

Factors associated with the outcome of Dengue Haemorrhagic Fever/Dengue Shock Syndrome cases admitted to Yangon Children Hospital

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A prospective cohort study included the 303 mothers of Dengue Haemorrhagic Fever (DHF)/Dengue Shock Syndrome (DSS) cases admitted to Yangon Children Hospital (YCH). Case Fatality Rate (CFR) was highest in 1-5 year age group (8.53%), the patients ill for >5 days (10.95%), and more than 5 hours duration of shock at home (34.15%). CFR was low in the cases consulted with the medical personnel (4.18%), and the hospitalized patients referred by the health staff (4.46%). CFR was highest among the cases of illiterate mothers (16.13%) and vendors (9.47%), and lowest in those of mothers with high education (4.25%). Though the mothers gained high knowledge and attitude scores of 59% and 62.7% respectively, only 34.7% got high practice scores. The difference of knowledge, attitude, and practice scores was statistically significant to education of the mothers. CFR was high in the children of the mothers who had no action taken for preventive measures (8.1%). CFR was cent percent in Grade IV cases. Early and timely referral should be enhanced by modified health education processes.

INTRODUCTION

Dengue/dengue haemorrhagic fever (DHF) is now the most important and rapidly rising arbovirus infection in the world. Clinically, dengue fever has been recognized for more than 200 years and a disease similar to DHF was first described at the end of the past century. Currently, the incidence of DHF is greater by far in Asia than in the Americas. DHF continue to be a serious public health problem and a major cause of hospitalization and death among children in many Asian countries [1-2].

Aedes aegypti is a small black-and-white, highly domesticated mosquito that prefers to lay its eggs in artificial water-containers commonly found in urban areas of the tropics. Containers found in and around the home, such as those used for water storage,

flower vases, old automobile tyres, buckets and other junk items that collect rain water are examples. The adult mosquitoes are rarely noticed, preferring to rest indoors and to feed on humans during daylight hours in an unobtrusive and often undetected way [3].

DHF, a severe, often fatal, febrile disease caused by dengue viruses is characterized by acute febrile illness of 2-7 days duration, haemorrhagic tendency, and in severe cases, Dengue Shock Syndrome (DSS), a protein losing shock syndrome. It is currently thought to have an immunologic basis. At least four distinct types of dengue virus (type 1-4) have been isolated from patients with haemorrhagic fever. [4]

An increase in the number of reported cases was noted in Myanmar. DHF is now

occurring in many townships from 12 out of 14 States and Divisions in Myanmar. The recorded cases for YCH was 2242 with 31 deaths in 1997. Most of the reported cases are under 15 years of age. An increase in the number of reported dengue cases is noted in Myanmar. DHF is prevalent in Yangon throughout the year. Disease incidence rises during the rainy season. Highest number of cases occurs in July or August. The reported total cases in Yangon Division were 3943 and dead cases were 76 in 1967. DHF occurs annually in an endemo-epidemic form. Control of DHF is included in the VBDC program. Early diagnosis and prompt treatment, timely hospitalization, can prevent severe complication of DHF and it is cost effective.

DHF is prevalent in Yangon throughout the year. Disease incidence rises with the rainy season. Highest number of cases occurs in July or August. DHF/DSS is a disease mainly of children under 12 years. The most vulnerable age group is 3-8 years, which contribute 79.8% of DSS cases and 86.1% of fatal cases. Female preponderance was seen in DSS (male:female = 1:1.39). Most of the children with DSS developed shock on 3rd to 7th day of fever [5].

A previous infection makes people more susceptible to serious complications or to subsequent infections. The breeding habits of the main mosquito vector, *Aedes aegypti*, are closely related to poor sanitation or overcrowding and incorrect water storage [1]. Our interest is to find out the outcome of DHF influenced by maternal education and awareness. Early hospitalization based on awareness of the disease of the mother could favor the reduction of mortality, as DSS is a severe fatal outcome. The study will provide future intervention for reduction of Case Fatality Rate (CFR).

"HFA by the year 2000" targets to decrease the CFR in DHF/DSS to less than 1.8% in Myanmar health plan. Early recognition of the disease and early admission are the

prime importance to decrease CFR. This study is carried out to detect different presentations of DHF/DSS, which will give valuable information to decrease CFR.

Objectives

The general objective was to determine the factors associated with the outcome of DHF/DSS cases admitted to Yangon Children Hospital (YCH) from September to December 1998. The specific objectives were to determine the association of maternal education to knowledge, attitude, practice, and outcome of the disease, and to identify the risk factors associated with DSS.

METHODOLOGY AND DESIGN

A prospective cohort study was conducted at YCH from July to December 1998. The total sample was 303 mothers of DHF/DSS cases admitted to YCH. Systematic random sampling was done from the admission list. The hypothesis was that the CFR of the children of the educated mother is lower than that of the children of uneducated mother. Dependent variable was the outcome of DHF/DSS cases (recovery or death). Independent variables were maternal education, knowledge and practice, family income, days of fever at home, duration of shock at home, and stage of illness at the time of admission. Structured questionnaire, hospital registers, and charts were used as data collection tools. Data entry, and processing were performed using Epi-info 6.0.

Assumptions of the study were as follows:

1. The educated mothers are aware of DHF/DSS.
2. The children of the educated mothers consult at YCH regardless of hospital admission.

3. Maternal education and knowledge influence the outcome of DHF/DSS.

FINDINGS

Three hundred and three children of DHF/DSS cases admitted to YCH participated in the study.

Table 1. Characteristics of the children admitted to YCH with DHF/DSS

| Variables | No. | Percent | CFR (%) |
|---|-----------|---------|---------|
| Age group | | | |
| <1 | 17 | 5.6 | 5.88 |
| 1-5 | 129 | 42.6 | 8.53 |
| 6-12 | 157 | 51.8 | 4.46 |
| Mean age (SD) | 3.6 ± 1.3 | | |
| Gender | | | |
| Female | 148 | 48.84 | 7.43 |
| Male | 155 | 51.16 | 5.16 |
| Day of fever at home | | | |
| 1 | 12 | 4.0 | 0 |
| 2-4 | 218 | 71.9 | 5.05 |
| >5 | 73 | 24.1 | 10.95 |
| Mean day of fever (SD) | 3.6 ± 1.3 | | |
| Duration of shock (hours) at home | | | |
| 0 | 172 | 56.8 | 1.16 |
| 1-5 | 90 | 29.7 | 3.33 |
| >5 | 41 | 13.5 | 34.15 |
| Mean (SD) | 2.63 ± | | |
| Same illness among the child's associates | | | |
| Siblings | 23 | 7.6 | |
| Neighbors | 4 | 1.3 | |
| Classmates | 44 | 14.5 | |
| Consultation of the cases with medical personnel | | | |
| Yes | 239 | 78.9 | 4.18 |
| No | 64 | 21.1 | 14.06 |
| Advice for hospitalization of the cases | | | |
| Decision of the parents | 104 | 34.3 | 3.85 |
| Referred by health staff | 157 | 51.8 | 4.46 |
| Others | 42 | 13.9 | 19.05 |
| Accessible health facility of the cases | | | |
| Health center | 40 | 13.2 | 10.0 |
| Private clinic | 254 | 83.8 | 4.7 |
| None | 9 | 3.0 | 3.3 |

Most of the cases fell in six to twelve year age group compared to under one year age

group (51.8% vs 5.6%). CFR was highest in 1-5 year age group. Males were 51.16% of the cases and CFR (5.16%) was lower than females (7.43%). The majority of the cases (71.9%) were febrile of the cases at home for 2-4 days. Mortality was highest among the patients ill for >5 days at home (i.e.10.96%). More than half of the cases did not suffer any shock at home. If duration of shock lasted for more than 5 hours, CFR was highest (34.15%). Some cases had history of same illness in the classmates (14.5%), and in the siblings (7.6%). The majority of the cases (78.9%) consulted with the medical personnel and CFR was lower than those without any consultation. The hospitalized patients referred by the health staff were more than 50% and CFR was 4.46%. Private clinics and health centres were the most accessible health facility (97%) (Table 1).

More than 30% of the mothers were high school and college level and only 10.2% were illiterate. CFR was highest among the cases of illiterate mothers and lowest in those of mothers with high education (Figure 1).

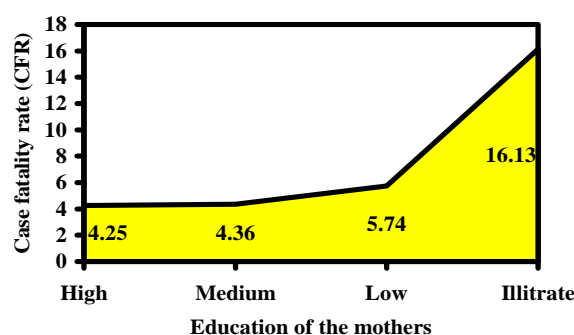


Fig. 1. Mother's education and outcome of the cases. Half of the mothers were dependent and 31.4% were vendors. CFR was highest in vendors (9.5%).

Mortality was high in the cases with associated diseases such as primary complex (10.6%), protein energy malnutrition (10%), malaria (10%), asthma (6.1%), etc. Though the mothers gained high knowledge and attitude scores of 59% and 62.7%

respectively, only 34.7% got high practice scores.

The difference of knowledge, attitude, and practice scores was statistically significant to education of the mothers (Table 2).

Thirty two percent of the mothers covered water container to prevent mosquito multiplication, and 23% exchanged water vases regularly. The mothers who had no action taken for preventive measures were 41% and CFR was highest in those cases.

Table 2. Maternal education and knowledge, attitude, and practice scores

| | Education of the mothers | | | | P value |
|-------------------------|--------------------------|----------------------|------------------------|------------------------------|---------|
| | Illiterate | Low (primary school) | Medium (middle school) | High (high school & college) | |
| Knowledge scores | | | | | |
| - High | 6 | 51 | 31 | 91 | 0.00* |
| - Low | 25 | 71 | 25 | 3 | |
| Attitude scores | | | | | |
| - High | 5 | 23 | 16 | 69 | 0.00* |
| - Low | 26 | 99 | 40 | 25 | |
| Practice scores | | | | | |
| - High | 2 | 17 | 15 | 71 | 0.00* |
| - Low | 29 | 105 | 41 | 23 | |

* Statistically significant

Although Grade IV cases were very few (4.3%) at the time of admission, CFR was cent percent (Figure 2).

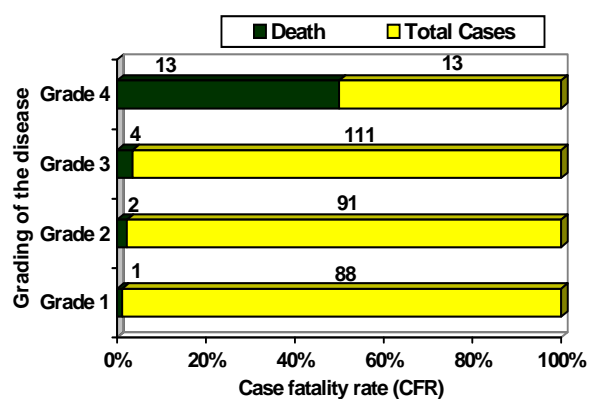


Fig. 2. Severity of admitted cases and outcome

DISCUSSION

As from the survey findings, DHF/DSS is common in 6-12 age group, school going age group, however, CFR is lower than other age groups. It should be taken into consideration that the disease might be transmitted in the school.

Although male preponderance was seen in the study, mortality is lower. No death was observed in the child consulted on the first day of fever. Most of the cases came to the hospital without shock at home and mortality rate was very low, indicating that early admission could lower the mortality.

CFR was highest in the children of illiterate mothers and vendors. Education of the mothers influenced knowledge, attitude, and practice on DHF preventive measures. Cases without associated diseases had very low fatality. Primary complex was the common disease among the studied cases.

Regarding the knowledge scores of the mothers, the majority had a high level of knowledge about the DHF/DSS features, transmission and prevention. Even some mothers with low education level had high knowledge, attitude, and practice scores; the reason was that most of the mothers were aware of DHF which is fatal. Low education level with low practice score was the majority group. Practices scores were not satisfactory although the education level was high.

Fatality of the cases consulted with medical personnel was very low. Doctor's advice was the major role for hospitalization of the cases. Some cases came to the hospital by the parents' own decision. It had double reasons: (1) Mothers are alarmed for DHF/DSS. (2) Financial deficit to consult at the outside clinic.

Many patients were accessible to general practitioner's clinic. CFR was too high in the patients without accessible health because

these cases were from the rural area where transportation was difficult.

The majority of the mothers took no action to prevent the process of transmission mosquito multiplication and mortality was the highest. Some mothers covered water containers. Only few mothers knew to remove the breeding places for mosquito multiplication. Some mothers didn't know that DHF/DSS was transmitted by the mosquito bite.

At the time of admission, most of the cases were stage 3. Stage 4 at the time of admission was very few, due to the fact that most of the mothers were aware of DHF and they came to the hospital in the early stage and critical cases expired at home were under-reported.

Recommendations

DHF/DSS is a principal epidemic disease in Myanmar. Consideration for effective prevention and control measures is essential. DHF frequently occurs in school going age. Some cases are likely to be transmitted in the school. Health education for DHF/DSS features, transmission and preventive measures, and early sign should be strengthened not only for the mothers but also for the teachers and students.

Awareness of the mothers plays a major role in the incidence and outcome of the disease. Promotion of information system relevant to prevention DHF/DSS is essential through different media.

Motivation of the NGOs and community to participate for source reduction and early referral should be emphasized. Effective intervention programme for the reduction of CFR of DHF is a need for the vulnerable group. Early and timely referral should be

enhanced by modified health education processes.

Limitations of the study

- Though our target population includes all children, we have restricted the study population to children with diagnosis of DHF/DSS admitted to YCH because of the anticipated difficulty in identifying the cases without reporting.
- Due to constraints of time and finance, our study is limited to a selected institution. However, we do not anticipate much variation among the community.
- The accuracy of the response of mother was difficult to ensure.

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