

**A PROFILE OF CHILDREN ADMITTED
TO A REHYDRATION UNIT**

A PROFILE OF CHILDREN ADMITTED TO A REHYDRATION UNIT

by

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**Submitted in partial fulfillment of the requirements of the degree
M.Prax.Med. (Primary Care) in the department of Community Health,
University of Natal. 1988.**

Osindisweni

1988

PREFACE

The research described in this thesis was carried out in Osindisweni hospital, Verulam, Natal from 1 July 1987 to 30 June 1988 under the supervision of Professor D. Arbuckle, Department of Community Health, University of Natal.

These studies represent original work by the author and have not been submitted in any other form to another university. Where use was made of work of others it has been duly acknowledged in the text.

ACKNOWLEDGEMENTS

I would like to thank all the staff nurses and professional nurses of the outpatient departments Osindisweni involved in providing care and supervision on the rehydration unit. It is thanks to their enthusiasm and dedication that this study was able to be undertaken.

I am also indebted to Dr Frankel, the Medical Superintendent, and Sister Carmen the Chief Matron for their support in this project as well as all the medical officers at Osindisweni and in particular Dr Crosby who took charge of the unit during any of my absence.

I would like to thank Professor Arbuckle and all the Department of Community Health, University of Natal firstly for the motivation they gave me to start such a project and also for their supervision, guidance and advice.

For help with the typing of questionnaires and protocols for the unit I am indebted to Mrs van Heerden, the hospital secretary. For typing and preparation of the manuscript I give grateful thanks to Mrs M. du Plessis.

I am also indebted to Mr Iain Macdonald of the Department of Mathematical Statistics, University of Natal, for his invaluable help with recording of results for the computer and analysis thereof.

Finally I wish to thank my husband and two sons for their support during the preparation of this thesis.

ABSTRACT

The first twelve months operation of a five-bed rehydration unit at Osindisweni Hospital is described and data related to admissions presented. Osindisweni hospital is situated in a rural area north of Durban and has approximately 300 general beds with 60 000 outpatient attendances per year.

A profile of children admitted to this unit was obtained and results are analysed according to the objectives of this study. The main findings of the study showed that 269 children were admitted to the unit during the study year and the majority of children were black African children, below three years of age, coming from rural areas.

The children presented with acute diarrhoeal dehydration mostly of mild to moderate degree and were normally managed by oral rehydration therapy. Eighty-four percent of these children were successfully managed on the rehydration unit and only 13,7% received IV fluids. The majority of children requiring transfer to the ward had either persistent dehydrating diarrhoea or other complications such as malnutrition or septicaemia. No child died on the unit and no child died as a result of dehydration but 4 children died later as inpatients on the children's ward. The mortality of children admitted to the unit was therefore 1,5%. One hundred and nine patients were followed up (41,6% of questionnaires) and of these only 76 (69,7%) actually came for review the others presenting for other illnesses or else interviewed on the wards after transfer. However, most of these children had either no or minor complaints on follow up.

Seventeen and a half percent of children were below the 3rd centile for age on discharge. Children with marasmus and/or kwashiorkor were not admitted to the unit.

The availability of health care was poorly assessed but indicated a general lack of facilities for the rural population served. Also it was noted that the principles of G.O.B.I. had been poorly taught at Osindisweni in the past, particularly growth charts. Mothers received health education on the unit and were found to have a good understanding of G.O.B.I. after their stay on the unit. On the whole the unit was well accepted by the mothers.

It is thought that this short-stay oral rehydration unit offers a more appropriate and more cost effective alternative to previous methods of in-patient management of children with diarrhoeal dehydration and that it offers an excellent opportunity for health education.

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LIST OF SYMBOLS/DEFINITION OF CRITERIA

1. For the purposes of this study the person accompanying the patient has been referred to as "mother" at all times in order to allow ease of narration. However it was not always the mother who attended to the child as shown in Table 51 of the results.

2. G.O.B.I. is part of the UNICEF acronym for the promotion of health in all children and is broken down as follows:

G. Growth monitoring

O. Oral rehydration solutions

B. Breast feeding

I Immunisation

3. Other symbols used

% = percentage

hrs = hours

mins = minutes

wt = weight

ORT = Oral Rehydration Therapy

mmole = millimole

RU = Rehydration Unit

°C = Degrees centigrade

G.P. = General practitioner

A.N.C.= Antenatal Clinic

W.B.C.= Well Baby Clinic

O.P.D.= Outpatients Department

O.R.S.= Oral Rehydration Solution

G.E. = Gastroenteritis

Kwash = Kwashiorkor

Malnutrition is taken to mean undernutrition for the purposes of this study and obesity is not included.

INTRODUCTION

Diarrhoea is the most important cause of morbidity and mortality of children under five years in the world. There are approximately 500 million children affected by acute diarrhoea annually and 5 million of these children die.^{1,2} At the International Conference on Oral Rehydration³ in Washington 1983, it was stated that:

"Oral rehydration therapy can: reduce mortality, sometimes drastically, in communities, clinics and hospitals; promote child growth and sound nutrition; lessen the morbidity burden; reduce hospitalization attendance, duration of stay and cost; and generate ancillary benefits such as minimizing the indiscriminate use of ineffective or harmful drugs."

Oral rehydration therapy has been hailed as one of the greatest advances in paediatric practice and is now estimated to be saving the lives of half a million children each year.⁴ It is also known that diarrhoeal disease accounts for approximately 30% of all child hospital admissions and 40% of all out patient visits to clinics and health centres in the developing world.⁴ With this in mind, it was proposed to establish a rehydration unit at Osindisweni Hospital, the main aim of which was to promote the use of oral rehydration for dehydrated children with acute diarrhoeal illnesses. This study was undertaken in order to determine the profile of children admitted to this rehydration unit.

The study was carried out at Osindisweni Hospital. This hospital is situated in a rural area about 45 kilometres North of Durban, and serves both a rural population (Ndwedwe and surrounding

areas) and an urban/peri-urban population (Inanda, Verulam, Tongaat). A map is included in Appendix I.

There are 300 general beds and 200 TB beds in the hospital. During 1987 approximately 60,000 outpatients attended and 12000 patients were admitted to the general hospital.⁵ The outpatient population is made up of 85% African and 15% Asian patients.⁶ Osindisweni was originally a mission hospital until April 1985 when it became State-run, and, more recently in April 1988, it has become part of the Natal Provincial Administration.

The paediatric section of the hospital consists of two wards of 45 beds each and a nursery serving approximately 2500 deliveries per year. Children from the age of 1 day to 2½ years are admitted to 'C' floor. The second ward, 'D' floor, cares for older children up to 12 years of age and also has isolation facilities for all the measles cases, burns cases and any other children requiring isolation.

In the year preceding this study it was found that 48% of children admitted to 'C' floor had the diagnosis of gastroenteritis as the main cause of admission.⁷ This is considerably higher than the 30% quoted for the developing world but, as stated above, 'C' floor admits only children below 2½ years, the age group most likely to suffer from severe diarrhoeal illness. Also a great many children in this age group are admitted to 'D' floor with measles, burns and other infectious illnesses that may require isolation, thus making the percentage appear higher for this age group on 'C' floor.

In the summer months in particular the ward is grossly overcrowded and at times bed occupancy is greater than 200%.⁸

Before the opening of the rehydration unit all children with acute diarrhoeal dehydration were managed on the open ward and, almost exclusively, IV fluids were used to correct dehydration. It was hoped that by opening a rehydration unit at Osindisweni a more appropriate management of children presenting with acute diarrhoeal dehydration could be encouraged, and also that overcrowding on 'C' floor could be reduced.

The rehydration unit was opened on 1 July 1987 and is situated in a small room (3 metres by 5 metres) attached to the casualty area of the out-patients department. There have been up to five children and their mothers admitted to the unit at any one time, but the room is overcrowded with this number. In the room is a large table with mattresses on, and also there are wooden benches for mothers to sit on. At night the mother and child sleep on mattresses on the floor. An area is allocated for the preparation of rehydration fluid, with a kettle, jugs, cups, sink etc. There are a variety of instructional posters around the walls of the room (Appendix II).

The main aims of the unit are set out in the protocol for the establishment of the rehydration unit (Appendix III). As already mentioned, the emphasis is on oral rehydration of children with acute diarrhoeal dehydration. Further aims include provision of essential health education for the mothers (who should be in constant attendance to the child) and a reduction in the amount of admissions for gastroenteritis to 'C' floor (and hence a decrease in overcrowding on this ward).

Following the opening of the unit a prospective study was undertaken of all admissions to the unit over the first year i.e. 1.7.87 to 30.6.88. A protocol for this study is included in

Appendix IV. and the results obtained will be presented in this thesis.

The primary objective was to determine the demographic profile, morbidity and mortality, and nutritional status of those children admitted to the unit during the study period.

The demographic profile was assessed in terms of age, sex, race and area of residence. When assessing morbidity and mortality and nutritional status it should be noted that in the criteria for admission to the unit children with complications such as marasmus and/or kwashiorkor were excluded as well as children with other serious illnesses (see Appendix III). The reason for these exclusions were, firstly the unit is a short stay unit (maximum 48 hours) and therefore it was felt that severely malnourished patients would normally require a longer period of rehabilitation and treatment and, secondly, the unit was designed for management of acute diarrhoeal dehydration not other illnesses. Morbidity was therefore assessed using several parameters (see Methodology). These included the severity of the illness on admission and the outcome of the stay on the unit. From this assessment of morbidity which takes into account the exclusion of certain patients as mentioned above, it was hoped to gain experience in the usefulness of oral rehydration units in the hospital setting as opposed to the traditional use of "drip rooms" for the out-patient management of dehydration.^{1,9,10} The rehydration unit was not used as a "drip room" although IV drips were still used in severely dehydrated/shocked patients. It is now well documented in various studies¹¹⁻¹⁵ that intravenous therapy in the hospital situation can be replaced by oral rehydration therapy and has several advantages over IV therapy, including a reduction in risks of complications and a

reduction of cost. Oral rehydration has also been used successfully in patients with severe dehydration.¹³

Table 1 overleaf shows how improved knowledge of the physiology of the body has led to changes in therapy of childhood diarrhoea and an improvement in mortality since 1832 when Latta first introduced IV fluid therapy for patients with cholera. Oral glucose-electrolyte solutions were introduced in the late 1960's for volume repletion in cholera and non cholera enteritis and is now a well proven therapy with a mortality of less than 2%.

The idea of a short stay rehydration unit in out-patients' departments has also been advocated for some time as a means of reducing overcrowding on busy paediatric wards. As stated above these units generally have rehydrated patients using parenteral routes rather than oral and this is of little long term educational value to the accompanying mother^{9,10} as she does not learn the appropriate techniques for home management.

In view of all these comments a profile of morbidity and mortality, which includes nutritional status, is crucial for the assessment of the functioning of the unit and must be an essential objective of the study.

The second objective was to ascertain the availability of health care and previous exposure to the principles of G.O.B.I. at the place of health care delivery. Following this the third objective was an assessment of the knowledge of the mother in respect to G.O.B.I. on admission, at discharge and at follow up.

Taking these two objectives together it should first be noted that essential health education, such as an understanding of the

TABLE 1: CHANGES IN HOSPITAL MORTALITY OF CHILDREN'S DIARRHOEA

YEAR	EVENT	HOSPITAL MORTALITY
1832	Latta uses intermittent intravenous saline and alkali in cholera. Most relapse when drip ceased.	Over 75%
1912	Sellards describes acidosis in cholera and uses alkali. Howland and Marriot describe acidosis in infantile diarrhoea and give small doses of alkali, with brief improvement.	86%
1926	Powers uses intermittent blood, glucose, saline and and bicarbonate infusions, and prescribes prolonged fasting.	33%
1928-1938	Hartmann uses sodium lactate to relieve acidosis; recurrent dehydration, however, causes high mortality.	51%
1931-1933	Karelitz and Schick use continuous saline dextrose infusions and recommend a 3-day fast.	12-33%
1945	Mortality at Harriet Lane Home (Johns Hopkins) still quite high on regimen without potassium.	32%
1946-1949	Darrow, at Hopkins, does balance studies to measure salt-H ₂ O deficits in diarrhoea; emphasizes use of potassium in addition to saline, base and water. Prescribes 1-5 day fast.	6%
1948	Chung urges continued feeding in spite of diarrhoea, mortality unaffected, disease not prolonged, nutrition enhanced, but fluid balance more difficult to achieve.	10%
1947-1958	Rapport, Finberg and Harrison and others describe hypernatremic dehydration.	12-14% for hypernatremia
1958	‡ Darrow's solution (in mEq/L:Na ⁺ 61,K ⁺ 18, base 27) as sole intravenous fluid in tropics.	10%
1959	Watten et al. measure water and electrolyte loss in cholera.	
1950's-1960's	In the West, better understanding of hypernatremia careful tailoring of intake, and laboratory monitoring put treatment of diarrhoea on a scientific footing.	0-5%
1960's-1970's	In Asia, simplified methods of treatment of cholera and non-cholera diarrheas developed at cholera research laboratories, based on physiologic studies emphasize speed and large fluid volume for rehydration; simultaneous use of salt, potassium, base; and early feeding.	2-3%
1966-1979	Increasing use of oral glucose-electrolyte solutions in cholera and noncholera enteritis.	0-2%

principles of G.O.B.I., is one of the main aims of the rehydration unit. To assess the effectiveness of the unit in terms of its educational role it is important to know what the existing knowledge of the mother is on admission. One aspect of this is to discover how "available" health services are to the mother e.g. how far and how expensive. It is also important for the development of the hospital to ascertain whether health education is undertaken successfully elsewhere in the hospital.

The principles of G.O.B.I. i.e. growth monitoring, oral rehydration, breast feeding and immunization, are four of UNICEF's strategies for a child survival programme. G.O.B.I. is stated to have the potential for saving 20,000 lives per day worldwide.^{24,25} In this study it was decided to concentrate on these four principles in health education and to compare the mother's knowledge of them on admission, discharge and follow up as an assessment of the effectiveness of education on the unit.

Oral rehydration was taught through practical experience. In the unit it is the mother who cares for her child and administers all the oral fluids and she is able to observe the improvement which results from the use of this simple method. Growth monitoring and breast feeding were emphasized on the unit and the use of the growth chart explained. The mother's attention was drawn to the importance of the continuation of feeding during diarrhoeal episodes and the need to give extra food to the child after any illness to make up for what he has lost and maintain the child on the "road to health".

These aspects of health education derive from the well known synergistic relationship between diarrhoea and undernutrition.¹⁶⁻¹⁸ Health education of the mother is known to play a crucial role in prevention of this devastating condition.¹⁹ Diarrhoea can cause anorexia, increased catabolism and increased calorie loss

thus predisposing to undernutrition. The undernourished child is more susceptible to protracted diarrhoea due to various mechanisms including villous and gastric mucosal atrophy and bacterial colonization of the upper gut. These children are usually from very poor families and poverty is usually associated with poor sanitation, water supply and housing, all of which also predispose to repeated episodes of diarrhoea. The situation is self perpetuating and it is important that it should be demonstrated to the mother that a child with diarrhoea needs food as well as fluids in order to combat the illness and maintain adequate growth. Therefore breast feeding was strongly encouraged, to provide food and fluid for the child with diarrhoea as well as to protect the child from diarrhoea. If the child was not breast fed, full strength milk feeds were reintroduced as soon as the child was adequately rehydrated. Where the child was already weaned, small amounts of solids were offered at frequent intervals as tolerated. There are many studies which illustrate the efficacy of reintroducing full strength milk and feeding early in the course of diarrhoeal illness and these show that the traditional method of withholding food is the wrong treatment.²⁰⁻²³ It is known that mothers learn best from demonstration and practical experience²⁴ consequently oral rehydration and continued feeding were demonstrated together when instructing mothers on the management of diarrhoea. The use of growth charts was also demonstrated - preferably the child's own growth chart was used. The advantages of breast feeding were frequently discussed and, as stated above, breast feeding was strongly supported as a useful tool in "treating" diarrhoea. Immunizations were discussed and the children received any immunization due before discharge. Where the child was over six months and either had no vaccination record or the record did not document measles vaccine, measles vaccine was given as is the policy

of the hospital. Hence all the principles of G.O.B.I. were discussed and where possible demonstrated. Despite their distraction with their child's illness, mothers have been shown to respond well to instruction during the acute episode of illness of their child.¹⁵ It is hoped that this study substantiates this statement and demonstrate the effectiveness of such health education on rehydration units.

The fourth objective was to ascertain the attitudes of the mother to the unit. It was also hoped to gain some experience in the beliefs and attitudes of the mothers to their child's illness. It is thought that effective health education should build upon rather than directly confront traditional beliefs. Hence it is important to know how the mother perceives the illness in order to avoid conflict.²⁶⁻²⁸ This, together with an assessment of the attitudes to the unit is important in determining the need for any modifications to the unit. If the unit is unacceptable to the patients and is in conflict with traditional beliefs it will never be successful.

The fifth and final objective is to use the results of the study to make recommendations concerning the future of the rehydration unit and to suggest any modifications thought necessary. Hopefully, this work will offer some valuable information to enable this objective to be achieved as well as offer assistance to other health workers wishing to undertake a similar project and perhaps indicate ways in which "primary health care" can be incorporated at all levels of health care delivery.

METHODOLOGY

1. CLINICAL METHOD

1.1 The establishment of the rehydration unit

Before establishing the unit at Osindisweni Hospital permission was obtained from the medical superintendent and chief matron and a protocol was drawn up and submitted to them for approval. The protocol was then circulated to all medical officers and nursing staff and copies were made available for reference on the rehydration unit and in the outpatients department and doctor's room.

At the beginning of 1987 a new outpatients' block was opened at Osindisweni and a room was made available in this block for the establishment of the rehydration unit. It was decided to second staff nurses from the outpatient department for duties in the rehydration unit with supervision from the outpatient professional nurses. As space was limited (the room was very small) the unit was only able to accommodate a maximum of five patients and their mothers. The unit was opened in July 1987, which is a quiet time of year and so enabled a gradual introduction to the use of the rehydration unit.

It was felt necessary to draw up certain criteria for admission to the unit in order to avoid inappropriate usage. The unit is intended for rehydration of children with acute diarrhoeal dehydration and has not got facilities or staffing to deal with patients severely ill e.g. with pneumonia or severe malnutrition. Obviously infectious diseases, such as

measles, which require isolation facilities were also not appropriate for management on the rehydration unit.

Due to the limited availability of space and an awareness that acute diarrhoea with dehydration was mainly a problem in the under three age group^{17,18,29} an upper age limit of three years was placed as a criteria for admission. The lower age limit was set at three months. The reasons for this were firstly, to exclude neonates who are at risk of developing serious infections and, secondly, in those babies below three months who were not breast fed it is a policy of the Paediatric Department of Osindisweni to attempt to reestablish such babies on full breast feeds. It is our experience that very few babies presenting with diarrhoea below three months of age are exclusively breast fed. The maximum stay on the unit is 48 hours. This would not be long enough to effectively reestablish the breast in such babies.

All children admitted to the unit had to be accompanied by a mother or suitable guardian. If this was not possible then such children requiring rehydration were admitted to the paediatric wards. The mother was expected to care for the child totally whilst on the unit and, therefore, needed to be in constant attendance. She was instructed by the staff nurse on how to prepare oral fluids and administer them to the child. It was the mother who noted the amount of fluids taken, frequency and nature of stools passed, urine passed and vomitus.

Children were only admitted to the unit, and hence included in the study if they were assessed to be dehydrated by the admitting medical officer. The assessment of dehydration

was determined with reference to the W.H.O. standards as included in the rehydration unit protocol (Appendix III). If space allowed, the unit was also used for education and short term observation (up to 3 hours) of outpatient children presenting with a diarrhoeal illness without dehydration. The mothers of such children were instructed on preparation of oral fluids and also the need to feed the child as often as possible as soon as the child was able to take food. These children were not included in the study as they were clinically well hydrated and therefore not admitted to the unit.

1.2 Management criteria

Oral rehydration was used except where the child was in circulatory failure (shock) or where there was marked abdominal distension. The solutions used on the unit were either Kalena (Lennon Ltd) or Sorol (Biocide Ltd).

The formula for these solution are as follows:

<u>Kalena (g/l)</u>		<u>Sorol (g/l)</u>	
NaCl	2	NaCl	2
Na Citrate	2,5	NaHCO ₃	2,3
KCl	1,5	KCl	1,5
Dextrose monohydrate	25	Dextrose monohydrate	20

Standard W.H.O. formula³⁰ g/l

NaCl	3.5
NaHCO ₃	2.5
KCl	1.5
Glucose	20

The W.H.O. recommended formula is given for comparison. This formula gives a higher Sodium concentration (90 m mol/l) as opposed to the Sorol/Kalena which both use 60 m mol/l of Sodium. Also there is slightly more dextrose in Kalena. Kalena is dispensed as a solution, hence citrate is used rather than bicarbonate which is unstable in solution. In general the Sorol was used to distribute to patients on discharge as the sachets are easier to dispense and instructions are simpler i.e. dissolve one sachet in one litre of cooled boiled water.

250 ml cups were available on the unit as well as smaller plastic medicine cups of 75 ml and 5 ml teaspoons. Oral fluids were given at rates of 10 ml per Kg per hour as a minimum i.e. the child was allowed and encouraged to take more than this but this level was placed as the minimum acceptable intake. The children were frequently reassessed to ensure enough fluids were taken and that their condition was improving. Oral fluids were offered at least hourly and where vomiting was a problem the mother was instructed to allow 10 minutes to elapse before starting to give fluids after the child had vomited. Upon restarting fluids they began with sips (teaspoons) every 2-3 minutes. By offering such small amounts frequently both vomiting and reluctance to drink could be overcome.

During the night, if the child's condition was reasonable, fluids were given 3 hourly to allow the mother some rest.

If the above regime failed a nasogastric drip using oral electrolyte solutions placed in emptied vacolitres was tried. The stomach was first washed out with the electrolyte solution and, depending on the severity of the dehydration, the

nasogastric drip was run at rates of up to 40 mls per kg per hour. IV fluids were reserved for those patients in shock or not able to tolerate the above regime. The regime for IV fluids is set out in the protocol for the rehydration unit in Appendix III.³².

Another important aspect of management was feeding. Where a child was breast fed this was continued as frequently as possible. If the child was vomiting the mother was instructed to withhold the breast for approximately 10 minutes, as with the oral fluids, and then to feed at frequent intervals for short periods of time. Where the child was formula fed, full strength milk feeds were not introduced until after the child was rehydrated. However $\frac{1}{2}$ strength feeds were offered before this by cup and spoon. Solid food was given as soon as the child was able to eat this. The solid foods offered included such items as porridge to which Pronutro, skimmed milk, peanut butter or cooking oil had been added; soups with rice or macaroni; brown bread with margarine or peanut butter; a mixed diet depending on the age of the child.

The essential elements of management were thus food, fluid and time, all of which were provided by the mother. No anti-diarrhoeal or anti-emetic preparations were used and as a general rule no antibiotics unless obvious bacterial infection was present. Children with serious bacterial infection were not managed on the unit. As children were mostly managed on proprietary electrolyte solutions, K⁺ supplements were not given.

Children were discharged if rehydrated, retaining fluids adequately, taking some feeds and also the diarrhoea had

improved. It was not expected that the diarrhoea would have completely settled within 48 hours but a decrease in frequency and improvement in consistency was expected. In particular, the continuation of frequent watery stools was felt an indication to delay discharge or, if the child had stayed beyond 48 hours, transfer the child to the main wards. Therefore, if children were found to be still unfit for discharge after 48 hours on the unit then they were admitted to the paediatric wards. Other important criteria for assessing the patients were the general well being of the child and that the mother should understand the principles of oral rehydration.

On discharge the patients were all given follow up dates and also advised to return if diarrhoea persisted for more than a few days or worsened. Emphasis was also placed on the need to increase food intake following illness and monitor the child's growth carefully. All mothers were also given handouts on the preparation of home made salt and sugar water. (Appendix IX).

1.3 Nurses Duties

The staff nurses involved in management of patients on the unit were trained to 'supervise, instruct and observe'. Mothers were shown by them how to prepare solutions and how to administer these, and also taught to assist the nurses at all times in adequately recording fluids given, stools, vomitus and urine passed. The nurse monitored the child's condition in terms of pulse, temperature, respiratory rate and degree of dehydration, at least 4 hourly. She informed the medical officer of any change in condition. The medical officer

attended the patients at least twice a day and also whenever requested to by the supervising nurse.

The other important role of the nurse was to provide health education. Mothers were taught about the use of oral rehydration fluids as above, but also on the other principles of G.O.B.I. Apart from this they were shown how to recognise the signs of dehydration and the need to feed a child with diarrhoea as well as giving extra fluids. Education also extended to discussion of safe water, cleanliness, personal hygiene, proper sanitation and waste disposal.

Nutritional advice was also an important part of health education with emphasis on the use of locally available foods, an adequate weaning diet and prolonged breast feeding. Instruction took place on an individual basis and in group discussions depending on the occupancy of the unit.

2. DATA CAPTURE

Before collecting any data concerning the unit's operations permission was sought and obtained from the medical superintendent and the Department of Health and Population Development. (Appendix V).

2.1 The Questionnaire

A questionnaire was designed to enable the objectives of the study to be met. (Appendix VI) The main objectives have been discussed in the introduction and are listed in the protocol for this study. (Appendix IV)

As it was the researcher's intention to analyse the questionnaire results by computer, the format of the questionnaire was such to enable easy coding of answers for entering on a computer programme.

The questionnaire was divided into three sections to be filled on admission, on leaving the unit and on follow up. The initial part of the questionnaire was devised to determine the demographic profile of the patient in terms of age, sex, race and area of residence. The patients were also given a study number and details of their home address and outpatient file numbers were included to allow for retrieval of patient files where necessary.

Each of the sections was then divided into a part for collection of medical data and a part for collection of health care data. The information collected in the medical data sections served to provide a profile of morbidity and mortality, as well as nutritional status in terms of weight for age on discharge (after rehydration) and at follow up.

The availability of health care was assessed on admission, in the health care data section and the format for this was derived from that used by 4th year University of Natal medical students in 1983.³³

The questions on health care knowledge were designed to indicate if there was any knowledge of the principles of G.O.B.I. before admission to the unit and any previous exposure to teaching of G.O.B.I. at Osindisweni hospital. This was followed with questions on the various aspects of G.O.B.I., feeding and nutrition both at discharge and on follow up so

that the effectiveness of health education on the unit could be determined.

Questions were also included which identified the beliefs and therapeutic practices of the mother on admission and also her attitude to the unit.

It was felt that the questionnaire would provide results to meet the objectives of the study. The forms were typed and cyclostyled by the hospital typist. A sample form was submitted to the Department of Community Health, University of Natal. Having obtained approval of the form from that department, the staff nurses and sisters involved in supervising the unit were then trained in the use of the questionnaire and shown, on an individual basis, how to fill it in.

The admission and discharge sections were filled by the nurses attending the unit except for the questions regarding other symptoms and signs elicited on admission which were determined by the admitting medical officers. The degree of dehydration was also evaluated by the medical officers. Also the questions regarding reason for any transfers, and other problems elicited during the patient's stay were determined by the medical officer discharging the patient.

The follow up questions were filled in by the medical officer reviewing the patient. This was limited to the researcher and one other medical officer who was also appraised of the objectives of the research and the completing of questionnaires. This same medical officer supervised the unit in the researcher's absence.

Before embarking on the main study a pilot study was undertaken to determine the viability of the questionnaire. This took place over a period of one week in the month of May 1987. Patients admitted to 'C' floor with acute diarrhoeal dehydration were used in the pilot study. This was prior to the opening of the rehydration unit. Five such patients were interviewed and no problems were encountered with the use of the questionnaire.

The opening of the rehydration unit was delayed until July 1st 1987 and hence the study began on that day. It was intended to be a prospective study over a one year period which therefore extended from 1st July 1987 to 30th June 1988. All patients admitted to the unit during this period of time were included in the study and a standardized questionnaire as described above was used, reducing the risk of bias in the study. The nurses filling in the forms were also informed of the objectives of the research protocol and the aims of the rehydration unit. In addition to the preliminary instructions on the questionnaire and on management of patients on the unit, the nurses were involved in frequent reappraisals and updating of health education methods. The researcher undertook regular verbal reminders of the routine procedures on the unit and the use of the questionnaires. The forms were collected and checked on a daily basis, whenever possible, by the researcher.

Certain sections of the questionnaire included space for comments and uncoded items. These sections were later coded by the researcher so that they could be entered onto the computer for analysis. The questions relating to the comments and uncoded items are as follows:

Section I Page 2

"Please specify any other symptom"

Answers coded as follows:

	<u>Code</u>
Blank/No symptoms	0
General Symptoms - e.g. Fever	
Weakness	
Loss of appetite	1
Loss of weight	
Abdominal pain	2
Respiratory Symptoms e.g. Cough	
Shortness of breath	3
Chest pain	
Worms	4
Other	5

"Please specify any other illness/signs"

	<u>Code</u>
None	0
Malnutrition	1
Oral sores	2
Scabies	3
Respiratory Infection	4
I ^o PTB	5
Rash	6

"Parent/Guardian's cultural attitudes/beliefs of this illness"

	<u>Code</u>
None	0
"Traditional" beliefs	1
Teething	2
"Scientific" e.g.	
Bad milk/Food ingested	
Unpurified water	
Not breast feeding	3
Virus	
Worms	
"Natural" illness	4

"Relationship of the patient to the person giving the information"

	<u>Code</u>
Not stated	0
Mother	1
Grandmother	2
Aunt	3
Older sister	4

Section 2 Page 4

"Reasons for Transfer"

	<u>Code</u>
Not transferred	0
Persistent severe diarrhoea	1
Persistent vomiting	2
Malnutrition	3
Respiratory infection	4
General condition unacceptable after 48 hours	5
Other	6

"Any other significant findings/illness diagnosed"

	<u>Code</u>
Nil	0
Respiratory infection	1
Malnutrition	2
Stomatitis	3
Worms	4
Other	5

Section 2 Page 5

"Attitudes to the rehydration unit"

	<u>Code</u>
No answer recorded	0
Positive response	1
Negative response	2
Indifferent	3

Section 3 Page 5

"Any other problems? (specify)"

	<u>Code</u>
Nil	0
Readmission to 'C' floor	1
Malnutrition	2
Poor appetite	3
Malaise/Fever	4
Worms	5
Prolonged or recurrent diarrhoea	6
Respiratory infection	7
Other	8

Section 3 Page 6

"Attitude to rehydration unit"

	<u>Code</u>
Nil recorded	0
Positive	1
Negative	2
Indifferent	3
Different guardian attending with the child	4

The above coding system was devised by analysing these sections separately after all forms were collected. The codes were then entered in the appropriate sections of the completed questionnaires before inputting all the information into the computer. The length of stay of children on the unit and the time from admission to follow up were calculated manually. These times were recorded on the individual questionnaires by the researcher and entered into the computer.

Finally, in order to make some assessment of the nutritional status of the children, the weights on discharge were plotted on the growth chart supplied by the Department of Health and Welfare (Appendix VII). The chart was divided into five sections as follows and the appropriate code entered into the computer:

	<u>Code</u>
Not recorded	0
Below 60% of expected weight for age line	1
Between 60% line and 3rd centile	2
Between 3rd and 50th centile	3
Between 50th and 97th centile	4
Above 97th centile	5

Although it is true that one point alone on the Road to Health growth chart is not a true indicator of the level of nutrition (it is the rate of growth of the child that is important), it can be used as a simple screening in a study such as this.²⁵

The same method of coding was used in assessing the weight for age of the child on follow up.

The length of time from admission to follow up was extremely variable. Originally it was planned to recall patients approximately one month after admission. However this appeared to lead to a high failure rate and so the time was reduced to approximately two weeks. Some patients were recovered at much later intervals after attending the outpatient department for another illness. All the outpatient cards of the study patients had a note concerning their admission to the rehydration unit and entry into the research project, with a message to refer such patients to the researcher should they appear in the outpatient department. In addition to this reminders were posted to 160 of the patients but this was a relatively fruitless exercise with only 2 of such patients responding to the reminders. One of those who responded to the postal reminder was an Asian child with a detailed residential address. Most of the patients came from rural areas or squatter compounds with no proper postal address

e.g. addresses were most often c/o the local store or school. This is thought to be one possible reason for the poor response to postal reminders.

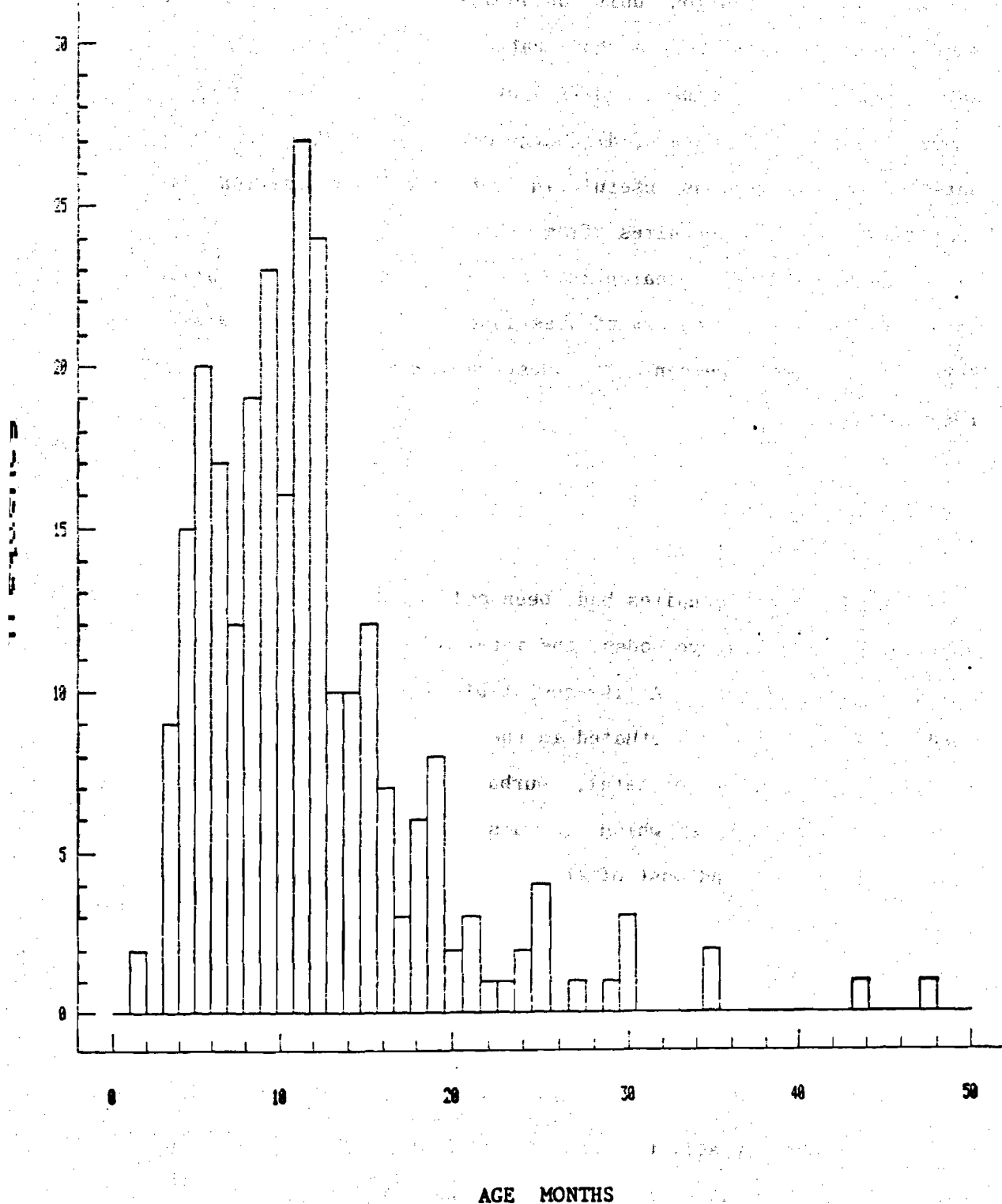
On the rehydration unit an admission record book was also kept in which was recorded the patient's name, study number, outpatient file number, date of admission, age, weight, immunization status, date of discharge or transfer and follow up date. This book was useful in retrieving information and sometimes lost questionnaires from the hospital records. The researcher undertook a search for missing questionnaires in order to obtain as full a recovery of questionnaires as possible. Ninety seven point four percent of questionnaires were successfully recovered.

2.2 Analysis of data

Once the questionnaires had been collected, checked and the sections mentioned above coded, the information was entered into a computer for analysis. An IBM-compatible personal computer with hard disk was used, situated in the Department of Mathematical Statistics, University of Natal, Durban. The software package used was Statgraphics which is a statistical system providing access to graphics and most of the statistical procedures, making it easy to explore data more fully from both numerical and graphical perspectives. A copy of the data directory for the rehydration questionnaire file and the systems options are included in Appendix VIII.

A printout of all the entries was obtained and these were manually checked against the questionnaires by the researcher before using the above programme to analyse the results.

FIGURE 1: THE DISTRIBUTION OF AGE IN MONTHS OF CHILDREN ADMITTED TO THE REHYDRATION UNIT



RESULTS

269 patients were admitted to the rehydration unit during the study period and 262 research questionnaires were successfully recovered. Data from these questionnaires was entered onto a computer and analysed using Statgraphics as described in the method. The results from these questionnaires are now presented and analysed according to the objectives of the study. Further discussion of the results will follow in the next chapter and hence only brief discussion and explanation is included in this chapter.

1. DEMOGRAPHY

1.1. Age

The histogram shown in Figure 1 demonstrates the distribution of age within the study group. Only four children fell outside the established age limits of 3 months to 3 years. These included a pair of twins aged 6 weeks who had mild diarrhoea following a home administered soap and water enema. They were fully breast fed and hence it was not felt necessary to transfer them to the ward. The other two children were older than 3 years but admitted at a time when the unit was empty. The results of an analysis of distribution of age is further summarised in Table 2 below.

TABLE 2: SUMMARY OF STATISTICS RELATED TO AGE DISTRIBUTION

	Age in Months
Average	11,3
Median	10
Mode	11
Minimum	1
Maximum	48
Standard deviation	6,9
Sample Size	262

1.2. Sex

As expected the sex distribution was approximately equal.

TABLE 3: SEX DISTRIBUTION OF STUDY GROUP

Sex	Number of Patients (%)
Male	138 (53)
Female	124 (47)
Sample Size	262

1.3. Race

Table 4 shows that the majority of the admissions to the unit were African patients.

TABLE 4: RACIAL DISTRIBUTION OF STUDY GROUP

Race	Number of Patients (%)
African	257 (98)
Asian	4 (1,5)
Coloured	1 (0,5)
White	0 (0,0)
Sample size	262 (100)

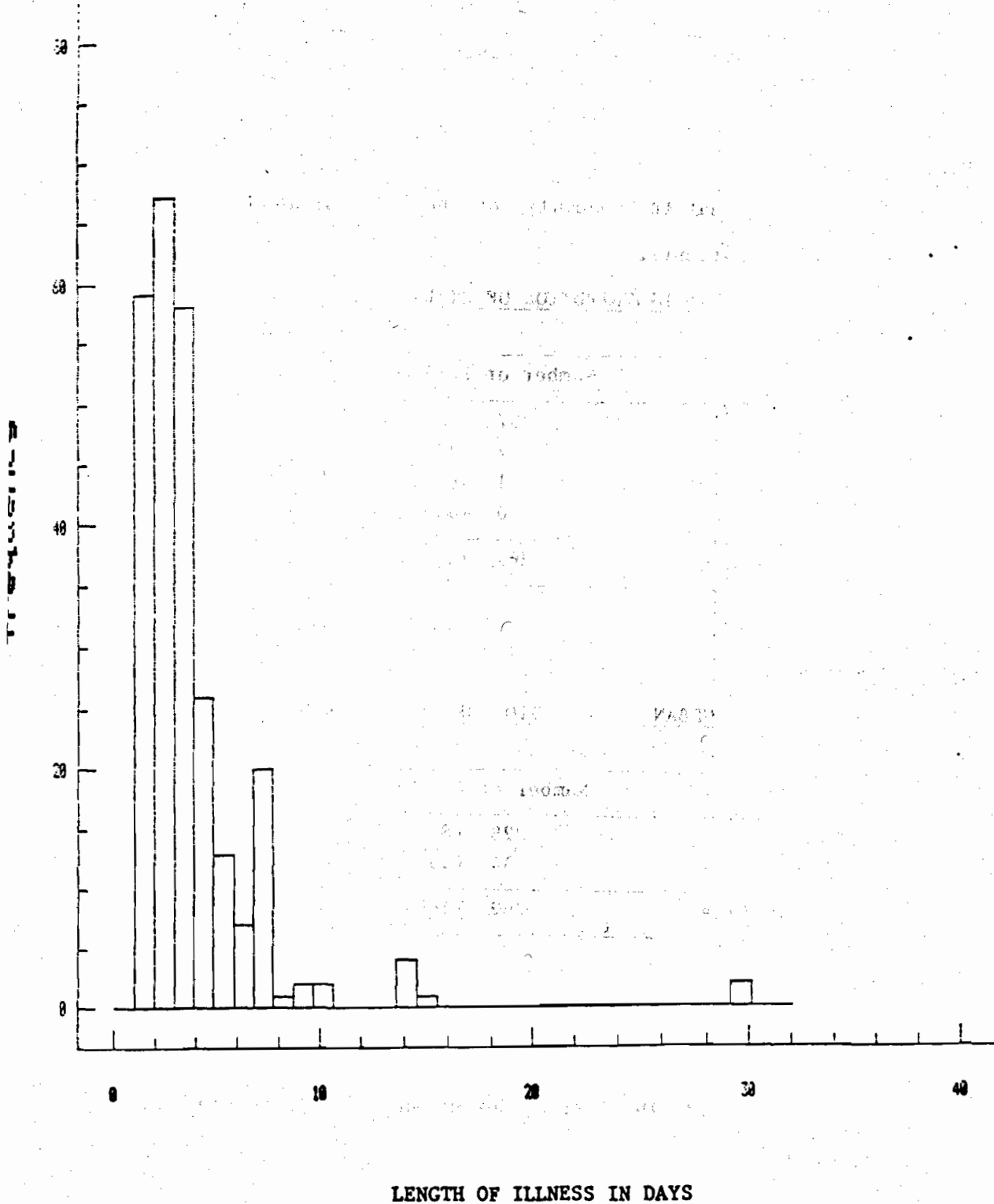
1.4. Area of Residence

TABLE 5: RURAL/URBAN DISTRIBUTION OF STUDY GROUP

Area	Number of Patients (%)
Rural	228 (87)
Urban	34 (13)
Sample Size	262 (100)

The distribution of patients is shown in Table 5. This differs from that found in a survey of outpatients attending Osindisweni in 1986.⁶ The earlier survey showed that 56,5% of all outpatient attendances were from rural rather than urban areas but the present survey shows that a much higher

FIGURE 2: LENGTH OF ILLNESS IN DAYS BEFORE ADMISSION TO THE REHYDRATION UNIT



percentage (87%) of the children attending were in fact drawn from a rural catchment. Although this is specific for children with diarrhoea it might reflect the problems particularly associated with a rural rather than urban environment.

In summary, the demographic profile shows that the children admitted to the rehydration unit during the study period were mostly black African children from rural areas with an average age of 11,3 years and an almost equal sex distribution.

2. MORBIDITY AND MORTALITY

The results will be analysed in the following order:

- 2.1 Morbidity data on admission
- 2.2 Morbidity data on discharge
- 2.3 Morbidity data on follow up
- 2.4 Analysis of admission factors affecting outcome of stay on the unit
- 2.5 Mortality
- 2.6 Summary of main findings of significance in morbidity/mortality data

2.1 Morbidity data on admission

2.1.1. Length of illness on admission

The majority of patients had had symptoms for less than 7 days prior to admission (average 3, 4 days). The distribution is shown in Figure 2 and the results summarised in Table 6 below.

FIGURE 3: DISTRIBUTION OF NO. OF STOOLS PASSED IN 24 HOURS BEFORE ADMISSION

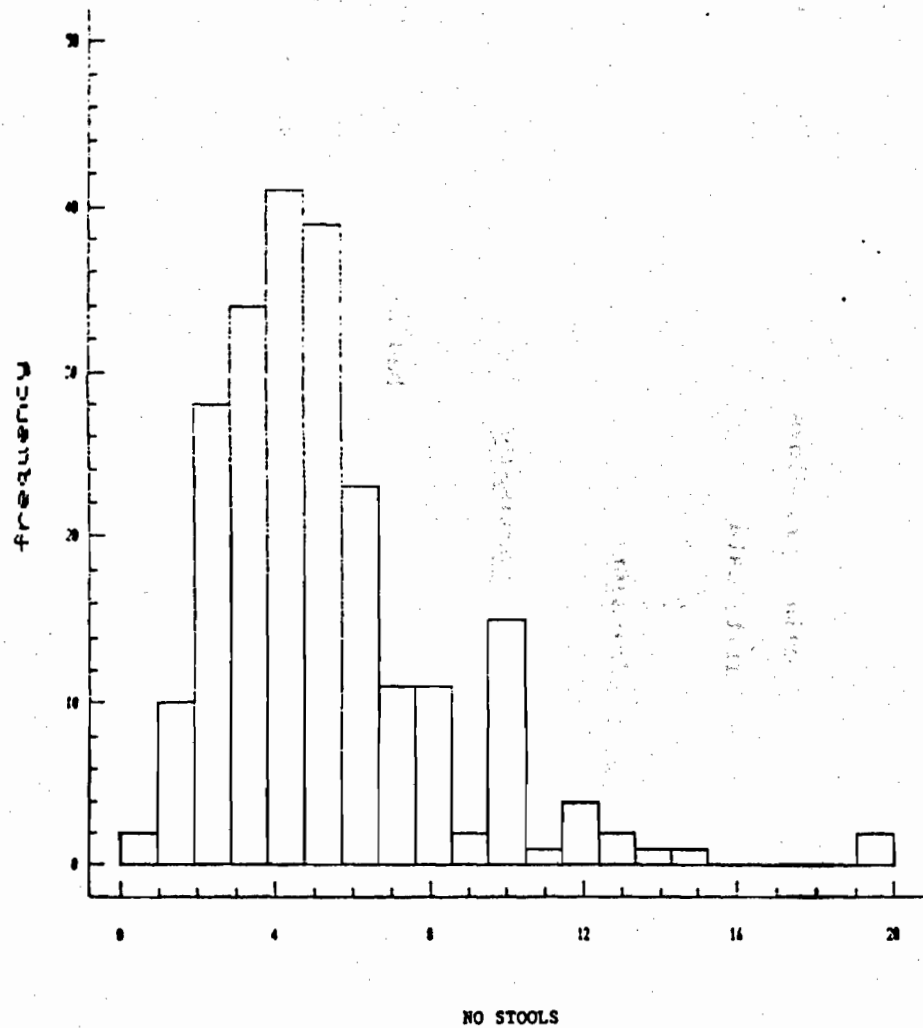


FIGURE 4: DISTRIBUTION OF NO. OF VOMITS IN 24 HOURS BEFORE ADMISSION

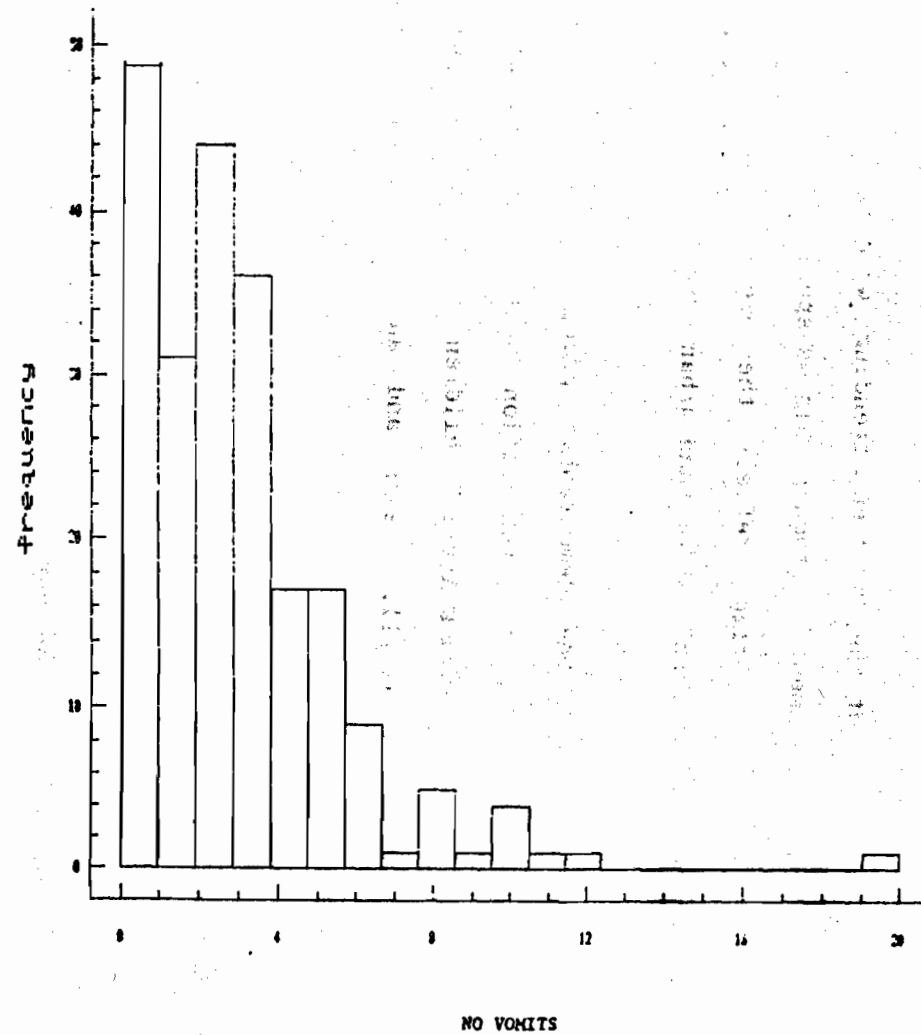


TABLE 6: LENGTH OF ILLNESS PRIOR TO ADMISSION

Length of illness in days	
Average	3.4
Minimum	1
Maximum	30
Sample size	262

2.1.2. Frequency of stools/vomits in 24 hours prior to admission

This section of the questionnaire was not always filled in appropriately and mothers often found it difficult to judge numbers of stools/vomits. Comments such as "many" and "every time" were sometimes written in this section hence the low sample size shown in Table 7 below. It may have been more helpful to categorize this section differently in order to help mothers reply e.g. less than 5, between 5 and 10 and greater than 10.

TABLE 7: FREQUENCY OF STOOLS/VOMITS ON ADMISSION :

NUMBER PER 24 HRS

	Stools	Vomits
Average	5.07	2.64
Minimum	0	0
Maximum	20	20
Sample size	227	217

See also Figure 3 and Figure 4.

2.1.3. Consistency of Stools on admission

Yellow or green watery stools were the most frequently described, with dysenteric stools (blood and mucous) being relatively uncommon. Very few stool cultures were undertaken due to limited laboratory facilities and the short stay on the unit. Table 8 demonstrates the relative frequencies of the different stool characteristics reported on.

TABLE 8: DESCRIPTION OF STOOLS ON ADMISSION

Description of Stool	Number of Patients (% of sample analysed)
Watery	163 (62,2)
Yellow	130 (49,6)
Loose	94 (35,9)
Green	90 (34,4)
Mucous	48 (18,3)
Blood	11 (4,2)
Worms	10 (3,8)
Other nature	3 (1,1)
Sample size	262

Mothers often used more than one of the above characteristics to describe the stools. All observations by the mothers were recorded. The stools of "other nature" consisted of: Food particles x 1; Soft stool x 1; White stools x 1.

2.1.4. Other symptoms presenting on admission

Apart from diarrhoea and vomiting the most common symptoms were those of systemic upset and also of cough or other respiratory symptoms. Table 9 indicates the main symptoms complained of.

TABLE 9: PROFILE OF OTHER PRESENTING SYMPTOMS

Symptom	No. of Patients
General symptoms e.g. Fever Malaise, Loss of appetite	33
Respiratory symptom e.g. cough	49
Abdominal pain	2
Worms	8
Miscellaneous	10
None	175
Sample size	262

The miscellaneous symptoms were composed of:

Oral sores x 2; Swelling of the lower limbs x 1; Discoloured urine x 1; Sores on the head x 1; Painful micturition x 1; blood in the stools x 1; Rash on the lower limbs x 1; Sores on the body x 1; and discharging eyes x 1.

2.1.5. Attendances at health care facilities for the present illness prior to admission to the rehydration unit

This section seeks to establish how many of the patients had already sought medical attention for the presenting illness before being admitted to the rehydration unit. As shown in Table 10 below, many patients had attended another health facility before being admitted to the rehydration unit. Several patients had attended more than one facility i.e. 46 patients attended two facilities, 14 patients attended 3, 8 patients attended 4 and 1 patient 5 different facilities. However, the number previously attending Osindisweni for the presenting illness has been over estimated as in many cases staff nurses recorded this as positive for the attendance at the time of admission.

TABLE 10: PREVIOUS ATTENDANCES FOR PRESENTING ILLNESSES

Health facility	No. of Patients attended (% of sample size)	
Osindisweni Hospital	47	(18)
Health Clinic	113	(43)
Other hospital	24	(9)
General Practitioner	72	(27,5)
Faith Healer	35	(13)
Traditional healer	19	(7)
None	60	(23)
Sample size	262	(100)

Therefore 77% had sought health care before being readmitted to the unit. If outpatient attendances at Osindisweni Hospital are excluded for the reasons discussed above 59% had sought care previously.

2.1.6. A profile of previous diarrhoeal illness

Diarrhoeal illness was common in the study population, with 58% having had episodes of diarrhoea previously and 18% having had previous hospital admissions for diarrhoeal illness. The results are presented in Table 11.

TABLE 11: PREVIOUS EPISODES OF DIARRHOEAL ILLNESS:
AND ADMISSION FOR DIARRHOEA

Episodes/Admission	Diarrhoea (%) No. of patients	Admissions % No. of patients
0	79 (30)	153 (58)
1	49 (19)	35 (13)
2	60 (23)	7 (3)
3	26 (10)	1 (0,5)
4	11 (4)	2 (1)
5	4 (1,5)	1 (0,5)
10	1 (0,5)	0 (0)
Unknown	32 (12)	63 (24)
TOTAL	262 (100)	262 (100)

2.1.7. Respiratory rate on admission

Only 191 (73%) questionnaires had this section filled in, and, on the whole, the recording of respiratory rates tended to be poorly done. It is possible that in two cases where the respiratory rate was recorded as extremely high (124 and 130 per minute), pulse rates rather than respiratory rates were recorded as on reviewing the case notes of these two patients there is no mention of respiratory distress or pneumonia and the respiratory rates on discharge were approximately 30 per minute each. These two patients had been assessed as moderately dehydrated on admission.

Apart from these two results the respiratory rates tended to have been underestimated when checked by the researcher. However this cannot be assumed to be true as the patients were often first seen by the researcher some time after admission. It was later stressed to the staff nurses that respiratory rate should be counted over at

least one minute, preferably with a quiet child, because of the irregular pattern of infant breathing.

Because of the above opinion it is felt that, in this study, respiratory rate is not a good indicator of the child's condition on admission. The results are summarised below in Table 12 and Figure 5.

TABLE 12: RESPIRATORY RATE ON ADMISSION

	Respiratory rate/minute
Average	32
Minimum	10
Maximum	130
Standard deviation	14
Sample size	191

2.1.8. Temperature on admission

TABLE 13: TEMPERATURE °C ON ADMISSION

	Temperature °C
Average	37,8
Minimum	35
Maximum	40
Standard deviation	0,9
Sample size	258

Rectal temperatures were used at all times on the unit and, in contrast to respiratory rate, this section was well reported with only 4 (1,5%) questionnaires missing information. The results are presented in Table 13 above and illustrated in Figure 6.

2.1.9. Level of dehydration on admission

Table 14 demonstrates the distribution of the degree

of dehydration found on admission. This represents a typical distribution of dehydration¹¹ in such a group of children and it is the opinion of the researcher that the level of dehydration was assessed reasonably accurately. Personal observation made on many of the admissions to the unit confirmed the results.

TABLE 14: ASSESSMENT OF DEHYDRATION

Level of Dehydration	Number of Patients (%)
Mild	126 (48)
Moderate	122 (46,5)
Severe	14 (5,5)
Sample size	262 (100)

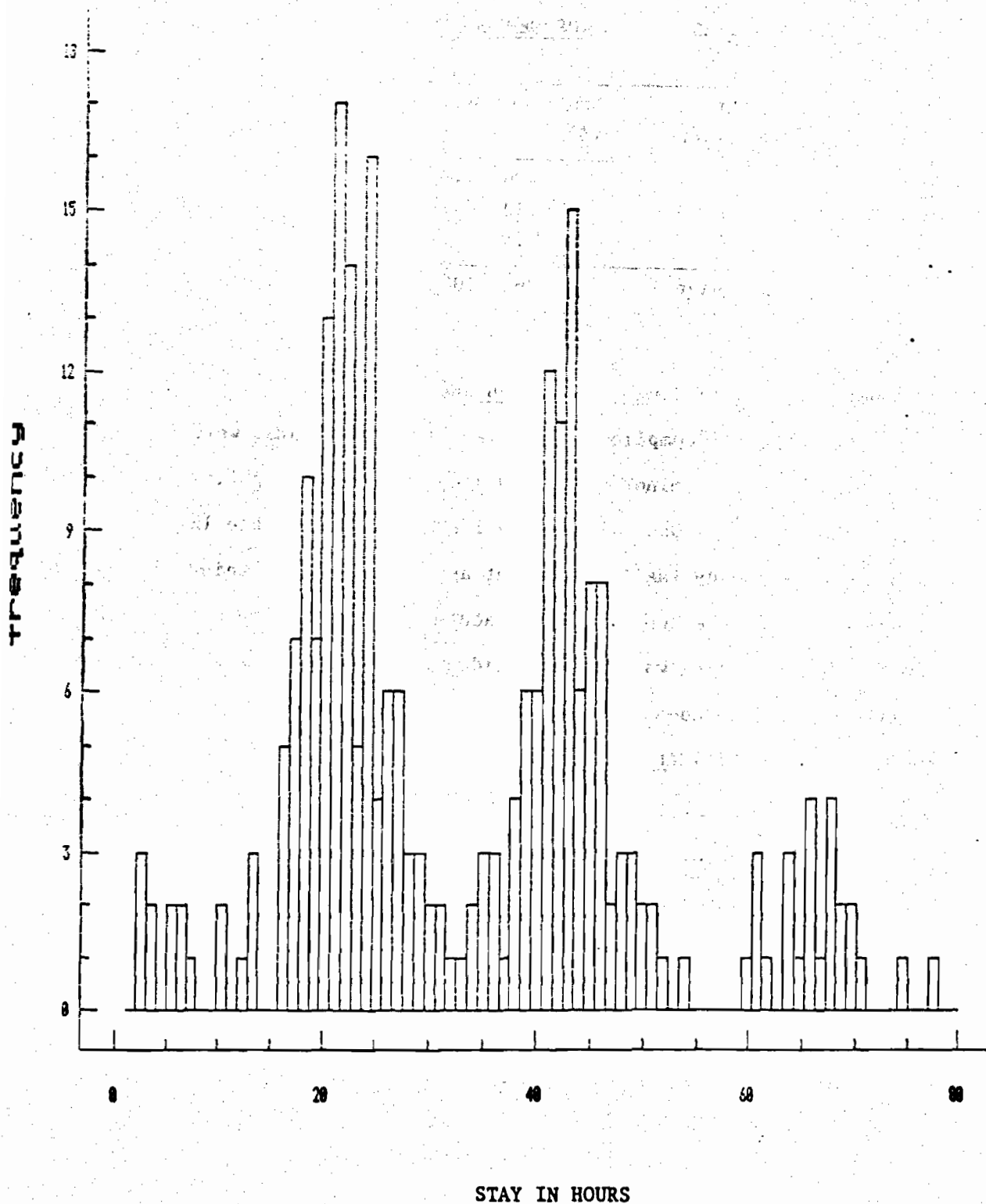
2.1.10. Other clinical findings present on admission

In general complications, like other symptoms, were uncommon and of a minor degree in keeping with the policy of the unit. One child with 1°PTB listed in Table 15 below was already taking treatment as an outpatient being admitted to the unit for an acute diarrhoeal illness. Hence this finding was really incidental to the presenting illness of diarrhoea and not a complicating illness.

TABLE 15: OTHER CLINICAL FINDINGS PRESENT ON ADMISSION

Finding	No. of Patients
Malnutrition	13
Oral sores	10
Scabies	3
Respiratory Infection	5
1°PTB	1
Rash	8
None	216
Nil recorded	6
TOTAL	262

FIGURE 7: DISTRIBUTION OF LENGTH OF STAY ON THE UNIT IN HOURS



2.2. MORBIDITY DATA ON DISCHARGE

2.2.1. Outcome of the stay in the rehydration unit

Table 16 shows the number of patients transferred and discharged. The majority of patients were managed on the rehydration unit and discharged home without need to transfer the patient to the ward. No patient died whilst in the rehydration unit but 4 of the children admitted to the unit died at a later stage on 'C' floor. These will be discussed later in the mortality section (2.5) of the results.

TABLE 16: OUTCOME OF STAY

Outcome	Number of Patients (%)
Discharged home	220 (84)
Transferred to ward	42 (16)
Transferred to another hospital	0
Died	0
Other	0
Sample size	262 (100)

2.2.2. Length of stay on the unit

Figure 12 demonstrates that the majority of patients stayed less than 48 hours on the unit. Many of these who stayed longer were kept because of transport problems, e.g. if it was Sunday or late in the afternoon when the patient was ready for discharge. The policy of transferring any child not sufficiently improved and ready for discharge at 48 hours was generally well upheld. Table 17 below summarises the results which are also presented in Figure 7.

TABLE 17: STAY ON THE UNIT IN HOURS

Variable	Stay in hours
Average	33,3
Minimum	2
Maximum	78

2.2.3. Reasons for transfer to wards

As will be discussed later, it is felt by the researcher that a few children may have been transferred prematurely and others admitted without reference to the criteria for admission. However the main reasons for transfer were persistent severe diarrhoea or dehydration and also poor general condition after 48 hours stay on the unit. The results are presented in Table 18 below.

TABLE 18: REASONS FOR TRANSFERS TO IN-PATIENT WARDS

Reason	No. of Patients
Persistent severe diarrhoea	15
Persistent vomiting	2
Persistent dehydration	8
Poor general condition after 48 hours	5
Malnutrition	10
Respiratory infections	4
Other	13

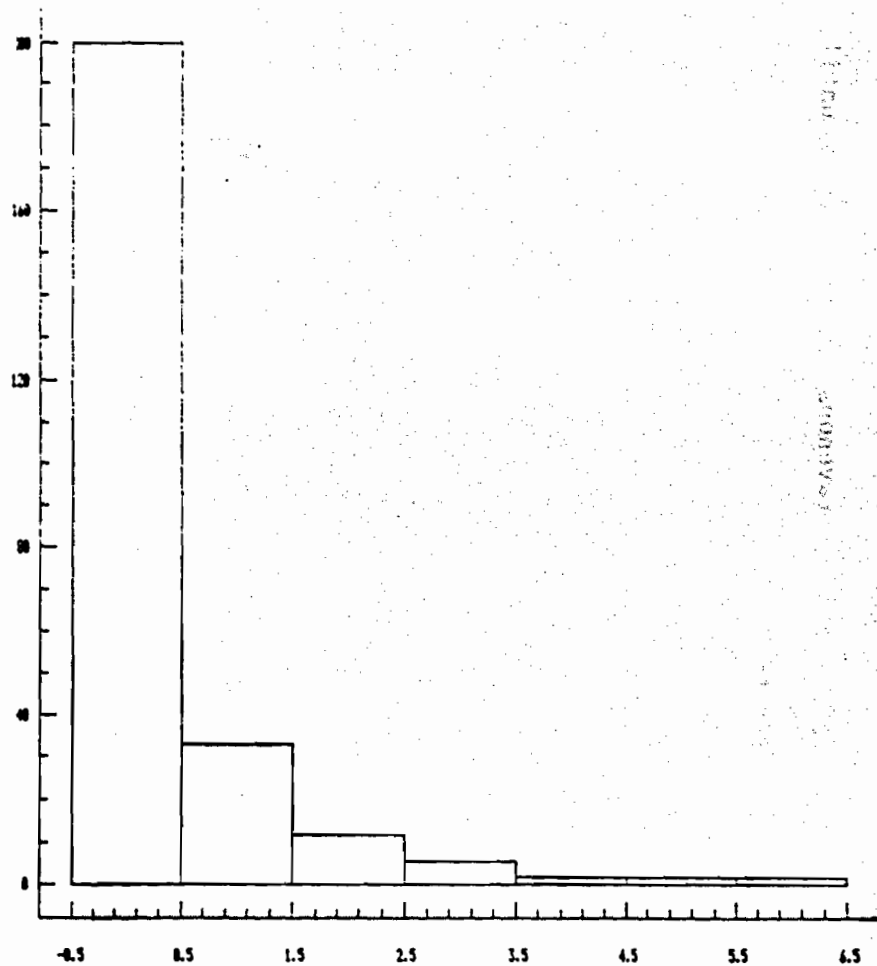
Some patients had more than one reason given for transfer. Included in "other" reasons were: 5 children with persistent pyrexia and toxemia; 1 x measles; 1 x measles vaccine illness; 1 x bullous impetigo; 2 x abdominal distension; 1 x heavy worm infestation; 1 x urinary tract infection and 1 child with suspected meningitis but lumbar puncture proved to be normal.

2.2.4. Use of intravenous fluids

Only 36 (13.7%) of the 262 patients admitted to the unit were managed with intravenous fluids. The remaining patients were treated with oral rehydration solutions.

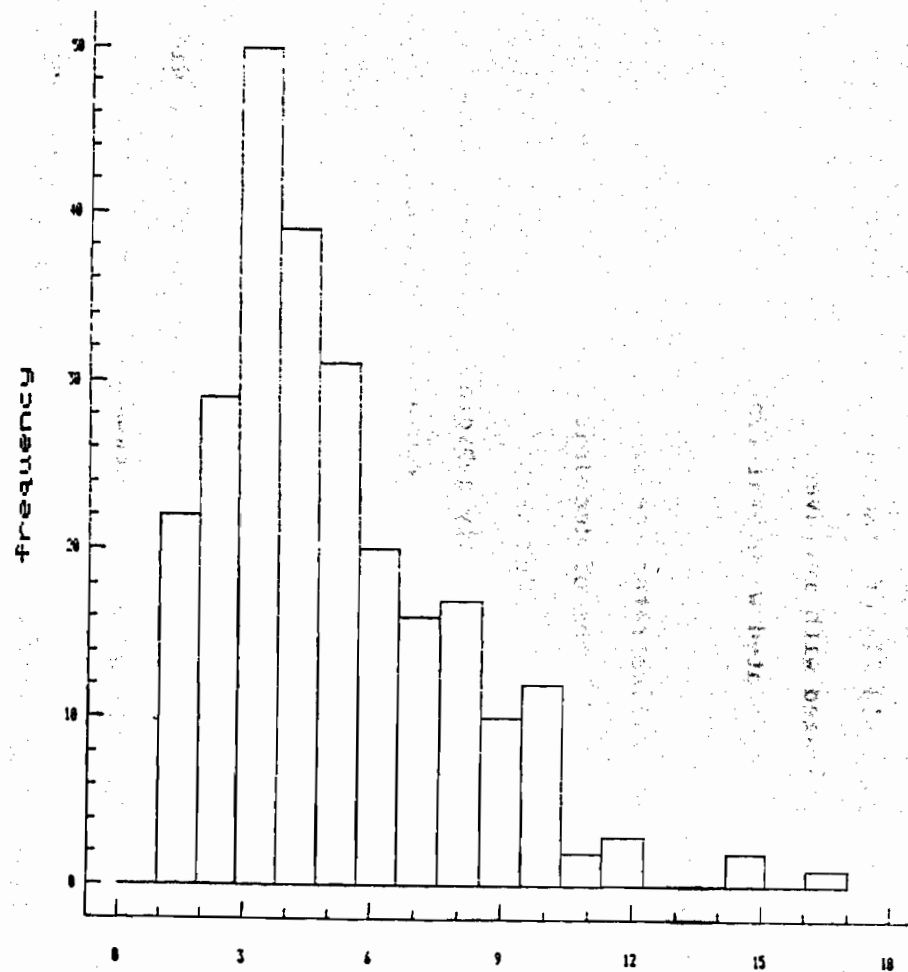
Table 19 illustrates the use of IV fluids in patients with differing degrees of dehydration. It can be seen that 93% of severely dehydrated patients had IV fluids, compared with 6,5% of mildly dehydrated patients. Some of the patients who received IV fluids actually arrived from a peripheral clinic already on a drip and it is probable that the majority of these children would otherwise have been managed without drip. The number of children arriving with drips is unknown as the questionnaire did not take account of them. However the researcher can recall three children arriving with drips that fit into this category. It is also the opinion of the researcher that drips were often started prematurely, in the unit before giving oral rehydration a trial. However, in those children who were severely dehydrated it was the policy of the unit to begin with intravenous fluid therapy until shock was corrected.

FIGURE 8: DISTRIBUTION OF NO. OF VOMITS IN 24 HOURS PRIOR TO DISCHARGE FROM THE REHYDRATION UNIT



NO VOMITS PER 24 HOURS BEFORE DISCHARGE

FIGURE 9: DISTRIBUTION OF NO. OF STOOLS IN 24 HOURS BEFORE DISCHARGE FROM THE UNIT



NO STOOLS PER 24 HOURS BEFORE DISCHARGE

TABLE 19: FLUID THERAPY ADMINISTERED ACCORDING TO SEVERITY OF DEHYDRATION : NUMBERS AND PERCENT (%)

Level of dehydration	Intravenous	No intravenous	Total
Mild (%)	8 (6,5)	118 (93,5)	126 (100)
Moderate (%)	15 (12)	107 (88)	122 (100)
Severe (%)	13 (93)	1 (7)	14 (100)
Total (%)	36 (13.7)	226 (86,3)	262 (100)

2.2.5. Profile of the no. of stools/vomits in 24 hours preceding discharge/transfer

TABLE 20: FREQUENCY OF STOOLS AND VOMITING IN 24 HOURS PRIOR TO DISCHARGE : NUMBER

Variable	Stools	Vomits
Average	4,7	0,4
Minimum	0	0
Maximum	17	6
?Sample size	260	257

These figures should be compared with those on admissions presented in Section 2.1.2. Table 7. The average number of stools passed is similar to that on admission (5.07) but vomiting is much improved from the average of 2,64 on admission. See Histogram Figure 8 and Figure 9.

2.2.6. Consistency of stools on discharge

These results were taken from the staff nurses' observations of the consistency of the last stool passed. Very few patients still had watery stools on discharge home. The consistency of the stools were felt to be more

important as a criterion for discharge than the frequency but both were taken into account when discharging the patient. If stools were still frequent and watery after 48 hours, patients were transferred to the ward for further management. The results of this section are summarised in Table 21 below.

TABLE 21: STOOL CONSISTENCY AT DISCHARGE/TRANSFER :

NUMBER AND PERCENT

Consistency	Number	(%)
Soft	58	(22,1)
Semi loose	91	(34,8)
Loose	95	(36,2)
Watery	10	(3,8)
Other	5	(1,9)
Nil recorded	3	(1,2)
Sample size	=	262

(only one answer per patient)

"Other" stools included 3 patients who did not pass stools whilst on the unit and 2 patients with mucous and blood in the stools. Relatively few patients had no diarrhoea on discharge (22,4) but overall there is an improvement from the 62% with watery stools on admission.

2.2.7. Respiratory rate on discharge

As discussed in Section 2.1.7 respiratory rate was poorly recorded. Also, in presenting the results in Table 22 below, it should be remembered that these results represent all patients treated on the unit including those who required transfer for ongoing illnesses.

FIGURE 10: DISTRIBUTION OF RESPIRATORY RATE ON DISCHARGE

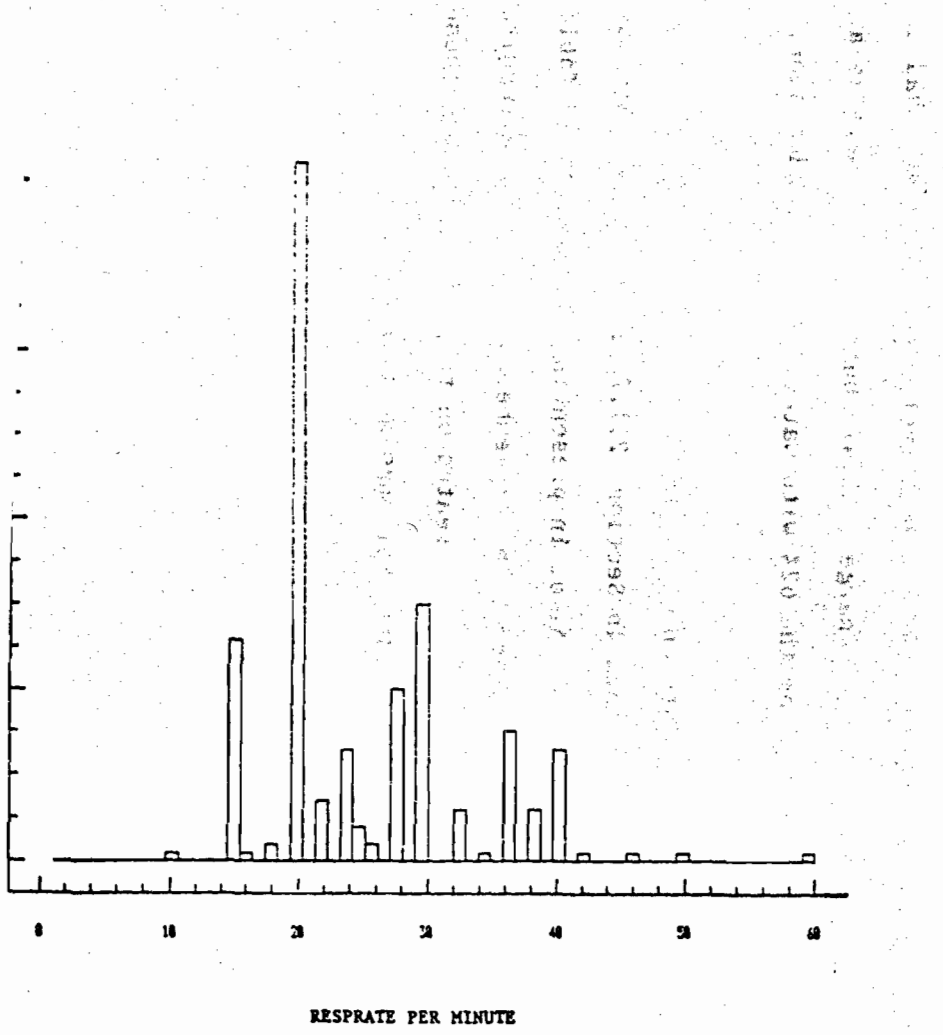


FIGURE 11: DISTRIBUTION OF TEMPERATURE ON DISCHARGE

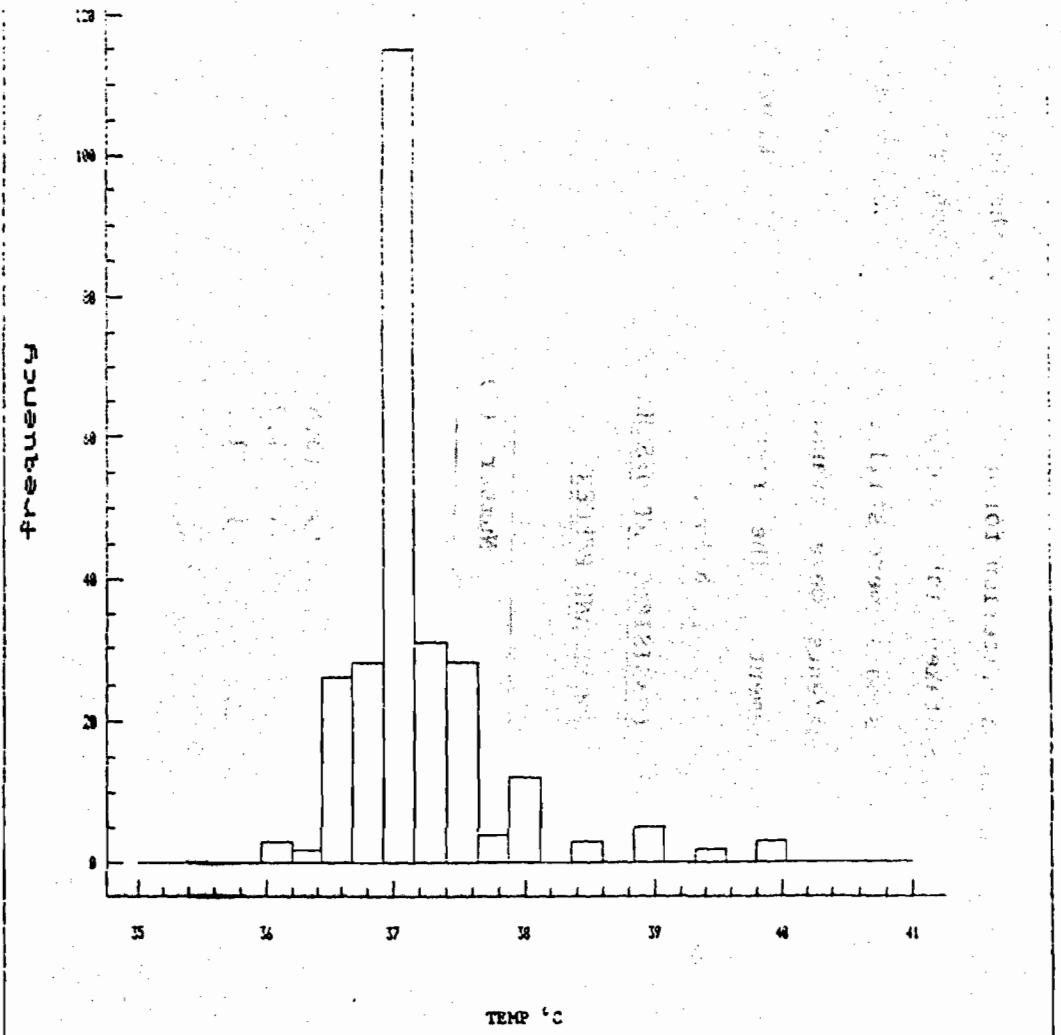


TABLE 22: RESPIRATORY RATES ON DISCHARGE

Respiratory rate/minute	
Average	25,2
Minimum	10
Maximum	60
Sample size	262

These results are also displayed in Figure 10. There is an overall reduction in respiratory rates on discharge from those found on admission.

2.2.8. Temperature on discharge

As with respiratory rates, results show a trend towards temperatures lower than those recorded on admission. Again it should be noted that high temperatures were still recorded for some of the patients who were transferred to the wards. Table 23 and Figure 11 demonstrate the distribution of temperature on discharge.

TABLE 23: TEMPERATURES ON DISCHARGE

Temperature °C	
Average	37,2
Minimum	36
Maximum	40

2.2.9. Other significant findings/illness diagnosed on discharge/transfer

74 patients had another illnesses or a complication of the acute diarrhoeal illness. These are listed in Table 24, respiratory infections and malnutrition being the commonest.

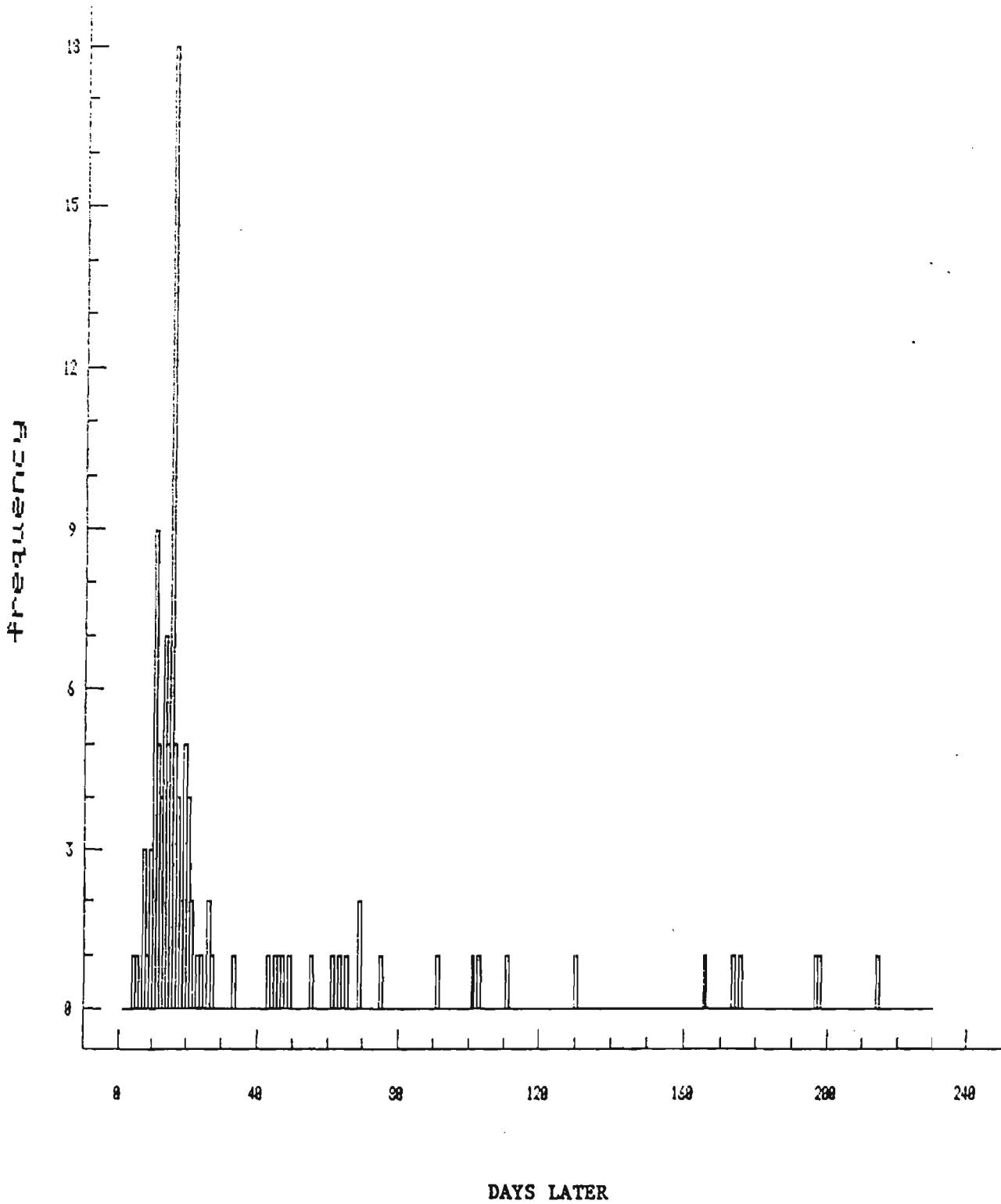
TABLE 24: OTHER ILLNESSES DIAGNOSED

Illness	No. of patients (%)
Respiratory infections	27 (10,3)
Undernutrition	24 (9,2)
Stomatitis	6 (2,3)
Worms	5 (1,9)
Other	12 (4,6)
None	188 (71,7)
Sample Size	262

"Other" findings were as follows: 2 patients with dysentery; 1 child with hypernatraemic dehydration; 1 case of bullous impetigo; 1 case of measles (transferred to ward after 3 hours stay on the unit); Otitis media x 1; Scabies x 1; Urinary tract infection x 1; Iron deficiency anaemia x 1; eczema x 1; and two children with septicaemia (E. Coli and Proteus) who were also transferred to the ward.

These results show that the majority (71,7%) of children admitted to the unit suffered from uncomplicated diarrhoeal illnesses.

FIGURE 12: DAYS FROM ADMISSION TO FOLLOW UP



2.3. Morbidity data on follow up

One hundred and nine (41,6%) patients were followed up.

2.3.1. Time to follow up

TABLE 25: SUMMARY OF LENGTH OF TIME FROM ADMISSION TO FOLLOW UP

	Days
Average	33,3
Minimum	4
Maximum	215
Sample size	109

Table 25 and Figure 12 show the patients were seen at varying times after follow up. This was mainly because many patients were seen much later than the original review date, whilst they were attending the out patient department for another illness.

2.3.2. Profile of further diarrhoeal illness

Nineteen (17,4%) patients followed up had ongoing diarrhoea after discharge from the unit. The nineteen patients with ongoing diarrhoea represent 7,2% of the total sample analysed. This is not thought to reflect on inappropriate criteria for discharge but rather to indicate the susceptibility of the sample group to diarrhoeal illness. Forty-two (38,5%) had had further bouts of diarrhoea between discharge and follow up but these were not continuous with the original diarrhoeal illness. Therefore, of patients who were followed up, 56% had suffered further diarrhoeal illness. It is unknown how the other 153 (58,4%) of patients analysed in this

study fared as there is no follow up information available for them.

Table 26 below illustrates the consistency of the stools on follow up. If semi-loose is included with soft then 90 (86,5%) of the children analysed in this table had no diarrhoea at follow up.

TABLE 26: CONSISTENCY OF STOOL AT FOLLOW UP

Consistency	No. of Patients
Soft	81 (77)
Semi loose	10 (9,6)
Loose	11 (8,6)
Watery	2 (1,9)
Sample size	104

2.3.3. Problems from discharge/transfer

TABLE 27: ANALYSIS OF PROBLEMS FOLLOWING DISCHARGE/TRANSFER OF PATIENTS FROM THE REHYDRATION UNIT

Problem	No. of Patients (%)
Respiratory infection	29 (26,6)
Prolonged/recurrent diarrhoea	25 (22,9)
Malnutrition	10 (9,2)
Poor appetite/malaise	7 (6,4)
Worms	5 (4,6)
Died	4 (9,6)
Other	4 (3,7)

Table 27 shows the main problems that were encountered after discharge from the rehydration unit.

The 4 children who died will be discussed in Section 2.5. The other problems encountered were 1 child who was readmitted to the rehydration unit many months later for a

further diarrhoeal illness and 3 children who had protracted illnesses following transfer to 'C' floor from the unit i.e. 1 with Klebsiella septicaemia, 1 with persistent pyrexia for 7 days for which no cause was found, and one child with PTB who was later transferred to the TB hospital.

15 children required readmission to 'C' floor on follow up. Details of these admissions are summarised in Table 28.

TABLE 28: ANALYSIS OF REASONS FOR READMISSION TO 'C' FLOOR

Case	Length of time to readmission/ days	Cause of readmission
1	10	Persistent diarrhoea with weight loss
2	15	
3	11	
4	13	
5	14	
6	10	
7	33	Kwashiorkor
8	197	
9	49	
10	91	
11*	61	
12	7	Chest infection
13	65	
14	69	PTB
15	101	Further diarrhoeal illness

*Herpes Stomatitis coexistent

Therefore only six of the 15 (40% of those readmitted) children required readmission for protracted diarrhoea associated with weight loss. Five (33% of

readmissions) were admitted between one and seven months after their initial contact with the rehydration unit and were suffering from Kwashiorkor. Most of these children had had recurrent bouts of diarrhoea. The rest of the 25 children with prolonged/recurrent diarrhoea detailed in Table 27 had only a mild degree of diarrhoea and were thriving. Also only 2 of those children presenting with respiratory infections on follow up (29 shown in Table 27) had significant chest infection to require admission.

2.4. Analysis of admission factors affecting outcome of stay

2.4.1. Length of illness related to outcome

TABLE 29: LENGTH OF ILLNESS PRIOR TO ADMISSION
RELATED TO RATE OF TRANSFER TO WARDS

Length of illness in days	Discharged	Transferred	Total
0-7	214	36	250
>7	6	6	12
TOTAL	220	42	262

Although the numbers shown in Table 29 are low for patients who's illness had lasted for more than 7 days it is clearly shown that a protracted illness on admission was associated with a higher transfer rate to the ward.

2.4.2. Level of dehydration related to outcome

As could be expected, the more serious the illness on admission the more likely the child would be transferred from the unit to the ward for further management. Table 30 illustrates this.

TABLE 30: LEVEL OF DEHYDRATION RELATED TO OUTCOME

Level of Dehydration	No. of Discharge	No. of Transfer
Mild (%)	113 (90)	13 (10)
Moderate (%)	99 (81,2)	23 (18,8)
Severe (%)	8 (57)	6 (43)

Hence only 10% of patients presenting with mild dehydration were transferred to the ward as compared with 43% of those with severe dehydration.

2.5. Mortality

No children died whilst on the rehydration unit. However, 4 (1,5) of the 269 children admitted to the unit over the study period of one year are known to have died at a later date. Follow up figures are only available for 109 children hence it is unknown how the other 160 fared. However the known mortality rate is 1,5% of admissions i.e. 15 per 1000 admissions per annum.

Details of the four children that died are as follows:

Case 1

This child was admitted to the unit for rehydration having been assessed to be moderately dehydrated following 14 days of diarrhoea. When reviewed by the researcher he was found to be below 60% of expected weight for age with early nutritional oedema and signs of pneumonia. (Respiratory rate was not recorded on admission). Despite broad spectrum antibiotic coverage and supportive measures the pneumonia progressed and the condition worsened until the child died 5 days after admission. It is felt that the child should not have been

admitted to the rehydration unit initially as he was suffering from marasmic kwashiorkor, pneumonia and chronic diarrhoea. However, he was transferred the same day so it is unlikely the course of his illness was altered in any way by his stay on the rehydration unit.

Case 2

This child was readmitted to 'D' floor with measles 20 days after admission to the rehydration unit. The patient had severe measles and was moribund and died within an hour of admission. The vaccination record was complete for this child and she had received measles vaccine at 10 months of age. She was 1 year old on admission. It is highly probable that she contracted measles whilst in the out patients department. As already stated in the Introduction, measles vaccine is given to all patients over six months of age who have no documentary proof of prior vaccination. However, vaccination doesn't always lead to immunisation and measles vaccine has a failure rate of up to 25%. Also hospital acquired measles tends to be more severe due to the fact that the host is usually already compromised by another illness and also that the dose of virus received is usually much higher than that received in community acquired measles.³⁴

Case 3

This child was transferred to the ward after 20 hours because of grunting respirations, high fever and toxæmia. He was found to have a Shigella septicaemia and remained critically ill for some time with severe protracted diarrhoea. The diarrhoea eventually responded to Alfaré feeds (semi-elemental diet) after having received Isomil, AL110 and the bowel cocktail³⁵ (repeated twice), and intravenous antibiotics

for the shigella septicaemia. The baby appeared to be making a good recovery and had been reestablished on breast feeds and normal diet without relapse of the diarrhoea. However he had suffered a marked weight loss during the illness and nutrition was poor (from 6,2 kg on admission at 5 months of age to 4,8 kg at death). Forty-five days after admission he developed a raised temperature and died suddenly four hours later during the night. The most likely cause would seem to be a hospital acquired infection in a severely compromised host.

Case 4

This child was 8 months old when admitted to the rehydration unit moderately dehydrated with a 4 day history of watery yellow diarrhoea. She had been given a soap and water enema at home but had not visited any health facility for this illness. After 45 hours on the rehydration unit, she remained dull and unwell with a persisting pyrexia, so she was transferred to 'C' floor. A blood culture isolated Proteus species which was sensitive to the antibiotics used. The child remained ill for the first week with persisting diarrhoea and was treated on bowel cocktail, Isomil feeds and antibiotics as above. The temperature returned to normal and diarrhoea improved. 15 days after admission the child changed condition suddenly and died.

2.6. Summary of main finding of significance in morbidity/mortality

In summary 269 patients were treated on the unit during the first year of operation. Information was successfully completed on 262 of which 109 were followed up after discharge or transfer from the unit. The average length of illness prior to admission was 3 days with 62% of patients having watery diarrhoea. The level of dehydration on admission was assessed

as 48% mild, 46.5% moderate and 5.5% severely dehydrated. IV fluids were used mainly for severely dehydrated children and 86.3% of patients were rehydrated orally without resort to IV drips. The average stay on the unit was 33.3 hours and 84% of patients were discharged home after rehydration. Of the 16% requiring transfer to the wards the main reasons were found to be persistent, severe diarrhoea, persistent dehydration and poor general condition after 48 hours stay. Undernutrition was another important reason for transfer to the ward.

No child died on the rehydration unit but 4 children died at a later stage on 'C' floor. The known mortality of children admitted to the unit was thus 1.5%. At follow up 25 children had protracted diarrhoea or further bouts of diarrhoea. However, of these only 11 were significantly debilitated to require readmission. i.e. 6 children with persistent diarrhoea and weight loss and 5 children with Kwashiorkor associated with recurrent diarrhoeal illnesses. Of the 109 children followed up 33 were seen either on the ward before discharge or much later on in the Outpatients department. 25 patients attended more than 30 days after admission. These patients had attended for another illness and not for review. Therefore only 76 patients actually came for review following discharge from the rehydration unit. Many of these children also had minor complaints and it is the opinion of the researcher that if the child was well at home it would be unlikely for the mother to return for review especially after a short stay in the hospital and hence the morbidity data on follow up cases should be viewed with this in mind.

3. NUTRITIONAL STATUS

3.1. Analysis of weight for age groups

Using the Department of Health and Welfare growth chart (Appendix VII) each child's position on the graph was plotted on discharge and at follow up. Results are shown below in Table 31 and in Figures 13 and 14.

TABLE 31: WEIGHT FOR AGE PROFILE ON DISCHARGE AND FOLLOW UP

Wt. Group on Histo-gram	Centile Rating on RTH chart	No. of patients (%) on discharge		No. of patients (%) on follow up	
1	<60% expected weight for age	3	(1,1)	2	(1,8)
2	Between 60% line and 3rd centile	43	(16,4)	20	(18,5)
3	3-50 centile	161	(61,5)	62	(57,4)
4	50-97 centile	54	(20,6)	24	(22,2)
5	>97 centile	1	(0,3)	0	(0)

The percentage of underweight children (less than 3rd centile) was high in the study group i.e. 17.5% on discharge and 20.3% on follow up but this should be compared with 'C' floor where over the same time period 37.7% of children admitted were below the 3rd centile. (See Section 11).

3.2. Changes in weight on discharge and follow up

Not all children gained weight. However of those successfully rehydrated and discharged the majority gained weight well during their stay on the unit and also on follow up. The results are summarised in Table 32 below.

TABLE 32: WEIGHT CHANGES ON DISCHARGE AND FOLLOW UP

Weight change	No. of patients at discharge (%)	No. of patients at follow up (%)
+ve gain	164 (62,5)	82 (75)
-ve gain	45 (17)	20 (18,5)
Static weight	48 (18,5)	6 (5,5)
Missing information	5 (2)	1 (1)
Total No.	262	109

The weights were all taken from the same scale in the outpatients department (which is a Yamato infant scale weighing up to 20 kg in 0,5 kg increments) but not always by the same observer so there were errors here and the scale is not particularly accurate. However as stated above, most of the children that were discharged within 48 hours gained weight well. The 20 that had lost weight at follow up included many of those children either on the ward with prolonged illness or readmitted for further illness.

4. THE AVAILABILITY OF HEALTH CARE

This section of the questionnaire was poorly filled in, especially when trying to estimate distances. Also many people stated they didn't know of any faith healers or traditional healers and often answers which were filled in seemed to be inaccurate e.g. R40 for the cost of a consultation with a traditional healer.

The cost of transport was more consistently filled in but it is possible that a single fare rather than return was entered in error on several occasions despite frequent

correction of this error by the researcher. The results are analysed in Tables 33 to 35.

TABLE 33: DISTANCE OF PATIENT FROM HEALTH CARE FACILITIES

	Clinic	G.P.	Traditional healer	Faith healer	Hospital
Average distance (km)	3,6	7,5	1,0	0,7	10,5
Minimum distance (km)	0,5	0,5	0,5	0,5	0,5
Maximum distance (km)	15	20	2	1	30
Standard deviation	4,1	6,4	0,86	0,28	10,3
No. of respondents	33	13	3	3	15

As can be seen by the number of respondents only 3 patients were able to assess the distances to the nearest traditional healer or faith healer and only 33 to the clinic.

TABLE 34: RETURN COST OF TRANSPORT TO VARIOUS HEALTH FACILITIES

Cost (Rands)	Clinic	G.P.	Traditional healer	Faith healer	Hospital
Average	0,95	1,70	1,64	0,80	2,17
Minimum	0	0	0	0	0
Maximum	5,00	12,00	25,00	4,00	12,00
Standard deviation	0,70	1,75	5,00	1,00	1,38
Respondents	214	159	25	41	194

The cost of transport to the clinic was well recorded and results show that 68% of patients live within R1.65 transport cost of a clinic.

TABLE 35: COST OF TREATMENT AT DIFFERENT HEALTH FACILITIES

Rands	Clinic	G.P.	Traditional healer	Faith healer	Hospital
Average cost	1,35	9,10	6,82	1,83	3,00
Minimum cost	0	0	0	0	1,00
Maximum cost	7	18,00	40,00	20,00	6,00
Respondents	200	148	50	58	208

5. PREVIOUS EXPOSURE TO G.O.B.I. AT OSINDISWENI

These results have been analysed by cross tabulating each of the 4 principles of G.O.B.I. with different areas of the hospital. It is realised that some patients had contact with more than one area of the hospital making it difficult in analysing the questionnaire to elicit which area offered the most in health education for these patients but nevertheless an overall picture can still be gained.

5.1. Previous exposure to instruction on the use of growth charts at Osindisweni Hospital

**TABLE 36: EXPOSURE TO GROWTH CHARTS/HOSPITAL DEPARTMENT :
NUMBER AND PERCENT (%)**

Department	Instructed	Not instructed	Total no.
ANC (%)	20 (32)	42 (68)	62 (100)
Delivery (%)	31 (36)	56 (64)	87 (100)
W.BC (%)	91 (41)	16 (59)	27 (100)
OPD (%)	20 (34)	39 (66)	59 (100)
Childrens ward (%)	12 (30)	28 (70)	40 (100)
RU (%)	5 (100)	0 (0)	5 (100)
TOTAL (%)	99 (35)	181 (65)	280 (100)

It seems from Table 36 that an understanding of growth charts was poorly taught in all departments (except the rehydration unit) with only 35% of patients attending having received instruction and explanation in the use of the card.

5.2. Previous instruction on oral rehydration solution

TABLE 37: CROSS TABULATION OF INSTRUCTION ON
ORS/HOSPITAL DEPARTMENT

Hospital department	Instructed	Not instructed	Total no. of patients
ANC (%)	40 (62)	24 (38)	64
Delivered (%)	53 (61)	34 (39)	87
WBC (%)	23 (82)	5 (18)	28
OPD (%)	38 (63)	22 (27)	60
Childrens ward (%)	26 (63)	15 (27)	41
RU (%)	5 (100)	0 (0)	5
TOTAL (%)	185 (65)	100 (35)	285

Table 37 shows that the knowledge of oral rehydration solutions was more prevalent and seems to have been well taught especially in the Well Baby Clinic.

5.3. Previous instruction on advantage of breast feeding

TABLE 38: CROSS TABULATION OF INSTRUCTION ON
BREAST FEEDING/HOSPITAL DEPARTMENT

Hospital department	Instructed	Not instructed	Total no. of patients
ANC (%)	46 (73)	17 (27)	63
Delivered (%)	62 (71)	25 (29)	87
WBC (%)	21 (75)	7 (25)	28
OPD (%)	36 (60)	24 (40)	60
Childrens ward (%)	26 (63)	15 (27)	41
RU (%)	4 (80)	1 (20)	5
TOTAL (%)	195 (69)	89 (31)	284

The one patient in Table 38 not instructed on breast feeding had not been previously admitted to the rehydration unit but had spent a few hours for observation purposes during a previous diarrhoeal illness. Overall, the advantages of breast feeding are seen to be promoted at the hospital.

5.4. Previous instruction on immunisation

TABLE 39: CROSS TABULATION OF IMMUNISATION/
HOSPITAL DEPARTMENT

Hospital department	Instructed	Not instructed	Total no. of patients
ANC (%)	46 (73)	17 (27)	63
Delivered (%)	60 (70)	26 (30)	86
WBC (%)	24 (86)	4 (14)	28
OPD (%)	38 (66)	20 (34)	58
Childrens ward (%)	28 (70)	12 (30)	40
RU (%)	5 (100)	0 (0)	5
TOTAL (%)	201 (72)	79 (28)	280

Table 39 illustrates that instruction on immunisation was reasonable in most departments of the hospital.

Of the 262 patients analysed 113 had had no previous contact with Osindisweni Hospital hence, Tables 36-39 represent 149 of the patients admitted to the rehydration unit. Eighty-nine of these patients had had contact with more than one department of the hospital.

6. HEALTH KNOWLEDGE OF THE MOTHER WITH RESPECT TO G.O.B.I.

6.1. Growth charts

The understanding of different patterns of growth was assessed using specimen growth charts and the mother was asked to interpret these and also her own child's growth chart if this was available. This understanding was assessed on admission, discharge and follow up and results are shown in Table 40. Also the previous use of the card was assessed on admission by recording recognition of the chart and, where cards were available, whether any weights had been plotted on the chart on previous occasions. Another important aspect recorded was the number of patients bringing their cards on admission and follow up. Where a different person attended at follow up, information on understanding of growth charts has been omitted hence only the response from those mothers who were actually exposed to instruction on the rehydration unit is recorded here.

TABLE 40: KNOWLEDGE OF GROWTH CHARTS

	On admission		On discharge		On follow up	
	Yes	No	Yes	No	Yes	No
Clinic card brought (%)	131 (51)	125 (49)	-	-	79 (79)	21 (21)
Weight plotted previously (%)	94 (73)	35 (27)	-	-	-	-
Recognises growth chart (%)	129 (50)	129 (50)	-	-	-	-
Understands growth chart (%)	86 (34)	170 (66)	203 (81)	48 (19)	77 (84)	15 (16)

The blanks in the above Table 40 indicate that these points were not included on the questionnaire at discharge/follow up.

There was a marked improvement of understanding of the charts on discharge which appears to have been sustained on follow up. Also the percentage of mothers bringing their clinic cards was much improved on follow up. Despite weights being plotted on 73% of cards that were available for inspection on admission only 34% of mothers actually had any understanding of the growth charts at this time.

6.2. Oral rehydration solutions

The knowledge and the use of oral rehydration solutions was assessed on admission, discharge and follow up. The mother was asked how to make up home-made sugar and salt solutions as well as how and when to use these solutions. Also, the mother was asked if they had been given for the presenting illness, if she would

use them in future. and on follow up, if she had used them since discharge. The results are summarised in Table 41.

TABLE 41: KNOWLEDGE AND USE OF ORAL REHYDRATION SOLUTIONS

	On admission	On discharge	On follow up
Knows a correct formula for homemade O.R.S.(%)	138 (55)	236 (93)	89 (95)
Knows how and when to use ORS (%)	205 (79)	245 (97)	90 (97)
Has used/will use ORS (%)	147 (58)	251 (99)	72 (77)

The 2 patients that thought they would not use ORS after discharge were unsure of the method of preparation and didn't know the correct formula. The majority of the 21 patients who had not used ORS on follow up stated this was because there had been no need to use it.

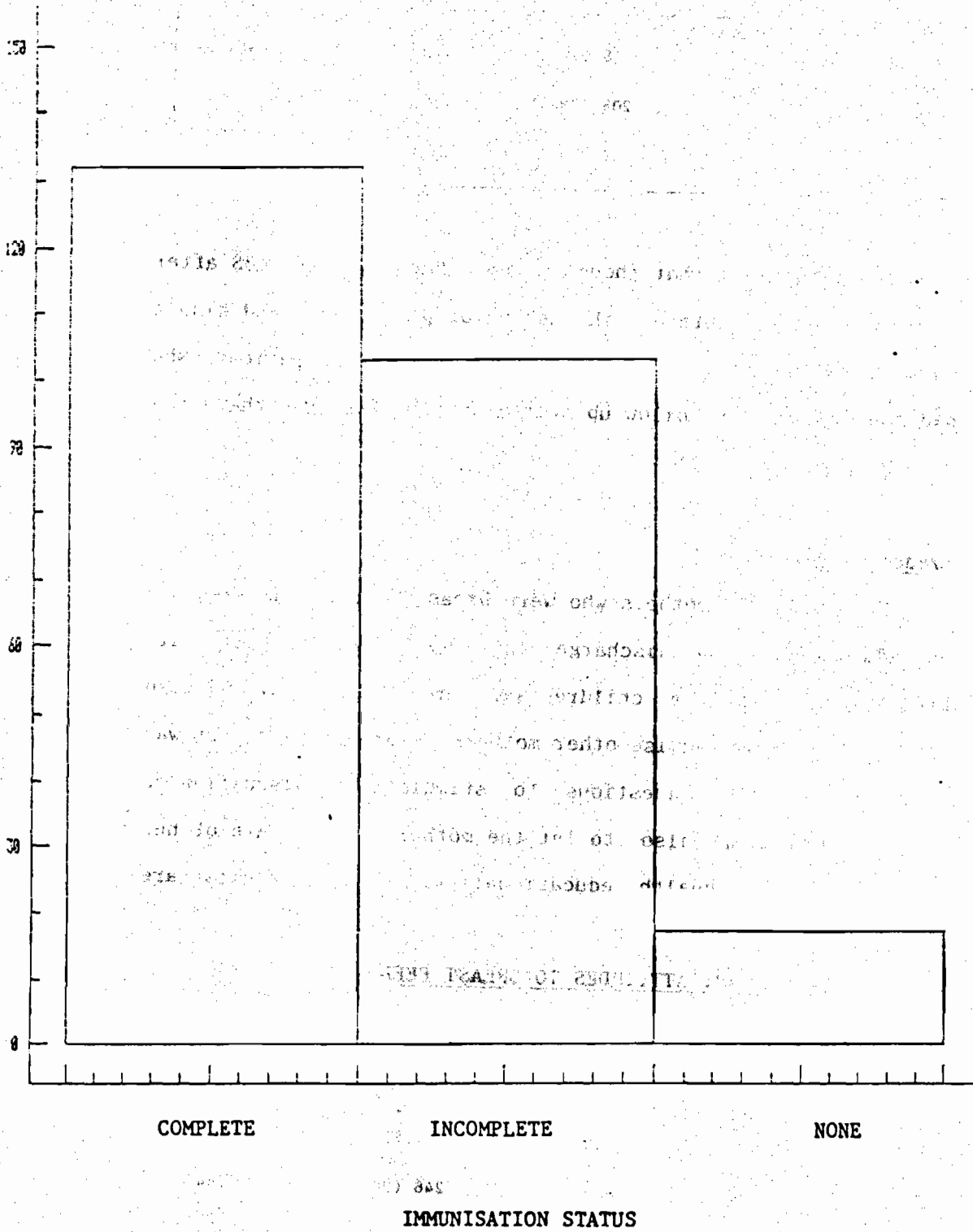
6.3. Breast feeding

The number of mothers who were breast feeding was assessed on admission. On discharge they were asked if they would breast feed any future children and the reasons why and also whether they would advise other mothers to breast feed. It was hoped to use these questions to stimulate a discussion on breast feeding and also to let the mother become aware of her own role as a health educationalist. The results are summarised in Table 42.

TABLE 42: ATTITUDES TO BREAST FEEDING

	On admission	On discharge	On follow up
Is breast feeding? (%)	173 (68)	-	-
Will breast feed? (%)	-	243 (95)	91 (99)
Will advise breast feeding? (%)	-	246 (98)	76 (84)
Is bottle fed? (%)	108 (49)	-	-

FIGURE 15: IMMUNISATION STATUS ON ADMISSION



6.4. Immunisation

The immunisation status of the child was assessed on admission by questioning the mother and, where possible, checking the immunisation record card. The histogram in Figure 15 depicts the distribution and the results are summarised in Table 43 below. In cases categorised as having had no immunisations it is possible they had received a BCG at birth but these children were usually attended by a relative other than the mother plus had no immunisation card and no history of any clinic attendances. It is also the opinion of the researcher that some of the children categorised as having incomplete immunisations were up to date for their age but on a few occasions this question may have been misinterpreted by the staff nurse i.e. she may have interpreted "complete" as meaning the child had finished all the initial immunisation before his/her pre-school booster. However this would only account for a few cases.

TABLE 43: IMMUNISATION STATUS ON ADMISSION

	Complete	Incomplete	None
No. of patients (%)	132 (52)	103 (41)	17 (7)

On discharge and follow up of patients, the mother was questioned on immunisations in terms of the type and number of immunisations needed by her child as well as when she must next attend with her child for immunisation. The results are summarised in Table 44.

TABLE 44: KNOWLEDGE OF IMMUNISATION SCHEDULES

	Discharge	Follow up
Knows immunisations needed (%)	244 (97)	89 (96)
Knows when to attend for immunisations (%)	248 (99)	88 (94)

7. FURTHER ASSESSMENT OF HEALTH KNOWLEDGE : FEEDING

7.1. Weaning diets and use of locally available foods

As the majority of the children were over 3 months of age many of them (87%) were already taking solid food. See Table 45.

TABLE 45: SOLID FOOD

No. of patients on solids	218 (87)
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Health education on the unit also included discussions on adequate weaning diets with emphasis on the use of locally available foods rather than expensive commercial preparations. As this was an important part of the health education on the unit it was felt necessary to assess the mother's knowledge on appropriate feeding of her child after exposure to the unit i.e. at discharge and on follow up. Table 46 demonstrates the findings.

**TABLE 46: KNOWLEDGE OF WEANING FOODS AND LOCALLY
AVAILABLE FOODS**

	Discharge (%)	Follow up (%)
Knows an adequate weaning diet	-	87 (87)
Knows/uses locally available nutritional foodstuffs	226 (91)	90 (97)

7.2. Feeding practices during acute diarrhoeal illness

Also included in advice on feeding was the need to continue feeding a child with diarrhoea and also to give extra food more often whenever a child is ill. Again, this was felt to be an important part of health education and the response to this is summarised in Table 47.

TABLE 47: FEEDING OF CHILDREN WITH DIARRHOEA

	Discharge (%)	Follow up (%)
Knows to continue feeds during diarrhoeal illness	214 (85)	84 (90)

8. MOTHERS' BELIEFS AND USE OF HOME REMEDIES

8.1. Mothers' beliefs of the illness

50% of mothers stated they had no idea why or what had caused their child's illness. Another 28% thought the diarrhoea was associated with teething! In these cases it was explained to the mother that teething is a harmless natural development whereas diarrhoea is far from harmless. The distribution of beliefs are summarised in Table 48.

TABLE 48: ANALYSIS OF DIFFERENT BELIEFS ON CAUSES
OF DIARRHOEA

Belief	No. of Patients (%)
No idea or no answer recorded	135 (50,5)
Traditional problem	10 (4)
Teething	74 (28)
Scientific	40 (13)
"Natural" illness	7 (3)

Some mothers gave more than one reason for the diarrhoea. Included under scientific beliefs are such ideas as: bad food or milk taken by the baby; unpurified water used; "virus"; not breast feeding and worms.

Traditional problems were looked on as "inyoni"²⁶ or failure to have attended to traditional ceremonies leading to illness in the child due to the displeasure of the ancestors.

8.2. Use of home remedies

The use of oral rehydration solutions has been discussed in Section 6.2. On assessing the use of enemas and herbal medicines it seems that a minority of children received these remedies but it is felt mothers were often reluctant to admit to this as they often perceive that western type medicine scorns the use of such remedies. However the results are summarised in Table 49 and Table 50.

TABLE 49: USE OF ENEMAS AND HERBAL MEDICINES

	Yes (%)	No (%)
Herbal medicine given?	42 (17)	212 (83)
Enemas given?	62 (24)	194 (75)

TABLE 50: TYPE OF ENEMA USED

Description	No. of patients (%)
Herbal	38 (61)
Soap and water	16 (26)
Alum	3 (5)
Ashes	1 (1,5)
Jeyes fluid	1 (1,5)
Not stated	3 (5)

The herbs used for enemas were usually not stated except for the following: Syringa tree leaves x 2; Guava tree leaves x 2; Black jack x 1 and water from the faith healer x 2.

9. ATTITUDES OF MOTHER TO THE REHYDRATION UNIT

TABLE 51: ASSESSMENT OF ATTITUDE ON DISCHARGE
AND FOLLOW UP

Attitude	No. of patients on discharge (%)	No. of patients on follow up (%)
Positive	219 (84,5)	89 (87)
Negative	1 (0,5)	1 (1)
Indifferent	2 (1)	0
No answer recorded	34 (13)	5 (5)
Different person attending	0	7 (7)

Table 51 confirms that the majority of mothers approved the rehydration unit.

10. RELATION TO THE PATIENT OF PERSON GIVING INFORMATION

As stated in the preliminary pages of the study the term "mother" has been used to represent the person accompanying the patient. However, it was not always the mother who attended to the child as shown in Table 52 below.

TABLE 52: INFORMANTS RELATION TO PATIENT

Relation	No. of admissions (%)	
Mother	243	(93)
Grandmother	9	(3,5)
Aunt	6	(2)
Older sister	1	(0,5)
Not stated	3	(1)

11. PRESENTATION OF STATISTICS FOR 'C' FLOOR BEFORE AND DURING THE STUDY PERIOD

It is thought by the researcher that it is necessary to present some statistics from 'C' floor for the year prior to and during the opening of the rehydration unit. As shown in Table 53 there was a fall in admission to 'C' floor following the opening of the unit. However the mortality on 'C' floor was much higher than previous years. Reasons for this are uncertain but during the year of study 2 "disasters" did occur. Firstly there was a serious measles epidemic at the beginning of 1988 and secondly the floods in September 1987.

TABLE 53: STATISTICS 'C' FLOOR OSINDISWENI HOSPITAL

	July 1986 + June 1987	July 1987 + June 1988
No. of admissions	1885	1540
No. of deaths	66	107
Mortality rate/1000	35	69,5
No. of children below 3rd centile (%)	605 (32)	581 (37,7)
No. of children Δ Kwash/Marasmus (%)	344 (18)	354 (23)
No. of children Δ GE/Diarrhoea (%)	907 (48)	505 (32,8)

Gastroenteritis (G./E.) is used synonymously with acute diarrhoeal illness for the purposes of this study as the

admission records book for 'C' floor often uses "GE" rather than the latter. As can be seen from Table 53 the percentage of admissions for diarrhoea fell but those for malnutrition rose.

12. DISTRIBUTION OF ADMISSIONS TO REHYDRATION UNIT ACCORDING TO THE MONTH OF THE YEAR

FIGURE 16: DISTRIBUTION OF ADMISSIONS PER MONTH OF THE YEAR

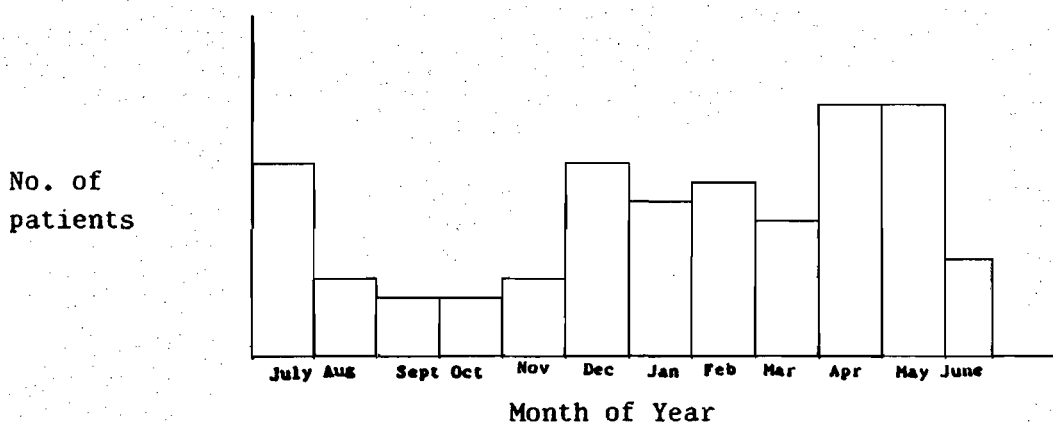


TABLE 54: NO. OF PATIENTS ADMITTED PER MONTH

Month	No. of patients
July	24
August	12
September	11
October	11
November	14
December	32
January	24
February	29
March	23
April	35
May	35
June	19
TOTAL	269

Table 54 and Figure 16 illustrate the pattern of admissions to the rehydration unit as related to the month of the year.

DISCUSSION

The following discussion is centred around the objectives of this study with a review of the results in relation to international experience. The discussion will therefore be divided into sections according to the objectives of the study as laid out in the protocol in Appendix III.

1. THE PROFILE OF CHILDREN ADMITTED TO THE UNIT

1.1 The Demographic profile

The demographic profile of children admitted to the rehydration unit at Osindisweni Hospital established that the unit serves mostly black African infants from rural areas. Acute diarrhoeal disease is known to be the second most common cause of death in blacks in South Africa and it is also known that the vast majority of these deaths are in young children.³⁶ The incidence of diarrhoeal illness is, however, not related to race or climate but rather to socioeconomic development.³⁷ The finding in this study that 98% of the children admitted were African, despite the knowledge that 15% of outpatient attendances at this hospital are Asian patients,⁶ does not indicate that African children are more susceptible to diarrhoea because they are black, but rather because they come from lower socio-economic backgrounds such as is found in the rural areas. Also in rural areas there also tend to be problems with inadequate supplies of safe water and safe sanitation.³⁸ The children admitted to the unit from rural areas and most of those from urbanised areas are known to come from a low socioeconomic status. As stated in the Introduction poverty goes hand in hand with lack of education, overcrowding, poor hygiene and limited food supply and the young child with an immature immune response, particularly if malnourished and

not breast fed, provides the most fertile ground for acute illnesses such as diarrhoea.³⁷

The average age of 11 months differs from what may be expected but it should be remembered that children below 3 months were excluded from admission hence increasing the average age. A peak incidence of 3 to 4 months of age was found in a Cape Town survey in 1960.¹⁰ There was also slightly more males than females in the Cape Town survey which is similar to the findings in the present study. Another study in The Gambia in 1977 showed a peak age of 9 months.¹⁷ It is likely that diarrhoea causes problems in the very young child following the introduction of solids or bottle feeds as there is more chance of contamination of feeds once the child is no longer exclusively breast fed and, as mentioned above the young child is a very susceptible host. The child is also becoming more mobile at this age and picking up objects to place in the mouth. Added to this is the often inadequately prepared bottle feed, poor weaning diet and unhygienic conditions which prevail in many rural areas.¹⁹

Thus pre-school children living in underdeveloped countries from low socioeconomic backgrounds are the main sufferers from acute diarrhoeal illness which, as stated in the introduction, is the major cause of morbidity and mortality in the world. The findings of this study support this statement in that the demographic profile consisted of black African children, of average age 11 months, from poor rural areas.

This study is biased to an extent by being hospital based as the very poor may be unable to afford to travel to the

hospital and may feel the hospital will be costly and hence are less likely to use this service.

1.2 Morbidity and mortality

The majority (84%) of children admitted to the unit during the study period were successfully managed on a short stay basis and 86,3% of patients were rehydrated orally, without resort to the use of intravenous fluid therapy. One of the greatest advantages of this unit is that the mother is able to care for her child and also learn the basic principles of the management of diarrhoea, which are fluid, food and time.³⁹ She observes the child's improvement by using the simple method of oral rehydration therapy without requiring any sophisticated treatment or highly trained personnel. The child is left in close contact with the mother at all times and it is the mother who "treats" the child.

The morbidity profile of the children admitted to the unit, obtained from an analysis of the results of the questionnaires, is that of infants with acute diarrhoea, often watery and usually of less than 7 days duration. The majority of these children were mildly to moderately dehydrated with only 5,5% severely dehydrated. This is similar to findings in other studies¹¹ however larger centres which also use oral rehydration therapy tend to have found a greater proportion of moderate to severely dehydrated children.^{13,14,31} It is the opinion of the researcher that this unit has so far been underutilized and there are still a large number of children admitted to 'C' floor that could be managed on the unit. During the year of the study 505 children were admitted to 'C' floor with diarrhoea as the main cause of admission. Some of these children were sent to the ward either because the

rehydration unit was full or there was no "mother" accompanying the child and able to stay on the unit. Others were admitted to the ward because they were assessed as unsuitable in terms of the criteria for admission to the unit. However many of these children bypassed the unit because of the perceived need for a drip to manage dehydration. Worldwide the acceptance of oral rehydration therapy by community health workers and physicians is very poor and this was also true at Osindisweni Hospital.

1.3 The use of Oral Rehydration Therapy

As noted in the Introduction oral rehydration therapy (O.R.T.) was first introduced in the later 1960's when controlled studies showed it to be effective in the management of acute diarrhoeal dehydration in all age groups.¹¹ Its use is based upon the knowledge that glucose enhances the absorption of sodium and water in the gut.¹⁴ It is now well established that ORT can be used in patients with all degrees of dehydration including severe dehydration.^{2.13.14.31}

ORT is simple, practical, highly effective and technologically appropriate for less developed as well as developed countries and should be the keystone of national diarrhoea control programmes.⁴⁴ It has been used successfully throughout the world and has led to a reduction in admission rates and case fatality rates in many hospitals.^{12.41} The many complications of IV therapy such as overhydration, electrolyte imbalance, thrombophlebitis, introduction of septicaemic infections, pyrogenic reactions, embolism, rupture of veins and psychological stress to the mother are largely eliminated with the use of ORT as opposed to IV fluids.¹⁴ Also hospital stay and cost of treatment is reduced and patients have been shown

to gain weight faster and the duration of diarrhoea has been shortened by the use of ORT.¹³ A WHO report in 1983 calculated the cost of ORT per patient as \$0,50 per patient as opposed to a cost of \$5,00 per patient when IV fluids were used.¹¹ A vast amount of research has contributed to the development of appropriate oral rehydration solutions and the results are demonstrated by the fact that in 1981 41 million packets of ORT were supplied by UNICEF to 87 countries in the world.^{1,40-42} New "super" ORT's have been developed using cereals and proteins (e.g. rice water) as a basis for oral rehydration solutions. Both fluid/electrolyte and protein/energy malnutrition can be diminished or prevented by using ORT and super-ORT.⁴³ However, the core of oral rehydration is *behaviour change* and the most crucial group to convince may be health professionals, especially doctors, who often exercise overall control of the health system. The results of this study show that ORT is effective in treating mild to moderate dehydration in the outpatient department of Osindisweni Hospital. IV fluids were used almost exclusively for severely dehydrated patients. It is hoped that experience with the use of ORT will lead to greater acceptance and further extension of its use.

With further development of the unit and better acceptance of ORT it is hoped that more patients will be managed in the unit including those severely dehydrated. Another problem with regards to the management of such patients, apart from acceptance of ORT, is that of staff allocation and supervision. The occupancy of the unit was constantly changing and often it was empty. It is therefore difficult to have staff allocated on a constant basis and hence the staff nurse involved was often busy elsewhere and did not have enough time for

supervision of the mothers or for the provision of health education. For this reason not many children with severe dehydration were managed on the unit and patients were readily transferred to the ward if they were in such a critical condition on admission. With better staff allocation and supervision it is hoped to expand the unit to cope with more patients of all levels of dehydration.

1.4 The clinical assessment

1.4.1 Assessment of Vomiting/Diarrhoea/Dehydration

As discussed previously certain parameters used for assessing morbidity were found to be lacking. Assessment of the number and consistency of stools and the number of vomits prior to admission, was difficult and the findings bore no relation to the severity or outcome of the illness. The number of stools passed is seldom if ever reported with any accuracy by the parent and in fact tends to be unhelpful e.g. a single large watery stool can exceed 20-40 scanty stools in terms of fluid/electrolyte loss.² Vomiting is also not thought to contribute significantly to dehydration as diarrhoea is almost invariably the major factor in determining this. In this study vomiting was not found to be of any influence on the success of ORT. 77,4% of patients had a history of vomiting on admission but only 2 patients were transferred to the ward for persistent vomiting. One of these was vomiting large amounts of worms and was transferred mainly for this reason rather than a failure of fluid management.

These findings are in agreement with other studies that found that neither severe vomiting nor severe

diarrhoea were limitations to the use of ORT.^{11,13,14} Although the figures on number of stools and vomits are not thought to reflect the severity of the illness or condition of the patient on discharge or transfer, if admission and discharge results are compared improvement is demonstrated, especially in the number of vomits.

The consistency of the stools is perhaps a better monitor of the severity of the illness than the number. It is known that watery stools are far more serious in terms of fluid loss. This is reflected in the fact that the majority of patients requiring admission for rehydration had watery stools. Also there is an obvious reduction in the number of patients with watery stools on admission (163) to those on discharge/transfer (10).

1.4.2 Respiratory rates and temperatures

Respiratory rates and temperatures on admission and discharge were also analysed in the morbidity data presented in the results. As discussed in Section 2.1.7 respiratory rate was found to be poorly reported and hence it was not a good indicator of the condition of the child. It would be expected that a moderately or severely dehydrated child should breathe faster and more deeply^{2,45} but this was not reflected in the results. The respiratory rate of such children is usually in the range of 40/minute to 60/minute.⁴⁶ Overall the averages in this study were much lower than this which is probably due to an underestimate rather than a lack of acidosis in these children. The deep rapid respirations normally found in dehydrated children are a sign of acidosis and this latter is almost invariably present to some degree in

any child who is more than mildly dehydrated. There appeared to be a great reluctance to spend time assessing respiratory rates accurately and some questionnaires had comments such as "too restless" or "crying" instead of accurate assessments. Perhaps this is because respiratory rates are not checked routinely by nurses either on the wards or in the outpatients department as are temperatures and blood pressures. It is possible that pulse rates may have been better used as an indication of the severity of illness, a rapid pulse being an indicator of increasing dehydration. But even this is difficult to obtain in a restless, dehydrated child.

Fever was a common finding on admission in these dehydrated children. In those patients who were discharged home the temperature had returned to normal. The fever is thought to be related to both the dehydration and the acute infection causing the diarrhoea. Those children whose fever persisted, at a particularly high level for more than 24 hours despite rehydration, were often found to have other problems. Five such children were transferred to the ward. Three of these children had septicaemia and the other two responded to broad spectrum antibiotics although no focus of infection apart from the diarrhoea was found and cultures were negative.

Therefore persistent fever may be an important monitor of continued morbidity but in this study the temperature on admission bore no relation to the eventual outcome.

In comparison to this, assessment of the level of

dehydration on admission was found to be a good indicator of the outcome in that 43% of severely dehydrated children were transferred to the ward as opposed to only 10% of mildly dehydrated children.

1.4.3 Length of Illness

The length of illness prior to admission also seems to be an indicator of outcome i.e. those children whose diarrhoea had persisted for more than 7 days were found more likely to be transferred to the wards for further management i.e. 50% of such children were transferred. In these cases the main reasons for transfer were persistent diarrhoea whilst on the unit and malnutrition. Two of the patients in this group were amongst the later deaths (Case 1 and Case 2 in the mortality section 2.5). As discussed in the introduction diarrhoea and malnutrition are closely linked and it can be expected that prolonged diarrhoea will compromise the nutritional status of the child. This linkage is borne out by these results although very few children are included in this group since the unit was designed to manage children with acute diarrhoea. However, the protocol for the rehydration unit did not state what constitutes acute and chronic diarrhoea. The study has therefore served to indicate that diarrhoea of longer than 7 days duration is associated with a poorer outcome in terms of morbidity and mortality and in future admission to the rehydration unit shall be restricted to those children with diarrhoea of less than 7 days duration. This forms a novel and significant recommendation.

1.4.4. Past History on Admission

From the results it is clear that previous episodes of diarrhoea were common in this group of children. It has been estimated that in underdeveloped countries children below the age of 3 years suffer 6 to 8 separate episodes of acute diarrhoea per child per year.⁴⁴ Many of these episodes are mild and of short duration and it is likely that the mother would not recall all episodes especially if mild. However, the number of children with previous admissions for diarrhoea was also relatively high (18%) particularly if it is considered the average age is 11 months, this indicated that this group of children were predisposed to the development of diarrhoea - probably for the reasons explained in the discussion on demography at the beginning of this chapter. It is also apparent from the results that many of the mothers had sought medical attention (77%) before being admitted to Osindisweni Hospital. This serves to indicate the severity of the illness. Osindisweni Hospital is a referral hospital for many peripheral clinics and general practitioners. Therefore a high level of previous contact with health care facilities may indicate concern by the mother and/or the health centre if the child was referred.

1.4.5. Clinical signs and symptoms on admission

The profile of other signs and symptoms presenting on admission served to show that on the whole the unit was used appropriately for the management of acute diarrhoea with dehydration. Very few patients had other significant problems and these were mostly symptoms of constitutional upset associated with the diarrhoeal illness. The development of serious complications whilst on the unit

usually led to the transfer of the patient to the wards and if the patient was found to be seriously malnourished when reviewed by the researcher this also resulted in transfer.

1.5. Length of Stay on the Unit

The average stay on the unit of 33 hours is well within the time limit of 48 hours set for the rehydration unit. The histogram in Figure 7 shows a pattern of distribution which is related to the fact that most patients were admitted during the day and discharged within the mornings or early afternoons. This is related to transport services which are poor in many rural areas and even the ambulance service is difficult to obtain in remote areas. It is also the reason why some patients stayed for more than 48 hours as it was understood that this time limit must be flexible in terms of a reasonable hour for patient discharge. The limitation was really placed at 48 hours in order to avoid treating patients with protracted or complicated illness in the outpatient department. Therefore, the time limit was not flexible if the child remained significantly debilitated at 48 hours and children were only kept longer than this time for the practical reason given above. It was decided on this time limit for many reasons. Firstly it is an exhausting time for the mother who has very little rest during her stay, hence to remain longer would place too great a strain on the mother. The mothers of in-patient children stay in a lodge and are able to get ample rest. Secondly, from the past experience of the researcher, 48 hours is normally ample time to rehydrate a child with acute diarrhoea and see a significant improvement in the child's well-being. In fact, as is obvious from the average of 33 hours, many children required a shorter time to be rehydrated

and recuperated. Again, a larger period of time means the child is not suitable for management in a "short stay" unit. Finally this time period was thought to be enough to allow good contact between the mothers and nursing staff and facilitate health education.

1.6 Transferring of Patients to the Main Hospital

The main reasons for transferring patients to the wards were a combination of malnutrition and persistent severe diarrhoea associated with poor general condition after 48 hours stay. Undernutrition was a very important factor in determining the outcome of the stay on the unit. This is a reflection of the close relationship between diarrhoea and malnutrition which was discussed in the introduction. There is a statistical relationship between the frequency of a child's diarrhoea and his nutritional state and malnourished children are known to take longer to rehydrate and they stay longer in hospital.⁴⁷ Therefore it is not surprising that this group of patients had persistent diarrhoea and dehydration. The other group of reasons for transfer were a miscellany of complicating illness such as the septicaemic infants included in the five children with persistent pyrexia and toxæmia and 4 children with bronchopneumonia. Minor respiratory infections were not uncommon with 27 patients noted to have this as a finding on discharge otherwise, the only significant finding on discharge of patients was a degree of malnutrition in 24 cases. It has been stated that in rehydration units two problems exist. One is the diarrhoea and dehydration and the other the poor nutrition of children who attend them.⁴⁷ This is supported by the findings of this study.

Of the 42 children transferred it is possible that a few of them may have been transferred prematurely. Again this relates to acceptance of ORT and to problems of nurse allocation/supervision as discussed when dealing with the number of admissions to the unit. This statement is difficult to support as there must be a great deal of personal bias as to which children are suitable to be managed on the rehydration unit. However the management of children with dehydration on 'C' floor has changed since the opening of the rehydration unit following the observed success of ORT. Previously practically all patients admitted to 'C' floor with signs of dehydration were managed with IV fluids. To use ORT requires constant attention on a one-to-one basis as the fluid has to be given frequently, and often in small amounts every few minutes if the patient is vomiting and irritable - as is often the case when the child is first admitted in a dehydrated state. This requires a great deal of patience and care. There are not enough nurses on the ward for this and the space available on the wards is not sufficient to cope with having all the mothers in fulltime attendance, as in the rehydration unit. As a compromise it is therefore been the increasing policy of the ward to use ORT in nasogastric drips in order to reduce the amount of IV fluids used. Oral rehydration solutions are placed in empty vacolitrans for this purpose as the usual IV preparations such as half strength Darrows/Dextrose are unsuitable for oral use because of their high dextrose content. Thus most of the patients who were thought to have been transferred earlier than necessary were still managed successfully on the ward using ORT in nasogastric drips. On reviewing the case notes of those patients transferred it appears there are six patients who on this basis were transferred prematurely. These patients were transferred after

admission for reasons mostly of watery stools and poor hydration which reflects uncertainty by the staff initiating the transfer regarding which patients were suitable for management in the rehydration unit. They were managed on 'C' floor as described above and all had a successful outcome. Such cases were few in number and on the whole the reasons for transfer had apparent legitimacy.

1.7 Use of IV Fluids

As well as the tendency to transfer a few patients before necessary there were also cases of the use of IV fluids without an adequate trial of ORT. As can be seen in Table 18 in the Results, 8 children with mild dehydration and 15 children with moderate dehydration were managed with IV fluids. A few of these patients came from clinics with IV drips. It is difficult to assess how many patients arrived with drips but probably not more than 5 or 6. Hence it is probable that the greater proportion of the rest of this group didn't require IV therapy. Abdominal distension was only noted in 2 children and this cannot therefore be a general reason for resorting to the use of IV fluids. With increasing experience in the benefits with the use of ORT it is hoped to see a reduction in the use of IV fluids both on the rehydration unit and in the wards.

1.8 Follow up of Children

Of the children followed up, 90 (82,5%) had either no complaints or minor illnesses. The other 19 children consist of the 4 children who died and 15 of the readmissions. One child was readmitted as a boarder because the twin was ill and hence this child is included in the 90 "well" children. However, as discussed in the results minor illness and recurrent diarrhoea were common in the follow up group which is

perhaps a reflection on the reasons why they came for follow up but also possibly is related to the fact that the group of children studied are prone to diarrhoeal illnesses. The main reasons for readmission were malnutrition and recurrent diarrhoea.

The four children that died are discussed in Section 2.5. As can be seen, no child died on the unit and these deaths were not because of dehydration but rather because of other illnesses developing in malnourished and hence immunocompromised children. As far as is known there were only 4 deaths amongst children who had been admitted to the unit and therefore the follow up mortality for this group of children was 1,5%. This compares favourably with the estimated death rate in hospital of 2% or less for acute diarrhoea¹ but it should be noted that no child actually died on the unit therefore the mortality for children on the rehydration unit was 0. In similar studies¹³⁻¹⁵ deaths were not related to the method of rehydration but rather to coexisting malnutrition. The overall mortality on 'C' floor actually increased during the study period and this could be a reflection of the fact that more seriously ill patients were admitted having excluded those with acute diarrhoeal illnesses and a relatively low mortality. However the exclusion cannot account for all the increase and one suggestion was an increase in malnutrition as a result of the effects of the measles epidemic and the devastating floods that occurred in Natal in September 1987.

1.9 Summary of main findings from morbidity/mortality profile

The morbidity and mortality profile of children admitted to the unit during the study period shows that of the 269 children admitted with mild to severe dehydration, 86,3% were

rehydrated orally and 84% were discharged home after a short stay of average 33 hours. 109 of these children were followed up of which 82,5% were well or had only minor complaints. 15 of the children followed up required readmission and 4 children died. In this study the level of dehydration on admission as well as the length of illness prior to admission were important indications of a successful outcome to the stay on the unit.

1.10 The nutritional status

Assessment of the nutritional status of the study group was important. It can be seen from Table 31 that 17,5% were below the 3rd centile for age which is far fewer than the 37% admitted to 'C' floor over the same period of time. It has been argued that primary intervention against diarrhoeal morbidity should be aimed at improving childhood nutrition¹⁸ and that a diet-based nutrition programme cannot function properly until the cycle of protracted diarrhoea is broken.¹⁷ It is obvious that the two problems are closely linked together and must be tackled together. This has been highlighted by the findings of this study. The fact that fewer children in the study group were underweight as compared with 'C' floor for age is a reflection of the exclusion of seriously malnourished children from the unit. However, it should be remembered that a single weight-for-age is not a true indicator of the child's nutritional status but rather the rate of growth.²⁵ A more important indication of chronic malnutrition is the weight for height ratio but weight-for-age does give an estimate of acute malnutrition. A recent survey (1987)⁴⁸ of pre-school children in a Cape Town township showed 13,7% as being below the 3rd centile which may indicate that despite attempts to exclude significantly malnourished children the rehydration unit was still dealing with a group of infants of below average

nutrition. In fact only 20% of the patients were actually above the 50th centile of weight for age.

When assessing weight gain on discharge from the unit it should be expected that those children successfully rehydrated should have gained weight. It seems only 62,5% of patients did so but it should be remembered that these results include the patients transferred to the wards who, on the whole, were referred to the ward early in the course of the illness or had persistent dehydration. Also rehydration is not the only factor in determining weight gain.

Of the 164 patients who gained weight the average % weight gain was 5% of body weight.

A fasting child loses an estimated 1 to 2% of his/her body weight daily even in the absence of fluid loss due to diarrhoea.⁴⁹ Although feeding was continued where possible in all children, (particularly breast feeding^{21,49}) it is likely that apart from the breast very little food was taken because of the poor appetite of these children and also the diarrhoea which would affect absorption of food. This could lead to some weight loss along with the increase in catabolism associated with an acute infection.

The third factor affecting changes in weight was the accuracy of the scales. Although the same scales were used at all times they are not extremely sensitive and are subject to observer bias, hence one nurse may get a different reading for the same child as from another nurse. Therefore the results can only serve as an indicator of an overall improvement in weight in the majority of patients especially those with a

successful outcome in terms of being managed on a short stay basis on the rehydration unit.

The reason that the discharge weight was used to assess the nutritional status was so that dehydration could be removed as a cause of the lower weight. As stated above it is accepted that not all patients were rehydrated on transfer to the ward but any patient found fit for discharge home was assessed as being fully rehydrated. The weights at follow up show a slight increase in the number of children below the 3rd centile (20,3%). This is a reflection of those children with ongoing morbidity which made up part of the group and, indeed, was the reason these children were able to be followed up. 75% of these children had gained weight however.

Overall it can be said that the nutritional status of the children admitted to the rehydration unit was below that which may be expected for the population served although no valid figures are available for this area.

2. AVAILABILITY OF HEALTH CARE AND EXPOSURE TO G.O.B.I.

2.1 Availability of Health Care

The availability of health care was found to be difficult to assess in this study and this section was poorly filled in e.g. many of the mothers stated that they had no contact with either faith healers or traditional healers and hence there is no clear picture of the availability, accessibility or affordability of such healers. Only 3 mothers supplied information on the distance to the nearest traditional or faith healer. In Swaziland it is estimated that there is either a traditional healer or faith healer for roughly every 12 rural

homesteads i.e. roughly 1 per 110 population as opposed to 1 physician to every 10 000.²⁶ The figures are likely to be similar in this area therefore it is unlikely so few mothers knew the whereabouts of such healers. It is thought that this is more a reflection on the mothers' interpretation of how "western" medicine views traditional medicine and that in fact many more mothers knew of and visited such healers. However, overall, patients found it difficult to estimate distances although they knew of the cost of transport to clinics, GP's and hospitals. The cost of bus fare from Osindisweni to Verulum at the time of the study was R1.00 return. It is a distance of approximately 10 kilometres and it is assumed this is an average cost for transport (Combi-taxis cost more). Therefore it would seem that many children in this study lived more than 10 kilometers from a clinic or doctor. It has been shown elsewhere that the average number of out-patient attendances per person halves for every two miles that people live from a hospital, for ever one and a half miles from a dispensary and for every mile from an aide-post.⁵⁰ Therefore the further from a health facility the less likely are people to use it e.g. if the health facility is 10 miles away then only 20% of patients will reach it. Therefore an average transport cost of R0.95 to the clinic seems high if one interprets this as a distance of approximately 10 kilometers. It would seem that primary health care is not universally accessible to the patients admitted to the rehydration unit in contrast to the recommendation⁵¹ that every homestead should have a maternal and child health service within 5 kms.

General practitioners were most expensive in terms of cost of treatment but the affordability of health care can not be assessed from this study as an assessment of income was not

undertaken. The cost of outpatient treatment at Osindisweni has remained at R3.00 for low income families and the majority of patients paid the minimum. Indigent patients are supposedly seen and treated free of charge but most people pay towards their treatment even if their income is below the poverty line.

2.2 Exposure to G.O.B.I

Information concerning the availability of health care is important for an assessment of the health knowledge of the mother in terms of G.O.B.I. Poor access to health facilities may lead to a low knowledge of the G.O.B.I principles. However, it was seen from the results on previous exposure to G.O.B.I. of Osindisweni that many mothers had had contact with the hospital before admission to the rehydration unit (56,8%). For many of these this contact was either at Antenatal clinic or during delivery of a baby on the maternity ward. This is an example of the great demand for maternal services which are generally well utilised in Africa despite obstacles of distance and cost.⁵² The fact that this service is well utilised and reaches many people even at a distance from the hospital should lead to a greater emphasis on health education in these departments as the opportunity appears to be good. As regards the principles of G.O.B.I. only breast feeding and immunisation seem to have been consistently promoted to expectant mothers. The mothers are given road to health charts on discharge with their babies from the maternity wards. However, it seems that so far few mothers are taught how to use the card. Hopefully this will change in the future.

3. HEALTH EDUCATION IN THE REHYDRATION UNIT/KNOWLEDGE OF G.O.B.I.

3.1. Growth Charts

The knowledge of the use of growth charts was not only poorly taught in Osindisweni but also in the community. Despite the fact that weights had been plotted on 73% of available growth charts of children on admission to the unit only 34% of mothers had any understanding of the growth chart. Similar results have been found in other studies.⁵³⁻⁵⁵ The value of growth charts in detecting malnutrition long before it is clinically manifest is now well known^{25,56-58} and the image of the child being weighed under a tree at the rural clinic is almost synonymous with good primary health care. However any system is only as good as the workers who operate it and in order for growth monitoring to be successful, the charts have to be promoted adequately at all levels of the health service. The road to health chart was first introduced by Morley in the 1960's and he gives five reasons for their use⁵⁹: 1) early detection of malnutrition; 2) advice on timing of supplementary feeding; 3) selection of children at high risk of malnutrition; 4) Health Education and involvement of the mother in the child's comprehensive care; and 5) epidemiological studies on undernutrition.

With this in mind it should be noted that weighing is not growth monitoring i.e. without feedback nothing further will occur. It has been said that mothers who can't read can't understand growth charts^{25,57,60} but this has been shown to be untrue if time is taken to teach them how to use the card.^{53,54,57,58}

The results of this study support this because on discharge and follow up over 80% of mothers had a good understanding of the road to health card despite a short stay on the unit. The percentage of mothers bringing the card at follow up also showed good improvement with 79% having cards available as opposed to 51% on admission. This percentage may have been higher but for the fact that some of the patients were followed up on discharge from 'C' floor and hence had not returned home to collect their cards. It is very important to the promotion of growth charts that health workers themselves have a good understanding of the chart. Errors in charting weights have been found in up to 80% of cards in some studies⁵⁷ and there is often more importance ascribed to the position on the weight chart rather than the rate of growth.^{25.57} Health workers need to be trained in the weighing and reading of scales, the recording of weight after age verification, the interpretation of growth curves and the follow up actions necessary. If they do not know this the mother and child cannot benefit from regular weighing. Although this study did not analyse the accuracy of plotting of weights it has highlighted the deficiency in adequate instruction on interpretation of growth charts. With good health education mothers are shown to be able to understand and thus see when their child's growth is faltering and benefit from the low-cost actions that are necessary to prevent childhood malnutrition e.g. the promotion of ORT, immunization and prevention of frequent illnesses that hold back the child's growth; the promotion of breast feeding and when to introduce other foods, and how to add energy to the child's diet using locally available foods as well as frequent feeding; the need to feed more often during and after illness; and the promotion of birth spacing and good nutrition during pregnancy. The mother needs

to know that most malnutrition is invisible and not caused by shortages of food in the house but rather by repeated illnesses such as diarrhoea that take away appetite and reduce food intake often over many days each month. A good understanding of growth charts will enable the mother to see this invisible malnutrition. There would be no reason in teaching parents how to understand growth faltering if there were nothing that they could do about it but with the above knowledge there is a great deal that can be done. Unfortunately explanation is a big consumer of staff time and staff availability is a constraint on any service and this is often a problem in a busy clinic and is probably another reason why there was a poor understanding of growth charts on admission. More staff need to be consistently involved in health education to overcome this problem and the mothers themselves should be able to weight their children and plot the results. Health workers also need to know the action to be taken when growth falters and they should not just hand out food supplements which are known to be ineffective.^{57.60} In fact feeding programmes are only thought to be worthwhile in encouraging attendance at health programmes and have no significant effect on children's nutritional status.⁶⁰ By using the card as a monitor of growth and a tool to involve the mother in health education it is hoped to prevent malnutrition before it becomes visible and before the child has already suffers serious damage in terms of normal development. The results of this study are encouraging as it is seen that a small scale operation such as the rehydration unit can have great success in meeting the objectives of the use of growth charts.

3.2. Oral rehydration therapy

There was a far better understanding of the use of oral rehydration solutions by mothers on admission than there was of growth charts. 79% of mothers knew about them and 55% knew a correct formula for home made sugar and salt water on admission. This increased to 95% of mothers knowing a correct formula on follow up, showing that this knowledge was well retained by the mother, and also 77% had used homemade solutions (the other mothers had not used it either because of having no opportunity or no necessity).

The use of home made oral rehydration solutions has been shown to prevent severe dehydration and decrease mortality in acute diarrhoeal illness.^{29,61-63} It is difficult to supply prepacked oral rehydration solutions to all mothers and the present supply of ORS packets in the world is only enough to meet a percentage of childhood diarrhoeal episodes,⁶¹ therefore it is important to teach mothers how to prepare ORS with home ingredients and to use it as soon as diarrhoea begins. Church (1972) first introduced a practical simplification of the oral rehydration regime using salt and sugar measured with the mother's own hands.⁶⁴ One of the main drawbacks of home made ORT is the inaccuracy of mixing which has been shown in many studies.^{61,63,65,66} However it is also known that the earlier in an episode of diarrhoea that fluid is given, the less important its precise concentration because the body's mechanisms can make the necessary homeostatic adjustments.⁶¹ It should therefore be stressed that home made rehydration should start early, with the first loose stool, and if the diarrhoea is persistent then the child should be taken to the clinic. Most episodes of diarrhoea subside without vigorous treatment.²⁹ It is important to emphasise the need to give

fluids for all diarrhoeal stools which means changing attitudes in the mothers. Intensive training programmes have been shown to be successful in changing attitudes and oral rehydration therapy is readily acceptable to mothers because of the rewarding consequences of treatment.^{29,67} By explaining to the mother the significance of all diarrhoeal illnesses in hampering the growth and well being of her child and its importance as a major cause of death she will become aware of its seriousness and take action using these simple methods.²⁹ However mothers and health workers need repeated training and reinforcement^{61,66} of these principles. The results of this study demonstrate an excellent recall by mothers of the formula for ORT and also the use of ORT. 97% of mothers knew when and how to use homemade sugar and salt solution on follow up. This included positive responses that they would use homemade oral solutions as soon as the child had a loose stool. On the rehydration unit mothers were taught to give an extra cup of such fluid for every loose stool as well as the normal food for the child and this information was well retained. This study shows that with intensive promotion of oral rehydration therapy mothers can learn a safe formula and method of use of home made solutions for acute diarrhoea.

3.3. Breast feeding

Of the children admitted to the unit 68% were still breast fed and 49% were bottle fed (obviously some of the older children were on neither bottle or breast). Breast feeding was promoted on the unit at all times, both to help in rehydrating the child and to provide some nutrients. Breast feeding during acute diarrhoea has been shown to have a beneficial effect on the course and outcome of the illness and to reduce the number and volume of diarrhoea stools as well as protect against the

development of persistent diarrhoea.^{21,49} It is also recognised that exclusive breast feeding in the first few months of life protects babies from diarrhoea and bottle feeding is more often associated with frequent bouts of diarrhoea and concomitant malnutrition in children in developing countries.⁶⁰ The decline in breast feeding seen in many developing countries has led to the "marasmic-diarrhoea" syndrome being seen frequently in the first 18 months of life and has also been associated with shorter birth intervals and hence an adverse affect on infant mortality. It is said that breast feeding is essential in the rural homes of developing countries and should be promoted by all health workers, and mothers should be encouraged to breast feed for a minimum of 2 years.⁶⁸ Most of the women interviewed on the unit were well informed about breast feeding and knew the many benefits. An often quoted reply to why a mother should breast feeding was "because it is healthy". However bottle feeding was common in this group and frequent reasons given for this were either the baby refused the breast or the mother felt her supply of milk was inadequate. It has been shown that health education sessions are successful in teaching mothers the advantages of breast feeding but do not increase the prevalence of breast feeding⁶⁹ i.e. they do not change the behaviour of the mothers. To do this requires support from society and the community as well as the immediate family. Rather than merely inform the mother of the advantages of breast feeding and the dangers of bottle feeding it was attempted to gain some insight into whether the mother would continue to breast feed further children or advise others to breast feed. The majority were positive about this but it is obvious that few mothers would wish to answer no to such questions whatever they might do in the future. However 84% of mothers on follow up had discussed

breast feeding with friends or relatives. Initiating breast feeding is not usually the problem, especially where mothers are aware of the advantages, but continuing breast feeding for an optimal length of time requires the support of the community.⁶⁹ It was hoped to motivate these mothers to support others in the community.

3.4. Immunisations

The final component of G.O.B.I. highlighted on the unit was immunisation. Clinic cards were requested from all mothers and those without (49%) were instructed in the need to carry the card whenever travelling or visiting a health facility. Only 52% of patients were noted to be up to date with immunisations although this may be a slight underestimate. To compare this to figures for the developing world as a whole, in the mid 1970's less than 5% of children received even the first dose of vaccine whereas today 40% are fully immunised.⁴ The figures of immunisation status found in this study are very similar to those found in Mosvold, KwaZulu in 1987.⁵¹ As in that study it seems that many of the children admitted to the rehydration unit lived at some distance from a health facility and hence there is likely to be a fall off in immunisation after the first dose of DPT, Polio. It has been estimated that in the R.S.A. the dropout rate is in the region of 10% per dose⁷⁰ but this increases with the distance from a clinic. Another important finding in the Gelukspan Health ward⁷¹ was the fact that only 33% of children with more than 10 visits to the clinic during their first year of life were vaccinated on time. It has been demonstrated that a concerted effort by all levels of health workers can bring about improvements in immunisation coverage⁷². Immunisations must be included in health education and mothers should be aware of the six target

diseases immunised against as well as how often and when she should attend a clinic for immunisation. It is estimated that an immunisation coverage of 80% or more is sufficient to disrupt disease transmission and protect even those remaining children not immunised. It is also important that children are immunised during the first year of life and each new generation is protected.⁷³ Immunisation coverage of children is a monitor of progress towards "Health for all" used by WHO.⁷⁴ Many of the mothers in this study had a poor knowledge of the actual number of immunisations required in the first year and of what their child was immunised against. They were taught the six diseases immunised against i.e. Diphtheria, Tetanus, Whooping Cough, Polio, Measles and TB, and were also told the number of immunisations required in the first year of life. Most mothers did have some knowledge on admission. At discharge the majority had considerably improved their knowledge and 97% had a good idea of what diseases were immunised against and when to attend for immunisations. This knowledge was retained on follow up. In order to promote immunisation within the unit every opportunity was used to vaccinate any child whose record was incomplete. Measles vaccine was given priority in those children over 6 months because it is known that of all vaccinations measles has the poorest coverage (only 26% in the developing world) and yet causes 55% of all vaccine preventable deaths.⁷³ Also children in hospitals are particularly at risk of contracting measles and hence this is given priority in the outpatients department of Osindisweni as in other hospitals.^{34.75.76} Immunisation or information about immunisation should be provided at every health contact and therefore is an essential part of the health education in the rehydration unit.

3.5. Feeding and nutrition

Apart from the principles of G.O.B.I. health education on the unit was directed at the promotion of appropriate weaning diets and the use of locally available foods as well as an emphasis on continued feeding during diarrhoeal episodes. Not knowing when and how to begin introducing other foods, in addition to breast milk, is a major cause of child malnutrition along with the problem of frequent infections.⁷⁶ However, at the root of malnutrition is poverty and by emphasising the use of locally available foods as well as frequent and extra foods during and after illnesses it is hoped to avoid the invisible malnutrition that precedes the appearance of kwashiorkor or marasmus. Proprietary infant foods are relatively expensive although well advertised (like bottle feeding). For the great majority of malnourished children there is enough food in the home to provide an adequate diet if the mother is made aware of the basic facts about feeding a young child i.e. breast feeding; introducing solids between 4 to 6 months; not using a bulky staple alone; feeding frequently; making use of all the foods available in the home.⁶⁰

Traditional management of acute diarrhoea has entailed a period of rehydration with clear fluids followed by the gradual reintroduction of milk and food.^{37.77} However, it is now well established that the withholding of food is wrong and can prolong diarrhoea and lead to malnutrition.⁷⁸ It is also well established that there is no need to reintroduce full strength milk feeds in a step-wise manner for babies who are not breast fed. Once the child has been rehydrated full strength milk feeds can be reintroduced immediately.^{20.22.23.39.77} As well as health workers having in the past promoted the restrictions of food and fluid for the management of diarrhoea traditional

beliefs amongst mothers commonly insist that food/fluid should be withheld. This is based on the accurate observation by mothers that increased intake of fluid containing carbohydrates often aggravates diarrhoea.²⁹ These beliefs can be overcome if mothers are taught the importance of diarrhoea as a major cause of death and malnutrition in young children. On discharge from the unit 85% of mothers knew to continue feeding their child during diarrhoea episodes, and of those followed up 90% of mothers knew this.

3.6. Promotion of Personal and Domestic hygiene

Hygiene is an important part of the management of acute diarrhoea in terms of prevention. Although the knowledge of the mother was not assessed, with regards to hygienic principles, or the means of the families assessed in terms of water supply, housing and sanitation, it was part of the policy of the unit to instruct mothers on this aspect of prevention. It has been shown that education on hygiene can reduce diarrhoeal morbidity rates by 14 to 48%.⁷⁹ Evidence indicates that the adoption of hygiene behaviour can be achieved by sustained and culturally appropriate educational programmes particularly where no expenditure is needed e.g. in the disposal of children's excreta and child cleanliness, kitchen hygiene, garbage disposal, latrine hygiene and water storage.⁷⁹ It is important that the mother has some idea of how diarrhoea is spread and also that she observes hygienic behaviour in the staff and hygienic conditions in the rehydration unit in order that she can learn from this.

Thus, health education in the unit was directed at the primary prevention of diarrhoea by efforts to change behaviour, at the individual level by focussing on hand washing after

defecation and before food handling; cleaning the child's eating utensils; proper storage and purification of water and attention to the child defecation habits. (In many cultures the small child's stools are considered innocuous and hence they are allowed to defecate in random locations¹⁹). Included in the primary prevention is the focus on continuous breast feeding; beginning nutritionally adequate weaning diets at 4 to 6 months of age and avoiding bottle feeding. Promoting growth monitoring to enable undernutrition to be highlighted early and immunisations to prevent important childhood illnesses is also part of health education aimed at the primary prevention of diarrhoea.

Secondary prevention is aimed at what to do when the diarrhoea occurs i.e. to give extra fluid, (e.g. home made ORT) to continue feeding, and to avoid the use of purges or prolonged starvation.

Tertiary prevention aimed at the management of dehydration included teaching the mother how to recognise dehydration and seek help and finally the management of the dehydration using oral replacement therapy.

4. BELIEFS AND ATTITUDES

In order to evolve an acceptable programme for health education it is imperative to learn the prevalent beliefs and therapeutic practices of the community.²⁸ It seems in this study only 10% of mothers thought of the diarrhoea as a traditional problem and only 24% used an enema in home management (as mentioned before, this is possibly an underestimation). 28% of mothers thought that teething was a cause of diarrhoea and similar findings have been noted in

previous studies.²⁷ The reason for this common misconception is that acute diarrhoeal illness is most common in that group of children who happen to be at the age of teething. The events are incidental to one another and diarrhoea is never due to teething. Mothers are often resistant to this idea but the main concern is that mothers understand that diarrhoea, unlike teething, is not harmless. The study did not seek to delve into all the traditional beliefs about the causation of diarrhoea in small children but some useful information was achieved. It is probable that for most Africans there are two explanations for disease i.e. the traditional and the scientific. In interview situations however it is usually the scientific explanations that are referred to.²⁶

As expected the majority of mothers were positive in their attitude to the unit (most Zulu people are too courteous to be otherwise). The one mother who had a negative attitude was an Asian mother who had felt frightened and unsafe in the casualty area at night. Otherwise most mothers commented that they felt they and their children had benefited from the stay and had "learnt a lot". Overall the mothers seemed to accept the use of oral rehydration and the other aspects of health education and the results show an excellent recall of the various aspects of health education promoted on the unit.

5.

CONCLUSIONS AND
RECOMMENDATIONS

5.1 Conclusions

The majority of children admitted to the unit were successfully managed on a short stay basis using oral rehydration therapy. The use of oral fluids is felt to be one of the greatest advantages of this unit over traditional inpatient management of acute dehydrating diarrhoea. The advantages in the use of oral fluids include a decrease in cost to the hospital, a decrease in length of time of patient stay in the hospital (also reducing cost) and, most important, a positive educational benefit to the mother caring for the child. The rehydration unit was able to offer a more comprehensive medical care to the mothers and children in terms of promotive and preventive education, oral rehydration therapy and rehabilitation of the child by emphasis on nutrition and feeding practices.

Other advantages of the unit have been the modifications it has led to in terms of inpatient management of diarrhoea (a decrease in the use of IV fluids) as well as being a learning experience for the staff of Osindisweni. The unit has trained the nurses in health education and led to a greater emphasis in preventative and promotive care in the outpatients department.

The main limitations of the rehydration unit are related to staffing and acceptance of the unit and oral rehydration therapy by medical personnel. However, the nurses were extremely enthusiastic and worked hard to provide the best care and supervision possible. Other problems encountered were concerned with the lack of adequate facilities for the mothers.

There was little opportunity for rest during their stay and hence they were often exhausted.

The questionnaire was adequately completed in the majority of cases. Some questions were not always interpreted correctly such as the immunisation status of the child and understanding what is meant by a weaning diet. Another problem area was in assessing the beliefs of the mother with regards to the illness. Most mothers didn't respond to this question. An important aspect not covered in the study was health education in respect of hygiene.

There was a poor attendance at follow up. As we are dealing with poor families from rural areas it is not surprising that they do not wish to travel a long distance at relatively great expense with a well child.

The study served to highlight an apparent inadequate availability of health care facilities to the population served by the rehydration unit although this section was poorly filled. Also, health education in other departments of Osindisweni was seen to be inadequate especially as regards the use of growth charts.

Health education on the unit in terms of the principles of G.O.B.I. was shown to be successful and the work is encouraging in this respect. Also the attitudes of the mother to the unit were positive and supportive, most mothers expressing gratitude for the health education as well as the improvement in their child's condition.

5.2 Recommendations

1. A continuation of the services offered by the rehydration unit with expansion of that service to link it with a nutrition/health education centre as well as to provide a health education service for all other outpatients attending the hospital. Such a centre could also be involved in rehabilitation services to outpatients.
2. An improvement in staffing to allow for expansion of the unit and to allow more time for adequate supervision and health education.
3. Further updating of personnel in Primary Care and the advantages of ORT. Included in this is continuing medical education and in service training programmes for all health workers.
4. An improvement in the teaching aids available on the unit in terms of posters, handouts etc.
5. An improvement in facilities offered to mothers to allow more adequate rest.
6. An improvement in liaison between hospitals/clinics/general practitioners in order to change the management of this common childhood illness by promoting the use of ORT.
7. The establishment of similar units at other hospitals and clinics.
8. Modifications to the questionnaire for future studies to enable a more adequate assessment of health care availability plus demography and also to remove any ambiguous questions.
9. The present criteria for admission to the rehydration unit (Appendix III) be revised to include the definition of acute diarrhoea as being diarrhoea of 7 days or less in duration.

10. Further studies to enable an evaluation of the ongoing care on the unit and thus make further recommendations for improvement.

11. The development of comprehensive medical care in all departments of the hospital i.e. Promotive and preventive, diagnostic and curative, and rehabilitative medicine. Thus health education would be offered in all departments.

12. Continued monitoring of the level of care in the hospital and in the different departments with respect to recommendation No. 11.

13. Extension of health education into the community by use of community health workers, health committees and other community groups e.g. church groups, Womens groups and schools.

14. The encouragement of discussion and questioning by the mother to allow greater understanding of the needs of the mother and child within their community.

15. A further survey needs to be undertaken to assess the availability of health care.

16. A greater understanding of the cultural beliefs and practices of the people served by the unit is needed in order not to conflict with these beliefs and win greater acceptance of the principles of management of childhood diarrhoeal as seen by the "Western" doctor.

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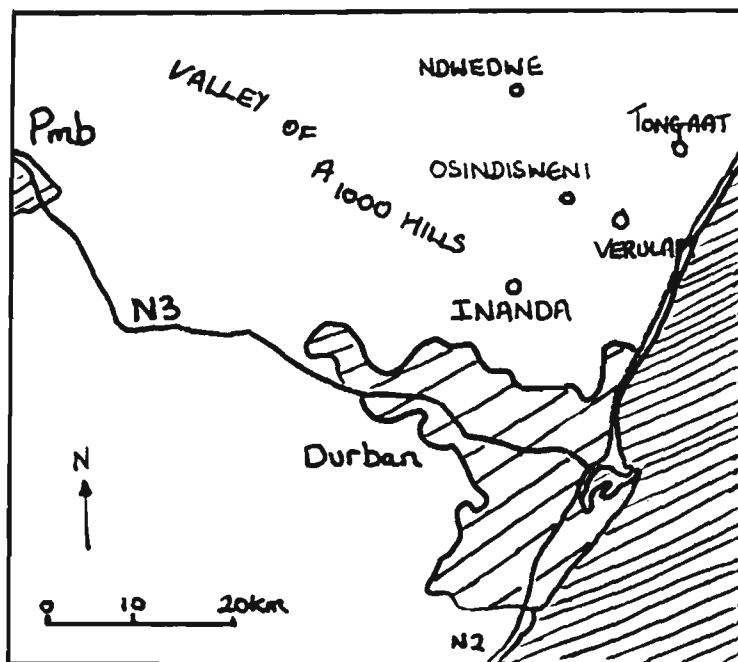
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APPENDIX I MAP OF THE AREA IN WHICH OSINDISWENI HOSPITAL
IS SITUATED

OSINDISWENI HOSPITAL:

Situated 45 km from Durban and serves a rural (Ndwedwe) and Urban/Periurban (Inanda, Verulam, Tongaat) population.

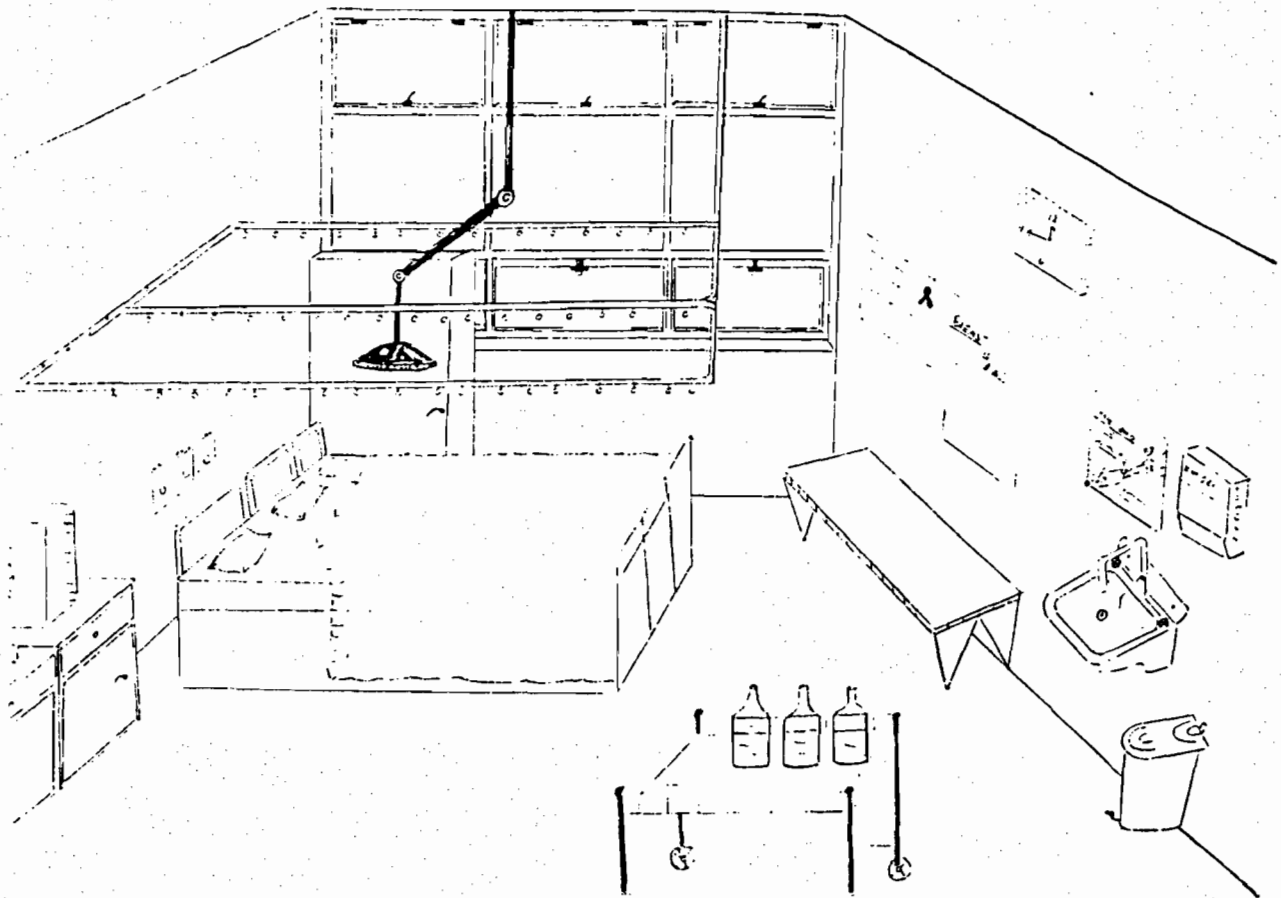


300 GENERAL BEDS

200 TB BEDS

In 1987 ~ 12000 patients were admitted to the general hospital and there were ~ 60000 outpatient attendances.

APPENDIX II PICTORIAL DIAGRAM OF THE REHYDRATION UNIT



APPENDIX III THE PROTOCOL FOR THE REHYDRATION UNIT

O S I N D I S W E N I H O S P I T A L

REHYDRATION UNIT

Proposed criteria for admission and management of children with acute diarrhoeal illnesses on the Rehydration Unit.

AIMS OF THE UNIT

1. Emphasis to be placed on oral rehydration of children with acute diarrhoea.
2. Health education of Mothers / Guardians accompanying and remaining in constant attendance to the child.
3. Maintenance of nutrition.
4. To keep Gastroenteritis out of the paediatric wards.

CRITERIA FOR ADMISSION TO THE UNIT

1. For rehydration of children with acute gastroenteritis.
2. Depending on the availability of beds, children with mild diarrhoea, but not dehydrated may be admitted to the unit as "day" patients for education and observation purposes. Dehydrated children must always be given priority.
3. All infants below 3 months of age should be admitted to the main ward (C). Upper age limit will depend on cot size and therefore more related to WT/HT rather than age.. probably +- 3 years.
4. No children with marasmus or kwashiakor (See W.H.O. criteria in Appendix III). These children must be admitted to C / D Floor.

APPENDIX III THE PROTOCOL FOR THE REHYDRATION UNIT

5. No obvious infectious diseases e.g. measles. These children must be appropriately isolated.
6. No children with any serious pathology other than diarrhoea e.g. Meningitis, Pneumonia, Typhoid, (→to be managed in the childrens ward.)
7. No child can be admitted to the unit without a mother or guardian in attendance. Unaccompanied children requiring rehydration should be admitted to the main wards.

APPENDIX III THE PROTOCOL FOR THE REHYDRATION UNIT

REHYDRATION UNIT : MANAGEMENT CRITERIA

ORAL REHYDRATION is intended as the main treatment EXCEPT:

- a) Where circulatory failure (shock) is present.....
i.e. the child is greater than 10% dehydrated : in these cases IV fluids to be used initially as per chart in Appendix II.
- b) Where an abdominal condition is a contraindication.

FLUIDS TO USE

1. For Rehydration .. use standard formula Powders.....
e.g. Sorol
2. After the child's hydration is corrected to use homemade oral rehydration solution as follows:
1 litre Boiled (cooled) water
 $\frac{1}{2}$ teaspoon salt
8 teaspoons sugar

HOW TO USE THEM

See Appendix I for amounts to be used. Fluids to be given hourly during the day and 3 hourly at night whilst mother and child are sleeping.

All mothers / Guardians to make up rehydration solutions themselves and to give the children the fluids :(UNDER SUPERVISION

Where VOMITING IS A PROBLEM fluids can still be given orally. Firstly instruct "Mother" to allow 5 minutes to elapse before starting to give fluids after a child has vomited. Then the fluids should be given by sips (teaspoons) every 5 minutes.

APPENDIX III THE PROTOCOL FOR THE REHYDRATION UNIT

If vomiting still remains a problem, despite this method of administering fluids then the next step is a NASOGASTRIC DRIP.

FEEDING

This is in addition to O.R.S.

O.R.S. = ORAL REHYDRATION SOLUTION

1. Breast fed infants should continue to feed as frequently as possible.
2. Formula fed infants can be given $\frac{1}{2}$ strength milk initially (by cup and spoon). These infants must be taking full strength feeds before being suitable for discharge.
3. Solid food should be given as soon as the child is able to eat this. Again small amounts often initially.

OTHER TREATMENT

1. No anti diarrhoea or anti emetic preparations to be used.
2. As a general rule antibiotics should be avoided unless obvious bacterial infection is present e.g. Otitis Media. Children with serious Bacterial Infection should be referred to the PAEDS Wards.
3. KCL supplements e.g. 2.5mls/kg/day to be given to children when on maintenance homemade O.R.S. Provided urine output is good.
4. Immunisations to be checked and given where due before discharge.

APPENDIX III THE PROTOCOL FOR THE REHYDRATION UNIT

GENERAL MANAGEMENT

1. Weights to be plotted on Road to Health chart
2. Serious complications developing after admission e.g. persistent Pyrexia, Kwashi, Fits etc. should be transferred to the main PAEDS Wards.
3. If child remains too ill for discharge after 48 hours on the R.U. then he/she must be transferred to PAEDS Ward.
4. All patients to be assessed for underlying illness.
5. M.O. to assess all children in the morning and afternoon plus on request of the attending nurse or "mother".
6. MAXIMUM STAY ON UNIT IS 48 HOURS.

HEALTH EDUCATION

1. Principles of homemade oral rehydration solutions plus need to give early i.e. as soon as the child has diarrhoea.
2. How to recognise the signs of dehydration plus an explanation of the process of diarrhoea and dehydration.
3. The need to feed a child with diarrhoea as well as giving extra fluids.
4. Safe water for drinking ...Boiling
...Jik
5. Cleanliness / personal hygiene / proper sanitation and waste disposal.
6. G.O.B.I. F.F.F. i.e.....

APPENDIX III THE PROTOCOL FOR THE REHYDRATION UNIT

6. Cont/ ...

G - Use of growth charts

O - Oral rehydration (as before)

B - Breast Feeding

I - Immunisation

F - Family spacing

F - Feeding ... with particular emphasis here on good weaning foods

F - Female education.

APPENDIX III THE PROTOCOL FOR THE REHYDRATION UNIT

REHYDRATION UNIT : DISCHARGE CRITERIA

1. The child must be
 - a) Rehydrated
 - b) Retaining fluids adequately
 - c) Taking feeds
 - d) Diarrhoea improved

If the diarrhoea is not completely settled but is improving (i.e. ↓ frequency and better consistency) plus the general well being of the child is good (as above) then he/she can be discharged.

2. Mothers should understand the principles of O.R.S. and have received adequate health education.

MAXIMUM STAY ON R.U. IS 48 HOURS

3. If patient is unfit for discharge at this time then he/she must be transferred to the main wards.

ON DISCHARGE

1. All mothers to be instructed to return if diarrhoea persists for more than two days or worsens or recurs.
2. All mothers must be advised to attend W.B.C. to monitor the child's further growth etc. (W.B.C. WELL BABY CLINIC)
3. All patients to be given a follow up date for 1 month (P.O.P.D.) for further research purposes.

APPENDIX III THE PROTOCOL FOR THE REHYDRATION UNIT

ORAL FLUID REGIMES

If in a state of shock refer to IV fluid chart.

ORAL REHYDRATION

Use standard rehydration solution eg. Sorol, Kalena.

1. Give a **minimum** of 10mls/Kg/hour. If the child will take more, this should be encouraged. Fluids to be given at least hourly during the day. During the night can be given 3 hourly if the child's condition is not serious (i.e. minimum 30mls/Kg/3hours).*
2. If the child is vomiting / restless / irritable -----use teaspoons every 2---3 minutes.
3. If above regime fails try a nasogastric drip. Oral electrolyte solutions should be put into empty vacolitrines (don't use IV $\frac{1}{2}$ Darrows Dextrose for oral use). Advisable to wash out stomach with the solution first if the child is vomiting and then run the NG drip at rates of 10mls/Kg/hour up to 40mls/Kg/hour as directed by Medical Officer.

* Need to continually reassess child's hydration and increase amounts if this is not improving.

ORAL MAINTENANCE FLUID AFTER REHYDRATION

Continue to use Sorol / Kalena, or use ;-

Homemade O.R.S.

- 1 litre boiled water
- $\frac{1}{2}$ teaspoon salt
- 8 teaspoons sugar.

Maintenance fluids can be given as required to replace ongoing losses.

- e.g. $\frac{1}{2}$ cup (+-150mls) for each liquid stool to children less than 10kg (or 1 year).
- 1 cup (+-250mls) for children -----10kg.

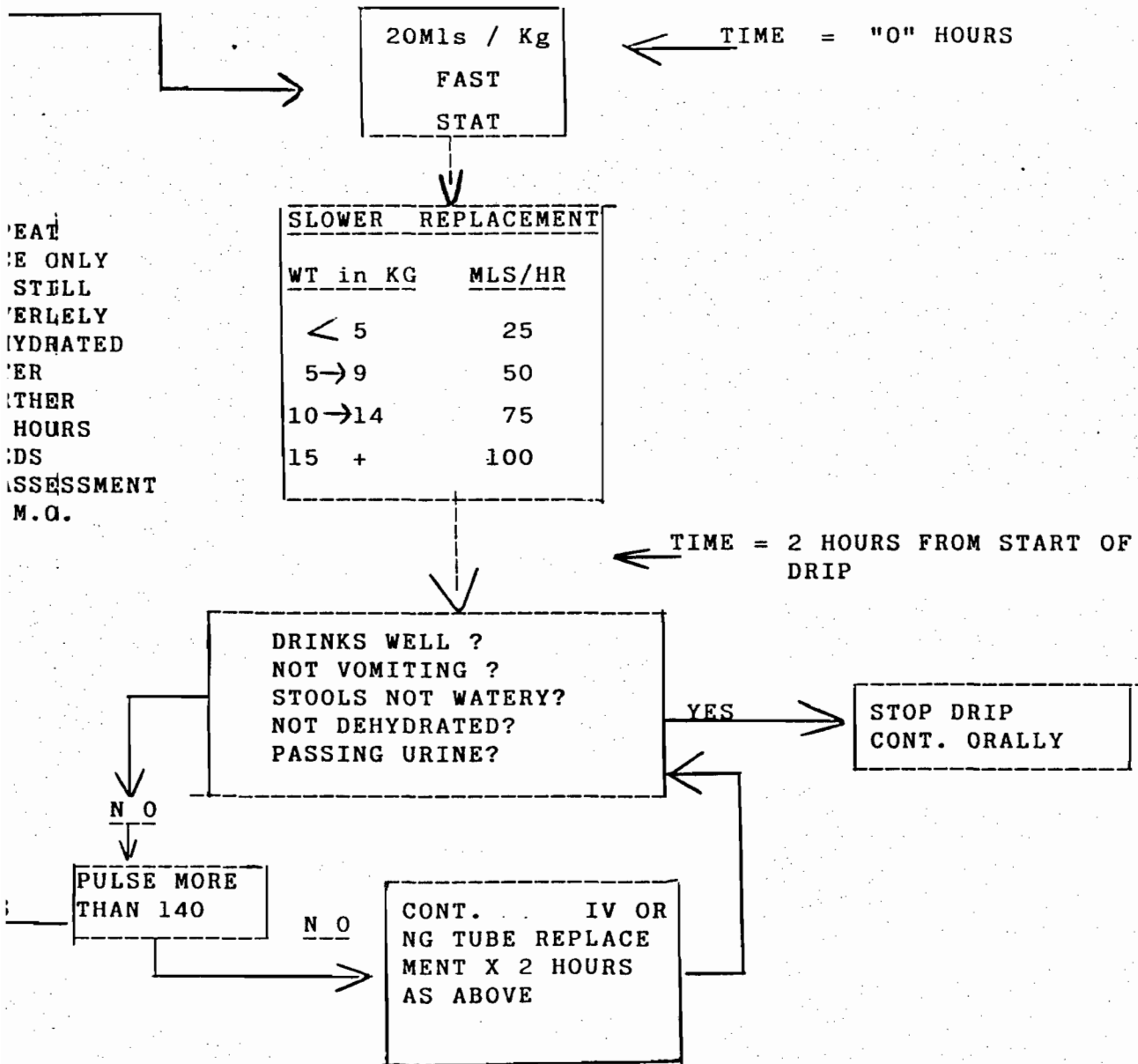
* Breast feeding and continued feeding is in addition to the above fluids.

APPENDIX III THE PROTOCOL FOR THE REHYDRATION UNIT

A P P E N D I X II

I.V. FLUID REGIMES

All patients in a state of shock (peripheral circulatory collapse)
 i.e. $\geq 10\%$ Dehydrated $\frac{1}{2}$ St. DARROWS / DEXTROSE SOLUTION TO BE USED.



APPENDIX III THE PROTOCOL FOR THE REHYDRATION UNIT

WHO CRITERIA OF PROTEIN ENERGY MALNUTRITION

	NO OEDEMA PRESENT	OEDEMA PRESENT
% OF 50th CENTILE SS FOR AGE (BELOW 3rd CENTILE ROAD TO HEALTH = BELOW THE AD SHADED IN	UNDERWEIGHT	KWASHIAKOR
% OF 50th CENTILE SS FOR AGE BELOW THE VERY LOW NE ON ROAD TO HEALTH CARD	MARASMUS	MARASMIC.... ..KWASHIAKOR

B.

CHILD WITH KWASHIAKOR MAY HAVE A WEIGHT WITHIN THE NORMAL SHADED AREA ON
THE ROAD TO HEALTH CHART (OR EVEN ABOVE THE 97th CENTILE)

APPENDIX III THE PROTOCOL FOR THE REHYDRATION UNIT

A P P E N D I X IV & NURSES DUTIES

1. SUPERVISE AND INSTRUCT "Mothers" in the preparation and giving of rehydration solutions.
2. OBSERVATIONS of child's condition and progress especially recording of a) pulse, temp, resp. rate 4 hourly (unless otherwise indicated by M.O.)
b) STRICT INPUT / OUTPUT CHART
Mothers to assist nurses at all times in adequately recording fluids given, stools, vomitus, urine. They must be taught this and supervised accordingly.
3. HEALTH EDUCATION as indicated in the management policies of the unit. Both on an individual level and in group discussions.... the later to take place in am and pm.
4. Clerical duties as necessary.
5. IV Drips / NG Tubes / Medications as ordered.
6. IMMUNISATIONS to be checked and given where indicated.
7. Clinic Cards / ROAD TO HEALTH CARDS to be checked and updated. If not available a new one to be filled out and issued to the patients.
8. Any change in condition to be reported to the Med. Officer on call.
9. Patients to be weighed daily.

A P P E N D I X V

ENVISAGED REQUIREMENTS / EQUIPMENT FOR R.U.

1. Safe Water, plus means of boiling water e.g. paraffin or gas stove with adequate protection for prevention of accidents.
2. Means of measuring 1 Litre e.g. Coke Bottles...washed 1 Litre cartons.
3. Salt and sugar / orange juice to add if necessary.
4. Teaspoons and cups.
5. Rehydration solution sachets .. Sorol is suggested
6. KCL oral solution.
7. $\frac{1}{2}$ St Darrows / Dextrose for IV fluids.
8. Paediatric IV giving sets + paedatrols.
9. IV Cannulas / scalp vein sets / tourniquets
10. Swabs / strapping / P.O.P. / shaving equipment.
11. N.G. Tubes sizes '5' and size '8'.
12. IV soda Bicarbonate.
13. A set area for drip setting with a good light.
14. Cots / Boxes for children plus place to hang NG or IV Drip sets.
15. Floor beds for mothers.
16. Chairs for mothers and staff.

APPENDIX III THE PROTOCOL FOR THE REHYDRATION UNIT

17. Washing facilities for mother and child.
18. Place for mother to rest / have a break
19. Linen.
20. Nappy disposal system.
21. Food for mothers and children.
22. Formula feeds where necessary.
23. Charts / Notes for patients.
24. Road to health cards
25. Weighing scales
26. Hand disinfectant sprays for attendants (mothers should be encouraged to wash their hands after dealing with soiled linen).
27. Teaching aids / posters/ handouts (see appendix VI)
28. Cut down pack.
29. Stool / urine / blood containers plus lab. forms.
30. Syringes / Needles
31. Admission records book.

APPENDIX III THE PROTOCOL FOR THE REHYDRATION UNIT

A P P E N D I X VII

POSTERS TO BE DESIGNED FOR R.U.

1. Preparation of oral Rehydration.
2. Breast Feeding
3. Recognition of dehydration
4. Nutrition :
 - Weaning diets
 - Meals per day
 - Local Foods
 - Feeding sick children
5. Sanitation :
 - Flies
 - Pit Latrines
 - Waste Disposal
 - Washing Hands
6. Safe Water :
 - Jik
 - Boiling
7. Road to Health Charts.

CLINICAL ASSESSMENT OF SEVERITY OF DEHYDRATION (W.H.O. GUIDE)

Signs and Symptoms

Moderate Dehydration

Severe Dehydration

General appearance and condition

Thirsty; Restless or lethargic and drowsy but irritable to touch

Drowsy, limp, cold, sweaty, cyanotic extremities, may be comatosed.

Radial pulse

Rapid and weak

Rapid, feeble, impalpable

Respiration

Deep. May be rapid

Deep and rapid

Anterior fontanelle

Sunken

Very sunken

Systolic blood pressure

Normal or low

Less than 90 mmHg/unrecordable

Skin elasticity

Pinch leads to slow retraction

Pinch leads to very slow retraction (>2 secs)

Eyes

Sunken (detectable)

Grossly sunken

Tears

Absent

Absent

Mucous membranes

Dry

Very dry

Urine flow

Reduced amount and dark

None passed for several hours plus empty bladder

% Body weight loss

6 to 9%

10% or more

***Extracted from "A manual for treatment of acute diarrhoea" W.H.O. 1980 Geneva (WHO/CDD/SER/80.2)**

APPENDIX IV THE RESEARCH PROTOCOL

RESEARCH PROTOCOL

M. PRAX. MED. PART II

DR. L.A. DAVIES.

A PROFILE OF CHILDREN ADMITTED TO A REHYDRATION UNIT

PURPOSE

To determine the profile of children admitted to the Rehydration Unit at Osindisweni Hospital.

OBJECTIVES

1. To determine in respect of the children admitted to the Rehydration Unit:-
 - a) The Demographic Profile
 - b) The Morbidity and Mortality
 - c) The Nutritional Status
2. To ascertain the availability of health care and previous exposure to the principles of "G.O.B.I." at the place of health care delivery.
3. To assess, in respect of "G.O.B.I.", the knowledge of the Mother/Guardian on admission, at discharge and at follow-up of the children treated at the Rehydration Unit.
4. To ascertain the attitudes of the Mother/Guardian to the Rehydration Unit.
5. To make recommendations, where necessary, regarding modifications to health care rendered at the Rehydration Unit.

CRITERIA

1. CHILDREN - For the purpose of this study this will be defined as all persons less than three years of age.
2. REHYDRATION UNIT - A room in Osindisweni Hospital, set aside for the management of children, less than three years of age, with acute diarrhoeal illnesses. A protocol for this unit is included in the appendix.
3. OSINDISWENI HOSPITAL - A State run hospital situated approximately 50 km. north and inland from Durban, serving both a rural and a periurban population. 85% of patients are African and the remaining 15% Asian.
4. DEMOGRAPHIC PROFILE - An outline of the age, sex, racial group and area of residence of the children admitted to the Rehydration Unit.
5. NUTRITIONAL STATUS - To be determined on a weight for age basis.
6. AVAILABILITY OF HEALTH CARE - Distance to, cost of travel plus cost of treatment at;
 - a) Nearest clinic
 - b) General Practitioner
 - c) Hospital
 - d) Traditional Healer
 - e) Faith Healer
7. "G.O.B.I." - This is part of the U.N.I.C.E.F. mnemonic for some of the essential tools for promoting health in all children. It is broken down as follows:-

APPENDIX IV THE RESEARCH PROTOCOL

- G. = Growth Charts
- O. = Oral Rehydration
- B. = Breast Feeding
- I. = Immunisations

REDUCTION OF BIAS.

1. All patients admitted to the Rehydration Unit during the study period will be included in the study.
2. A standardized questionnaire will be used.
3. The protocol will be adhered to
4. A thorough briefing of all staff attending to patients in the unit, and all persons involved in completing / handling the questionnaires will be undertaken.

METHOD.

1. Permission to conduct the study will be obtained from the Medical Superintendent of Osindisweni Hospital.
2. The main study will be a prospective study and will include all admissions to the Rehydration Unit over a one year period from 01.06.87 to 31.05.88.
3. A standardized questionnaire will be used for all patients and will include information on the following;
 - a) A study number
 - b) Age, sex and area of residence of the patient
 - c) Assessment of severity of presenting symptoms and signs on admission, discharge plus follow-up
 - d) Nutritional status on discharge plus follow-up in terms of wt. for age using standard road to health charts.
 - e) Distance travelled to health care facilities as defined in the criteria, plus cost of such travel and cost of treatment.
 - f) Previous exposure to "G.O.B.I." and where exposure took place.
 - g) Knowledge and usage of "G.O.B.I." on admission, discharge and follow-up.
 - h) The cultural attitudes and beliefs of the parents/guardians towards the child's illness plus their attitudes towards the rehydration unit.
4. Before embarking on the main study, a pilot study will be undertaken to assess the viability of the questionnaire. This will be undertaken over the course of one week in the month of May using admissions to the childrens' wards at Osindisweni with a diagnosis of an acute diarrhoeal illness. The first ten such admissions during this week will be included in the pilot study.
5. All persons involved in the management of patients on the rehydration unit will be instructed in the method and objectives of the study. Any person involved in the filling in of questionnaires will be suitably trained beforehand. Such persons will be limited to the researcher, the Professional Nurses and Staff Nurses posted in the unit, and any Medical Officer with responsibility for the unit should the researcher be unavailable.

APPENDIX IV THE RESEARCH PROTOCOL

6. All patients will be followed up at one month from discharge by the researcher. If the researcher is unavailable a suitably appraised Medical Officer will review the patient and complete the questionnaire.
7. The questionnaires will be coded in such a way that the information can be entered into a computer for analysis. All the questionnaires will be collected and sorted by the researcher before entering into a computer. The sections of the questionnaires available for comment on attitudes and beliefs will be analysed separately by the researcher.
8. The findings will be presented in a dissertation, and recommendations made where necessary depending on these findings.

DATA SOURCES

1. Questionnaires
2. Records
3. Literature Survey
4. Personal Communications

LITERATURE SURVEY

This will be ongoing throughout the study period.

COLLATION OF DATA / ANALYSIS OF DATA

This will be undertaken by the researcher as outlined in the method.

PUBLICATION OF FINDINGS

A dissertation will be submitted in accordance with the requirements for the M. PRAX. MED. PART II, of the University of Natal.

BARRIER DATES.

- | | |
|---|----------------------|
| 1. Completion of Protocol | 22.05.87 |
| 2. Obtaining Authority | 22.05.87 |
| 3. Training Personnel and distributing questionnaires | 25.05.87 |
| 4. Pilot Study | 25.05.87 TO 31.05.87 |
| 5. Collection of data | 01.06.87 " 31.05.88 |
| 6. Collation / Analysis of data | 31.07.88 |
| 7. Completion / Submission of dissertation | 30.09.88 |



Departement van Gesondheid en Welsyn
Department of Health and Welfare

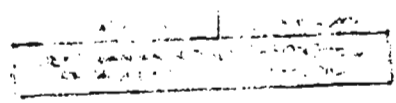
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Navrae/Inquiries Dr B. O'Dowd

Verwysing/Reference 18/3/2 Osindisweni



DR L.A. DAVIES' RESEARCH PROJECT : PROFILE OF CHILDREN
ADMITTED TO REHYDRATION UNIT

Approval is granted for the above research project. On completion of the study the Regional Office requests a copy of the findings and recommendations as these could have a bearing on services rendered by the Department.

for REGIONAL DIRECTOR
NATIONAL HEALTH AND POPULATION DEVELOPMENT : DURBAN

SECTION ONE

DIX VI THE QUESTIONNAIRE

DATA TO BE COLLECTED ON ADMISSION:

PATIENT'S NAME : _____

ADDRESS : _____

FILE NUMBER : _____ STUDY NUMBER : _____

DATE OF ADMISSION : _____ DAY MONTH YEAR

TIME OF ADMISSION : _____ HOURS MINUTES

DATE OF BIRTH : _____ DAY MONTH YEAR

AGE IN MONTHS : _____

SEX : M: 1 F: 2

AREA OF RESIDENCE : RURAL 1 URBAN 2

RACIAL GROUP : ASIAN 1 COLOURED 3

AFRICAN 2 WHITE 4

MEDICAL DATA

WT. ON ADMISSION IN KG. _____

RESPIRATORY RATE PER MINUTE _____

TEMPERATURE °C _____

ASSESSMENT OF DEHYDRATION (TICK ONE ONLY) MILD 1
MODERATE 2
SEVERE (SHOCKED) 3

LENGTH OF ILLNESS IN DAYS _____

NUMBER OF STOOLS FOR PRECEDING 24 HOURS _____

NUMBER OF VOMITS FOR PRECEDING 24 HOURS _____

NATURE OF STOOL (MORE THAN ONE CAN BE TICKED)
WATERY _____ 1
LOOSE _____ 2
MUCCUS _____ 3
BLOOD _____ 4
WORMS _____ 5
GREEN _____ 6
YELLOW _____ 7
OTHER _____ 8

PLEASE SPECIFY ANY OTHER SYMPTOMS _____

SPECIFY ANY OTHER COMPLICATING ILLNESS / SIGNS _____

ANY HERBAL MEDICINE GIVEN? YES 1 NO 2
 ANY ENEMA GIVEN? YES 1 NO 2

SPECIFY TYPE OF ENEMAL GIVEN _____

PARENT/GUARDIAN CULTURAL ATTITUDES / BELIEFS OF THIS ILLNESS _____

RELATIONSHIP TO THE PATIENT OF PERSON GIVING THE INFORMATION _____

HEALTH CARE DATA

PREVIOUS ATTENDANCE FOR THIS ILLNESS AT:-
 OSINDISWENI 1
 HEALTH CLINIC 2
 OTHER HOSPITAL 3
 GENERAL PRACTITIONER 4
 FAITH HEALER 5
 TRADITIONAL HEALER 6
 NONE 7

NUMBER OF PREVIOUS ADMISSIONS TO ANY HOSPITAL FOR
 DIARRHOEAL ILLNESS

NUMBER OF PREVIOUS EPISODES OF DIARRHOEA

ACCESSIBILITY OF NEAREST HEALTH CARE FACILITIES:-

	ESTIMATED DISTANCE IN KILOMETRES	RETURN TRANSPORT COST		COST OF TREATMENT PER VISIT	
		R	c	R	c
CLINIC	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
GENERAL PRACTITIONER	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
TRADITIONAL HEALER	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
FAITH HEALER	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
HOSPITAL	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

CLINIC CARD BROUGHT? YES 1 NO 2

NUMBER OF VISITS TO WELL BABY CLINIC

..3..

IMMUNISATION STATUS FOR AGE

COMPLETE 1
 In-COMplete 2
 NONE 3

DOES PARENT / GUARDIAN RECOGNISE:

A GROWTH CHART?

YES 1 NO 2

WHERE CARD IS AVAILABLE HAS CHILD'S WT. BEEN PLOTTED ON THE CARD PREVIOUSLY?

YES 1 NO 2

DOES PARENT / GUARDIAN HAVE ANY UNDERSTANDING OF THE GROWTH CHART?

YES 1 NO 2

ANY KNOWLEDGE OF O.R.S.?

YES 1 NO 2

A CORRECT FORMULA FOR O.R.S. USED?

YES 1 NO 2

WAS HOME MADE O.R.S. GIVEN FOR THIS ILLNESS?

YES 1 NO 2

IS THE CHILD : BREASTFED?

YES 1 NO 2

(CAN TICK MORE THAN ONE) BOTTLE FED?

YES 1 NO 2

TAKING SOLID FOOD?

YES 1 NO 2

ANY PREVIOUS CONTACT WITH OSINDISWENI AT:

(CAN TICK MORE THAN ONE)

A.N.C 1

DELIVERED HERE 2

WELL BABY CLINIC 3

O.P.D. 4

ADMISSIONS 5

NONE 6

R.U.

7

PREVIOUSLY INSTRUCTED ON FOLLOWING AT OSINDISWENI?

(IF NO PREVIOUS CONTACT WITH OSINDISWENI ANSWER NO TO ALL THESE QUESTIONS)

BROWTH CHARTS YES 1 NO 2

O.R.S. YES 1 NO 2

BREAST FEEDING YES 1 NO 2

IMMUNISATION YES 1 NO 2

SECTION TWO

DATA TO BE COLLECTED ON DISCHARGE

MEDICAL DATA

DATE OF DISCHARGE

DAY	MONTH	YEAR
<input type="text"/>	<input type="text"/>	<input type="text"/>

TIME OF DISCHARGE

HOUR	MINUTE
<input type="text"/>	<input type="text"/>

OUTCOME :

DISCHARGED HOME	<input type="text"/>	1
*TRANSFERRED TO WARD	<input type="text"/>	2
*TRANSFERRED TO OTHER HOSPITAL	<input type="text"/>	3
DIED	<input type="text"/>	4
OTHER (SPECIFY) _____	<input type="text"/>	5

*REASONS FOR TRANSFER _____

INVESTIGATION RESULTS (IF ANY) _____

INTRAVENOUS FLUIDS USED? YES: 1 NO: 2

WT. ON DISCHARGE IN KG.

RESP. RATE / MIN.

TEMPERATURE °C

ANY OTHER SIGNIFICANT FINDINGS / ILLNESS DIAGNOSED _____

NUMBER OF STOOLS FOR PRECEDING 24 HOURS

NUMBER OF VOMITS FOR PRECEDING 24 HOURS.

CONSISTENCY OF LAST STOOL

SOFT	<input type="text"/>	1
SEMI-LOOSE	<input type="text"/>	2
LOOSE	<input type="text"/>	3
WATERY	<input type="text"/>	4
OTHER (SPECIFY) _____	<input type="text"/>	5

KNOWS WHEN AND HOW TO USE O.R.S.?	YES <input type="checkbox"/> 1	NO <input type="checkbox"/> 2
KNOWS A CORRECT FORMULA FOR O.R.S.?	YES <input type="checkbox"/> 1	NO <input type="checkbox"/> 2
WILL USE O.R.S.??	YES <input type="checkbox"/> 1	NO <input type="checkbox"/> 2
KNOWS TO CONTINUE FEEDING CHILD WITH DIARRHOEA?	YES <input type="checkbox"/> 1	NO <input type="checkbox"/> 2
UNDERSTANDS ROAD TO HEALTH GRAPH?	YES <input type="checkbox"/> 1	NO <input type="checkbox"/> 2
KNOWS ABOUT LOCALLY AVAILABLE NUTRITIONAL FOODSTUFFS?	YES <input type="checkbox"/> 1	NO <input type="checkbox"/> 2
WILL MOTHER BREAST FEED HER NEXT CHILD?	YES <input type="checkbox"/> 1	NO <input type="checkbox"/> 2
WILL SHE ADVISE OTHERS TO BREAST FEED?	YES <input type="checkbox"/> 1	NO <input type="checkbox"/> 2
KNOWS ABOUT THE NEED TO IMMUNISE CHILD?	YES <input type="checkbox"/> 1	NO <input type="checkbox"/> 2
WILL ATTEND FOR IMMUNISATIONS?	YES <input type="checkbox"/> 1	NO <input type="checkbox"/> 2

ATTITUDES TO THE REHYDRATION UNIT _____

KNOWS FOLLOW-UP DATE IN ONE MONTH? YES 1 NO 2

SECTION THREE

DATA TO BE COLLECTED AT FOLLOW-UP

DATE OF ATTENDANCE

MEDICAL DATA

DAY MONTH YEAR

WT. OF PATIENT IN KG.

STILL HAS DIARRHOEA?

YES 1 NO 2

NO. OF STOOLS FOR PRECEDING 24 HOURS

CONSISTENCY OF STOOLS :

SOFT 1

SEMI LOOSE 2

LOOSE 3

WATERY 4

OTHER (SPECIFY) _____ 5

ANY FURTHER BOUTS OF DIARRHOEA SINCE DISCHARGE?

YES 1 NO 2

ANY OTHER PROBLEMS? (SPECIFY) _____

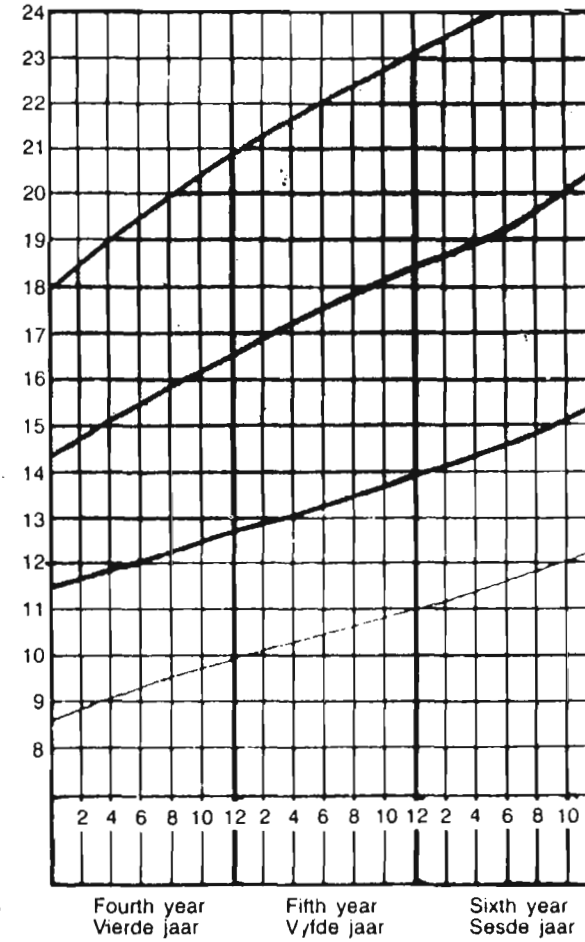
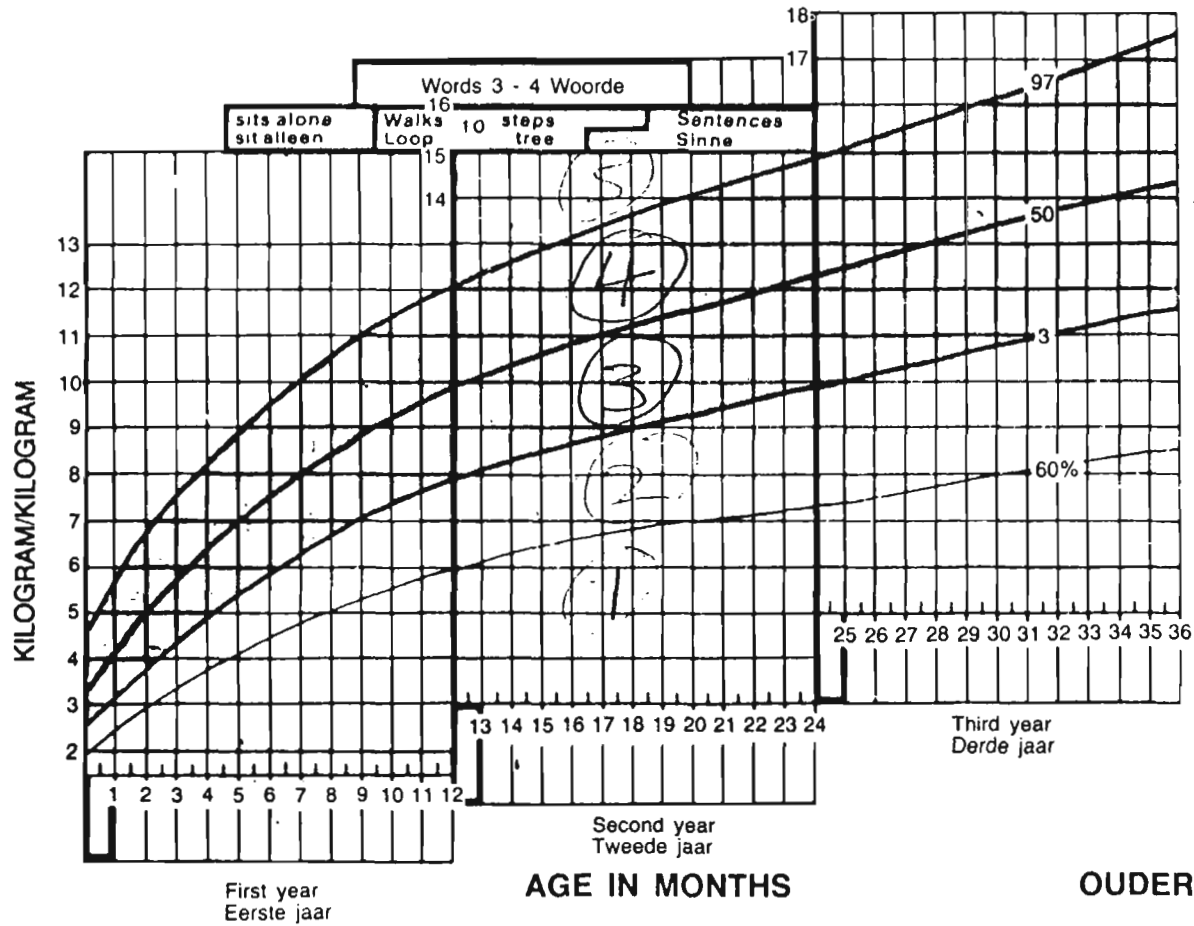
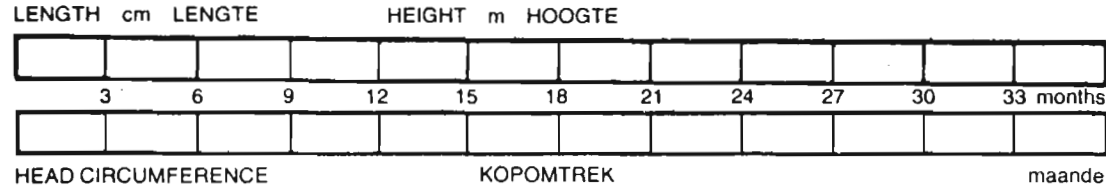
HEALTH CARE DATA

CLINIC CARD BROUGHT?	YES <input type="checkbox"/> 1	NO <input type="checkbox"/> 2
UNDERSTANDS ROAD TO HEALTH CHART?	YES <input type="checkbox"/> 1	NO <input type="checkbox"/> 2
USES AN ADEQUATE WEANING DIET?	YES <input type="checkbox"/> 1	NO <input type="checkbox"/> 2
USES A GOOD LOCAL DIET?	YES <input type="checkbox"/> 1	NO <input type="checkbox"/> 2
KNOWS LOCALLY AVAILABLE NUTRITIONAL FOODSTUFFS?	YES <input type="checkbox"/> 1	NO <input type="checkbox"/> 2

KNOWS WHEN AND HOW TO USE O.R.S.?	YES	1	NO	2
HAS USED O.R.S.?	YES	1	NO	2
KNOWS IMPORTANCE OF CONTINUED FEEDING DURING DIARRHOEAL ILLNESSES?	YES	1	NO	2
WILL BREAST FEED HER NEXT CHILD?	YES	1	NO	2
HAS ADVISED OTHERS TO BREAST FEED?	YES	1	NO	2
KNOWS ABOUT IMMUNISATIONS?	YES	1	NO	2
KNOWS WHEN TO ATTEND FOR NEXT IMMUNISATION?	YES	1	NO	2

ATTITUDE TO REHYDRATION UNIT _____

**GROWTH CHART
 GROEIKAART**



APPENDIX VIII STATGRAPHICS HEADINGS AND DATA

DATA FILE 7227

File	Variable	Type	Rank	Length
RR1	.star		1	262
RR1	.stodyn	N	1	262
RR1	.timeoradm	N	1	262
RR1	.agemontas	N	1	262
RR1	.sex	N	1	262
RR1	.area	N	1	262
RR1	.race	N	1	262
RR1	.wtonadm	N	1	262
RR1	.resprate1	N	1	262
RR1	.tempi	N	1	262
RR1	.dehydration	N	1	262
RR1	.illness	N	1	262
RR1	.nostools	N	1	262
RR1	.novomits	N	1	262
RR1	.watery	N	1	262
RR1	.loose	N	1	262
RR1	.mucous	N	1	262
RR1	.blood	N	1	262

Data Directory

File	Variable	Type	Rank	Length
RR1	.blood	N	1	262
RR1	.worms	N	1	262
RR1	.green	N	1	262
RR1	.yellow	N	1	262
RR1	.othernatur	N	1	262
RR1	.othersymp1	N	1	262
RR1	.othersymp2	N	1	262
RR1	.othersymp3	N	1	262
RR1	.othercompl	N	1	262
RR1	.herbalmed	N	1	262
RR1	.enema	N	1	262
RR1	.beliefs1	N	1	262
RR1	.beliefs2	N	1	262
RR1	.relation	N	1	262
RR1	.osind	N	1	262
RR1	.holinic	N	1	262
RR1	.otherhosp	N	1	262
RR1	.gp	N	1	262

APPENDIX VIII STATGRAPHICS HEADINGS AND DATA

Data Directory

File	Variable	Type	Rank	Length
RR1	.fradhealer	N	1	262
RR1	.noattend	N	1	262
RR1	.dadmits	N	1	262
RR1	.depisoles	N	1	262
RR2	.odist	N	1	262
RR2	.ctrancost	N	1	262
RR2	.ctreatcost	N	1	262
RR2	.gpdist	N	1	262
RR2	.gptrancost	N	1	262
RR2	.gptreatcost	N	1	262
RR2	.thdist	N	1	262
RR2	.thtrancost	N	1	262
RR2	.thtreatcost	N	1	262
RR2	.fhdist	N	1	262
RR2	.fhtrancost	N	1	262
RR2	.fhtreatcost	N	1	262
RR2	.hdist	N	1	262
RR2	.htrancost	N	1	262

Data Directory

File	Variable	Type	Rank	Length
RR2	.htrancost	N	1	262
RR2	.htreatcost	N	1	262
RR2	.cliniccard	N	1	262
RR2	.visitswbc	N	1	262
RR2	.immunstat	N	1	262
RR2	.recgrchart	N	1	262
RR2	.wtplotted	N	1	262
RR2	.undrgrchrt	N	1	262
RR2	.knowors	N	1	262
RR2	.formulaors	N	1	262
RR2	.homeors	N	1	262
RR2	.breastfed	N	1	262
RR2	.bottlefed	N	1	262
RR2	.solidfood	N	1	262
RR2	.anc	N	1	262
RR2	.delivered	N	1	262
RR2	.wbcclinic	N	1	262
RR2	.opd	N	1	262

APPENDIX VIII STATGRAPHICS HEADINGS AND DATA

Data Directory

File	Variable	Type	Rank	Length
RR2	.admissions	N	1	262
RR2	.nocontact	N	1	262
RR2	.ru	N	1	262
RR2	.grcharts	N	1	262
RR2	.ors	N	1	262
RR2	.brfeeding	N	1	262
RR2	.immunisatn	N	1	262
RR2	.studyno	N	1	262
RR3	.timedschrg	N	1	262
RR3	.stayinhrs	N	1	262
RR3	.outcome	N	1	262
RR3	.reasont1	N	1	262
RR3	.reasont2	N	1	262
RR3	.reasont3	N	1	262
RR3	.invfluids	N	1	262
RR3	.wtondschrj	N	1	262
RR3	.wtforage2	N	1	262
RR3	.resprate2	N	1	262

Data Directory

File	Variable	Type	Rank	Length
RR3	.temp2	N	1	262
RR3	.findings1	N	1	262
RR3	.findings2	N	1	262
RR3	.findings3	N	1	262
RR3	.nostools2	N	1	262
RR3	.novomits2	N	1	262
RR3	.consist2	N	1	262
RR3	.whenhwors2	N	1	262
RR3	.crrctfors	N	1	262
RR3	.willuseors	N	1	262
RR3	.feedd2	N	1	262
RR3	.rthgraph	N	1	262
RR3	.locnutfood	N	1	262
RR3	.willbrfd2	N	1	262
RR3	.advbrfd2	N	1	262
RR3	.knowimmun2	N	1	262
RR3	.attndimm2	N	1	262
RR3	.attitude2	N	1	262

APPENDIX VIII STATGRAPHICS HEADINGS AND DATA

Data Directory

File	Variable	Type	Rank	Length
RR3	.dayslater	N	1	262
RR3	.wt3	N	1	262
RR3	.wtstorage3	N	1	262
RR3	.stilld	N	1	262
RR3	.nostools3	N	1	262
RR3	.consist3	N	1	262
RR3	.furtherd	N	1	262
RR3	.probs1	N	1	262
RR3	.probs2	N	1	262
RR3	.probs3	N	1	262
RR3	.ccard3	N	1	262
RR3	.rthchart3	N	1	262
RR3	.adeqwd	N	1	262
RR3	.goodld	N	1	262
RR3	.locnutfd3	N	1	262
RR3	.orsform3	N	1	262
RR3	.whenhwors3	N	1	262
RR3	.usedors	N	1	262

Data Directory

File	Variable	Type	Rank	Length
RR3	.feedd3	N	1	262
RR3	.willbrfd3	N	1	262
RR3	.advbrfd3	N	1	262
RR3	.knowimmun3	N	1	262
RR3	.whenimmun3	N	1	262
RR3	.attitude3	N	1	262
RR3	.studyno	N	1	262

APPENDIX VIII STATGRAPHICS HEADINGS AND DATA

STATGRAPHICS Statistical Graphics System

MANAGEMENT AND SYSTEM UTILITIES

Job Management
System Environment
Report Writer and Graphics Replay
Graphics Attributes

GRAPHICAL AND DESCRIPTIVE STATISTICS

Plotting Functions
Descriptive Methods
Estimation and Testing
Probability Distribution Functions
Exploratory Data Analysis

LINEAR AND NONLINEAR REGRESSION ANALYSIS

Analysis of Variance
Regression Analysis

TIME SERIES PROCEDURES

L. Forecasting
M. Quality Control
N. Smoothing
O. Time Series Analysis

ADVANCED PROCEDURES

P. Categorical Data Analysis
Q. Multivariate Methods
R. Nonparametric Methods
S. Sampling
T. Experimental Design

MATHEMATICAL AND USER PROCEDURES

U. Mathematical Functions
V. Supplementary Operations

Prevention and Treatment of Diarrhoea at home

UKUVIKENI NOKVELAPHI I-SHUDO EKHAYA

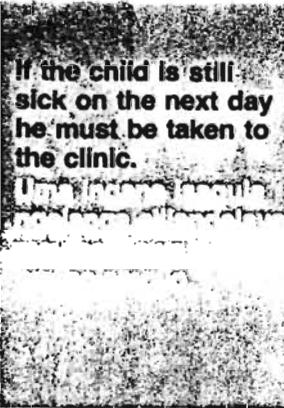
Prevent Diarrhoea like this:

1. Always use clean water for cooking and drinking. Tap water is already clean.
2. To clean other water, add 1 teaspoon Jik to 25l water.
3. Leave for at least 1 hour in the shade.
4. Wash your hands before touching food.



8. Give plenty of the mixture to the child often while the diarrhoea lasts. If the child is not passing urine, it means there is not enough fluid in his body.

Mphuzise kakhulu isiphozo umntwana zikhathizonke esaphethwe yeshudo. Uma ingane ingachami kusho ukoma akanamanzi emzimbeni wakhe.



Keep on breastfeeding the child.

Ihubeka ngokumncelisa bele umntwana.

10. Remember to give extra food to the child to make up for what he has lost.

Ihubeka ukutya oko nokondle ingane ukachiyisi osokulandekile emzimbeni.



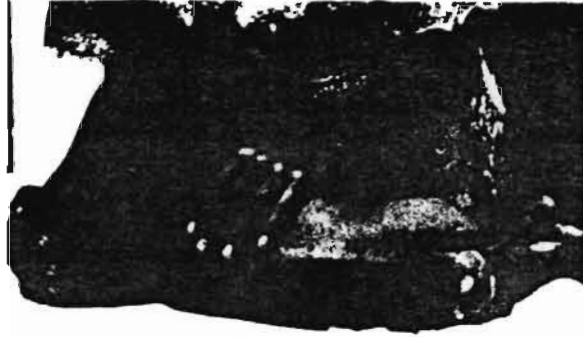
This leaflet is produced by the South African Sugar Association in the interests of better

wayiso sikhishwe INhlangano ka Shukela Ekazeni kwesampilo Yompakathi

ndlela yokwelapha isinudo:

If your child has diarrhoea, give him this mixture:

Uma ingane yakho ihuda, yinike isiphuzo esilandelayo:



2. Take 1ℓ clean water.
Thatha ilitha yamanzi
ahlanzekile.



3. Pour into a clean container.
Thela amathisipuni amlanzekele.



4. Add 8 level teaspoons sugar.
Thela amathisipuni alingene
angu 8 kashukela esitsheni.



5. Add ½ level teaspoon salt.
Thela uhlatu wethisipuni
olingene kasawoti esitsheni.



6. Stir well.
Caphuzela kahle.



7. Pour some into a mug.
Thela amathisipuni amlanzekele.



SOLUTION PREPARATION

EXAMPLE OF HANDOUTS TO BE GIVEN TO MOTHERS

KING EDWARD VIII HOSPITAL, DURBAN.

UKWELASHWA KWESIFO SOHUDO eBANTWANENI.

Izingane ezikapalatayo zilahlekelwa kakhulu ngamanzi, usawoti, noshukela emzimbeni yazo.

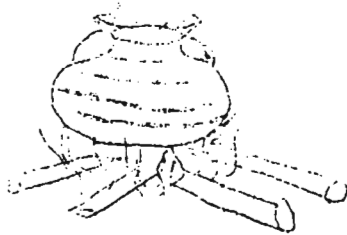
Uma lokho kungabuyiselwa, ingane yakho ingagula kakhulu (amehlo nokhakhayi kushone phansi).

UKWAKHWA KWAMANZI KASAWOTI NOSHUKELA OKUPHUZISA UMNTWANA (S.S.)

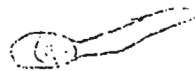
Amanzi
elitha



Wabilise

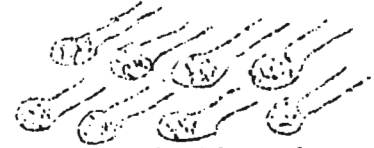


Faka Usawoti



uhafu wetispuni

Noshukela



Amatispuni
angu-8 Ayilevele

KEZA NJANI:

VZI (SS) ANGABI NOSAWOTI UKWEDLULA IZINYEMBEZI

Qhubeka nokudla kwakhe umntwana (ibhodlela, ibele noma ukudla okunye) uma engabuyisi.

Nikeza la manzi kasawoti ngesipuni, inkomishi noma ibhodlela (uma ebevel encela ebhodlela) phakathi kwezikhathi zokudla.

KEZA NINI:

Nikeza ngalo emuva kwemizuzu engu-30 noma emuva kokukaka.

Qhubeka kuze kungamuke ukukapalata noma isimo somntwana sishintshe kakhulu, lapo sekufanele abonwe ukodotela.

THAMBISA NINI KUDOKOTELE NOMA eKLINIKI:

Uma umntwana engawaphuzi amanzi noma ehlanza.

Uma umntwana eshisa noma engula kakhulu.

- nokunye

Uma ehuda igazi.

Uma amehlo nokhakhayi kushona phansi emva kwe nkomishi ezimbili noma ezintathu (2-3) zamanzi.

Uma ephefumula masinyane noma eyethile kumbe ethambile.

Uma engabingcono emva kwezinsuku ezimbili.

: 93 (b)

/KP

4/86