Lessons to Be Learnt For Policy Planners on Promoting Health Education on Childhood Fever Management: Evidence from a Cohort of Children with Dengue Fever

S.M Arnold

Ministry of Health, Colombo 10, Sri Lanka

ABSTRACT

Introduction

Dengue fever has been a public health challenge in Sri Lanka. Many of the home-based secondary preventive measures are influenced by the parental knowledge on fever. This study was done to describe the level of knowledge on fever among parents and its associations with the events of child's dengue episode with the view of exploring the components that should be covered in related health educational messages.

Methods

A descriptive cross-sectional study was done in six general medical wards of the premier children's hospital in Sri Lanka. Parents who were the bystanders of children admitted as suspected cases of dengue according to the surveillance guidelines, consisted the study population. The sample size was determined with a statistical formula. An interviewer administered questionnaire was used. Data collection was done by two trained data collectors. Descriptive statistics and the chi square test were used with a significance level of 5%. Prior ethics approval was obtained.

Results

Study sample included 423 parents with a response rate of 99.5%. Most were parents of children of school going age (64.8%) and majority were mothers (97.6%). In more than half (50.4%), the level of knowledge was unsatisfactory. The level of knowledge was significantly associated with the education level ($p<0.05$), but not with the gender or the employment status ($p>0.05$) of the parents. A higher knowledge was further associated with a higher utilization of thermometer, and the administration of the correct anti-pyretic dosage and early laboratory diagnosis ($p<0.05$).

Conclusions and Recommendations

A higher level of knowledge on fever is associated with favourable clinical events in the dengue episode. The level of knowledge on fever must be improved irrespective of the gender and the employment status of the parents prioritizing those with a lower level of education. Public health interventions must be implemented by regular updating of public health staff's knowledge on prevention of dengue, fever management their implications on laboratory diagnosis and treatment costs through in service training and in empowering the field health staff in disseminating relevant health education messages to the community.

KEYWORDS: Dengue; Knowledge on fever; Home-based secondary prevention; Parental knowledge, Laboratory diagnosis and treatment costs

INTRODUCTION

Dengue fever, is regarded as the most significant out of the global mosquito-borne viral illnesses[1]. Due to the geographical factors (e.g. favouring the breeding of vectors) and agent related factors (e.g. having four serotypes), it has become a challenge for many countries with Sri Lanka being a no exception[2]. In the last decade dengue has become a public health issue of high burden in Sri Lanka with the highest incidence of 186,101 cases being reported in 2017[3]. Giving evidence of it remaining as a burden, in 2019, a total of 105,049 cases were reported according to the Epidemiology Unit of Sri Lanka which is the apex body of its surveillance[4].

Timely actions are mentioned as of utmost importance in deciding the morbidity and mortality of an episode of dengue fever[5]. In this regard, in the global literature, proper public health education has been identified as a crucial component in the management and control of dengue[6]. This is in fact true not only for its primary prevention, but also is highly applicable for the home-based

secondary preventive measures as well. The correct detection of fever, the correct determination of its duration, timely laboratory diagnosis and seeking of medical care as well as correct usage temperature control strategies (including the correct dosages of paracetamol) would potentially influence the clinical outcome of the illness episode.

Sri Lanka has achieved a remarkable level of health achievements compared to settings with similar economic statuses[7]. The strong and the well-organized public health infrastructure has been regarded as one of the main reasons for this success[8]. Under the current health-unit system each household of the country has been geographically allocated into a specific Medical Officer of Health (MOH office) which is with different categories of field staff members and supervisor staff. Consultant Community Physicians guide the health service delivery at various levels[9]. Within these dynamics proper health education of public is valued at all levels[10].

Once the specific weaknesses in relation to the public awareness related to fever are identified, this well-aid public health platform can be used to disseminate proper health educational messages to reach the community members. This study was done to describe the level of knowledge on fever among parents and its associations with the events of child's dengue episode with the view of exploring the components that should be covered in related health educational messages.

METHODS

This was a descriptive cross-sectional study done in six general medical wards of the premier hospital for children (LRH) in Sri Lanka. Ethics approval was obtained from the ethics review committees of Faculty of Medicine, University of Colombo and of the study setting. The study population included the parents of the children admitted as with suspected dengue fever according to the surveillance-based definitions[11]. Being transferred from another institution was an exclusion criterion. The data collection was done in 2012-2013 and a re-analysis was done in September 2020.

Sample size was calculated in order to get the maximum sample size with the formula of Lwanga and Lemeshow (1991)[12]. A minimum sample of 425 was planned to be recruited with an anticipated response rate of 90%. All parents satisfying the eligibility criteria were invited to be recruited until the sample size was reached. An interviewer-administered questionnaire was used for the assessment of the parental knowledge on fever. This was developed with the consultation of a panel of experts of five representing multi-disciplinary medical specialties. The domains covered included: pathophysiology, body-temperature, practices of detecting fever, seeking laboratory diagnosis and usage of anti-pyretic medications. Data collection was done by two trained data collectors by visiting the wards.

Each question carried a maximum of ten marks adding to potential total of 100. Guidelines were developed in allocation of the marks. With the expert inputs the level of knowledge was classified as "good" (i.e. ≥ 75 marks), satisfactory (i.e. ≥ 50 marks) and as "unsatisfactory" when the score was less than 50. The level of knowledge was subsequently dichotomized as "satisfactory" and "unsatisfactory". The associations with the level of knowledge was explored with the chi square test with a significance level of 5%.

RESULTS

A sample was 423 were recruited with a response rate of 99.5%. The age distribution of the child is shown in Table 1. A majority (63.8%) were in the school going age (above 5 years).

Table 1: Age distribution of the children

Age Category	Frequency (N)	Percentage (%)
Infants (Below 1 year)	8	1.9
Young children (1 to 2 years)	65	15.4
Pre-school aged (3 to 5 years)	80	18.9
School going age (above 5 years)	270	63.8
Total	423	100.0

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School going age		
6 to 8 years	110	40.7
9 to 12 years	160	59.3
Total	270	100.0

It was found that 97.6% of the by standers were mothers and 2.4% were fathers. Table 2 shows the summary of the distribution of the parents' age. The mean age of fathers who are staying with the child is shown to be higher than the mothers who are staying. The age of the by standers in general have a wide range with a value of 38 years in the case of mothers and 18 in the case of fathers.

Table 2: Distribution of the age of interviewee and the spouse

Interviewee	Mean (SD)	Range Minimum	Maximum
Mother	35.6 (6.9)	19	58
Spouse	38.8 (6.5)*	24	56
Father	42.9 (6.6)	35	53
Spouse	38.2 (8.4)	29	53

* 02 mothers claimed that the partners have been deceased.

Majority in the mothers (59.3%) as well as the fathers (62.4%), have their education levels between grade 6 and ordinary level. When both parental categories are combined, similar distribution was seen (60.9%). Of the families, 02 children is the mode with approximately quarter of families having a one child and three children. Of the parents, father was employed in 98.8% (n=415) with only 22.9% (n=97) of mothers being employed. The categorization of the knowledge is shown in Table 3

Table 4.3: Categorization of knowledge

Category	Frequency	Percentage (%)
Good*	44	10.4
Satisfactory*	166	39.2
Unsatisfactory	213	50.4
Total	423	100.0

*amalgamated as "Satisfactory" in exploring for the associations.

The associated factors of knowledge are shown in Table 4. It shows that the level of knowledge is not associated with the gender or the employment status of the parents. Yet a higher level of knowledge was seen when the parental education level was higher.

Table 4: Association between knowledge with selected factors

	Knowledge Satisfactory		Not satisfactory		Total		
Interviewee	N	%	N	%	N	%	χ2=0.001
Male	5	1.2	5	1.2	10	2.4	df=1
							p= 0.98
Female	205	49.4	208	50.4	413	97.6	OR=1.02
							CI= 0.3-3.6
Respondent Employed							χ2=2.07
							df-1
Yes	58	13.7	46	10.9	104	24.6	p=0.15
							OR=1.4
No	152	36.0	167	39.5	319	75.4	CI=0.8-2.1

Spouse employed							χ2=0.28 df-1
Yes	185	43.7	184	43.5	369	87.2	p=0.60 OR=1.2
No	25	5.9	29	6.9	54	12.8	CI=0.7-2.1
Education level of respondent							χ2=46.04 df- 1
Beyond O/L	104	24.6	39	9.2	143	33.8	p<0.001 OR=4.4
Up to O/L	106	25.1	174	41.1	280	66.2	CI=2.8-6.8
Education level of spouse							χ2=23.58 df- 1
Beyond O/L	93	22.0	47	11.1	140	33.1	p<0.001 OR=2.8
Up to O/L	117	27.7	166	39.2	283	66.9	CI=1.8-4.3

Two practices associated with the level of knowledge are shown in Table 5. When the level of knowledge was higher, the usage of a thermometer was higher (P<0.001). Similarly, with a higher level of knowledge the correct administration of the paracetamol dose was higher.

Table 5: Association between selected practices and knowledge

Knowledge	Usage of a thermometer			Correct paracetamol dose		
	Yes	No	Total	Yes	No	Total
	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)*
Satisfactory	97 (71)	113 (39)	210 (49.6)	99 (57)	56 (43)	155 (51.0)
Not satisfactory	39 (29)	174 (61)	213 (50.4)	74 (43)	75 (57)	149 (49.0)
Total	136 (100)	287 (100)	423 (100.0)	173 (100)	131 (100)	304 (100.0)
Association	Chi square – 37.68 df-1 p<0.001 OR=3.8(CI=2.5-6.0)			Chi square-6.25 df-1 p=0.012 OR= 1.8(CI=1.1-2.8)		

*Excluding those who did not give paracetamol and those who cannot remember the dose

DISCUSSION

The study revealed that in the present cohort, in general, emphasis must be given in improving the knowledge on the fever among the parents. Those with the higher level of knowledge were more likely to use a thermometer and to use the correct dosage of paracetamol, seek for early laboratory diagnosis and treatment. In addition, this revealed that these interventions must be planned irrespective of the gender and the employment status of the parents. These findings are of great importance in the perspective of the policy planners in relation to the development of health educational messages and training of public health staff members. Furthermore, these would help in minimizing the laboratory diagnosis and treatment costs of the health system.

In general, the knowledge on fever was not up to the expected level among approximately half of the study sample. The tool used in the present study in exploring the knowledge on fever included essential domains. As examples the basics of pathophysiology of fever, awareness on body temperature, seeking laboratory diagnosis at an early stage of fever and the proper practices are invaluable

in the proper detection and the response to fever. When the parents are unaware of these, the timing of the fever cannot be done properly. Since the timely management of events is crucial in dengue fever, raising the awareness of the pubic on these aspects becomes a priority demand(5). Additionally, the aspects like awareness on the anti-pyretic dosages are of utmost importance. Plenty of literature is available on the ill effects of the improper usage of anti-pyretic dosages that result in higher morbidity and mortality (13, 14).

In the exploration of the associated factors, it was revealed that the level of knowledge was not associated with the gender or the employment status of the participants. However, a higher education level was associated with a satisfactory knowledge. This yields several important implications for the policy planners. The health education messages must target both parents. Secondly, they must target both the employed and unemployed categories. Work-based heath discussions must be promoted and is observed as a present-day need. Possibilities must be explored by building partnerships with work-setting related resources like welfare societies in implementing these. Public health staff members should be regularly updated on the knowledge on prevention, early laboratory diagnosis and treatment seeking at early stage through in-service training. The public health staff should disseminate the current knowledge grain through the in-service training to the community. The health staff must be promoted in prioritizing the less-educated community members as they seem to be vulnerable for the lack of awareness.

Usage of a thermometer, laboratory diagnosis at early stage and correct dosage of antipyretics were associated with a higher knowledge in the present study. The usage of thermometer has been appreciated as a correct and a cost-effective practice in the global literature rather than by trying to rule-in with "hand touch"(15). Similarly, the correct dosage of the antipyretics would minimize potentially harmful health risks. All these suggest the complementary benefits of raising the awareness of the public on fever related domains. Since fever is a common symptom in many communicable conditions, the benefits of these interventions would cut across a wider scope.

These associations have significant implications on the laboratory diagnosis costs of the health system as well. Non-usage of thermometers would limit the correct estimation of the duration of fever giving rise to a higher morbidity. Similarly, the incorrect dosages of paracetamol would affect the organs like liver, necessitating monitoring with laboratory investigations. Hence the lower knowledge on fever is associated with a higher degree of laboratory investigation and treatment costs for the health system.

There were several limitations of the study. Firstly, even though the employment status was collected, analysis was not done based on the type of the employment. This analysis could be done as a future extension of this study in a larger study sample. Secondly, serological confirmation of dengue was not considered as an inclusion criterion among these children were not. However, the surveillance definitions were strictly adhered to and the correct terminology was used in defining the study population.

CONCLUSIONS AND RECOMMENDATIONS
The level of knowledge on fever and early laboratory diagnosis must be improved in more than half of the parents. A higher level of knowledge on fever is associated with favourable clinical events in the dengue episode. Public health interventions must be target irrespective of the gender and the employment status of the parents prioritizing those with a lower level of education. The knowledge of field health staff must be regularly updated through in-service training and promoted in disseminating health education messages to the community members.

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