countries with a life expectancy of less than 45 years. Over 5 billion people in 120 countries today have life expectancy of more than 60 years. About 300 million people live in 16 countries where life expectancy actually decreased between 1975 and 1995. Many thousands of people born this year will live through the 21st century and see the advent of the 22nd century. Table 1 summarizes Malaysia’s life expectancy by age.
Table 1: Life expectancy by age in Malaysia

<table>
<thead>
<tr>
<th>Age</th>
<th>Male</th>
<th>Female</th>
<th>M</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>AT BIRTH</td>
<td>70.8</td>
<td>76.5</td>
<td>77</td>
<td>82</td>
</tr>
<tr>
<td>AGE 5</td>
<td>71.5</td>
<td>76.3</td>
<td>85</td>
<td>97</td>
</tr>
<tr>
<td>AGE 10</td>
<td>71.6</td>
<td>76.4</td>
<td>85</td>
<td>97</td>
</tr>
<tr>
<td>AGE 15</td>
<td>71.7</td>
<td>76.5</td>
<td>85</td>
<td>98</td>
</tr>
<tr>
<td>AGE 20</td>
<td>72.0</td>
<td>76.6</td>
<td>84</td>
<td>99</td>
</tr>
<tr>
<td>AGE 25</td>
<td>72.4</td>
<td>76.7</td>
<td>86</td>
<td>101</td>
</tr>
<tr>
<td>AGE 30</td>
<td>72.7</td>
<td>76.8</td>
<td>85</td>
<td>103</td>
</tr>
<tr>
<td>AGE 35</td>
<td>73.2</td>
<td>77.0</td>
<td>84</td>
<td>102</td>
</tr>
<tr>
<td>AGE 40</td>
<td>73.6</td>
<td>77.2</td>
<td>85</td>
<td>104</td>
</tr>
<tr>
<td>AGE 45</td>
<td>74.2</td>
<td>77.5</td>
<td>85</td>
<td>105</td>
</tr>
<tr>
<td>AGE 50</td>
<td>74.9</td>
<td>77.9</td>
<td>84</td>
<td>108</td>
</tr>
<tr>
<td>AGE 55</td>
<td>75.8</td>
<td>78.5</td>
<td>89</td>
<td>110</td>
</tr>
<tr>
<td>AGE 60</td>
<td>77.0</td>
<td>79.3</td>
<td>95</td>
<td>111</td>
</tr>
<tr>
<td>AGE 65</td>
<td>78.6</td>
<td>80.4</td>
<td>99</td>
<td>110</td>
</tr>
<tr>
<td>AGE 70</td>
<td>80.7</td>
<td>82.0</td>
<td>99</td>
<td>110</td>
</tr>
<tr>
<td>AGE 75</td>
<td>83.3</td>
<td>84.0</td>
<td>96</td>
<td>116</td>
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<tr>
<td>AGE 80</td>
<td>86.6</td>
<td>86.9</td>
<td>79</td>
<td>101</td>
</tr>
<tr>
<td>AGE 85</td>
<td>90.1</td>
<td>90.1</td>
<td>70</td>
<td>91</td>
</tr>
<tr>
<td>AGE 90</td>
<td>93.8</td>
<td>93.7</td>
<td>56</td>
<td>85</td>
</tr>
<tr>
<td>AGE 95</td>
<td>97.7</td>
<td>97.7</td>
<td>58</td>
<td>77</td>
</tr>
<tr>
<td>AGE 100</td>
<td>102.0</td>
<td>102.0</td>
<td>58</td>
<td>77</td>
</tr>
</tbody>
</table>

- Age structure of deaths

In 1955, 40% of all deaths were among children under 5 years, 10% were in 5-19 year-olds, 28% were among adults aged 20-64, and 21% were among the over-65s. In 1995, only 21% of all deaths were among the under-5s, 7% among those 5-19, 29% among those 20-64, and 43% among the over-65s. By 2025, 8% of all deaths will be in the under-5s, 3% among 5-19 year-olds, 27% among 20-64 year-olds and 63% among the over-65s.

- Leading causes of global deaths

In 1997, of a global total of 52.2 million deaths, 17.3 million were due to infectious and parasitic diseases; 15.3 million were due to circulatory diseases; 6.2 million were due to cancer; 2.9 million were due to respiratory diseases, mainly chronic obstructive pulmonary disease; and 3.8 million were due to perinatal conditions. Leading causes of death from infectious diseases were acute lower respiratory infections (3.7 million), tuberculosis (2.9 million), diarrhoea (2.5 million), HIV/AIDS (2.3 million) and malaria (1.5-2.7 million). Most deaths from circulatory diseases were coronary heart disease (7.2 million), cerebrovascular disease (4.6 million), other heart diseases (3 million). Leading causes of death from cancers were those of the lung (1.1 million), stomach (765 000), colon and rectum (525 000) liver, (505 000), and breast (385 000). Table 2 summarizes the top ten causes of death in Malaysia.
Table 2: Top causes of death in Malaysia

<table>
<thead>
<tr>
<th>Cause</th>
<th>Rate</th>
<th>World Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coronary Heart Disease</td>
<td>138.75</td>
<td>57</td>
</tr>
<tr>
<td>Stroke</td>
<td>75.81</td>
<td>114</td>
</tr>
<tr>
<td>Influenza &amp; Pneumonia</td>
<td>65.08</td>
<td>68</td>
</tr>
<tr>
<td>Road Traffic Accidents</td>
<td>34.53</td>
<td>20</td>
</tr>
<tr>
<td>HIV/AIDS</td>
<td>23.15</td>
<td>57</td>
</tr>
<tr>
<td>Lung Disease</td>
<td>19.09</td>
<td>108</td>
</tr>
<tr>
<td>Diabetes Mellitus</td>
<td>18.99</td>
<td>128</td>
</tr>
<tr>
<td>Lung Cancers</td>
<td>17.93</td>
<td>74</td>
</tr>
<tr>
<td>Tuberculosis</td>
<td>17.82</td>
<td>76</td>
</tr>
<tr>
<td>Breast Cancer</td>
<td>15.83</td>
<td>100</td>
</tr>
</tbody>
</table>

There are major differences in the ranking of causes between high- and low-income countries. In low-income countries, the dominant causes are infectious and parasitic diseases (including malaria), and perinatal conditions. In the high-income countries, 9 out of the 10 leading causes of death are noncommunicable conditions, including four types of cancer. In the middle-income countries, the 10 leading causes of death are again dominated by noncommunicable conditions; they also include road traffic accidents as the sixth most common cause.

• Health of infants and small children

Spectacular progress in reducing under 5 mortality achieved in the last few decades is projected to continue. There were about 10 million such deaths in 1997 compared to 21 million in 1955. The infant mortality rate per 1000 live births was 148 in 1955; 59 in 1995; and is projected to be 29 in 2025. The under-5 mortality rates per 1000 live births for the same years are 210, 78 and 37 respectively. By 2025 there will still be 5 million deaths among children under five - 97% of them in the developing world, and most of them due to infectious diseases such as pneumonia and diarrhoea, combined with malnutrition. There are still 24 million low-birthweight babies born every year. They are more likely to die early, and those who survive may suffer illness, stunted growth or even problems into adult life. In 1995, 27% (168 million) of all children under 5 were underweight. Mortality rates are 5 times higher among severely underweight children than those of normal weight. About 50% of deaths among children under 5 are associated with malnutrition. At least two million a year of the under-five deaths could be prevented by existing vaccines. Most of the rest are preventable by other means.

• Health of adults

Infectious diseases will still dominate in developing countries. As the economies of these countries grow, non-communicable diseases will become more prevalent. This will be due largely to the adoption of “western” lifestyles and their accompanying risk factors - smoking, high-fat diet, obesity and lack of exercise. In developed countries, non-communicable diseases will remain dominant. Heart disease and stroke have declined as causes of death in recent decades, while death rates from some cancers have risen. Cancer will remain one of the leading causes of death worldwide. Only one-third of all cancers can be cured by earlier detection combined with effective treatment. By 2025 the risk of
cancer will continue to increase in developing countries, with stable if not declining rates in industrialized countries. Cases and deaths of lung cancer and colorectal cancer will increase, largely due to smoking and unhealthy diet respectively. Lung cancer deaths among women will rise in virtually all industrialized countries, but stomach cancer will become less common generally, mainly because of improved food conservation, dietary changes and declining related infection. Cervical cancer is expected to decrease further in industrialized countries due to screening. The incidence is almost four times greater in the developing world. The possible advent of a vaccine would greatly benefit both the developed and developing countries. Among the premature deaths are those of 585 000 young women who die each year in pregnancy or childbirth. Most of these deaths are preventable. Where women have many pregnancies the risk of related death over the course of a lifetime is compounded. While the risk in Europe is just one in 1 400, in Asia it is one in 65, and in Africa, one in 16.

- Health of older people

Cancer and heart disease are more related to the 70-75 age group than any other; people over 75 become more prone to impairments of hearing, vision, mobility and mental function. Over 80% of circulatory disease deaths occur in people over 65. Worldwide, circulatory disease is the leading cause of death and disability in people over 65 years. Data from France and the United States show breast cancer on average deprives women of at least 10 years of life expectancy, while prostate cancer reduces male average life expectancy by only one year. The risk of developing dementia rises steeply with age in people over 60 years. Women are more likely to suffer than men because of their greater longevity.

Global disease trends

Communicable disease

A communicable disease such as a cold is a disease that spreads from person to person. Some people may use the words contagious or infectious when talking about communicable diseases. Six infectious diseases currently cause 90% of infectious disease mortality: acute respiratory infections (which may lead to pneumonia), HIV/AIDS, diarrhoeal diseases, tuberculosis, malaria and measles. Reservoir could be person, animal, insect. Transmission of communicable diseases can occur:

- Direct method: immediate transfer of infectious agent from reservoir to new host.
  - Require direct contact with resource. E.g. touching biting, kissing or sexually
- Indirect method
  - Transmitted within contaminated inanimate material. E.g. water, food.

The number of refugees and displaced people has increased 9-fold over the past 2 decades. In 1998, as many as 50 million people worldwide had been uprooted from their homes. Refugees and displaced persons are especially vulnerable to disease, as they live in overcrowded, unsanitary conditions and are at risk of outbreaks of cholera and other waterborne diseases. In addition, their movement has been shown to facilitate the spread of infectious diseases into new geographical areas, placing additional populations at risk.

WHO has various priorities in the area of communicable diseases. First priority is to reduce the negative impact of malaria and tuberculosis through global partnership. Second priority is to continue to strengthen surveillance and monitoring of communicable disease problems of international health importance and effective response to these problems. Next priority is to reduce the impact of communicable diseases through intensified and routine prevention and control. Lastly, the priority is to generate new knowledge, tools, intervention methods, implementation strategies and research capabilities for use in developing endemic countries.

Non-communicable (NCD) disease

Noncommunicable diseases (NCDs), also known as chronic diseases, are not passed from person to person. They are of long duration and generally slow progression. According to the World Health Organisation (WHO), problems such as diabetes, heart disease, and hypertension are referred to as
diet-related chronic diseases and are termed NCD. The list goes on, and includes cancer, chronic kidney disease, osteoporosis, gallbladder, and many more. NCD diseases are those conditions that are most commonly associated with an ageing population in relatively wealthy countries, such as those in North America, Western Europe and Australasia. A number of conditions are considered to be NCD including heart disease, stroke, cancer, chronic lung conditions, mental illness and arthritis. Many of these problems arise through the development of risk conditions such as diabetes and hypertension, which in turn are influenced by lifestyles that include cigarette smoking, poor diet and physical inactivity. NCD diseases particularly those relating to heart attack and stroke (cardiovascular diseases), remain the leading cause of ill-health and premature death in high income countries.

NCD diseases kill more than 36 million people each year. Nearly 80% of NCD deaths - 29 million - occur in low- and middle-income countries. More than nine million of all deaths attributed to noncommunicable diseases (NCDs) occur before the age of 60; 90% of these "premature" deaths occurred in low- and middle-income countries. Cardiovascular diseases account for most NCD deaths, or 17 million people annually, followed by cancers (7.6 million), respiratory diseases (4.2 million), and diabetes (1.3 million). These four groups of diseases account for around 80% of all NCD deaths. They share four risk factors: tobacco use, physical inactivity, the harmful use of alcohol and unhealthy diets.

Impacts of NCDs have high risks on individuals and society. A comprehensive approach is needed from all sectors, including health, finance and education. All the sectors have to work together to reduce the risks associated with NCDs, as well as promote the interventions to prevent and control them. An important way to reduce NCDs is to focus on lessening the risk factors associated with these diseases. Low-cost solutions exist to reduce the common modifiable risk factors (mainly tobacco use, unhealthy diet and physical inactivity, and the harmful use of alcohol).

REFERENCES
CHAPTER 5
Social, cultural and psychological aspects of health and wellness

INTRODUCTION

Getting and sustaining optimal health and wellness requires an understanding of the many different aspects that affect our health and well-being. A lot of information from media, health experts and personal individual promoting us on several ways to stay healthy. This chapter aims to create an understanding of social, cultural and psychological factors affecting DISEASE, HEALTH and WELLNESS of individuals and groups and to assess how and in what ways these can be learnt and applied in practice and research.

DEFINITION OF TERMS

Social

Social can be defined as interactions between individuals and groups within society. Meanwhile, the society is composed of people, values and traditions. Social is relating to activities that involves being with other people, especially activities that you do for pleasure. Some experts define social in different way such as something that is achieved, produced and set in their daily interactions between citizens and government (Lewis). Other experts define the social as below:

i. Keith Jacobs: Socially constructed and is something that happens in a community site
ii. Ruth Aylett: Social is something that is understood as a difference but still inherent and integrated
iii. Philip Wexler: Social is the nature of each individual human being
iv. Enda M.C: Social is a way of how individuals relate to each other

Culture

Culture means the whole complex of traditional behaviour which has been developed by the human race and is successively learned by each generation. According to Keesing, culture refers to learned, accumulated experience. A culture refers to those socially transmitted patterns for behaviour characteristic of a particular social group. Tylor had define culture, or civilization, as that complex whole which includes knowledge, belief, art, law, morals, custom, and any other capabilities and habits acquired by man as a member of society. Due to Linton, the culture of any society consists of the sum total of ideas, conditioned emotional responses, and patterns of habitual behaviour which the members of that society have acquired through instruction or imitation and which they share to a greater or less degree.

As we can see, definitions agree on the fact that culture consists of something that is shared and/or learned by a group of people, but the content of the culture varies in different definitions.

Culture can be studied anthropology which is “a discipline that investigates the nature and causes of human variation and those aspects of life that are common to all of humanity” and medical anthropology (a sub-field of anthropology) means “the study of health-related issues from broad anthropological perspective”.

Health

There is no single comprehensive definition of health. The WHO defines health as a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity. In WHO words Health is the general condition of a person in all aspects. It is also a level of functional and/or metabolic efficiency of an organism, often implicitly human. The word health also can be defined as the state of being free from illness or injury (Oxford dictionary). The Collins Concise Dictionary
(Sinclair 1999:662) offers a relativist-functionalist perspective. It expands the meaning of ‘health’ somewhat by stating that health is the state of being bodily and mentally vigorous and free from disease.

Psychology

Psychology is derived from the Greek words *Psyche* and *logos*, meaning soul and study. To Greeks, Psychology is simply a study of the soul (psyche) or mind. It is the science that deals with the mind and how it works. Feldman (1990) defines Psychology as the scientific study of human behaviour and mental processes. Scientific because it uses the steps in a scientific method in its quest to understand why a person behaves in a certain manner. It is systematic and empirical and it is dependent upon measurements. A scientific method generally follows the steps:

1) Identification of the Problem
2) Formulation of Hypothesis
3) Gathering of Data
4) Interpretation and Analysis of Data
5) Generalization of Conclusion

Wellness and Well being

Wellness is the overall state of being well (physically, emotionally, spiritually, culturally, psychologically) while well being is linked to wellness “…is a contented state of being happy, healthy, and prosperous”. Wellness is not an easy concept to define. The term is used in everyday language with an assumption that everyone knows what it means. Many have made attempts to define wellness.

Wellness from a Holistic Perspective

Wellness is generally viewed from a holistic perspective; it represents a perceived positive state of being and embraces a body-mind-spirit concept. Many factors contribute to wellness in a series of complex and interacting ways, but wellness, like health, is more than the absence of disease; it involves important subjective concepts by individuals about themselves. Several aspects related to wellness including physical, psychological/emotional, social, intellectual, spiritual, occupational and environmental.

Several techniques have been developed to measure wellness at an individual level. These include the Life Assessment Questionnaire (LAQ) (National Wellness Institute, 1983), developed to measure the six wellness dimensions outlined by Hettler and a modification called TestWell, the Perceived Wellness Survey (PWS), the Optimal Living Profile (OLP) and a Wellness Inventory (WI), developed by Travis to mention a few.

Sociology

Sociology is about the study of relationships. It consists of direct (face-to-face relationships) and indirect (actions and decisions made by people not known to us directly, for example policy makers). The scope of sociology is wide, where it can be ranges from large scale social and economic developments to small scale relationships in specific organizations, such as hospitals.

Anthony Giddens (‘Sociology’, 1989) provides the following general definition:

“Sociology is the study of human social life, groups and societies. It is a dazzling and compelling enterprise, having as its subject matter our own behaviour as social beings. The scope of sociology is
extremely wide, ranging from the analysis of passing encounters between individuals in the street up to the investigation of world-wide social processes”. As you will no-doubt note, Giddens in this particular extract is more-concerned with describing the sociological enterprise in very general terms than with trying to nail-down a specific definition.

In “The Complete A-Z Sociology Handbook” (1996) Tony Lawson and Joan Garrod, the two writers with recent experience of being an AQA Chief Examiner had provide the following definition:

“Sociology is the study of individuals in groups and social formations in a systematic way, which grew out of the search for understanding associated with the industrial and scientific revolutions of the 18th and 19th centuries. It is now an established discipline in post-16 education and has offered generations of students insights into the social world they inhabit. Often accused by the right of being left-wing, it includes individuals of every political opinion who are united by a commitment to search for knowledge and understanding through providing evidence for the theories and insights they offer”.

DOES HEALTH EQUAL WELL BEING?

Health may not accompany well being. Traditionally ill person may have a sense of well being, whereas a person in good health may lack a sense of well being. Thus, well being is an ongoing process through which person develops body, mind and feelings to interrelate harmoniously. Health and health care can be studied on some aspects:

- Sociology of health
- Anthropology of health
- Psychology of health

DETERMINANTS OF HEALTH

Health is created through the interplay of many factors, including economic factors, environment, genetic disposition, people’s behaviour, quality of people’s social relations, access to prevention, treatment and care services. The context of people’s lives determines their health, and so blaming individuals for having poor health or crediting them for good health is inappropriate. Individuals are unlikely to be able to directly control many of the determinants of health.

![Figure 1: The five dimensions of optimal health](image)

Fitness and exercise initiatives organized in a workplace setting are one single component of optimal health. They are categorized as ‘physical health’, which is influenced by factors such as smoking, alcohol and nutrition. There are our other components that a health initiative may address. Social Health is the ability to ‘get along’ with others, such as family members, friends and colleagues, giving
Health Care

Medical dictionary has defined health care as the prevention, treatment, and management of illness and the preservation of mental and physical well-being through the services offered by the medical and allied health professions.

Health care consist of dominant health care, traditional health care, alternative and complementary. Dominant health care are such hospitals, health clinics, trained professionals, standardized equipment and procedures and modern drugs. Dominant health care sometimes called “mainstream medicine” or “western medicine”. This healthcare system is practised by people who have been medically trained and gained professional medical qualifications. Typically in this health care they uses drugs, surgery and physical manipulation for treatment and it has developed using the philosophy that the body is composed of individual parts. According to World Health Organization, traditional medicine refers to health practices, approaches, knowledge and beliefs incorporating plant, animal and mineral based medicines, spiritual therapies, manual techniques and exercises, applied singularly or in combination to treat, diagnose and prevent illnesses or maintain well-being. Malay traditional medical system, chinese traditional medicine, indian traditional medicine and aborigines health system are example of traditional health care.

Models to study health, illness and health care

Bio-medical model

The biomedical model of illness and healing focuses on purely biological factors, and excludes psychological, environmental, and social influences. This is considered to be the dominant, modern way for health care professionals to diagnose and treat a condition in most Western countries. Most health care professionals do not first ask for a psychological or social history of a patient; instead, they tend to analyze and look for biophysical or genetic malfunctions. The focus is on objective laboratory tests rather than the subjective feelings or history of the patient.

According to this model, good health is the freedom from pain, disease, or defect. It focuses on physical processes that affect health, such as the biochemistry, physiology, and pathology of a condition. It does not account for social or psychological factors that could have a role in the illness. In this model, each illness has one underlying cause, and once that cause is removed, the patient will be healthy again.

Socio-medical model

The socio medical model of health focuses on the social factors that contribute to health and well being in society. When this model considers social factors, it particularly looks at the impact of poverty, poor housing, diet and pollution. For example, poor housing and poverty are causes to respiratory problems, and in response to these causes and origins of ill health, the socio-medical model aimed to encourage society to include better housing and introduce programmes to tackle poverty as a solution.
Social aspects of sickness

Social variables, including education, income, occupation, social cohesion, ethnicity, and race, have been related to health and illness. The effects of these variables on increased rates of illness and death are related both to behaviors (e.g., smoking) that influence bodily systems and to psychological-physiological interactions (e.g., stress responses) mediated by the brain. Because the relationships between social variables and disease processes are complex, detailed examination of the social context is required if societal contributions to health and illness are to be understood.

Social behavior influences disease and is influenced by it. Disease and disease mortality are woven into the complex of behavioral and physiological reactions to the stresses of overpopulation, which act to reduce population size. These principles are illustrated with reference to a number of diseases, including vitamin D imbalance, lactose intolerance, malaria, sickle cell anemia, plague, yellow fever, syphilis, ergot poisoning and the sweating sickness.

Nurse-patient relationships

In professional nursing, violations of professional boundaries are almost always to make ourselves come across to the patient as the victim. It does not matter whether you are whining to a patient about your personal life or accepting a gift, you have altered the role of caregiver to the person in need of care.

As stated by Farber, 1997 "Boundaries are mutually understood, unspoken physical and emotional limits of the relationship between the patient and the nurse."

Warning signs of unhealthy boundaries could be:

- You keep secrets with patients.
- You become defensive when someone questions your interaction with.
- You have received gifts from a patient.
- You speak to the patient about your own professional needs or inability.
- You speak poorly of co-workers or the hospital to patients.
- You give patients personal contact information or money.
- You fail to set limits with a patient.
- You spend duty time with patients.
- You feel that you understand the patient’s problems better than other members of the healthcare.

INEQUALITY IN HEALTH

Definition

Health inequalities refer to differences in the extent to which groups of people experience health problems, access health services and how long they live. In order to define the health inequality there are three concepts that commonly used which are differences or variations in health (or income) between groups, inequalities in health (or income) and inequalities or the unfairness of differences.

People’s life expectancy has almost doubled in the UK over the past 150 years, but there are marked variations in the health of different groups. There are gaps between different socioeconomic groups, geographic regions, ethnic groups, between men and women, between people of different age groups and between those affected by conditions such as mental health issues and others. For example, a girl born in London’s Kensington and Chelsea area might be expected to live to about 90, ten years longer than a girl born in Glasgow.
Measuring Health Inequalities

Health inequalities can be measure by some characteristics like socio-economic status for example social class such as occupational ranking, income level, education, housing and power. Besides, it can be measure by looking for the health such the mortality statistics. However, this matter does not tell much about the experience of health and illness. Researchers had found that the overall self-assessment of good or bad health is the single best indicator of health status. On the other hand, the inequalities cannot be explained just by one factor e.g. socio-economic status of users only. Other factors that affecting inequality in health care are external factors beyond control of the individual such as level of unemployment, pollution and working environment and factors over which individuals have some control like unhealthy behaviour e.g. smoking and consuming a lot of high-cholesterol foods and interactions with friends and relatives.

Gender Issues in Health

Men’s health is in no way more or less vital than the health of women or children, but it is unlike. Men have different health needs, are affected differently by various diseases and illnesses, and access services in different patterns and for different reasons.

Understanding gender is crucial to understanding male health issues because it helps to explain, for instance, why so many men take risks with their health. Even today, traditional attitudes towards gender remain surprisingly strong and prevalent. Boys and young men continue to be socialised to be tough and strong, to appear in control and to take risks. This creates dangerous behaviours such as fast driving and cigarette smoking.

It is important not to directly compare male and female health. Resources are needed for the development of better health services for both groups. And although the needs of both are different, it is clear that men’s and women’s health issues are closely intertwined.

Peggy Maguire, President, European Institute of Women’s Health

Healthcare Disparities

Numerous studies in recent years have documented disparities in the quality of health and healthcare among different racial, ethnic and socio-economic groups. For instance:

African Americans receive poorer quality of care than whites in 43 percent of the core measures, and American Indians and Alaska Natives receive poorer quality of care than whites in 38 percent of measures. Among preschool children hospitalized for asthma, 2 percent of Hispanic children are prescribed routine medications to prevent future asthma-related hospitalizations, as compared with 21 percent of white children. The length of time between an abnormal screening mammogram and the follow-up diagnostic test to determine whether a woman has breast cancer is more than twice as long for Asian American women than for white women. Low-income people, regardless of race or ethnicity, experience many of the largest disparities health care quality and access.

The Important Of Health Care Issues

The health care system is developed to meets the different needs of the people. Needs are determined based on size and distribution of population. While, the mortality rates among infants or mothers are usually used as indicators for that where in developed countries where mortality rates are low, morbidity rates are more useful. Early recording of mortality rate in European cities proved highly useful in controlling the plague and other major epidemics. Public health in industrialized countries was transformed when mortality rate as a function of age, sex and socioeconomic status emerged in the late 19th and 20th centuries. This track record has led to the argument that inexpensive recording
of vital statistics in developing countries may become the most effective means to improve global health.

Meeting the Cultural Diversity

The cultural diversity is sometimes control by the health needs of minority that are include of those in groups of migrants, inland communities and illegal population. Due to Dr. Richard Daines, although some gains have been made, racial and ethnic minorities continue to experience a disproportionate burden of disease. People of colour continue to have dramatically higher rates of HIV infection, Hispanics have higher incidence of diabetes deaths, and African Americans have higher rates of death from cancer. While progress in reducing minority health disparities for certain diseases and access to care has been made, minorities continue to experience lower health status when measured against other groups and the population as a whole, according to findings of the state's 2007 Minority Health Surveillance Report. An estimated 40% of New Yorkers are ethnic and racial minorities. Besides that, the cultural diversity is also influenced by the cross-cultural globalization and migrant activity. In this case, it is hard for the weaker country to develop their own health program for their residents and to manage their system as well as the others.

The Marmot Review

The Marmot Review was a year-long, independent review into health inequalities. The following are some of the key issues which were highlighted in the final report, "Fair Society, Healthy Lives":

- There are huge economic benefits to be gained from reducing health inequalities as ultimately less funds will be needed for illnesses associated with inequality
- Many people die prematurely as a result of health inequalities. Currently in England people who die prematurely would otherwise have enjoyed in total between 1.3 and 2.5 million extra years of life
- Tackling health inequalities is a shared responsibility and therefore it is important that action is taken on all the social determinants of health. Central and local government, the NHS, the third sector, the education system, the private sector, individuals, families and communities all have significant roles and responsibilities for reducing health inequalities
- Empowering individuals and communities to influence decision making at local level is key to effective local action

Issues in This Topic

Western biomedical perspective

"Western medicine" refers to the type of medicine practiced in the West; the United States, Western Europe, and so on. It's based on the philosophical foundations of Western thinking, which maintains that a body is only a collection of its parts, and that by isolating the parts and studying them separately, you can understand the whole.

Existence of alternative healing systems

The term "alternative medicine" is used to describe healing treatments that are not part of conventional medical training like acupuncture, massage therapy, or herbal medicine. People used to consider practices like these outside the mainstream, which is why they got the name "alternative". Many patients and health care providers use alternative treatments together with conventional therapies. This is known as complementary medicine.

Privatization of Malaysian Health Care System

A few sector of Malaysian health care system such haemodialysis; pharmaceutical and hospital support had been privatized for several reasons. Sometimes this could be a controversial because of a political motive and healthcare disparities among the middle group. However, the privatization
actually can make the services and management being more effective and productive and also contribute to the growth and development of economy.

Bridging the social and economic disparity

According to Dr Muhammed Abdul Khalid, although Malaysia has made great strides in reducing poverty and inequality (especially between ethnic groups) from 1970 to 1990, the inequality remains high post-1990. It has remained almost at the same level for the past 20 years; in fact, the inequality in Malaysia is among the highest in the region. Before the 1990s, the inequality improved tremendously, due to commendable government policies that include the promotion of export-oriented industrialisation, education, and training, and the restructuring of equity ownership and assistance in asset accumulation. However, post-1990s, there is little change in inequality due to the difference in the growth rates of incomes of the rural and urban areas, return on assets against wages, inflows of migrant workers, and impediments to the process of internal migration. Although there was huge improvement in the rural-urban gap, it also has stopped improving since the 90’s, the income gap ratio between urban and rural in 2009 is almost at the same level as in the year 1989. But in absolute terms, the income gap has in fact widen considerably, it has jumped three times during the same period. The gap between the rich and the poor also remains wide and equally high across all ethnic groups in absolute terms.

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CHAPTER 6
Measures of Morbidity and Mortality

Indicator of health

Health indicators are individual measures of health that must be assessed individually, and then combined collectively to measure health accurately. Individual measures should be evaluated for reliability, validity and practicality of administration and analysis. The efficient system of recording the mortality and morbidity is a fundamental requirement for defining the principal current problems in the fields of public health, preventive medicine, social medicine and epidemiology. Without these vital statistics, means this field is nothing as there is no yardstick by which to measure progress and no certain indication of the points to be concentrate. As survival improves with modernization and populations age, mortality measures do not give an adequate picture of a population’s health status where the indicators of morbidity become more important.

Morbidity

Morbidity is any departure from health or another term for illness. This results in or has potential to result in at least some restriction on performing the normal activities of life. In many countries some morbidity data are collected to meet legal requirements such as in respect of notifiable diseases.

The morbidity is not east to measure as mortality because illness can recur, varies duration of episodes and sometimes is not well defined. The sources of information on morbidity are data on hospital admissions and discharges, outpatients and primary health care consultations, and specialist services, and registers of diseases events such as cancer and congenital malformations. However, to be useful for epidemiological studies the data must be relevant and easily accessible. The magnitude of morbidity in community can be measured by:

i. the number of person affected
ii. the number of episodes of sickness, particularly for acute conditions
iii. the duration of illness or of restricted activity in affected person
iv. the severity of illness in different patient

Basic measurements of morbidity:

1. Prevalence:

Prevalence is a measure of disease that allows us to determine a person's likelihood of having a disease. Therefore, the number of prevalent cases is the total number of cases of disease existing in a population. It refers to all current cases (old and new) existing at a given point in time or over a period of time in a given population. A prevalence rate is the total number of cases of a disease existing in a population divided by the total population. So, if a measurement of cancer is taken in a population of 40,000 people and 1,200 were recently diagnosed with cancer and 3,500 are living with cancer, then the prevalence of cancer is 0.118. (or 11,750 per 100,000 persons).

Prevalence data provide an indication of the extent of a health problem and thus may have implication for the scope of health services needed in the community. It will useful in describing the health burden of a population, to estimate the frequency of an exposure, and in allocation of health resources, such as facilities and personnel
There are two types of prevalence:

i. **Point prevalence** - disease is defined as the number of all current cases of a disease at one/single point in time in a defined population.

\[
\text{Point prevalence} = \frac{\text{no. of person ill at a time point}}{\text{Total no in the group at a time point}} \times 100
\]

ii. **Period prevalence** - disease is defined as the number of all current cases of a disease existing during a defined period of time in a defined population (eg: annual prevalence)

\[
\text{Point prevalence} = \frac{\text{no. of person ill during a time period}}{\text{Average population during a time period}} \times 100
\]

2. Incidence:

Incidence is a measure of disease that allows us to determine a person's probability of being diagnosed with a disease during a given period of time. Generally, it is defined as the number of new cases of a disease in a defined population during a specified period of time. This means that individual who have a history of the disease are not included. Therefore, incidence is the number of newly diagnosed cases of a disease. An incidence rate is the number of new cases of a disease divided by the number of persons at risk for the disease. For example, if over the course of one year, five women are diagnosed with breast cancer, out of a total female study population of 200 (who do not have breast cancer at the beginning of the study period), then we would say the incidence of breast cancer in this population was 0.025 (or 2,500 per 100,000 women-years of study).

An incidence rate includes three important elements:

1. a numerator- the number of new cases
2. a denominator- the population at risk which may represent special risk categories.
3. time- the period during which the cases occur

There are two types of incidence:

i. **Cumulative incidence** – number of new cases of a specific disease in a specific period of time divided by total population at risk during the same time period whereas time is not an integral part but just expressed by the word only.

ii. **Incidence rate** - occurrence of disease that arises during person-time observation. The numerator is identical to that cumulative incidence but the different is in incidence's rate denominator which it integrates time (t) that makes it a true rate.

3. Other measures of morbidity

1. **Attack rate** – incidence rate used in such a population is observed for a short time period such as epidemics or outbreak of disease.
Attack rate = \( \frac{\text{no. of cases during the epidemic}}{\text{Total no. of exposed or at risk during the same period}} \times 100 \)

2. Secondary attack rate - defined as the number of exposed person developing the disease within the range of the incubation period following exposure to primary case.

Mortality

Mortality is another term for death. Death is a unique and universal event, and clearly defined as final event in human life. Mortality is the number of deaths due to a disease divided by the total population. If there are 25 lung cancer deaths in one year in a population of 30,000, then the mortality rate for that population is 83 per 100,000. In high mortality settings, information on trends of death (by causes) substantiates the progress of health programs. The sources of mortality information can get from the national vital registration systems, household surveys, death registration and special longitudinal population study.

Measurement of mortality:

The measures of mortality include life expectancy, death in infancy, death from all causes major diseases and from untimely causes such as suicide and accident. The basic concept of a rate can be broken into three general categories: crude rates, specific rates and adjusted rates.

1. Crude rates

Crude rates are summary rates based on the actual number of events in a population over a given time period. It does not account for differences of age, sex, or any other aspects of death. This limit and give disadvantage of CDR as it take no account of the fact that the chance of dying varies according to age, sex, race, socioeconomic class and other factor and not usually appropriate to use for comparing different time periods or geographical. Examples of crude rates are:

i. Crude death rate (CDR)

\[ \text{CDR} = \frac{\text{Total deaths per year}}{\text{Average total population of that year}} \times 100 \]

Infant mortality rate (IMR):

It can be used for international comparisons, a high rate indicates unmet health needs and poor environmental conditions.

\[ \text{IMR} = \frac{\text{no. of child death less than 1 year old/1 year} \times 1000}{\text{no. of live births in the same year}} \]
ii. Neonatal mortality (NMR):

It measures risk of dying among newborn infants who are under the age of 28 days for a given year. The formula is as follow:

\[
NMR = \frac{\text{no. of infant deaths <28 days old}}{\text{no. of live births in the same year}} \times 1000
\]

It can reflect event happening after birth, primarily the congenital malformations, prematurity and low birth weight.

iii. Maternal mortality rates (MMR):

Maternal death is death of a woman while pregnant or within 42 days of termination of pregnancy from any cause related to or aggravated by the pregnancy or its management but not from accidental causes.

\[
MMR = \frac{\text{no. of deaths from puerperal/year/population}}{\text{total no. of births in the same period and population}} \times 100,000
\]

2. Specific rates

Although the crude rates describe so far are important and useful summary measures of the occurrence of disease, they still have limitation as it cannot making comparative statements about diseases frequencies in populations. Specific rates refer to a particular subgroup of the population defined, for example, in terms of race, age or sex, or they may refer to the entire population but be specific for some single cause of death or illness.

i. Cause specific mortality rate (CSMR):

\[
CSMR = \frac{\text{no. of death by certain disease/group/year}}{\text{Total mortality cause population in the same period}} \times 100,000
\]

ii. Case fatality rate (CFR):

\[
CFR = \frac{\text{no. of death by a certain disease in given time}}{\text{no. of diagnosed cases in the same period}} \times 100
\]

iii. Age-specific rates:

This can be calculate by divide the age in defined group for example 5 to 10 years old and then one divide the frequency of a disease in a particular age stratum to find the age specific rates.
**Age-specific rates**

\[ \text{age-specific rates} = \frac{\text{no. of death among those aged 10-15 years}}{\text{no. of person aged 10-15 years (during time period)}} \times 100,000 \]

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CHAPTER 7

Communicable diseases: HIV/AIDS, Malaria, Dengue fever

Definition

- **Communicable diseases** (infectious diseases or transmissible diseases) are diseases for which biological agents or their products are the cause and which are transmissible from one individual to another. The disease process begins when the causative agent is able to lodge and grow or reproduce within the body.
- The process of lodgement and growth of a microorganism or virus in the host is termed *infection*.
- Infectious pathogens include some viruses, bacteria, fungi, protozoa, multicellular parasites, and aberrant proteins known as prions. These pathogens are the cause of disease epidemics, in the sense that without the pathogen, no infectious epidemic occurs.
- It is also called "contagious" when they are easily transmitted by contact with an ill person or their secretions (e.g., influenza). A contagious disease is a subset of infectious disease that is especially infective or easily transmitted.
- Other types of infectious/transmissible/communicable diseases with more specialized routes of infection, such as vector transmission or sexual transmission, are usually not regarded as "contagious".

Classification

- Infectious disease results from the interplay between those few pathogens and the defences of the hosts they infect.

![Diagram](image.png)

Figure 1

- Left model in Figure 1, shows agent, host, and environment as having equal influence.
- Right model – shows agent and host as variables that are dependent on each other and on the environment.
- Different diseases require different balances and interactions of these three components.
  - Epidemiologic triad serves as a useful model for many infectious diseases.
  - Inadequate for cardiovascular disease, cancer, and other diseases that appear to have multiple contributing causes without a single necessary one.
Agent originally referred to an infectious microorganism or pathogen: a virus, bacterium, parasite, or other microbe. Agent must be present for disease to occur - however, presence of that agent alone is not always sufficient to cause disease. A variety of factors influence whether exposure to an organism will result in disease:
- Infectivity – ability to invade a host
- Pathogenicity – ability to cause a disease
- Virulence – ability to cause severe disease or death

Host refers to the human who can get the disease. A variety of factors intrinsic to the host, sometimes called risk factors, can influence an individual’s exposure, susceptibility, or response to a causative agent. Opportunities for exposure are often influenced by behaviours such as sexual practices, hygiene, and other personal choices as well as by age and sex.

Environment refers to extrinsic factors that affect the agent and the opportunity for exposure. Environmental factors include physical factors such as:
- geology and climate
- biologic factors such as insects that transmit the agent
- socioeconomic factors such as crowding, sanitation
- availability of health services
- transportation

Transmission
- An infectious disease is transmitted from some source. Defining the means of transmission plays an important part in understanding the biology of an infectious agent, and in addressing the disease it causes.
- Transmission may occur through several different mechanisms;
  - aerosolized droplets, spread by sneezing, coughing, talking, kissing – i.e. respiratory diseases and meningitis are commonly acquired by contact with
  - ingesting contaminated food and water – i.e. gastrointestinal diseases are
  - contact with bodily fluids, generally as a result of sexual activity – i.e. sexually transmitted diseases
  - contact with a contaminated, inanimate object (known as a fomite) i.e. coin passed from one person to another, while other diseases penetrate the skin directly.
  - Vector i.e. mechanical or biological vectors.
    - Mechanical vector picks up an infectious agent on the outside of its body and transmits it in a passive manner. (i.e. housefly, which lands on cow dung, contaminating its appendages with bacteria from the feces, and then lands on food prior to consumption).
    - Biological vectors harbor pathogens within their bodies and deliver pathogens to new hosts in an active manner (usually a bite). Biological vectors are often responsible for serious blood-borne diseases, such as malaria, viral encephalitis, Chagas disease, Lyme disease and African sleeping sickness. Biological vectors i.e. arthropods, mosquitoes, ticks, fleas and lice.
    - A common strategy used to control vector borne infectious diseases is to interrupt the life cycle of a pathogen by killing the vector.
Timeline for infection and disease

1. Dynamics of infection

- **Latent period** is time that elapse before an infected host becomes infective.
- **Infectious period** is the time during which an infectious agent may be transferred directly or indirectly from an infected person to another person, from an infected animal to man, or from an infected person to an animal, including arthropods.
- Why doesn’t infection result in disease immediately?
  - Time for organism to replicate sufficiently to build critical mass needed for disease
  - Site in body at which the organism replicates may matter (near skin vs. deeper in body)
  - Dose of infectious agent at time of infection (may affect length)
2. Pattern of disease occurrence

- Level of Disease is amount of a particular disease that is usually present in a community (Figure 4).

- **Sporadic** is the cases that occur irregularly, haphazardly from time to time, and generally infrequently. The cases are few and separated widely in time and place. It show no or little connection with each other, nor a recognizable common source of infection e.g. polio, meningococcal meningitis, tetanus

- **Endemic** is refers to the constant presence of a disease or infectious agent within a given geographic area or population group. It is the usual or expected frequency of disease within a population (En = in; demos = people)

- **Epidemic** is the unusual occurrence in a community of disease, specific health related behavior, or other health related events clearly in excess of expected occurrence (epi= upon; demos= people).

- **Pandemic** is an epidemic usually affecting a large proportion of the population, occurring over a wide geographic area such as a section of a nation, the entire nation, a continent or the world e.g. Influenza pandemics.

- **Point epidemic** is when the epidemic begins at one central point, with a large number of cases coming in contact with the source over a short time. A very rapid form of spread with a number of cases presenting with the same stage of the disease at the one time, indicating the single source of the pathogen. It is single exposure, does not spread. E.g. Food - borne disease outbreaks.

- **Propagated epidemic** is an outbreak in which the disease propagates in one or more initial cases and then spreads to others, a relatively slow method of spread. It often involves vectors or carriers.

- **Outbreak** is two or more related cases in infections, suggesting the possibility of a common source or transmission between the cases.

Prevention

- The different points in the progression of a disease at which one can intervene can be classified according to three levels of prevention: primary, secondary, and tertiary.

  - **Primary prevention** with objectives to promote health, prevent exposure, and prevent disease.
    - Health promotion - consists of general non-specific interventions that enhance health and the ability to resist disease, such as measures aimed at the improvement of socio-economic status through the provision of adequately paid jobs, education and vocational training, affordable and
    - Prevention of exposure i.e. by reducing exposure of the child to contaminated milk.
    - Prevention of disease after exposure i.e. by the provision of anti-infective factors, including antibodies, white blood cells, and others

  - **Secondary prevention** is after the biological onset of disease, but before permanent damage sets in. The objective is to stop or slow the progression of disease so as to prevent or limit permanent damage, through the early detection and treatment of disease (e.g. breast cancer (prevention of...
the invasive stage of the disease), trachoma (prevention of blindness), and syphilis (prevention of tertiary or congenital syphilis).

- Tertiary prevention is when permanent damage has set in. The objective of tertiary prevention is to limit the impact of that damage. The impact can be physical, psychological, social (social stigma or avoidance by others), and financial.

- Rehabilitation refers to the retraining of remaining functions for maximum effectiveness, and should be seen in a very broad sense, not simply limited to the physical aspect. Thus the provision of special disability pensions would be a form of tertiary prevention.

Communicable disease control

- Communicable disease control refers to the reduction of the incidence and prevalence of communicable disease to a level where it cannot be a major public health problem.

- There are three main methods of controlling communicable diseases;
  a) Elimination of the Reservoir
  b) Interruption of transmission
  c) Protection of susceptible host

- Elimination of reservoir:
  (i) Man as reservoir. When man is the reservoir, eradication of an infected host is not a viable option. Instead, the following options are considered;
    a) Detection and adequate treatment of cases - arrests the communicability of the disease (e.g. Treatment of active pulmonary tuberculosis).
    b) Isolation - separation of infected persons for a period of communicability of the disease. Isolation is indicated for infectious disease with high morbidity and mortality and high infectivity
    c) Quarantine: limitation of the movement of apparently well person or animal who has been exposed to the infectious disease for a duration of the maximum incubation period of the disease.
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- Interruption of transmission involves the control of the modes of transmission from the reservoir to the potential new host through:
  o Improvement of environmental sanitation and personal hygiene
  o Control of vectors
  o Disinfections and sterilization

- Protection of susceptible host; this can be achieved through;
  o Immunization: Active or Passive
  o Chemo-prophylaxis- (e.g. Malaria, meningococcal meningitis, etc.)
  o Better nutrition
  o Personal protection. (e.g. wearing of shoes, use of mosquito bed net, insect repellents, etc.)

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- Diagnosis of infectious disease sometimes involves identifying an infectious agent either directly or indirectly.
  o Microbial culture
  o Microscopy (fluorescence microscop)
  o Biochemical test (Serological methods)
  o Molecular diagnostic (polymerase chain reaction (PCR) method
  o Indication of test (i.e. anti-retroviral drugs)
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Note: Other causes of death include maternal and perinatal conditions (5.2%), nutritional deficiencies (0.9%), noncommunicable conditions (58.8%), and injuries (9.1%).

Example of communicable diseases

1. HIV/AIDS
   - Human immunodeficiency virus infection / acquired immunodeficiency syndrome (HIV/AIDS) is a disease of the human immune system caused by the human immunodeficiency virus (HIV).
   - During the initial infection a person may experience a brief period of influenza-like illness. This is typically followed by a prolonged period without symptoms. As the illness progresses it interferes more and more with the immune system, making people much more likely to get infections, including opportunistic infections, and tumors that do not usually affect people with working immune systems (Figure 5).
   - HIV is transmitted primarily via unprotected sexual intercourse (including anal and even oral sex), contaminated blood transfusions and hypodermic needles, and from mother to child during pregnancy, delivery, or breastfeeding.
   - Some bodily fluids, such as saliva and tears, do not transmit HIV.
   - Prevention of HIV infection, primarily through safe sex and needle-exchange programs, is a key strategy to control the spread of the disease. There is no cure or vaccine; however, antiretroviral treatment can slow the course of the disease and may lead to a near-normal life expectancy.
   - Genetic research indicates that HIV originated in west-central Africa during the early twentieth century. AIDS was first recognized by the Centers for Disease Control and Prevention (CDC) in 1981 and its cause—HIV infection—was identified in the early part of the decade.
• Since its discovery, AIDS has caused nearly 30 million deaths (as of 2009). As of 2010, approximately 34 million people have contracted HIV globally. AIDS is considered a pandemic—a disease outbreak which is present over a large area and is actively spreading (Figure 7).

• HIV/AIDS has had a great impact on society, both as an illness and as a source of discrimination. The disease also has significant economic impacts. There are many misconceptions about HIV/AIDS such as the belief that it can be transmitted by casual non-sexual contact.

Figure 5: Main symptoms of AIDS

• The WHO system uses the following categories to classify HIV and HIV related disease (Figure 6):

  i. Primary HIV infection: May be either asymptomatic or associated with acute retroviral syndrome.
  ii. Stage I: HIV infection is asymptomatic with a CD4$^+$ T cell count (also known as CD4 count) greater than 500/uL. May include generalized lymph node enlargement.
  iii. Stage II: Mild symptoms which may include minor mucocutaneous manifestations and recurrent upper respiratory tract infections. A CD4 count of less than 500/uL.
  iv. Stage III: Advanced symptoms which may include unexplained chronic diarrhea for longer than a month, severe bacterial infections including tuberculosis of the lung as well as a CD4 count of less than 350/uL.
  v. Stage IV or AIDS: severe symptoms which include toxoplasmosis of the brain, candidiasis of the esophagus, trachea, bronchi or lungs and Kapos'i sarcoma. A CD4 count of less than 200/uL.
Figure 6: A generalized graph of the relationship between HIV copies (viral load) and CD4\(^+\) T cell counts over the average course of untreated HIV infection.

Figure 7: Estimated HIV/AIDS prevalence among young adults (15-49) by country as of 2011.

2. **Malaria**

   - Malaria is caused by a parasite called *Plasmodium*, which is transmitted via the bites of infected mosquitoes. In the human body, the parasites multiply in the liver, and then infect red blood cells.

   - Five species of *Plasmodium* parasites that can infect malaria to human:
     - *P. falciparum* (most common, caused majority of death)
     - *P. vivax* (most common)
     - *P. ovale*
     - *P. malariae* (cause a generally milder form of malaria that is rarely fatal)
     - *P. knowlesi* (recent one, cause malaria among monkeys in South-East Asia)

   - Malaria is transmitted exclusively through the bites of *Anopheles* mosquitoes. The intensity of transmission depends on factors related to the parasite, the vector, the human host, and the environment.

   - About 20 different *Anopheles* species are locally important around the world and species bite at night. *Anopheles* mosquitoes breed in water and each species has its own breeding preference; for example some prefer shallow collections of fresh water, such as puddles, rice fields, and hoof prints.

   - Transmission is more intense in places where the mosquito lifespan is longer (so that the parasite has time to complete its development inside the mosquito) and where it prefers to bite humans rather than other animals. For example, the long lifespan and strong human-biting habit
• Of the African vector species is the main reason why more than 90% of the world’s malaria deaths are in Africa.

• Transmission also depends on climatic conditions that may affect the number and survival of mosquitoes, such as rainfall patterns, temperature and humidity. In many places, transmission is seasonal, with the peak during and just after the rainy season.

• Human immunity is another important factor, especially among adults in areas of moderate or intense transmission conditions. Most malaria deaths in Africa occur in young children, whereas in areas with less transmission and low immunity, all age groups are at risk.

• Symptoms of malaria include fever, headache, and vomiting, and usually appear between 10 and 15 days after the mosquito bite. If not treated, malaria can quickly become life-threatening by disrupting the blood supply to vital organs. In many parts of the world, the parasites have developed resistance to a number of malaria medicines.

• **Who is at risk?** - Approximately half of the world’s population is at risk of malaria. Most malaria cases and deaths occur in sub-Saharan Africa. However, Asia, Latin America, and to a lesser extent the Middle East and parts of Europe are also affected. In 2010, 99 countries and territories had ongoing malaria transmission.

• Specific population risk groups include:
  i. young children
  ii. non-immune pregnant women
  iii. semi-immune pregnant women
  iv. semi-immune HIV-infected pregnant women
  v. people with HIV/AIDS;
  vi. international travellers from non-endemic areas
  vii. immigrants from endemic areas and their children

• Key interventions to control malaria include: prompt and effective treatment with artemisinin-based combination therapies; use of insecticidal nets by people at risk; and indoor residual spraying with insecticide to control the vector mosquitoes.

3. **Dengue fever**

• Dengue fever is an infectious tropical disease caused by the dengue virus. Dengue is transmitted by several species of mosquito within the genus *Aedes*, principally *A. aegypti* (Figure 5).

• The virus has four different types; infection with one type usually gives lifelong immunity to that type, but only short-term immunity to the others. Subsequent infection with a different type increases the risk of severe complications. As there is no commercially available vaccine, prevention is sought by reducing the habitat and the number of mosquitoes and limiting exposure to bites.

![Figure 5: A. aegypti](image-url)
• Treatment of acute dengue is supportive, using either oral or intravenous rehydration for mild or moderate disease, and intravenous fluids and blood transfusion for more severe cases.

• The incidence of dengue fever has increased dramatically since the 1960s, with around 50–100 million people infected yearly. Early descriptions of the condition date from 1779, and its viral cause and the transmission were elucidated in the early 20th century. Dengue has become a global problem since the Second World War and is endemic in more than 110 countries.

• The characteristic symptoms of dengue are sudden-onset fever, headache, muscle and joint pains, and a rash similar to measles. In a small proportion of cases the disease develops into the life-threatening dengue hemorrhagic fever, resulting in bleeding, low levels of blood platelets and blood plasma leakage, or into dengue shock syndrome, where dangerously low blood pressure occurs.

• The course of infection is divided into three phases: febrile, critical, and recovery (Figure 8).

• The **febrile phase** involves high fever, often above 40°C (104 °F), and is associated with generalized pain and a headache; this usually lasts for two to seven days.

• Vomiting may also occur. A rash occurs in 50–80% of those with symptoms in the first or second day of symptoms as flushed skin, or later in the course of illness (days 4–7), as a measles-like rash. Some petechiae (small red spots that do not disappear when the skin is pressed, which are caused by broken capillaries) can appear at this point, as may some mild bleeding from the mucous membranes of the mouth and nose. The fever itself is classically biphasic in nature, breaking and then returning for one or two days.

• In some people, the disease proceeds to a **critical phase** around the time fever resolves and typically lasts one to two days. During this phase there may be significant fluid accumulation in the chest and abdominal cavity due to increased capillary permeability and leakage. This leads to depletion of fluid from the circulation and decreased blood supply to vital organs. During this phase, organ dysfunction and severe bleeding, typically from the gastrointestinal tract, may occur.

• Shock (dengue shock syndrome) and hemorrhage (dengue hemorrhagic fever) occur in less than 5% of all cases of dengue, however those who have previously been infected with other serotypes of dengue virus ("secondary infection") are at an increased risk.

• The **recovery phase** occurs next, with resorption of the leaked fluid into the bloodstream. This usually lasts two to three days. The improvement is often striking, but there may be severe itching and a slow heart rate. Another rash may occur with either a maculopapular or a vasculitic appearance, which is followed by peeling of the skin. During this stage, a fluid overload state may occur, if it affects the brain, it may cause a reduced level of consciousness or seizures. A feeling of fatigue may last for weeks in adults.

![Figure 8: The clinical course of dengue fever](image-url)
Prevention and control - At present, the only method to control or prevent the transmission of dengue virus is to combat vector mosquitoes through:

- a) preventing mosquitoes from accessing egg-laying habitats by environmental management and modification;
- b) disposing of solid waste properly and removing artificial man-made habitats;
- c) covering, emptying and cleaning of domestic water storage containers on a weekly basis;
- d) applying appropriate insecticides to water storage outdoor containers;
- e) using of personal household protection such as window screens, long-sleeved clothes, insecticide treated materials, coils and vaporizers;
- f) improving community participation and mobilisation for sustained vector control;
- g) applying insecticides as space spraying during outbreaks as one of the emergency vector control measures;
- h) active monitoring and surveillance of vectors should be carried out to determine effectiveness of control interventions.

REFERENCES


CHAPTER 7

Communicable diseases: HIV/AIDS, Malaria, Dengue fever

Definition

- **Communicable diseases** (infectious diseases or transmissible diseases) are diseases for which biological agents or their products are the cause and which are transmissible from one individual to another. The disease process begins when the causative agent is able to lodge and grow or reproduce within the body.
- The process of lodgement and growth of a microorganism or virus in the host is termed infection.
- Infectious pathogens include some viruses, bacteria, fungi, protozoa, multicellular parasites, and aberrant proteins known as prions. These pathogens are the cause of disease epidemics, in the sense that without the pathogen, no infectious epidemic occurs.
- It is also called "contagious" when they are easily transmitted by contact with an ill person or their secretions (e.g., influenza). A contagious disease is a subset of infectious disease that is especially infective or easily transmitted.
- Other types of infectious/transmissible/communicable diseases with more specialized routes of infection, such as vector transmission or sexual transmission, are usually not regarded as "contagious".

Classification

- Infectious disease results from the interplay between those few pathogens and the defences of the hosts they infect.

![Figure 1](image)

- Left model in Figure 1, shows agent, host, and environment as having equal influence.
- Right model – shows agent and host as variables that are dependent on each other and on the environment.
- Different diseases require different balances and interactions of these three components.
• epidemiologic triad serves as a useful model for many infectious diseases

• inadequate for cardiovascular disease, cancer, and other diseases that appear to have multiple contributing causes without a single necessary one
• **Agent** originally referred to an infectious microorganism or pathogen: a virus, bacterium, parasite, or other microbe. Agent must be present for disease to occur - however, presence of that agent alone is not always sufficient to cause disease. A variety of factors influence whether exposure to an organism will result in disease:
  - Infectivity – ability to invade a host
  - Pathogenicity – ability to cause a disease
  - Virulence – ability to cause severe disease or death

• **Host** refers to the human who can get the disease. A variety of factors intrinsic to the host, sometimes called risk factors, can influence an individual’s exposure, susceptibility, or response to a causative agent. Opportunities for exposure are often influenced by behaviours such as sexual practices, hygiene, and other personal choices as well as by age and sex.

• **Environment** refers to extrinsic factors that affect the agent and the opportunity for exposure. Environmental factors include physical factors such as:
  - geology and climate
  - biologic factors such as insects that transmit the agent
  - socioeconomic factors such - crowding, sanitation
  - availability of health services
  - transportation

Transmission

• An infectious disease is transmitted from some source. Defining the means of transmission plays an important part in understanding the biology of an infectious agent, and in addressing the disease it causes.

• Transmission may occur through several different mechanisms;
  - aerosolized droplets, spread by sneezing, coughing, talking, kissing – i.e. respiratory diseases and meningitis are commonly acquired by contact with
  - ingesting contaminated food and water – i.e. gastrointestinal diseases are
  - contact with bodily fluids, generally as a result of sexual activity – i.e. sexually transmitted diseases
  - contact with a contaminated, inanimate object (known as a fomite) i.e. coin passed from one person to another, while other diseases penetrate the skin directly.
  - Vector i.e. mechanical or biological vectors.
    - **Mechanical vector** picks up an infectious agent on the outside of its body and transmits it in a passive manner. (i.e. housefly, which lands on cow dung, contaminating its appendages with bacteria from the feces, and then lands on food prior to consumption).
    - **Biological vectors** harbor pathogens within their bodies and deliver pathogens to new hosts in an active manner (usually a bite). Biological vectors are often responsible for serious blood-borne diseases, such as malaria, viral encephalitis, Chagas disease, Lyme disease and African sleeping sickness. Biological vectors i.e. arthropods, mosquitoes, ticks, fleas and lice.
    - A common strategy used to control vector borne infectious diseases is to interrupt the life cycle of a pathogen by killing the vector.
Timeline for infection and disease

1. Dynamics of infection

- **Latent period** is time that elapse before an infected host becomes infective
- **Infectious period** is the time during which an infectious agent may be transferred directly or indirectly from an infected person to another person, from an infected animal to man, or from an infected person to an animal, including arthropods
- **Incubation period** is an interval from receipt of infection to time of onset of clinical illness
- Why doesn’t infection result in disease immediately?
  - Time for organism to replicate sufficiently to build critical mass needed for disease
  - Site in body at which the organism replicates may matter (near skin vs. deeper in body)
  - Dose of infectious agent at time of infection (may affect length)
2. **Pattern of disease occurrence**

- **Level of Disease** is amount of a particular disease that is usually present in a community (Figure 4).

![Figure 4: Pattern of disease occurrence](image)

- **Sporadic** is the cases that occur irregularly, haphazardly from time to time, and generally infrequently. The cases are few and separated widely in time and place. It show no or little connection with each other, nor a recognizable common source of infection e.g. polio, meningococcal meningitis, tetanus.

- **Endemic** is refers to the constant presence of a disease or infectious agent within a given geographic area or population group. It is the usual or expected frequency of disease within a population (En = in; demos = people).

- **Epidemic** is the unusual occurrence in a community of disease, specific health related behavior, or other health related events clearly in excess of expected occurrence (epi= upon; demos= people).

- **Pandemic** is an epidemic usually affecting a large proportion of the population, occurring over a wide geographic area such as a section of a nation, the entire nation, a continent or the world e.g. Influenza pandemics.

- **Point epidemic** is when the epidemic begins at one central point, with a large number of cases coming in contact with the source over a short time. A very rapid form of spread with a number of cases presenting with the same stage of the disease at the one time, indicating the single source of the pathogen. It is single exposure, does not spread. E.g. Food borne disease outbreaks.

- **Propagated epidemic** is an outbreak in which the disease propagates in one or more initial cases and then spreads to others, a relatively slow method of spread. It often involves vectors or carriers.

- **Outbreak** is two or more related cases in infections, suggesting the possibility of a common source or transmission between the cases.

**Prevention**

- The different points in the progression of a disease at which one can intervene can be classified according to three levels of prevention: primary, secondary, and tertiary.

- Primary prevention with objectives to promote health, prevent exposure, and prevent disease.
  - **Health promotion** - consists of general non-specific interventions that enhance health and the ability to resist disease, such as measures aimed at the improvement of socio-
economic status through the provision of adequately paid jobs, education and vocational training, affordable and
- Prevention of exposure i.e. by reducing exposure of the child to contaminated milk,
- Prevention of disease after exposure i.e. by the provision of anti-infective factors, including antibodies, white blood cells, and others

• Secondary prevention is after the biological onset of disease, but before permanent damage sets in. The objective is to stop or slow the progression of disease so as to prevent or limit permanent damage, through the early detection and treatment of disease (e.g. breast cancer (prevention of the invasive stage of the disease), trachoma (prevention of blindness), and syphilis (prevention of tertiary or congenital syphilis))

• Tertiary prevention is when permanent damage has set in. The objective of tertiary prevention is to limit the impact of that damage. The impact can be physical, psychological, social (social stigma or avoidance by others), and financial.

• Rehabilitation refers to the retraining of remaining functions for maximum effectiveness, and should be seen in a very broad sense, not simply limited to the physical aspect. Thus the provision of special disability pensions would be a form of tertiary prevention.

Communicable disease control
• Communicable disease control refers to the reduction of the incidence and prevalence of communicable disease to a level where it cannot be a major public health problem.

• There are three main methods of controlling communicable diseases;
  a) Elimination of the Reservoir
  b) Interruption of transmission
  c) Protection of susceptible host

• Elimination of reservoir:
  (i) Man as reservoir. When man is the reservoir, eradication of an infected host is not a viable option. Instead, the following options are considered;
    a) Detection and adequate treatment of cases - arrests the communicability of the disease (e.g. Treatment of active pulmonary tuberculosis).
    b) Isolation - separation of infected persons for a period of communicability of the disease. Isolation is indicated for infectious disease with high morbidity and mortality and high infectivity
    c) Quarantine: limitation of the movement of apparently well person or animal who has been exposed to the infectious disease for a duration of the maximum incubation period of the disease.

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HIV is transmitted primarily via unprotected sexual intercourse (including anal and even oral sex), contaminated blood transfusions and hypodermic needles, and from mother to child during pregnancy, delivery, or breastfeeding.

Some bodily fluids, such as saliva and tears, do not transmit HIV.

Prevention of HIV infection, primarily through safe sex and needle-exchange programs, is a key strategy to control the spread of the disease. There is no cure or vaccine; however, antiretroviral treatment can slow the course of the disease and may lead to a near-normal life expectancy.

Genetic research indicates that HIV originated in west-central Africa during the early twentieth century. AIDS was first recognized by the Centers for Disease Control and Prevention (CDC) in 1981 and its cause—HIV infection—was identified in the early part of the decade.

Since its discovery, AIDS has caused nearly 30 million deaths (as of 2009). As of 2010, approximately 34 million people have contracted HIV globally. AIDS is considered a pandemic—a disease outbreak which is present over a large area and is actively spreading. (Figure 7)

HIV/AIDS has had a great impact on society, both as an illness and as a source of discrimination. The disease also has significant economic impacts. There are many misconceptions about HIV/AIDS such as the belief that it can be transmitted by casual non-sexual contact.

The WHO system uses the following categories to classify HIV and HIV related disease (Figure 6):

vi. Primary HIV infection: May be either asymptomatic or associated with acute retroviral syndrome.

vii. Stage I: HIV infection is asymptomatic with a CD4+ T cell count (also known as CD4 count) greater than 500/uL. May include generalized lymph node enlargement.

viii. Stage II: Mild symptoms which may include minor mucocutaneous manifestations and recurrent upper respiratory tract infections. A CD4 count of less than 500/uL.
ix. Stage III: Advanced symptoms which may include unexplained chronic diarrhea for longer than a month, severe bacterial infections including tuberculosis of the lung as well as a CD4 count of less than 350/uL.

x. Stage IV or AIDS: severe symptoms which include toxoplasmosis of the brain, candidiasis of the esophagus, trachea, bronchi or lungs and Kaposi's sarcoma. A CD4 count of less than 200/uL.

Figure 6: A generalized graph of the relationship between HIV copies (viral load) and CD4+ T cell counts over the average course of untreated HIV infection.

Figure 7: Estimated HIV/AIDS prevalence among young adults (15-49) by country as of 2011.

2. Malaria

- Malaria is caused by a parasite called Plasmodium, which is transmitted via the bites of infected mosquitoes. In the human body, the parasites multiply in the liver, and then infect red blood cells.

- Five species of Plasmodium parasites that can infect malaria to human:
  - P. falciparum (most common, caused majority of death)
  - P. vivax (most common)
  - P. ovale
  - P. malariae (cause a generally milder form of malaria that is rarely fatal)
  - P. knowlesi (recent one, cause malaria among monkeys in South-East Asia)

- Malaria is transmitted exclusively through the bites of Anopheles mosquitoes. The intensity of transmission depends on factors related to the parasite, the vector, the human host, and the environment.

- About 20 different Anopheles species are locally important around the world and species bite at night. Anopheles mosquitoes breed in water and each species has its own breeding preference;
for example some prefer shallow collections of fresh water, such as puddles, rice fields, and hoof
prints.

- **Transmission** is more intense in places where the mosquito lifespan is longer (so that the
parasite has time to complete its development inside the mosquito) and where it prefers to bite
humans rather than other animals. For example, the long lifespan and strong human-biting habit
of the African vector species is the main reason why more than 90% of the world's malaria deaths
are in Africa.

- Transmission also depends on climatic conditions that may affect the number and survival of
mosquitoes, such as rainfall patterns, temperature and humidity. In many places, transmission is
seasonal, with the peak during and just after the rainy season.

- Human immunity is another important factor, especially among adults in areas of moderate or
intense transmission conditions. Most malaria deaths in Africa occur in young children, whereas in
areas with less transmission and low immunity, all age groups are at risk.

- Symptoms of malaria include fever, headache, and vomiting, and usually appear between 10 and
15 days after the mosquito bite. If not treated, malaria can quickly become life-threatening by
interrupting the blood supply to vital organs. In many parts of the world, the parasites have
developed resistance to a number of malaria medicines.

- **Who is at risk?** - Approximately half of the world's population is at risk of malaria. Most malaria
cases and deaths occur in sub-Saharan Africa. However, Asia, Latin America, and to a lesser
extent the Middle East and parts of Europe are also affected. In 2010, 99 countries and territories
had ongoing malaria transmission.

- Specific population risk groups include:
  
  VIII. young children  
  IX. non-immune pregnant women  
  X. semi-immune pregnant women  
  XI. semi-immune HIV-infected pregnant women  
  XII. people with HIV/AIDS;  
  XIII. international travellers from non-endemic areas  
  XIV. immigrants from endemic areas and their children

- Key interventions to control malaria include: prompt and effective treatment with artemisinin-
based combination therapies; use of insecticidal nets by people at risk; and indoor residual
spraying with insecticide to control the vector mosquitoes.

3. Dengue fever

- Dengue fever is an infectious tropical disease caused by the dengue virus. Dengue is transmitted
by several species of mosquito within the genus Aedes, principally A. aegypti (Figure 5).

- The virus has four different types; infection with one type usually gives lifelong immunity to that
type, but only short-term immunity to the others. Subsequent infection with a different type
increases the risk of severe complications. As there is no commercially available vaccine,
prevention is sought by reducing the habitat and the number of mosquitoes and limiting exposure
to bites.
Figure 5: A. aegypti

- Treatment of acute dengue is supportive, using either oral or intravenous rehydration for mild or moderate disease, and intravenous fluids and blood transfusion for more severe cases.

- The incidence of dengue fever has increased dramatically since the 1960s, with around 50–100 million people infected yearly. Early descriptions of the condition date from 1779, and its viral cause and the transmission were elucidated in the early 20th century. Dengue has become a global problem since the Second World War and is endemic in more than 110 countries.

- The characteristic symptoms of dengue are sudden-onset fever, headache, muscle and joint pains, and a rash similar to measles. In a small proportion of cases the disease develops into the life-threatening dengue hemorrhagic fever, resulting in bleeding, low levels of blood platelets and blood plasma leakage, or into dengue shock syndrome, where dangerously low blood pressure occurs.

- The course of infection is divided into three phases: febrile, critical, and recovery (Figure 8).

- The **febrile phase** involves high fever, often above 40°C (104 °F), and is associated with generalized pain and a headache; this usually lasts for two to seven days.

- Vomiting may also occur. A rash occurs in 50–80% of those with symptoms in the first or second day of symptoms as flushed skin, or later in the course of illness (days 4–7), as a measles-like rash. Some petechiae (small red spots that do not disappear when the skin is pressed, which are caused by broken capillaries) can appear at this point, as may some mild bleeding from the mucous membranes of the mouth and nose. The fever itself is classically biphasic in nature, breaking and then returning for one or two days.

- In some people, the disease proceeds to a **critical phase** around the time fever resolves and typically lasts one to two days. During this phase there may be significant fluid accumulation in the chest and abdominal cavity due to increased capillary permeability and leakage. This leads to depletion of fluid from the circulation and decreased blood supply to vital organs. During this phase, organ dysfunction and severe bleeding, typically from the gastrointestinal tract, may occur.

- Shock (dengue shock syndrome) and hemorrhage (dengue hemorrhagic fever) occur in less than 5% of all cases of dengue, however those who have previously been infected with other serotypes of dengue virus ("secondary infection") are at an increased risk.

- The **recovery phase** occurs next, with resorption of the leaked fluid into the bloodstream. This usually lasts two to three days. The improvement is often striking, but there may be severe itching and a slow heart rate. Another rash may occur with either a maculopapular or a vasculitic appearance, which is followed by peeling of the skin. During this stage, a fluid overload state may occur; if it affects the brain, it may cause a reduced level of consciousness or seizures. A feeling of fatigue may last for weeks in adults.
Prevention and control - At present, the only method to control or prevent the transmission of dengue virus is to combat vector mosquitoes through:

i) preventing mosquitoes from accessing egg-laying habitats by environmental management and modification;

j) disposing of solid waste properly and removing artificial man-made habitats;

k) covering, emptying and cleaning of domestic water storage containers on a weekly basis;

l) applying appropriate insecticides to water storage outdoor containers;

m) using of personal household protection such as window screens, long-sleeved clothes, insecticide treated materials, coils and vaporizers;

n) improving community participation and mobilisation for sustained vector control;

o) applying insecticides as space spraying during outbreaks as one of the emergency vector control measures;

p) active monitoring and surveillance of vectors should be carried out to determine effectiveness of control interventions.

REFERENCES


CHAPTER 8

Cancer

Introduction of cancers

Cancer is a group of diseases characterized by:

• Abnormal growth of cells.
• Ability to invade adjacent tissues and even distant organs.
• The eventual death of the affected patient if the tumor has progressed beyond that stage when it can be successfully removed.

Benign Tumors (noncancerous)

• Enclosed in a fibrous shell or capsule.
• Take up space
• Concerned if they interfere with surrounding tissues or vessels or impede the function of the body.

Malignant Tumors (cancerous)

• Not usually contained—metastasis
• Invade and emit claw-like protrusions that disrupt the RNA and DNA of normal cells (these cancerous cells act like a virus).

Cancers are classified by organ/tissue of origin (site or topographical code) and histological features (morphology). International Classification of Diseases 10th Revision (ICD-10) classified cancer as:

• Lymphomas: cancers of the immune system
• Leukemias: Cancers of the blood forming organs
• Carcinomas: cancers of the glands and body linings, including the skin and the linings of the digestive tract and lungs
• Sarcomas: cancers of connective tissue, including bones, ligaments and muscle

Figure 1: Factors Believed to Contribute to Global Causes of Cancer
Magnitude of the cancer problem:
- Cancer emerges as a major public health problem not only in developed countries, but also in many developing countries.
- All forms of cancers are causing 9% of deaths throughout the world.
- At the beginning of this century, it is sixth cause of death in developed countries.
- Today, it is the second leading cause of death next to cardiovascular diseases in these countries.
- In developing world, it ranks fourth as a cause of death.
- There is a steady increase in incidence and mortality. This could be explained by:
  - Techniques for case-finding & detection.
  - Control of communicable diseases.
  - Marked demographic aging.
  - Changes in lifestyle and environment.

Sources of information on cancers
- Incidences
  - Registries
  - Isolated regional surveys/studies
- Mortality rates
  - Death certificates
- Only 30-40% are medically certified in Malaysia
  - Population census data
  - Registries

Epidemiology of cancers

Malaysian scenario
- 1 in 5.5 Malaysians can be expected to get cancer
- More Malaysian females have cancers than males
- 1 in 4 Malaysian female is at risk of getting cancer in her lifetime

Figure 2: Ten most frequent cancers in females, Peninsular Malaysia, 2003
Causes of cancers

Researchers have estimated that as many as 2 in 3 cases of cancer (67%) are linked to some type of environmental factor, including use or abuse of tobacco, alcohol, and food, as well as exposures to radiation, viruses, and substances in the air, water, and soil.

It depends on:
  - exposures to certain environmental factors (including diet, hormones)
  - genetic makeup
  - age and gender

Carcinogenic risks of chemicals to man (IARC)

- **Group 1** - established human carcinogen
  - Evidence derived from epidemiological studies is sufficient
- **2A** - probable human carcinogen
  - Evidence in human is limited and the agent is an experimental carcinogen
- **2B** - possible human carcinogen
  - Include experimental carcinogens for which human evidence is inadequate or non-existent
- **3** - not classified as carcinogenic to humans

Proven risk of cancers from environment

- **Smoking**
  - People smoking tobacco
  - People who previously smoked tobacco
  - Using smokeless tobacco
- **Treatment with certain therapeutic drugs**
- **Drinking alcoholic beverages**
  - Heavy drinkers have an increased risk of cancers of the mouth, throat, liver, voice box, and oesophagus.
  - There is also some evidence for an increased risk of breast cancer.
  - Drinkers who also smoke may have an even higher risk of some oral and throat cancers.
  - Drink in moderation, if at all: no more than one or two drinks per day.
- **Occupational cancer attributable to specific agents**
  - Approximately 40 occupational agents, groups of agents and mixtures have been classified as carcinogenic agents by IARC
  - Estimates global burden of cancer attributed by occupation in high resource countries is 2-3%
  - Mostly role of air, water and soil pollutants
- **Ultraviolet (UV) Radiation**
  - Comes from natural sunlight, sunlamps, or tanning beds--can lead to melanoma and other forms of skin cancer.
  - While some sun exposure is good for health, excessive exposure during childhood seems a particularly important factor that increases skin cancer risk, and repeated exposure as an adult can increase risk as well.
  - Avoid sun exposure between 10 am and 4 pm.
  - Wear protective clothing and use sunscreen.
Unknown carcinogenic risk
- Medical management involving blood transfusion bags and similar devices
- Occupational exposure to agents with inadequate evidence of carcinogenicity
- Consuming chlorinated drinking water
- Hazard presented by cell (mobile) phones
- Non-occupational exposure to solvents
- Agent in non-stick cookware and breathable all-weather clothing
- Environmental pollutants, including xenoestrogens, increasing risk of breast cancer
- Use of irritant cosmetics
- Food additives
- Deliberate exposure to sunlight
- Particular work environments or job classifications
- Residing near point sources of recognised carcinogens causing extreme local pollution
- Passive smoking
- Drinking water contamination from industrial sources of arsenic
- Residential exposure to radon

Ionizing and non-ionizing radiation
- Acute lymphoblastic leukemias, acute and myeloid leukemias, cancers of breast, lung, bones, brain, thyroid (IARC 2000)
- Most people the exposure is natural radiation: indoor radon or artificial sources of radiotherapy
- Estimates 3-5% contribution of ionizing radiation to cancers
- Solar ultraviolet with melanoma
- Other types of non-ionizing radiation electric and magnetic fields, handphones inconclusive

Reproductive factors and exogenous hormones
- Strong association reproductive history with cancers of breast, ovary, endometrium, reflecting hormonal changes
- Estrogenic stimulation is associated with breast cancer
- Oral contraceptives associated with cervical (>5 years) and liver cancer

Sex hormones
- Effects of OCP on risk of breast cancer
  - Increased 25% in current users
  - Declines to that of never users after cessation of use
  - Relative risk in women who ever used OCPs was 1.1

Occupational Cancer Risks
- Types of occupation that increased cancer risk:
  - Painters;
  - Furniture makers;
  - Workers in the iron, steel, coal;
  - Rubber industries;
  - Workers involved in shoe manufacturing and repair.
Prevention of cancers of environmental origin

Cancer prevention

- This aimed at reducing the number of new cases, increasing the number of cures and reducing the invalidism due to cancer.
- It is estimated that at least one third of all cancers are preventable.

National Cancer Control Program for all types of cancer Strategies

- Antismoking campaign
- Early detection of cancers through public education eg. NPC, breast, cervix
  - PAP smear rates still low 26%,
  - Prevalence BSE 46.8%
  - Screening rate [BSE 34.1%, clinical examination 31.1%, mammography 3.8%], especially among rural women
- Public education
- Diet and physical inactivity
- Promotion of healthy lifestyles and wellness programs through information technology

Level of prevention:

- Primary
  - Remove risk factor
    - Health promotion
    - Specific protection
- Secondary
  - Early detection
  - Prompt treatment
- Tertiary
  - Reduce complication
    - Disability limitation
    - Rehabilitation

REFERENCES

CHAPTER 9
Mental Health: Common Psychiatric Disorders in the Community

Introduction

Mental illness is used positively to indicate a state of psychological well being, negatively to indicate its opposite (as in “mental health problems”) or euphemistically to indicate facilities used by, or imposed upon, people with mental health problems (as in “mental health services”).

These disorders can affect persons regardless of age, race, sex, religion, or income. Mental illnesses are not a definite result of a personal weakness, lack of character, or poor upbringing.

At least one in four people are affected by a mental health problem at some point of their lives, many of them (about 20 percent) presenting in primary care setting.

Why should we care?

By understanding mental health issues, we can bring awareness to the community and our surrounding environment. The ultimate goal is to become a society that is accepting of others who do not fit our idea of a perfect population.

What is mental illness like?

Mental illness is a physical condition just like asthma or arthritis. But still society believes that people who are mentally ill needs to show more willpower to be able to pull themselves out of it.

It is also like telling a person who has an amputated leg to run across the room. But a person who has a mental health issue has a "broken brain", so to speak.

Myths of Mental Illness

Among the myths of mental illness is it is caused by bad parenting. The real fact is that there are diagnosed individuals who come from supportive homes. Another myth is that the mentally ill are violent and dangerous. The correct fact is most are victims of violence, therefore, if they are treated adequately, they are not likely to be violent. And some tend to think that people with a mental disorder are not smart. In real life, numerous studies have shown that many have average or above average intelligence.

Mental illnesses in our community

There are three main mental illnesses in our community:
- Depression
- Anxiety
- Schizophrenia

Early explanation of mental illness

In ancient times, holes were cut in an ill person’s head to let out evil spirits in a process called trepanning. Hippocrates believed that mental illness came from an imbalance in the body’s four humors. In the Middle Ages, the mentally ill were labeled as witches.
Definitions of abnormality

Psychopathology is the study of abnormal behavior.

Psychological disorders means any pattern of behavior that causes people significant distress, causes them to harm others, or harms their ability to function in daily life and it also interferes with one’s role or functioning as a mother/father/student. On the other hand, it is statistically rare. Deviant from social norms includes situational context which is the social or environmental setting of a person’s behavior. Subjective discomfort includes emotional distress or emotional pain, while maladaptive means anything that does not allow a person to function within or adapt to the stresses and everyday demands of life.

Biology and Psychopathology

A biological model is a model of explaining behavior as caused by biological changes in the chemical, structural, or genetic systems of the body. Psychosis is a situation where a person is not in touch with reality with having hallucination or delusion, while neurosis is situation where a person is disturbed but still in touch with reality.

Psychological Viewpoints of Psychopathology

There are three different viewpoints on psychopathology:

The psychoanalytic theorists assume that abnormal behavior stems from repressed conflicts and urges that are fighting to become conscious, while the behaviorists see abnormal behavior as something which is learned. The cognitive theorists see abnormal behavior as coming from irrational beliefs and illogical patterns of thought.

Culture and Psychopathology

The interrelationship between culture and psychopathology can be explained by two components: The first is cultural relativity where the need to consider the unique characteristics of the culture in which behavior takes place, for example, there is no dependent personality disorder in Taiwan as people are expected to be dependent with each other. While culture-bound syndromes are disorders found only in particular cultures, for example ‘run amok’.

Anxiety Disorders

Anxiety disorders are disorders in which the main symptom is excessive or unrealistic anxiety and fearfulness. For example, free-floating anxiety is an anxiety that is unrelated to any realistic, known source. On the other hand, phobia is an excessive, irrational, persistent fear of an object, situation, or social activity. For example, social phobia is fear of interacting with others or being in social situations that might lead to a negative evaluation.

Other examples of anxiety disorders are specific phobia, which is fear of objects or specific situations or events; claustrophobia is fear of being in a small, enclosed space; acrophobia is the fear of heights while agoraphobia is the fear of being in a place or situation from which escape is difficult or impossible. Obsessive-compulsive disorder, on the other hand, is a disorder in which intruding, recurring thoughts or obsessions create anxiety that is relieved by performing a repetitive, ritualistic behavior (compulsion). Panic disorder, in the meantime, is a disorder in which panic attacks occur frequently enough to cause the person difficulty in adjusting to daily life. For example, a panic attack occurs when there is a sudden onset of intense panic in which multiple physical symptoms of stress occur, often with feelings that one is dying. In addition, people with panic disorder have sudden and repeated attacks of fear that last for several minutes.

Other examples of anxiety disorder are panic disorder with agoraphobia which is fear of leaving one’s familiar surroundings because one might have a panic attack in public. Generalized anxiety disorder is a disorder in which a person has feelings of dread and impending doom along with physical symptoms of stress, which lasts six months or more.
Causes of Anxiety Disorders

There are a few possibilities that may cause anxiety disorders. Among them are psychoanalytic explanations which point to repressed urges and desires that are trying to come into conscious, creating anxiety that is controlled by the abnormal behavior. There are different opinions, though. The behaviorists state that disordered behavior is learned through both positive and negative reinforcement. The cognitive psychologists, on the other hand, believe that excessive anxiety comes from illogical, irrational thought processes, which is:

- Magnification, the tendency to interpret situations as far more dangerous, harmful, or important than they actually are;
- All-or-nothing thinking, the tendency to believe that one’s performance must be perfect or the result will be a total failure;
- Overgeneralization, the tendency to interpret a single negative event as a never-ending pattern of defeat and failure; and
- Minimization, the tendency to give little or no importance to one’s successes or positive events and traits.

Biological explanations of anxiety disorders include chemical imbalances in the nervous system, in particular serotonin and GABA systems.

Mood Disorders

Mood disorders are defined in psychology as an emotional reaction. They are disorders in which the mood is severely disturbed. Mood disorders are categorized into five, the first is dysthymia, which is a moderate depression that lasts for two years or more and is typically a reaction to some external stressor; cyclothymia is a disorder that consists of mood swings from moderate depression to hypomania and lasts two years or more. Major depression is a severe depression that comes on suddenly and seems to have no external cause. Manic is like having the quality of excessive excitement, energy, and elation or irritability. The last is bipolar disorder, which are defined as severe mood swings between major depressive episodes and manic episodes.

Causes of Mood Disorders

There are a few causes of mood disorders:

Psychoanalytic theories see depression as anger at authority figures from childhood turned inward on the self. On the other hand, learning theories link depression to learned helplessness. Cognitive theories see depression as the result of distorted, illogical thinking. Biological explanations of mood disorders look at the function of serotonin, norepinephrine, and dopamine systems in the brain.

Schizophrenia

Schizophrenia is termed as a severe disorder in which the person suffers from disordered thinking, bizarre behavior, hallucinations, and is unable to distinguish between fantasy and reality. Psychotic is the break away from an ability to perceive what is real and what is fantasy. Anyone can be a schizophrenic and it is present in 1 percent of the world’s population.

There are positive symptoms, meaning the symptoms of schizophrenia that are excesses of behavior or occur in addition to normal behavior; hallucinations, delusions, and distorted thinking. Among them are:

- Delusions which are false beliefs held by a person who refuses to accept evidence of their falseness. For example, there is delusional disorder, a psychotic disorder in which the primary symptom is one or more delusions (may or may not be schizophrenia);
- Hallucinations are false sensory perceptions, such as hearing voices that do not really exist.

The negative symptoms are symptoms of schizophrenia that are less than normal behavior or an absence of normal behavior, others such as poor attention, flat affect, and poor speech production. Flat affect is a lack of emotional responsiveness.
Types of Schizophrenia

There are a few types of this mental disease:

- **Disorganized** is a type of schizophrenia in which behavior is bizarre and childish and thinking, speech, and motor actions are very disordered;
- **Catatonic** is a type of schizophrenia in which the person experiences periods of statue-like immobility (called catatonic stupor) mixed with occasional bursts of energetic, frantic movement and talking (often referred to as catatonic excitement);
- **Paranoid** is a type of schizophrenia in which the person suffers from delusions of persecution, grandeur, and jealousy, together with hallucinations;
- **Undifferentiated** is a type of schizophrenia in which the person shows no particular pattern, shifting from one pattern to another, and cannot be neatly classified as disorganized, paranoid, or catatonic; and
- **Residual** is a type of schizophrenia in which there are no delusions and hallucinations, but the person still experiences negative thoughts, poor language skills, and odd behavior.

Causes of Schizophrenia

There are different schools of thought with regards to the causes of this disorder:

- **Psychoanalytic** theories see schizophrenia as resulting from a severe breakdown of the ego, which has become overwhelmed by the demands of the id and results in childish, infantile behavior.
- **Behaviorists** focus on how reinforcement, observational learning, and shaping affect the development of the behavioral symptoms of schizophrenia.
- **Cognitive** theorists see schizophrenia as severely irrational thinking.
- **Biological** explanations focus on dopamine, structural defects in the brain, and genetic influences in schizophrenia.
- **Stress-vulnerability model**, which explained on the disorder that assumes a biological sensitivity, or vulnerability, to a certain disorder will develop under the right conditions of environmental or emotional stress.

What Causes Schizophrenia?

There is no one cause to this complex and puzzling illness, but it is believed that some combination of genetic, biological (virus, bacteria, or an infection) and environmental factors play a major role. There is currently no reliable way to predict whether a person will develop the disease.

What occurs in the brain of someone with schizophrenia?

Researchers believe an imbalance of neurotransmitters may cause the symptoms of schizophrenia. Two neurotransmitters that have most been implicated as abnormal in schizophrenia are dopamine and serotonin. The ability to produce images has helped in identifying structural and functional differences in a schizophrenic brain versus a normal brain.

Brain imaging has shown a difference in:

- Enlargement of the ventricle
- Decrease in the hippocampus (controls emotional and working memory)
- Decrease in overall size
- Abnormal development of pre-frontal cortex (forehead region; controls information process, motivation, problem solving, decision making, and thinking speed)

Treatment

With all three of these illnesses, treatment, with the right combination of medications and/or therapy, can help stabilize the moods that interfere with a productive life. Medications are an important part of treatment. Cognitive-behavioral therapy, on the other hand, helps people understand their behaviors and how to gain control of them. For schizophrenia, the usage of electroconvulsive therapy is one of
the methods to cure this ailment. Other ways include work activities, family support and conversation with a trained person.

**Conclusion**

Overall, mental health is an issue that affects everyone. Hopefully, throughout the years, education will curve the sigma of these brain disorders so that hate, bias judgment and discrimination will be gone. To have better mental health is to hold oneself close to serenity.

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CHAPTER 10

Health problems: Maternal health, child health, adolescent and elderly health

Family health includes:
• Maternal health
• Child health
• Adolescent health
• Elderly health

1. Maternal Health

Health problems:
• Problems Related to Pregnancy
  • Late pregnancy
  • Spontaneous Abortion
  • Still Birth Premature Delivery
  • Low Birth Weight
  • HIV during pregnancy
• Problems in family planning
• Stress
• Diet
• Obesity
• Infertility
• Diabetes / Hypertension
• Cancer – Breast Cancer and Cervical cancer

Maternal health services:
• Antenatal care
• Intra-partum Care: Home delivery & ABC care
• Postnatal nursing / care
• Breast Feeding
• Family Planning
• Home visit
• Women health
• PMTCT
• Health education
• Treatment
• Dietitian education (Cooking Demonstration)

Antenatal Services
• First visit to clinic
  o Interview session
  o Physical examination
  o Antenatal screening
  o Lab test
  o Antenatal card

• Subsequent visit
- Progress of pregnancy
  - Physical examination (fetal heart rate and fetal position)
  - Lab test
  - Immunization
  - Education for pregnant mother
  - Frequent home visit for high risk mothers (Promip / diabetic / hypertension)

- Frequency of visit
  - Below 28 weeks: once a month
  - 28 to 36 weeks: every 2 weeks
  - 36 weeks and above: every week

- Services provided during childbirth or delivery:
  - Management of labour and delivery for uncomplicated cases
  - Management of complicated cases

- Choices for delivery:
  - Home delivery for normal cases
  - Hospital delivery
  - Alternative birth centre at health clinic

- Safe motherhood initiatives
  - Family planning
  - Clean / safe delivery
  - Essential obstetric care
  - Health promotion: women / families
  - Community participation

Post-natal services
- Daily assessment of the condition of mother and baby in the first week postpartum
  - blood pressure, heart rate,
  - Signs and symptoms of potentially life threatening conditions)

- Vaccination

- Consultancy on:
  - Breastfeeding/ Basic neonatal care / Nutrition aspects
  - Contraceptive choices in the postpartum period / Postpartum family planning

Family planning
- Deciding when is the right time to have children and what is the appropriate number of children for a couple to have.
- The right time to have children:
  - Age between 20 and 35 years old / Have fewer than 2-3 children
  - Last child birth 2-3 years ago
  - Has no illness which can affect the woman’s and the baby’s wellbeing

Women Health
- Family Planning Services
- Reproductive Cancer Control Program
  - Cervical Cancer
  - Breast Cancer
- Promotion of Breast Health (Breast awareness through BSE, CBE)
- Gender & health
2. **Child Health**

   Care of newborn / toddler / preschool / school health

**Child health issues:**

- **New Born**
  - Low Birth weight & Prematurity/ Birth Trauma
  - Neonatal Sepsis/ Neonatal Jaundice
  - Respiratory Distress Syndrome
  - Congenital deformities

- **Children Under 5 years**
  - Malnutrition
  - Diarrhea
  - Immunization preventable diseases;
    - T.B / Measles/ Poliomyelitis / Diphtheria / Whooping Cough / tetanus /
      Pertussis/ Meningitis / Mumps / Hepatitis-B / Haemophilusinfluenzae

**Care of new born**

- **Basic care**
  - Check head to toe for Congenital abnormalities & G6PD Screening
    - Physical examination: hair, head skin, eyes, mouth, nose, ears, neck
      Color of the baby (blue, pale, pink).. Etc.
  - Appropriate nutrition/ Breast feeding / home visit for special case
  - Management of specific problems / Referral for delayed milestone, malnutrition, .. etc.

- **Special care**
  - Newborns with disease acquired before, during, after the birth.
  - Too small / Premature/ Management of sick newborn

- **Development Assessment:**
  - Anthropometric Procedures: Weight (kg)/ Length(cm)/ BMI / Head

- **Weight- for- age chart**
- Immunization schedule
  - At birth
    - BCG
    - Hepatitis B 1st dose
  - 2nd, 3rd month
    - DPT + Hib + OPV
    - Hepatitis B 2nd dose
  - 5th month
    - DPT + Hib + OPV
    - Hepatitis B 3rd Dose
  - 6th month
    - Measles (Sabah only)
  - 12th month
    - Booster dose (DT)
  - Standard one
    - BCG (If no scar)
    - DT + OPV + booster MMR
  - Form 3
    - ATT

**Toddler Health**
- Pre-schoolcare (At Child Care Center / Tadika / Estate)
  - Health Examination: physical & Mental / Nutritional status Vision & Hearing Screening
  - Dietary supplement
Home Visit: Priority cases
- Child Care at:
  - Immunization
  - Health Education: Nutritional Advice
  - Referrals: Pediatrician/Dentist

- Growth Assessment
  - Health screening and development assessment of toddler and preschoolers
  - Test for the normal physical development/congenital abnormalities

- Management of Specific Problems
  - ARI, diarrhea/De-worming “Pemberian Ubat Cacing”

School Health Program
- Screening and Health Appraisal For:
  - Standard One
  - Standard 6
  - Form 3 (Secondary)

- Immunization:
  - Standard 1: MMR+DT+OPV/booster:
  - Standard 6: BCG booster
  - Form 3: ATT

- Dental Health Care
- Referral of Cases: medical/dental/welfare
- Health Promotion:
  - Doktor Muda/PROSTAR/Dengue Free
  - School/Healthy Canteen

- Health Education: Home and Road Accidents
- De-worming
- Treatment of Minor Ailments: Scabies/head Lice

3. Adolescent Health

Health issues:
- Mental Health
- Drug abuse
- Smoking
- Obesity
- Teen-age pregnancy
- HIV AIDS
- Diabetes

Service Activities:
- Stress Management
- Mental Illness clinics
- Harm Reduction (methadone Clinics
- Prostar
- Peer Education
- Counselling
- Quit smoking Clinic
Mental Health
- 1998: Development of National Mental Health Policy
- Strategies:
  - Promotive
  - Preventive
  - Rehabilitative
- Activities:
  - General Mental Health
  - Stress Management
  - Mental Illness
  - Mental Health in Children
- Training manuals on children with special needs
  - MODULES
    - Gross motor delay
    - Fine motor delay
    - Self help skill
    - Communication problems
    - Personnel & social problems
    - Visual impairment

Health Care for Disabled Persons
- Early Detection of persons with disabilities
- Purchasing & distributing rehabilitative equipment’s to the health Clinics
- Revision of specialized care for Children with special needs

Wellness Clinic
- Health Promotion…. Healthy life style campaign;
- Healthy diet / healthy home / safe home & work-place
- Health & disease information
- Health Risk Screening, assessment and management
- Diseases Screening, assessment and management
- Coping with acute & chronic diseases
- Response to individual needs
  - Adequate health care provider & Client communication
  - Adequate referral system
- Individual & family counselling
- Self-help

4. Elderly Health

Health issues:
- Chronic Diseases
  - Diabetes / Hypertension / Heart disease / osteo-arthritis
- Menopause / impotence
- Mental health

Services activities:
- Home visit and home nursing / Counseling
- Special clinics
- Physiotherapy, occupational therapy
• Recreational, exercise, social and welfare activities
• Health promotion and education
• Health screening / assessment
• Medical examination, treatment and referral
• Nutritional activities
• Oral Health

5. Expended and Extended Scope of Family Health Program

• Family Medicine
• Health Care for Children & Adult with Special Needs
• Community Mental Health
• Control of Non-Communicable Diseases (CVD, Diabetes, Hypertension, Quit Smoking)
• Control of Communicable Diseases (HIV, TB, STD Syndromic Approach, Harm reduction Program)
• Occupational Health / Environmental Health
• Home-based Care / Community-based Care
• Rehabilitation
• Risk Screening / Diseases Screening
• Routine Medical Check-up

6. Nutritional Activities

• Nutritional Promotion
  o Healthy Diet
  o Breast Feeding
  o Baby Friendly Hospital
• Nutritional Supplement / Remedy
  o Children / Elderly with imbalance diet
  o Prevention & Control for:
    ▪ Iodine deficiency,
    ▪ Anemia during pregnancy,
    ▪ Obesity
    ▪ Malnutrition

7. Diabetic Clinic

Diabetes known as the “hidden” disease and is undiagnosed in an estimated 5 million persons

• Early Diagnosis (Blood Glucose Screening)
• Risk Factor Management
  o Obesity & over-weight
  o Physically inactive
  o Aging

• Diabetes education
  o An informed and motivated patient is essential in managing the disease and reducing the risk of complications (gangrene, foot ulcers, hypoglycemia,
hypertension, heart attack, blindness, kidney failure, stoke, and nerve diseases)
  o Self-blood-glucose-monitoring
  o Dietary measures, exercise, and treatment
    • Early treatment
    • Follow-up… Referral

8. Quit Smoking Clinic

  • Preventing people from starting to use tobacco
  • Helping people quit using tobacco
  • Reducing exposure to second hand smoke
  • Identifying and eliminating disparities in tobacco use among population groups.

Are you a smoker?

  • Decide to quit smoking
  • Understand when to quit smoking
  • Set a date to quit smoking
  • Have self-confidence…. Always think positively
  • Write a reminder: Say to yourself “I am not a smoker”
  • Fight the urge to smoke… Get support
  • Use Nicotine Replacement Therapy (NRT)
  • Continue getting treatment from quit smoking clinics
  • Plan a daily routine that excludes smoking

REFERENCES

CHAPTER 11

Health care system in Malaysia: Conventional and Traditional / Complementary Medicine

Introduction

- Health care system in Malaysia can be divided into two;
  i. Conventional medicine
  ii. Traditional and complementary medicine

- Mainly under the responsibility of the Ministry of Health (MOH)

- Operates a two-tier health care system – government run the universal health care system and a co-existing private health care system

The Evolution of HC in Malaysia

- Health care system in Malaysia has undergone some radical transformations.

- The earliest pre-colonial medical cases were confined mostly to those traditional remedies that are evident today in Malay, Chinese, Indian and other ethnics.

- With the colonisation, more modern and westernised medical practices were slowly introduced to the country

Conventional medicine

1. Historical Development

- Colonial era before 1900AD: Role of East India Company and opening of tin mining and estates
- 1900 - Institute for Medical Research
- 1905 - Singapore Medical College
- 1911 – 1956 Expansion of Urban and Estate Medical Services
- 1957 – 1980 Development of Rural

2. Health Services

- In 1980’s, the development of private sector started

- Discussion of the health care system in Malaysia covers following areas:
  o Who is the provider
  o The services provided
  o The level of care
• It is a dualism health care structure

• Health care providers can be divided into three:
  1. Public Sector – government sector
  2. Private Sector - non-government sector
  3. Complementary Medicine – alternative medicine

• Public Sector
  - Ministry of Health is major provider
  - Other agencies such as:
    a) Ministry of Education
    b) Ministry of Defence
    c) Ministry of Finance
    d) Ministry of Home Affairs
    e) Ministry of Social Services
    f) Local Authority

• Ministry Of Health
  - Major health services provider – 60%
  - Organization structure: Federal, State and District (Figure 1)
  - Comprehensive programs: preventive, promotive, curative and rehabilitative.
  - Vertically plan and control – implemented via integrated health care system
  - Service provisions: comprehensive services, encompass of:
    1. Medical services: curative and rehabilitative
    2. Public health services: preventive and promotive
Figure 1: Organizational structure Ministry of Health Malaysia

- **The Private Sector** (non government sector) consist of:
  a) Profit organization
  b) Non-profit organization

- Profit organization is a:
  a) **Modern Medicine**:
     i. Private Hospital
     ii. Ambulatory Care, provided by GP’s
  b) **Complementary or Alternative Medicine**:
     i. Traditional Medicine
     ii. Acupuncture, chiropractic
     iii. Ayurvedic
     iv. Reflexology, Aromatherapy etc.

- **Development of private health care sector in Malaysia are**:
  - Mainly in high economic activity – urban areas and estates
  - Development of private hospitals in urban areas relatively slow at earlier phase. Up to 1970’s only 4 private hospital, namely as (i) Assunta Hospital (1954), (ii) Gleneagles Medical Hospital (1971), (iii) Sentosa Hospital (1972) and (iv) Pantai Medical Centre (1974).
Currently, there are total of 219 private hospitals with bed complement of 10,405 beds.

Private clinics (GP) currently more than 5000 GP’s

Out of 18,000 doctors registered with MMC, 46% are in private sector.

Uncontrolled growth of private hospitals and clinics causing concentration of private health care facilities in urban area.

Mainly for profit entities

Service provision is mainly curative care – primary to tertiary care. Some is preventive services, i.e. antenatal care, immunization etc. Fee-for service: out of pocket or third party payment

- **Non profit organization comprise of:**

  - Voluntary or informal sector
  - Focus on certain group of population
  - Provide specific service
  - Complement services provide by government or private health care facilities in urban area

  1. Ambulance services by 919 Services and Bulan Sabit Merah
  2. Hospice provide palliative care
  3. Day Care Centre for Special Children
  4. Home or shelter for unfortunate group; elderly, women or drug addict
  5. Preventive and promotive activities: Ad-hoc seminar or talk, campaign, exhibition etc

**Level of care**

- Level of care in the health care system was shown in Figure 2 consist of Primary care, Secondary care and Tertiary care.
1. Public Health
   - Public Health is a protection and improvement of the health of entire populations through community-wide action, primarily by governmental agencies.
   - The goals of public health are to prevent human disease, injury, and disability; protect people from environmental health hazards; promote behaviors that lead to good physical and mental health; educate the public about health; and assure availability of high-quality health services.

Roles and responsibilities of Public Health Physician (Medical health officer)
   - Identified health problems and analysis
   - Program planning, implementation, monitoring and evaluation
   - Need knowledge & skills in: epidemiology & research methodology, community and social medicine

Diseases prevention & control, environmental health services (inspectorate)
   - CDC & Non-CDC control
   - Food Quality Control
   - Drinking Water Quality Control
   - Environmental Health: (BAKAS)
   - Occupational Safety and Health
   - International Health: ports & airports
   - Health Services Administration
   - Health Information System, etc.
2. **Primary health care (PHC)**

- Ambulatory care is a personal health care consultation, treatment or intervention using advanced medical technology or procedures delivered on an outpatient basis (i.e. where the patients stay at the hospital or clinic, from the time of registration to discharge, occurs on a single calendar day).

- Many medical investigations and treatments for acute illness and preventive health care can be performed on an ambulatory basis, including minor surgical and medical procedures, most types of dental services, dermatology services, and many types of diagnostic procedures (e.g. blood tests, X-rays, endoscopy and biopsy procedures of superficial organs).

- Other types of ambulatory care services include emergency visits, rehabilitation visits, and in some cases telephone consultations.

- Ambulatory care services represent the most significant contributor to increasing hospital expenditures and to the performance of the health care system in most countries, including most developing countries.

- WHO 1978 proposed Primary health care (PHC) approach - declaration of Alma-Ata (USSR) or Health for All. Defined PHC, approaches and strategies in the community health care.

- Primary Health Care Health for All are defined as:
  a) Accessible – near to patient home
  b) Integrals part of the national health system
  c) Integrated with other services: agri, education etc
  d) Community participation
  e) Using local resources
  f) Integrated and comprehensive approach of health care
  g) Affordable

- PHC is the essential equally to everyone in a community. It & basic level of health care provided addresses the most common problems in the community and to maximize health, wellness & well-being.

3. **Primary Health Care, Ministry of Healthy Malaysia:**

Adopting strong and broad-based of PHC and incorporated the following strategies:

- a) Wellness focus: this will involve creating & providing services that will promote individual wellness through life
- b) Personalized information: providing accurate and timely information and promoting knowledge through personalized education services to enable a person to make informed health decision.
- c) Person focus: focusing services on the individual and making available services when & where required.
- d) Self care: increasing the ability of individuals and families to manage health through knowledge transfer and intensive network based health management tools
- e) Seamless care: integration of health services and information across settings and episodes of care to provide continuity of care.
- f) Customized care: services modified to the needs of individual & group in special circumstances
- g) High quality of care: improving the quality, access and delivery of care at a reasonable cost
h) Care close to home: using multiple ways to provide services and to minimized the movement of patients through the system.

4. Primary Care Services

a) Health unit (2 – tier system)

Figure 3: Two-tier system

b) Public health facilities at district level

Figure 4: Public health service at district level

- Consist of one of two administrative district
- One or more rural health units is/are in the health district.
- One rural health units consist of one health clinic and 4 rural clinics
- Health clinic coverage is for 20,000 population whereas rural clinics are between 2000 to 4000 population.
Health clinic in Malaysia

- Health Clinic is for non specialize services and walk in.
- Type of health clinics:
  - Type I : 800 – 1000 patient per day
  - Type II : 500 – 800 patient per day
  - Type III : 300 – 500 patient per day
  - Type IV : Less than 300 patient per day
Figure 7: Health clinic organization

- Health Clinic services includes;
  i. Maternal and Child Health; Outpatient and home visit
  ii. Outpatient clinic & emergency care
  iii. Laboratory services
  iv. Pharmacy
  v. Diagnostic imaging
  vi. Expanded program; screening clinic for Diabetes Mellitus and quit smoking clinic
  vii. Care for elderly
  viii. Special need children clinic
  ix. Mental health

Medical and Health Officer

- They are involved in primary medical care and community health services in the health unit coverage area and out-patient clinic (Figure 8).

Figure 8

- In the clinics there are minor surgery, dressing, immunization etc (Figure 9).
Home visit and home care to elicit their patients’ and family’s knowledge regarding the patient’s illness and management (Figure 10).

School health services
• Special need children clinic

• Care for elderly clinic
• Mobile clinic:

• Community Health Promotion Activities
• Health promotion activity

• Public health services to various community and population locality with diverse cultural background. For example home visit to orang asli community.

Hospitals and curative services

1. Hospital
   • Total number of public hospitals are 119 (6 institutions) with bed complements of 28,966 beds.
   • Total no. of private hospital are 219 with bed complements of 10,405 beds.
   • Public hospitals and clinics subsidize by government.
   • Private hospitals and clinics provide services base on fee-for services.
   • Curative services: public and private sectors – hospitals and clinics.
   • Public hospitals and clinics subsidize by government.
   • Private hospitals and clinics provide services base on fee-for services.

2. Hospital under Ministry of Health
   □ Regional Hospital
      a) Referral Hospital
      b) State Hospital
   □ District Hospital:
      a) District Hospital with specialist
      b) District Hospital without specialist
   □ Headed by Hospital Director – Public Health Medicine
q Specialist specialize in hospital management

q Services:
   a) Inpatient Care
   b) Ambulatory Care
   c) Accident and Emergency
   d) Specialist Clinic

q Support Services:
   ✓ Laboratory
   ✓ Diagnostic and Imaging
   ✓ Pharmacy
   ✓ Physiotherapy
   ✓ Health Education
   ✓ Medical Record and Health Information System
   ✓ Social and Welfare Services
   ✓ Engineering
   ✓ Kitchen
   ✓ Administration and Finance

q Example of Malaysian health care system structure;

Traditional and complementary medicine (T/CM)

1. Overview of T/CM in Malaysia
   • The National Health and Morbidity Survey II (1996) showed that 2.3% of Malaysians reported visits to T/CM practitioners.
   • 3.8% of the population use both modern & T/CM.
   • Standing Committee for T/CM was formed in 1998.
   • National Policy for T/CM was launched in 2001 by the Ministry of Health, Malaysia.
• Five umbrella bodies set up & registered with ROS to self regulate the T/CM practitioners.
  ✓ The Malay Traditional Medicine – PUTRAMAS
  ✓ The Chinese Traditional Medicine – The Federation of Chinese Physicians & Medicine Dealers of Malaysia
  ✓ The Indian Traditional Medicine - PEPTIM
  ✓ Homeopathy – Majlis Perubatan Homeopathy Malaysia (MPHM)
  ✓ Complementary Therapies - Malaysian Society of Complementary Therapies (MSCT)

• The Malaysian Cabinet on 11/1/2006 approved the proposal to set up an integrated medicine program that incorporates selected T/CM practices into modern medicine

• Three hospitals were selected for the 1st phase. Hospitals chosen to integrate T/CM within the public health care system are;
  ✓ Hospital Kepala Batas, Penang
  ✓ Hospital Putrajaya, Federal Territory
  ✓ Hospital Sultan Ismail, Johore
  ✓ Acupuncture for chronic pain & post stroke management
  ✓ Traditional Malay massage for chronic pain & post stroke management
  ✓ Malay postnatal care

• Services provided are;
  ✓ Herbal therapy as an adjunct treatment for cancer
  ✓ Traditional Indian Medicine
  ✓ Acupuncture for chronic pain and post stroke management
  ✓ Traditional Malay massage for chronic pain & post stroke management
  ✓ Malay postnatal care

• The Malay Traditional Medicine traced is mainly from Indonesia. The umbrella body is PUTRAMAS.

• Caution;
  • T/CM treatment is not an alternative treatment
  • It is complementary to the allopathic treatment
  • No acute cases shall be treated in the T/CM Unit

• Modalities;
  • Traditional Herbal Treatments
• Malay Traditional Massage
• Bone fracture treatment
• Mid-wifery treatment
• Sexual potency treatment
• Gynecological treatment
• Malay traditional exercises
• Traditional Malay Moxibustion (Bekam)
• Treatment for Resdung Allergic Rhinitis
• Traditional treatment for Herpes zoster (Kayap)
• Traditional treatment for Hernia
• Traditional treatment for Renal Stones
• Traditional treatment for Cancers
• Spiritual Healing (Pawang)
• Acupuncture
• Herbal medicines
• Exercises – Tai Chi & Qi gong
• Nutritional therapy
• Chinese Traditional Massage

• Traditional herbal treatments;
  
a) Ulam – Petai
  • The Malays take petai to prevent diabetes whereas the Chinese used it for kidney disease.
  • Petai seeds (and also buah jering) give out a strong pungent smell.
  • In the treatment of kidney disease, the ancient Chinese medical book, "Nei Ching" recommended the use of pungent food.
  • The plant is also used for high blood pressure, bloating and help evacuate the bowels and cleanse blood.
  • Modern marketers also promoted petai products to Control weight problems by reducing fat, ease constipation, for good complexion and to remove toxins in the body as well as to remove uric acid accumulation.

b) Ulam rajah (Cosmos caudatus)
Traditionally used to improve blood circulation and cleanse the blood as well as to strengthen the bones.

c) Chekur manis / Vitamin plant /star gooseberry (Sauropus androgynus)
- Chekur manis is a protein rich blood tonic. in Malaysia it is used to improve lactation, treat ulcers, boils, fever and for 'cleaner' blood
- A comparative study found chekur manis have the richest source of vitamins & proteins amongst all leafy vegetables investigated.
- The young leaves and flowers are eaten.

The Chinese Traditional Medicine:
- Dates back as early as the 6th Century BC
- Diagnosis based on holistic view of the patient & the patient’s symptoms viewed as the yin & yang
- Umbrella body: Federation of Chinese Physicians & Medicine Dealers of Malaysia

![Figure 11: Acupuncture](image)

Chinese traditional massage consist of two types;
- a) Tui na which focuses on pushing, stretching and kneading the muscle
- b) Zhi Ya which focuses on pinching and pressing at acupressure points.

- Tui Na is Chinese Medicine's Physio-Therapy. Utilized for medical purposes instead of relaxation. Tui Na works to correct the patient's problems, from musculoskeletal conditions, to diseases, cancers and even minor and major headaches.
- Within the foundation of Tui Na, Traditional Chinese Medicine principles are followed, from Meridian Applications to Herbal Formulas, Qigong Therapy and heated herbal application (Moxa).
- Technique applications such as friction and vibration are used as well.
- Modalities;
a) Acupuncture
b) Herbal medicines
c) Exercises – Tai Chi & Qi gong
d) Nutritional therapy
e) Chinese Traditional Massage

- The Indian Traditional Medicine comprise of;
  a) Ayurveda
  b) Siddha
  c) Yunani

![Figure 12: Ayurveda – Yoga](image)

- Hundreds of vegetable drugs are used in Ayurvedic medicine—including cardamom and cinnamon. Research suggests that *Terminalia arjuna* is useful in alleviating the pain of angina pectoris and in treating heart failure and coronary artery disease. Terminalia may also be useful in treating hypercholesterolemia.

- Homeopathy is first mentioned by Hippocrates, but Samuel Hahnemann (a German Medical Doctor) who established the basic principles of Homeopathy.
• The umbrella body of homeopathy are;
  a) Majlis Perubatan Homeopathy Malaysia.
  b) The Homeopathic Medical Association
  c) Malaysian Homeopathic Doctors Association
  d) Persatuan Sains Perubatan Homeopathy Malaysia
  e) Persatuan Perubatan Homeopathy Bumiputra Malaysia
  f) Persatuan Perubatan Homeopathy Sarawak
  g) Malaysian Homeopathic Practitioners Association
  h) Malaysian Registered Homeopathic Medical Practitioners Association
• Complementary therapies are previously known as alternative medicine.
• Today, modalities used to complement modern medicine such as;
  • Western Acupuncture
  • Aromatherapy
  • Bach Flower Remedy
  • Chiropractic
  • Colon Hydrotherapy
  • Crystal & Gem Healing
  • Herbal Therapy
• The umbrella body for complement modern medicine is The Malaysian Society of
  Complementary Therapies (MSCT).

2. Definitions

• **Allopathic medicine** refers to broad category of medical practice. It also known as
  western or modern medicine.
• **Traditional medicine** is a sum of total knowledge, skills and practices on holistic
  healthcare, which is recognised & accepted by the community for its role in the
  maintenance of health and the treatment of diseases.
• **Complementary medicine** refers to a wide range of health interventions originating from
  different cultures across thousands of years of history. It also used to refer to health care
  considered supplementary to allopathic medicine.
• **T/CM Practitioner** is an individu who registered with the respective Umbrella bodies.
• **T/CM Practitioner** is an individu who registered with the respective Umbrella bodies.
• **Therapist** is a person who is trained and skilled in the respective practice in an auxiliary
  capacity & qualification as defined by the T/CM Council.
• **Practitioner** is a person who is trained and skilled in the respective practice in a therapeutic capacity and qualification as defined by the T/CM Council.

3. **Regulatory situation in Malaysia**

Currently, there is NO designated law and regulation on T/CM. However, a draft Law have been prepared.

4. **Issues and challenges in T/CM**

   a) **Quality, Safety & Efficacy of T/CM Products**

   - Under the purview of the National Pharmaceutical Control Bureau (NPCB)
   - Contamination by heavy metals, microbes, adulteration, labeling or claims, disintegration time, uniformity of weight & good manufacturing practice

   *Air Ikan Haruan contains a drug call dexamethasone which when taken over a long period of time without doctor’s supervision can lead to irregular heartbeats and raise the blood pressure, blood sugar and blood cholesterol level. Dexamethasone can also cause seizures, osteoporosis and mood disturbances.*

   *(Source: Health Sciences Authority)*

   b) **Quality, safety and efficacy of T/CM practices.**

   - Documented evidences of the safety of the practices/modalities
   - Ensure the modalities do not cause morbidity & mortality.

   c) **Research**

   - Currently only research in herbal medicine – HMRC in IMR.
   - Need to promote research in the various modalities, practices – efficacy & safety

   d) **Proper sanitation and sterilisation techniques for T/CM practitioners**

   - Issue must be addressed to avoid complications of treatment.
   - Can be included as part of the training module for T/CM practitioners.

   e) **Advertisements & claims**

   - Must be monitored & regulated so as not to mislead the public.

   f) **Practitioner**

   - Formal training to ensure credibility and upkeep good name of the profession.

   g) **Qualification**

   - Cases whereby the qualifications are bought from overseas.
   - The proposed T/CM Council will need to monitor & regulate this issue.

   h) **Institutions offering training in T/CM.**
Must be regulated by MQA & JPA to ensure credibility.

i) Religious implications
   - Some of the modalities contradict the beliefs of certain religion, therefore must be very cautious.

j) Insurance scheme.
   - To protect the public against complications of T/CM treatment.

k) Promotion of T/CM in Malaysia
   - Economic potential in T/CM – Health Tourism

l) Other forms of T/CM not currently covered by the 5 Umbrella bodies.
   - Traditional methods of treatment in Sabah & Sarawak
   - Traditional medicine of our Orang Asli
   - Medical doctors practicing T/CM

5. Current Development of T/CM in Malaysia
   - Division of T/CM in the Ministry of Health at Block E, Jalan Cenderasari, Kuala Lumpur in 2005.
   - MQA looking into standards and criteria of T/CM Training in IPTA/IPTS
   - A pilot project – an integration of T/CM in 3 Hospitals – Hospital Kepala Batas, Hospital Putrajaya and Hospital Johor Baharu (Malay Post-Natal Massage & Care, Chinese Acupuncture & Reflexology)
   - Draft of T/CM Act
   - More Awareness of T/CM
   - Health Tourism
   - National Agro-Based Policy – Herbal Plantations

The Way Forward
- General Observations have shown TCM is becoming quite popular.
- More awareness, advertisements and publicity.
- Public believes TCM products and services as natural – but TCM too have their own complications.
- The way forward is to ensure TCM is credible and safe for public consumption and use – more research and clinical trials need to be done. The public is still exposed to uncertainties and heresay.

Conclusion
- TCM products & practices are readily available in Malaysia
- No Act or regulations on TCM available yet
• The Public has to be careful in using TCM as they are not protected by law should they develop any morbidity or mortality subsequently.

REFERENCES