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Original Article

Knowledge gained and preventive practices planned by mothers of children with dengue admitted to a ward at the Lady Ridgeway Hospital, Colombo, Sri Lanka

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Abstract

Background and objective

Targeting parents of children affected by dengue fever offers a window of opportunity for education. The present study aimed to assess the knowledge on dengue fever and preventive measures planned among mothers of children with dengue fever admitted to the University Paediatric Unit at the Lady Ridgeway Hospital.

Methods

This cross-sectional study included a consecutive sample of 300 mothers of children admitted to the University Paediatric Unit at the Lady Ridgeway Hospital with a clinical suspicion of dengue/confirmed dengue infection. An interviewer administered questionnaire was used to collect data.

Results

Of the 300 mothers, 122(40.6%) were between 26 to 30 years of age. Approximately half 140 (46.7%) were educated up to G.C.E Ordinary Level and a great majority 266 (88.7%) were housewives. Approximately half of the mothers had 'good' knowledge on symptoms, warning signs and complications of dengue fever [139 (46.3%)] and on initial home management of a child with suspected dengue fever [135 (45.3%)] while a great majority had 'good' knowledge on transmission and prevention of dengue fever [268 (89.3%)]. A majority agreed that their knowledge on dengue [192 (64%)] and level of competence [190 (63.3%)] has improved following hospital admission. All participants reported looking for potential breeding places even prior to the admission and would continue to do so after discharge. Only 64 (21.3%) cleaned small water collections prior to the admission and those who would continue/take up this new practice was shown to increase to 174 (58%). The practice of day time application of repellent oils/ointments or sprays was seen to be the least practiced preventive measures 48(16%) but was the practice that the highest number indicated that they would adhere to after discharge from the hospital 258(86%).

Conclusions

The study showed evidence of success of the health education services of the University Paediatric Unit at Lady Ridgeway hospital and also revealed some important gaps to be addressed to improve the services.

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Introduction

Dengue is the fastest spreading mosquito-borne viral infection in the world [1]. Spreading in epidemic proportions, dengue has become a major public health problem in Sri Lanka. Up to the end of November 2016 the country recorded 44893 cases of dengue with 40 deaths. The number of cases from the district of Colombo alone was 13875[1].

The National Dengue Control Unit of the Ministry of Health, Nutrition and Indigenous Medicine is the central body coordinating dengue prevention and control activities in the country. Enhancing community participation for sustainable control and prevention of dengue is one of its objectives. Educating people on practical measures to be adopted at household level and changing their attitudes motivates them to participate actively in preventing mosquito breeding sites while educating them on identifying the illness, managing the patient at home and recognizing dengue haemorrhagic fever (DHF) patients early contributes to reduction of mortality due to dengue[2,3]. Moreover, educating people while they are experiencing the specific diseases has been shown to be more effective in promoting preventive practices compared to educating them at other times. The effectiveness has been found to be higher when those affected by the disease are children [4].

Dengue is a common illness which causes high morbidity and mortality in the paediatric age group in Sri Lanka. Thus, it is important that all opportunities are utilized to educate and motivate parents on measures to prevent dengue fever, disease management at home setting and early recognition of its complications. As indicated by the evidence, targeting parents of children affected by dengue illness offers an opportunity for such education. However, literature on effectiveness of such education programmes was found to be sparse.

A study had been conducted to assess the level of knowledge, attitudes and practices regarding dengue fever in people visiting tertiary care hospitals (n=447) in Karachi, Pakistan in the latter part of 2006 at a time that the country was experiencing an epidemic of dengue with high mortality[5]. Only about one third of the sample was found to have adequate knowledge about dengue (38.5%). A majority knew the measures to prevent mosquito bites (78.3%) but only a minority knew about getting rid of breeding places (17.3%). Most had indicated television as the most useful source of information on the disease.

In 2010, a total of 192 parents attending child health clinics in the Parish of Westmoreland in Jamaica were studied for their knowledge on dengue which revealed that 54% had good knowledge about signs, symptoms and mode of transmission of dengue. In contrast to this finding, a majority (77%) reported that they did not practice dengue preventive methods such as looking for breeding sites at homes and 51% did not use bed nets. Main sources of information on dengue fever were the radio and television [6].

Effectiveness of the advice of primary care physicians to patients on preventive measures for dengue was assessed in Malaysia in 2008 by interviewing 236 patients admitted to two government hospitals for suspected dengue. Results revealed that a great majority (83.9%) of the patients had sought treatment at a primary care facility before admission to the hospital, with 68.7% of them seeking treatment on two or more occasions. Inquiries on advice from the primary care practitioners revealed that 96% had not been provided with any advice on preventive measures to be taken in spite of 51.9% being informed of a tentative diagnosis of dengue fever. A related study was conducted in Sri Lanka in 2013 on the health seeking behaviour of parents of children with dengue illness at the Lady Ridgeway Hospital for Children, Colombo and, of the study units, 192 (86.4%) were mothers[7]. The study revealed that a majority (64.4%) had sought prompt and appropriate care for the dengue infection prior to hospital admission. Mothers' level of education and the socio economic level of the family were significantly associated with prompt and appropriate health seeking behavior (p=0.001). Mothers' age and monthly income were not associated with prompt and appropriate health seeking behavior.

In this backdrop, the present study aimed to assess the knowledge on dengue and preventive measures planned, among mothers of children with dengue fever admitted to the University Paediatric Unit of the Lady Ridgeway Hospital following exposure to the formal and informal health education available in the ward setting.

Methods

Study design

This was a descriptive, cross-sectional study conducted at the University Paediatric Unit of the Lady Ridgeway Hospital, Colombo from April 2015 to October 2015.

Study units

A study unit was defined as a mother of a child admitted to the University Paediatric Unit at Lady Ridgeway Hospital, Colombo with a clinical suspicion of dengue/confirmed dengue infection. Only those who had been in the ward for at least 48 hours were included in the study to understand the gains of knowledge while in the ward.

Sample size and sampling technique

Calculation of the sample size required to estimate the proportion of knowledge of dengue illness among mothers was based on the formula to estimate sample sizes for prevalence estimates [8]. In the absence of previous similar estimates the calculation assumed that 50% of mothers would possess an adequate knowledge of dengue illness to allow for maximum sample size and used 6% as the desired level of precision with an allowance of 10% for non-response. The estimated sample size was 300. Eligible study units were recruited consecutively till the required number was fulfilled.

Data collection instruments

An interviewer administered questionnaire was used to collect data. The questionnaire included questions on socio-demographic characteristics, housing conditions and details about the child admitted to the hospital including information on previous dengue infections.

Knowledge regarding dengue was assessed under three main components: symptoms, warning signs and complications of dengue fever; initial home management of a child suspected to have dengue fever; and transmission and prevention of dengue. In an attempt to assess the education they received in the ward the mothers were questioned on their perception on improvement of their knowledge on dengue following hospital admission, their perception on whether they feel more competent in identifying symptoms and initial home management of dengue fever compared to before admission and whether they were satisfied with the health education given by hospital staff. Sources of information on dengue were also inquired into. Inquiry on preventive practices related to dengue consisted of a comparison of practices prior to admission and practices planned for the future following discharge, to understand the gains of education while being in the ward. The questionnaire consisted of both open-ended and close-ended questions and was in Sinhalese and Tamil. It was pre-tested among a group of mothers of children warded for dengue in another teaching hospital in the district of Colombo. A panel of experts in the fields of paediatrics and dengue control reviewed the questionnaire and confirmed it as a valid measure to assess knowledge and practices.

Data collection

The questionnaire was administered by two trained pre-intern medical officers, after the patient had been in the ward for at least 48 hours. After checking the eligibility criteria, the mothers were informed about the study, given adequate time to ask questions and verbal consent was obtained. At the end of each interview the data collectors educated the mothers on dengue addressing the specific gaps in their knowledge and practices. Ethics approval was obtained from the Ethics Review Committee, Faculty of Medicine, University of Colombo.

Statistical analysis

Knowledge on dengue, perceived improvement in knowledge on dengue, perceived improvement in level of competence in identifying dengue fever and initial home management and the comparison of dengue preventive practices of mothers prior to the admission and future planned practices following discharge from the ward, were examined by means of descriptive statistics using SPSS version 20.

In addition to presenting the frequency distributions of those who responded accurately to the questions, the study population was also categorized as having either 'Good' or 'Poor' knowledge on each of the three main components under which the knowledge of dengue was assessed. This was achieved by using a

scoring system for each component where accurate responses were awarded a score of '1' and inaccurate responses/non responses were awarded a score of '0'. Based on this method, each of the components, namely, symptoms, warning signs and complications of dengue fever; initial home management of a child suspected to have dengue fever; and transmission and prevention of dengue were awarded a maximum score of 13, 20 and 24, respectively with a total score of 57. Knowledge on each component was then categorized as 'Good' and 'Poor' on predetermined cut-off points of 8, 15 and 17, respectively. The cut offs were decoded based on possessing an accurate knowledge on the essential aspects of each of the components.

Results

A total of 314 mothers were invited to recruit 300, giving a response rate of 95.5%.

Socio demographic information

Of the 300 mothers, 40.6% were between 26 to 30 years of age. Approximately half (46.7%) were educated up to G.C.E Ordinary Level and reported a total monthly income of 25 000 to 49 999 rupees (47.3%). A great majority (88.7%) were housewives. Of the spouses, approximately half (55.7%) were educated up to G.C.E. Ordinary Level and approximately one third were involved in business (31.4%) (Table 1).

Table 1: Distribution of study population by socio-demographic characteristics

	Number (n=300)	Percent (%)
Age category in years		
20-25	61	20.3
26-30	122	40.6
31-35	88	29.4
36-40	28	9.3
>40	01	0.3
Highest level of education of the mothers		
Grade 1 to 5	20	6.7
Grade 6 to 11	107	35.7
Passed Ordinary level	140	46.7
Passed Advanced level	26	8.7
Tertiary education	7	2.3
Occupation		
House wife	266	88.7
Business	09	3.0
Other	25	10.0
Average total monthly income of family in rupees		
< 10 000	1	0.3
10 000 – 24 999	100	33.3
25 000 – 49 999	142	47.3
≥ 50 000	57	19.0

A majority (93%) was resident in the Colombo District and lived in their own houses (85%). Most of their houses were single storied (86.7%) with no land or less than 10 perches land around the house (91%). Of the hospitalized children 13.7% had a previous history of dengue and approximately half (49.7%) of the mothers reported

at least one member in the family or extended family with a previous dengue infection.

Knowledge on symptoms, warning signs and complications of dengue fever

Of the 300 mothers, 292 knew that high fever is a symptom of dengue infection. Only 24% could specify haemorrhagic manifestations of dengue fever. Most knew that reduced urine output (53%), abdominal pain (51%) and persistent vomiting (72%) are warning signs of complications of dengue fever. Other warning signs; lethargy, drowsiness or ill child (15.3%), restlessness (10%), postural dizziness (1%) and cold extremities (10.7%) were known by a few. Though almost all (98.7%) knew that death can be a complication of dengue fever, other complications such as organ failure (1.3%), massive bleeding (6.3%) and shock (6.7%) were less known. A majority (60.7%) knew that a child who has got dengue once can get a severe second infection although 27% believed that a child who has got dengue once will never get a second infection (Table 2).

Table 2: Distribution of study population who responded accurately to the questions on symptoms, warning signs and complications of dengue fever

Question	Number (n=300)	Percent (%)
Symptoms of dengue fever		
High fever	292	97.3
Headache	178	59.3
Retro-orbital pain	19	6.3
Arthralgia/Bone pain	100	33.3
Myalgia	212	70.3
Rash	122	40.7
Haemorrhagic manifestations	72	24.0
Warning signs that indicate need of hospitalization		
Lethargy, drowsiness or ill child	46	15.3
Restlessness	30	10.0
Persistent vomiting	216	72.0
Reduced urine output	159	53.0
Postural dizziness	03	1.0
Abdominal pain	153	51.0
Cold extremities	32	10.7
Complications of dengue fever		
Death	296	98.7
Organ failure (renal failure, liver failure, encephalopathy)	4	1.3
Massive bleeding	19	6.3
Shock	20	6.7
Can your child who has got dengue once get a second infection?		
Child will never get a second infection	81	27.0

Assessing the level of knowledge of the study population on symptoms, warning signs and complications of dengue fever using the scoring system described above, it was shown that approximately half (46.3%) of mothers possessed a 'good' level of knowledge on symptoms, warning signs and complications of dengue fever. The level of knowledge did not show a difference based on whether the child was previously hospitalized for dengue or whether there was a family member who has had dengue infection in the past.

Knowledge on initial home management of a child with suspected dengue fever

Almost all knew that a child suspected to have dengue fever needs initial laboratory investigations. Most (88%) knew that the initial laboratory investigation should be done on third day of fever. Only 40% were able to mention the correct name of the initial laboratory investigation as 'a full blood count'. A majority (78.3%) knew that aspirin should not be given to a child suspected of having dengue fever and almost all knew that paracetamol can be used safely. A majority did not know that non-steroidal anti-inflammatory drugs such as ibuprofen (68%) and mefenamic acid (69%) should not be given in dengue fever. Most mothers (97%) knew that an oral rehydration fluid such as 'Jeewani' can be given in the initial home management of a child suspected of having dengue fever and that 'dark' coloured drinks (95.7%) should be avoided (Table 3).

Table 3: Distribution of study population by their responses to questions on initial home management of a child with suspected dengue fever

	Number (300)	Percent (%)
If you suspect your child is having dengue, do you think your child need any		
Yes	300	100
Do you know the name of initial laboratory investigation?		
Blood test	179	59.7
Full blood count	120	40.0
Do not know	01	0.3
On which day of fever should you do the laboratory test?		
Day 01	07	2.3
Day 02	20	6.7
Day 03	264	88.0
Day 04	03	1.0
Day 05	05	1.7
Which of the following medications/supportive care should a child be given		
Aspirin		
Yes	2	0.7
No	235	78.3
Paracetamol		
Yes	293	97.7
No	6	2
Do not know	1	0.3
Ibuprofen		
Yes	1	0.3
No	95	31.7
Do not know	204	68
Mefenamic acid		
No	93	31
Do not know	207	69
Coloured drinks		
Yes	8	2.7
No	287	95.7
Do not know	5	1.7
Jeewani		
Yes	291	97
No	8	2.7
Do not know	1	0.3

Approximately half (45.3%) possessed a 'good' level of knowledge on initial home management of a child with suspected dengue fever. The level of knowledge on initial home management of a child with suspected dengue fever did not show a

difference based on whether the child was previously hospitalized for dengue or whether there was a family member who has had dengue infection in the past.

Knowledge on transmission and prevention of dengue infection

Almost all knew that dengue is transmitted through a bite of an infected mosquito. A majority (76.3%) knew that the dengue mosquito breeds only in clean water while 10.3% thought that the dengue mosquito can breed in both clean and dirty water. Of the mothers, 92.7% were able to correctly identify five or more common breeding sites of dengue mosquito, from a specified list. Only 20% knew that a dengue mosquito can fly 100 to 500 meters. Only 17.3% knew that the dengue mosquito can bite humans at any time of the day but most (78%) incorrectly thought that dengue mosquitoes bite humans only in day time. A majority (58.7%) were able to tell five or more ways in which the public can contribute to getting rid of mosquito breeding places and five or more ways in which people can protect themselves from mosquito bites (76.3%) (Table 4).

Table 4: Distribution of study population by their responses to the questions on transmission and prevention of dengue

	Number (300)	Percent (%)
What are the ways in which dengue is transmitted?		
Through a bite of an infected mosquito	300	100
In which of the following type/s of water does the dengue mosquito breed?		
Only in clean water	229	76.3
Only in dirty stagnant water	40	13.3
In both clean and dirty water	31	10.3
Describe at least five breeding sites of the dengue mosquito		
Able to tell 03 correct breeding sites	6	2.0
Able to tell 04 correct breeding sites	16	5.3
Able to tell 05 or more correct breeding sites	278	92.7
How far can a dengue mosquito fly?		
100m	116	38.7
100m to 500m	60	20.0
500m to 1 km	4	1.3
Do not know	120	40.0
What are the times in which the dengue mosquito bites humans?		
Only during day time	234	78.0
Only at night	14	4.7
Can be any time during day or night	52	17.3
How do you identify a dengue mosquito?		
White bands on legs	198	66.0
White bands on back	16	5.3
White bands on both legs and back	34	11.3
Do not know	52	17.3
Name at least five ways in which public can contribute to getting rid of		
Able to tell 03 correct ways	31	10.3
Able to tell 04 correct ways	93	31.0
Able to tell 05 or more correct ways	176	58.7
Name at least five ways in which people can protect themselves from		
Able to tell 02 correct ways	3	1.0
Able to tell 03 correct ways	8	2.7
Able to tell 04 correct ways	60	20.0
Able to tell 05 or more correct ways	229	76.3

A majority possessed a 'good' level of knowledge on transmission and prevention of dengue fever (89.3%). The level of knowledge on transmission and prevention of

dengue did not show a difference based on whether the child was previously hospitalized for dengue or whether there was a family member who has had dengue infection in the past.

Perceptions on health education received in the ward

The assessment of the education they received in the ward showed that a majority agreed that their knowledge on dengue has improved following hospital admission (64%), felt that their level of competence in identifying symptoms and initial home management of dengue fever in the future has improved following hospital admission (63.3%) and were satisfied with the health education given by hospital staff (64.3%) (Table 5).

Table 5: Distribution of study population by their perceptions on health education received during the hospital stay

Perceptions on health education received during the hospital stay	Number (n=300)	Percent (%)
My knowledge regarding dengue has improved following hospital admission		
Agree	192	64.0
Not sure	108	36.0
Disagree	0	0.0
My competence regarding identifying symptoms and initial home		
Agree	190	63.3
Not sure	110	36.7
Disagree	0	0.0
I am satisfied with the health education given by the hospital staff		
Agree	193	64.3
Not sure	107	35.7
Disagree	0	0.0

Television (98%), newspapers (33.7%), awareness programmes (38%), health care workers (67%) and information from previous hospital admissions (33.7%) were the main sources of information before hospital admission for the present illness. During hospital stay doctors (62%), nurses (59.7%) and medical students (55.7%) were reported as the main sources of information.

Preventive practices regarding dengue prior to the admission and practices planned following discharge

Preventive measures already practiced before hospital admission to eliminate mosquito breeding places and measures to protect children from mosquito bites and whether they plan to continue or take up such practices once the child is discharged from the ward were assessed. All reported that even prior to the admission they were regularly actively looking for potential breeding places in and around their household/garden and destroyed such places and would continue to do so after discharge from the hospital.

Only 21.3% cleaned small water collections like vases/ant traps in the house once a week or more frequently prior to the admission and the number who would continue/take up this new practice was shown to increase to 58% (Table 6).

Table 6: Distribution of study population by their preventive practices regarding dengue

	Number (%) (n=300) Practicing prior to admission	Number (%) (n=300) Will continue or planning new after discharge
Preventive measures to get rid of mosquito breeding places		
Destroy small containers (cups, coconut shells etc.) which has collected water in and around household/ gardens	300 (100)	300 (100.0)
Look for small containers (cups, coconut shells etc.) places which can collect water in and around household/ gardens.	300 (100)	300 (100.0)
Clean small water collections like vases/ant traps in the house once a week or more frequently	64 (21.3)	174 (58.0)
Participate in community campaigns	49 (16.3)	74 (24.7)
Preventive measures to protect children from mosquito bites		
Sleep under mosquito nets	179 (59.7)	239 (79.7)
Dress the child in clothes which adequately cover the body in the evenings/night	133 (44.3)	193(64.3)
Use mosquito coils/mats in the night time	128 (42.7)	138 (46.0)
Day time application of repellent oils/ointments or sprays	48 (16.0)	258 (86.0)

The practice of day time application of repellent oils/ointments or sprays was seen to be the least practiced preventive measures to protect children from mosquito bites prior to the admission (16%) but was the practice that the highest number of study population indicated that they would adhere to after discharge from the hospital (86%).

Discussion

The present study used the simple indicators of: perceived improvement of knowledge and competency in applying the knowledge; and preventive measures planned following discharge of a set of clients of ward services to get an insight into the effectiveness of the patient education component of the services of the ward setting.

The women included in the present study were less educated and less employed compared to the average Sri Lankan woman. The Sri Lankan population census of 2012 indicates that 66.5% of women in Sri Lanka are educated up to G.C.E Ordinary Level and that 62.1% are housewives [9]. The corresponding proportions of women in the present study were 46.7% and 88.7%, respectively. This difference limits the extrapolation of the findings. Another fact that is noteworthy in interpreting the results is that 49.7% reported previous dengue infection among family members and 13.7% reported previous dengue infection in the same child. Though this indicates that at least half of the study population was likely to be previously exposed to the dengue related health and educational services, the results revealed no difference in the knowledge of any of the aspects assessed between the two groups.

Of the different aspects of dengue illness that were assessed, transmission and prevention of dengue fever was the best known among the mothers of children with dengue with 89.3% being classified as having good knowledge. The other two

aspects which are symptoms, warning signs and complications of dengue fever and initial home management of a child with suspected dengue fever were well known by less than half of the mothers. Considering the importance of the latter aspects in the prevention of complications and death due to dengue fever, the study indicates the need for health education to emphasize these aspects.

Moreover, the study highlighted some key facts that were previously unknown. Among the symptoms, only 72 (24%) specified the haemorrhagic manifestations of dengue fever. Hemorrhagic manifestations are important symptoms that should be monitored by parents at home and inability to specify them should be considered as a serious gap in knowledge that should be addressed. The finding that 27% erroneously responded that a child who has got dengue once will never get a second infection is of great concern that would deter preventive efforts of parents. Though not as important as symptoms and early warning signs, it is of concern that none of the late warning signs or complications other than death were known to many.

Promoting better initial home management of a child with suspected dengue fever is a key strategy in the dengue control efforts of the country. The aspects in this regard that were less known were the correct name of the initial laboratory investigation and the non-steroidal anti-inflammatory drugs to be avoided.

The findings of the present study on knowledge of dengue among parents were more or less similar to the findings of other studies. Though not a direct assessment of knowledge, the assessment of health seeking behaviour of parents of children with dengue conducted at the Lady Ridgeway Hospital (the same hospital setting as the present study) in 2013 [7] showed that 64.4% had sought prompt and appropriate care for the dengue infection. This can be considered as an indicator that a similar proportion had knowledge of early warning signs of dengue. In the Parish of Westmoreland in Jamaica in 2010 [6] approximately half (54%) of parents showed good knowledge about signs, symptoms and mode of transmission of dengue although only about one third of the sample was found to have adequate knowledge about dengue (38.5%) in the study in Karachi among people visiting tertiary care hospitals[7].

The present study showed that two thirds of mothers perceived that their knowledge on all aspects of dengue and their competency in applying the knowledge improved while being in the ward. It is encouraging to note that all categories of staff have contributed to the delivery of health education.

In the present study there was also evidence that knowledge gained in the ward settings would be translated to adoption of preventive measures in the future. The high proportion of mothers who planned to clean small water collections like vases/ant traps in the house once a week or more frequently and to apply repellent oils/ointments or sprays on their children during day time were noteworthy. However, a higher number of mothers had new plans to protect children from

mosquito bites compared to the number who had new plans to get rid of mosquito breeding places. This indicates that health education efforts in the ward setting needs to emphasize more on promoting elimination of mosquito breeding places.

The fact that the present study was conducted among those admitted for only 48 hours limited its use in assessing the full gains of health education services obtained during the total duration of hospital stay of the child. The other major limitation was that only the planned preventive practices were assessed rather than the actual practices.

Conclusions and recommendations

A majority of the mothers of children with dengue fever admitted to the University Paediatric Unit at Lady Ridgeway Hospital possessed good knowledge on transmission and prevention of dengue fever. The health education session at the University Paediatric Unit at Lady Ridgeway Hospital has been successful as most mothers perceived an improvement in their knowledge and competency in applying the knowledge and pledged to adopt preventive measures to protect children from mosquito bites in the future. It is recommended that the health education efforts in the ward be further improved by addressing the highlighted gaps, specifically by emphasizing the importance of getting rid of mosquito breeding places in and around the home.

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Conflicts of Interest

None.

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