

Microbial Diseases in Malaysia : Recent Experiences

J T Arokiasamy, MPH, Department of Social and Preventive Medicine, Faculty of Medicine, University of Malaya, 50603 Kuala Lumpur

Summary

Microbial diseases continue to occur in Malaysia despite the marked socio-economic development that has been taking place in the country along with improvements in the medical, health, and environmental sectors. This paper highlights the continuing presence of the numerous microbial diseases including the emergence of new problems such as AIDS. Local publications dealing with work on several microbial diseases is reviewed to show that this group of diseases will pose challenges for a long while. Undoubtedly several other diseases that were relatively unrecognised in the past are increasingly being identified owing to recent availability of diagnostic facilities and equipments. The need for continued vigilance is emphasised.

Key Words: Microbial diseases, Malaysia

Introduction

Disease occurrence is part of a complex interaction between humans and their social and physical environment. Improvements in health care, advances in biomedical research and socio-economic changes play a role in modifying this relationship, thus contributing to the dynamics of disease occurrence. In contrast to the developed countries such as the United States of America and the United Kingdom, where these advances and changes occurred gradually over a long period of time, countries that are rapidly developing economically, such as Malaysia, are experiencing this growth and development in a much shorter span of time, gaining to an extent the experience of the developed world. Thus, in recent decades, the health status of Malaysians has improved markedly, and this can be expected to further improve as the country rapidly progresses towards becoming an industrialised country by the year 2020.

Health transition, which includes both demographic and epidemiological transitions, is linked to socio-

economic growth and development. Epidemiological transition as a theory proposes that, as populations modernise and age, the balance of causes of death and morbidity also changes. The change is characterised by a gradual shift from the eminence of pandemics and infectious diseases to the more chronic or degenerative, sometimes apparently "man-made" diseases which become the chief causes of illness and death. Thus in the western world, the chronic non-communicable diseases dominate the disease patterns.

Around the world, the epidemiological transition seems to have occurred and to be occurring at least three speeds. The transition from the age of "pestilence and famine", through the age of receding pandemics, to the age of degenerative and man-made diseases, may occur gradually. This slow transition occurred over perhaps a century or more in Britain, many north-west European countries and the USA. A very rapid transition (the "accelerated model") has occurred in some countries in a much shorter time of perhaps a few decades. This has occurred in Japan, Eastern Europe, and the USSR, and also in some developing

countries such as Hong Kong and Singapore. The third variant in the rate of epidemiological transition (the "delayed model") in which birth rates may have declined a little and death rates somewhat, has resulted in morbidity and mortality arising from both infectious and noninfectious causes. While birth rates remain still relatively high, the population is living on average, much longer. This is seen in many of the developing countries especially the "rapidly industrialising countries" of which Malaysia is one. The populations of these countries while continuing to face the infectious diseases are now becoming subject to "developed" world diseases such as heart disease, cancer, stroke, and psychiatric disorders (mental illness and stress).

It is important to note that industrialised nations, despite their enormous progress in communicable disease control during the past century continue to experience the infectious diseases. In the United States, tuberculosis, hepatitis and salmonellosis continue to occur in the thousands while others like nosocomial infections, sexually transmitted diseases, influenza and other acute respiratory illnesses occur in the millions. Newly recognised diseases like Legionnaires disease and AIDS are making their presence felt and are requiring action.

In Malaysia, the common causes of mortality between the post-war years and independence in 1957 were mainly communicable diseases such as malaria, tuberculosis, gastroenteritis and the like, which were largely associated with poverty and underdevelopment¹. With the introduction of socio-economic development programmes through the five-year Malaysia Plans, communicable diseases as leading causes of death have given way to those diseases that are more related to development and modernisation, such as cardiovascular diseases and neoplasms^{2,3}. However though they have declined, communicable diseases continue to cause considerable morbidity in the community. Today, except for smallpox, diseases such as tuberculosis, hepatitis, salmonellosis, sexually-transmitted diseases, hospital-acquired infections, influenza, measles, poliomyelitis, and malaria continue to occur and have yet to be eradicated or overcome. Epidemics of these diseases continue to occur in different parts of our country indicating their continued presence. In fact,

it has been stated that they pose a continuous threat of returning probably with greater vengeance in the event public health measures could not be maintained or should our civilizations collapse for any reason⁴.

Microbial Infections in Malaysia

Available statistics reported by the Ministry of Health Malaysia show that communicable diseases have declined though at varying rates. Nevertheless they are represented in the 10 principal causes of new attendance's at the General Out-patient Departments (GOPD) in Peninsular Malaysia in 1992⁵. Table I shows the current trends and status of our communicable diseases during the period 1980 to 1992^{6,7,8}.

The incidence of childhood immunisable diseases in the country continue to decline with improvements in immunization coverage through the Expanded Programme of Immunisation (EPI)^{6,9}. With the introduction of rubella immunization as a pilot project in June 1987 and its subsequent expansion into a national programme, it can be expected that declines in measles incidence will occur. Incidence of diphtheria, whooping cough and poliomyelitis have remained below 0.1 per 100,000 since 1980⁵. These reflect the good coverage of immunisation achieved against these diseases. However, despite being kept at low levels, these diseases tend to reemerge into the limelight from time to time either sporadically or as an epidemic, as in the case of diphtheria when an outbreak occurred in Selangor in 1988⁸. Hepatitis B has only recently been incorporated into the EPI in 1989 and the coverage for this has also been good.

Food and water-borne diseases of which cholera and typhoid predominate have shown varying trends. The Ministry of Health⁶ reported that during the period 1983-1987, food and water-borne diseases like cholera, food poisoning, viral hepatitis and typhoid showed increasing trends but subsequently decline. Cholera still occurs as outbreaks¹⁰. Isa *et al* recently described two El Tor cholera outbreaks. Investigations revealed that 8% of water samples from wells and rivers grew *Vibrio cholerae*. Foodhandlers had a carrier rate of 0.6% while active case detection yielded a carrier rate of 0.3%. The authors reported that while the Inaba serotype was

Table I
Number of cases of selected microbial diseases in Malaysia, 1980-1992

Diseases	1980	1983	1985	1987	1990	1992
Cholera	105	2195	68	584	2066	6999
Typhoid/Paratyphoid	1886	1953	2358	2962	2214	1750
Food Poisoning	1220	1582	1418	2272	1255	963
Dysentery	1151	1182	785	955	549	372
V. Hepatitis	2062	3346	3210	4529	1422	1097
Dengue/DHF	673	790	367	2025	2924	2753
Tuberculosis	6818	9361	8904	9432	10873	NA
Whooping cough	97	86	150	121	23	NA
Poliomyelitis	5	2	4	0	0	NA
Measles	8727	9313	5163	5429	563	NA
Tetanus	60	36	49	86	11	NA
Diphtheria	131	24	39	26	9	NA

Diseases	1988	1989	1990	1991	1992
Diarrhoeal Diseases	366141	329074	336566	322319	295363
Hepatitis B	938	1151	942	724	723

NA = Not Available
 Ministry of Health Malaysia^{6,7}
 Sarvananthan R.⁵

usually involved in El Tor cholera outbreaks, they found that one of the two outbreaks reported were of the Ogawa serotype¹¹. Of the viral hepatitis cases seen in the country, approximately 72.2% were due to Hepatitis A infection, 16.5% were due to Hepatitis B infection and the remaining 10.8% were classified as others⁶.

Diarrhoeal diseases, a major cause of morbidity particularly among children, show no indication of declining trends. Group A rotaviruses are associated with a significant proportion of diarrhoea cases in children. A one year community based study in urban and rural children in the Klang valley revealed that the incidence rate for diarrhoeas was 23.6 per 100 person-years. Rotavirus was isolated in 12% of the cases, all of which were Group A. Asymptomatic rotavirus infection was

found in 3.2% of the children¹². Enteropathogenic *E.coli* (EPEC) is also common in diarrhoeal disease outbreaks and is routinely investigated for in children with diarrhoea. However there has been a lack of data on prevalence of enterotoxigenic *E. coli* (ETEC) due primarily to the lack of testing kits in the past. A report shows that ETEC was involved when 16 of 403 stool samples were tested positive for ETEC. of these 16, nine were positive for heat stable toxin, 6 for heat labile toxin and 1 for both. Though the isolation rates are small, the authors report that the isolation rate was as common as for *Shigella* species and *Salmonella* species isolated in the same study¹³.

Chloramphenicol resistant *Salmonella typhi* cases are seen. The Institute for Medical Research, a national

centre for phage typing of *S. typhi* identified the first case of chloramphenicol resistant *S. typhi* in 1978 and since then sporadic cases have been identified. However in 1991 an outbreak of 8 cases in Selangor was reported of which one case was a visitor from India. In 1992 they reported 13 cases from different states and of which 7 were among those who had visited India, 2 were among tourists from India and Pakistan, while one case was a foreign worker from India. Eleven of the 13 cases were of phage type E1 while the remaining 2 were of phage type O. The potential for outbreaks of antibiotic resistant microbes occurring more frequently in view of increased numbers of foreign labour in the country is real¹⁴.

Like diarrhoeal diseases, acute respiratory infection too are a major cause of morbidity and mortality, in particular among children. These too show no indication of declining trends. Among GOPD new attendances of Government hospitals, diseases of the respiratory system continue to top the list of conditions seen. Pneumonias remain in the top 10 leading causes of admissions to hospitals in Peninsular Malaysia⁵.

Tuberculosis has plateaued out following a marked fall in the past decades. However it is under threat of further increase and it continues to be a public health problem as it is still one of the ten major causes of death with its present rank being number nine in Sabah and Sarawak. Coverage for B.C.G. vaccination in 1987 was reported to be 98.4%. While the decline in incidence of pulmonary tuberculosis has taken place markedly with anti-tuberculous chemotherapy, extra-pulmonary tuberculosis has not declined correspondingly¹⁵. Noorhayati *et al* looking at 100 cases of extra-pulmonary tuberculosis in General Hospital Kota Bharu during a two-year period of 1990-1991 noted they constitute 11% of all newly diagnosed tuberculosis cases with common sites involved being lymphnodes, osteoarticular sites, pleura, genitourinary, larynx, gastro-intestinal sites and the meninges¹⁶. Hooi reports that of 100 cases of pleural effusion patients, 49 were due to tuberculosis¹⁷. Drug resistance to tuberculosis is of concern especially with increasing occurrence of HIV positive cases and the growing presence of migrant labour from countries that have a higher incidence of tuberculosis¹⁸. Jalleh *et al* looking

at primary drug resistance to anti tuberculous chemotherapy found that in 856 strains tested during 1984-1987, 121 were resistant to one drug while 17 were resistant to two drugs. None were resistant to more than two drugs. 4.2% were resistant to isoniazid, 7.59% to streptomycin, 0.95% to rifampicin and 1.44% to etambutol. Though the figures appear to be low, these are relatively high compared to figures in developed countries such as Australia and the U.S.A.¹⁹.

Sexually transmitted diseases (STDs), a major group of underreported diseases are a continuing major public health problem. This has been particularly of concern in recent years with the emergence of AIDS and HIV infection as a relatively new public health problem and one that is part of a global pandemic. Among the STDs, gonorrhoea was the commonest (80.1%) with the problem being highest in Sarawak, Wilayah Persekutuan and Sabah. Penicillinase producing *Neisseria gonorrhoea* isolates varied between 16.9% to 47.1% during the period 1983-1987⁶. Investigations conducted on 130 new inmates of a rehabilitation centre who were female drug abusers, majority of whom were also self confessed sex workers (77.7%), showed that 50.8% tested positive for syphilis, 52.2% for Hepatitis B, 23.8% for moniliasis, 19.2% for trichomoniasis, 8.5% for gonorrhoea, while 6 of the inmates were found to be HIV positive²⁰. Yaws, a chronic non-venereal treponematosi, has been occurring sporadically in this country with occasional small outbreaks from time to time. An outbreak of 10 active cases was reported in Baling recently indicating the need for medical practitioners to be vigilant to its presence²¹.

The first case of HIV infection was reported in Malaysia in late 1986. Since then the number of HIV infected individuals have increased which in part has been due to aggressive increased case finding and screening of high risk groups. Up to January 1996 it has been reported that there are about 14,418 HIV infected persons in the country (New Straits Times, February 3, 1996 p.10). A retrospective analysis of 104 cases of HIV/AIDS cases registered at the University Hospital Kuala Lumpur showed IV drug use was the commonest mode of acquiring HIV infection followed by heterosexual and homosexual routes respectively²².

Vector borne diseases of microbial origin continue to be a problem in the country. In this group, Dengue and Dengue Haemorrhagic Fever predominate. The number of cases have varied, with epidemics getting to be relatively common. Dengue fever has been occurring almost throughout the country in recent years⁸. It was reported that the emergence of 'rural dengue', transmitted by the outdoor *Aedes albopictus* has significantly contributed to the high incidence of the disease⁸.

The availability of Hepatitis C Virus (HCV) antibody screening tests locally since 1990 has made it possible to start diagnosing this type of Non A-NonB hepatitis in Malaysia. Merican in a recent update of Hepatitis C, mentions that HCV accounts for 90-95% of post transfusion hepatitis and 50% of sporadic and community acquired hepatitis²³. Sinniah in a review of Hepatitis C in Malaysia describes high risk groups based on looking at published and unpublished data. High risk groups include, IV drug abusers, haemophiliacs, and haemodialysis patients. Others that include those with liver cirrhosis, hepatocellular carcinoma, chronic hepatitis, those who are male homosexuals, and female prostitutes had lower prevalence of HCV. The authors recommend that transmission perinatally, through the sexual route, or occupationally especially in those working in laboratories and haemodialysis units need to be studied²⁴. Blood donors are also capable of carrying Hepatitis C as was reported by Duraisamy *et al* in a study of 3540 blood donors, of whom 53 were positive with a seroprevalence of 1.49%²⁵. Ng *et al* recently reported anti-HCV antibody was found in 1.9% of blood donors seen at the University Hospital. 33.3% of post transfusion hepatitis cases and 30% of intravenous drug users were tested positive for anti-HCV antibody²⁶.

Nosocomial infection or hospital acquired infections have become a major cause of morbidity and mortality, the rates reported varying according to the efficiency of the surveillance system in place and the definition of infection employed²⁷. Lim reports that in Malaysia the true rates of nosocomial infections are not known and that a recent Ministry of Health survey gave an

overall incidence of 1.3%, which in his opinion was likely to be an underestimate²⁷. Bacterial contamination of diluted disinfectants in 6 Malaysian hospitals was studied recently. Bacterial isolates obtained included *Pseudomonas* spp., *Moraxella* spp., *Flavobacterium* spp., *Enterobacter* spp. and *Acinetobacter* spp.²⁸. Methicillin resistant *Staphylococcus aureus* (MRSA) is of concern in any medical care centre. First recognised more than 20 years ago, methicillin resistant *Staphylococcus aureus* is an increasing clinical problem both as a community acquired and nosocomial infection. Increasingly severe MRSA infection outbreaks are being seen in hospitals with high mortality in immuno-compromised patients. 10 to 20% of Malaysian hospitals in Malaysia have been found to be MRSA positive in a survey²⁹. Cheong *et al* report that during August 1990 to November 1991, 905 out of 2583 (35.4%) isolates of *Staphylococcus aureus* were found to be methicillin resistant in a Malaysian hospital³⁰.

There are other less frequently occurring infections that serve as a reminder that these must be considered when patients are seen. A few of these are highlighted. Tetanus is a disease of low occurrence and cases occur from time to time. This infection, caused by *Clostridium tetani*, is ubiquitous and occurs in nature, thus making it difficult to control or eliminate³¹. Infections due to *Chlamydia trachomatis* are not uncommon. Rachagan and Ngeow report 33.8% of 36 asymptomatic infertile women being investigated for their infertility were positive for chlamydial antigens³². Ocular chlamydial infection presenting as classical trachoma or inclusion conjunctivitis is relatively common. Deva and Ngeow report 52 cases positive for the chlamydial antigen out of 184 cases of acute conjunctivitis investigated during the period 1984 to 1990³³. Lum and Ngeow reported a case of *Chlamydia pneumoniae* in a child, and the authors commented that the epidemiology and clinical spectrum of this type of chlamydial infection in Malaysia is still not known, primarily due to limitation of diagnostic facilities³⁴.

Outbreaks and cases of human rabies occur from time to time, with areas in the Malaysian-Thailand area being endemic³⁵.

Discussion

Despite their decline globally, infectious diseases continue to be the most common cause of death in the world. According to the World Health Organisation, 16.4 million deaths out of the 53 million deaths in 1993 were due to infectious and parasitic diseases. Wilson remarks that increasingly, humans are facilitating microbes to move and to reach vulnerable populations. This is illustrated by emerging infectious diseases such as Hantavirus pulmonary syndrome, which was recently recognised and has now reached every country of the world and is estimated to reach a cumulated 30-40 million people by the year 2000 to be infected worldwide³⁶. It has to be noted that the true load of some infections are not known as a result of the non availability or lack of diagnostic facilities in the country. An increase in the reporting of some of these infections is more likely due to improved diagnostic capabilities as illustrated by such infections as Hepatitis C.

The magnitude and speed of internal and international migration today is unprecedented leading to growth of settlements occupied by large numbers of migrants. These settlements are characterised by poor accommodation, lack of basic amenities and poor environmental conditions which facilitate the widespread occurrence of enteric and respiratory infections³⁷. However this massive movement is not confined to just humans but also animals, agricultural products, insects and most importantly microbes³⁶. Thus the HIV pandemic we face today is an illustration of this, facilitated by today's feasibility of rapid travel. Another, Dengue fever/dengue haemorrhagic fever has largely been an urban disease of fairly recent occurrence, being spread by *Aedes Egypti* that breeds in tins and containers that are indiscriminately scattered around by man, clearly related to behaviour patterns of the latter³⁷. However, more recently in Malaysia, the introduction of *Aedes albopictus* has resulted in the emergence of 'rural dengue', which is contributing to the increased incidence of this viral disease. Of concern is that the current rapid development taking place in the country to reach an industrialised status by the year 2020 will make us more vulnerable to dengue/dengue haemorrhagic fever owing to the vector's breeding

patterns and the result of man's behaviour of indiscriminately discarding containers and creating the breeding sites.

Waterborne diseases are regularly responsible for epidemics in Malaysia and considerable morbidity. The relatively slow progress in the improvement of water supply and excreta disposal have facilitated cholera and other diarrhoeal diseases to continue to spread, or appear as epidemics. It is true that even as we enter the next millenium, not all our people in Malaysia have access to safe water supplies and or a satisfactory means of excreta disposal⁹. With increases in the risk factors associated with poor food hygiene, and increases in the incidence of zoonoses³⁸, food borne diseases too can be expected to continuously occur and as epidemics⁴. This trend has been due to increases in human populations and in the numbers of animals in contact with man; urbanisation and environmental pollution; the inadequate health measures taken by uncoordinated veterinary and public health services; changing patterns of land use and agricultural practices; industrialisation of food production; evolution of consumer habits in greater use of processed foods; an increase in the national and international trade in foods and feeds; and the development of tourism³⁸. Most of these factors are relevant to Malaysia.

It has been noted that while mortality from tuberculosis can be lowered almost immediately by an effective treatment programme, the impact on morbidity can only be noticed in subsequent years. This retarded impact is usually observed with BCG vaccination programmes¹¹. Our national control programme against tuberculosis has had its impact as shown by the declining rates. However in order to push the current prevalence rates of tuberculosis lower, even greater efforts will be required to identify and overcome any factors that may be impeding their decline. Globally, the tuberculosis situation is changing slowly due to problems associated with the specific epidemiological dynamics of the disease and also the difficulties faced by many countries in the application of the available control techniques³⁸. These have to be considered in Malaysia since the decline in occurrence of cases has slowed down. Vigilance is necessary as the rates could increase due to increasing HIV occurrence and the presence of a large immigrant population.

It has been estimated that globally, some 5 million deaths due to diseases of childhood preventable by immunisation occur among children under 5 years of age. As with diarrhoeal and respiratory diseases, these deaths occur in the context of severe malnutrition interacting diseases³⁷. Measles, diphtheria and pertussis can be leading killers especially among unimmunised children. Poliomyelitis can result in paralysis in 1-2% of unimmunised children under the age of 3 years, and in a higher proportion among older children who are infected. According to the World Health Organisation, an increase in the number of cases of paralytic poliomyelitis has been reported³⁸. While our current coverages through EPI are good, vigilance in ensuring adequate coverage of children with immunisations for diphtheria, pertussis, tetanus, measles, poliomyelitis and tuberculosis is important. Ensuring that the required schedule of immunisation is completed is also equally important. At the same time pockets of unimmunised children in the community should be looked for and identified continuously to prevent these diseases from occurring from time to time or as outbreaks.

The increasing occurrence of sexually transmitted diseases along with the occurrence of resistance of gonococcal strains to penicillin and other antibiotics have important implications on costs of treatment³⁸. Measures will have to be taken to prevent the misuse of antibiotics. The underreporting of cases, and inadequacies in contact tracing and case investigations have to be overcome for these factors make controlling of this category of communicable diseases difficult. The emergence of AIDS has turned considerable public attention to it and sexually transmitted diseases indirectly. This has important implications for public health activities that are being directed towards

modifying behaviour patterns and towards handling culturally sensitive issues relating to sexually transmitted diseases. Efforts directed at AIDS can have an impact on sexually transmitted diseases as a whole and should be taken advantage of if an impact is to be made³⁹.

Methods of control of communicable diseases focus on modifying the interaction between factors related to the host, the etiologic agent, the environment and these factors³⁶. Major approaches include reduction of host susceptibility, for example through immunisations; alteration of the environment in an effort to eliminate sources or vectors of the etiologic agent; elimination of opportunities for disease transmission; and inactivation of the infectious agent⁴⁰. It is clear that communicable diseases will continue to cause morbidity in Malaysia. Epidemiologists in all developing countries will continue to be challenged by communicable diseases so long as these diseases remain endemic and cause outbreaks every now and then⁴⁰. Added to the problem is that subclinical infections of communicable diseases are common, and milder forms of some may mimic other disease conditions⁴. Continuous efforts directed at controlling communicable diseases have to be maintained for they cannot be abandoned until the causative organisms have been eradicated from the whole world⁴. The public, and perhaps even governments, may become blasé about a disease that nobody has seen for years and seems to pose no threats. However, rapid intercontinental travel has transformed the world into a single epidemiological unit and, as long as a simple pocket of endemic infection remains anywhere on earth, the risk is real that the disease in question will one day be reintroduced, even if it has been eradicated from our country⁴.

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