

MEASLES IN PENINSULAR MALAYSIA.

S.T. CHEN

INTRODUCTION

IN many parts of the world especially in developing countries where malnutrition is common, measles is a serious communicable disease of childhood. Measles ranks among the 10 leading causes of death of toddlers in many countries including Chile, Mexico, Panama, Venezuela, Hong Kong, Singapore, and Japan (WHO, 1974). Not only is measles responsible for deaths but it is also responsible for morbidity particularly in its detrimental effect on the nutritional state of the child. In developing countries, it often precipitates protein-calorie malnutrition in childhood (Morley, 1964).

In Malaysia measles is common and endemic (Fig. 1 and Fig. 2). The number of notified cases ranged from 2,798 in 1976 to 3,686 in 1977 (Malaysia 1976 - 1978). However the number of notified cases does not represent the true incidence of the disease since people in Malaysia tend to resort to home treatment or seek traditional medical treatment for measles. Further, even when they seek treatment from "Western trained" medical practitioners, measles may not be notified.

In Malaysia both measles as well as protein-calorie malnutrition are common. On the other hand records indicate that measles caused only 0.5% (5/1001) of the medically certified toddler deaths in 1972 (Malaysia 1977a). However, it has been noted that children often died of complications of measles such as bronchopneumonia which account for 23% of toddler deaths in Malaysia (Chen, 1975). In the Malaysian situation, it is possible that mortality overtly due to pneumonia is associated in some cases with underlying measles.

S.T. CHEN, M.B.B.S., M.P.H.,
 Department of Paediatrics,
 University of Malaya,
 Kuala Lumpur.

Fig. 1.
 No. of notified measles cases,
 Peninsular Malaysia.

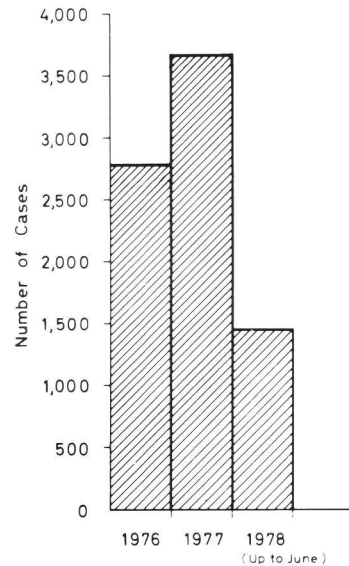


Fig. 1. Notified measles cases, Peninsular Malaysia

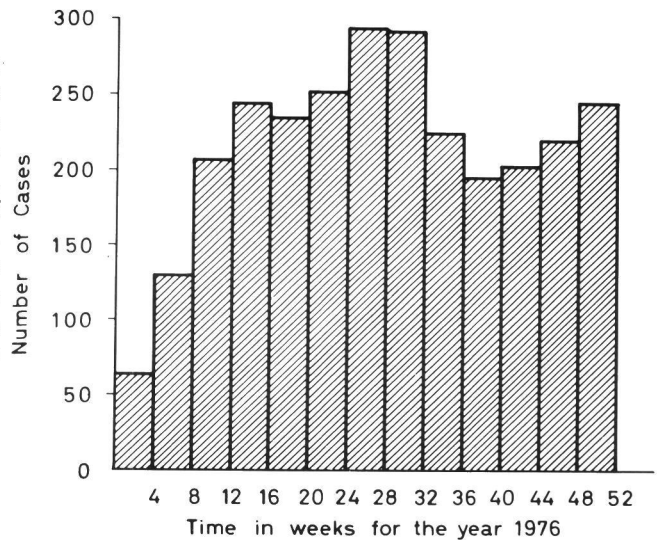


Fig. 2. Notified measles cases by week, Peninsular Malaysia, 1976.

In this paper an attempt is made to examine the incidence and complications of measles as seen in an urban hospital and to examine the effect of measles on growth of a small group of upper income Malay Children followed-up longitudinally from birth to 2 years of age.

MATERIAL AND METHODS

1. Study of hospital records.

There were 863 patients coded as measles of which 200 (23%) were admitted to the University Hospital, Malaysia, from March 1968 to December 1977. Of these, 185 of them were of children up to 12 years of age and admitted to the Paediatric Unit (Fig.3). Children with measles are only admitted to the Paediatric Unit if they are ill with complications such as pneumonia or fits or admitted with high fever of unknown origin. The records of these 185 children were analysed with regards to age, sex, ethnic groups, complications and mortality. Since bronchopneumonia is the commonest complication of measles, the records of a sample of children aged 6 months to 4 years who died of bronchopneumonia during the period of 1968 - 1976 were also studied to see if measles could be the underlying cause of death of some of these children even though death was not certified as being due to measles. Further, the records of all deaths aged 1 month to 12 years in 1972 were studied to locate the number of deaths due to measles.

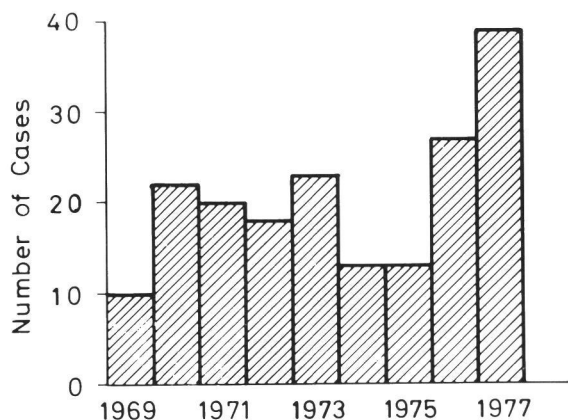


Fig. 3. Measles cases, Paediatric Unit, University Hospital, 1969-1977.

2. Longitudinal Study

A group of 114 upper income Malay children were followed from birth to 1-2 years of age as part of a longitudinal growth and development study from June 1975 to December 1977. Children were immunized with measles vaccine at one year of age. 11 children (10%) developed measles before one year of age. All the children developed measles after the age of 7 months except for one who developed measles at the age of 5 months when her sibling developed measles. One child developed measles at 14 months of age when immunization was delayed due to an upper respiratory infection. This paper examines the complications of measles and the effect of measles on the weight of these children.

RESULTS

1. Hospital Records

a) Incidence.

Measles made up 0.9% (185/20,318) of all Paediatric admissions. Of the 185 children with measles 50 (27%) were Malays, 87 (47%) Chinese and 46 (25%) Indians and 2 (1%) were of other ethnic groups. Compared with the overall admission rates of children of the various groups which was 20%, 49%, 28% and 3% respectively, the Malays had a higher measles admission rate compared with the Chinese and the Indians. This difference is statistically significant ($p < 0.05$). There were 93 males and 92 females.

Fig. 4 shows the age at which measles occurred in children in hospital. It can be seen that only 3% of the children contracted measles at 6 months of age, but 44% by 1 year, 77% by 4 years and 90% by 7 years.

b) Complications.

The rate of complications from measles was 54% (99/185) (Febrile fits which were common were not included as complications). The Malays had a higher rate of complication (70%) compared with the Chinese (46%) and the Indians (52%) and this difference is statistically significant ($p < 0.02$). The most frequent complications were respiratory tract infections (73%) namely bronchopneumonia and bronchitis (65%), otitis media (5%) and empyema (3%)

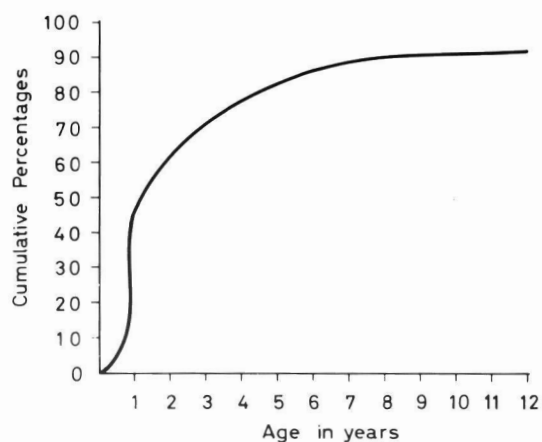


Fig. 4. Cumulative percentages of measles cases by age, Paediatric Unit, University Hospital.

followed by gastroenteritis (14%), encephalitis and meningitis (7%) and septicaemia, conjunctivitis and stomatitis (6%).

The duration of hospital stay ranged from 1 — 38 days with a median of 5 days.

c) Mortality.

The case fatality rate was 3% (5/185). The age of children who died of measles ranged from 6 months to 4 years. In the University Hospital measles caused 1.7% (5/297) of deaths of children aged 6 months to 4 years. However a search through the records of 27 children (aged 6 months to 4 years) who died of bronchopneumonia revealed a further 4 children (15%) whose underlying cause of death was due to measles but not certified as such.

These were 62 deaths of children aged 1 month to 12 years in 1972 and none of which was certified as death from measles. However, a search through the records of these children revealed 2 deaths due to measles, one an 11 month old male infant who died of post measles pericarditis and empyema and the other a 6 year old boy who died of post measles bronchopneumonia. For the same period, 1972, there were only 7 deaths within these age group certified as being due to measles for the whole of Peninsular Malaysia. (Malaysia, 1977a).

2. Longitudinal study

a) Complications.

Of the 12 children, 3 (25%) developed complications and required hospitalization. The complications were bronchopneumonia, bronchopneumonia with empyema and febrile fits.

b) Effect of measles on weight of children.

Except for 2 children who were underweight (72% and 77% of standard weight for age using Boston 50th percentile as standard - International Working Party in Jamaica, 1970) the rest of the children's growth was good (81% to 104% of standard weight) before the onset of measles. As these children were seen at two monthly intervals (except for the 5 month old child who was seen at monthly intervals) minor changes in weight as a result of measles would not be detected. Of the 12 children, 3(25%) had weight loss as a result of measles (compared with the weight taken 2 months earlier), with 2 having post measles bronchopneumonia and one being underweight before the onset of measles. It took 13 months for one (Fig. 5) and 21 months for another to regain the previous weight percentiles, while the third child had not regained her original weight percentile even 15 months after the onset of measles.

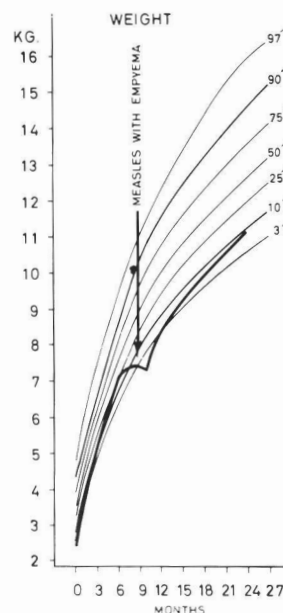


Fig. 5. Weight chart of a child showing the effect of an attack of measles on weight gain.

However, with remaining 9 children, 2 (17%) had definite deviation of weight from a higher to a lower percentile. It took 10 to 19 months to regain the previous weight percentiles. Thus in 42% of the children, measles had an adverse effect on their weight gain and this effect persisted for 10 to 21 months.

DISCUSSION

1. Incidence.

Incidence of measles in Malaysia is not known. The reported cases of about 3,000 cases a year are the tip of the iceberg because many children with measles do not seek treatment from "Western trained" doctors. The Malaysian, people of all ethnic groups, have their own home treatment for measles, ranging from herbs, coconut water, various taboos and spiritual incantations. Many do not seek Western medicine unless the diagnosis is in doubt or when complications set in. Many prefer to see the "Sinsih" or "Bomoh" rather than "Western trained doctors". However a rough estimate of the number of cases seen by "Western trained" medical practitioners can be made from available data. In the University Hospital only 4% of measles cases (35/863) were notified to the health authorities. If it is assumed that the notification rate is 10%, there would be an estimated 30,000 cases of measles seen by medical practitioners each year.

2. Age of onset.

The age at which measles occurred, as seen in the University Hospital, is very similar to that of other developing countries that is with a peak from 6 months to 4 years of age. The high percentage of children (44%) who developed measles before one year of age is probably higher than in the community at large because of higher rates of complications at this age group. The age of onset is earlier compared with developed countries where children are exposed to the disease later in life (Morley 1973). Even among the higher income children (longitudinal study) whose housing conditions are good, 10% of the children developed measles before the age of one year. This means that Malaysian children will have to be immunized with measles vaccine at an earlier age, say at 9 months to one year compared with their American counterparts. The

U.S. Public Health Service Advisory Committee on immunization practices recommends measles immunisation at 15 months of age (CDC, 1976).

3. Mortality.

Although measles is endemic in Malaysia, yet mortality statistics do not indicate that measles is an important cause of death in young children contributing to only 0.5% of toddler death. However a search through hospital records reveals that this is more apparent than real. Death from measles usually results not from the disease itself but from its complications such as bronchopneumonia and encephalitis. By the time children come to hospitals with such complications the rash of measles would often have faded and parents may not volunteer to give the information of the preceding measles infection. Even if the diagnosis of post measles complications is made, doctors often neglect to certify measles as the underlying cause of death as seen in this study where 15% of deaths due to bronchopneumonia were associated with underlying measles which was not noted in the death certificate.

The case fatality rate for measles of 3% is bias, as only severe cases of measles are admitted to the hospital. To get a true picture of the case fatality rate a community survey is indicated. Most of the deaths from measles occur during the first 4 years of life indicating that measles is more severe during the preschool age period. Similar findings have been noted elsewhere in the world eg. England (Miller, 1964), Kenya (O'donova, 1971), Uganda (Bwibo, 1970), Chile (Ristori *et al.*, 1962) and India (Taneja *et al.*, 1962):

4. Morbidity.

The extent of morbidity caused by measles in Malaysia is not known. But measles as seen in Malaysia is probably not as severe as is seen in Africa where a "dark rash" with severe desquamation and sore mouths are frequently seen and measles often precipitates Kwashiorkor (Morley, 1964). This type of measles is seen occasionally in malnourished children in the University Hospital, (Fig. 6). The severity of measles is related to malnutrition (Taneja *et al.*, 1962; Morley, 1964; Bwibo, 1970). However the types of complications seen here are very similar to

those seen in other parts of the world. Respiratory complications are by far the commonest (73%) followed by gastroenteritis (14%), encephalitis and meningitis (7%). The rate of complications in Malaysia is not known but judging from the small sample of higher income children (longitudinal study) where 25% of the children below 14 months of age developed complications, the rate of complications is probably higher in the general population where 40% of the population live below the poverty level. In Denmark the rate of complications of children aged 0—14 years was reported to be 18% (Horwitz *et al.*, 1974) while in Nairobi it was 63% (Hayden, 1974). In U.S.A. the incidence of encephalitis is estimated to be 1 per 1,000 reported cases of measles and measles encephalitis is reported to cause permanent brain damage and mental retardation (CDC, 1976).



Fig. 6. Photograph of a malnourished child with severe measles showing extensive desquamation of skin, stomatitis, and surgical emphysema of neck as a result of bronchopneumonia and pneumomediastinum.

Morley (1964) has pointed out the detrimental effect of measles on African children. In Malaysia, even among the higher income children, the nutritional status of 42% of these children was adversely affected for 10-21 months by an attack of measles.

5. Cost of therapy.

Table I shows the estimated annual cost for in-patient care of measles.

6. Prevention.

Measles is a preventable disease and can be controlled by active immunization which is both safe and effective (Forbes 1973, CDC 1976). However the cost of vaccine is comparatively high (Table II). Nevertheless the cost of therapy for measles approximates that of the cost for the vaccine. Besides in Malaysia where sophisticated medical care such as open heart surgery is available, the prevention of measles must surely be given priority. Measles immunization will not only protect children from the misery, morbidity and mortality of measles, but at the same time a major step will be taken in reducing malnutrition. For the successful control of measles, it is important to maintain a continuing programme of immunization and to establish a successful cold chain system (Hendrickse, 1975). This is best done by incorporating the measles immunization programme into the existing ongoing routine immunization programme for children.

Health education to the public, making them aware of the safety and benefits of measles vaccination, will further contribute to the success of the programme. Health education is very important because of the cultural beliefs and attitudes of the people here regarding measles (Pakshong *et al.*, 1977).

SUMMARY

Although statistics indicate that measles caused only 0.5% of toddler death in Malaysia in 1972, a search through case records of the University Hospital revealed that there was under reporting of measles as an underlying cause of death. 15% of deaths certified as due to pneumonia in children, aged 6 months to 4 years, were the result of underlying measles which was not certified as such. The most common complications were respiratory in na-

Table I**Estimated annual cost of inpatient care for measles**

Estimated no. of measles seen by medical practioners	= 30,000
Porportion of measles cases requiring admission in University Hospital	= 23%
Estimated no. of admissions based on estimate of 10% of all cases of measles	= 3,000
Cost to hospital per patient per day in University Hospital	= \$100/-
Medium duration of hospital stay	= 5 days
Total annual cost of in-patient care for 3,000 measles cases based on a cost of \$75 per day for 5 days	= M\$1,125,000

Table II**Estimated annual cost of measles vaccine**

No. of live birth in Peninsular Malaysia in 1975 (Malaysia 1977b)	= 313,741
No. of infants alive at 1 year based on in fant mortality rate of 33/1,000 live birth	= 303,388
Cost of measles vaccine (when purchase in bulk) per dose	= M\$4/-
Cost of measles vaccine to immunise all infants at one year of age	= M\$1,213,552

ture (73%) followed by gastroenteritis (14%) and encephalitis and meningitis (7%). The rate of complications in the general population is unknown but among a group of higher income children followed longitudinally the rate of complications was 25%. Measles had a deleterious effect on the nutritional status of 42% of these children. To control measles, active immunization should be carried out in Malaysia as part of the routine immunization programme for children. This will not only protect children from the misery, morbidity and mortality of measles, but at the same time it would contribute to the reduction of malnutrition.

ACKNOWLEDGEMENT

I would like to thank Professor K.L. Lam for permission to publish this paper, Professor A.E. Dugdale for advice, Miss F.Aw Yong for typing the manuscript.

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