EVALUATION OF THE HEALTH EDUCATION COMPONENT OF DIARRHOEAL DISEASES CONTROL PROGRAMME AT IGBO-ORA RURAL HEALTH CENTRE

By

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Dedication

In loving memory of my late father

Mudima Zoza CHIRWA

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ABSTRACT

Oral Rehydration Therapy (ORT) is an innovative, inexpensive and effective approach to the treatment of diarrhoea and dehydration. Health education is a major component of an ORT programme. This study was designed to evaluate patient education approach to health education within an ORT Unit. It assesses mothers' gain and retention of knowledge due to exposure to oral rehydration education and also compares the knowledge of mothers who attended the ORT unit with non-attenders.

The study of quasi-experimental design was carried out in Igboora, Oyo State of Nigeria, between October 1986 and December 1986. Mothers who attended the ORT unit were the experimental group while those who did not, served as the control group. After three visits to each home of mothers who attended the ORT unit between its opening on 23rd October 1985 and 30th June 1986 a sample of 124 mothers was found at home and was interviewed. By geographical matching another sample of 110 mothers with pre-school children was also interviewed and constituted the control group.

Baseline data on the attenders was obtained from the records at the ORT unit which include a pretest and post test of mothers' knowledge on diarrhoea control and management. A questionnaire was used for home visit/interview that paralleled the records data in construction. In addition observation was used to assess mothers' ability to prepare sugar salt solution (SSS) in the home.

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The respondents in both experimental and control groups were similar as regards education, age, parity, religion and occupation. Almost all mothers in both experimental and control groups were able to recognise diarrhoea. However significantly more mothers in the experimental group gained and retained knowledge on danger, prevention, cause, treatment of diarrhoea and appropriate feeding during diarrhoea than the control mothers. More mothers exposed to health education at the ORT unit knew the national standard formula and correctly demonstrated preparation of SSS than did the control counter-parts, who were exposed to different recipes and only a few demonstrated the correct recipe. Knowledge and skill accounted for use in actual episodes of diarrhoea among experimental mothers. This was not the case with the control.

About a quarter of mothers in both experiment and control groups had a misconception that SSS stops diarrhoea rather than treats dehydration. Some control mothers expressed concern that ten level teaspoons of sugar in SSS may cause Jedijedi, culturally a more serious condition than diarrhoea.

The study has demonstrated that by aiplying an interactive and participatory demonstration approach to patient education, mothers can gain and retain knowledge and skill required to manage episodes of diarrhoea at home.

Based on the findings the author recommends firstly that the health education approach (interactive with participatory demonstration)

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utilized in the ORT unit be extended to the antenatal and under-five clinic sessions at the Rural Health Centre, as well as to the community. Secondly further studies should compare different approaches to SSS/ORT promotion. Specifically future studies in SSS/ORT should standardize documentation of input and impact analysis in order to provide proper comparison, to enhance objective judgement and thereby to enable selection of the best health education methods in ORT.

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CERTIFICATION

I certify that this work was carried out by Dr. B. U. CHUKWU, in the Department of Preventive and Social Medicine, College of Medicine, University of Ibadan, Ibadan, Nigeria.

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CHAPTER 1

INTRODUCTION

Child survival in the resource poor nations poses a great challenge to health workers. One health problem which accounts for great morbidity and mortality in the developing countries is dehydration due to diarrhoeal diseases. Many attempts to control this major health problem have involved either reduction of incidence of diarrhoea or reduction of the case fatality.

Reduction of the incidence of diarrhoea or attack rate constitutes the prevention of diarrhoea. This requires better sanitation and water supplies, improved personal hygiene, health education, adequate nutrition, specific protection (vaccination) and indeed many aspects of community development (WHO 1979). This is a long term goal particularly as some of its strategies, e.g. vaccination against diarrhoea pathogens, are still in the developmental stages.

The immediate goal of diarrhoea control is reduction of the case fatality rate. This requires better treatment of individual patients with diarrhoea. Such treatment is the immediate task for the full spectrum of health personnel from hospital staff to the village health worker. In fact it is also becoming increasingly clear that mothers should not only participate in caring for a child with diarrhoea but also take responsibility for early treatment of episodes of diarrhoea at home. Maternal involvement has been made possible by the discovery of oral rehydration therapy (ORT) which focuses on continued fluid and

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food intake during diarrhoea episodes. This cheap effective and appropriate technology has revolutionalized treatment of dehydration due to diarrhoea in both health institutions and homes. ORT as a primary health care tool and as a child protection strategy (Lancet 1983) has enabled WHO to attempt global control of diarrhoea.

The distribution problem associated with the prepackaged Oral rehydration salts (ORS) has lead to development of sugar salt solution (SSS) as an initial home remedy to prevent dehydration or treat mild cases of dehydration. A variety of formulae for SSS have been developed throughout the world depending on sizes of available water containers and measuring utensils for salt and sugar. Although much energy has been expended to promote ORT and SSS, low acceptance and adoption of this home remedy for diarrhoea has been common(WHO 1986[b]).

Many programmes are now incorporating health education to answer the acceptance problem with strategies such as mass media, home visits and clinic demonstrations. For health education to succeed it must be addressed to the root of the acceptance problem, in this case the lack of consideration of social and behaviour factors in planning and implementing ORT programmes (Mosley 1986). The ideal approach to health education is one that encourages mothers to take a central role in the ORT programme (de Zoysa 1984 and Creese et al 1985).

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It is one thing to hypothesize about the elements of successful health education programmes and another to have hard data to support this. The author notes that existing evaluation exercises on health education activities in ORT are rare. Those that exist have assessed programmes which utilized either mass media or personalized approach. Lack of standardized input and output measures have been noted. While health education programmes reported in the literature have been either community or clinic based(or a combination), none has been based on a patient education approach as would be relevant for use in a clinic based ORT unit. This study aims not only at adding to the existing small body of general knowledge on health education evaluation in ORT but also to fill the gap concerning the patient education approach.

Igboora, a town of 60,000 people in the Ibarapa Local Government of Oyo State, Nigeria, is the community where this study takes place. Igboora is also base of the University of Ibadan's Ibarapa Community Health Programme, a training, research and service programme that was established in 1963. Because of the Ibarapa Programme useful background information is available on the nature of the diarrhoea problem in the study area.

Medical students' studies have estimated a prevalence of diarrhoeal diseases among preschool children in Igboora as 11.6% for June and July 1985 (Ubadike et al, 1985) and in Idere, a neighbouring

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town, 10.7% for April and May 1986 (Ifatoicm et al, 1986). Hospital records in the preschool clinic of the Igboora Rural Health Centre showed that in 14.8% of children diarrhoea was the presenting complaint in 1983, while in 1984 the figure was 13.4%. This represented an average of 5.1 diarrhoea patients per clinic day over the two year period.

Diarrhoea persists in Igboora and Idere inspite of the fact that both towns have been served with pipe borne water since 1967. Unfortunately after nearly two decades of service, the water system which serves four towns, is not only stretched beyond its original capacity but also experiences serious maintenance problems. Consequently water flows in Igboora on average only twice a week. Hand dug wells are becoming more common in the community but surrounding streams are another source of domestic water supply. Unfortunately the wells are not a safe alternative. Another medical student survey documented diarrhoea prevalence in Igboora preschool children whose families used well water was 19.1% during the month prior to survey compared to only 5.6% prevalence in preschool children whose families relied on tap water (Adebiyi et al, 1987).

Added to the water problem is the almost complete lack of sanitary human waste and refuse disposal systems. According to a recent survey few people in Igboora make regular use of a water closet (2.8%) or a pit latrine (3.6%) (Aigbojo-Oduwole et al, 1986).

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The majority of the population defecate in the surrounding bushes. Small children commonly ease themselves on the collective refuse dumps scattered in open spaces within and around town. Faeces was found to comprise 5.7% of solid matter at such refuse dumps according to another medical students' study (Ademuga et al, 1984). To give an idea of poor sanitary facilities Akenroye et al (1984) found 51.1% of Igboora secondary school pupils had at least one type of intestinal helminth in stool sample.

In the event of a diarrhoea episode, patients have a variety of health service options to choose from. The Igboora Health Centre has a 24-hour service with a wide compliment of staff and a more reliable supply of drugs from the state pharmacy, supplemented by a low cost drug store run by the Igboora Development Committee. The two local government dispensaries sited within Igboora have service hours between 7.30 a.m. and 3.30 p.m. They are staffed by trained Pharmacy Assistants and Community Health Assistants, and drug supply is erratic. There are four private clinics well spaced out in Igboora namely Colony, Idura Itwol and Abivere. All provide 24-hour service. The last one is the only one without the service of a resident medical doctor and in patient service. The consultation fees are prohibitive, and as a result the medicine sellers (patent stores) of which there are twenty four, not only sell but also prescribe medicine for their clients. A survey carried out by Abiola et al (1983) showed that in 40% of cases the medicine

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seller was the first contact of the Igboora health consumer.

To complement the modern health services are the traditional medicine men who still flourish in Igboora. Olumide et al (1986) in a pilot survey on primary health care found that the traditional healer was the fourth source of drugs among respondents and that Agunmu jedijedi for diarrhoea constituted 2.8% of drugs usually kept at home in Ibarapa.

Until recently management of diarrhoea episodes in both home and clinic relied heavily on drugs. Oral rehydration salts (ORS) packets have not been among the regular items supplied to government dispensaries and pharmacies. Occasional health talks on sugar salt solution (SSS) have been going on at the Rural Health Centre since 1976. The formula promoted was that of pinch, scoop and cup method (Morley 1973). A survey of Igboora mothers conducted a year before this study showed that nearly three quarters of them knew about oral rehydration therapy (ORT) but only about 20% reported using ORT in diarrhoea management (Ubadike et al, 1985).

An ORT Unit has been established at the Igboora Rural Health Centre since September 1985. Services include health education utilizing the patient education approach for mothers whose children are having bouts of diarrhoea. This study assesses mothers' gain of knowledge on diarrhoea and ORT immediately after health education in the ORT Unit as well as retention of this knowledge some months later. Against this background mothers were followed up to their

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homes three to nine months after health education. Mothers ability to prepare SSS was observed and reported use of SSS in actual episodes of diarrhoea was sought. This focus on the home is important since education on diarrhoea and ORT is aimed at transfering skills to mothers for prevention of dehydration and treatment of mild dehydration in the home.

This brief introduction to the research problem serves as the first chapter of the text. Chapter two reviews literature on diarrhoea and ORT. Diarrhoea as a global problem threatening child survival through high mortality and morbidity is described. Traditional long and short term options for tackling diarrhoea are reviewed and found inadequate. This explains the shift in emphasis from diarrhoea to its complication, dehydration. The discovery of ORT as is a cheap effective technology for controlling diarrhoea has lead to attempts at global control.

It is noted that management of acute diarrhoea in children commonly takes place at two levels. First and more important is the home where appropriate treatment if given early in the course of diarrhoea will prevent dehydration. The second level is at the health institution. The former can be effective if all mothers have the knowledge and skill for preventing dehydration in the home. Hence the need for health education in ORT programmes.

Health education is a systematic and planned activity based on scientific principles. The conceptual and theoretical issues involved in planning health education relevant for ORT are therefore reviewed. Included are theories concerning diffusion of innovations and the issues involved in developing appropriate strategies to promote the diffusion and communication process.

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This sets the stage for the role of evaluation in the health education planning process.

Evaluation is variously defined but involves a central theme of measurement, comparison and judgement. Of particular concern in evaluation of health education are the health and related behaviours of the client group and the antecedent factors such as knowledge and skills (Green et al 1980).

From this perspective the few studies on evaluation of health education in ORT are reviewed and critiqued.

Chapter three begins with a description of the geographical area where the study took place as well as the services provided at the ORT Unit where health education on diarrhoea and SSS was undertaken. A brief account is given of the health education process, that is the programme inputs which are being evaluated. The objectives of the health education are clearly delineated. These objectives formed the basis for developing the objectives of the study which are as follows:

1. To assess mothers' gain and retention of knowledge and skill due to exposure to health education in the ORT Unit.
2. To compare the knowledge and skill of mothers who attended the ORT Unit with non-attenders.

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The above will be considered in light of the following specific factors :

(a) Knowledge of the cause, danger, prevention and management of diarrhoea.

(b) Knowledge of the formula for preparing home made SSS.

(c) Ability to demonstrate preparation and use of SSS.

(d) Reported actual utilization of home made SSS.

(e) Reported feeding practices of children with diarrhoea.

(f) Opinions on the usefulness of SSS.

(g) Knowledge, opinion and practices concerning drugs in the treatment of diarrhoea.

The scope of the study is limited to assessing educational and behavioural indices. The study is of quasi-experimental design with mothers who attended ORT health education unit being the experimental set. A post hoc control group of non-attenders was selected by the researcher from the study area. Baseline data on experimental respondents was collected through review of records kept by the ORT unit for this specific purpose.

Each mother who attends the Unit is given pre and post tests concerning diarrhoea and ORT. The researcher added the important component of home follow up. Interview using a questionnaire and observation check list on preparation of SSS were the data gathering tools used in the home. The validity and reliability of data collecting methods as well as limitation of the study are documented.

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Chapter four presents the results of the study. First the demographic variables are compared showing similarity between the experimental and the control mothers. Secondly mothers perceptions of cause, prevention, danger and recognition of diarrhoea are presented. The data is compared from five perspectives. Response of experimental mothers at pretest are compared with the answers given by control mothers. Pretest and post test results of experimental mothers on arrival and before departure from the ORT unit are also compared. Next the experimental mothers' answers at follow up are viewed against both pretest and post test responses. The final comparison is between experimental mothers at follow up and the control group. In this way hypotheses about gain of knowledge, retention of ideas and skills and also the effect of the programme can be tested.

The third subsection of the chapter looks at mothers' care and treatment of children during diarrhoea episodes. The next section presents mothers ability to demonstrate preparation of SSS and also examines the availability of equipment and ingredients for preparing the solution. Finally mothers' reported use of SSS in actual episodes of diarrhoea and their opinion on the usefulness of SSS concludes the chapter.

Chapter five discusses results and draws conclusions. It is observed that patient education approach to health education in ORT is not only worthwhile but also produces significant results. However the short coverage period implies that it has a smaller and a slower coverage.

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To overcome this recommendations are made for expanding ORT education from its base at the unit in the health centre. Suggestions are also made for future studies in ORT.

A new technology like ORT is not considered appropriate simply because it is inexpensive or incorporates locally available materials. The true test of appropriateness is in the actual acceptance and use of the innovation. ORT applied by mothers can be revolutionary in terms of child survival. Hopefully this study will contribute to the understanding of how health education can enable this innovation come to fruition.

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CHAPTER TWO

LITERATURE REVIEW

Introduction

Diarrhoeal disease in young children poses a major problem for child survival and a major challenge to health workers, especially health educators. This chapter will begin with a brief outline of the nature and magnitude of the problem of diarrhoea and dehydration. Management options for both diarrhoea and dehydration and intervention strategies for prevention of diarrhoea and dehydration will be described.

With this background the chapter will look at the evolution of home-based management of dehydration from simple salt and sugar solution (SSS) to the development of international standard for packaged Oral Rehydration Salts (ORS). The unavailability of this powerful innovation, the ORS packet, in many communities has led to reversion to home-based treatment of dehydration with a standardised local formulae for SSS.

Since the home-based management of diarrhoea and dehydration rests almost entirely on the knowledge, skills and attitudes of mothers and other family members, health education has become the central strategy for promoting acceptance and use of ORS technology. As a consequence there is need for evaluation of existing educational programmes to determine the effectiveness of various methods and approaches. Therefore the chapter will conclude with a review of

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evaluation issues in health education in general and health education for oral rehydration therapy (ORT) in particular.

Nature of the problem

Many children under the age of five suffer from diarrhoeal diseases and many of these die from the effects of loss of body fluids and salts culminating in dehydration. Each child experiences on the average three episodes of diarrhoea per year during the first two years of life and in some areas the incidence is much higher (Snyder and Merson, 1982). Prospective studies carried out in some developing countries such as Guatemala, India and Indonesia have shown that during the first three years of life children experience one to two episodes of severe acute diarrhoeal diseases of which one to four per cent are fatal (Gordon et al. 1963, Guatemala, 1975 and Fagbami and Oyejide, 1986). While in Nigeria a prospective study in an urban community suggests that children suffer from three diarrhoeal episodes per child annually (Oyejide et al.1986). A similar finding was reported by Khan (1984) in Bangladesh who found 3.2 attacks of diarrhoea per child per year.

Over all in Asia, Africa and Latin America it has been estimated that about 750 million children below five years of age suffer from acute diarrhoea each year. The case fatality from these episodes has been put at three to six million annually. Those who recover or survive repeated episodes of diarrhoea may suffer from

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malnutrition and mental retardation because of associated food restriction, anorexia and malabsorption (WHO, 1984).

In most developing countries diarrhoea ranks as the second commonest cause of morbidity, malaria being the first. In Nigeria figures from the Oyo State Statistics Office (1977) indicate that dysentry/diarrhoea is the third ranked presenting complaint after malaria and measles. Adeyokunnu (1980) reviewing childhood mortality among 22,255 consecutive admissions in the University College Hospital, Ibadan, Nigeria found 17.7% case fatality relating to diarrhoea. He observed that this was second after acute respiratory infections. The same study observed that diarrhoea was the commonest cause of mortality in the one to three year group representing 24.9%.

Diarrhoea is defined as a passage of greater than two unformed stools per day by non-breast feed babies. Although breastfed babies normally pass stools with increased water content they are not considered to have diarrhoea until they pass greater than two additional unformed stools per day beyond their normal bowel pattern (WHO, 1984).

The development of techniques and availability of facilities for detection of virus in stool has led to recognition of the role of viruses in diarrhoeal diseases in children. Among viruses rota viruses have been identified as a major cause of diarrhoeal morbidity. Kapikian et al (1983) were able to isolate rota viruses in 12.2% of

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stool specimens from diarrhoeal children attending a health institution in Nyori, Kenya while in Mombasa the figure was 20.4%. Rota viruses together with enterotoxigenic Escherichia coli account for the major part of diarrhoea episodes. These produce a self-limiting disease and do not require drug therapy (Malin, 1982). Infective conditions in the third world countries that cause diarrhoea and may require drug therapy include typhoid, cholera, shigellosis, amoebiasis and giardiasis (Goh, 1981). The role of infective bacteria like campylobacter and yersinia is yet to be clarified in third world countries. Systemic conditions of note which may cause gastro-intestinal upset in children include otitis media, pneumonia and malaria (WHO, 1984, Chatterjee and Crange undated).

The small percentage (5 - 10%) of infective conditions requiring drug therapy for diarrhoeal diseases makes it impracticable to use drugs routinely and requires a degree of skill to determine those which need drug therapy. Even if the diarrhoea is treated with drugs, their effect (or lack of it) on dehydration still leaves the child in danger.

Injudicious use of drug therapy in infantile watery diarrhoea is of no benefit as there is increasing evidence that most of the intestinal pathogens are resistant to commonly used antimicrobial agents. Chaudhir-Bar et al (1985) working on intestinal flora isolates from children with acute diarrhoea found that bacteria were

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resistant to more than five antibiotics in Benin, Nigeria.

"Anti diarrhoeal" drugs with anti-motility properties, are not recommended. Some like diphenoxylate (Lomotil) can cause drowsiness and paralytic ileus which may cause clinical prolongation of the infectious diarrhoea through delay in excretion of pathogens (Dupont and Hornick, 1973).

Although absorbents like Kaolin may increase the stool consistency of infantile diarrhoea, they do not affect the stool weight and water content. Absorbents may be beneficial in binding and inactivating bacteria toxins as occurs in cases of some enterotoxigenic E. coli and some shigella (WHO, 1986[a]).

Antidiarrhoeal drugs with anti-secretory effect may diminish the number of unformed stool. However, drugs like chlorpromazine (a tranquilizer) also causes sedation which interferes with the patient's ability to drink the ORS solution.

Specific protection of children against diarrhoeal diseases will involve development of vaccines against common causes of infective diarrhoea, e.g. rotavirus vaccine (Kapikian et al, 1986). There is also need to improve the effectiveness of the vaccines in use which have marginal and short term benefits to devastating epidemic causes of diarrhoeal diseases (cholera and typhoid).

Although (WHO (1979) hopes to eliminate diarrhoea as a public health problem, it notes that this is a long term goal and will be

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realized through improving water supply, sanitation, promoting child care practices and health education, and undertaking other general community hygiene measures. Unavailability of a practical, simple and effective tool for combating diarrhoeal diseases has led to the shift in emphasis from diarrhoea per se to its complication, dehydration.

DEHYDRATION

The formal management of dehydration has been the use of intravenous fluid therapy (Woodruff, 1974). This unfortunately is expensive and requires trained and skilled manpower. Furthermore it has to be administered in a static and relatively sterile environment. These static health establishments are usually far from the people who need them most. This has led to the development of a cheap simple but effective technology in the form of oral rehydration therapy (ORT).

ORT is a process by which body fluids and salts lost (for instance during a diarrhoea episode) are replaced by giving fluids containing glucose and electrolytes by mouth. It has been hailed by most health workers as an answer to the public health problems of dehydration due to diarrhoeal diseases. Mahlin (1982) has pointed out that there is no justification for any therapy other than oral in uncomplicated management of dehydration due to diarrhoea. Cases in which ORT may fail include persistant vomiting, oral solution malabsorption, incorrectly prepared solution and in severe dehydration

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which will require intravenous fluids.

In Nigeria, Soriki et al (1983) successfully rehydrated children with diarrhoea using ORT in 90% of the those who came in with mild to moderate dehydration. Only 6% required intravenous fluids. Similarly Okanlola and Grange (undated) had a success rate of 94.8% of those who came in with diarrhoea. Only 5% of patients required intravenous fluids and mortality was 1.4 %. John Robbs (1984) in Port au-Prince introduced ORT which reduced case fatalities from more than 30% to less than one percent.

These cases clearly illustrate how ORT has revolutionalized treatment of dehydration in clinics. However it is pertinent to note that most people in third world countries live far from health institutions. Rahman et al (1982) noted in a diarrhoeal clinic in rural Bangladesh that the greater the distance from the clinic the more severe the degree of dehydration on presentation with diarrhoea and therefore more frequent use of intravenous fluids. To circumvent this problem some workers have advocated distribution of prepacked salts for ORT at the community level. This met with success in Bangladesh where two villages with and without distribution of packets of glucose electrolyte salts were compared. It was shown that the community with village based workers distributing ORT packets had reduced case fatality rates (Rahman 1978). Similar results were obtained in Honduras (Smith et al 1984).

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(Clements et al, 1981, Grange et al, 1985). A home based sugar salt solution (SSS) which utilizes locally available ingredients and materials has been suggested as an answer to the problem.

Studies done to compare SSS with WHO/UNICEF recommended prepacked salts (Enigu et al, 1981, Clements , 1981, de Zoysa et al, 1984) indicate that carefully prepared SSS if accompanied by adequate potassium supplement (e.g. by giving fruits juices) may be used as an alternative to the proposed UNICEF/WHO formula when the latter is not available. It should also be remembered that use of SSS along with continued feeding is recommended as soon as diarrhoea starts. In this way mothers should be preventing dehydration (Grange et al, 1985) not treating it. Consequently worries about the differences between prepacked ORS treatment and the home made SSS therapy should be minimised.

Evolution of home based treatment

In the 1940s Darrows through his work on rehydration of dehydrated patients postulated and later demonstrated that it was possible to replace lost fluids and electrolytes by mouth (Tripp and Canby, 1984).

This concept did not catch on in most western countries except in resource poor nations where facilities and personnel for intravenous fluid therapy were lacking. In Nigeria, Morley (1973) working in 1950s in the rural communities of Ingai near Ilesa, Oyo State, noted high prevalence of diarrhoea associated with weaning. This

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Table 1

SSS formulae developed and promoted in different countries

COUNTRY	INGREDIENTS FOR SSS FORMULA			
	WATER	SALT	SUGAR	OTHERS
BANGLADESH	Half beer (465ml.)	3 finger pinch	4 finger scoop	-
GAMBIA	3 Julpearl bottles (1 litre)	1 level bottle cap	8 level bottle caps	-
LIBERIA	1 soda bottle 300ml.	3 finger pinch	2 cubes	Juice of orange
NIGERIA (Ilesa)	cup(pint) 455ml.	3 finger pinch	4 finger scoop	Juice of orange
NIGERIA (Lagos)	beer bottle (600ml.)	½ teaspoon	4 teaspoon	-
NIGERIA (UNICEF)	beer bottle 600ml.	1 level teaspoon (5ml.)	10 level teaspoon (35ml.)	-
ZIMBABWE	fruit cordial bottle (750ml.)	½ teaspoon	6 level teaspoon	-

* See also Figure 1

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prompted him to adopt an oral rehydration therapy for most of diarrhoea patients presenting to the clinic with mild to moderate dehydration. His formula consisted of a pint of water, three finger pinch of salt (thumb and two fingers), four finger scoop of sugar and juice from an orange as a source of potassium. Noting that not all mothers, due to distance, could bring children to the health centre and that even those who came were in clinically poor condition, Morley promoted community health education for a home-based sugar salt solution using the same formula developed in the clinic. Similar formulae have been devised in other countries and regions to suit local conditions (Gambia : Mahgoub et al, 1983; Zimbabwe : de Koyna et al, 1984; Bangladesh : Bhatia and Cutting, 1984; Liberia : In-service Education Division, Ministry of Health undated) as seen in Table 1.

Home based RT has been criticised on the basis of absence of a readily available standard measurement of water (El-Mougi, et al, 1984). Thus the final solution has varying concentrations of sodium, some of which may be dangerously high. Other factors include grain size and shapes of salt and sugar. Individual dexterity in measurement also introduces variation (Cutting et al, 1979).

Another notable formula among the many that have evolved over the years is the special plastic two ended measuring spoon (Morley and King, 1978). Not much success was demonstrable with this partly because of distribution problems associated with the spoon(WHO, 1986[b])

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It was also noted that even in communities where the spoon was available, it was ineffective partly due to lack of a standard container for measuring water.

As the search for a practical home based SSS preparation was going on, concurrently there was growing need to find a cheap and effective tool to combat the problem of dehydration in the clinic setting. This concern was particularly acute in cholera ravaged communities where devastating epidemics left many either dead or dehydrated. International interest in ORT was brought about by a break through by Nalin et al (1968) when they discovered that most of cholera patients could be successfully rehydrated by ORT even in the presence of copious cholera.

This has culminated in the elucidation and formulation of a physiological basis for the oral rehydration process (Nalamedia et al, 1981). It was noted that glucose acts as a carrier and enhances sodium and water absorption. Also the components of ORS (sodium and potassium salts, glucose and bicarbonate) have to be in certain proportions for maximum absorption.

Therefore for optimum absorption the following criterion is observed:

1. The solution should be approximately iso-osmotic with plasma which is above 330 mosmol/L.
2. The concentration of the carrier, i.e. glucose, should be between 20 and 30g/l for maximum water absorption.
3. The nearer the sodium concentration in the solution is to that in the plasma the better the absorption and correction of the deficit i.e. 50mmol/L.

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4. Absorption of potassium is passive and depends on the concentration gradient.

5. Bicarbonate is actively absorbed independently and corrects acidosis due to diarrhoea concentration of 30.48 mmol/l is recommended.

The above led to the development of an internationally accepted standard sponsored and promoted by WHO/UNICEF (1979). This has revolutionalized treatment of dehydration in the health institution from intravenous to oral. Grange and Obaliliau (1985) noted that they were able to treat 95% of dehydration with oral rehydration therapy at a cost of about thirty kobo as opposed to estimated cost of forty naira per one intravenous infusion.

The UNICEF sponsored formula used by the Federal Government of Nigeria's Ministry of Health is reproduced below. This is being produced in packets for distribution to clinics around the country (Figure 2).

COMPOSITION OF ORS

INGREDIENT	GRAM PER millilitre
Glucose anhydrous	12.00g
Sodium Chloride	2.15g
Trisodium citrate dihydrate	1.74g
Potassium chloride	0.30g

The finding that ORT can effectively treat mild to moderate degrees of dehydration [illegible] at less cost (Gwalia Tan, 1985)

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has promoted the Federal Government of Nigeria with technical assistance from UNICEF to promote use of ORT in health institutions. This led to formal launching of four zonal ORT demonstration and training centres in the country. Subsequently ORT demonstration centres were established in all states of the federation. By 1986 it was envisaged that ORT units would be established in all local government areas of the federation (Brody, 1985). It is worth mentioning that the Igboora ORT unit was the first district level demonstration and training centre, established in 1985.

The institutionalization of ORT has led to a shift in the management of dehydration from intravenous therapy to oral therapy in health institutions in Nigeria (Federal Government of Nigeria/ UNICEF, 1985).

The move to standardize local formulae for SSS arises from two concerns. One is the need to adapt preparation to the actual utensils (spoons) and water container sizes (cups, bottles) available in a locale, thereby producing a consistent educational message. The second concern is the non-availability of standard ORS packed salts in rural communities.

In Nigeria the Federal Ministry of Health in conjunction with UNICEF has developed and recommend the following home based remedy as seen in Figure 1 (Crange et al, 1985):

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1 beer bottle of water or two soft drink bottles of water (approximately 600ml)

1 level teaspoon of salt (3ml spoon)

10 level teaspoons of sugar (3ml spoon) or five cubes of sugar.

Although professionals at both national and international levels have been deeply involved in the standardization of SSS and ORS formulae, many of their colleagues remain skeptical about the use of home-made solution and prepacked salts in the home and community, fueled by some studies which indicate that most mothers are unable to prepare an effective SSS (de Zoysa et al, 1984, Banwo-Kuti and Basiseiyo, 1978). However others have shown that this problem arises in the main when health workers fail to consider social and behavioural factors in programme design and the need for health education of mothers (Morley, 1985 and de Zoysa et al, 1984).

In summary the discovery of oral rehydration therapy has revolutionalized treatment of dehydration with resultant shift from intravenous therapy to oral therapy in the clinic setting. The need for early use of oral therapy at home to prevent dehydration has led to development and standardization of sugar salt solution. Both the universal ORS salts and standard home based SSS are promoted in Nigeria (Figures 1 and 2), with the latter for home use.

Issues of acceptance:

There is need to examine some theoretical issues in human health behaviour in order to develop a context for designing and evaluating health education for oral rehydration therapy. Some

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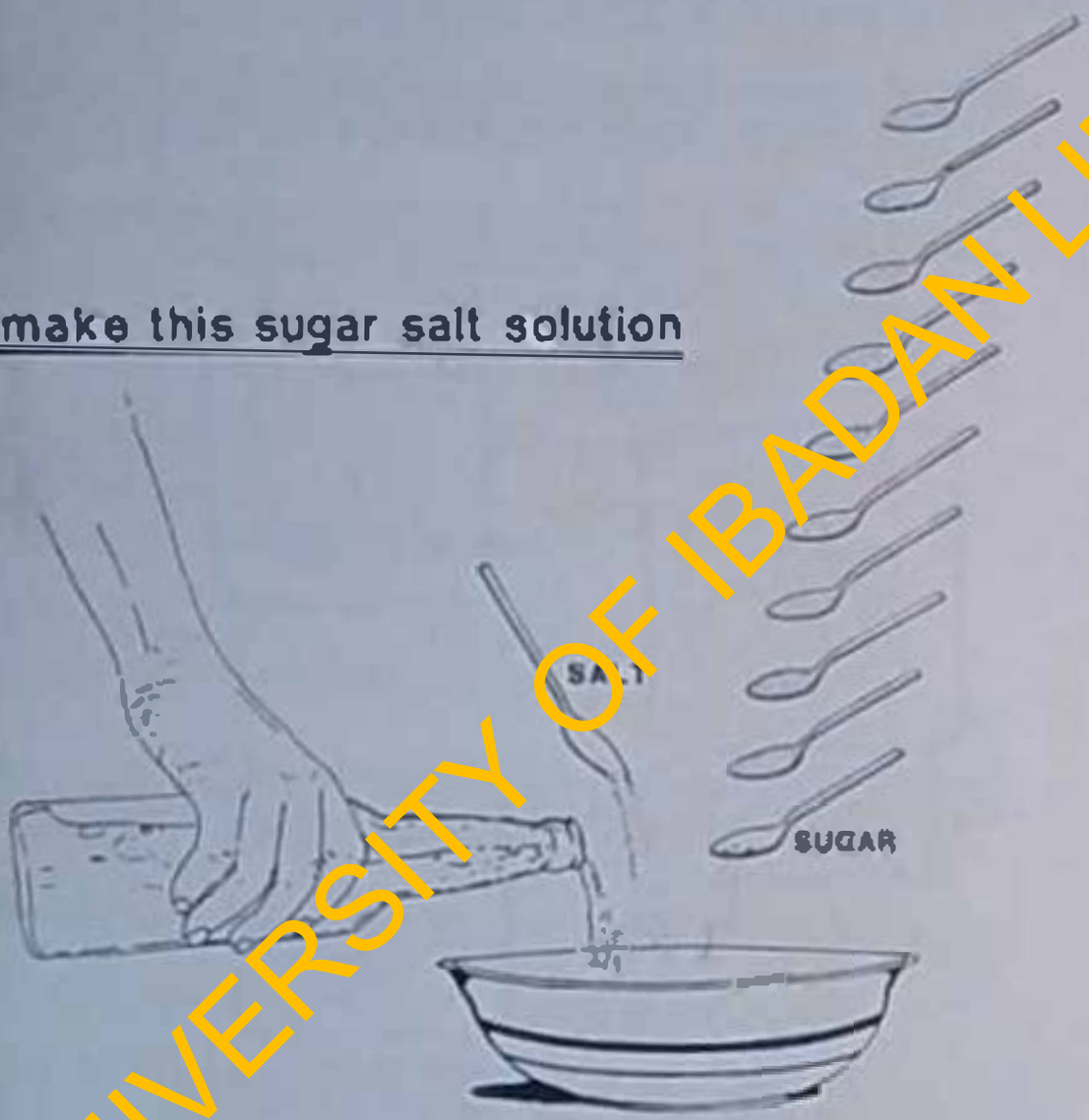
FIGURE 1

How to prepare sugar-salt water solution at home;

To make this sugar salt solution



1 Beer bottle of WATER	1 Level teaspoon of SALT	10 Level teaspoons of SUGAR

The appropriate containers found in most homes in Nigeria are the standard beer bottle or soft drink bottle. Either can be used to measure water in preparing the solution. The beer bottle (650 ml.) has approximately twice the volume of the soft drink bottle, so use one beer bottle full of water or two soft drink bottles full.

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FIGURE 2

ORAL REHYDRATION SALTS
(DIRECTIONS FOR USE)

This packet makes 600 ml. of oral rehydration solution. You can use one beer bottle filled with clean drinking water to measure the water (600 ml).
Instead of a beer bottle, you can use two mineral bottles full of clean drinking water to measure the same amount (600 mL).

TO PREPARE SOLUTION

Pour the water (600 ml) into a clean container.

Mix the entire contents of this package with the water.

Stir until completely dissolved.

TO USE THE SOLUTION

Give the solution to drink using a cup and spoon. For treatment of diarrhoea and dehydration.

FOR INFANTS (less than 4 months of age) Give the solution slowly using a spoon. Give the whole amount of solution (600 ml.) over an 8-12 hour period. At the same time continue with breast feeding and water.

FOR CHILDREN. Give slowly using spoon. Give the whole amount of the solution (600 ml.) over a 4-8 hour period, and especially after each stool. Give other fluids as well, and feed the child as soon as he will take solid foods. If child vomits, wait a few minutes and then give solution again. Just 2 tea-spoonfuls at a time.

FOR ADULTS. Drink freely as required.

CONTINUE TREATMENT UNTIL DIARRHOEA STOPS
DO NOT STORE MIXTURE FOR MORE THAN 24 HOURS

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issues relating to various conceptual frameworks are discussed below.

Although the widespread availability of ORS salts is an important public health measure (Mahalanabis et al, 1981), important still is its diffusion. That is the communication of a new idea or technology (Rogers and Shoemaker, 1971).

Diffusion is the process by which innovations spread to members of a social system. Focus is made on bringing overt behavioural change, that is adoption or rejection of new ideas rather than change in attitudes. Diffusion is differentiated from communication which deals with the spread of all ideas both old and new (Rogers and Shoemaker, 1971).

Oral rehydration therapy as an innovation has not varying rates of diffusion. In some communities ORT has met wide-spread use in a few years while in another the adoption rate has been quite low (WHO, 1986[b]). To explain the rate at which innovations are adopted Rogers and Shoemaker(1971) proposed five general characteristics of the innovation that will affect the rate of adoption. These are relative advantage, compatibility, complexity, trialability and observability.

Compatibility is the degree to which an innovation is perceived as consistent with existing values, past experience and needs of the receiver. In Papua New Guinea Prantil and Leiman (1985) noticed that there was a decline in the acceptance of ORS and utilization of health posts when use of kaolin and sulfaguanidine were discontinued.

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It later transpired that the innovative ORT was not compatible with local expectations. Kaolin produced a rapid cessation of symptoms similar to the traditional medicine of former days. In contrast diarrhoea did not stop quickly with ORT.

Complexity is the degree to which an innovation is perceived as relatively difficult to understand and use. Reyes (1981) noted that the formula promoted in Lagos in 1979 for making home made SSS was difficult to understand by mothers. In particular measurement of one-quarter teaspoon of salt posed problems since most mothers were not used to such fractions.

Trialability is the degree to which an innovation may be experimented with on a limited basis, while observability is the degree to which the results of an innovation are visible to others. These two aspects were fully adopted by the Bangladesh Rural Advancement Committee (Bhatia and Cutting, 1984). Not only did mothers practice the preparation of SSS but they also administered the solution to a dehydrated child. Through close observation they noted the improvement in the clinical condition of the child. Abro adoption rate of the SSS was high (98%).

Perceived relative advantage is the degree to which an innovation is seen as being better than the idea it supercedes. In Swaziland mothers hailed the introduction of ORS because it meant that their children would not have to be pricked in the scalp (a procedure which relatives usually instigated) for the purpose of

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setting up an intravenous infusion (Lynd, 1984). The author's personal experience in Zambia confirms this. In Nigeria Okonkwo and Grange (undated) noted financial advantage derived from using ORT (30 kobo) as against intravenous therapy (40 naira).

From the foregoing it will be noted that certain factors have to be taken into consideration in designing formulae for SBS promotion. These include, that it should be cheap, simple, sensitive to local culture, and its purported effect should be demonstrable.

In bringing about change it is pertinent to take into account individual personal variables especially considering that some people are innovators and early adopters, while others are laggards (Rogers and Shoemaker, 1971). Equally important is the adoption process of innovation as outlined by Rogers and Shoemaker (1971) viz: awareness, interest, evaluation and adoption.

At the awareness stage, the individual learns of the existence of the new idea e.g. ORS but, lacks information about it. At the interest stage the individual develops interest in the innovation and seeks additional information about it. During the evaluation stage the individual makes mental application of the new idea to his present and anticipated future situation and decides whether or not to try it. Then in the trial stage the individual actually applies the new idea on a small scale in order to determine its utility in his own situation. Finally adoption occurs when the individual uses the new idea continuously on a full scale.

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Before the innovation is to be adopted mothers must perceive that the condition it purports to treat is serious enough to warrant action. Rosenstock (1974) in his Health Belief Model suggested that the way individuals perceive personal susceptibility and seriousness of a disease will trigger them to act.

Among Yoruba of Western Nigeria physical sickness is classified into two broad categories : aisan, a mild indisposition type of sickness and arun a more serious and dreadful condition (Brieger et al, 1983, Adeniyagun, 1982). Diarrhoea is considered aisan (mild) while jedijedi, a triad of conditions including constipation, dysentry and haemorrhoids is found in the grey area between arun and aisan (Brieger et al, 1983). Because diarrhoea is considered mild, in most cases no action is taken to treat it. Omololehinna and Brieger(1987) noted that since children get more diarrhoea around the time they start to walk, mothers believe children want to shed weight in order to stand up. Morley (1973) with his experience in Ibadi, Nigeria, found that mothers did not take action against the common condition of weaning diarrhoea. Most mothers treated it by withholding fluid and food.

Although diarrhoea is considered by mothers to be a mild condition, it is infact a serious one, especially among children, and accounts for high morbidity and mortality. Nevertheless the evidential physical signs and symptoms provide a cue for mother to bring a child to the health institution or herbalist with a view to

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either define their state of health or discover suitable remedies (illness role behaviour, Kirscht, 1974). On the other hand the signs and symptoms can provide a cue for the mother to initiate home treatment for dehydration with SSS for the purpose of getting well (sick role behaviour, Ross and Mico, 1980).

Persistent diarrhoea, if not attended to, will result in dehydration. In some communities dehydration is believed to be another disease entirely. For instance depressed fontanelle, a sign of dehydration, is thought of as disease in its own right in Zimbabwe (de Zoysa, 1985) and in Liberia it is called "open mole". Its traditional remedy consists of applying topical medicines on the sunken fontanelle. "Open mole" is perceived more seriously than diarrhoea, and the treatment is directed at the open mole rather than diarrhoea (Inservice Education Division, Ministry of Health, Liberia and UNICEF, undated).

The above is analogous to a belief among Yoruba of Western Nigeria that malaria and febrile convulsions are never connected. Malaria is considered to be a mild temporary condition not requiring treatment, while febrile convulsion is thought to be serious and caused by evil earth (Ramakrishna and Brieger, 1987). The net result of these dichotomies is a delay in providing appropriate treatment and a risk to the child's life.

Not only is the individual personal perception important but also the social-cultural environment of the individual. Thus there

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to need to consider a wide range of factors that may influence behaviour. These are expressed in the PRECEDE framework of Green et al (1980) under three main headings. Predisposing factors consist of beliefs, attitudes and values towards an innovation. The resources at a person's disposal to implement change are enabling factors. Finally the attitudes, opinions and behaviour of significant others (peers, elders and relatives) towards the change are reinforcing factors that encourage or inhibit action.

For instance in Kenya diarrhoea is believed to be due to bad teething (a predisposing factor). Treatment consequently involves cutting the child's gums. Some health workers ignored this belief and practice and attempted to give ORT to children. It was observed that with sore gums the children found ORT unpleasant and refused to take it. This led to the general misconception that ORT was not good for children. WHO (1986[b]) has noted that although published reports are few, surveys and informal enquiries in some Asian and African countries (e.g. Bangladesh, India, Mali, Nigeria and Senegal) have revealed that non-availability of salt and sugar or mixing bowls can create operational problems in the use of sugar salt solution (an enabling factor). Noyes (1981) noted that determination of treatment options for diarrhoea was a familial process rather than individual. The husband was central to decision making about what treatment the sick child would receive (a reinforcing factor). This model thereby provides a framework to assist the health

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worker pinpoint reasons why promotion of ORT/SSS may or may not succeed in a given community. This allows educational intervention to be targeted more appropriately.

Lewin (1953) offers a model for the actual decision making process in an individual namely unfreezing and refreezing. Unfreezing relates to the stage when a consumer identifies the need to give up stereotyped behaviour. As regards diarrhoea and dehydration this relates to appreciating the need to stop withholding fluids from a child with diarrhoea (Morley, 1973) or passive role by the mother (Moyse, 1981). Problem diagnosis means trying to achieve a better understanding of the problem. For instance in Zimbabwe, de Zoysa (1983) observed that depressed fontanels, one of the signs of dehydration, was thought by mothers to be a disease in its own right and treatment was directed at the fontanels. When mothers noted that the depressed fontanelle returned to normal after fluid therapy (ORT) they understood that the problem was due to loss of fluid due to diarrhoea.

Next setting is considering behavioural alternatives. From the above example from Zimbabwe it was noted that once mothers understood that the depressed fontanelle was due to loss of fluid, they exercised their old habit of directing treatment at the fontanelle. Mothers were also willing to try treatment with ORT.

New behaviour is established when the goal or change is established. The individual then develops a habit or behaviour. When no there

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noted clinical improvement in the child and disappearance of dreaded depressed fontanelle after ORT, they were more willing and likely to try SSS at home on their own. Lack of opportunity for mothers to observe the demonstrated effect of the ORS in a sick child may force mothers to revert to their old ways.

Refreezing occurs when the new learning or habit has become a routine part of the individual's ongoing behaviour as to be taken for granted. This is the stage when mothers, unprompted, use ORT/SSS to treat episodes of diarrhoea at home.

The foregoing theories have been used to throw light on the various factors that may influence an individual mother to adopt the ORT/SSSinnovation. The following theory looks at the change process as a whole to help predict the nature, type and feasibility of change required for the adoption of ORT/SSS by mothers and the health system.

The behaviour change the health educator strives for in relation to ORT is complete shift in responsibility from at worst inactivity (by mother) as well as stopping feeding or fluid intake (Nalin and Lundstrom, 1981; Morley, 1973) and at best a passive role as health seekers (Hayes, 1981), to the one in which the mother will take active role in initiating and treating dehydration with SSS (second order change, Bates and Winsor, 1984).

The setting for education is important and should be conducive to learning. Nalin (1982) working in a clinic setting and using the same health workers noted that many mothers brought their

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children with diarrhoea, to give health education on prevention, danger and treatment of dehydration and nutritional counseling. He noted that under such atmosphere the mothers were receptive and could see the immediate results of a rehydrated child. Hence the health system as a unit of change requires restructuring in order to promote ORT. As a result ORT should have a legitimate place in the health institution through establishment of ORT units (Macro change, Bates and Winder, 1984). Therefore health education for ORT must consider social and behavioural factors. Consideration of such factors is needed in design and may explain why programmes do or do not achieve goals.

We have discussed change in theory, but adoption of SSS/ORT is not just a chance occurrence. It is usually preceded by planned interventions. Therefore some intervention models and designs are presented.

Diffusion can occur naturally or can be hastened by change agents. One means of promoting diffusion is social marketing. In relation to ORT, diffusion has been operationalised through utilization of social marketing strategies in Gambia (Rasmuson and Smith, 1983) and in Honduras (Smith et al, 1984). Social marketing is marketing of socially relevant programmes and ideas or behaviours similar to commercial marketing (Smith and Cliff, 1986).

Social marketing focuses on individual behaviours that promote health. These behaviours often centre around specific products.

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ORT is an example of such a product. ORT as an innovation and appropriate technology is far cheaper than the traditional intravenous infusion in the management of dehydration: only 30 kobo as against 40 Naira (Grange et al, 1985). It is easy to prepare and administer even by mothers at home as long as they are educated in this (de Zoysa et al, 1985, Smith et al, 1984). Where mothers have been involved in the preparation of ORT/SSS and administration of the solution to a sick child, clinical improvement of the child is observed and acceptance has been high (Klein, 1982). In Papua New Guinea, Frankel and Lohman (1985) noted that ORT acceptance was low because its effect was contrary to the belief and expectation of the local people that ORT would dry and block the diarrhoea. Hence there is need to be sensitive to people's culture in designing health education programmes.

Intervention strategies for promotion of ORT depend largely on communication channels. Communication channels are divided into two broad groups, either mass media or interpersonal approach. Mass media are printed material (e.g. posters, newspapers) and audio-visuals (i.e. radio, television and cinema). Use of printed material presupposes that the target population is literate while the audio-visuals work on the assumption that people not only hear but also listen or watch these media. The advantage of mass media is that it reaches a wide population. It is useful in creating awareness and reinforcing already established practices. However the role of mass media in

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effecting behaviour change is limited (Green, 1978, Wallack, 1981).

In both Gambia (Rasmuson and Smith, 1983) and Honduras(Smith et al, 1984) investigators carried out preliminary surveys on the literacy level of the people as well as home ownership of radio. Finding of high literacy level and household ownership of radio at more than 75% in both countries lead to the use of printed material (posters hand bills etc.) and radio programmes for promotion of ORT. They noted with interest that awareness of ORT increased within a short time.

Interpersonal communication can occur either individually or in groups. With regard to ORT personalized communication can be achieved either in the clinic or in the community. The clinic setting gives credibility to ORT as a real form of treatment for dehydration due to diarrhoea. Smith et al (1984) in promoting use of ORT in Honduras used the health institutions to legitimize ORT. The community setting provides environment for social support of an innovation. If influential members of the community endorse the new technology, other members of the community are likely to use it. This was the experience of Hosmer et al (1986). In one community in Egypt they involved opinion leaders, elders, etc., in the promotion of use of ORT by mothers. They noted with satisfaction that acceptance was high.

Government health personnel legitimize ORT as bona fide treatment for dehydration due to diarrhoea. Rasmuson and Smith (1983) used

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health workers in institutions to give credibility to ORT as a real treatment for dehydration. Paraprofessionals (community volunteer workers) provide homophilous atmosphere for communicating messages on ORT. In Gambia the red flag volunteer (Rasmuson and Smith, 1985) and in Bangladesh (Bhatia and Cutting, 1984) the Oral Replacement workers were used. In these and other places behaviour change was effected as noted by high success rate of adoption. The draw back with personalized communication is that it cannot reach large numbers of the target population in a short period of time.

It is worthwhile to note that in both Gambia and Honduras the main avenue for promoting ORT was mass media. However personalized communication and clinic education were utilised to effect behaviour change and legitimize ORT respectively. Therefore communication channels may be used in combination, but it is necessary to assign a specific role to each communication channel in order to achieve a desired goal of the ORT programme.

Having utilised specific intervention strategies to implement a programme (for instance ORT), there is need to assess how effective the programme has been in achieving its goal. Therefore the next section will focus on the need for evaluation.

The Need for Evaluation

Providing Health Education for mothers on ORT is not an end in itself. There is need to determine the effectiveness of the health

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education programme and its worth (Moss and Mico, 1980). The results of evaluation provide feedback which is used for improving the programme. Evaluation also ensures that meagre resources will be channelled to those programmes that are found to be beneficial to society or patient (client).

Evaluation is a process of assessing progress towards predetermined objective. Another way of defining evaluation is the comparison of an object of interest against a standard of acceptability (Croon et al, 1980[a]). Croon (1974) proposed six standards of acceptability namely historical, normative, absolute, theoretical, arbitrary and negotiated.

Normative standard of acceptability is used when comparing one programme with others. Programmes in similar settings are compared so that extraneous variables are equalized. Historical standard is applied when the comparison is between different points in time for the individual, the population, the programme, the problem or the technique that represents the object of interest. Absolute standard is applicable when there is need for 100 per cent solution of the problem as a goal.

Theoretical standard is based on theory and previous research. It compares achievement with what we would expect to achieve if everything went right in the programme. It also referred to as scientific or professional standard. Arbitrary standard is usually based on a complete [illegible] rather than a thorough

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analysis of information. Negotiated standard is arrived at after a compromise is reached among different goals of the parties involved in the programme.

Green (1974) indicated that the state of art in health education leaves us more frequently with historical and normative standards and in case of new programme areas often with arbitrary and absolute standards. As we accumulate a body of professional literature we should begin to formulate theoretical standards that can be employed in the evaluation of health programmes.

Before embarking on an evaluation exercise some important questions to be given consideration are what is to be evaluated, how is it judged (standard), and how is evaluation to be designed? Evaluation is a measurement. Therefore one has to standardize input and at the same time recognise appropriate output. Green et al (1980[4]) indicated three levels at which health education programmes can be evaluated namely process, impact and outcome.

As regards ORT evaluation, process evaluation relates to finding out how the educator has performed in bringing about awareness on ORT, knowledge and skill in ORT/SSS preparation and acceptance. This in fact is the short term goal of ORT education. The second or intermediate level focuses on health related behaviour. That is, are mothers actually utilising ORT in the management of children during diarrhoeal episodes? At the third level, evaluation considers the outcome of the education programme. This outcome is defined in

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terms of morbidity and mortality. For ORT this concerns prevention of dehydration and death as a result of diarrhoea.

The general focus of health education programmes is at the first two levels with the intention that change in short term factors (knowledge, attitude and skill) will influence change at the intermediate level (behaviour) and together result in a long term lowering of mortality. Health education evaluation would therefore focus primarily at the process and impact levels.

It should be noted that the long term goals are not the sole responsibility of health education, though in the case of ORT health education interventions play a major role. The long term success of ORT programmes depends on a variety of inputs. Biochemical intervention is necessary to determine scientifically sound SSS and ORS formulae (Crango et al, 1985). Medical and nursing inputs all needed to assess dehydration and administer appropriate oral therapy (Federal Ministry and UNICEF, 1985). Administrative or management inputs are required for adequate distribution of ORT supplies. (Ellerbrock, 1981). Epidemiology contributes in the monitoring of baseline and outcome conditions(Rabeeah et al, 1978). When all these components work together in harmony, the long term results of ORT should be successful. This illustrates Green's (1980[2]) concept of behavioural and nonbehavioural factors which contribute toward health outcome within the PRECEDE framework.

Most researchers have lamented at the paucity of evaluation results in health education (Stecklar et al, 1980; Adams and Miao, 1980;

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Windsor et al, 1980; Wallack, 1981). This may be related to the historical development of health education. Originally health education was considered good to do for its own sake. However as the era of fiscal tightness, responsibility and accountability dawned, the need to evaluate mounted. Health educators are moving with that trend.

Windsor et al (1980) point out that the nature and setting of health education programme often make evaluation difficult. The classical experimental design model of evaluation is not feasible and sometimes not ethical in the natural setting. Therefore in employing other evaluation methods one needs to be aware of and attempt to control for potential sources of bias in interpreting the impact of the programme on education and behaviour outcomes.

Some potential sources of bias as noted by Wallack (1981) and Moseley (1985) include lack of control groups, non-representative population, lack of coordination between campaign and evaluation objectives and unknown reliability and validity of dependent variables.

Fitz-Gibbon and Morris (1978) and Windsor (1980) noted that if research designs have a control group, even a weak one, they are better than programme with no control group at all. Classical experimental designs have equivalent control groups derived by random assignment of participants into an experimental and a non-experimental group. Due to ethical reasons and community realities it is not usually possible to assign people thus. Hence there is often need to select by non-random procedure an approximately equivalent group of people or

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community who are as similar as possible to the experimental group.

The need for knowledge about the universe and also the sample and representative population cannot be over-emphasised, otherwise no valid conclusion can be drawn on the results. Likewise there is need to coordinate the education objectives of the health education programme and the evaluation objectives as this lends strength to the evaluation results, such that they can be attributed to the programme (intervention).

In experimental design there is need to describe fully the nature of the experiment. What was the intervention (input). Education is an adjust education. For instance there are many methods. One purpose is to determine whether method X, Y or Z works in situation A, B or C. Just because a programme failed does not mean health education failed. Poor results may simply mean that the wrong educational method was used (Squyres, 1980). Hence there is need to trace back to whether appropriate diagnosis was done to select methods, and whether a baseline study was done to evaluate pre and post tests and to determine if intervention between was appropriate. Consequently there is need for full documentation of programme processes from the beginning.

Baseline diagnostic data is essential for choosing appropriate health education methods (Green et al, 1980[a]). The intervention strategies chosen and the specific steps in deploying them must be thoroughly described.

This allows one to judge (1) were right methods chosen and (2) were they carried out as described? Once one knows what happened,

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one can more reliably attribute blame or praise for the measured outcome. Finally the evaluator needs to know the limitations of the intervention as well as the limitation of his evaluation methods, so that those factors are taken into consideration when drawing conclusions.

Internal validity refers to the degree to which a study appropriately measures what it claims to measure (Green, 1974). For instance a survey question like "How many children do you have?" may appear simple on the surface. Findings in Western Nigeria show that it is often answered by not certain or an under-estimate because people believe it is bad luck to count one's children (Ravenhorst and Krieger, 1967). External validity of a given study is the degree to which the results can be generalized to other population in other places at other times. This requires first examining the peculiarities of the specific programme the population and the setting in which the study was done. Second the timing of events surrounding the study in some historical perspective must be assessed (Green, 1974).

With the dawn of the CHT unit concept (WHO, 1966[a]) in the health institutions comes emphasis and possibility of clinic based education for CHT. In this context many valuable lessons about programme evaluation studies have been conducted for over two decades (Murdock et al, 1985). The experience has been that evaluation can be an effective strategy for providing decision makers with actual experience in patient education thereby leading to a new order of things in health care delivery (D'Onofrio, 1980).

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Green et al (1980[b]) noted that with an increasing body of evaluation literature in patient education there has been a steady increase in rigor applied in evaluation. This has resulted in improved programme design and implementation. Consequently there has been improved patient benefits from education programmes.

More and more evaluation programmes are incorporating object of interest. Object of interest used in many studies include knowledge gain, behaviour change, attitude change, cost effectiveness and use of health services. Most health educators are realizing the value of behavioural and educational diagnoses and are utilizing these before intervention. It is noted that success with one method of patient education in one setting for one population of patients does not guarantee success with all patients in all settings. Therefore there is need to test multiple methods of education (Green et al. 1980[b]).

It is noteworthy that the design of evaluation of patient education programmes has also improved over the years. In the formative years one shot evaluation was common, that is intervention followed by evaluation (Mann and Michael. 1977). With time the evaluation design has undergone rigorous modification. As a result two broad categories of evaluation design have emerged in evaluating patient education. Firstly those aimed at assessing change through passage of time(time series design) and secondly those aimed at assessing change before and after programme intervention (Bigsan and Carr. 1981).

Time series designs have been utilized to evaluate patient education programme that require acquisition of skill and retention

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of knowledge (Fitz-Gibbon and Morris, 1976), With regard to before and after intervention one group pretest - post test evaluation design has given way to the design utilizing control group (Windsor et al, 1980). It has been possible to use, on a limited scale due to ethical consideration, the classical experimental design (Green, 1977). This employs assigning at random patients to different health education programmes. However the design favoured by most health educators is the quasi-experimental design which takes into consideration medical ethics. The quasi-experimental design has an experimental group and a control group consisting of comparable group of patients. This design has also been found useful in comparing different education methods.

Evaluation activities in health education for ORT

Though oral rehydration therapy (ORT) has been adopted worldwide with many individual efforts reported, there are few full scale studies that clearly describe health education activities for ORT and also evaluate them. In reviewing the evaluation activities in health education for ORT it is pertinent to consider them in relation to communication method used since in health education the education method employed is directly related to the type of communication channel used. Green (1978) noted that communication channels are usually assessed on the basis of the type of adopter (e.g. early vs. late) or the stage of adoption process (e.g. awareness, interest, trial evaluation or adoption) with which they work best.

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The author could locate only nine comprehensive ORT evaluation programmes in the literature. This may not be related to the fact that ORT is still a new area and that much reporting is still anecdotal. The nine programmes spanned three continents. A brief outline of each programme and education method used is given.

In Bangladesh Resident Oral Replacement Workers visited homes and instructed mothers in the preparation of labon-gur solution (Dhatia and Cutting, 1984). In one rural Egyptian community local staff used a personalized approach to train mothers to mix ORS packets (Mossier et al, 1986). In Honduras mass media for ORT was the main thrust of the educational programme, though interpersonal approach was also used (Smith et al, 1983). Similarly in Gambia the main channel for ORT education was the mass media with interpersonal approach employed to give credibility to the ORT programme (Rasmuson et al, 1983). In Ikorodu, Lagos, Nigeria mothers received group education on SSS at antenatal and preschool clinic sessions(Reyes,1981). In Honduras radio campain was used to promote use of SSS (Cook and Rosenberg, 1977 as reported by Reyes, 1981). In Swaziland mass media was the main avenue for promotion of ORT (Sornick et al, 1985). In Rwanda (WHO, 1986[b]) health workers in health institutions taught mothers various SSS formulae. Finally in Zimbabwe,de Zoysa et al (1984) visited homes where mothers were individually and personally coached in the use of SSS.

The programmes were differentiated in five respects. First the communication/education methods utilised by the ORT programme were

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either interpersonal or mass media. Secondly setting for the education programme was also different. Interpersonal communication was set either in clinic or home, whereas mass media was community oriented. Thirdly the type of ORT action also differed using either SSS or ORS packets. Fourthly outcome measure of the programme also varied with some looking at the short term (awareness, knowledge and skill) while others studied the intermediate impact of the education programme (actual practice in the event of a diarrhoea episode). Finally, there was no consistent span for time lapse between inception of the programme and their evaluation. These factors are summarized in Table 2 and elaborated on below.

The actual effect of using mass media for ORT promotion can be seen in four studies. The Gambian programme was built primarily around mass media. Baseline findings indicated that although rural women are predominantly illiterate. Two-thirds of them listen to the radio, and that their knowledge on ORT was initially low. Information on ORT was subsequently disseminated primarily through radio and printed media. Radio broadcast took the form of jingles, songs and question and answer sessions. These sensitised mothers to recognize diarrhoea and its dangers and to prevent dehydration through use of SSS (utilising 3 Julpearl bottles of water, 1 litre, 8 level cups of sugar, and 1 level cup of salt).

To reinforce the radio messages pictorial graphic material was distributed. This consisted of a hand bill measuring 8" by 11" showing the Julpearl bottle and cup formula for SSS. The hand bills

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Table 2

Comparison of primary communication method used for health education on 3S3/ORS and impact of the programme in different countries

COUNTRY, YEAR	TYPE OF ORT	HEALTH EDUCATION METHODS	IMPACT MEASURES REPORTED IN PERCENTAGE				TIME LAPSE
			AWARE	STATE CORRECTLY	MIX CORRECTLY	ACTUAL USE	
BANGLADESH, 1984	SSS	Home demonstration	-	-	48	-	1 month after demonstration
EGYPT, 1986	ORS	Home demonstration	-	-	67	-	6 months after demonstration
GAMBIA, 1983, 1985	SSS	2 year campaign Radio, handbill and clinic instruction.	91	30	-	70	1 year into program
			-	20	-	50	end of program
			-	10	-	25	1 year after program
HONDURAS, 1983	ORS	Radio, Posters, packet inserts Instruction by health workers	-	29	-	9	4-5 months into programme
			-	34		26	12-17 months into program
NICARAGUA, 1977	SSS	Radio campaign	most	-	-	25	not available
NIGERIA 1981, 1978	SSS	Talk by health staff at clinic and/or radio	90/40*	50	34/45**	26	at least one year
RWANDA, 1985	SSS	Health water advice	-	-	21	-	not available
SWAZILAND, 1985	SSS	Campaigns similar to Gambia	80	26	-	48	not available
ZIMBABWE, 1984	SSS	Home demonstration	88	33	84	-	24 weeks after demonstration

* registered at clinic/not registered ** 1978/1981

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were given to mothers who attend health centres, dispensaries and homes of red flag voluntary workers (primary health workers).

The happy baby lottery contest was designed to test mothers' knowledge of ORT. Randomly selected winners at local contests competed in the national contest. Results showed that of the 1440 mothers who entered the contest 76.2% demonstrated the correct procedure to prepare SSS (Rasmuson and Smith, 1983). The contest format was really more of an awareness tool and reinforcement exercise than an evaluation method. Entrants were self-selected and likely therefore to be more confident in their ability to prepare SSS.

However a national survey (N = 148) using cluster sampling method a year into implementation of case radio programme showed that although 91.2% of mothers were aware of SSS only 33.8% of mothers interviewed gave correct amounts of all components of SSS. The results also indicated that 69.6% of women reported using SSS to treat an episode of diarrhoea. No indication was given of how many of the mothers who used SSS knew the correct recipe.

A survey done two years into the educational programme showed that 70% of mothers knew the correct recipe and 50% of mothers had utilized SSS in episodes of diarrhoea. While a study conducted three years after inception of case radio for ORT showed that only 10% of the mothers knew the recipe though 26% of the mothers had utilized SSS in actual episodes of diarrhoea (Benker, 1985).

In Swaziland (Hamilton et al, 1985) a six-month campaign similar

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to the one in Gambia was undertaken to promote home use of SSS. In an evaluation project 60% of mothers were aware of SSS, while 26% of them could describe the formula correctly. Almost half of the mothers interviewed reported using SSS during the most recent episode of diarrhoea.

Mass media campaign for ORT in Honduras also utilized radio and printed material. It was heartening to note that 80% of rural households owned radio of which 90% were functioning and that two-thirds of mothers listened to the radio. Radio programmes used to promote ORT included 30 and 60 second spots which described Litrosol (ORS packets) and signs of dehydration and played songs on breast feeding and dehydration. Other inputs were news on ORS, weekly 15-minute programme featuring ORS, question and answer sessions and radio games. Although household literacy was high (86.8%) only about half of mothers can read. Printed material in terms of envelopes for ORS packs to showed mixing of entire content of Litrosol packets into one litre of water. Several posters depicted signs of dehydration, Litrosol, mixing and administration of Litrosol and breast-feeding. These were displayed in health institutions, red flag volunteer residences and in public places.

A national evaluation of mothers' (N = 75) knowledge and utilization of ORS four to five months in the programme, showed that 29% of mothers could state the correct preparation while only 9% of mothers had reported using Litrosol in episodes of diarrhoea. A subsequent survey a year after inception of the programme showed an

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improvement on the performance of mothers. About one-third could now recollect the mixing procedure while 26% reported using it to treat diarrhoea cases. (Smith et al, 1983).

Boyes (1981) reported a study by Cook and Rohrabor (1979) that after radio campaign to promote use of home-based SSS in Nicaragua most respondents on being interviewed indicated they were aware of SSS, though only 25% of respondents reported using it in episodes of diarrhoea.

From these studies one could conclude that mass media had a large impact on awareness, a moderate initial influence on use but a poor effect on the knowledge and skill needed to prepare SSS/ORS correctly.

These programmes confirm what most researchers find about mass media, i.e. it is effective in providing information or creating an awareness about the presence of an innovation (Wallack, 1981, Smith et al, 1984, and Green, 1978). Another role of mass media is reinforcing already learned, adopted or established behaviours. Concerning ORT the first role of mass media is of limited value because ORT education requires learning skills, not just acquiring information. The second role would be of value if media is used to complement other education strategies such as training which is the appropriate strategy for imparting skills (Green et al, 1980[a]).

Interpersonal Communication

Denloste(1985) noted that most Africans in rural areas depend or rely on relatives and friends for information. This implies the

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desirability of interpersonal, two-step or multistep communication flow in educational programmes for this population (Rogers and Shoemaker, 1971). In fact most social scientists agree that behavior change requires interpersonal communication (Rose, 1981; Green, 1978; Wallack, 1981). Personalized communication provides feedback from the recipient of the information. Thus the recipient's perceptions, beliefs and attitudes are incorporated in the education programme. During interpersonal relationship the recipient develops interest and is given a opportunity to evaluate and try the new idea. Thus the individual is equiped with skill to utilize the new idea on a full scale. Since the adoption of the innovation is on a voluntary basis, the individual will internalize it (Kelman, 1958).

The personalized communication becomes even more effective if the sender of the message and the receiver are similar in most attributes such as education, socio-economic and culture, the principle of homophilous communication (Rogers and Shoemaker (1971). Rose (1981) suggests the use of paraprofessional residents in a community to disseminate information. Similarly WHO (1978) and Briscoe and Akpori (1982/83) advocate the use of resident village health workers in communicating health messages. The studies utilizing the interpersonal method of communication will be reviewed next.

In remote rural areas in Bangladesh residents aged between 20 to 30 years were employed as Oral Replacement Workers by the Bangladesh Rural Advancement Committee. They went house to house instructing

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mothers on how to mix lobon-gur solution. The solution consists of 3 finger pinch of salt (Lobon) and four finger scoop of sugar(gur) in half 'seer' of water (465ml). Mothers prepared fluids in containers provided for mixing. A month later a monitoring team surveyed 5% of the households visited.

They tested and also reinforced mothers' knowledge. It was interesting to note that almost all women (98%) prepared the solution correctly. However an added incentive for workers is that they were paid according to the number of mothers mixing the solution correctly (Bhatia and Cutting, 1984).

In Zimbabwe, de Zoysa et al (1984) noted that only 12% of rural population interviewed could prepare SSS initially. Their source of information on ORT ranged from the formal health system to promotional campaigns by some health workers. After interpersonal coaching in the home using home ingredients and equipment (the recipe taught was 6 level teaspoons of sugar and half a tablespoon of salt in a 750ml bottle of water) 69% of respondents gave correct recipe. Interviews occured a fortnight to a month after the home teaching.

Moyes (1981) assessed mothers management of child diarrhoea in the Shomolu community of Lagos, Nigeria. Her sample consisted of 305 mothers whose children had diarrhoea the previous one month. Most of the mothers were registered at the preschool clinic where regular sessions on preparation of home made SSS were carried out. She described the health education as group presentation (health talks)

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and noted that mothers were also exposed to other sources of information on ORT, in particular the mass media. Most (90%) of clinic attenders knew of SSS as compared to only 40% of non-attenders. Though 50% of mothers could state the correct formula for SSS, only 49% of mothers could mix correctly the SSS. She found out that most mothers had problems in measuring one-quarter teaspoon of salt which was part of the ingredients for making SSS. Use of SSS in actual episodes of diarrhoea was low (26%).

Another study was also done in Shomolu, Lagos, Nigeria by Ransome-Kuti and Bacisaiyo (1978). They objified the SSS formula that was taught to mothers who attended the clinic as consisting of four teaspoons of sugar, one-quarter teaspoon of salt and one beer bottle of water (600ml). Of the 217 mothers who could describe SSS, only 34% correctly stated the formula. The problem of correct measurement was attributed to lack of education and unfacilitarity with the one-quarter teaspoon measure. Over half of mothers mentioned one teaspoon or more of salt.

In one rural community in Egypt, Hosain et al (1986) used local persons to distribute ORS packets to homes. They used a standardized plastic bottle (one litre) to demonstrate mixing of the solution. Random sampling of the community six months after the survey showed 87.4% of mothers knew how to mix ORS correctly.

Although there is no standard national SSS formula in Rwanda, a variety of health workers teach mothers over fifty different recipes when they visit health facilities (WHO, 1986). A community survey

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indicated that only 21% of mothers could mix a solution with acceptable concentration of sodium.

As noted earlier, some element of interpersonal communication occured in the Honduran and Gambian programmes. A brief account of these is given below. In Honduras mothers received instruction on preparing ORS packets from health workers as well as the mass media. Although less mothers claimed radio as their source of information than those mentioning the health workers or the ORS packet inserts, no data was presented on the relative effect of these sources on ability to prepare ORS (Smith et al, 1985).

Similarly in Gambia, although government and volunteer health workers were found to be an additional source of ORT information, no data was reported that attributed knowledge of correct recipe with information channel (Mahgoub and Smith, 1985).

The experiences using interpersonal health education methods suggest that lack of a standard SSS formula (Rwanda) or a conceptually difficult formula (Lagos) results in low ability to prepare an acceptable mixture. In contrast, simple standard procedures (Bangladesh, Egypt and Zimbabwe) seem to produce a higher level of skill. These conclusions are limited by two major differences that make results difficult to compare. The venue of education in Rwanda and Lagos was the clinic while home visits were undertaken in Bangladesh, Egypt and Zimbabwe. Also measurements in the latter studies were taken relatively soon after the educational intervention while in the former up to a year had elapsed. Furthermore it is difficult to compare the mass

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media with the interpersonal interventions since none of the former used ability to mix a solution, the actual skill required in home management of diarrhoea. As an outcome measure where data on correct statement of ingredients is available, it appears that interpersonal measure may have a slight edge.

The author realizes that it is difficult if not impossible to compare the results of the various ORT evaluation exercises due to several issues. Firstly, the time lapse was different between inception of the programmes and their evaluation. Secondly, programmes used different SSS recipes, some of which may be inherently easier to learn than others. Thirdly, education methods were different, and finally impact measures (i.e. awareness, knowledge of formula, ability to prepare SSS and actual use of SSS) also varied. Bearing these points in mind the following observations are made.

Programmes utilizing mass media to promote ORT show increase in awareness of ORT after inception of the campaign. Though there is also an increase in reported use after the campaign, a drop off in use is noted after some time. The interpersonal approach focused on acquisition of skill in the preparation of ORT. Many mothers coached in ORT/SSS preparation demonstrated correct recipes. However these studies lacked follow up to show either change in ability over time or actual use of SSS during episodes of diarrhoea.

The aspect of two different forms of ORT action (ORS and SSS) may soon become a non-issue, due to distribution problems associated with ORS packets (Ellerbrook, 1981). Future programmes will likely be

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more concerned with comparing approaches to education on preparing home made salt-sugar solution.

A general weakness of almost all studies, particularly those using interpersonal methods, is lack of reports on actual use of sass/ ORS during episodes of diarrhoea. Where these are reported (Zambia, Honduras, Nicaragua, Nigeria, Swaziland) there are serious problems. Some do not specify whether percent who used home ORT refer to all mothers surveyed or only those whose child had diarrhoea. Also time frame within which use occurs is not standard or clearly defined. Only the Lagos study (Reyes, 1981) makes clear that the total sample consists only of mothers whose children had diarrhoea one month prior to interview. If lessons are to be learned from these studies, more rigorous and standard programme input and evaluation procedure will be needed.

The author observes that all existing studies evaluated a programme which conducted education with mothers whose children were not likely to be currently suffering a bout of diarrhoea. As noted earlier in the literature, in the adoption of an innovation there is need for the consumer to try and observe the new idea (Rogers and Shoemaker, 1971). In these studies few mothers would have had immediate opportunity to observe results and to be convinced of the efficacy of ORT. No study yet reported has evaluated education provided at an ORT unit for mothers whose children are actually experiencing the disease. This also have yet evaluated the patient education approach to ORT. It is pertinent to point out that the patient education approach has

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general dimensions, namely it solves the immediate need of the patient (rehydration with ORT), it affords the mother the opportunity to care for the child and observe results, and finally it gives credibility to ORT through observable clinical improvement of the child thus legitimising it as a real form of management of diarrhoea. However the major limitation to the patient education approach in the clinic setting is that one deals with small numbers of clients at a given time. On the other hand it is a continous programme that functions every day such that over time a sizable portion of the population may be reached. The present study at Igbora falls under the patient education approach of personalised education, and hopes to address some of the general issues raised about evaluation as well as those that are specific to that approach.

Summary

In this chapter it has been noted that diarrhoea is a major cause of morbidity and mortality especially in resource poor nations. Various options for tackling diarrhoea were discussed and found wanting which led to shift in emphasis to diarrhoea's effect - DEHYDRATION. The discovery of ORT as a practical and appropriate technology has revolutionalised treatment of dehydration. Low acceptance of this proven technology led to discovery that social and behaviour factors were not considered in most ORT programmes. Consequently health education has been identified as a necessary component of ORT programmes. Now that the need for health education in an ORT programme has been recognised there is need to justify this component of the programme

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through properly conducted evaluation procedures.

A review of evaluation activities in health education for ORT has led to the discovery of inadequacy of evaluation efforts. All evaluation studies reviewed conducted their health education on mothers whose children were not likely suffering from diarrhoea. The present study is the only one to evaluate patient education approach to ORT. However with the available evaluation results it was possible to postulate that the more personalized and directly relevant the education on ORT, the higher the adoption and retention of the innovation. The author also recognised the importance of the ORT unit in the health institution as giving credibility to the ORT.

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CHAPTER THREE

METHODOLOGY

Introduction

This chapter will describe the study area and the background of the oral rehydration programme at Igboora Rural Health Centre. Since this is an evaluation of the health education component of the programme both the objectives of the programme and objectives of the study will be presented. The methodology used to assess the programme will then be discussed.

Description of the study area

Igboora, the site of this study, is largest of seven major towns that comprise the Ibarapa district of Oyo State, Nigeria. The 1986 estimated population of 60,000 Igboora citizens is calculated from the birth and death register of Igboora Rural Health Centre using the 1963 population census as the base year (Ayeni and Olayinka, 1979; Bakibola et al, 1985). The town is situated, approximately 130 kilometers from the state capital of Ibadan.

Igboora in reality is made up of six distinct communities which have grown together over the years. Igbole, Ikko, Sagaun, Ikorokodo, Idofin and Igboora, each has its own traditional leaders and history. The settlement pattern consists of extended family housing clusters called compounds. Modern demographers have grouped the compounds into 66 enumeration areas which in turn are divided among six blocks for census gathering purposes. These blocks correspond partly with the traditional six divisions (figure 3).

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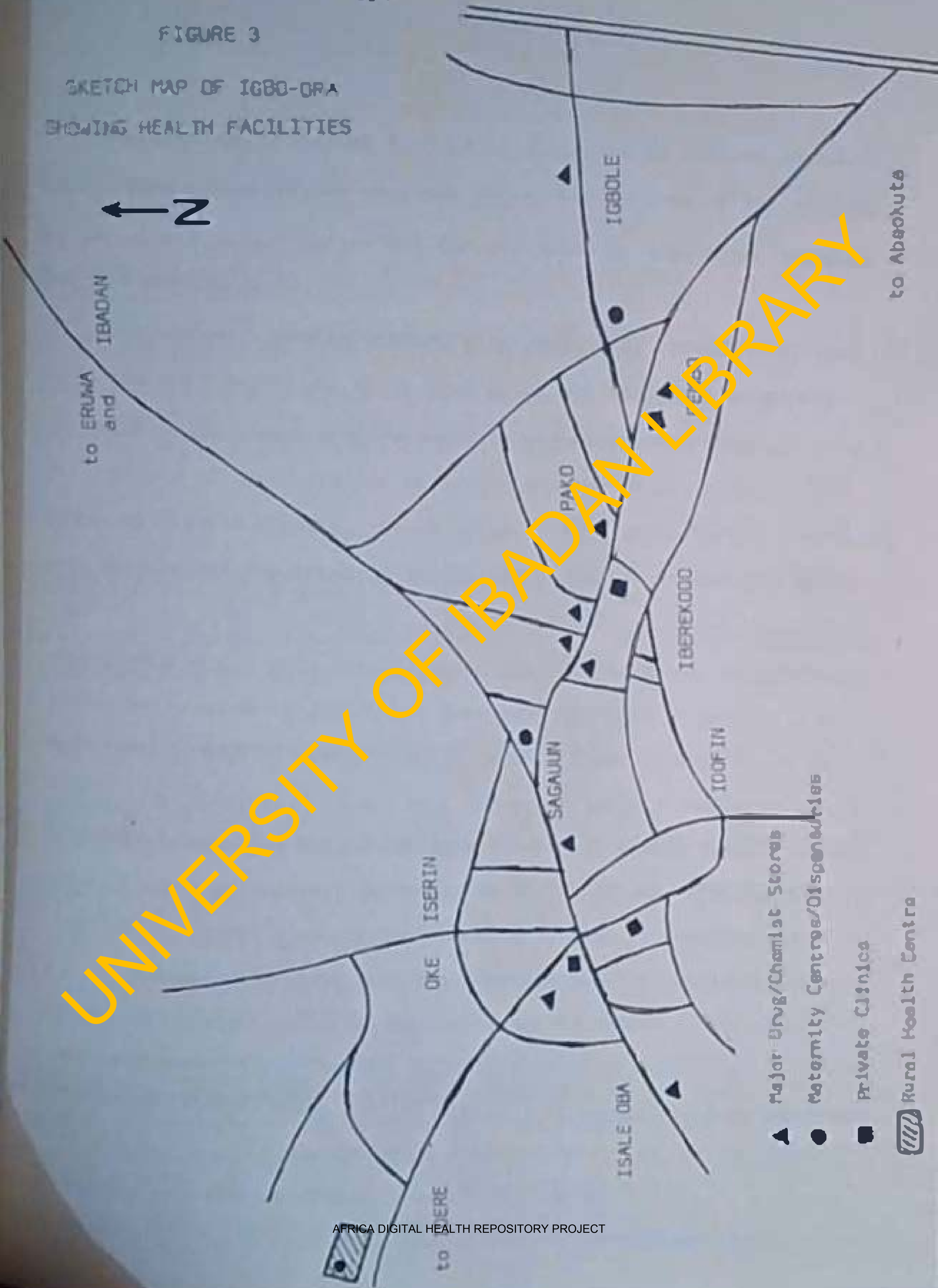
FIGURE 3

SKETCH MAP OF IGBO-ORA SHOWING HEALTH FACILITIES



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The countryside around Igboora is described as derived savannah due to heavy deforestation over the years. As an area of the tropics Igboora experiences distinct wet and dry seasons, the latter occurring from November to April.

The economic base is primarily agricultural. Traditional cash crops such as tobacco and cocoa have given way to intensive growth and trade in food cash crops especially cassava, melon seed and maize.

People of Igboora are a part of the large ethnic group of the Yoruba of Western Nigeria. It is believed that every Yoruba originated from Ile-Ife and the founding father was Oduduwa. Oduduwa had seven children who later migrated to different places. Four of Igboora's communities trace their ancestry from the Oyo branch of the Yoruba family while those in Igbolo and Iboreledo are said to hail from the Egba branch based in Abeokuta which is only forty kilometres to the south. The original settlers were hunters. Igboora community proper also has strong links with Idere town (seven kilometres West) since the king of Idere is a direct descendant of Alafin of Oyo. The Isale Oba section of Igboora contains some members of Idere's royal family.

Igboora is the site of the innovative Ibarapa Community Health Programme, begun in 1963 by the University of Ibadan in collaboration with the then Western Nigeria Regional Government's Ministry of Health (Gunlesi, 1965). Today the University's Department of Preventive and Social Medicine and the Oyo State Ministry of Health are the prime actors, with growing community input through the Igboora Development Committee. The Ibarapa Programme is based at the Igboora Rural Health

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Centre, a state owned facility that was built in 195[illegible] and provides teaching, service and research opportunities in all specialities of public health and primary health care for a variety of health science students.

Background of the programme

This is an evaluation study, hence there is need to describe the programme being evaluated. From 1982 UNICEF in conjunction with the Federal Government of Nigeria embarked on promotion of Oral Rehydration Therapy (ORT) as part of the national Diarrhoeal Diseases Control Programme as well as UNICEF's Child Survival and Development Revolution (CSDR) with GOBI strategies (Grant, 1984). Subsequent demonstration and training centres in ORT were instituted at regional and state levels. Igboora Rural Health Centre is the first district level demonstration centre and is considered part of UNICEF's operational research activities.

On September 23rd, 1985, an Oral Rehydration Therapy (ORT) unit was set up at the Igboora Rural Health Centre by a team of health educators from the Department of Preventive and Social Medicine with funds and technical guidance from UNICEF. The ORT unit is located within the health centre infrastructure and situated adjacent to the Preschool clinic and the children's ward.

Two mature female health aides, who are both residents and indigenes of Igboora, staff the ORT unit, with back-up service and supervision from the medical and health education staff. These women have many years experience in community research and have a good command

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of English as well as their own Yoruba language. The women have undertaken in-service training courses in health education, primary health care and malaria control. They received special orientation in the use of ORT and management of the unit.

The health education objectives of the ORT programme are outlined below followed by a discussion on methods utilized to achieve the objectives. The immediate objectives of a diarrhoea control programme are to promote use of ORT which can substantially decrease mortality from acute diarrhoeal diseases; to combine this therapy with proper feeding practices; to minimise malnutrition; and to reduce diarrhoea disease incidence through encouraging appropriate child care practices (WHO, 1979). These objectives are also reflected in the Igboora ORT unit objectives.

The general objectives of the ORT unit at Igboora are:-

1. To provide training opportunity for members of staff, students (both undergraduate and post graduate) and community-based primary health workers in diarrhoea management.
2. To provide service to patients with diarrhoea through prompt treatment of dehydration with ORT and in the process legitimise ORT as a real form of treatment.
3. To educate mothers on the preparation and use of home-made sugar salt solution (SSS).

In regard to the third objective the behaviours expected of mothers after exposure to the ORT education programme are outlined below:-

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(a) Mothers will recognise diarrhoea, dehydration and their dangers.

(b) Mothers will continue breast feeding during diarrhoea.

(c) Mothers will continue regular feeding and normal diet during diarrhoea.

(d) Mother will prevent diarrhoea by handwashing.

(e) Mothers will use cup, spoon and plate as feeding utensils and wash these before use.

(f) Mothers will mix and administer home made sugar salt solution during episodes of diarrhoea.

To achieve the specific behavioural objectives a variety of health education methods are used. Overall an interactive process employing brainstorming, discussion, talk with visual aids and demonstration are used (Figure 4).

Posters correspond to each objective and aid mothers in recognition of the condition and what is being discussed. Posters also act as prompts to facilitate discussion as well as help in idea generation (Hambrichan and Krueger, 1987). The posters also guide the health educator in delivering a standardized presentation each time. Each session culminates in a participatory demonstration where mothers have a chance to practice SSS preparation skills and taste the home-made solution.

The Study

The main component of the CHP unit at Iddoora is health education of mothers on the prevention of diarrhoea and management of dehydration. In addition mothers are counselled on the need for appropriate nutrition

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during diarrhoea. This study is an evaluation of the health education component of the programme.

The need for an evaluation cannot be over-emphasised as this is the only indicator of success towards a predetermined goal. There is lack of evaluation results in health education programmes in general (Wallack, 1981) and in ORT programmes in particular. A review of ORT programme evaluation showed that most were tag on and not comprehensive.

Results of the study will be invaluable as a feedback to improve the Igboora programme. It may be found useful by others engaged in other district level programmes in Nigeria as well as other countries. It may serve as a basis for planning community outreach programmes by the Daraja staff.

Objectives:

The broad objectives of the study are as follows:

1. To assess mothers' gain and retention of knowledge and skill due to exposure to health education in the ORT unit.
2. To compare the knowledge and skill of mothers who attended the ORT unit with non attenders.

The above will be considered in light of the following specific factors.

(a) Knowledge of the cause, prevention and management of diarrhoea.

(b) Knowledge of the formula for preparing home-made SSS.

(c) Ability to [illegible] and use of SSS.

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FIGURE 4

SAMPLE OF UNICEF POSTERS USED AT ORT UNIT TO STIMULATE DISCUSSION

1. Continuous fluids during diarrhoea
2. Handwashing for prevention
3. Continued feeding during diarrhoea
4. Recognizing dehydration

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(d) Actual utilization of home-made SSS.

(e) Reported feeding practices of children with diarrhoea.

(f) Opinions on the usefulness of SSS.

(g) Knowledge, opinion and practices concerning drugs in the treatment of diarrhoea.

Scope of Study:

The evaluation in this study is confined to assessing educational and behavioural indices in respondents in relation to diarrhoea and ORT, that is the short term and intermediate outcome (Green, 1980). The study does not look at the effect of ORT as this has been verified in many other researches (Ragin et al 1981, Cleocata et al, 1981 and Crango et al, 1985). Although it would add validity to the study, the chemical constitution of home made sugar salt solution is not analysed here due to lack of adequate facilities in Igbora. However Crange et al (1985) have shown that using the available teaspoons and types of salt and sugar found in the local market, the range of sucrose and sodium concentration in the resulting home-made solution are within acceptable limits.

The study is unique in that it looks at education at an ORT unit with follow-up whereas other studies have focussed on mass education.

Hypotheses:

Though one hopes for gain in knowledge and reported practices and skill in SSS preparation as a result of exposure to health education at the ORT unit, it will be assumed the programme had no effect.

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Therefore the following Null hypotheses were formulated.

1. There will be no difference in mothers' knowledge and skill on diarrhoea and ORT preparation before and after exposure to health education at the ORT unit Igbo-

2.. There will be no difference in knowledge and skill on diarrhoea and ORT preparation between the attenders at the ORT unit and non-attenders.

Research Design:

The study is quasi-experimental with control group design. The mothers who attended ORT unit are the experimental group. While mothers who did not (non-attenders) serve as the control. The design is depicted in the figure below:

	Pretest	Intervention	Immediate Post test	Follow-up Test
Experimental	TE_o	X	TE_1	TE_2
Control	.	.	.	T_o

Although the researcher desired pretest of both groups he was not physically present to do so at the onset of the programme. Therefore to circumvent this problem the researcher will compare the baseline data (TE_o) of the ORT clinic attenders and the control group data. The control group serves to compare the effect of the ORT unit health education on the attenders. The control group

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would be free of any bias introduced by testing effect but may have, during the year, been exposed to CMT messages from other sources.

Universe

The study population ever all are mothers of preschool children in Igbora town. There are approximately 6,000 to 8,000 of such women. Women were selected as target population because they are the main health care providers of children under five years in Igbora (Afilaka et al, 1985). It was mothers who brought children to the CMT clinic.

The experimental group consists of mothers who attended the CMT unit from its inception on 23rd September, 1985 to 30th June, 1986, that is 549 attendare. Of these 28 forms had incomplete records and could not be used. It transpired that these mothers took the pretest and received health education but then proceeded to the laboratory or pharmacy and did not return for the post test. Forty-four mothers came from surrounding towns, viz. Tapa, Idero and Ikongan, and were not used for study because of logistical constraints. Igbora mothers equalled 477 and this was taken to be the universe for the experimental group.

Selection procedure

The original intention of the writer was to use stratified random sample in selecting mothers from the universe based on the six census blocks. However practical experience in the field showed difficult in finding mothers at home (regardless of time of day) due

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to high mobility to Lagos, Ore and elsewhere, an issue also documented by Krieger (1984).

Consequently the interviewers visited all homes up to three times, a process which yielded 124 experimental respondents. It is noteworthy, though that the proportion of the sample in relation to geographical distribution of Igboora is similar to that of attenders at the ORT unit (Table 3).

110 mothers from Igboora town constituted the control group (non-attenders). The selection of these mothers was non-probability sampling, but attempts were made at geographic spacing. To ensure that control group members were non-attenders, mothers were asked specifically if they had attended ORT unit at Igboora any time since its inception on 23rd September 1985. An answer in the affirmative resulted in rejection from the control group.

To assess the element, if any, of diffusion in relation to ORT within the community, the control group was divided into two subgroups. Those mothers of preschool children living in the same compound as those who attended ORT clinic and those outside the household but within the same enumeration area. The selection into each category was done alternatively with resultant equal number of 55 in each group. The total number of control (110) is less than that of experimental(124) because of the mobility problem mentioned earlier.

Instruments for Data Collection

In this study three methods of data collection were used viz -

i) Review of records.

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ii) Interview using a questionnaire.

iii) Observation.

Review of records

Baseline data on the clinic attenders was obtained from records at the ORT unit. Two female staff members filled registration forms for each patient that included demographic data, assessment of dehydration, and reported feeding practices. The form also contained pre and post tests on mothers knowledge concerning recognition and prevention of diarrhoea, feeding practices during diarrhoea and preparation and administration of home-made sugar salt solution. Pretest is the baseline (TE_0) for this study. While post test is immediate effect (TE_1) after health education in ORT unit. Against these retention (TE_2) of knowledge and skill can be measured.

Questionnaire

A questionnaire was used for the home visit interview (TE_2) in the follow-up survey. It paralleled the records data in construction. Mothers' knowledge on diarrhoea and dehydration and their dangers, prevention of diarrhoea feeding practices during diarrhoea and management of diarrhoea with home-made SSS were sought. It also asked for mothers' opinion on the usefulness of SSS.

A pretest of the follow-up questionnaire was conducted on six ORT unit attenders and six control mothers in Igboora community. These women were subsequently removed from the study population. Appropriate amendments were made removing ambiguities in some questions.

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Observation

In addition to the follow-up questionnaire, an observation checklist on the availability of ingredients for preparation of SSS was included. Mothers were requested to demonstrate preparation of home based SSS. The interviewers looked for the following behaviours: washing of hands with soap and water; cleaning and filling of a bottle (beer 600ml) with water; measuring of one level teaspoon of salt and ten level teaspoons of sugar; mixing of the ingredients in a bowl; and administering the solution to a child using cup and spoon.

Administration of Data Collection Instruments

The same ORT unit staff who had conducted the pre and post tests in the clinic also administered the follow-up questionnaire under the researcher's supervision. These women took turns on alternate days to accompany the researcher to the field.

Houses of ORT attenders were identified by the house numbers and compound names recorded on the ORT unit forms. When a house was found the interviewers introduced themselves to the occupant and asked for the particular mother who had attended the ORT unit. Customary greetings were exchanged and the purpose of the visit explained. In most cases this was superfluous since mothers easily recognised the interviewers and recalled their visit to the ORT Unit.

The interview aspect of data gathering began first with the ORT unit staff member asking the question which had been pretranslated into Yoruba. The researcher closely observed the process and ensured that mothers were given opportunity to respond fully to all items.

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Validity and Reliability

The use of the same staff throughout lended continuity and consistency. The same staff also helped to translate questionnaires from English to Yoruba which reflected their original work in the ORT unit. Validity may have been greater in the follow-up where more open ended questions were used. The interview was carried out in respondent's own familiar environment which was likely to boost her confidence, therefore encouraging her to express her views more freely. Observation also enhanced validity, particularly as two people observed the same event.

Use of the control group will seek to rule out the possibility of incidental effects or other programmes (confounding variables). Similarly it will seek to rule out effect of maturation. That is, mothers pick up information relating to the ORT programme with passage of time. In this way the result of the evaluation may be attributed to the health education programme.

The first step in the observation process was to request mothers to assemble all the materials required to make ORS. In case the mothers did not have any of those items the researcher carried along two bel, plastic spoons, one plastic cup with cover, a bowl, some sugar and some salt. Mothers were then asked to prepare the rehydration drink while the interviewers observed patiently without prompting. The researcher and the ORT unit staff members compared their observations on [illegible] performance and recorded there on the appropriate place in the questionnaire.

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Data Analysis

The researcher constructed a coding protocol which was used in compiling the data. Subsequently coded results were arranged into frequency tables. Using pocket calculator the researcher carried out statistical tests (X^2 and Z) of association. The purpose of the manual computation of results was to provide the author with experience in data analysis.

Limitations of the study

Some questions such as, "has any of your children had diarrhoea in the last three months" and "what did you do for diarrhoea", sought information on past events and actions. This information relates to reported behaviour, and the researcher did not observe it and could not verify what actually happened.

The non-availability of control for pre-test made it difficult to assess the influence of effects external to the ORT programme at the Igboora Health Centre. It should be noted that the local government launched its ORT/ORT programme formally in July, 1986. Maternity centres were at that time supposed to present health talks on ORT during immunization and antenatal occasions. Observation and interview at the maternity centres revealed that there was no standard format for presentation of health talk on ORT, and due to lack of ingredients for preparation of SSS no demonstration was carried out.

Another potential source of ORT information would be mass media and clinics in Lagos where Igboora mothers do travel on business.

The size of the control subgroups is small so that the effect of diffusion of ORT knowledge from attenders to close neighbour non-attenders may be difficult to judge.

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CHAPTER FOUR

RESULTS

The findings of this study will be presented under five broad headings. First the demographic characteristics of the experimental and control mothers will be described. The second section will look at mothers ability to recognise diarrhoea as well as their knowledge about its cause, danger and prevention. The third area of focus will be on mothers' knowledge about care of children who have diarrhoea. This includes feeding practices, treatment measures and home-made salt sugar solution. Sections two and three will not only compare experimental and control mothers but will also measure retention of knowledge within the experimental group.

The fourth section reports observational data on mothers' actual ability to prepare and administer SSS. Finally mothers' opinion about and actual use of SSS will be documented.

Demographic characteristics

Demographic variables are used to compare characteristics between attendees of Igboora Oral Rehydration Therapy (ORT) unit and the non-attending control mothers.

In all 234 mothers were interviewed. Of these 124 constituted the experimental group, representing 26% of total patients who attended the ORT unit. The distribution of experimental and control samples among the various census blocks in Igboora town was proportional to the distribution of total patients who attended ORT clinic except block two in which resided 30% of patients but accounted for only 17.7% of

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the experimental and 16.7% of the control mothers (see Table 3).

The experimental and control groups were similar with regard to occupation, religion, age, education and parity (Tables 4 to 8). The distribution of occupations among respondents in the two groups is similar with majority being traders in both the experimental and control groups, 77.4% and 80.9% respectively. Only 8.9% in the experimental and 8.2% among the control claimed not to be engaged in any gainful employment and therefore classified as housewives, while 13.7% and 10.0% among experimental and control respectively were engaged in skilled work such as tailoring, typing, and teaching. Statistically there was no difference between the two groups with regard to occupation (Table 4).

Muslims formed a majority in both experimental (70.2%) and control (61.8%) groups. The balance was made up of Christians. Statistical test showed no significant difference between the two groups (Table 5). Table 6 compares the ages of mothers between the control and experimental groups. Most of the mothers in both categories were in the age range 25 to 34 years represented by 51.6% among experimental and 50% among the control. About one third in each group were in the age bracket 15 to 24 years. While the older mothers (35 years and above) were 14.5% of the experimental and 17.3% of the control groups. The similarities were proved by a statistical test. About three-fourths in both experimental and control groups had not received any formal education. While 24.5% among the control and 23.4% among the experimental groups had received education ranging from primary to college

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education. No statistical difference was evident in Table 7.

Table 8 shows that parity overall was fairly evenly distributed in the study population, with nearly equal numbers having one, two, three, four or more children. The distribution was quite similar between experimental and control mothers producing no statistically significant differences.

The above findings indicate that there were no observable differences between the two groups as regards occupation, religion, age, education and parity. One may therefore conclude that the above factors are unlikely to have effect on any differences found in knowledge, skill and opinions between experimental and control mothers.

Recognition, Cause, Danger and Prevention of Diarrhoea

Mothers were assessed about their ability to recognise diarrhoea as well as their knowledge about cause, danger and prevention.

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Table 3

Distribution of experimental and control groups among different blocks in Igbo-Ora Town

BLOCK	TOTAL PATIENTS (%)	EXPERIMENTAL PATIENTS (%)	CONTROL (%)	TOTAL PEOPLE STUDIED (%)
1	77 (16.2)	15 (12.2)	17 (15.4)	32 (13.7)
2	146 (30.6)	22 (17.7)	17 (15.4)	39 (16.7)
3	98 (20.6)	27 (21.8)	23 (21.0)	50 (21.4)
4	56 (11.7)	22 (17.7)	18 (16.4)	40 (17.1)
5	55 (11.5)	22 (17.7)	17 (15.4)	39 (16.7)
6	45 (9.4)	16 (12.9)	18 (16.4)	34 (14.4)
	477 (100)	124* (100)	110 (100)	234 (100)

* 26% of total patients.

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Table 4

Comparison between experimental and control groups by occupation

OCCUPATION	Research Group		TOTAL (%)
	Experimental	Control (%)	
TRADER	96 (77.4)	89 (80.9)	185 (79.0)
SKILLED	17 (13.7)	12 (10.9)	29 (12.4)
HOUSEWIFE	11 (8.9)	9 (8.2)	20 (8.6)
T O T A L	124 (100)	110 (100)	234 (100)

χ^2 = 0.323 df = 2 P> 0.50

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Table 5

Comparison between experimental and control groups by religion

RELIGION	Research Group		Total (%)
	Experimental (%)	Control (%)	
MUSLIM	87 (70.2)	68 (61.8)	155 (66.2)
CHRISTIAN	37 (29.8)	42 (38.2)	79 (33.8)
T O T A L	124 (100)	110 (100)	234 (100)

X^2 = 1.840 df = 1 P> 0.20

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Table 6

Comparison between experimental and control groups by age

AGE (YEARS)	Research Group		TOTAL (%)
	Experimental (%)	Control (%)	
15 - 24	42 (33.9)	36 (32.7)	78 (33.3)
25 - 34	64 (51.6)	55 (50.0)	119 (50.9)
greater than 35	18 (14.5)	19 (17.3)	37 (15.8)
TOTAL	124 (100)	110 (100)	234 (100)

$\chi^2 = 0.33$ df = 2 $p > 0.50$

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Table 7

Comparison between experimental and control groups by education

FORMAL EDUCATION	Research Group		TOTAL (%)
	Experimental (%)	Control (%)	
WBS	29 (23.4)	27 (24.5)	56 (23.9)
HOHS	95 (76.6)	83 (75.5)	178 (76.1)
TOTAL	124 (100)	110 (100)	234 (100)

χ^2 = 0.0462 df = 1 P> 0.50

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Table 8

Comparison between experimental and control group on respondents' parity

PARITY	Research Groups		TOTAL (%)
	Experimental	Control (%)	
1	25 (20.2)	18 (16.4)	[illegible]
2	24 (19.4)	20 ([illegible].2)	44(18.8)
3	29 (23.4)	21 (19.1)	50(21.4)
4	20 (16.1)	24 (21.8)	44(18.8)
[illegible] 4	26 (20.9)	27 (24.5)	53(22.6)
TOTAL	124 (100)	110 (100)	234(100)

x^2 [illegible] df = 4 $P > 0.50$

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The question asking mothers to list signs by which they recognise diarrhoea was not asked on the pre and post test. Therefore table 9 compares the responses between experimental mothers on the follow up and the control group. The most commonly mentioned sign was three or more stools daily (71.6% experimental, 66.6% control). Watery stool was mentioned by 21.0% of experimental and 20.0% of control mothers. Noisy belly was a third response, while only three mothers overall had no idea. No significant difference between the two groups was found. Therefore the hypothesis that there will be no difference between the two groups is retained.

With regard to knowledge about danger of diarrhoea weight loss, death, water loss and signs of dehydration (sunken fontenole, decreased urine etc.) were considered as correct answers. This data was available at pre and post test as well as at follow-up. As seen in Table 10 no difference was found between experimental mothers at pretest and the control group. Correct responses increased in the experimental group from 42.2% in the pretest to 100% in the post test. The above finding caused the rejection of the hypothesis that there will be no difference before and after health education intervention. There was a drop in the follow-up to 91.1% correct responses. However this figure is still significantly higher than either the pretest or the control group(53.6%). The result supported the rejection of the hypothesis that there will be no difference in the two groups.

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Mothers were not questioned directly on cause of diarrhoea in the pre and post tests. Significantly more mothers in the follow-up survey (66.9%) correctly cited dirt, uncovered food, bad water, germs and cholera as possible causes of diarrhoea than did the control mothers (33.6%). The finding resulted in the rejection of the hypothesis that there will be no difference between the experimental and control groups. Options considered incorrect were teething, hot belly, beans and pepper given by 23.4% of respondents among experimental and 36.4% among control. Only 9.7% among experimental did not know a possible cause of diarrhoea, whereas as many as 30.0% did not know among the control (Table 11).

Table 12 reflects knowledge about diarrhoea prevention among the experimental groups at different times and the control group. Pretest showed that 37.1% of responses by the mothers were don't know, whereas immediate test after health education intervention showed that all respondents cited an acceptable preventive measure. In the follow-up 10.5% of responses were don't know as compared to control which had 26.4%.

Multiple responses given by mothers relating to preventive measure against diarrhoea are protecting child's food by covering it, washing child's feeding utensils (plate cup and spoon), washing hands, personal hygiene (taking a bath, cutting finger nails, and washing the breast before breast feeding), environmental sanitation (sweeping the house and surrounding and proper refuse disposal), and lastly use of latrine. Of the above responses these preventive measures were specifically emphasised in the education programme. Those are covering

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of food, cleaning child's feeding utensils (cup, plate and spoon) and washing mothers hands before feeding the child.

Concerning covering food the control and pretest groups showed no difference. The increase in responses between pretest (36.7%) and post test (54.0%) was significant. Therefore the hypothesis that there will be no difference before and after health education intervention is rejected. The drop off at follow up (49.2%) was not significantly different from the post test. The follow up responses of experimental patients were significantly higher than the control group (33.6%). Thus the hypothesis stating that there will be no difference between the two groups is rejected.

As regards washing child's utensils there was a significant rise in knowledge from pretest (25.8%) to post test (40.3%). The result refuted the hypothesis that there will be no difference before and after health education intervention. Though there was a drop in the follow-up experimental responses to 34.7%, this was still higher than pretest (25.8%) and control (26.4%) responses. However the difference between the experimental and control is not significant. Therefore the hypothesis is valid. The responses between control (26.4%) and pretest (25.8%) are almost the same.

Mothers performed significantly better on hand washing at post test (16.1%) than pretest (4.0%). The finding resulted in rejection of the hypothesis that there will be no difference before and after health education. On observational grounds the portion of mothers who recall hand washing is quite low for health purposes. Interestingly

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at follow-up they performed better (23.4%) than on the post test (16.1%), though the difference was not significant. However the follow-up experimental (23.4%) scored significantly higher than control (11.8%). This result invalidated the hypothesis that there will be no difference between the experimental and control groups.

The results show a general trend of gain in knowledge by experimental mothers from pretest to post test and retention in the follow-up as well as a higher level of knowledge compared to the control group. It is also important to note that the pretest and control groups show similar performance.

Results so far indicate that almost all mothers are able to recognise diarrhoea. Though only about half who are not exposed to health education appreciate its danger. Although about two-thirds of mothers exposed to health education know correct causes of diarrhoea only one third of mothers who were not exposed know correct causes. Two-thirds of mothers who did not receive health education related diarrhoea causation either to teething, hot belly and pepper or they did not know cause of diarrhoea. Mothers who had health education intervention know more correct preventive measures than their control counterparts. The follow-up experimental group listed an average of 1.32 correct preventive ideas while the control group listed only 0.83 apiece.

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Table 9

Comparison between experimental and control respondents' recognition of diarrhoea

RECOGNITION OF DIARRHOEA	Research Group		TOTAL (%)
	Follow-up Experimental (%)	Control (%)	
FREQUENCY: More than 3 times daily	89 (71.8)	73 (66.4)	162 (69.2)
CONSISTENCY: Watery stool	26 (21.0)	22 (20.0)	48 (20.5)
NOISY BELLY	7 (5.6)	14 (12.7)	21 (9.0)
DON'T KNOW	2 (1.6)	1 (0.9)	3 (1.3)
TOTAL	124 (100)	110 (100)	234 (100)

$X^2 = 3.755$ df = 3 P > 0.20

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Table 10

Knowledge of danger of diarrhoea among experimental and control groups

KNOWLEDGE OF DANGER OF DIARRHOEA	EXPERIMENTAL			CONTROL (%)
	PRE TEST (%)	POST TEST (%)	FOLLOW-UP (%)	
YES*	61(49.2)	124(100)	113(91.1)	59(53.6)
NO	63(50.8)	0(0)	11(8.9)	51(46.4)
TOTAL	124(100)	124(100)	124(100)	110(100)

* Dangers of diarrhoea considered are weight loss, death, water loss and signs of dehydration (sunken fontanell, decreased urine, etc.).

χ^2 tests

a) Between Pre and Post tests χ^2 = 81.400 df = 1 $P < 0.005$

b) Between Post test and Follow-up χ^2 = 11.511 df = 1 $P < 0.005$

c) Between Follow-up and Control χ^2 = 42.065 df = 1 $P < 0.005$

d) Between Pretest and Follow-up χ^2 = 72.450 df = 1 $P < 0.005$

e) Between Pretest and Control χ^2 = 0.461 df = 1 $P > 0.50$

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Table 11

Comparison of knowledge of cause of diarrhoea between experimental and control groups

KNOWLEDGE	RESEARCH GROUPS		TOTAL (%)
	FOLLOW-UP EXPERIMENTAL (%)	CONTROL (%)	
CORRECT Dirt Uncovered food Bad water Germs Cholera	83 (66.9)	37 (33.6)	120 (51.3)
INCORRECT Teething Hot body Beans Popper	29 (23.4)	40 (36.4)	69 (29.5)
DON'T KNOW	12 (9.7)	33 (30.0)	45 (19.2)
TOTAL	124 (100)	110 (100)	234 (100)

$X^2 = 28.130$; $df = 2$; $P < 0.005$

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Table 12

Knowledge of prevention of diarrhoea among experimental and control groups

Knowledge idea	EXPERIMENTAL			Control (%)
	Pre-Test(%)	Post-Test(%)	Follow-up(%)	
Cover food	45 (36.3)	67 (54.0)	61 (49.2)	37 (33.6)
Wash cup, spoon and plate	32 (25.8)	50 (40.3)	43 (34.7)	29 (26.4)
Wash hands	5 (4.0)	20 (16.1)	29 (23.4)	13 (11.8)
Personal Hygiene*	3 (2.4)	13 (10.5)	20 (16.1)	1 (0.9)
Environmental sanitation**	5 (4.0)	18 (14.5)	11 (8.9)	11 (10.0)
Use medicine	2 (1.6)	0 (0)	5 (4.0)	7 (6.2)
Don't know	46 (37.1)	0 (0)	13 (10.5)	29 (26.4)
N	124	124	124	110

* Wash breast, cut finger nails and take a bath.

** Sweeping house and surrounding and proper refuse disposal.

χ^2 and P values derived after comparison of different research groups against knowledge of preventive measure against diarrhoea

Item Tested	Pre and Post	Post and Follow-up	Pre and Follow-up	Follow-up and Control	Pre and Control
Cover food	2.809 P<0.04	0.750 P>0.40	2.081 P<0.04	2.438 P<0.02	0.495 P>0.40
Wash cup plate and spoon	2.458 P<0.02	0.918 P>0.30	1.535 P>0.10	1.482 P>0.10	0.104 P>0.9
Wash hands	3.270 P<0.002	1.460 P>0.10	4.619 P<0.001	2.4167 P<0.02	2.201 P<0.04

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Care and Treatment

Mothers were asked about several issues regarding the care and treatment of a child with diarrhoea. These included food and fluid intake, treatment measures and home-made sugar salt solution (SSS).

Overall mothers recommended twelve different food items to be given to a child who has diarrhoea. The most common item at the pretest was ogi (pap 50.8%) followed by beans (20.2%) and breast milk (12.1%). Others included rice, amala, infant formula, moinmoin, yam, egg, water, tea and eko. Some mothers (22.4%) said they did not know.

All of the food items mentioned except infant formula showed an increased mention during the post test. Follow-up responses remained higher than pretest results and in two cases, ogi and amala, actually increased since the post test. Only increased mention of beans and beans products (moinmoin) distinguished those receiving education from their pretest selves and from the control group (Table 13).

Average positive responses per mother rose from 1.2 in the pretest to 2.5 in the post test and 2.1 at follow-up. There were no "don't know" responses at post test and 17.2% during follow-up. While there does not appear to be an overall pattern to responses the general observation is that mothers seem to see the need to continue feeding during diarrhoea with a variety of foods.

In the control group 16.4% did not know which foods to give a child with diarrhoea, while the group as a whole gave 1.6 positive responses on average. Their responses for beans mirrored the pretest answers (20.8% each), while their choice of ogi matched post test

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results. The number of breast milk responses resembled the follow-up answers.

Moinmoin, a form of bean cake, was recommended more after health education (post test 20.2%) than before (pretest 0.8%). Findings support the rejection of hypothese that there will be no difference in knowledge before and after education. The knowledge was retained as reflected in the follow-up interview, 17.7% as opposed to only 6.4% of control mothers. This result invalidated the hypothesis that there will be no difference between the two groups. A similar trend is observed with beans, rice and meals. However it is noteworthy that although breast feeding was given only in 12.1% of responses in the pretest with a gain to 35.5% in the post test there was no difference in the follow-up and control groups responses with both giving about one-quarter of each mentioning breast-feeding.

Z tests comparing pre and post, post and follow-up, follow-up and pre, follow-up and control and control and pretest indicate gain in knowledge on recommended feeding during diarrhoea from pre to post and retention of this knowledge in the follow-up. The retained knowledge was shown to be higher than in the pretest and also higher than control in relation to ogi, beans, rice, meals and moinmoin.

Table 14 depicts food items that mothers discourage feeding a child during a diarrhoeal episode. Of these spicy, peppery foods, oily food and tinned milk were specifically discouraged during health education at the CRT unit. In contrast pretest responses show that commonly discouraged food items are beans (40.3%), rice (14.5%), hot

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food (12.1%), amala (6.5%) and moinmoin (6.5%). Control mothers had similar views discouraging beans (43.6%), rice (18.2%), hot food (17.9%), amala (7.3%) and moinmoin (5.5%). Although there is no evidence that food is generally withheld from children with diarrhoea, the results indicate an attitude which discourages certain food items from being taken during diarrhoea. It is noteworthy that some of these food items such as beans, rice and moinmoin are of high nutritional value. There is a decline in the mention of beans, rice, moinmoin and amala as forbidden foods in the post test as well as the follow-up (with the exception amala, which was same in pretest and follow-up).

A comparison between Table 13 and 14 shows a similar trend regarding beans, rice and moinmoin. Following the educational intervention, these items increase as acceptable foods and decrease as foods to discourage.

Fluids do not receive such mention on either Table 13 or 14, although the need for continued fluid intake was stressed during education along with need for continued feeding. Yoruba mothers do not consider items like tea, breast milk and drinks as food so questions about foods to give or forbid during diarrhoea could not be expected to yield responses concerning liquids. Ironically tinned baby milk/formula is called "fufu" by local mothers giving it a different status than breast milk.

Four items, puppery food, oily food, tinned milk and hot (temperature) food showed a marked increase as items not to give

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between pretest and either post test or follow-up. Control responses matched the pretest group. Nearly 34% of responses are don't know in the pretest and 25.5% in the control. Whereas for post test and follow-up they were 0.8% and 7.3% respectively.

Results show that mothers had significantly improved their knowledge between pre and post test regarding beans, pepper, oily food and tinned milk. This result refutes the hypothesis that there will be no difference in knowledge before and after health education. Similarly the finding that more experimental (follow-up) mothers had better knowledge regarding beans, pepper, oily food and milk than control mothers supported the rejection of the hypothesis that there will be no difference between the two groups.

Mothers ideas on how to treat diarrhoea are depicted in Table 15. Nearly 35% of mothers in the pretest recommended SSS. This is similar to their counterparts in the control group (36.3%). Those exposed to health education (post test) all cited SSS. However on the follow-up there was a drop to 87.1% recommending SSS as part of treatment. Don't know responses were given more in the pretest group (44.4%) than the control group (16.4%). The control group gave more options relating to anti-diarrhoea drugs such as entero-sedative, thalasole, emilin, antibiotic capsules, traditional remedies (agbo) and obtaining drugs either from chemist or hospital.

Similar numbers of mothers in the pretest (62.1%) and the control group (61.8%) had heard of SSS when asked specifically. Table 16 shows that the pretest group mentioned only the cup, pinch and scoop method

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while 24.5% of the control who knew SSS mentioned the bottle method. All post test respondents mentioned the bottle method and listed the ingredients correctly. All mothers at follow-up still knew of SSS but 10.5% now could only describe the cup method. Although none of the mothers of the experimental group in the pretest had heard of the new national formula, 30 (24.2%) know the proportions and ingredients for making SSS using cup method which compared favourably with that of the control group (23.7%).

Post-test results indicate that mothers had learnt the standard national formula using bottle. The difference between pre and post tests is significant resulting in the rejection of the hypothesis that there will be no difference in knowledge on SSS before and after education. The follow-up however shows a drop with 66.9% retaining the new innovative formula, four citing the cup method, while thirty-seven could not get ingredients and proportions correct for either the bottle or cup method. Although the drop in knowledge from the post test level was significant, the retained knowledge was still significantly higher than the control. The finding supports rejection of the hypothesis that there will be no difference between the experimental and control groups. X^2 tests comparing various groups are found on Table 16.

Majority of control mothers who heard about SSS heard from the Ifeora health centre. However the information was obtained during general health talks and not at the CTT unit. Friends and neighbours appear to be another important source of information as they were cit

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by 19.1% of the 68 who knew about SSS. Other sources of information about SSS include other Igboora clinics and clinics outside Igboora. Only one mother mentioned radio as her source of information on SSS (Figure 5).

To get an idea about possible diffusion of the SSS formula from mothers who attended the ORT unit into the community, the control group was divided into two subgroups. Those located in the same household as the mother who attended ORT unit (within) and those outside the compound of any of the mothers who attended ORT unit (Table 17).

There were no observable differences between the two groups, each of which was 55 in number. In both cases 61.8% had heard of SSS. Also 32.7% of those living within the compound know the bottle method while 31.1% living outside the compound of a mother who had attended ORT clinic knew of the bottle formula. Only four mothers gave the correct formula for SSS. It is interesting however, to note that three of the four mothers who knew the correct bottle formula came from the same compound as a mother who attended ORT clinic and learnt it from her. The fourth one picked up the recipe from her neighbour.

Prior to asking their ideas about treatment for diarrhoea, mothers at home were specifically asked if they used any home treatment. Of the 121 mothers who brought their children to the ORT unit 45 reported an attempt at initial home treatment. One-fourth tried SSS. Capsule (i.e. some form of antibiotic) was used by 17.8% of mothers. A traditional remedy (agbo) for diarrhoea was used by 13.3%. Chloroquine and Flagyl were used respectively by 6.7% and 4.4% of mothers (Figure 6).

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It is important to note the treatment children actually received at the Igboora Rural Health Centre because this may influence mothers' perceptions. Additional treatment to SSS was given to 113 children (91.1%) who attended the ORT clinic (see Table 18). Children received a range of one to five drugs and an average of 1.4 drugs. Staff engaged in the prescription of drugs included nurses, midwives, medical students and physicians. Although anti-diarrhoeal drugs have been shown to be of no proven value in most infantile diarrhoeal cases, they were prescribed in 16.9% of cases.

Antibiotics in diarrhoeal diseases are indicated when there is evidence of pathogenic bacteria in the stool or clinical evidence of systemic invasion. Laboratory facilities available in Igboora do not permit desired bacteriological investigations. Results imply that antibiotics were prescribed injudiciously in 21% of cases.

The general pattern of recorded complaints and prescriptions indicates that diarrhoea is accompanied by malaria in 33.7% of patients diagnosed clinically. This is understandable as malaria is known to cause gastrointestinal upset. However there was no parasitological confirmation of malaria. Diarrhoea per se was treated in about one-third of patients. Antipyretic treatment was given to 12.1% of patients and acute respiratory infection (ARI) accounted for 6.4% of prescriptions (Figure 7).

In summary concerning SSS, 62.1% of pretest respondents were aware of it, but only 33.7% actually mentioned it as a possible treatment measure. Four less (8.9%) had reported actually using it prior to coming to clinic. Awareness of SSS increased to 100% at the post-test and remained at that

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level in the follow-up. However when asked specifically for a special drink that can be given to a child with diarrhoea 87.1% mentioned SSS. The control group displayed a similar level of awareness as the pretest mothers.

Ability to prepare sugar salt solution (SSS)

Knowing the ingredients and proportions for making sugar salt solution (SSS) is one thing; putting this into practice is another. In order to find out if knowledge was related to skill in preparation of SSS, mothers during follow-up were requested to assemble equipment and ingredients, prepare and administer home-based oral rehydration solution.

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Table 13

Foods Mothers recommend for child during diarrhoea among experimental and control groups

FOOD RECOMMENDED	EXPERIMENTAL			CONTROL (%)
	Pretest (%)	Post test (%)	Follow-up (%)	
Ogi	63 (50.8)	78 (62.9)	89 (71.8)	70 (63.6)
Beans	25 (20.2)	90 (72.6)	54 (43.5)	25 (22.7)
Breast milk	15 (12.1)	44 (35.5)	32 (25.6)	29 (26.4)
Rice	12 (9.7)	30 (24.2)	26 (21.0)	5 (4.5)
Kanla	11 (8.9)	17 (13.7)	36 (29.0)	25 (20.2)
Infant Formula	5 (4.0)	0 (0)	2 (1.6)	1 (0.9)
Maimoin	1 (0.8)	25 (20.2)	22 (17.7)	7 (6.2)
Others*	15 (12.9)	32 (25.8)	2 (1.6)	12 (10.9)
Don't know	29 (23.4)	0 (0)	22 (17.2)	18 (16.4)
N	124	124	124	110

*Others - Yam, Egg, Water, Tea and Eko

Z and P values

Item Ogi	Pre and post	Post and Follow-up	Pre and Follow-up	Follow-up Control	Pre and Control
	1.952 P>0.05	1.509 P>0.10	3.500 P = 0.0005	1.459 P>0.10	1.991 P<0.05
Beans	9.703 P<0.0001	4.866 P< 0.0001	4.087 P<0.0001	6.541 P< 0.001	same
Rice	2.164 P<0.05	0.604 P>0.3	2.511 P<0.0001	3.928 P<0.0001	1.530 P>0.05
Maimoin	5.272 P<0.0001	0.5102 P>0.4	4.829 P<0.0001	2.752 P<0.006	2.200 P= 0.0278

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Table 14

Food items to not recommend for child during diarrhoea among experimental and control groups

Food item	EXPERIMENT: L			Control (%)
	Pre test (%)	Post-test (%)	Follow-up (%)	
Pepper	2 (1.6)	42 (33.9)	24 (19.4)	5 (4.5)
Oily Food	1 (0.8)	41 (33.1)	37 (29.8)	2 (1.6)
Tin Milk	7 (5.6)	82 (66.1)	55 (44.4)	5 (4.5)
Hot Food	15 (12.1)	70 (56.5)	42 (33.9)	14 (12.7)
Beans	50 (40.3)	2 (1.6)	14 (11.3)	48 (43.6)
Rice	18 (14.5)	0 (0)	11 (8.9)	20 (18.2)
Amala	8 (6.5)	0 (0)	8 (6.5)	8 (7.3)
Maizoin	8 (6.5)	0 (0)	0 (0)	6 (5.5)
Tea/Mineral	0 (0)	1 (0.8)	4 (3.2)	2 (1.8)
Don't know	42 (33.9)	1 (0.8)	9 (7.3)	28 (25.5)
N	124	124	124	110

Z and P values derived after comparison of different research groups against knowledge of food discouraged during diarrhoea.

Item	Pre and Post	Post and Follow-up	Pre and Follow-up	Follow-up and Control	Pre and Control
Beans	8.513 $P<0.0001$	3.173 $P<0.0005$	5.531 $P<0.0001$	5.856 $P<0.0001$	0.511 $P>0.10$
Pepper	7.212 $P<0.0001$	2.636 $P<0.01$	4.811 $P<0.0001$	3.725 $P<0.0005$	1.318 $P>0.10$
Oily Food	7.651 $P<0.0001$	0.553 $P>0.40$	6.905 $P<0.0001$	6.067 $P<0.0001$	0.557 $P>0.4$
Milk	12.373 $P<0.0001$	3.523 $P<0.0005$	7.918 $P<0.0001$	8.260 $P<0.0001$	0.396 $P>0.4$

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Table 15

Mothers ideas on how to treat diarrhoea among experimental and control groups

Method of Diarrhoea Management	EXPERIMENTAL			CONTROL (%)
	Pretest (%)	Post test (%)	Follow up (%)	
SSS	43 (34.7)	124 (100.0)	108 (87.1)	40 (36.3)
Anti-Diarrhoeal Drug	4 (3.2)	0 (0)	7 (5.7)	13 (11.8)
Capsule	8 (6.4)	0 (0)	2 (1.6)	14 (12.7)
Agbo	5 (4.0)	0 (0)	5 (4.0)	7 (6.4)
Herbal Concoction/ Hospital	9 (7.3)	0 (0)	2 (1.6)	18 (16.4)
Don't know	55 (44.4)	0 (0)	0 (0)	18 (16.4)
TOTAL	124 (100)	124 (100)	124 (100)	110 (100)

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Table 16

Changes between experimental and control groups in respondents' knowledge of ingredients for preparing home-based SSS

SSS METHOD	EXPERIMENTAL GROUPS			CONTROL(C)
	Pre test (%)	Post test (%)	Follow-up(%)	
BOTTLE				
Correct	0 (0)	124 (100)	83 (66.9)	4 (3.6)
Incorrect	0 (0)	0 (0)	28 (22.6)	23 (20.9)
CUP				
Correct	30 (24.2)	0 (0)	4 (3.2)	26 (23.7)
Incorrect	47 (37.9)	0 (0)	9 (7.3)	15 (13.6)
DON'T KNOW	47 (37.9)	0 (0)	0 (0)	42 (38.2)
N	124 (100)	124 (100)	124 (100)	110 (100)

χ^2 test (Compare groups by SSS method only, i.e. Bottle, Cup and Don't know)

a. Pre and Post X^2 = 248.000 df = 2 $P < 0.0005$

b. Post and Follow-up X^2 = 49.121 df = 2 $P < 0.0005$

c. Pre and Follow-up X^2 = 151.072 df = 2 $P < 0.0005$

d. Pre and Control X2 = 2.791 df = 2 $P > 0.20$

e. Follow-up and Control X^2 = 67.63 df = 2 $P < 0.0005$

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Figure 5

Distribution of control group by source of information and method of SSS preparation

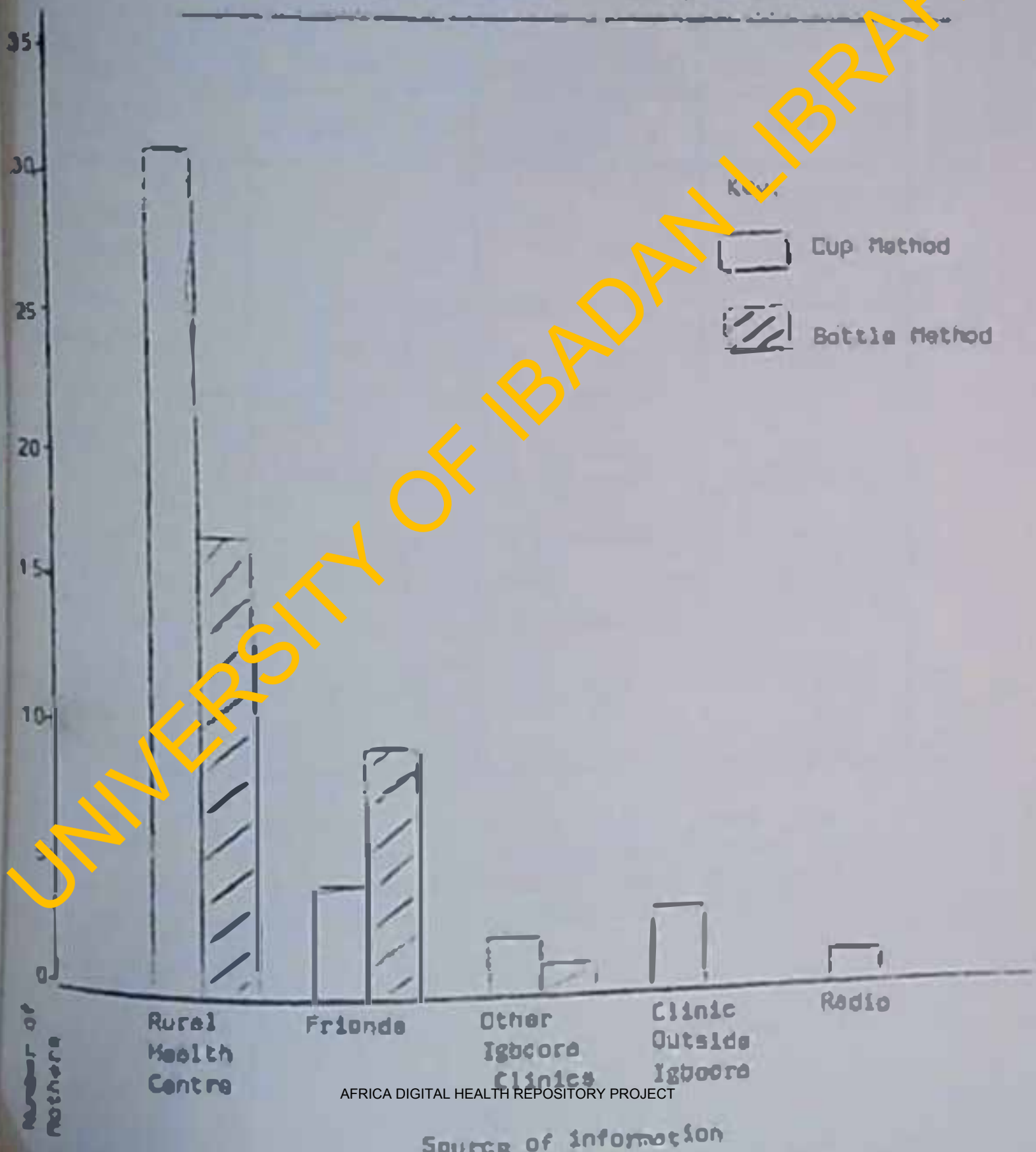

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Table 17.

Knowledge of recipe for SSS between control mothers who live within and outside the compound of an ORT attender.

METHOD OF SSS PREPARATION	CONTROL SUBGROUP RESIDENCE		TOTAL (%)
	WITHIN (%)	OUTSIDE (%)	
BOTTLE			
Correct	3(8.8)	1 (2.9)	4(5.9)
Incorrect	10(29.4)	13 (38.3)	23(33.8)
CUP			
Correct	11(32.4)	15 (44.1)	26(38.2)
Incorrect	10(29.4)	5 (14.7)	15(22.1)
TOTAL	34 (100)	34 (100)	68(100)

Within - Implies mother in the control group lives in the same household as the experimental mother whereas outside implies control mother lives in a different household.

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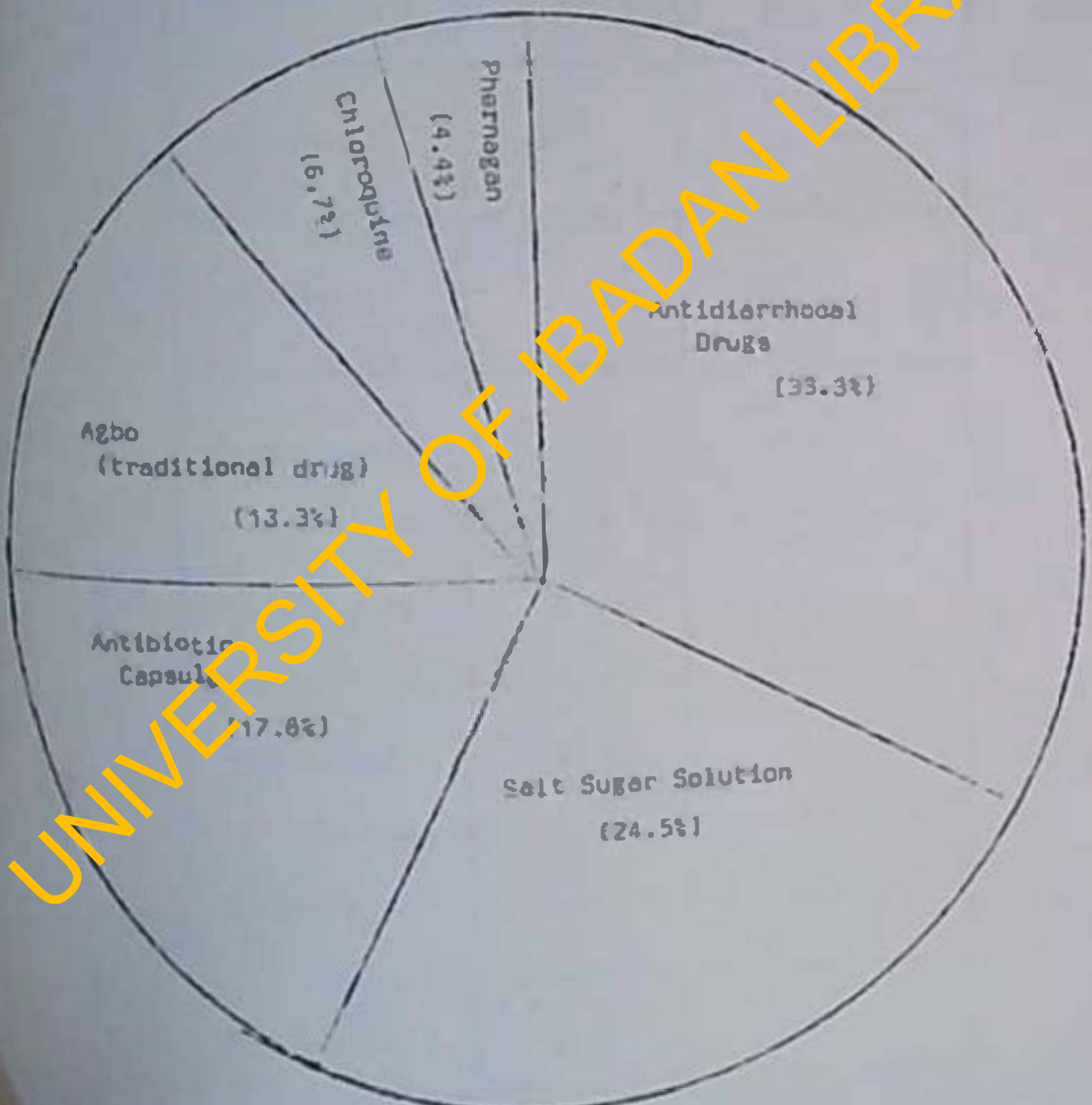
Figure 6

Distribution of reported home treatment of diarrhoea on day presenting at ORT Unit, Igboora Health Centre



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N = 45

Table 18.

Additional treatment received by experimental mothers at Igboora Health Centre

Drug *	No.	%
Chloroquine	39	31.4
Pharmogan	30	24.2
Paracetamol	26	21.0
Antibiotic	26	21.0
Antidiarrhoea	21	16.9
Cough mixture	10	8.1
Multivits	8	6.4
No Treatment	11	8.9
N	124	

* Multiple drugs given

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Figure 7

Distribution of conditions for which drugs were prescribed to ORT Unit patients

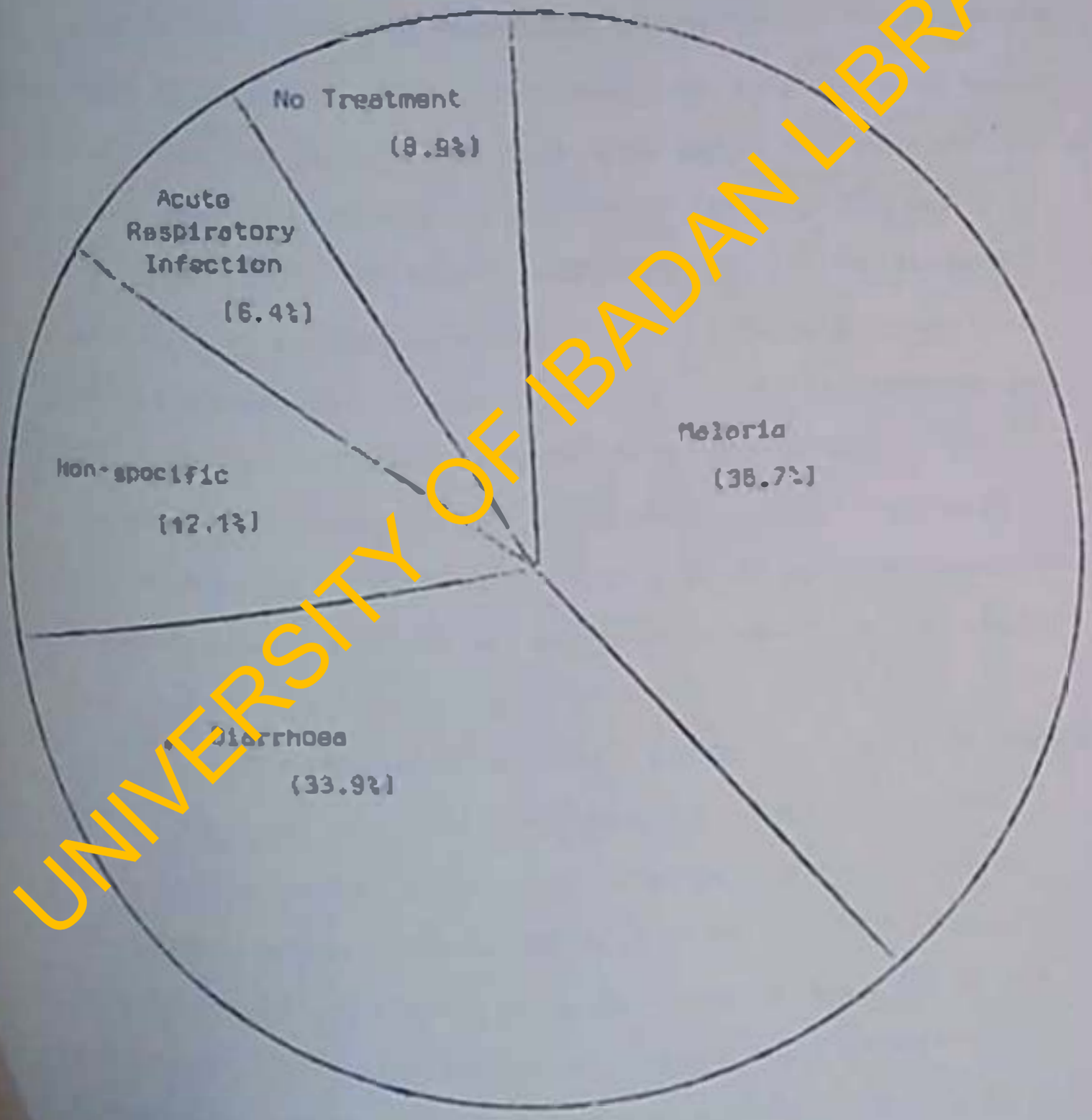

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Table 19 shows that both research groups had most of the items for preparing SSS at home. The exception was sugar, an item not available in 25% of homes for both groups. However sugar was obtained in small quantities at a cost of between ten kobo and fifty kobo (50k = US 1$) either within the compound or at nearby provision shops.

After assembling the ingredients and equipment for making SSS, the next important step is to wash hands with soap and water and dry them with a clean cloth. More mothers in the experimental group(70.2%) did this correctly compared to the control (57.4%). The number of controls who forgot hand washing completely (19.1%) was slightly higher than among the experimental mothers (12.1%). Table 20 shows that these differences are not significant. Therefore the hypothesis that there will be no difference between the two groups is retained.

Only those 68 members of the control group who were aware of SSS were asked to demonstrate these procedures. Also the interview team carried extra supplies and equipment to aid mothers who lacked them to carry out the demonstration.

Not every mother who could state a correct recipe could actually mix it correctly. Table 16 shows that 66.9% of mothers in the follow-up experimental group could state the correct formula for making SSS by bottle. However Table 21 shows that 63.7% correctly demonstrated the preparation using the bottle method. Two of the four mothers who could state the cup formula right demonstrated it correctly. Similar trend was observed with the control group with 11.3% correctly demonstrating preparation of SSS against 23.7% who

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could state the formula using the cup. One out of four control mothers who could state the bottle formula correctly also demonstrated preparation of SSS correctly.

Table 21 also shows that experimental mothers were significantly more able to mix a correct SSS formula than the control mothers. This finding supports the rejection of the hypothesis that there will be no difference between the two groups. The ability of the experimental group to excel lay primarily with the bottle recipe. Seventy-nine (71.2%) of experimental mothers who used bottle (N = 111) mixed correctly compared to only one (3.7%) of control's who knew the bottle (N = 27). The reverse was actually true for the cup method. Thirteen experimental mothers remembered this method but only two (15.4%) could mix it properly. In contrast nineteen (46.3%) of the control mothers who used cup (N = 41) prepared it correctly.

Salt measurement was considered very important since solutions with high sodium content can be dangerous, especially in children who may already be dehydrated. Comparison between method of SSS preparation either using bottle or cup and salt measurement in the experimental (following) group showed that mothers were more likely to measure out the salt using cup method (69.2%) than using the bottle method (6.3%). (Table 22). Similar trend was seen with the control group (Table 23). More mothers over estimated amount of salt with the cup method (41.9%) than the bottle (25.9%). However the difference was not significant.

Review of the pretest results from the ORT unit also indicated that mothers were likely to state an excess amount of salt using cup

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method (57.1%). However since there were no mothers at the time using the bottle method with whom to compare, Table 21 looks at the difference between pretest knowledge of cup ingredients and follow-up with bottle. As with Table 22 the difference between methods were significant.

More experimental mothers (89.5%) using the bottle method (N = 111) correctly measured the amount of water required than the control(74.1%; N = 27), whereas only 53.8% of experimental mothers using cup method correctly measured out the water. This was higher than the control (45.6%). Mothers using cup method had varying sizes of cups and measured varying quantities of water. Mistake with the bottle wrong measurements were as a result of use of wrong bottles such as 7 up, Lucozade, stout or schnapps. Mothers usually filled the bottle to the required level.

All mothers in the experimental group stirred the solution. Most (85.3%) of the control mothers also stirred the solution. Similarly 122 (98.4%) of experimental mothers tested the solution as opposed to 33 (48.5%) of the control group. These differences are significant (Tables 25 and 26). Therefore the result caused the hypothesis that there will be no difference between the experimental and control groups to be rejected.

Correct administration of SSS consisted of giving the solution to the child in a cup to drink. For small children feeding it to the child with cup and spoon was recommended. Almost all (97.6%) mothers in the experimental group as opposed to 60.3% of control mothers administered the SSS correctly. It was disheartening to note that majority (44.4%)

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of the incorrect practices by the control mothers was due to use of feeding bottle (Table 27). Results supported the rejection of Null hypothesis.

As regards indication for the SSS all members of both the experimental and control groups who demonstrated SSS said correctly that it was for diarrhoea and could also be used for a child who was vomiting so long as vomiting was not persistent. Therefore the hypothesis that there will be no difference between the two groups was retained.

Mothers were taught that SSS was to be given after every bowel motion in a child with diarrhoea. This was cited by 79% of the experimental mothers as opposed to 20.6% of the control mothers. The difference was significant and supported rejection of Null hypothesis. Wrong responses included many times, three times a day, once, twice a day and all the time (Table 28).

Table 29 shows that fewer (36.8%) of the control mothers considered a covered container as proper storage facility for SSS than the experimental (82.3%). Results support rejection of the hypothesis that there will be no difference between the two groups. Half of the control mothers said correctly that the solution should be discarded after 24 hours. However this figure is far below the 79.6% given by the mothers in the experimental group and proved significant (Table 30), a finding that caused the Null hypothesis to be rejected.

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Table 19

Comparison between experimental and control groups on home availability of equipment and ingredients for making sugar salt solution

ITEM EQUIPMENT	PERCENT (%) HAVING ITEM AVAILABLE AT HOME		TOTAL
	EXPERIMENTAL	CONTROL	
WATER	100.0	100.0	100.0
SALT	99.2	[illegible]	98.0
SUGAR	75.0	74.5	74.8
BOTTLE	97.6	95.5	96.6
CUP	100.0	100.0	100.0
SPOON	96.0	92.7	94.4
SCALE	99.2	98.2	98.7
MIXING BOWL	95.2	99.1	99.2
N	124	110	234

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Table 20

Comparison of demonstration of hand washing between experimental and control groups

HAND WASHING	RESEARCH GROUP		TOTAL (%)
	EXPERIMENTAL (%)	CONTROL (%)	
CORRECT	87 (70.2)	39 (57.4)	126 (65.6)
INCORRECT	22 (17.7)	16 (23.5)	38 (19.8)
NO HAND WASHING	15 (12.1)	13 (19.1)	28 (14.6)
TOTAL	124 (100)	68 (100)	192 (100)

$\chi^2 = 3.319$ df = 2: $P > 0.10$

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Table 21

Comparison between experimental and Control Group in Respondents' ability/skill to prepare home made SSS

SSS METHOD	RESEARCH GROUP		TOTAL
	FOLLOW UP EXPERIMENTAL (%)	CONTROL (%)	
BOTTLE[1] Correct	79 (63.7)	1 (1.5)	80(41.7)
Incorrect	32 (25.8)	26 (38.2)	58(30.2)
Subtotal	111	27	
CUP[2] Correct	2 (1.6)	19 (27.9)	21(10.9)
Incorrect	11 (8.9)	22 (32.4)	33(17.2)
Subtotal	13	41	
TOTAL	124 (100)	68 (100)	192(100)

1. X^2 (for bottle only) = 40.573 df = 1, $p < 0.0005$

2. X^2 (for cup only) = 3.981 df = 1, $p < 0.05$

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Table 22

Comparison of salt measurement between use of bottle and cup methods for making SSS: Follow-up experimental group

SALT MEASUREMENT	METHOD OF SSS PREPARATION		TOTAL (%)
	BOTTLE (%)	CUP (%)	
UNDER	5 (4.5)	0 (0)	5 (4.0)
CORRECT[1]	99 (89.2)	4 (30.8)	103 (83.1)
OVER[2]	7 (6.3)	9 (69.2)	16 (12.9)
TOTAL	111 (100)	13 (100)	124 (100)

1. Z = 4.445 $P < 0.0001$
2. Z = 4.835 $P < 0.0001$

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Table 23

Comparison of salt measurement between use of bottle and cup methods for making SSS : Control group

SALT MEASUREMENT	METHOD OF SSS PREPARATION		TOTAL (%)
	BEER BOTTLE (%)	CUP (%)	
Under	5 (18.5)	2 (4.9)	7 (10.3)
Correct[1]	15 (55.6)	22 (53.6)	37 (54.4)
Over[2]	7 (25.9)	17 (41.5)	24 (35.3)
TOTAL	27 (100)	41 (100)	68* (100)

* Only those who knew about SSS were asked to demonstrate.

1. $\chi^2 = 0.162$ $P > 0.50$
2. $\chi^2 = 1.367$ $P > 0.10$

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Table 24

Comparison of salt measurement between use of bottle and cup methods for making SSS : Pretest and follow-up experimental

SALT MEASUREMENT	METHOD OF SSS PREPARATION		TOTAL (%)
	FOLLOW-UP BOTTLE (%)	PRETEST CUP (%)	
UNDER	5 (4.5)	3 (3.9)	8 (4.3)
CORRECT[1]	99 (89.2)	30 (39.0)	129 (68.6)
OVER[2]	7 (6.3)	44 (57.1)	51 (27.1)
TOTAL	111 (100)	77 (100)	188 (100)

1. χ^2 = 7.980 $P < 0.0001$

χ^2 = 8.336 $P < 0.0001$

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Table 25

Comparison between follow-up experimental and control groups demonstration of stirring the SSS

STIR	RESEARCH GROUP		TOTAL (%)
	EXPERIMENTAL (%)	CONTROL (%)	
YES	124 (100)	58 (85.3)	182 (94.8)
NO	0 (0)	10 (14.7)	10 (5.2)
TOTAL	124 (100)	68 (100)	192 (100)

χ^2 = 19.736 df = 1 P<0.005

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Table 26

Comparison between follow-up experimental and control groups concentration of tasting the SSS after preparation

TASTE	RESEARCH GROUP		TOTAL (%)
	EXPERIMENTAL (%)	CONTROL (%)	
YES	122 (98.4)	33 (48.5)	155 (80.7)
NO	2 (1.6)	35 (51.5)	37 (19.3)
TOTAL	124 (100)	68 (100)	192 (100)

χ^2 = 70.178 df = 1 P <0.0005

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Table 27

Comparison between experimental and control respondents' ability to administer SSS to a child

ADMINISTRATION OF SSS	RESEARCH GROUP		TOTAL (%)
	EXPERIMENTAL (%)	CONTROL (%)	
CORRECT	121 (97.6)	41 (60.3)	162 (84.4)
INCORRECT	3 (2.4)	27 (39.7)	30 (15.6)
TOTAL	124 (100)	68 (100)	192 (100)

X^2 = 46.266 df = 1 $P < 0.0005$

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Table 28

Comparison between experimental and control respondents' knowledge of frequency of administration of SSS

FREQUENCY OF SSS ADMINISTRATION	RESEARCH GROUPS		TOTAL (%)
	EXPERIMENTAL (%)	CONTROL (%)	
CORRECT	98 (79.0)	14 (20.6)	112 (58.3)
INCORRECT	26 (21.0)	54 (79.4)	80 (41.7)
TOTAL	124 (100)	68 (100)	192 (100)

χ^2 = 61.[illegible] df = 1 $P < 0.005$

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Table 29

Comparison of experimental and control mothers' ideas on how to store SSS

STORE IN COVERED CONTAINER	RESEARCH GROUP		TOTAL (%)
	EXPERIMENTAL (%)	CONTROL (%)	
CORRECT	102 (82.3)	25 (36.8)	127 (66.1)
INCORRECT	22 (17.7)	43 (63.2)	65 (33.9)
T O T A L	124 (100)	68 (100)	192 (100)

χ^2 = 40.331 df = 1 P < 0.005

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Table 30

Comparison of experimental and control mothers' knowledge on length of storage for SSS

DISPOSE AFTER 24 HOURS	RESEARCH GROUP		TOTAL (%)
	EXPERIMENTAL (%)	CONTROL (%)	
CORRECT	99 (79.8)	34 (50.0)	133 (69.3)
INCORRECT	25 (20.2)	34 (50.0)	59 (30.7)
TOTAL	124 (100)	68 (100)	192 (100)

χ^2 = 18.33 df = 1 $P < 0.005$

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Opinion and use

Mothers' opinion on the usefulness of home-made solution and their reported use of SSS in real episodes of diarrhoea are given in the following paragraphs.

Mothers gave a variety of responses when asked their opinion about SSS (Table 31). These ranged from the general, "it is good", to practical comments. These latter included it, "stops diarrhoea", "replaces lost water", " is easy to use", "gives security for child" and "is cheap to provide."

The experimental group registered a slightly higher proportion of respondents for the three most frequent opinions (good, stops diarrhoea, replaces lost water) but these differences were not significant. It is noteworthy that 21% of all mothers feel SSS stops diarrhoea, although this is technically not true.

The control group did show a greater tendency toward negative opinions (29.1% compared to 12.1% in the experimental). Details of their reservations are found in Figure 8. The most notable reservation is that SSS might cause jedi jedi, a Yoruba cultural disease that is believed to arise from eating too much sugar and sweet things. Interestingly it is only the control respondents who expressed this opinion. Another observed difference is that a higher portion of experimental mothers felt SSS could not be used without other drugs. Some indicated that they held this opinion because that is how treatment was given at the health centre (see Table 18).

The reported three-month period prevalence of diarrhoea among

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children of experimental mothers was slightly higher (16.1%) than that of their counterparts in the control group (12.3%). However the difference was not significant (Table 32). Table 33 depicts reported use of SSS during that episode of diarrhoea. A majority (80.8%) of mothers in the experimental group reported use of SSS as opposed to only 35.3% of control mothers. Interestingly 17 of 21 mothers who used SSS to manage a diarrhoea episode among experimental had demonstrated the correct recipe. Whereas only two of the six who used SSS among the control demonstrated the correct preparation procedure.

Only four of the eleven control mothers who did not use SSS to manage a diarrhoea episode had never heard of SSS. Even if these are not counted, the experimental group still has a higher proportion using SSS (80.8% compared to 54%). Other reasons indicated for not using SSS during the episode of diarrhoea include "used traditional medicine" (agbo), "medicine doctor recommended anti-diarrhoeal drugs" and "sugar in SSS causes bad teeth".

Findings relating to SSS show that experimental mothers had greater awareness, more knowledge of correct ingredients, better skill at preparation, more positive attitude and higher reported use of SSS than did control.

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SUMMARY

Demographic indices namely occupation, age, education, religion and parity in the mother who attended CRT unit and those in the control group showed no significant difference. One may therefore conclude that the above factors are unlikely to have effect on any differences found in knowledge, skill and opinions between experimental and control mothers.

On most of the knowledge indices concerning danger, prevention, feeding practices and treatment of diarrhoea the control and pretest results were similar. For example about half in each group appreciated that diarrhoea was dangerous. Both pretest and control had similar responses relating to prevention of diarrhoea. About one fourth in each group mentioned cleaning child's utensils as a preventive measure against diarrhoea while 36.3% of pretest and 33.6% of control mentioned covering food. Both mothers in the pretest and control displayed similar knowledge about recommended and discouraged food items during diarrhoea. Similar ideas about treatment of diarrhoea were observed in both pre and control groups. Slightly more mothers in the pretest (24.2%) than control (21.6%) knew the ORS formula using cup method. Similarities were proved statistically. Most mothers, both those who attended the ORT unit and those who did not were able to recognise diarrhoea.

More mothers who were exposed to health education at the ORT UNIT learned and retained most of the knowledge on cause, danger, and prevention of diarrhoea. The retained knowledge for experimental mothers was higher than existing knowledge of mothers who were not exposed to health education. Health education intervention increased knowledge about

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appropriate feeding and treatment of children with diarrhoea. The above knowledge was retained in the follow-up and was higher than that of mothers without intervention. Mothers who were not exposed to health education had a wide variety of recipes of SSS and smaller proportion of these mothers prepared SSS with an acceptable formula compared to their counterparts who were attending the ORT unit.

More mothers who received health education had favourable attitudes to SSS than the control mothers. However some of the opinions point up problems in education and procedures. Most mothers in both groups had a favourable opinion of SSS although some had a misconception about its effect. A fifth in each group thought it stopped diarrhoea.

An interesting finding is that about 16.4% of mothers who were not exposed to health education at the ORT unit expressed concern that sugar in the SSS could cause *jodi jodi* a more serious condition than diarrhoea. Another expressed reservation by some mothers is that drugs are necessary to supplement ORT because this is what they experienced in the clinic.

In conclusion, experimental mothers had greater awareness, more knowledge of correct ingredients, better skill at preparation, more positive attitude and had a higher reported use of SSS than did controls.

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Table 31

Comparison between experimental and control mothers' opinion on usefulness of SSS

	RESEARCH GROUPS		TOTAL (%)
	EXPERIMENTAL(%)	CONTROL(%)	
Food[a]	50 (40.3)	37 (33.6)	87 (37.3)
Stops Diarrhoea	27 (21.8)	23 (20.9)	50 (21.4)	
Replaces[b] Lost water	24 (19.4)	13 (11.8)	37 (15.8)
Easy to use	6 (4.8)	3 (2.7)	9 (3.8)
Safe for child	2 (1.6)	0 (0)	2 (0.8)
Cheap	0 (0)	2 (1.9)	2 (0.9)
Preservation[c] of SSS	15 (12.1)	32 (29.1)	47 (20.1)
Total	124 (100)	110 (100)	234 (100)

a. $Z = 1.064$ $P > 0.20$

b. $Z = 1.618$ $P > 0.10$

c. $Z = 3.252$ $P < 0.002$

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Figure 8

Distribution of mothers' reservations about use of SSS in experimental and control groups

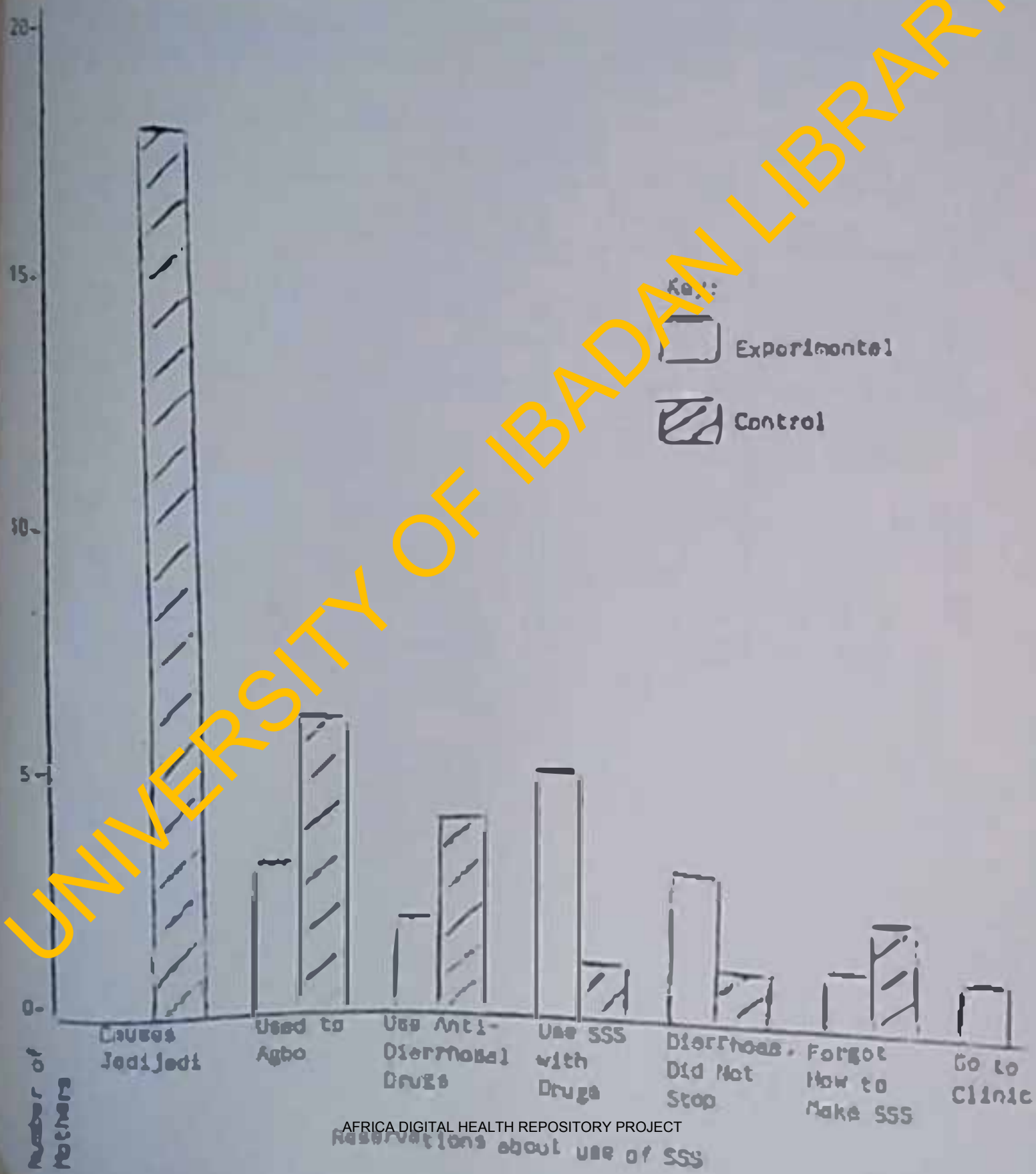

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Table 32

Reported three-month prevalence of diarrhoea among under-five-year old children of experimental and control mothers

DIARRHOEAL EPISODE	RESEARCH GROUP		TOTAL (%)
	EXPERIMENTAL (%)	CONTROL (%)	
YES	26 (16.1)	17 (12.3)	43 (14.4)
NO	135 (83.9)	121 (87.7)	256 (85.6)
TOTAL NUMBER OF CHILDREN	161 (100)	138 (100)	299 (100)

χ^2 = 0.82 df = 1 P > 0.20

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Table 33

Comparison between experimental and control mothers' reported use of SSS during an episodes of diarrhoea

UTILIZATION OF SSS BY MOTHER	EPISODES OF DIARRHOAE RESEARCH GROUP		TOTAL (%)
	EXPERIMENTAL (%)	CONTROL (%)	
USED	21 (80.8)	6 (35.3)	27 (62.8)
NOT USED	5 (19.2)	11 (64.7)	16 (37.2)
TOTAL	26 (100)	17 (100)	43 (100)

x^2 = 9.[illegible] df = 1; P<0.005

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In conclusion it has been shown that mothers who were exposed to health education at the ORT unit had more knowledge on diarrhoea and ORS after their exposure. Therefore the hypothesis that there will be no difference in knowledge on diarrhoea and ORT before and after participation in the health education programme at the ORT UNIT is rejected. Likewise more mothers among the ORT attenders were able to display knowledge and skill on diarrhoea management and oral rehydration than the non-attenders. Therefore the Null hypothesis that there will be no difference in the knowledge and skill between the attenders and non-attenders was rejected.

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CHAPTER FIVE

DISCUSSION, CONCLUSION AND RECOMMENDATIONS

In this chapter the implications of the study will be discussed. The discussion will follow the same pattern as results and is therefore grouped into five broad areas: demographic characteristics; recognition, cause, danger and prevention of diarrhoea; care and treatment; ability to prepare sugar salt solution (SSS) and opinion and use. Recommendations for improving health education in ORT and research on such programmes will conclude the chapter.

Demographic characteristics

The experimental group of mothers is comparable to the control group on all major demographic variables. This means that such factors would not be held responsible for any observed differences between groups concerning the impact of dependent variables.

It is important to note that the issue of a control group was not clearly addressed in any of the studies reviewed except that done in Lagos (Reyes, 1981). A control strengthens the validity of experimental results. In the Igboora case it has been shown that not only do experimental and control groups resemble demographically, but also that the experimental group at pretest did not give significantly different responses from the control concerning the major factors being studied (knowledge of danger, prevention, feeding practices and treatment of diarrhoea). Changes in the experimental group can then more confidently be attributed to the educational intervention at the ORT Unit.

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The small sample of 121 experimental and 110 control mothers is related to the relatively small universe of experimental mothers. But still the sample of experimental mothers was 26% of attenders. It also reflects the difficulty of finding Igboora women at home due to their economic and trade activities. However other studies on CDT which interviewed the general population of mothers had similar sample sizes. For instance in Honduras Smith et al (1983) interviewed 175 individual mothers while in Gambia, Cossay et al (1983) interviewed only 75 mothers. This study compares favourably with other studies that used an interpersonal approach to health education. Several based their following evaluation on one fourth of mothers given health education on ORT (Bhatia and Cutting, 1984; Bangladesh. Hossain et al, 1986, Egypt).

Recognition, cause, danger and prevention of diarrhoea

Some basic general knowledge was similar to both groups. For instance most mothers were able to recognise diarrhoea without having attended the ORT Unit. Signs of diarrhoea appear obvious. This is in keeping with baseline study by Ubadike et al (1984) which also showed that most women were able to recognise signs of diarrhoea. Similarly WHO (1984) also notes that although mothers may have their own perception of diarrhoea in different regions of the world, mothers still will be able to tell when the disease is present.

Although most mothers recognised diarrhoea, many among the control group did not appreciate its danger. Unless mothers realize that their children are susceptible and vulnerable to dehydration as a result of diarrhoea, they may not adopt timely illness behaviour and utilise home

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sugar salt solution (SSS) to prevent dehydration (Hirscht, 1974). Not only did experimental mothers have greater perceptions of this danger, but they were also more likely to take action using SSS during active diarrhoea episodes (Table 10 and 33).

Mothers existing general knowledge on prevention of diarrhoea may arise from many previous health talk sessions in the antenatal and preschool clinics as well as enforcement by health inspectors. However, knowledge on specific behaviours (e.g. handwashing, washing child's feeding utensils and feeding child with cup and spoon) as taught at the ORT Unit showed significant difference between the two groups. This emphasised the importance of health education focussing on specific behaviours as opposed to general hygiene messages, especially since such specific behaviours have been shown to make a real contribution to diarrhoea control as was found with handwashing in Bangladesh (Feachem, 1984).

Although the increased mention of handwashing by the experimental group was statistically significant, it is below educational expectations. Handwashing is specifically addressed in one of the eight ORT Unit posters which form the basis of interactive discussion. It is also a key step emphasised in the demonstration of SSS preparation. The problem may lie in mothers' perceptions that handwashing is a routine activity and not a specific preventive measure for diarrhoea. Also the broader issues of environmental sanitation and personal hygiene have received greater emphasis in health talks at clinic and in the media, making it easier for mothers to remember these general issues. The study results show that mothers can acquire knowledge of handwashing, but there is need for more specific and frequent education on this health behaviour.

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Although cause of diarrhoea was not included on the pretest for experimental mothers, the community baseline study by Obadike et al(1984) shows that the control group shares similar beliefs and knowledge with the larger community. By implication, differences in knowledge of cause between experimental and control groups can be attributed to ORT education.

Some answers relating to cause of diarrhoea though technically not correct, were not rejected outright by ORT Unit staff. These ideas were intergrated into the educational process. Most of such responses relate to culturally held beliefs that have arisen empirically through generations of mothers.

For instance some mothers believe that teething predisposes a child to diarrhoea. Health educators tell mothers that when a child's teeth are erupting, the gums become itchy and irritable. As a result a child may pick up objects from the ground and put them in the mouth. The object introduces infection leading to diarrhoea. As for "hot stomach," mothers are told that febrile illnesses like malaria, are generally accompanied by gastrointestinal upset. Beans and pepper as causes of diarrhoea may be related to their irritant effect on the intestinal wall. This again makes learning consonant to the perceptions of the target audience.

The educational principle assumed to be at work is that if the health educator respects and is willing to discuss the mothers' own beliefs, they in turn may be more receptive to new ideas or perspectives introduced through health education.

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In conclusion, women in Igboora already possess a vast amount of awareness and knowledge on diarrhoea gained from personal experience, advice from the older generation and talks by health workers. Yet the activities at the ORT Unit were still able to make an impact, first by heightening concern about the danger of the disease and then by encouraging simple specific behaviours such as handwashing. This shows the value of the focused, standardized educational process in which the eight key features helped the ORT Unit staff keep on track.

Care and treatment

Nutrition through appropriate feeding during diarrhoea is essential. This interrupts the diarrhoea-malnutrition cycle (WHO, 1979). Hence education at ORT Unit promoted continued feeding during diarrhoea. Health education took cognisance of food items which were both locally available and also conformed to traditional feeding pattern (Krieger, 1985).

Concerning general nutrition Akinfenwa et al (1984) found that Igboora mothers knew about a "correct balanced diet" and could answer accurately ideas relating to nutrition. Interestingly baseline(Ubadike, 1985), pretest and control responses indicate that Igboora mothers also feel that there should be a completely different dietary pattern during diarrhoea, focusing primarily on bland semi-solid or soft starches like maize pap. Therefore the concept of continued feeding with a normal diet (though slightly restricted e.g. little pepper) is a new idea for Igboora mothers. The acceptance of the knowledge by the experimental group is a true index in diarrhoea control.

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Home treatment for diarrhoea is a common feature among mothers. What they give the child for diarrhoea depends on their orientation. Those exposed to CTT may attempt SSS while those oriented to chemist or clinic will give the child left-over antidiarrhoea medicine. Those utilizing the services of a herbalist will give the child ogbo (herbal tea). Similar findings were noted by Royce (1981) in Shomolu, Lagos and Erinosho (1979) in Abeokuta, Nigeria.

Since most cases of diarrhoea, if not complicated by dehydration, are self-limiting and considering that some mothers attempt initial home treatment, mothers who come to the CTT Unit may constitute a small fraction of children with diarrhoea. For instance in Igboora it is estimated that there are about 5,000 pre-school children and diarrhoea two-month prevalence is put at 10%. That is roughly 900 sick children. However only about 180 underfive children are brought to the CTT Unit. It would appear that others utilize home treatment or patronize maternity centres, dispensaries, private clinics or traditional healers. Hence there is need to investigate other channels with a view to reaching non-clinic attenders with the CTT message and skills.

The perceived role of SSS in the treatment of diarrhoea is generally low in the community as evidenced by the fact that only about one-third of pretest and control mothers think of SSS as a form of treatment. Similarly the baseline study in Igboora showed that only about one-fifth thought SSS could be used for treating diarrhoea. In contrast a large majority of mothers who had gone through the CTT Unit and were

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followed up now see SSS as an actual form of treatment for diarrhoea. This result confirms the contention that ORT Unit in the hospital setting legitimises ORT/SSS as a real form of treatment for diarrhoea.

The experimental mothers who do not see SSS as the only treatment for diarrhoea indicated that their view is reinforced by the additional drug treatment they received at the Rural Health Centre. Unnecessary antidiarrhoea and antimicrobial therapy in the hospital may undermine credibility of ORT. Expressed opinion of some mothers concurs with this view when they said SSS by itself may not be enough.

Mothers initially had low awareness and knowledge of ingredients for SSS preparation. After exposure to the health education at the ORT Unit they learned and retained the innovative national SSS formula. Retained knowledge of correct ingredients was higher than ORT studies which evaluated short term effects of ORT education, that is, knowledge of recipe. In this study 70% of mothers knew the correct ingredients of SSS. In Gambia (Cooray et al, 1983) one year into mass media campaign 30% of mothers could state correctly SSS ingredients. In Swaziland (Hornick et al, 1985) the figure was 26% whereas in Honduras (Smith et al, 1983) it was 3%. This may suggest that in ORT an interpersonal approach may be more effective in acquisition of new concepts, since learning skills need feedback, and clarification (Bates and Winder, 1981).

It is interesting to note that of the control mothers about two-thirds had heard of SSS. The majority (70.6%) had heard of SSS at the Rural Health Centre. A similar trend is seen with the baseline study in which 73.4% of mothers had heard of SSS from Rural Health Centre(Doulito

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et al, 1985). Initial exposure to SSS by pretest mothers was also at the Rural Health Centre in 62.1%. A general impression one gets is that majority of Igboora women get health messages on diarrhoea/ORT from the Rural Health Centre. Thus implying need for standard health education at the Rural Health Centre since it reaches a large population. The ORT Unit health education appears to have partially fulfilled that need.

Interactive style of ORT Unit education may be adopted to suit larger audiences whose children may not have diarrhoea, i.e. well and getting immunization or sick with another problem. Possibly this could be done by either dividing the audience into smaller groups or discussing issues already raised by other mothers. The education should nevertheless culminate in a demonstration of SSS preparation and testing.

Ability to prepare SSS

While knowledge of ingredients as a predisposing factor is essential for SSS preparation, two enabling factors are also crucial (Green et al, 1980). First the actual materials and utensils must be available in the home. Secondly mothers must possess the skill to utilize and combine these correctly. Fortunately ingredients and equipment for making SSS are generally available in the homes. Plastic technology has made it possible for mothers to acquire the desired spoon at cheap prices. Sugar if not available in the home was accessible at nearby provision shops. This justifies the value of having a SSS formula or recipe that

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As noted in the previous chapter observation of SSS preparation was done only with mothers who were aware of the special drink (all experimental and 68 control mothers). Concerning the first step in SSS preparation, handwashing, a majority of mothers in both experimental and control groups did it correctly, with experimental performing slightly better, though not significantly. This may be related to the fact that when interviewers checked if mothers had required materials they had asked for soap. Mothers therefore may have sensitised to the need for handwashing.

Two issues arise concerning ability to prepare SSS. One concerns the method of health education; the other relates to the formula of the solution. The participatory demonstration used for education at the CRT Unit likely accounts for the better preparation performance of the experimental mothers. When learning a new skill people need a chance to practice and receive constructive feedback. Talks to large groups and mass media as educational methods are inappropriate to achieve this objective.

But even a good educational method cannot easily help mothers learn a difficult, ambiguous or awkward procedure. In this case both the experimental and control mothers showed that they could prepare SSS using the bottle method much more accurately than by the cup. The latter suffers problems with non-standard containers and unfamiliar measures like pinches, scoops or fractions of spoons (Ransome-Kuti and Ransomiye, 1978).

Measurement of one teaspoon of salt is convenient for the mother

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a retail as is the beer bottle of water (600ml.). This overcomes the potential problem of hypernatraemia of concern to many health workers (Taylor, 1981, Ragiu, 1981, El-Mougi, 1984 and Grange et al, 1985).

Mothers' performance on demonstration of preparation of SSS compares favourably with other studies based on interpersonal interaction and home visits (67% Monnier et al, 1986, 98% Bhatia and Cutting, 1984, 84% in 2days et al, 1984). It is noteworthy that those studies had a standard formula and also personalized teaching. Studies utilizing group health talk show poor performance (34% Ransome-Kuti and Bamiduiyo, 1978: 21% WHO, 1986[b]).

Mothers saw the need to stir the solution. This appears to be common sense. Tasting the solution is important because mothers may appreciate if the solution they have made is saltier than the one they were taught. More experimental mothers saw the need for administration of the solution with a cup and spoon than the control. This is important as some mothers tended to force feed their children or use feeding bottle. Frequency of administration of the solution is important since mothers may give inadequate amounts of fluids. Proper storage and duration of storage ensures that fluids being given do not pose any danger to a child.

Thus the complete procedure from handwashing to storage has been documented in this study. Other studies have reported only correct ingredients and how they are mixed.

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Opinion and use

Generally mothers opinion on SSS is positive. However some mothers point out problems. For instance, the suggestion that SSS stops diarrhoea may give false expectation especially taking into account that three mothers indicated that lack of cessation of diarrhoea was their reservation about using SSS. The message on actual benefits of SSS must be clarified at the ORT Unit.

The concern of control group mothers about the amount of sugar in SSS causing *jedijedi* also has implication for type of education method. It has already been shown that most mothers initially do not view SSS as a regular part of diarrhoea treatment. Now it can be seen that some specifically doubt its efficacy. The experimental mothers were able to taste the SSS and also saw it work to help their sick children. This likely allayed any fears or doubts they may have harboured.

Large group setting may not provide the opportunity for everyone to get involved in the education process, but they may be the only alternative for widespread communication of ORT messages. To overcome this problem of acceptance two steps might be taken. First effort could be made to divide into smaller groups for demonstration. If this is not possible then, with the awareness of mother's concerns, health workers can address the *jedijedi* issue directly in the talk.

Reported use of SSS for a diarrhoea episode arose from the question concerning three months prevalence of the disease. While recall may invalidate the accuracy of the prevalence figure itself (though it is

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line with expectation drawn from the reported two-month prevalence figure in the baseline study), the important issue is whether mothers actually used SSS during a recent occurence of diarrhoea.

Reported use of SSS during these diarrhoea episodes in this study was significantly higher in the experimental than control. Reported use of SSS/ORS is much higher than one reported in mass media campaigns. In this study 80% of experimental mothers reported using SSS during episodes of diarrhoea. In Swaziland only 18% of mothers reported utilizing SSS during diarrhoea (Jerulck et al, 1985). In Gambia a year into the SSS campaign Cossay et al, 1983 found 70% of mothers reporting utilization of SSS to treat diarrhoea, but noted a fall of 50% reported use, two years into the programme, and only 25% of mothers utilizing SSS to treat diarrhoea one year after the programme. In Honduras Smith et al (1983) indicated an increase in the reported use of ORS from 9% to 20% a year into the programme. In Lagos, Nigeria mothers receiving information on SSS through health talks reported 26% utilization of SSS to treat diarrhoea (Inoyes, 1981).

The higher reported utilization of SSS in this study than other programmes can probably be attributed to the fact that mothers observed clinical improvement in their children during rehydration at the ORT Unit. They therefore perceived the efficacy of the solution. It is also noteworthy that health education in the ORT Unit is interactive, culminating in a participatory demonstration of SSS preparation. The learning is made even more conducive by the fact that the ones giving health education are women with similar background as the audience.

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Conclusion

The ORT Unit education programme on diarrhoea oral therapy and SSS gives definitive results as it appears mothers not only learn the SSS recipe but also acquire skills and attitudes necessary to prepare and use the formula in actual episodes of diarrhoea.

An ORT Unit like the one at the Ikboora Rural Health Centre is easy to set up and run. It is also cheap. The ORT Unit is intergrated within the existing infrastructure. Two health assistants on the University staff received in-service training on ORT, health education and management of the Unit. Other inputs like a demonstration kit, benches for mothers to sit on, cups and spoons, ORS packets and posters are inexpensive and easy to buy or make.

An ORT Unit unlike a promotional campaign does not wear off. It provides continous service and also gives continuity to health education on ORT. The health education is either individual or in small groups. The informal format permits the audience to express their views and concerns which the educator then uses to adapt the education to suit the target group. It provides an intensive education which also gives opportunity for mothers to acquire skills on SSS preparation through participatory demonstration. As most mothers associate hospital therapy with credibility the presence of an ORT Unit legitimizes SSS/ORT as a real form of treatment for diarrhoea.

The only drawback is that smaller and slower coverage is achieved. In addition mothers oriented to other forms of diarrhoeal treatment, e.g. chemist, traditional herbalist, may never be reached. The challenge is

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to use the well established ORT Unit as a strong base and expand health education into the community.

Some of these efforts have begun since the author concluded his study. The staff of the ORT Unit now visit local primary schools to give demonstration on SSS. As part of their regular programme University of Ibadan medical students on posting in Ibarapa carry the ORT demonstration kit when they visit nearby villages. Other strategies are being planned.

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RECOMMENDATIONS

Two tiers of recommendations appropriately round up this study. The set is aimed at the ORT services in Igboora. The other relates to areas of general concern to education on ORT.

1. The finding that mothers generally pick up information on ORS/SSS from the Rural Health Centre implies the need to incorporate ORT education into the general Rural Health Centre programme especially antenatal and preschool sessions.

Demonstration of SSS preparation utilization of posters and division of the audience in small groups for easier feedback is recommended.

2. In view of the low diffusion of SSS from mothers who received health education to other mothers in the community, as well as the fact that some mothers are not oriented to attend the health institution for treatment of diarrhoea, there is need to reach these mothers through other channels. Therefore Ibarapa state may wish to undertake feasibility studies in the promotion of ORT through the following channels :

- Frontline or primary health workers (volunteer).
- School health education programmes.
- Traditional healers.
- Community drug sellers.
- Mass media, both modern and traditional.

The latter should be seen as a reinforcement of more inter-personal ventures as noted by Green (1978).

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3. Future studies may wish to compare different educational approaches to SSS/ORT promotion for example the effectiveness of ORT fairs versus home visits.

4. There is need for indepth look at the extent to which the belief among Yoruba that ten teaspoons of sugar in SSS can cause <u>Aoijodi</u> might deter SSS acceptance.

5. In order that mothers get consistent messages on diarrhoea and ORT, prescription of antidiarrhoeal drugs by Health staff should be discontinued while antibiotics and antimicrobial therapy must be limited to cases with either clinical evidence of systemic invasion of bacteria or isolation of pathogen in the stool.

6. There is need for future studies to be more standard in documentation of input and impact analysis and thereby offer proper comparisons. This enables better/objective judgement of what can and cannot be. Ultimately this leads to selection of the best methods for health education in ORT.

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APPENDIX A

ORT PROGRAMME R.H.C. IGBOORA

Name: _____ No.: _____ Date: _____ Time: _____

Sex: _____ Age: _____ Compound: _____

ASSESSMENT:

Stool: Consistency: _____ Contents: _____ Onset: _____

Frequency: _____

Eyes: Normal/sunken

Skin: Normal/dry/inelastic

Mental State: 1. alert, normal

2. drowsy but easily rousable, or irritable

3. drowsy but not easily rousable.

Nutrition: arm: _____ weight: before ORT: _____

after ORT: _____

Urin: Output: _____ Colour: _____

BACKGROUND:

Feeding since onset: _____

Home/other Treatment: _____

Previous History of Diarrhoea: _____

Immunisation Status: Measles: _____ BCG: _____

DPT 1 _____ 2 _____ 3 _____ Polio 1 _____ 2 _____ 3 _____

OTHER COMPLAINTS: _____

TREATMENT: _____

FLUID GIVEN: _____

OUTCOME: _____

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TEST	PRE	POST
How can someone prevent diarrhoea?		
What should a child with diarrhoea eat?		
What should a child with diarrhoea not eat?		
What treatment can be given at home to a child with diarrhoea		
What danger is there if diarrhoea does not stop?		
Have you heard of special drink to make for children with diarrhoea?		
What Ingredient are in the drink?.....and..... (tick ones mentioned + fill amounts)	water:_____ salt :_____ sugar:_____ Other:_____	water:_____ salt :_____ sugar:_____ Other:_____
How often do we give the special drink to a child with diarrhoea?		

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APPENDIX B

FOLLOW UP SURVEY ON ORT IN IGBORA COMMUNITY

Q U E S T I O N N A I R E

Name:_____ Age:_____ Sex:_____ Parity of Mother:_____

Occupation:_____ Religion(Sect):_____ Education:_____

Compound No:_____ Attended ORT(Yes/No):_____ Date:_____

Relationship to Child:_____ Where is mother?:_____

Reason for Absence:_____ Duration of absence:_____

FOR ALL CHILDREN UNDER 5 YEARS INQUIRE ABOUT THE FOLLOWING

No.	Name	Sex	Age	What did you feed the child last 2 weeks?	Has any of your children had diarrhoea last 2 months?	What did you do for diarrhoea	What did you feed the child with diarrhoea
1.							
2.							
3.							

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OUT FOLLOW UP SURVEY

Bawo ni o se mo pe omo re ni igbe aaro?(recognition)

Kinni o n fa igbe aaro lara awon omode?(Cause)

Bawo ni o se le dena igbe aaro?(Prevention)

Ounje wo ni omo ti o ni igbe aaro gbodo je?(recommended food)

Ounje wo ni omo ti o ni igbe aaro ko gbodo je?(forbidden food)

Ewu wo lo wa ti igbe aaro ko ba duro?(danger)

Nje o ti gbo aipe omi akanse?

Lodo tani?

Nibo(so ile eagun)

Igba wo?

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ORT FOLLOW UP SURVEY

Awo ni o ti se e?

Ingredients and Equipment	Type Amount	Availability Potability/Condition
Water		
Salt		
Sugar		
Bottle		
Cup		
Spoon		
Soap		
Mixing bowl		
Other		

- If the mother does not have sugar, find out where she can buy it, how far away and how much it costs.

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ORT FOLLOW UP SURVEY

DEMONSTRATION

1. Handwashing Yes/No
2. Water Yes/No
3. Soap Yes/No
4. Dry hands Yes/No
5. Clean bottle Yes/No
6. Pill bottle Yes/No
7. Measure No. Level
   Sugar Yes/No
   Salt Yes/No
8. Mix Yes/No
9. Taste Yes/No
10. Administer cup/spoon. Other: _____

Higba wo ni omi akanse naa wn fun _____

_____

Bawo ni o gbodo ti fun ni pe to? _____

Hibo ni o toju re ni _____

Fun aaiko wo ni o le toju re da? _____

Hini o re nipa omi akanse naa? _____

_____

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