

# Homemade sugar-salt solution for oral rehydration: Knowledge of mothers and caregivers.

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## Summary

**Background:** Worldwide, it is estimated, that more than two million children under the age of five die annually as a result of gastroenteritis with dehydration. Up to 95% of these cases can be treated successfully with oral rehydration therapy. The aim of the study was to evaluate caregivers' knowledge of, attitudes to and use of homemade sugar and salt solution (SSS) in order to address the shortfalls. Differences between the knowledge, attitudes and practices in urban, rural and very rural areas were also investigated.

**Method:** Three different studies were performed. All three were descriptive cross-sectional studies. During the research period, all mothers/caregivers who brought children to the hospital or clinic were asked to fill in a questionnaire. All participants who gave informed consent were selected consecutively for the duration of the different studies.

**Results:** A total of 597 caregivers were included in the study. Knowledge of the existence of SSS (88-94%) and the wide use of SSS in 78 to 90% of diarrhoea cases do not guarantee the correct use of it. Fewer than half of all caregivers could mix the correct solution.

**Conclusions:** Healthcare workers should make sure that everybody knows about the correct use of SSS by means of printed information and the informal and formal training of caregivers and scholars. The correct use of homemade SSS could save millions of lives.

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## Background

Worldwide, it is estimated that more than two million children under the age of five die annually as a result of gastroenteritis with dehydration.<sup>1</sup> Up to 95% of these cases can be treated successfully with oral rehydration therapy.<sup>2</sup> The combination of diarrhoea, pneumonia and malnutrition is well known as an evil combination with a poor outcome.<sup>3,4</sup> With the high incidence of HIV, there is an increase in all three these conditions, as well as combinations of two or more of them. It is therefore very appropriate that the D in diarrhoea is described as standing for disaster, disability, destruction and death.<sup>3</sup>

A major advance in the treatment of diarrhoea was the development of oral

rehydration therapy (ORT). ORT has been described as "potentially the most important medical advance of this century".<sup>5</sup> Research on ORT started in the 1940s, but it was only after it was discovered that the absorption of water from the intestine was mediated by an active transport process in which sodium and glucose were co-transported that ORT became popular.<sup>6</sup> During cholera outbreaks in Bangladesh in the 1960s and 1970s, the value of oral rehydration was noted and it was described that the mortality decreased from 50% to 5%.<sup>2</sup>

It is important to use the correct oral rehydration solution in order to rehydrate the child and to prevent hypernatremia, hyponatremia or osmotic diarrhoea.<sup>2,3,5,7,8</sup> An appropriate solution should contain

between 50 and 90 mmol/l of sodium and a glucose concentration of 1,4 -2 %<sup>2,3,6,7,8</sup> Homemade sugar and salt solution (SSS) should also meet these criteria. Worldwide, SSS is now the treatment for mild to moderate (some) dehydration and, in some cases, even for severe dehydration.<sup>1,2,3,4,6,7,8,9,10,11</sup> SSS is also the guideline to treat some dehydration according to the Integrated Management of Childhood Illness (IMCI) strategy.<sup>11</sup>

There is more than enough evidence to show that an awareness and knowledge of the guidelines improve the use of ORT, as has been demonstrated by ORT programmes in America and Africa.<sup>9,10</sup>

No published data on the knowledge

**Table I:** The demographic data of the three areas

	Heidedal CHC (n=80)	Taung district (n=397)	Swaziland (n=120)
Age range of mothers/caregivers	17-72 years	16-72 years	15-49 years
Median age of mothers/caregivers	30 years	28 years	25 years
Mothers as % of caregivers	81%	84%	100%*
% Mothers/caregivers with no school education	8%	8%	12%
% Mothers/caregivers that are unemployed	75%	77%	79%

\* Only mothers were included in this study

**Table II:** Results for the correct measurements for SSS at Heidedal

Ingredient	Correct norm	Correct (%)
Sugar (n=74)	8 teaspoons	45 (61%)
Salt (n=74)	1/2 teaspoon	33 (45%)
Water amount (n=74)	1 litre	60 (80%)

**Table III:** Results for the correct measurements for SSS in Taung

Ingredient	Correct norm	Correct (%)
Sugar (n=317)	8 teaspoons	177 (56%)
Salt (n=317)	1/2 teaspoon	114 (36%)
Water amount (n=317)	1 litre water	263 (83%)

**Table IV:** Results for the correct measurements for SSS in Swaziland

Ingredient	Correct norm	Correct (%)
Sugar and salt (n= 120)	8 teaspoons + 1/2 teaspoon	62 (52%)
Amount of water (n= 120)	1 litre	118 (98%)
Type of water (n= 120)	Clean water	58 (48%)

and correct use of homemade sugar and salt solution to treat dehydration in South Africa was available, despite the considerable movement towards IMCI strategies. The aim of this study was to evaluate caregivers' knowledge of, attitudes to and use of homemade sugar and salt solution in order to address any shortfalls. Differences between the knowledge, attitudes and practices in urban, rural and very rural areas were also investigated.

## Method

Three different studies with the same aim were performed. These studies were planned independently and were for different purposes. The first author acted as study leader for all three. A medical student (MB) did a study at the Heidedal Community Health Centre (CHC) in Bloemfontein, an urban setting. A postgraduate student (KSR) did a study in the Taung district, a rural setting, and another postgraduate student (AAO) did a study in a very rural area in Swaziland.

All three were descriptive cross-sectional studies. The study populations were caregivers who brought children, under the age of 12, to the hospital or clinic concerned for any illness. During the research period, all mothers/caregivers who brought children to the hospital or clinic were asked to fill in a questionnaire. All the participants who gave informed consent were selected

consecutively for the duration of the different studies. The research periods varied from five days for the study in Bloemfontein, one month for the study in Swaziland and two months for the study in Taung. When necessary, caregivers were assisted in the completion of the questionnaires.

Pilot studies were done at every site to evaluate the questionnaires and to adapt them where necessary.

The questionnaires were not exactly the same and it was therefore not possible to make direct comparisons between all the aspects of the information obtained at the different sites.

The Department of Biostatistics of the University of the Free State did the analysis of the data. The results were summarised by frequencies and percentage (categorical variables), and by medians and ranges for the numerical variables. To compare the age distribution of the three groups, 95% confidence intervals (CIs) were calculated for median differences.

The Ethics Committee of the Faculty of Health Sciences, University of the Free State, as well as the different health departments, approved the protocols. All the participants signed informed consent before completing the questionnaires.

## Results

At Heidedal CHC, 80 caregivers were

included in the study during one week in March 2002. A total of 397 caregivers were included in the study in the Taung district during May and June 2001, while the Swaziland study included 120 caregivers during May 2001. No mothers/caregivers refused consent to participate in the study. Table I summarises the demographic data of these three areas. There were very few differences between the three groups, except for the age difference, which was the result of only mothers (and not all caregivers) being included in the Swaziland study. The respondents in the Heidedal study were significantly older than the respondents in the Swaziland study: 95% confidence interval for a median difference in age of two to seven years. (see Table I)

The remaining results will be described separately for the different studies.

### Heidedal CHC

In this study, 74 out of 80 (92.5%) caregivers reported that they had been taught about sugar and salt solution (SSS). Ninety percent had used it previously for diarrhoea and 68% thought that SSS would stop the diarrhoea, which was why they had used it. Regarding breastfeeding, 82% knew that they should continue breastfeeding during diarrhoea. Table II shows the results regarding the recipe for the SSS. Only 27% could recall the recommended method of eight teaspoons of sugar, half a teaspoon of salt and one litre of clean water. (see Table II)

Muti and enemas were used for about 10% of children with diarrhoea.

### Taung district

In this study, 83.6% knew to give SSS to children when they have diarrhoea, but 60.4% incorrectly thought that it would stop diarrhoea. Herbal muti and enemas were used by 23.7% of caregivers, mainly to clean the gut. Only 23% could identify the danger signs for severe dehydration, which include persistent vomiting, deterioration in consciousness and becoming weak and lethargic. Table

III shows the results for the measurement of SSS. About 14% added one or more teaspoon of salt, with the potential danger of inducing hypernatremic dehydration. (see Table III)

### The Swaziland study

In this study, 32% of the children were their parents' only child and 17% were one of five or more children. Knowledge about SSS was very good and 97% knew to use it during episodes of diarrhoea. Their knowledge was mainly obtained from the clinic (77%) and from the radio (13%). As in the other studies, 57% wrongly thought that SSS would stop diarrhoea. Most mothers start with SSS as soon as the diarrhoea starts (87%) and also continue to feed their children during episodes of diarrhoea. Table IV shows the results for the measurements of SSS. (see Table IV)

Almost half of the mothers (43%) preferred intravenous treatment for diarrhoea instead of oral rehydration.

### Discussion

Regarding the demographic data there were very few differences between the three groups, except for the age difference, which was the result of only mothers, and not all caregivers, being included in the Swaziland study.

Although ORT is a simple and cheap lifesaver, it is not used optimally. Knowledge of the existence of ORT (88-94%) and the wide use of ORT in 78-90% of diarrhoea cases do not guarantee its correct use. Fewer than half of all caregivers could mix the correct homemade sugar and salt solution. Similar results were found in a study performed in Zimbabwe, where 72% of mothers had been taught about ORT, but only 21% could recall the correct recipe.<sup>10</sup> The incorrect measurement of too much salt or sugar can worsen the dehydration and lead to hypernatremic or osmotic dehydration, which is very difficult to treat.<sup>6</sup>

The language used in the questionnaires was different in the different areas and could be a source of bias. The higher socio-economic class was not represented proportionally in this study, as people from this group usually make use of private doctors and not clinics.

The use of herbal muti and enemas is a very dangerous practice with high morbidity and mortality and should be discouraged at all times. The fact that

mothers started with SSS as soon as diarrhoea starts, as well as the continuation of breastfeeding, speaks for good education regarding SSS.

The majority of caregivers do not know the danger signs of diarrhoea or when to take the child to a doctor. This needs to be addressed in counselling.

### Recommendations

To improve knowledge on the correct preparation of SSS, the instructions should be printed on the Road to Health charts of all children. Healthcare workers should be trained according to Integrated Management of Childhood Illness (IMCI) principles in order to empower themselves and caregivers with the appropriate knowledge. Information should also be spread by means of radio talks, as the clinics are not always accessible to everyone and the medical personnel do not have enough time to inform everyone. Community workers can also give group demonstrations in clinics and schools on how to prepare SSS.

Remember, the correct recipe is eight level teaspoons of sugar and 1/2 a level teaspoon of salt! Make sure that everybody knows this! 🙌

### Conflict of interest

None declared

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