Knowledge and use of oral rehydration therapy for childhood diarrhoea in Tumpat District

Douglas D. Shaw,† MTH, FRACGP
Carol A. Jacobsen, RM, MTH
Kenneth F. Konare, Diploma in Health, MTH
Ab. Rahman Isa* MPH & TM, MHPEd
Associate Professor/Head
** Department of Community Medicine, School of Medical Sciences, Universiti Sains Malaysia, Kubang Kerian, Kelantan.*

Summary

A community based study was conducted on the understanding and knowledge of childhood diarrhoea and use of oral rehydration therapy (ORT), in four selected villages in Tumpat District, Kelantan. The calculated annual incidence of diarrhoeal disease in children aged 0 to four years in all study villages was 1.38 episodes for each child. The main care-givers of children aged 0 to four years were interviewed and asked to demonstrate how to mix a standard ORS (oral rehydration solution) sachet if they had previously used ORT.

Forty percent of care-givers had heard of the locally available ORT and 30% had actually used ORT. Of those who had heard of or used ORT, 10% had good knowledge of what it was and what it was used for, 51% had some knowledge and 39% had either no knowledge or inaccurate knowledge. Of care-givers who had previously used ORT only 20.5% demonstrated the correct volume of water to add to one sachet of ORT, but 82% would discard an unused solution within 24 hours. Significantly more literate women had used ORT than those not literate ($p = 0.002$).

Mothers, particularly those literate, are the primary target group for ORT intervention strategies. Components of health education should include advice on what ORS is, what it is used for, and how to correctly mix a standard sachet.

Key words: Childhood diarrhoeal disease, oral rehydration therapy (ORT).

Introduction

The district of Tumpat is in the north of Kelantan and borders on Thailand. The climate is humid and tropical with the northeast monsoon from November to March bringing 60% of the annual rainfall of 4000 mm. The southeast monsoon is from May to September. Over 93% of the population of Kelantan are Malays, 5.2% Chinese, 0.7% Indians and less than 1% Thais.[1] The projected population for Tumpat District in 1988 was 115,384, of whom 14.7% were aged 0 to 4 years.[2] It is one of the poorest districts in the State, with farming and fishing being the major economic activities.

† Present address: c/o WVFT–PP, P.O. Box 1717, Bangkok 10501, Thailand.

In 1986, 66.2% of the rural population of Peninsular Malaysia had sanitary latrines and 66% a safe water supply compared to 50.2% and 16.5% respectively in Tumpat District.[1] This latter figure had risen to 61.1% for sanitary latrines and 19.9% for safe water supply in 1987.[2] The district is well covered by government health services with a District Hospital, Health Centres and Health Sub-Centres readily accessible to the population.

In Kelantan, diarrhoeal disease is a major health problem with low socio-economic status and lack of safe water supply and sanitation thought to be major determinants. The Tumpat District was selected for this study because of its known health needs and the high incidence of water borne diseases. The projected number of reported cases of diarrhoeal disease in children aged 0 to four years in 1988 was 547, an age specific incidence rate of 32.3 per 1000.[2] Acute gastroenteritis accounted for 17.7% (130 cases) of all admissions for children aged 0 to four years to the Tumpat District Hospital in 1987 (personal communication).

The dehydration caused by diarrhoea, which is the biggest single killer of the world's children, can now be combated by an oral therapy that is effective, simple and inexpensive.[3] The objectives of this study were to determine selected epidemiological characteristics of childhood diarrhoeal disease from data collected in the four study communities and determine the current knowledge and use of ORT.

Method

Preliminary fieldwork included discussions with key University and Health Department Officers as well as the headmen *(penghulu)* of the four study villages, to seek their approval and co-operation. Fieldwork was carried out for two months from May to June, 1988. The study villages were selected on their geographical location, ethnic group and water supply and sanitation status as shown in Table 1. Village populations varied from 802 (C) to 2187 (A). Two villages had health clinics (A and B) while the other two were served by health clinics less than 5 km away.

Table 1
Major characteristics of selected study villages – Tumpat District

	Village			
	A	B	C	D
Location	riverside	island in river delta	inland	inland
Ethnicity	Malay	Malay	Thai	Malay
Houses with safe water (%)	12.3	0	3.3	3.7
Houses with latrines (%)	66.7	21.9	8.7	100.0
Houses samples	89	81	29	66

(Personal communications – Public Health Inspector, Tumpat, 1988)

A sampling frame of all houses with at least one child aged 0 to four years was obtained by mapping and numbering the houses in each village. It was possible during the two weeks allocated to each village to conduct interviews in all houses in the sampling frame. A total of 265 interviews

with the main care-giver of children were held and the study design ensured that care-givers not at home on an initial visit were interviewed at a later time. Three refusals were recorded.

Questionnaires were developed, translated and field-tested before use in the survey. Most questions were pre-coded to facilitate recording. Each of the three authors conducted interviews with a Kelantanese interpreter fluent in English and Bahasa Melayu. The main duration of interview was 25 minutes with a range from 12 to 77 minutes.

The questionnaire aimed to identify the main care-giver for young children and obtain basic demographic information including education and socio-economic indicators. Cultural and social aspects of childhood diarrhoeal disease were also sought and are recorded elsewhere.[4] Details were obtained on the most recent episode of diarrhoea, as defined by the care-giver, and an incidence rate calculated on the number of cases occurring in the 14 days preceding the interview. The care-giver was questioned regarding knowledge and use of oral rehydration solution (ORS) using the names of the commonly available sachets and showing these sachets to the care-giver to aid recall. A scoring system was designed to categorise knowledge into "good", "some" and "none or inaccurate". If the care-giver had ever used ORS she was asked to demonstrate the amount of water she would mix with one sachet in the container normally used. This volume was measured. Literacy was assessed in a practical way for this study by asking the care-giver to read the sentence on mixing ORS printed on the sachet.

Secondary data was collected from the Health Centres and District Hospital serving the four study villages.

Results

The estimated annual incidence of diarrhoeal disease in children aged 0–4 years in all study villages was 1.38 episodes for each child. There were 21 recorded episodes of diarrhoea in the 14 days preceding the interview from a total of 395 children on whom information was obtained.

One hundred and seven (40.4%) care-givers had heard of one or more of the names of the locally available ORS preparations, and 78 (29.4%) had actually used ORS. Of the 117 women who had heard of, or who had used ORS, 12 (10.2%) had a good knowledge of what ORS was and what it was used for, 60 (51.3%) some knowledge, and 45 (38.5%) either no knowledge or inaccurate knowledge.

Of the 78 care-givers who had previously used ORS, 74 (94.9%) stated they knew how to prepare the mixture. Of these only 16 (20.5%) demonstrated the correct volume of water in the container normally used to mix one sachet, but 64 (82.1%) correctly answered less than 24 hours when asked how long the prepared solution should be kept before being discarded.

Table 2 shows the literacy, knowledge and use of ORS in each of the four study villages. Twenty-one percent of all mothers had no formal education. This ranged from 5.7% in Village A to 38.5% in Village C. Thirty-five percent of mothers had seven or more years of education with a range from 19.2% (Village C) to 49.5% (Village A). Significantly more literate women (38.7%) used ORS than those not literate (22.6%) ($p = 0.002$).

Care-givers comments on what ORS was and what it was used for included "replaced breast milk", "a substitute for bottle feeding", "cooled the body", "cleans the stomach", "a medicine for diarrhoea", "a salt mixture", "for vomiting" and "for energy".

Table 2
Literacy of care-givers, knowledge and use of ORS in study villages – Tumpat District

	Village				
	A	B	C	D	All
All care-givers.					
Literacy (%)	65.2	42.0	55.2	45.5	52.1
Heard of ORS (%)	47.2	28.4	62.1	36.4	40.4
Used ORS (%)	32.6	22.2	55.2	22.7	29.4
n =	89	81	29	66	265
Care-givers who had heard of or used ORS.					
Good knowledge (%)	6.7	3.6	11.1	23.1	10.2
Some knowledge (%)	60.0	64.3	33.3	42.3	51.3
No/inaccurate knowledge (%)	33.3	32.1	55.6	34.6	38.5
n =	45	28	18	26	117

An important finding was that five different types of ORS sachets were being used. The most frequently used was the 250 ml Ministry of Health sachet. At the Universiti Sains Malaysia Hospital a 200 ml sachet (Eltolit) was distributed. Both these sachets have less sodium than the World Health Organization/UNICEF ORS sachets (0.525 gm compared to 0.875 gm per 250 ml). Recently an orange flavoured Eltolit sachet has been introduced. The other two sachets were 240 ml and 250 ml respectively, with all instructions in English. The abbreviation "ml" for millilitres on most of these sachets was confusing for many literate women. Examples of incorrect mixing of an ORS sachet included mixing a half or third of a sachet in 200 to 220 ml of water, one sachet in 550 ml, one sachet in 1000 ml and a fifth of a sachet in 500 ml.

Discussion

The age specific incidence rates for diarrhoea in children aged 0 to four years vary widely depending partly on features of each study's design. In a review of 22 community based studies from Africa, Asia and Latin America a median incidence rate of 2.2 episodes of diarrhoea per child per year was calculated.[5] Lye,[6] in a study in rural Malaysia, determined that 19% of children aged 0 to four years in the sample experienced one or more episodes of diarrhoea in a six month follow-up period. The incidence rate calculated from our survey (1.38 episodes of diarrhoea for each child each year) is derived from a two week recall period only, and takes no account of possible seasonal variation. In order to assess seasonal variation and to obtain more accurate information on which to base ORT intervention strategies, the current health centre based surveillance system could be augmented by intermittent use of a community based system. The use of a two week or one month "calendar system" where a family records episodes of diarrhoea in children is a simple and inexpensive method of collecting community based morbidity data.[7]

The relationship between maternal education and the state of health in children is well documented. In our study an important finding for health education was that literacy (but not years of education) was related to ORS use ($p = 0.002$). In a comparable study[8] of a poverty village near the state capital of Kelantan 60% of the wives of heads of households had attended primary school compared with 43.9% in our survey. In a quite different setting in Malaysia (a hospital study of infants and young children admitted to hospital with gastroenteritis), Manderson[9] found 14% of mothers had no formal education and 59% had primary level education only. Reasons for the variation in education and literacy of care-givers in our study include the fact that the island village (B) had no primary or secondary school, with additional costs involved in travel to school, and that cultural and language difficulties may have been experienced in the Thai village (C).

Forty percent of all care-givers had heard of ORS and 30% had actually used it. The higher use of ORS in Village C might be explained by the higher incidence of diarrhoea, perhaps due to a combination of factors including unsafe water supply and lack of sanitary latrines found in this village.

Few care-givers were able to correctly demonstrate the preparation of ORS. The one exception was Village A with its higher educational level, where 31% of care-givers were correct. However in all villages most women would not keep a prepared solution for more than 24 hours.

The variety of ORS sachets found to be in use is an important finding, indicating an area where significant improvement is possible. This study has shown that ORS sachets are frequently mixed incorrectly, a potentially dangerous situation for a dehydrated child. The recent introduction of an orange flavoured sachet has the theoretical advantage of greater acceptability to care-givers and children, and consequent increased use. The theoretical disadvantage is the risk of over-consumption leading to hypernatraemia, particularly if mixed incorrectly. Co-ordination between the Ministry of Health, hospitals, clinics and private medical practitioners to standardise the ORS sachet would benefit both health care workers and the community. An important area for further research would be to determine whether households in a particular district have a common container which would be suitable for mixing ORS. Sachets could then be standardised, based on the volume of this container.

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References

1. Ministry of Health, Malaysia. Indicators for monitoring and evaluation of strategy for health for all by the year 2000. Information and Documentation System Unit, 1988.

2. Annual Report, Kelantan Medical and Health Director's Office, Kelantan State Health Department, 1987–88.

3. UNICEF. State of the world's children. London: Oxford University Press, 1985.

4. Konare KF, Shaw DD and Jacobsen CA. Knowledge, attitudes and practices for planning oral rehydration strategies. Master of Tropical Health report, University of Queensland, 1988.

5. Snyder JD, Merson MH. The magnitude of the global problem of acute diarrhoeal disease: a review of active surveillance data. Bull WHO 1982; 60: 605–13.

6. Lye MS. Diarrhoeal diseases in rural Malaysia: risk factors in young children. Annal Academy of Medicine 1984; 13(2): 156–62.

7. Guerrant RL, Kirchhoff IV, Shields DS et al. Prospective study of diarrhoeal illness in Northeastern Brazil: patterns of disease, nutritional impact, etiologies and risk factors. J Infect Dis 1983; 148: 986–97.

8. Institute for Medical Research, Malaysia. Status of community nutrition in poverty *kampongs* from four states of Peninsular Malaysia. 1984; 22:1–61.

9. Manderson L. Socio-economic and cultural correlates of gastroenteritis amongst infants and small children in Malaysia. J Trop Pediatr 1981; 27: 166–76.