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BARKIN-LADI COMMUNITY SURVEY

Final Report

May 1992

A Survey of Mothers'
Knowledge and Treatment Practices
related to Primary Health Care
with emphasis on
Immunization, Diarrhoea, and Fever

Conducted by:
Barkin-Ladi Local Government Health Department
Plateau State Ministry of Health

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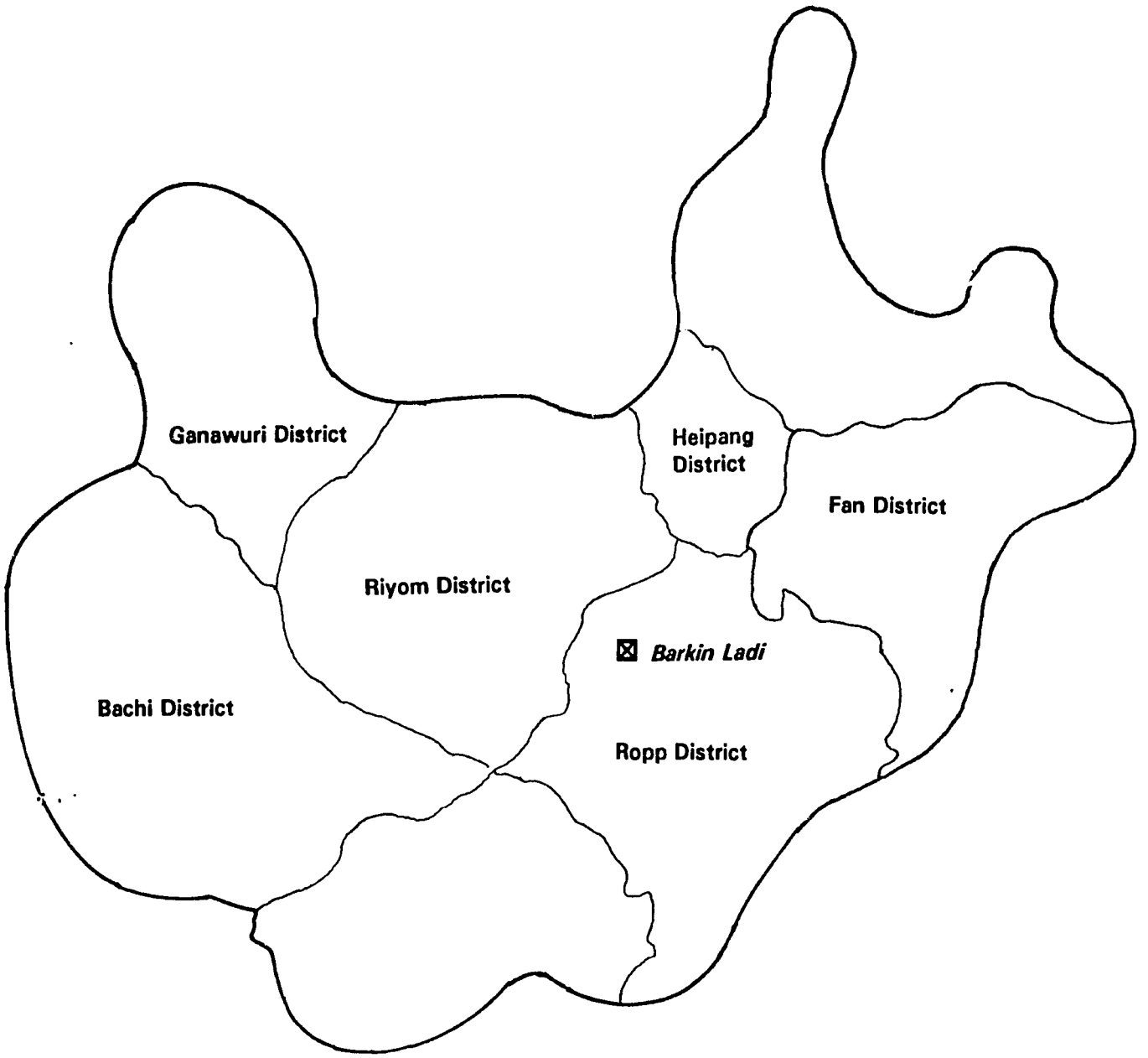
MAP OF BARKIN-LADI
SHOWING EIGHT PRIMARY HEALTH CARE DISTRICTS



SUMMARY OF FINDINGS

The Barkin-Ladi Community Survey provides information about mothers' knowledge and treatment practices related to four components of Primary Health Care --- immunization, nutrition, diarrhoea, and fever/malaria --- as well as antenatal care practices and tetanus toxoid coverage. Community survey data, combined with information from facility assessments and drug quality studies, will provide a useful planning tool for the Primary Health Care team to establish LGA health priorities and develop short and long term objectives for improving the quality of health service delivery.

Childhood immunization coverage has improved significantly in Barkin-Ladi over the past five years. Among 12-23 month olds, BCG coverage approaches 100% when card and history are considered (BCG scar rate=94%). Corrected DPT1 coverage by card and history is 75% (52% by card only), decreasing to 66% coverage (43% by card) with DPT3. Polio 0 coverage, though low at 15% (6% by card), has increased over the past year, reflecting LGA attempts to incorporate the new national policy which includes polio immunization at birth. While the majority of women in Barkin-Ladi who had delivered in the past year were immunized with the first and second doses of tetanus toxoid (87% and 73%, respectively, card and history), coverage for TT3 through TT5 is low, reflecting the recent adoption of a five-dose TT schedule in Nigeria.

Despite recent improvements, coverage for some specific antigens remains relatively low (67% measles coverage, 42% by card) and drop out rates for multiple dose antigens are high. Only one in three children aged 12-23 months were fully immunized before their first birthday. Facility-level integration of PHC services and provision of daily immunization will help to reduce missed opportunities for immunizing both women and children.

Both diarrhoea and fever remain major causes of childhood morbidity and mortality in Barkin-Ladi. About one quarter of children (29.2%) had an episode of diarrhoea in the two weeks prior to the survey, and 31.5% had an episode of fever. On the average, each child under five years in Barkin-Ladi will experience 5.5 episodes of diarrhoea and 6.6 episodes of fever during 1992.

Frequent episodes of diarrhoea and other infections can have a serious impact on nutritional status and growth. Based on arm circumference measurements, about 20% of children aged one to five years in this survey were considered undernourished. Children under two years of age were most severely affected. While most mothers in Barkin-Ladi breastfeed their child for at least one year, exclusive breastfeeding (i.e., breast milk only, with no water or other fluids given) is rare after two months of age. Pap and "kunu" were the most common weaning foods.

During episodes of diarrhoea, almost all mothers continued breastfeeding and giving home fluids, with the majority (69.4%) continuing solid food. One in three mothers (35.2%) gave sugar-salt-solution at home for diarrhoea; 52.7% of these mothers could prepare the solution correctly. Among all children with diarrhoea, 35.2% received SSS, 18.5% received correctly

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prepared SSS, 9.4% of children received correctly prepared SSS in adequate quantity, and 4.3% of children received correctly prepared SSS in adequate quantity on the first day of the diarrhoea episode.

Among children with fever, over half (54.2%) were given some type of medicine at home. One in four children (27.0%) were given an antimalarial (chloroquine) and 27.8% were given paracetamol. Among all children with fever, 6.7% were given an antimalarial over a three day period. One in three children with fever (39.4%) were given a sponge bath and 34.7% were given increased fluids. A substantial number of mothers continued to give inappropriate drugs (such as antibiotics and kaolin) at home to their children with diarrhoea and/or fever.

About one third of children with diarrhoea (36.5%) and half of the children with fever (46.0%) were taken to a health facility for treatment. Oral rehydration (ORS or SSS) was received by 40.4% of children with diarrhoea, and chloroquine (either tablets or syrup) was received by 83.7% of children with fever. One in three children with fever (32.2%) were given an antimalarial injection.

Information on the chloroquine dose given by mothers over a three day period was generally associated with under-dosing for syrup and over-dosing for tablets. For both tablets and syrup, it appears mothers do not halve the chloroquine dose on the third day of treatment as indicated in national malaria treatment guidelines.

Mothers' perception of the diarrhoea or fever illness as "severe" had a significant influence on home treatment practices. Mothers were more likely to give SSS to children with severe diarrhoea (41.5% and 31.1% for severe and non-severe diarrhoea, respectively) and sponge baths were given more often when the child's fever was perceived as severe (46.8% vs 32.8%). Sick children were taken to health facilities more often when their diarrhoea or fever illness was perceived as severe (49.2% vs 28.3% for diarrhoea, 62.0% vs 38.0% for fever).

Almost all women (97.4%) who delivered in the twelve months prior to the survey received antenatal care at a health facility. Three quarters of the women (74.6%) received care at a government health center or dispensary and 22.8% received care at a private hospital. Certain antenatal care and home treatment practices were influenced by mothers' level of education. Compared with mothers who had no forml education, mothers with secondary/post-secondary school training were significantly more likely to deliver at a health facility (100.0% vs 46.8%) and to have an antenatal card (100.0% vs 36.6%).

More than half of the mothers in Barkin-Ladi did not understand the reason for their child's diarrhoea or fever/malaria (54.9% and 59.4%, respectively), and 42.7% of mothers were unaware of any way to prevent malaria. Education efforts must enable mothers understand the causes of disease in the community, especially among children. Building on the solid Primary Health Care infrastructure which exists in Barkin-Ladi, communities must be encouraged to take ownership of their health problems, understand why they occur, and experience the impact of positive behavior change in reducing childhood morbidity and mortality.

1 INTRODUCTION

1.1 Background: Barkin-Ladi Local Government

Barkin-Ladi, one of twenty three Local Government Areas (LGA) in Plateau State, is situated about 42 kilometres from Jos, the state capital. The LGA occupies a land area of 1,956 sq km, with an estimated population of 152,808 (1991 census). Because of its location on the high plateau, Barkin-Ladi enjoys a temperate climate. The LGA is predominantly rural, with farming and trading the major occupations. There are fifty-five villages in Barkin-Ladi, grouped into eight districts. Berom, the major ethnic group, is predominant in seven districts. Hausa is almost universally spoken.

In 1986, Barkin-Ladi was selected as one of 52 LGAs nationwide for development as a Primary Health Care "Model LGA." Since that time, significant progress has been achieved in the implementation of PHC at all levels. Following Federal Ministry of Health guidelines, Barkin-Ladi has carried out the following activities:

- Within the LGA Health Department, Primary Health Care has been divided into five sections: 1) Immunization/Diarrhoeal Disease Control, 2) Essential Drugs, 3) Maternal and Child Health/Nutrition, 4) Health Education/Women in Health, and 5) Monitoring and Evaluation. Each section is headed by an Assistant PHC Coordinator, with overall technical direction and support provided by the LGA PHC Coordinator.

- Each of the eight districts in Barkin-Ladi (see map) has a District Supervisor who coordinates health activities within the district and reports to the LGA PHC Coordinator. The LGA PHC Coordinator conducts monthly planning and coordination meetings with all eight district supervisors.

- PHC Committees have been formed and are functional at all levels — LGA, District, and Village.

- House numbering and placement of home-based records have been completed in most villages in Barkin-Ladi.

- Over one hundred and fifty Village Health Workers (VHW) and Traditional Birth Attendants (TBA) have been trained to provide basic Primary Health Care services in villages throughout the LGA.

- Many government health clinics in Barkin-Ladi provide integrated PHC services, including immunization and family planning.

- Through support received from the Bamako Initiative, Barkin-Ladi has established a well-functioning Revolving Drug Fund at the LGA level and most facilities have an adequate supply of essential drugs.

Community involvement and participation in Primary Health Care forms the basic foundation upon which Barkin-Ladi has built its PHC program. At the grassroots level, village development committees and community members themselves are involved in the decision-making process on all health-related issues.

Other elements critical to successful PHC implementation in Barkin-Ladi include: 1) commitment to Primary Health Care by the LGA Chairman and political leaders, 2) continuous committed leadership and strong technical direction by the LGA PHC Coordinator, 3) an effective working relationship with traditional authorities in planning, financing, and community mobilization, and 4) functional transport available and used for PHC supervision.

In addition to approximately 20 government health facilities (including a general hospital and basic and rural PHC clinics), there are over fifty private/voluntary health institutions. Government health facilities are staffed by various cadres of community health workers, including Community Health Officers/Supervisors, Senior and Junior Community Health Extension Workers, nurses, midwives and environmental health officers. The Christian Health Association of Nigeria (CHAN) provides logistics and training support to a number of health facilities throughout Plateau State, including Barkin-Ladi.

Since mid-1991, the Combatting Childhood Communicable Diseases (CCCD) Project has provided support for Primary Health Care implementation in Barkin-Ladi. Major activities supported by CCCD (in line with Federal Ministry of Health guidelines for PHC implementation) include:

- PHC orientation for LGA government officials and district and village health committee members
- continuing education for facility-based PHC workers, village health workers (VHW) and traditional birth attendants (TBA)
- strengthening/establishment of ORT units and corners
- clinical training on case management of diarrhoea
- PHC supervision support through vehicle repair and maintenance
- establishment of PHC library at LGA Health Department
- completion of house numbering and placement of home-based records

1.2 Objectives of the Survey

The Barkin-Ladi Community Survey was conducted to obtain information about knowledge and treatment practices related to Primary Health Care among mothers of children under five years in the Local Government. Special emphasis was placed on obtaining information about immunization, diarrhoea, nutrition, and fever.

The community survey had the following specific objectives:

1) to determine immunization coverage among children, especially those aged 12-23 months

2) to determine the incidence of diarrhoea and fever among children under five years during the two weeks prior to the survey

3) to describe knowledge and treatment practices among mothers of children with diarrhoea, including use of sugar-salt-solution

4) to describe knowledge and treatment practices among mothers of children with fever, including use of antimalarial drugs

5) to describe breastfeeding, bottlefeeding and weaning practices among mothers

6) to assess nutritional status using mid-upper arm circumference among children aged one to five years

7) to determine tetanus toxoid coverage and antenatal care practices among mothers who delivered in the previous twelve months

1.3 Methods

Sampling: The Barkin-Ladi Community Survey was carried out in May 1992. The sampling method used was a cluster scheme based on probability proportionate to size, with 40 clusters randomly selected. The sampling frame used for selecting clusters was based on the most recent population data which provided a detailed breakdown of population by district and village. This sampling frame, based on 1960 census projections, reflects a total population of 274,766. For the purpose of this survey, it was assumed that the relative distribution of the population by district/village remained unchanged from 1960 till present. Appendix A provides population estimates by district/village and a list of the forty clusters selected for the survey.

The target group comprised children under five years of age residing in Barkin-Ladi at the time of the survey. Sample size was calculated using standard formulae for cluster sampling, with the following assumptions:

- the incidence of disease in the two weeks prior to the survey is at least 15%
- at least 40% of children receive treatment and at least 50% of these children are treated "correctly"
- after at least two years of programmatic intervention, a post-intervention survey should detect an increase of at least 10% in the proportion of children receiving correct home treatment
- the power of the study (the probability of correctly rejecting the null hypothesis when it is false) should be 80% and the alpha error (significance level) 5%
- the maximum design effect anticipated should be 4.0

Based on these assumptions, a sample size of approximately 1600 children less than 5 years of age was calculated.

In this survey, a "household" was defined as a mother (or caretaker) and all of her children (or other children living with her for at least the past six months) eating from the same cooking pot. Based on an assumption of 1.4 children per mother (Suleja Community Survey, 1991), 1160 mothers/caretakers (29 per cluster) and their children were selected and interviewed.

Within each cluster, a starting household was selected by randomly choosing a direction at the center of the cluster, numbering the households lying in this direction to the edge of the cluster, and randomly choosing one of the numbered households for the first interview. Interviewers then selected the next nearest household and carried on in this fashion until 29 mothers with children under five years had been interviewed.

Survey Questionnaire: The survey questionnaire was developed from a list of approximately fifty key indicators which address immunization coverage and mothers' knowledge and practices. It was divided into six sections (see Appendix B):

I. Household Information
II. Immunization
III. Nutrition
IV. Diarrhoea
V. Fever
VI. Mother Information

The questionnaire was written in English, field tested in Hausa and Berom (the commonest local languages), and revised.

Date of birth was obtained from the child's immunization card, birth certificate, or mother's history. The immunization status of each child under five was assessed using information available from his or her health card and from mother's history. Presence of a BCG scar was noted by physical examination of each child. Information on breastfeeding, bottlefeeding, and weaning practices was collected for all children, and mid-upper arm circumference was measured in centimeters using a standard tape measure.

Separate questionnaires were completed for each child who had diarrhoea or fever (defined as episodes of these illnesses, as perceived by the mother) during the two-week period prior to the interview. For those who reported episodes of diarrhoea or fever, information was obtained on associated symptoms, perceived severity of the episode ("severity" as defined by the mother) home treatment and referral practices, and treatment obtained at health facilities. Questions were asked about preparation and administration of sugar-salt-solution (SSS) and daily chloroquine dosages administered by mothers as treatment for fever at home (before going to a health facility) and following treatment instructions given at the health facility.

Both "voluntary" and "prompted" responses to questions about home treatment practices were obtained from mothers. "Voluntary" responses were obtained by asking mothers what they "did first" for their child with diarrhoea/fever. After providing her voluntary response, each mother was "prompted" by the interviewer about selected other forms of treatment.

All mothers were asked their age and level of education. Tetanus toxoid immunization status was assessed from antenatal health or TT cards, and from mother's history. Women were further questioned about antenatal care practices, including malaria chemoprophylaxis, during their pregnancy with their youngest child.

Survey personnel: Senior LGA Government officials and Primary Health Care Department staff provided strong leadership and support for the Barkin-Ladi Community Survey (Appendix C). Actual survey participants (twenty interviewers and ten supervisors) were recruited from Barkin-Ladi Local Government and Plateau State Ministry of Health (Appendix D). Ten interviewer teams were formed, consisting of two interviewers and one supervisor each. At least one member of each team spoke Hausa and one member spoke Berom.

Interviewers and supervisors were trained for five days on questionnaire content and interviewing techniques. Training included an overview of survey goals and objectives, and technical issues related to immunization, nutrition, diarrhoea and fever. Role play was emphasized, with the trainees acting, in turn, as interviewers and interviewees to clarify questions and confirm correct translation into either Hausa or Berom. Two field exercises were carried out in demonstration clusters.

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Field work: Each study cluster was visited by a senior Health Department official from Barkin-Ladi at least one day before the survey started. During this visit, local authorities were met and the objectives of the survey were explained. The geographical limits of the cluster were determined, using a local guide when necessary.

On the day of the survey, the team supervisor was responsible for selecting the first household to visit in the cluster. From the first house, the team progressed door-to-door to the next nearest household. All women absent at the first visit who were reported by neighbors to have children under five years of age were revisited before the end of the day. Three visits were made over a two-day period before a substitute was found in a contiguous household.

All interviews were conducted with the entire team present, i.e. two interviewers and a supervisor. In each household, one member of the interviewer team served as the primary interviewer. The second interviewer assisted with language translation when needed and listened to mothers' responses for accuracy and consistency. The team supervisor measured and recorded mid-upper arm circumference for all children.

As interviews were completed, the team supervisor reviewed each questionnaire to verify all answers and make necessary corrections. At the end of each day, questionnaires were again reviewed for completion and accuracy by survey facilitators at the LGA PHC Secretariat, which served as a central meeting point each evening for the survey teams.

Logistics support for field work included five vehicles, several motorcycles, questionnaire forms, salt, sugar, spoons of various sizes for preparation of SSS by mothers, and various stationary supplies.

Data entry and analysis: Data were entered on computer at the CCCD Office in Kaduna after the field work was completed. EPI-INFO 5.0 software was used to enter and analyze the data. Three full-time data entry clerks were recruited and trained to enter th under supervision of CCCD office personnel.

Immunization coverage: Immunization coverage rates (crude, corrected, and corrected by first birthday) were calculated for various age groups using information from card only and card plus history. *Crude* coverage was calculated using child's age based on card or history, with no regard for age at which immunizations were received or time intervals between doses. *Corrected* rates were based on child's age by card only, and took into consideration both age at immunization (i.e., DPT1 and Polio1 ≥ 6 weeks, measles ≥ 39 weeks) and time interval between doses (i.e. 28 days between doses of DPT and Polio). Calculation of corrected immunization rates by history were based on the assumption that the proportion of children immunized correctly was similar for children with and without cards. Drop-out rates were calculated for DPT1→DPT3 [1-(# DPT3/# DPT1)] and DPT3→Measles [1-(# Meas/# DPT3)].

Nutritional status classification: Using mid-upper arm circumference (MUAC) measurements, children aged one to five years were classified into one of three nutritional status categories. "normal nutritional status" (MUAC >=13.5 cm), "mild-moderate undernutrition" (MUAC 12.5-13.4 cm), and "severe undernutrition" (MUAC <12.5 cm).

Seasonality adjustment: The annual incidence of diarrhoea/fever per child (i.e., number of episodes per child per year) was calculated taking into account seasonal variation in disease incidence. Seasonality adjustments were based on the number of diarrhoea/fever cases reported by selected LGAs throughout Plateau State, by month, during 1991 (Source of information: Planning, Research and Statistics Division, Plateau State Ministry of Health, 1991 LGA Notifiable Disease Reports).

Chloroquine dosage: Mothers who gave chloroquine to their children with fever were asked the number of times the medicine was given each day (over a maximum three day period) and the amount of chloroquine administered each time. Based on Federal Ministry of Health (FMOH) chloroquine dosage guidelines for children in three age groups (i.e., <1 year, 1-3 years, and 4-6 years), the dose of chloroquine administered to the child each day was calculated By comparing the calculated dose administered each day with the FMOH recommended dose for a child in that age group, the dose administered each day was classified as low, correct, or high.

Assumptions made in calculating daily chloroquine dose include: 1) all chloroquine syrup contained 50 mg chloroquine/5 ml, 2) chloroquine syrup was administered using a 5-ml teaspoon, 3) all chloroquine tablets contained 150 mg chloroquine base, and 4) all chloroquine given was potent and of good quality.

2 GENERAL FINDINGS

2.1 Completed Interviews

During the survey, a total of 1160 female caretakers, essentially all mothers, were interviewed. Among these 1160 mothers, there were a total of 1605 living children under five years of age. The average number of children under five years per mother was 1.39, with a range of 1-4 children under five per mother.

Each interview took 15-45 minutes to conduct. Interviewer teams spent six to ten hours in the field each day. It took two full days for an interviewer team to complete all interviews in a cluster. The survey field work was completed in eight days.

A total of 469 children (29.2%) under five years of age had an episode of diarrhoea in the two weeks prior to the survey. Interviews were completed on all of these children. Mothers reported that 507 children (31.5%) had an episode of fever in the previous two weeks, and interviews were completed on all of these children. Episodes of both diarrhoea and fever were reported in the same two-week recall period for 211 (13.1%) children.

2.2 Characteristics of Mothers and Children

As shown in Table 2.1, the majority of women interviewed (93.5%) were twenty years of age or older. Seventy mothers (6.0%) were between 15-19 years of age, and two mothers were under age fifteen. Slightly more than half (53.4%) of the mothers had received no formal education. Nearly forty percent of mothers had some primary school training, and 7.6% attended either secondary or post-secondary school.

Documentary evidence of date of birth was available for 972 (83.8%) of the children; mother's history was used for the remaining children. As shown in Table 2.2, the majority of children (28.8%) were under one year of age, followed by 24.6% of children in the 12-23 month age group. Children aged three, four, and five years of age represented 17.6%, 16.4%, and 12.0% of the study sample, respectively. Slightly more than half of the children (51.6%) were female.

3 IMMUNIZATION

Immunization cards were available for 1,084 children (67.5%) under five years. Card availability decreases with age, from 74% of children aged 12-23 months possessing a card at the time of the survey to 54% of children aged 48-59 months.

Table 2.1 Age and educational status of mothers

Age and educational status of 1160 mothers who participated in the Barkin-Ladi Community Survey, May 1992

Characteristic	Percentage of mothers	Number of mothers
Age (years)		
<15	0.2	2
15-19	6.0	70
20-24	26.4	306
25-29	29.1	337
>30	38.0	441
Unknown	0.3	4
Education		
None	53.4	619
Primary	38.9	451
Secondary	6.6	77
Post-secondary	1.0	12
Unknown	1	1
Total	100.0	1160

Table 2.2 Sex and age distribution of children

Sex and age distribution of 1605 children under five years of age for whom information was obtained, Barkin-Ladi Community Survey, May 1992

Characteristic	Percentage of children	Number of children
Sex		
Male	48.8	777
Female	51.6	828
Age (months)		
<6	15.7	252
6-11	13.1	210
12-23	24.6	395
24-35	17.6	283
36-47	16.4	264
48-59	12.0	192
Unknown	0.6	9
Total	100.0	1605

3.1 Immunization Coverage, Children Aged 12-23 months

Immunization coverage rates (crude, corrected, and corrected by the child's first birthday) for children aged 12-23 months are presented in Table 3.1. For all antigens, coverage decreases significantly when corrected for age and dose interval, especially by the first birthday. For both crude and corrected rates, coverage increases when mothers' history is included for children without a vaccination card. About one quarter (26%) of 12-23 month old children did not have an immunization card. Fig. 3.1 summarizes corrected immunization coverage rates for selected antigens among children aged 12-23 months.

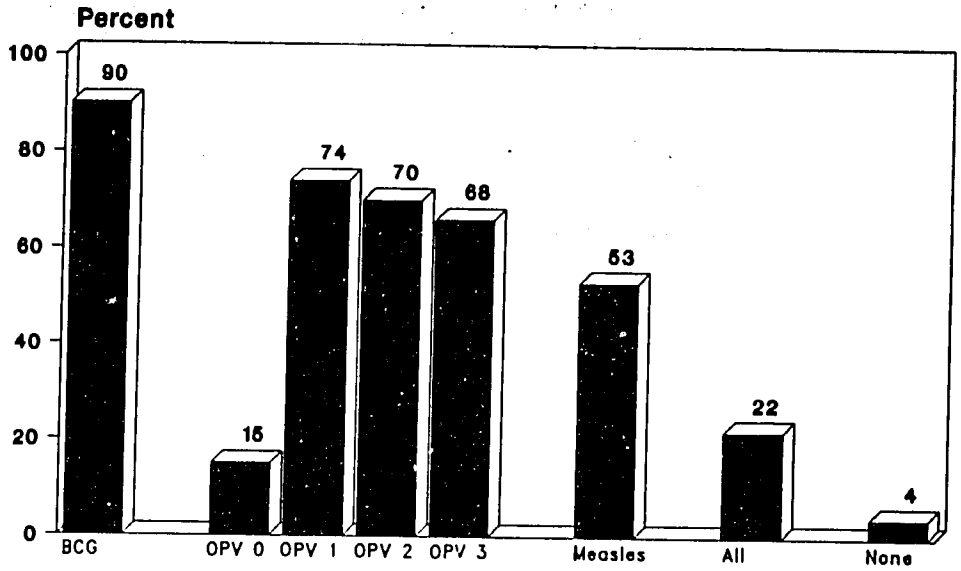
Table 3.1 Immunization coverage, 12-23 months

Immunization coverage among children aged 12-23 months, by antigen, Barkin-Ladi, May 1992

	CRUDE		CORRECTED		CORRECTED BY 1ST BD	
	Card	Card+Hx	Card	Card+Hx	Card	Card+Hx
BCG	66.8	96.2	62.3	89.6	62.0	89.4
BCG Scar	93.6					
DPT 1	64.6	92.4	52.2	74.7	51.6	73.9
DPT 2	60.3	88.1	49.1	71.9	48.4	70.6
DPT 3	52.2	80.5	42.8	66.1	42.0	64.8
Polio 0	6.6	15.9	6.1	14.7	6.1	14.7
Polio 1	64.3	91.9	51.9	73.9	51.4	73.2
Polio 2	60.5	88.1	48.1	70.1	46.8	68.4
Polio 3	52.2	80.3	42.5	65.6	41.8	64.3
Measles	41.5	66.6	32.9	52.7	27.6	44.1
Fully Immunized	36.2	36.2	22.3	22.3	19.5	19.5

n = 395 Children 12-23 months
CRUDE = DOB by card or history; age at immunization, dose interval not considered
CORRECTED = DOB by card; DPT 1, POL 1 >=6 wks, 28 days between doses;
Measles > 39 wks

Figure 3.1
Immunization Coverage
Children Age 12-23 months



n = 395
Corrected coverage, card + history

Based on information from immunization cards only, 66.8% of children received BCG immunization (Table 3.1). Crude coverage with BCG approaches 100% when mothers' history is considered. The BCG scar rate (93.6%) was only slightly lower than the crude BCG coverage rate by card and history (96.2%).

Crude coverage for DPT1 and Polio 1 are similar (64% by card, 92% by card and history). The 60% card-documented coverage rate for DPT2 and Polio 2 reflects a decrease of approximately 4% from the first doses of each antigen. The percentage decrease in coverage between the second and third doses of DPT and Polio (8%) is relatively greater. Coverage for polio at birth (Polio 0) is low, about 6% by card and 15% by card and history.

Crude coverage with measles vaccine is 41.5% by card only, increasing to 66.7% if mothers' history is considered. Measles coverage decreases when corrected for age >39 weeks (32.9% by card, 52.7% by card and history). Coverage among children immunized against measles after 39 weeks and before their first birthday decreases further to 27.6% by card (44.1% card and history).

While one-third (36.2%) of all children aged 12-23 months in Barkin-Ladi had received all childhood immunizations, only one in five children (19.5%) were fully immunized before their first birthday.

3.2 Immunization Coverage, Children under Five Years

Card documented immunization coverage is higher among children aged 12-23 months than among children aged 24-59 months (Table 3.2). The percentage of 12-23 month-old children possessing an immunization card is greater, 74% versus 58%. No children aged 24-59 months received Polio 0, reflecting the recent inclusion of polio at birth in the EPI schedule. Measles coverage was slightly higher in the younger age group (22%) than among children aged 24-59 months (18%).

Drop-out rates from DPT1→DPT3 and DPT3→measles were higher for children aged 12-23 months (18.0% and 23.1%, respectively) than for older children (10.4% and 8.3%, respectively). Within each group, the drop out rate from DPT3→measles was higher than for DPT1→DPT3.

Table 3.2 Immunization coverage, children under five years

Immunization coverage among children under five years of age, Barkin-Ladi, May 1992

	Age (months)			
	12-23		24-59	
Had immunization card	74	(69,79)*	58	(53,64)
Received				
BCG	62	(55,68)	43	(38,47)
DPT 1	52	(46,59)	37	(32,41)
DPT 2	49	(42,56)	34	(30,39)
DPT 3	43	(36,49)	33	(28,37)
Polio 0	6	(2,10)	0	(-, -)
Polio 1	52	(45,59)	36	(31,40)
Polio 2	48	(41,55)	34	(39,38)
Polio 3	43	(36,49)	32	(28,37)
Measles	33	(27,39)	30	(26,34)
Fully Immunized	22	(17,28)	18	(14,22)
Drop Out Rates**				
DPT 1 -> DPT 3	18.0		10.4	
DPT 3 -> Measle	23.1		8.3	

Corrected coverage, card only

* Figures in parentheses are the 95% confidence intervals

** DPT 1 -> DPT 3 = 1-(#DPT 3/#DPT 1)

DPT3 -> Meas = 1-(#Meas/#DPT 3)

Table 3.3 Immunizations during the first year of life, by birth cohort

Percentage of children immunized correctly during the first year of life, by birth cohort, Barkin-Ladi, May 1992

Features	Current age of child (months) 12-23	24-35	36-47	48-59	All Children 12-59 months
Had immunization card	74	66	55	54	64
Percent immunized at 0-11 months:					
BCG	62 (90)*	48 (88)	37 (84)	41 (88)	49 (88)
DPT 1	52 (75)	41 (75)	30 (69)	35 (75)	41 (73)
DPT 2	49 (72)	37 (67)	28 (67)	31 (69)	38 (69)
DPT 3	43 (66)	38 (69)	24 (60)	26 (63)	34 (65)
Polio 0	6 (15)	1 (5)	0 (0)	0 (0)	2 (10)
Polio 1	52 (74)	40 (73)	29 (69)	34 (74)	40 (73)
Polio 2	48 (70)	36 (67)	27 (65)	31 (70)	37 (68)
Polio 3	43 (66)	37 (68)	24 (60)	26 (63)	34 (65)
Measles	33 (53)	29 (54)	17 (42)	18 (40)	24 (47)
Fully immunized	22 (22)	16 (16)	10 (10)	13 (13)	15 (15)
No immunizations received**	4	3	3	2	3
Number of Children	395	283	264	192	1134

* 62 (89) = 62% by card only, 89% by card+history

** No immunizations received = immunizations either never received or received at incorrect age/dose interval as noted by card

Table 3.3 shows the percentage of children aged 12-59 months who were immunized by their first birthday, by their current age. Improvements in card documented immunization coverage over the last five years are reflected in higher coverage rates among children in the younger age groups. A greater number of younger children possess an immunization card, 74% among children aged 12-23 months compared to 54% among children aged 48-59 months. A small percentage (2.4%) of children in each age group received no immunizations at all.

3.3 Source of Immunization Services

In Barkin-Ladi, nearly all immunizations are given at a health facility (Table 3.4). Government health facilities provide 87.5% of all immunizations and private facilities provide 10.0%. A small percentage of mothers (2.5%) reported the child's immunizations to have been received through community outreach.

Just as most children receive immunizations at health facilities, the majority of mothers (87.0%) report that "clinics" were their primary source of information about immunization. A few mothers obtain information from radio and television, village health workers, churches and other social groups.

Table 3.4 Source of immunization services

Place immunization services received and source of information about immunization, as reported by mothers, Barkin-Ladi, May, 1992

Feature	Percentage of children
Place immunization received	
Govt. health facility	83.6
Private health facility	10.0
Govt. hospital	3.9
Outreach	2.5
Source of information	
Clinic	87.0
Radio/TV	2.0
Neighbor	1.7
VHW	1.1
Mobile van	0.9
Other	4.9
Don't Know	2.3

n = 1605 children

4 NUTRITION

4.1 Breastfeeding Practices

As shown in Table 4.1, nearly all mothers in Barkin-Ladi (99.6%) breastfeed their children for some time after birth, with the majority (94.9%) breastfeeding until the child is 12-23 months old. Exclusive breastfeeding (i.e., breastmilk only, with no water or other fluids) is rare after two months of age. Many mothers report giving water to the infant within several days of birth.

Table 4.1 Breastfeeding practices

Breastfeeding practices among children under five years of age, as reported by mothers, Barkin-Ladi, May 1992

Practice	Percentage of children
Ever breastfed	99.6
Duration of breastfeeding *	
<2 months	0.5
2-3	1.2
4-5	0.7
6-11	2.4
12-23	94.9
>24	0.2
Duration of exclusive breastfeeding **	
<2 months	93.6
2-3	3.5
4-5	2.1
>6	0.8

n = 1605 children
* n = 868 children not currently breastfeeding
** n = 1599 children ever or currently breastfed

4.2 Bottlefeeding and Weaning Practices

About one-half of all mothers (48.7%) report having bottlefed their child at some time (Table 4.2). Most (83.9%) begin bottlefeeding before the child is two months old. The age at which bottlefeeding is stopped varies from two months through two years of age, with nearly one-third of mothers (30.3%) discontinuing bottlefeeding after the child's first birthday.

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Table 4.2 Bottlefeeding and weaning practices

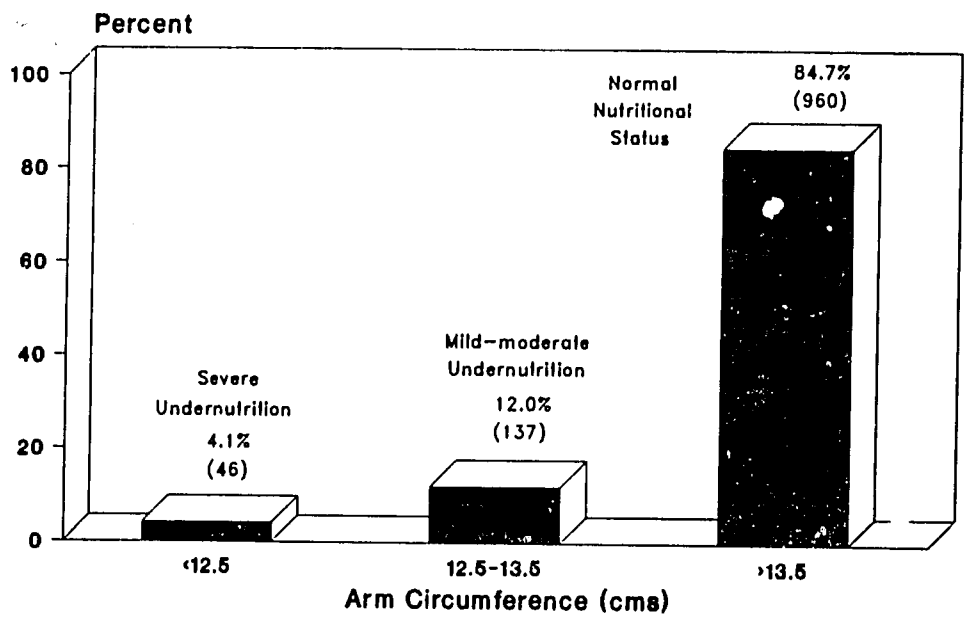
Bottlefeeding and weaning practices among children under five years of age, as reported by mothers, Barkin-Ladi, May 1992

Practice	Percentage of children
Ever bottlefed	48.7 (43.5, 54.0)
Age bottlefeeding started *	
<2 months	83.9
2-3	10.0
4-5	5.0
6-11	0.9
12-23	0.3
Age bottlefeeding stopped **	
<2 months	9.5
2-3	18.9
4-5	17.4
6-11	23.7
12-23	30.3
>36	0.3
Age weaning foods introduced***	
<2 months	2.4
2-3	22.7
4-5	60.9
6-11	12.5
12-23	1.4
Type of weaning foods given***	
Pap	79.9
Kunu	22.5
Family meal	18.8
Other	6.9

n = 1605 children
* n = 783 children ever or currently bottlefed
** n = 634 children who completed bottlefeeding
*** n = 1434 children, excluding 173 not yet weaned

Weaning foods are generally not introduced before two months of age, with the majority of children (60.9%) weaned at four to five months. Local pap and kunu are the most common types of weaning foods in Barkin-Ladi, used by 79.9% and 22.5% of all mothers, respectively. One of every five mothers (18.8%) report giving the child small portions of the same meal served to the rest of the family. Fewer mothers reported using milk (including nan milk) and various commercial formulae, beans, eggs, teas and traditional food/liquid mixtures (including gote and gwete) as weaning foods.

Figure 4.1
Mid-Upper Arm Circumference
Children Age 1-5 years



n = 1143

4.3 Mid-Upper Arm Circumference

Based on guidelines for rapid assessment of nutritional status, 960 children aged one to five years (84.7%) were considered "well nourished" (Fig. 4.1). Mid-upper arm circumference (MUAC) in these well nourished children is at least 13.5 cm. Among 183 children , with arm circumference less than 13.5 cm, 183 (16.1%) were mild-moderately undernourished (MUAC between 12.5 and 13.4 cm) and 46 children (4.1%) were severely undernourished (MVAC <12.5 cm).

Data presented in Table 4.3 demonstrate that the majority of "undernourished" children are under two years of age. There is the suggestion that more female than male children may be undernourished. The incidence of both diarrhoea and fever are higher in undernourished children. Whereas 41% of undernourished children had diarrhoea in the two weeks prior to the survey, only 26.9% of well nourished children had diarrhoea. About 45% of undernourished children had a fever episode in the past two weeks, compared with 29.7% of well nourished children.

Table 4.3 Mid arm circumference measurements

Mid-upper arm circumference measurements for children aged one to five years, by selected characteristics, Barkin Ladi, May 1992

	Arm Circumference (cm)		
	<12.5 (n = 46)	12.5-13.4 (n = 89)	>= 13.5 (n = 1000)
Age (months)			
12-23	63.0	64.0	30.9
24-35	23.9	18.0	25.6
36-47	8.7	10.1	25.1
48-59	4.3	7.9	18.3
Sex			
Male	47.8	39.3	49.8
Female	52.2	60.7	50.2
Diarrhoea in past two weeks	41.3	41.6	26.9
Fever in past two weeks	43.5	46.1	29.7

N = 1143 children aged 1 to 5 years

* Arm-circumference indicators of nutritional status

<12.5 = Severe undernutrition

12.5-13.4 = Mild - moderate undernutrition

>=13.5 = Normal nutritional status

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5 DIARRHOEA

5.1 Incidence in the Past 2 Weeks

A total of 469 children (29.2%) under five years of age had an episode of diarrhoea in the two weeks prior to the survey (Table 5.1). Adjusting for annual seasonal variation in diarrhoea incidence, it is estimated that, on the average, each child in Barkin-Ladi might experience 5.7 episodes of diarrhoea each year (Table 5.2). This translates to 156,779 diarrhoeal illnesses and 1,773 diarrhoea-related deaths each year among children in the Local Government. For every 100 cases of diarrhoea, one child will die.

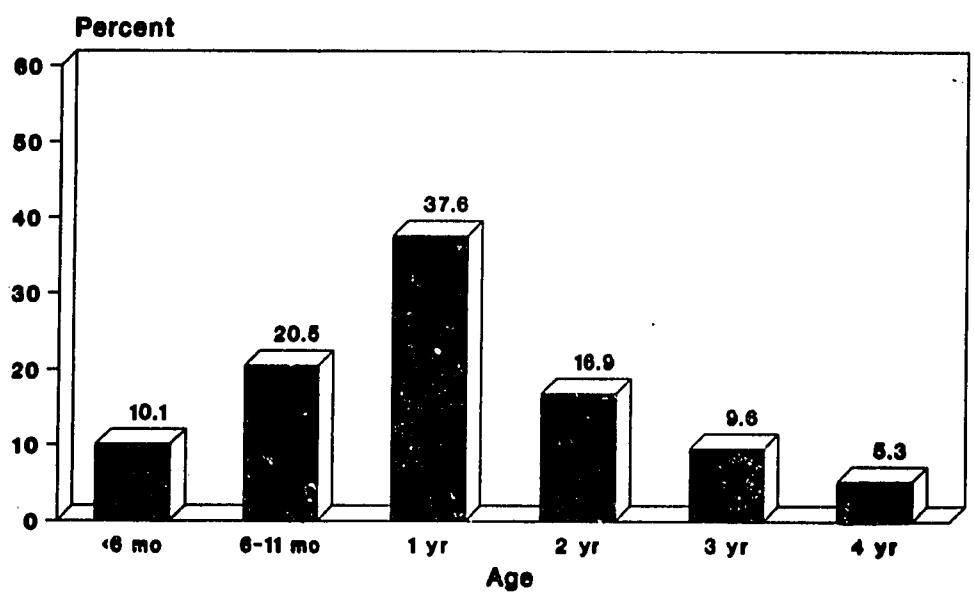
5.2 Characteristics of Children with Diarrhoea

Nearly one-third of all diarrhoea episodes (30.6%) occurred among children under one year of age, 16.9% among children age two years, and 14.9% among three to four year olds (Fig. 5.1). The incidence of diarrhoea did not differ between males and females (Table 5.1).

Over half of the diarrhoea episodes (52.1%) were of short duration, lasting less than three days. Diarrhoea lasted 4-6 days in an additional 25% of children and 1-2 weeks in the remaining 25% of children. Ninety six children (20.4%) had diarrhoea at the time of the survey.

Symptoms associated with diarrhoea included mucous in the stool (63.5%) and blood in the stool (20.7%). About half of all children with diarrhoea (52.5%) had fever at the same time. More than one third (39.1%) of the diarrhoea episodes were perceived as "severe" by the mother.

Figure 5.1
Age-specific 2-week Diarrhoea Incidence
Children under 5 years



n = 469 Children (29.2%) with diarrhoea during 2 wks prior to survey

Table 5.1 Characteristics of children with diarrhoea

Characteristics of 469 children who had diarrhoea during the two weeks prior to the survey, Barkin-Ladi, May, 1992

Characteristic	Percentage of children
Diarrhoea in past two weeks	29.2 (26.1, 32.3)
Age (months)	
<6	10.1
6 - 11	20.5
12 - 23	37.6
24 - 35	16.9
36 - 47	9.6
48 - 59	5.3
Sex	
Male	50.2
Female	49.8*
Duration*	
1 - 3 days	52.1
4 - 6 days	24.6
1 - 2 weeks	23.3
Mucus in stool	63.5 (58.4, 68.6)
Blood in stool	20.7 (16.4, 25.0)
Fever associated with diarrhoea	52.5 (45.4, 57.8)
"Severe" diarrhoea	39.1 (32.6, 45.5)

n = 469 children with diarrhoea
* Excludes 96 children who had diarrhoea at the time of the survey

Table 5.2 Diarrhoea morbidity and mortality

Estimated annual number of cases of acute diarrhoea-related illness and death among children under five years of age, Barkin Ladi, 1992

Population <5 years (a)	27,505
Annual diarrhoea morbidity rate (b) (Episodes per child)	5.7
Total diarrhoea illnesses per year	156,779
Annual diarrhoea mortality rate (c)	11.6
Total diarrhoea deaths per year	1,773
Case fatality ratio (Deaths per 100 episodes)	1.1

(a) Barkin Ladi 1991 population = 152,808
(b) Adjusted for seasonality
(c) Source: Ref 5

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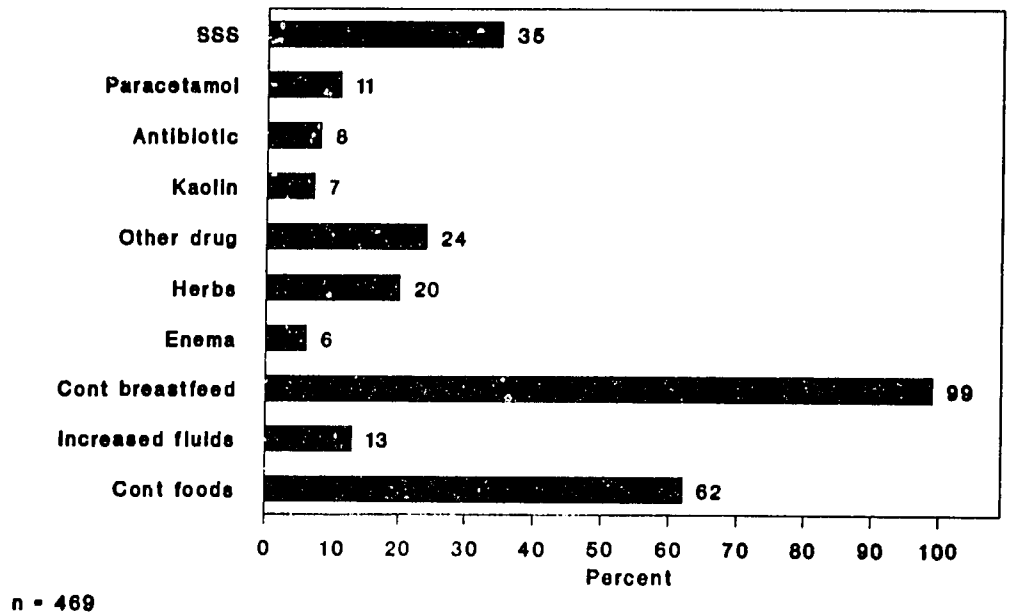
Figure 5.2
Home Treatment and Feeding Practices
Children with Diarrhoea



5.3 Home Treatment and Feeding Practices

Nearly all children (99.7%) who were breastfed before the diarrhoea started continued to breastfeed during the episode (Table 5.3). The majority (81.4%) continued receiving fluids, with 65.9% receiving the same amount of fluid, 12.7% receiving more fluid, and 21.4% receiving less than the regular amount of fluid. Among children who had been weaned, 69.4% were fed solid or semi-solid food during the diarrhoea. Over half of the children (62.3%) were given the same amount of food as before the diarrhoea began, 31.9% were given less, and 5.8% were given more food than usual.

In addition to continued fluids or food, the majority of mothers (59.7%) provided some additional home treatment for the child's diarrhoea (Fig. 5.2) The most common practice (35.2% of mothers) was to administer sugar-salt-solution. Among mothers who gave home treatment, SSS was the response most frequently volunteered by mothers when asked what they did first for the child (28.4%).

A variety of drugs were administered by mothers to their children with diarrhoea. Among children with diarrhoea, 11.1% were given paracetamol, 8.1% an antibiotic, 7.2% kaolin, and and 24.1% were given some "other drug." Nine children were given ORS (prepared from a sachet) and several received thalazole or chloroquine.

One in five children (20.3%) were treated with herbs and 6.2% were given an enema. Forty percent (40.3%) of children with diarrhoea received no treatment at home (i.e. were not given SSS, drugs, herbs or enema).

Table 5.3 Home treatment and feeding practices for diarrhoea

Home treatment and feeding practices among mothers of children under five years of age with diarrhoea, Barkin Ladi, May 1992

	Mothers' response			
	Voluntary*	Prompted	Total	
Sugar salt solution	28.4	6.8	35.2	(30.0, 40.4)
Drug				
Antibiotic	3.8	4.3	8.1	(5.1, 11.1)
Paracetamol	3.6	7.5	11.1	(7.8, 14.3)
Kaolin	4.9	2.3	7.2	(4.4, 9.7)
Other	20.7	3.4	24.1	(18.2, 30.0)
Herbs	12.4	7.9	20.3	(14.5, 26.0)
Enema	3.0	2.1	6.2	(3.1, 9.3)
Nothing	40.3		40.3	(34.9, 45.7)
Other	2.8	2.1	4.9	(2.1, 7.7)
Continued breastfeeding**			99.7	
Continued fluids			81.4	(74.1, 88.8)
More			12.7	
Less			21.4	
Same amount			65.9	
Continued solid food***			69.4	(63.1, 75.3)
More			5.8	
Less			31.9	
Same amount			62.3	

n = 469 children with diarrhoea
* Mothers' first response, before being prompted
** n = 286 children breastfed before diarrhoea started
*** n = 451 children, excluding 18 not yet weaned

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5.4 Use of Sugar-Salt Solution

More than fifty percent of mothers of children with diarrhoea (52.7%) were able to prepare the solution correctly by adding the correct amount of sugar, salt, and water (Table 5.4). Among mothers unable to prepare SSS, the majority added an incorrect amount of sugar and/or salt (78.2% and 73.1%, respectively). Forty two percent (42.5%) of mothers added the incorrect amount of water.

About one third of children with diarrhoea (37.2%) were given SSS on the first day of the diarrhoea episode. Nearly half of all children received SSS 2-5 times each day and a quarter of the children were given SSS after each diarrhoea motion. Each time SSS was given, the majority of children (69.5%) were given about half a cup. Fourteen percent of children received twenty teaspoons or less.

In summary, 35.2% of children with diarrhoea in Barkin-Ladi received SSS at home, and 18.5% received correctly prepared SSS. About one in ten children (9.4%) received correctly prepared SSS in "adequate" quantity (i.e., at least half a cup given after each episode or >=6 times a day) at any time during the diarrhoea episode, and 4.3% received an adequate amount of correctly prepared SSS on the first day of the diarrhoea episode.

Health facilities serve as the major source of information about SSS for mothers in Barkin-Ladi. Government clinics provided information for 87.4% of mothers and private practitioner for 7.1%. Church groups and TV or radio were the primary source of information for a smaller number of mothers.

Table 5.4 Home preparation of sugar salt solution

Preparation and administration of sugar salt solution among mothers of children with diarrhoea, and source of information about SSS, Barkin Ladi, May 1992

Practice	Percentage of children	
Prepared SSS correctly	52.7	(43.7, 61.8)
Among those unable to prepare SSS, ingredient added incorrectly*		
Water	42.5	
Sugar	78.2	
Salt	73.1	
Gave SSS on first day of diarrhoea	37.2	
Frequency SSS administered each day		
After each episode	24.4	
2-5 times	46.3	
6-9 times	13.4	
>= 10 times	12.2	
Quantity given each time		
1-9 tsp	7.9	
10-20 tsp	6.1	
Half a cup	69.5	
About a cup	14.0	
More than a cup	1.2	
Among all children with diarrhoea, those who received		
SSS at home	35.2	
Correctly prepared SSS	18.5	
Correctly prepared SSS in adequate quantity***		
At any time	9.4	
On day one	4.3	
Source of information on SSS		
Government clinic	87.4	
Private practitioner	7.1	
TV or radio	1.6	
Other	3.9	

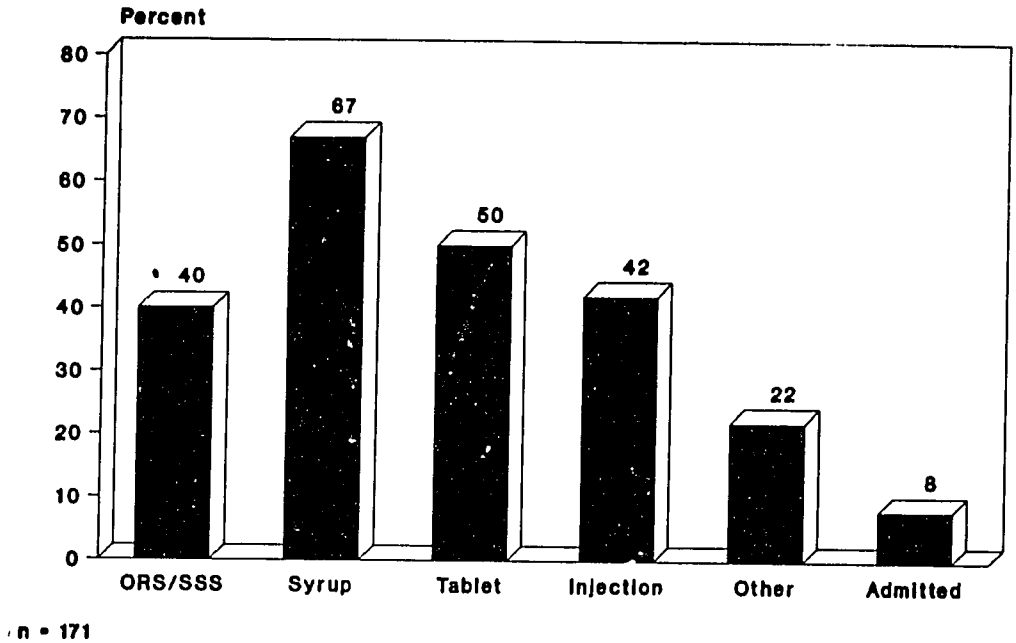
n = 165 children given SSS at home

* n = 78 children whose mothers prepared SSS incorrectly

** n = 469 children with diarrhoea

*** At least half a cup of correctly prepared SSS given after each episode or >= 6 times a day

Figure 5.3
Facility Treatment Practices
Children with Diarrhoea



5.5 Referral Practices and Facility Treatment

Almost half of all children with diarrhoea (44.2%) were taken for treatment outside the home (Table 5.5). Among these children, the majority (90.7%) were taken to a health facility. A smaller number of children were taken to a chemist (6.8%) or herbalist (3.7%).

Among 469 children with diarrhoea, 171 (36.5%) were taken to a health facility. Only 5% of children were taken on the first day of the diarrhoea episode. The majority (39.4%) were taken on day two, 28.2% were taken on day three, and 26.2% were taken on the fourth day or after.

The Oral Rehydration Therapy (ORT, including ORS and SSS) use rate was 40.4% (Fig. 5.3). Two thirds of children taken to a health facility (67.3%) were given syrup, 50.3% tablets, and 41.5% an injection. Since the vast majority of acute diarrhoeal illnesses in children are effectively treated with oral rehydration fluids only, detailed information on the specific types of medicines (i.e., syrups, tablets, injections) was not collected in this survey.

Of 171 children with diarrhoea taken to a health facility, thirteen (7.6%) were admitted.

Table 5.5 Diarrhoea referral practices and treatment at health facilities

Referral practices and treatment at health facilities, as reported by mothers who sought treatment for their children with diarrhoea, Barkin Ladi, May 1992

Practice	Percentage of children	
Took child for treatment	44.2	(38.8, 49.5)
Place child taken*		
Govt hospital	4.7	
Govt health center/disp	51.1	
Private hospital/clinic	32.1	
Chemist	6.8	
Herbalist	3.7	
Other	1.6	
Took child to a health facility	36.5	(32.0, 40.7)
Day taken to health facility**		
Day 1	5.3	
Day 2	39.4	
Day 3	28.2	
Day 4	26.2	
Treatment at health facility**		
ORS/SSS	40.4	(30.0, 50.7)
Syrup	67.3	
Tablets	50.3	
Injection	41.5	
Don't Know	21.8	
Admitted to health facility**	7.6	(4.0,11.0)

n = 469 children with diarrhoea
* n = 207 children taken anywhere for treatment
** n = 171 children taken to a health facility

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Table 5.6 Reasons for perceived severity of diarrhoea

Reasons mothers of children with diarrhoea perceive the diarrhoea as "severe," Barkin Ladi, May 1992

Reason	Percentage of children
Long duration	49.2
Mucous in stool	45.4
Fever	36.6
Weakness	33.9
Blood in stool	21.3
Vomiting	20.2
Child "dried out"	6.0
Other	18.0

n = 183 children with "severe" diarrhoea

5.6 Severity of Diarrhoea

Mothers who perceived their children as having "severe" diarrhoea were asked their reasons. As shown in Table 5.6, the most common reasons mentioned include long duration of the diarrhoea (49.2%) and mucous in the stool (45.4%). About one third of mothers cited the child having fever or feeling weak as reasons (36.6% and 33.9%, respectively). One in five mothers associated blood in the stool (21.3%) and vomiting (20.2%) with severe diarrhoea. Reasons such as the child being "dried out," having increased thirst, sunken eyes, or lack of appetite were mentioned infrequently by mothers.

A significantly greater percentage of children with "severe" diarrhoea were under two years of age (70.9%) compared with children whose diarrhoea was perceived as "not severe" (51.5%) (Table 5.7). Children with severe diarrhoea were given SSS significantly more often (41.5%) than those with non severe diarrhoea (41.5% vs 31.1%, $p<.05$). Kaolin and herbs were also given significantly more often to children with severe diarrhoea (Fig. 5.4).

Children with severe diarrhoea were referred for treatment outside the home significantly more often than those with non-severe diarrhoea (57.4% vs 35.7%, respectively). Referral to health facilities was particularly common, with 49.2% of children with severe diarrhoea taken to a health facility compared with 28.3% of children with non-severe diarrhoea.

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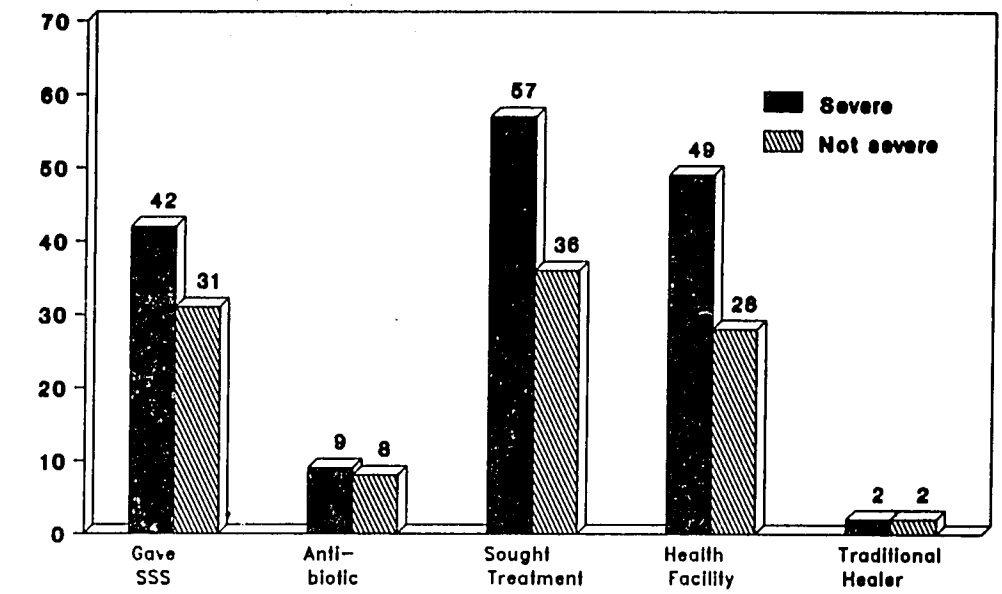
Table 5.7 Diarrhoea treatment practices, by severity

Home treatment and referral practices among mothers of children with diarrhoea, by perceived severity of the diarrhoeal episode, Barkin Ladi, May 1992

Characteristic/Practice	Mothers' perception: Severe (n = 183)		Mothers' perception: Not severe (n = 283)
Age < 2 years	70.9	***	51.5
Gave SSS at home	41.5	*	31.1
Gave drug			
Antibiotic	8.7		7.8
Paracetamol	13.1		9.9
Kaolin	10.4	*	4.9
Herbs	26.8	**	16.3
Enema	8.7		4.6
Continued fluids (a)	82.0		81.3
Continued food	61.7		70.0
Did nothing (b)	38.3		41.7
Sought treatment outside of home	57.4	***	
Took to health facility			
At any time	49.2	***	28.3
Within 48 hours	19.7		21.8
Admitted to health facility	6.7		8.6
Took to traditional healer	1.6		2.4

* $p < .05$
** $p < .01$
*** $p < .001$
(a) Gave the same amount or more fluids
(b) Nothing = no SSS, drugs, herbs, or enema

Figure 5.4
Diarrhoea Home Treatment and Referral Practices, by Severity



n, severe = 183
n, not severe = 283

5.7 Mothers' Knowledge

Reasons for the child's diarrhoea, as reported by mothers, are described in Table 5.8. More than half of the mothers (54.9%) did not know the reason. One in four mothers believed the child's diarrhoea was due to "teething." Less frequently cited reasons mentioned by mothers included dirty food, disease, worms/termites, hemorrhoids, and various types of foods.

Table 5.8 Mothers' knowledge about diarrhoea

Reason for child's diarrhoea, as reported by mothers of children with diarrhoea, Barkin Ladi, May 1992

Knowledge item	Percentage of children
Reason for child's diarrhoea	
Teething	27.1
Contaminated water	2.6
Other	15.4
Don't know	54.9

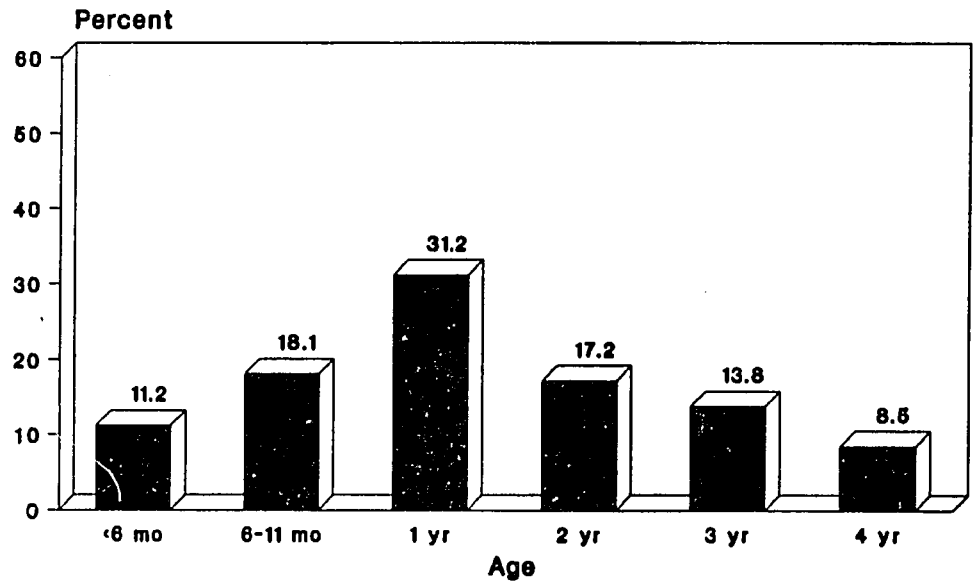
n = 469 children

6 FEVER

6.1 Incidence in the Past 2 Weeks

A total of 507 children (31.5%) under five years of age had an episode of fever in the two weeks prior to the survey (Table 6.1). An annual fever incidence rate of 6.6 episodes of fever per child per year was calculated, with an adjustment for seasonal variation in fever incidence. This translates to 181,533 fever-related illnesses each year among children in the Local Government (Table 6.2).

Figure 6.1
Age-specific 2-week Fever Incidence
Chilidren under 5 years



n = 507 children (31.5%) with fever during 2 wks prior to survey

6.2 Characteristics of Children with Fever

Nearly one-third of all fever episodes (29.3%) occurred among children under one year of age. Another one third (31.2%) occurred among children two years of age, 17.2% among three year olds, and 13.8% among four year olds (Fig. 6.1). The incidence of fever was similar for males and females.

The majority of fever episodes (68.6%) were of short duration, lasting less than three days (Table 6.1). Fever lasted 4-6 days in 20.7% of children and 1-2 weeks in the remaining 10% of children. Fifty two children (10.3%) had fever at the time of the survey.

Table 6.1 Characteristics of children with fever

Characteristics of 507 children who had fever during the two weeks prior to the survey, Barkin-Ladi, May 1992

Characteristic	Percentage of children
Fever in past two weeks	31.5 (27.1, 36.0)
Age (months)	
<6	11.2
6 - 11	18.1
12 - 23	31.2
24 - 35	17.2
36 - 47	13.8
48 - 59	8.5
Sex	
Male	49.0
Female	51.0
Duration*	
1 - 3 days	68.6
4 - 6 days	20.7
1 - 2 weeks	10.7
Symptoms	
Cough	59.6
Restlessness	38.1
Vomiting	37.5
Diarrhoea	36.3
Shivering	35.7
Skin rash	16.4
Convulsions	3.9
"Severe" fever	46.8 (42.4, 51.1)

* Excludes 52 children who had fever at the time of the survey

Table 6.2 Fever-related morbidity

Estimated annual number of cases of fever-related illness among children under five years of age, Barkin Ladi, May 1992

Population <5 years (a)	27,505
Annual fever morbidity rate (b) (Episodes per child)	6.6
Total fever illnesses per year	181,533

(a) Barkin Ladi 1991 population = 152,808
(b) Adjusted for seasonality

Symptoms associated with fever included cough (59.6%), restlessness (38.1%), vomiting (37.5%), and shivering (35.7%). About one third (36.3%) of children with fever had coincident diarrhoea. Nearly half of all fever episodes (46.8%) were perceived as "severe" by the mother.

6.3 Home Treatment Practices

More than half of all children (54.2%) were given some form of medicine at home as treatment for their fever (Table 6.3, Fig. 6.2). "Gave medicine" was the response most frequently volunteered by mothers when asked what they did first for the child (52.3%). One in four children (27.0%) were given chloroquine, the only type of antimalarial medicine given by mothers in this survey. Paracetamol was given to 27.8% of children. Very few children were given an antibiotic or other drug at home. Nine percent (9.3%) of children were given herbs and 6.2% given an enema.

Nearly one third of children with fever (39.4%) were given a sponge bath and/or increased fluids (34.7%). Forty percent of children with fever were not treated at home (i.e., did not receive medicine, herbs, bath, or fluids).

6.4 Home Treatment with Antimalarials

Of 133 children with fever who received an antimalarial at home, 53.4% received the antimalarial on the first day of the fever episode (Table 6.4). Thirty-seven percent (37.6%) were given an antimalarial drug on day 2, while 6.8% began treatment on day three. About thirty percent (32.3%) of children received chloroquine over a three day period, and 13.0% of children took chloroquine for four or more days. Among all 507 children with fever, 6.7% received chloroquine for three days.

Chemist shops served as a major source (33.1%) of antimalarial drugs used for home treatment in Barkin-Ladi. Eight percent (8.3%) of antimalarials were obtained from street or market vendors, and 6.8% from a clinic or hospital. Information was not obtained on the source of drugs which mothers reported as having already "had at home."

6.5 Referral Practices and Facility Treatment

More than half of children with fever (54.6%) were taken for treatment outside the home (Table 6.5). Among these children, 84.4% were taken to a health facility (68.0% to a government health facility and 26.4% to a private facility). Eight percent were taken to a chemist, and 3.3% to a village health worker.

Table 6.3 Home treatment practices for fever

Treatment practices among mothers who reported providing home treatment for their children under five years of age with fever, Barkin Ladi, May 1992

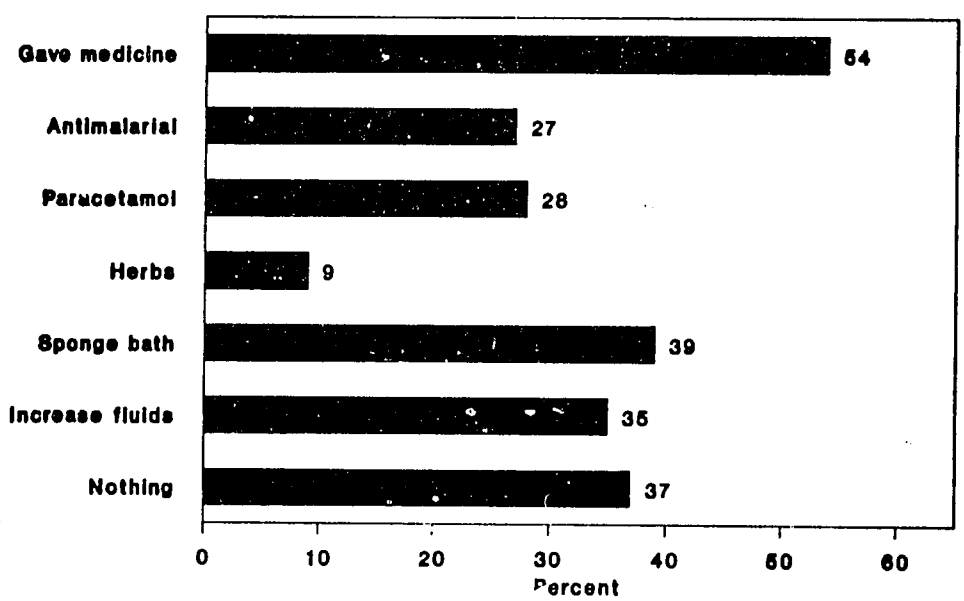
Treatment/Practice	Mothers' response: Voluntary*	Prompted	Total	
Gave medicine	52.3	2.0	54.2	(48.0, 60.5)
Antimalarial			27.0	(22.3, 31.7)
Paracetamol			27.8	(22.1, 33.5)
Antibiotic			0.4	
Other			8.9	
Gave herbs	3.9	5.3	9.3	(5.6, 12.9)
Sponge bath	13.6	26.3	39.4	(34.3, 44.6)
Increased fluids	9.4	25.2	34.7	(28.0, 41.4)
Did nothing	37.1	--	36.9	(31.2, 42.6)

n = 507 children with fever

* Mothers' first response, before being prompted

** Nothing = No medicine, herbs, bath, or fluids

Figure 6.2
Home Treatment Practices
Children with Fever



n = 507

Table 6.4 Home treatment with antimalarials

Administration of antimalarial medicine (chloroquine) at home by mothers of children with fever, and source of antimalarial, Barkin Ladi, May 1992

Practice	Percentage of children
Gave antimalarial*	27.0 (22.3, 31.7)
Day antimalarial first given	
Day 1	53.4
Day 2	37.6
Day 3	6.8
Day 4+	2.2
Number of days antimalarial was given	
1 day	17.3
2 days	31.6
3 days	32.3
4 days	6.0
5 - 7 days	7.5
Gave antimalarial and took for three days*	6.7
Source of antimalarial	
Had it at home	37.6
Chemist	33.1
Street vendor	8.3
Clinic/hospital	6.8
Friend	2.3
Other	12.0

n = 133 children with fever who received an antimalarial at home
* n = 507 children with fever
All antimalarial medicine given at home was chloroquine

Among all 507 children with fever, nearly half (46.0%) were taken to a health facility. One in four children (20.2%) were taken on the first day of the fever episode. The majority of children (42.9%) were taken on day two, with 20.6% taken on day three, and 16.3% taken on the fourth day or after.

Table 6.5 Fever referral practices and treatment at health facilities

Referral practices and treatment at health facilities, as reported by mothers who sought treatment for their children with fever, Barkin Ladi, May 1992

Practice	Percentage of children
Took child for treatment	54.6 (48.7, 60.6)
Place child taken*	
Govt hospital	4.0
Govt health center/dispensary	54.0
Private hospital/clinic	26.4
Chemist	8.0
Village health worker	3.3
Other	4.3
Took child to a health facility	46.0 (41.1, 50.8)
Day taken to health facility**	
Day 1	20.2
Day 2	42.9
Day 3	20.6
Day 4+	16.3
Treatment at health facility**	
Antimalarial	
Either tablet or syrup	83.7 (78.0, 89.4)
Tablet	36.4
Syrup	59.8
Injection	32.2 (23.8, 40.6)
Paracetamol	35.2
Antibiotic	2.1
Don't Know	23.2
Admitted to health facility**	9.9 (5.3, 14.5)

n = 507 children with fever

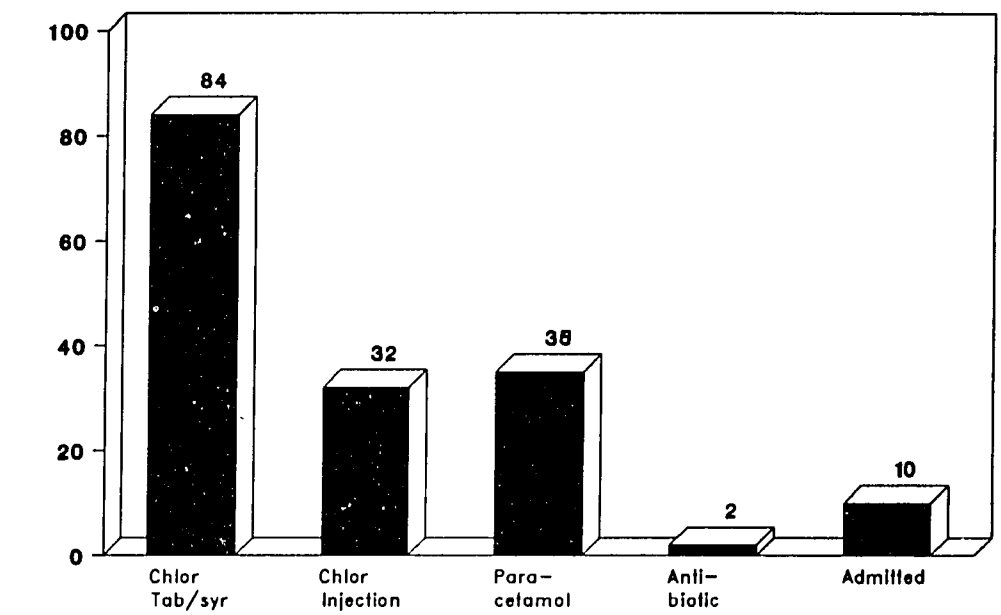
* n = 276 children taken anywhere for treatment

** n = 233 children taken to a health facility

At the health facility, 83.7% of children were given either chloroquine tablets or syrup; 32.2% received an antimalarial injection (Fig. 6.3). Thirty five percent (35.2%) of children were given paracetamol, 2.1% an antibiotic, and 23.2% a drug not known by the mother.

Of 233 children with fever taken to a health facility for treatment, 23 (9.9%) were admitted.

Figure 6.3
Facility treatment Practices
Children with Fever



n = 233

6.6 Severity of Fever

Table 6.6 summarizes reasons mothers perceived their child's fever episode as "severe." The most common reasons mentioned by mothers included the child being hot (74.7%), not eating well (25.7%), shaking (24.5%), and the child's fever lasting a long time (23.2%). Diarrhoea coincident with the fever episode was linked to severity by 18.1% of mothers.

A significantly greater percentage of children with severe fever were under two years of age (61.1%) compared with children who had non-severe fever (52.4%) (Table 6.7, Fig. 6.4). Home treatment with medicine, herbs and increased fluids was generally similar for children with severe and non-severe fever. Sponge baths were given significantly more often (46.8%) to children with severe fever.

Children with severe fever were referred for treatment outside the home significantly more often than children with non-severe fever (70.5% vs 40.7%, $p<.001$). Moreover, children whose fever was perceived as severe were taken more quickly, within 48 hours of fever onset.

Table 6.6 Reasons for perceived severity of fever

Reasons mothers of children with fever perceive the fever as "severe," Barkin Ladi, May 1992

Reason	Percentage of children
Child was hot	74.7
Not eating	25.7
Shaking	24.5
Fever lasted long	23.2
Diarrhoea	18.1
Convulsions	5.1
Other	20.7

n = 237 children with "severe" fever

Figure 6.4
Fever Home Treatment Practices and Referral Practices, by Severity

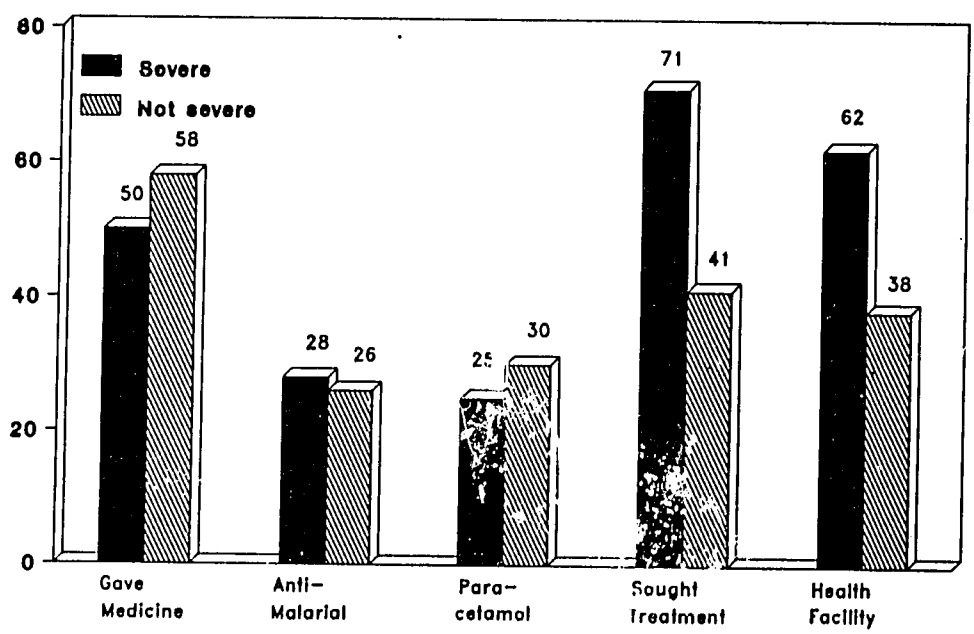


Table 6.7 Fever treatment practices, by severity

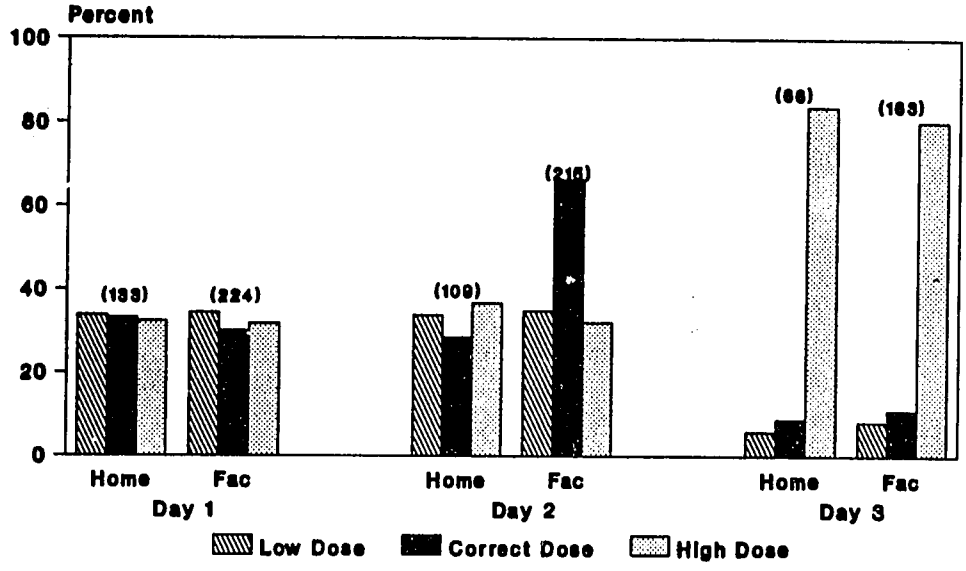
Home treatment and referral practices among mothers of children with fever, by perceived severity of the fever episode, Barkin Ladi, May 1992

Characteristic/Practice	Mothers' perception: Severe (n = 237)	Mothers' perception: Not severe (n = 270)
Age <2 years	61.1 *	52.4
Gave home treatment		
Any medicine	50.2	58.2
Antimalarial	28.3	25.6
Paracetamol	25.3	30.4
Antibiotic	0.4	0.4
Gave herbs	7.6	10.8
Sponge bath	46.8 **	32.8
Increased fluids	36.7	33.2
Did nothing (a)	40.1	33.6
Sought treatment outside of home	70.5 ***	40.7
Took to health facility		
At any time	62.0 ***	38.0
Within 48 hours	43.5 **	30.4
Admitted to health facility	12.9 *	4.7
Took to traditional healer	0.8	0.4

* $p < .05$
** $p < .01$
*** $p < .001$
(a) Nothing = no medicine, herbs, bath, or fluids

The admission rate at health facilities was significantly higher among children with severe fever than among those with fever perceived by the mother as non-severe (12.9% vs 4.7%, respectively).

Figure 6.5
Chloroquine Doses Administered, by Day
Home vs Facility



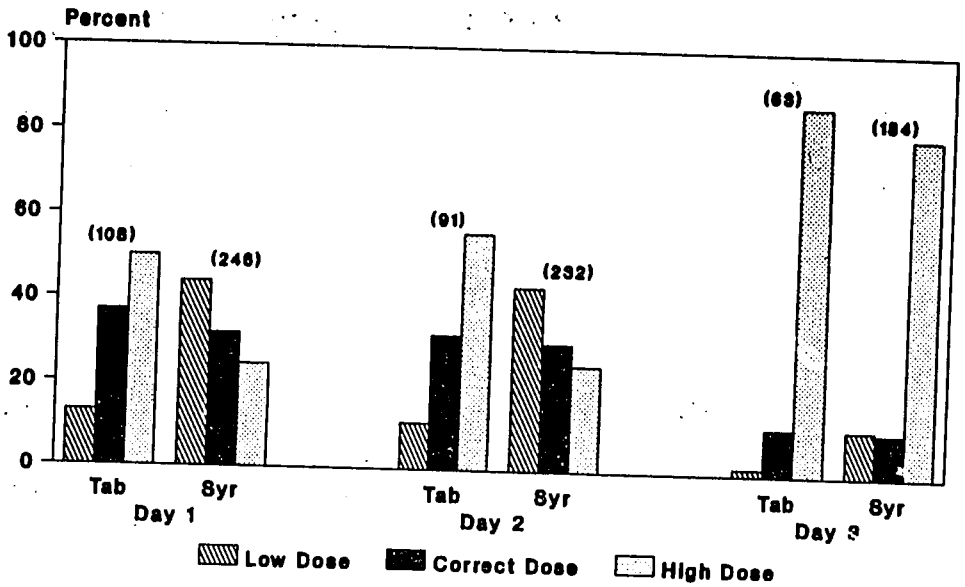
n = 507 children with fever
Chloroquine = tabs or syrup

6.7 Chloroquine Dosage

Following national chloroquine dosage guidelines for children in different age groups, the dose of chloroquine administered to children with fever each day was calculated. These doses were classified as "low," "correct," or "high" relative to recommended dosages for children in that age group.

Fig. 6.5 shows the dose of chloroquine (low, correct, or high) administered each day to children with fever. About 35% of children who were given chloroquine *at home* (before going to a health facility) received a correct dose on days one and two, with fewer than 10% of children receiving a correct dose on day three. Over 80% of children received a high dose of chloroquine on day three. A similar pattern occurs among children given chloroquine prescribed *at a health facility*.

Figure 6.6
Chloroquine Doses Administered, by Day
Tablets vs Syrup



n = 507 children with fever
Home and facility combined

High chloroquine dosing on day three occurs with both tablets and syrup (Fig. 6.6). On days one and two, high dosing is more common with chloroquine tablets and low dosing with chloroquine syrup.

Fig. 6.7 shows chloroquine doses administered to children in different age groups. Among children under age 1 year, high dosing is a problem on all three days (regardless of whether the chloroquine was given at home or prescribed at a health facility). High dosing is a particular problem on day three for children aged 1-3 years. Among older children aged 4 years, low dosing occurred on days one and two. On day three, high dosing was a problem for children who received chloroquine at home.

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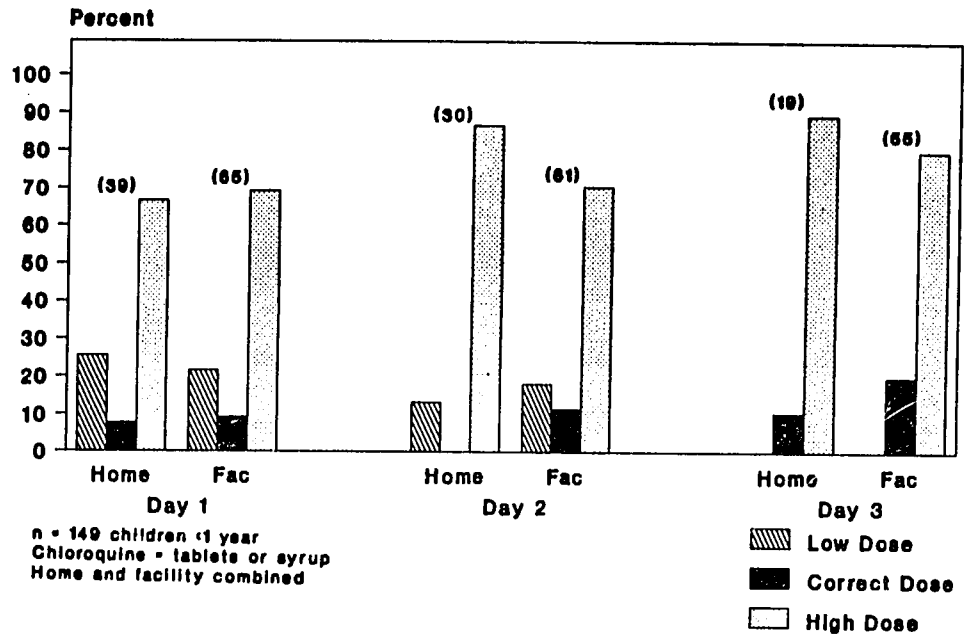
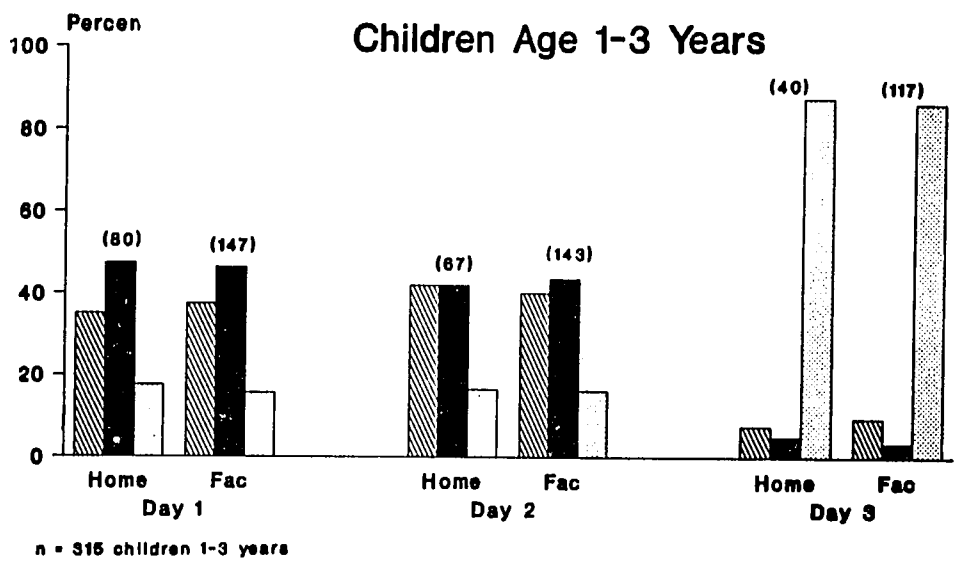
Figure 6.7
Chloroquine Doses Administered, by Day
Children Age <1 Year





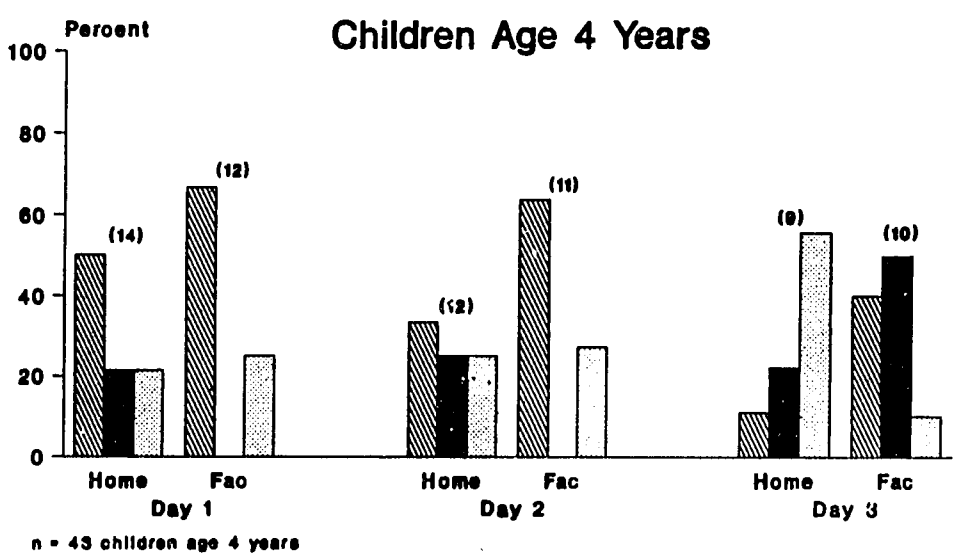


Table 6.8 Mothers' knowledge about malaria

Causes of malaria and ways to prevent malaria, as reported by mothers of children with fever, Barkin-Ladi, May 1992

Knowledge Item	Percentage of children
Causes of malaria	
Mosquitos	33.0
Water	2.0
Sun	0.2
Other	9.3
Don't know	59.4
Prevention of malaria	
Use insecticide spray	27.4
Use mosquito net	17.4
Remove standing water	11.4
Wear protective clothing	6.5
Screen windows	4.1
Stay indoors at night	3.0
Use mosquito coil	3.0
Don't know	42.7

n = 507 children

6.8 Mother's Knowledge

As shown in Table 6.8, nearly sixty percent of mothers (54.9%) did not know the cause of malaria. One third of all mothers reported that mosquitoes cause malaria. A small number of mothers associated water, the sun, or overwork with malaria.

The three most common ways of preventing malaria reported by mothers were: insecticide spray (27.4%), use of mosquito nets (17.4%), and removal of standing water (11.4%). Other preventive strategies mentioned by mothers included wearing protective clothing, screening windows, staying indoors at night, and using mosquito coils. Over forty percent (42.7%) of mothers were not aware of any way to prevent malaria.

7 MATERNAL HEALTH

7.1 Antenatal Care Practices

Antenatal care practices of 464 women who gave birth in the twelve months prior to the survey are summarized in Table 7.1. While all women claimed to have possessed an antenatal card in the past, only half (46.6%) still possessed their card at the time of interview. Among women who no longer have their card, 55.1% reported losing the card, 26.6% had their card withdrawn and kept by the hospital were delivery occurred, and 15.6% reported that it was kept with the husband.

Table 7.1 Antenatal care practices

Antenatal care practices among 464 women who gave birth in the 12 months prior to the survey, Barkin Ladi, May 1992

Practice	Percentage of women
Antenatal card	
Ever had	100.0
Still possess	46.6 (42.4, 50.7)
No. of antenatal visits	
1-3	17.7
4-6	45.5
7-9	26.4
>9	10.4
Source of antenatal care	
Health center/dispensary	74.6
Private hospital	22.8
Other	2.6
Place of delivery	
Home	32.1
Hospital	64.2
Malaria prophylaxis taken	89.0

n = 464 women

Almost all women (97.4%) who delivered in the twelve months prior to the survey received antenatal care at a health facility. Three quarters of the women (74.6%) received care at a government health center or dispensary and 22.8% received care at a private hospital. Several women (2.8%) reported receiving care through a traditional birth attendant, herbalist or traditional healer.

Nearly twenty percent (17.7%) of women had only 1-3 antenatal visits during their entire pregnancy. Almost half of the women (45.5%) had 4-6 antenatal visits, 26.4% had 7-9 antenatal visits, and 10.4% had more than nine antenatal visits. The total number of antenatal care visits per women ranged from one to eighteen.

Two thirds of women (64.2%) delivered at a health facility and about one third (32.1%) delivered at home. Malaria chemoprophylaxis was taken at some time during pregnancy by 89.0% of women.

7.2 Tetanus Toxoid Coverage

Table 7.2 shows tetanus toxoid (TT) coverage, by card and history, for 464 women in Barkin-Ladi who delivered in the twelve months prior to the survey. Card documented coverage is low for all doses of TT. Only several women received the third to fifth doses of TT, reflecting the relatively recent revision of the TT immunization schedule to include five doses. When history of TT immunization is considered for those women without cards, TT1 coverage increases to 87.0% and TT2 coverage to 72.6%.

When corrected for the valid 28-day dose interval between TT1 and TT2, card documented coverage for TT2 was only 14.8%. All third, fourth, and fifth doses of tetanus toxoid were found to be invalidly given.

7.1 Mothers' Knowledge and Practices, by Level of Education

In Barkin-Ladi, certain antenatal care and home treatment practices were influenced by mothers' level of education (Table 7.3). Compared with mothers who had no formal education, mothers with secondary/post-secondary school training were significantly more likely to deliver at a health facility (100.0% vs 46.8%, $p<.001$) and to have an antenatal card (100.0% vs 36.6%, $p<.001$). Regardless of educational background, almost all mothers breastfeed their child for some time after birth and about half bottlefeed.

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Table 7.2 Tetanus toxoid coverage

Tetanus toxoid coverage, by card and history, among 464 women who gave birth in the 12 months prior to the survey, Barkin Ladi, May 1992

Dose Received	Card	History	Card + History
TT 1	26.6	60.4	87.0
TT 2	19.5	53.0	72.6
TT 3	1.4	5.9	7.5
TT 4	0.4	6.1	0.8
TT 5	0.0	0.0	0.0
Corrected TT 2	14.8		

n = 464 women
Corrected TT2 = 28 days between TT1 and TT2, TT2 at least 2 weeks before delivery

Among mothers of children with fever, those with secondary/post-secondary school were more likely to give an antimalarial and to take the child to a health facility than those with no education or primary school education only. Use of sugar-salt-solution (SSS) and ability to prepare SSS correctly did not differ by level of education, nor did facility referral patterns for children with diarrhoea.

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Table 7.3 Mothers' knowledge and practices, by level of education

Mothers' knowledge and practices in caring for their children under five years of age, including referral and treatment practices for children with diarrhoea and fever, by level of education, Barkin Ladi, May 1992

	Mothers' education		
Characteristic/Practice	None (n = 619)	Primary (n = 451)	Secondary/ post secondary (n = 89)
Child has immunization card	66.5	68.1	70.9
Child ever breastfed	99.4	99.9	98.2
Child ever bottlefed	51.1	46.1	54.5
Delivered at health facility (a)	46.8	72.4	100.0 *
Has antenatal card (a)	36.6	53.5	100.0 *
Among mothers of children with diarrhoea (b)			
Gave SSS	39.0	31.6	40.0
Prepared SSS correctly (c)	56.3	48.7	56.3
Took to health facility	33.5	38.5	39.5
Among mothers of children with fever (d)			
Gave antimalarial	25.1	26.6	38.9
Took to health facility	37.3	57.9	68.8
Know mosquito causes malaria	30.7	35.2	33.3

(a) Women who delivered in past 12 months (n = 186, 243, 35)
(b) Mothers of children with diarrhoea (n = 182, 247, 40)
(c) Mothers who gave SSS (n = 71, 78, 16)
(d) Mothers of children with fever (n = 215, 256, 36)
* $p < .001$

DISCUSSION

This survey assesses mothers' knowledge and practices related to four components of primary health care (immunization, nutrition, diarrhoea, and fever/malaria) in Barkin-Ladi Local Government. Community survey data, combined with information from facility assessments and drug quality studies, provides a useful planning tool for the Primary Health Care team to establish LGA health priorities and develop short and long term objectives for improving the quality of health service delivery. Appropriate intervention strategies such as community health education, immunization outreach, and commodity management could be developed to address LGA priorities.

A simple monitoring plan to periodically review on-going program activities would serve as a framework for measuring progress towards achieving program objectives over time. A follow-up community survey to measure changes in mothers' knowledge and practices after a period of intensive program implementation might be considered. The sample size in this survey was large enough to allow for valid statistical comparisons in any follow-up survey. The low design effect measured suggests that a smaller sample size might be used, reducing logistics requirements and survey costs.

Immunization: It is clear from childhood immunization coverage rates determined in this survey that EPI program efforts in Barkin-Ladi have had a positive impact over the past five years. Card doumented coverage has improved most noticeably, reflecting increased availability of immunization cards among younger children. The close correlation between BCG coverage by card and history and the BCG scar rate suggests that mothers' historical reports of child immunizations are reasonably accurate. Polio 0 coverage, though still low, has increased over the past year, reflecting LGA attempts to incorporate the new national policy which includes polio immunization at birth. Eventually, polio 0 coverage should be similar to BCG coverage.

Despite recent improvements, immunization coverage in Barkin-Ladi remains low for some antigens (especially measles) and drop out rates between multiple dose antigens (DPT and Polio) are high. Only one in five children 12-23 months old were fully immunized before their first birthday. While the majority of women in Barkin-Ladi who had delivered in the past year were immunized with the first and second doses of tetanus toxoid, coverage for doses three to five is low, reflecting the recent adoption of a five-dose TT schedule in Nigeria.

Problems with immunization cards (both child and adult health or TT cards) persist. During the survey, mothers without cards for their children reported either losing the card or that it was with the husband, who was away at work or on the farm. Other problems were not the fault of the mother. Health workers sometimes failed to record the child's date of birth on the card, and some immunizations noted as "given" had no date recorded.

Assuming access to immunization services is approximately equal to crude DPT1 coverage, then mothers of over 90% of children in Barkin-Ladi have access to immunization services. Low

rates of corrected coverage may result from high dropout rates in some areas and missed opportunities for immunization at health facilities.

Previous studies examining the problem of high immunization dropout rates cite reasons such as mothers lack of awareness about EPI or about the need for additional doses, lack of faith in EPI, fear of side effects, and not knowing the place and time for immunization. Other reasons include mother being too busy, family problems, or the child being sick. At the facility level, lack of availability of vaccines poses a problem. Some mothers wrongly associate tetanus toxoid vaccine with a form of family planning. Most of the reasons cited here relate to lack of information or motivation on the part of mothers.

Facility-level integration of PHC services and provision of daily immunization will help to reduce the problem of missed opportunities for immunizing both women and children. Continued involvement and education of mothers and all community members on EPI/PHC issues will reduce immunization drop out rates. Incorporation of EPI updates into routine continuing education sessions for all cadres of health workers (facility and village-based) would address technical and policy issues, with regular on-the-job training and supervision of district and facility health workers reinforcing these efforts.

Education and supervision efforts will be in vain unless vaccine availability can be assured. Government officials and Health Department staff in Barkin-Ladi have demonstrated committment in attempting to ensure a regular supply of vaccines, essential drugs and other supplies to health facilities. The Revolving Drug Fund established in Barkin-Ladi has contributed significantly to improved drug availability throughout the LGA. As the Local Government accepts greater responsibility for Primary Health Care, increased emphasis will need to be placed on commodity management, including vaccine and ORS availability.

Diarrhoea/Fever morbidity: Based on the incidence of diarrhoea and fever reported in this survey, it is estimated that the average child under five years of age in Barkin-Ladi will experience 5.5 episodes of diarrhoea per year and 6.6 episodes of fever. This translates into over 150,000 episodes of diarrhoea (including 1,700 diarrhoea related deaths) and 180,000 episodes of fever in Barkin-Ladi each year. Clearly, both diarrhoea and fever (which often occur at the same time) remain major causes of childhood morbidity and mortality in the Local Government. The enormity of the burden of childhood diarrhoea and fever-related illness in Barkin-Ladi, with a total population of less than 200,000, emphasizes the need for continued efforts to reduce morbidity.

The urgency of the problem is further compounded by the increasing prevalence of malnutrition throughout Nigeria, especially in the north. In populations where young children are marginally nourished, frequent episodes of diarrhoea and other infections can have a serious impact on nutritional status and growth. In Barkin-Ladi, about one in five children were considered to be undernourished. While undernourished children had more episodes of diarrhoea and fever, their generally younger age (most undernourished children were under two years of age) may partially explain this finding. Further research is required to more accurately define the nature and extent

of undernutrition in the Local Government.

Home Treatment: As a result of community education efforts in Barkin-Ladi, the majority of mothers now continue giving home fluids to their children with diarrhoea. Almost all mothers continue breastfeeding and the majority continue solid or semi-solid food. Where food is stopped, anecdotal reports suggest the reason oftentimes relates to the child's poor appetite or anorexia during illness. To address this issue, nutritious alternatives to the traditional dilute pap or "kunu" served as food might be considered for children, regardless of health status. Such a home-prepared fortified liquid, "Eko Ilera," has been promoted in Ilorin since 1989.

Despite the emphasis placed on sugar-salt-solution as an appropriate home fluid, only one in three children with diarrhoea were given SSS at home by their mothers. Half of these mothers prepared the SSS correctly. Among mothers who were not able to prepared SSS correctly, the most common mistakes included use of too little water and too much salt and/or sugar. Overuse of sugar or salt sometimes occurred because the mother used a 5-ml teaspoon instead of the recommended 3-ml teaspoon. Previous studies have shown that there are over twelve types of teaspoons in Nigerian homes and that these vary in volume from 1.8 to 5 ml. Use of too much water in the SSS resulted from lack of knowledge or from using the wrong size bottle. High amounts of salt or sugar relative to water may result in an overly concentrated solution that is potentially dangerous for the child.

The success of oral rehydration therapy depends on several factors, including the adequacy of the volume ingested in relation to fluid losses in stool and vomitus. Generally, it is recommended that about 100-200 ml (1/2 to 1 cup) of SSS be administered after each loose stool. In this survey, the majority of children who were given SSS did not receive an adequate quantity. Health education on SSS should emphasize both correct preparation (encouraging mothers to taste the SSS for saltiness before giving to the child) and the importance of giving an adequate quantity to the child.

Among children with fever, over half were given some type of medicine at home. One in four children were given an antimalarial (chloroquine). Very few children (about one in ten) received an antimalarial for three days. Less than half of the mothers attempted to reduce fever by gibing a sponge bath or antipyretic, such as paracetamol.

A substantial number of mothers continue to give inappropriate drugs (such as antibiotics and kaolin) to their children with diarrhoea and/or fever. While home treatment with some drugs (such as antimalarials) may have potential advantages, the problems associated with extensive and inappropriate drug use are overwhelming. These problems range from adverse reactions, spread of resistance, unnecessary cost, and diversion of attention from appropriate treatment. Actions to limit the widespread, inappropriate use of drugs should be a high priority for health policy makers and medical professionals in Barkin-Ladi Local Government and throughout Nigeria.

Since all sick children are not taken to a health facility, correct home treatment of fever episodes

with chloroquine would increase the proportion of children with fever who receive an antimalarial and enhance promptness of treatment. Chloroquine dosage information presented in this report suggest that administration of chloroquine by mothers (whether given at home before going to a health facility or received, under health worker instructions, at a health facility) is generally associated with under-dosing for syrup and over-dosing for tablets. For both tablets and syrup, it appears mothers do not halve the chloroquine dose on the third day of treatment, as indicated in national malaria treatment guidelines.

Chloroquine dosage information in this study must be interpreted with caution, since dose calculations were based on a number of assumptions that may or may not be true (i.e., that all chloroquine syrup contained 50 mg chloroquine/5 ml and was administered using a 5-ml teaspoon, that all chloroquine tablets contained 150 mg chloroquine base, and that all chloroquine given was potent and of good quality). Moreover, the clinical implication of incorrect dosing is not clear. Detailed studies are needed to further define the extent and impact of chloroquine under- and overdosing.

Facility treatment: In this survey, about one third of children with diarrhoea and half of the children with fever were taken to a health facility for treatment. Oral rehydration (either ORS or SSS) was received by less than half of the children with diarrhoea. Clearly, health workers must recognize the importance of providing oral rehydration for *all* children with diarrhoea.

For fever, chloroquine (either tablets or syrup) was received by four out of five children taken to a health facility. Case management practices by health workers documented in the Barkin-Ladi Facility Assessment Survey (Nov, 1991) support this finding. While national malaria policy specifies that all children presenting with fever should be given chloroquine, it is possible that children with non-malaria associated fever were treated for another problem, such as acute respiratory infection. More detailed diagnostic criteria and case management guidelines are needed for sick children (especially those with fever) seeking teatment at different levels of health facilities.

Excessive use of injections at health facilities in Barkin-Ladi, particularly among those children with fever, should be discouraged. Inappropriate use of injections is a potentially dangerous practice, increasing the risk of abscesses and potential transmission of hepatitis B and HIV viruses.

Improved case management of sick children with diarrhoea and/or fever will require re-orientation of all cadres of health workers, both government and private sector, about national malaria treatment guidelines and ORS administration. Patent medicine vendors and chemists are an important source of drugs for mothers in Barkin-Ladi and should also receive training.

Health education and community involvement: This survey demonstrates the importance of using a classification of diarrhoea and fever episodes that is based upon what the people themselves perceive. For example, mothers understand the urgency of giving SSS to children with "severe" diarrhoea. Sponge baths are given more often when the child's fever is perceived

as "severe." Sick children are taken to health facilities more often when their diarrhoea or fever illness is perceived as "severe." Response to illness and compliance with prescribed treatment are influenced by many factors including cultural attitudes and practices, socioeconomic status, and level of education or literacy. Mothers' concepts of illness, their ability to recognize signs of illness and give appropriate home treatment, their time available for child care --- all are factors that must be understood to define relevant educational messages and communicate these messages effectively.

Fewer than half of the mothers in Barkin-Ladi understood the reason for their child's diarrhoea or fever/malaria. Only half knew any way to prevent malaria. Education efforts must enable mothers understand the causes of disease in the community, especially among children. Simple, feasible preventive interventions have been identified that could have a significant effect on morbidity and mortality. These include improved nutrition (exclusive breastfeeding and proper weaning), use of safe water, good personal and domestic hygiene (handwashing, use of latrines, disposal of infant stools), and measles immunization.

Building on the solid Primary Health Care infrastructure which exists in Barkin-Ladi, communities must be encouraged to take ownership of their health problems, understand why they occur, and experience the impact of positive behavior change in reducing childhood morbidity and mortality.

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Appendix A

List of Clusters

Estimated Population of Villages and Wards, Barkin Ladi LGA

District	Village	Pop.	Cum. Pop.	% of Total	Cum. %	Cluster No.
GASHISH	Kakuruk	7,025	7,025	2.557	2.557	1
	Gaching	6,361	13,386	2.315	4.872	2
	Ruku	5,320	18,706	1.936	6.808	3
	Nghar	4,150	22,856	1.510	8.318	4
	Nigwon	3,027	25,883	1.102	9.420	
FAN	Fan	6,353	32,236	2.312	11.732	5
	Rafan	5,261	37,497	1.915	13.647	6
	Nwok	4,232	41,729	1.540	15.187	
	Tafan	5,936	47,665	2.160	17.347	7
	Rite	3,840	51,505	1.398	18.745	8
	Rafan Raku	3,534	55,039	1.286	20.031	
	Nging Rankassa	1,935	56,974	0.704	20.735	9
	Nding Dafyong	1,558	58,532	0.567	21.302	
	Nding Gura	1,478	60,010	0.538	21.840	
BACHI	Bachi	5,425	65,435	1.974	23.815	10
	Sopp	4,773	70,208	1.737	25.552	11
	Shonong	2,960	73,168	1.077	26.629	
	Fang	3,497	76,665	1.273	27.902	
	Bangai	1,836	78,501	0.668	28.570	12
	Luwa	2,300	80,801	0.837	29.407	
HEIPANG	Heipang	3,156	83,957	1.149	30.556	13
	Tapo	1,423	85,380	0.518	31.074	
	Tatu	2,293	87,673	0.835	31.908	
	Chit	2,590	90,263	0.943	32.851	
	Kpang	1,408	91,671	0.512	33.363	14
	Pwomol	2,441	94,112	0.888	34.252	
ROPP	Lobiring	9,247	103,359	3.365	37.617	15
	Sho	7,510	110,869	2.733	40.350	16
	Gassa	10,221	121,090	3.720	44.070	17, 18
	Gafat	5,676	126,766	2.066	46.136	19
	Kwok	13,361	140,127	4.863	50.999	20, 21
	Marit	7,216	147,343	2.626	53.625	22
	Mazat	6,795	154,138	2.473	56.098	23
RIYOM	Riyom	9,352	163,490	3.404	59.502	24
	Rahoss	8,337	171,827	3.034	62.536	25
	Kwogo	2,690	174,517	0.979	63.515	26
	Tahoss	7,569	182,086	2.755	66.269	27
	Rim	5,858	187,944	2.132	68.401	28
	Jol	5,320	193,264	1.936	70.338	
	Wereng	2,558	195,822	0.931	71.269	29
	Kwi	2,766	198,588	1.007	72.275	

District	Village	Pop.	Cum. Pop.	% of Total	Cum. %	Cluster No.
FORON	Zabot	7,785	206,373	2.833	75.109	30
	Kapwis	6,710	213,083	2.442	77.551	31
	Kapwen	3,738	216,821	1.360	78.911	32
	Nafok	3,611	220,432	1.314	80.225	
	Ron	5,372	225,804	1.955	82.180	33
	Rung	2,751	228,555	1.001	83.182	34
	Ket	2,110	230,665	0.768	83.950	
	Kamang	4,501	235,166	1.638	85.588	35
	Niwo	3,750	238,916	1.365	86.953	
	Rarung	2,464	241,380	0.897	87.849	
	Fo	2,250	243,630	0.819	88.668	36
GANAWURI	Dantse	9,721	253,351	3.538	92.206	37
	Kwakwi	7,390	260,741	2.690	94.896	38
	Gura	7,230	267,971	2.631	97.527	39
	Danto	6,795	274,766	2.473	100.000	40

Total Population = 274,766
Sampling Interval = 6,869
Random Number = 1,467

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Appendix B

SURVEY QUESTIONNAIRE

Barkin Ladi Community Survey

Part I - Mother/Household Information

Cluster No: _____	Mother No: _____

Interviewer: _____ Supervisor: _____

Town/Village: _____

Date of interview _____ / _____ / _____
Day Month Year

Find a comfortable place to interview the woman.

1. We are trying to find ways to improve the health of mothers and children in Barkin Ladi. To do that, we need to know about you and all children born to you in the past 5 years. Please tell me their names, starting with your youngest child.

NO.	CHILD'S NAME	SEX M/F
1		M F
2		M F
3		M F
4		M F
5		M F

Please get the vaccination cards and any documents with birth dates for all your children younger than five years of age.

Barkin Ladi Community Survey

Part II - Immunization

Cluster No: _____	Mother No: _____	Child No: _____

Fill out a form for each child named in Part I

****** Name of child** _____ ********

---

1. **Copy date of birth from card or birth certificate.**

   _____ / _____ / _____
   Day Month Year

   If no card ask mother:

2. What was the child's date of birth?

   _____ / _____ / _____
   Day Month Year

Ask ALL mothers:

3. What is the age of the child now?

   ___ less than 6 months
   ___ 6-11 months
   ___ 1 year
   ___ 2 years
   ___ 3 years
   ___ 4 years
   ___ Don't Know

---

4. Has the child ever received any immunizations?

   ___ Yes
   ___ No -> **go to 6**
   ___ Don't know -> **go to 6**

---

5. Where do you take your child to be immunized?

   ___ Outreach/Campaign
   ___ Gov't Hospital
   ___ Gov't Health Center
   ___ Private/Non-Governmental
   ___ Other

---

6. Does the child have an immunization card?

   ___ Yes
   ___ No

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Cluster No: _____	Mother No: _____	Child No: _____

7. **Immunization Record**

Fill in the dates the child received the following immunizations from the card. If no card, ask the mother about each vaccine.

Vaccine	Date from card	Mother's History Yes/No
BCG		
DPT1		
DPT2		
DPT3		
Polio 0 (birth)		
Polio 1		
Polio 2		
Polio 3		
Measles		

	Yes/No
BCG Scar	

8. How did you learn that you should take your child for immunization?

____ Village health worker
____ Radio/Television
____ Poster
____ Told at clinic
____ Another mother/neighbor
____ Mobile van
____ Other, specify: _____
____ Don't know

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Barkin Ladi Community Survey

Part III - Nutrition

Cluster No: _____	Mother No: _____	Child No: _____

Fill out a form for each child

---

1. Have you ever breastfed this child?
   ___ Yes
   ___ No -> **go to 2**

   If yes, for how long did you breastfeed?
   ___ Still breastfeeding
   ___ less than 2 months
   ___ 2-3 months
   ___ 4-5 months
   ___ 6-11 months
   ___ 1-2 years
   ___ 3 years or more

   For how long did you breastfeed ONLY without giving any other food or fluid?
   ___ less than 2 months
   ___ 2-3 months
   ___ 4-5 months
   ___ 6-11 months
   ___ more than 1 year

---

2. Did you ever bottle feed this child?
   ___ Yes
   ___ No -> **go to 3**

   If yes, at what age did you start?
   ___ less than 2 months
   ___ 2-3 months
   ___ 4-5 months
   ___ 6-11 months
   ___ 1-2 years

   At what age did you stop?
   ___ Still bottlefeeding
   ___ less than 2 months
   ___ 2-3 months
   ___ 4-5 months
   ___ 6-11 months
   ___ 1-2 years
   ___ 3 years or more

Cluster No: _____	Mother No: _____	Child No: _____

. What type of weaning foods/liquids did you give the child?

___ Pap
___ Kunu
___ Family meal
___ Other, specify: _____

. At what age did you first give these weanin, foods?

___ less than 2 months
___ 2-3 months
___ 4-5 months
___ 6-11 months
___ 1-2 years

SUPERVISOR:
. **Record the child's arm circumference:** ____ centimeters

. Has this child had diarrhoea in the past 2 weeks?

___ Yes -> **go to Diarrhoea (Part IV)**
___ No -> **go to 7**

7. Has this child had fever in the last 2 weeks?

___ Yes -> **go to Fever (Part V)**

___ No -> **start new form for next child Immunization (Part II)**

If last child go to Tetanus Toxoid (Part VI)

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Barkin Ladi Community Survey

Part IV - Diarrhoea

Cluster No: _____	Mother No: _____	Child No: _____

Fill out one form for each child with diarrhoea in the past 2 weeks

---

1. How many days did the diarrhoea last?

___ Child has diarrhoea now
___ 1-3 days
___ 4-6 days
___ between 1 and 2 weeks
___ Don't Know

---

2. Was there mucous in the stool?

___ Yes
___ No
___ Don't know

---

3. Was there blood in the stool?

___ Yes
___ No
___ Don't know

---

4. Did the child have fever as well as diarrhoea?

___ Yes
___ No
___ Don't know

---

5. Do you think the diarrhoea was severe?

___ Yes
___ No **-> go to 6**
___ Don't know **-> go to 6**

If yes, why do you think it was severe?

Tick ALL answers given by the mother

___ Child had vomiting
___ Child had fever
___ Mucous in stools
___ Blood in stools
___ Diarrhoea lasted long
___ Child looked dried out
___ Child was weak/tired
___ Other, specify: _____
___ Don't Know

---

6. Were you breastfeeding the child when the diarrhoea started?

___ Yes
___ No **-> go to 7**

If yes, did you continue breastfeeding the child during the diarrhoea?

___ Yes
___ No

Cluster No: _____	Mother No: _____	Child No: _____

7. Did the child take any fluids (other than breastmilk) before the diarrhoea started?
   ___ Yes
   ___ No -> go to 8

   If yes, did you continue to give these fluids during the diarrhoea?
   ___ Yes
   ___ No -> go to 8

   Did you give more, less, or the same amount of fluid as before the diarrhoea started?
   ___ More
   ___ Less
   ___ Same
   ___ Don't Know

8. Did the child take any solid food before the diarrhoea started?
   ___ Yes
   ___ No -> go to 9

   If yes, did you continue to give solid food during the diarrhoea?
   ___ Yes
   ___ No -> go to 9

   Did you give more, less, or the same amount of solid food as before the diarrhoea started?
   ___ More
   ___ Less
   ___ Same
   ___ Don't Know

9. What did you give the child at home for the diarrhoea?

	Mother's Response	Prompted Response
* Sugar Salt Solution	_____	_____
Nothing	_____	XXXXXXXX
Antibiotic	_____	_____
Paracetamol	_____	_____
Kaolin	_____	_____
Other drug, specify:_____	_____	_____
Herbs	_____	_____
Enema	_____	_____
Other, specify:_____	_____	_____

If "Sugar Salt Solution" was given -> go to 10

All others -> go to 18

Cluster No: _____	Mother No: _____	Child No: _____

Q 10-17 SUGAR SALT SOLUTION PREPARATION

10. You said that you used a sugar salt solution to treat the child's diarrhoea. How did you learn to prepare it?

___ Village health worker
___ Gov't clinic/hospital
___ Private practitioner
___ Chemist
___ Other mothers/neighbors
___ Television/radio
___ Other, specify: _____

11. How much water did you use to prepare it?

___ Correct*
___ Incorrect

***Correct response: 2 mineral bottles, OR 1 beer bottle, OR 600 mls.**

Interviewer: show mother a tray containing salt, sugar, and 3 spoons.

12. Please show me how much salt you used to prepare it.

___ Correct*
___ Incorrect

***Correct response: 1 level 3 ml. spoonful**

13. Please show me how much sugar you used.

___ Correct*
___ Incorrect

***Correct response: 10 level 3 ml. spoonfuls, OR 5 cubes**

14. On what day of the diarrhoea did you first give this sugar salt solution to the child?

___ Day 1
___ Day 2
___ Day 3
___ Day 4 +
___ Don't know

15. How often did you give it each day?

____ after each episode
____ 2-5 times
____ 6-9 times
____ 10 or more times
____ Don't know

16. How much did you give each time you gave it?

___ 1-9 teaspoons
___ 10-20 teaspoons
___ half a cup
___ about a cup
___ more than a cup
___ Don't Know

17. Do you think the sugar salt solution was effective in treating the diarrhoea?

___ Yes
___ No
___ Don't Know

Cluster No: _____	Mother No: _____	Child No: _____

18. Did you take the child anywhere for treatment?

___ Yes
___ No -> **go to 21**

If Yes, where?

___ Government Hospital *
___ Health Center/Dispensary *
___ Private Hospital/Clinic *
___ Chemist/Pharmacy
___ Village Health Worker
___ Herbalist/Trad Healer
___ Other, specify: _____

*If the child went to a health facility was he admitted?

___ Yes
___ No

19. On which day of the diarrhoea did you take the child for treatment?

___ Day 1
___ Day 2
___ Day 3
___ Day 4 +
___ Don't Know

20. What did the child get there as treatment for the diarrhoea?

Tick ALL answers given by mother
Prompt for ORS/SSS

___ ORS/SSS
___ Tablets
___ Syrup
___ Injection
___ IV fluid
___ Native Medicine
___ Nothing
___ Other, specify: _____
___ Don't Know

21. What do you think may be the reason the child had diarrhoea?

Do not prompt

___ Contaminated water
___ Teething
___ Other, specify: _____
___ Don't know

22. Has this child had fever in the last 2 weeks?

___ Yes -> **go to Fever (Part V)**

___ No -> **start new form for <u>next</u> child Immunization (Part II)**

If <u>last</u> child, go to Tetanus Toxoid (Part VI)

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Barkin Ladi Community Survey

Part V - Fever/Malaria

Cluster No: _____	Mother No: _____	Child No: _____

Fill out a form for each child who had fever in the last 2 weeks

---

1. How many days did the fever last?

___ Child has fever now
___ 1-3 days
___ 4-6 days
___ Between 1 and 2 weeks
___ Don't know

---

2. When the child had fever what other symptoms were present?
Prompt after the mother has answered

	Yes	No	Don't know
a. Shivering	_____	_____	_____
b. Diarrhoea	_____	_____	_____
c. Vomiting	_____	_____	_____
d. Cough	_____	_____	_____
e. Convulsions	_____	_____	_____
f. Skin rash	_____	_____	_____
g. Restlessness	_____	_____	_____

---

3. Do you think the fever was severe?

___ Yes
___ No -> **go to 4**
___ Don't know -> **go to 4**

If yes, why do you think it was severe?

Tick ALL answers given by mother

___ Child was shaking
___ Child had convulsions
___ Child wouldn't eat
___ Fever lasted long time
___ Child had diarrhea
___ Child felt hot
___ Other, specify: _____
___ Don't know

---

4. What did you do for the child at home for the fever before you went to anyone else for help?

	Mother's Response	Prompted Response
* Gave medicine	_____	_____
Gave sponge bath	_____	_____
Increased fluids	_____	_____
Gave herbs	_____	_____
Nothing	_____	XXXXXXXX
Other, specify:	_____	_____

***If "Gave medicine" -> go to 5, All others -> go to 11**

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Cluster No: _____	Mother No: _____	Child No: _____

5. What type of medicine did you give to your child?

Antimalarial:
___ tablet
___ syrup -> **go to 6**

___ Antibiotic
___ Paracetamol
___ Other, specify: _____
___ Don't know

6. What type of malaria medicine did you give your child?

Do not prompt, ask to see drug

___ Chloroquine
___ Fansidar
___ Halfan
___ Other, specify: _____
___ Don't know

7. Where did you get this malaria medicine that you gave your child?

___ Friend or relative
___ Street or Market Vendor
___ Chemist/Pharmacy
___ Clinic/Hospital/Doctor
___ Had it at home
___ Other, specify: _____
___ Don't Know

8. On what day of the fever did you start giving this malaria medicine to the child?

___ Day 1
___ Day 2
___ Day 3
___ Day 4 +
___ Don't know

9. For how many days did you give the malaria medicine?

___ Child still taking malaria medicine
___ 1 day
___ 2 days
___ 3 days
___ 4 days
___ 5-7 days
___ 8-14 days
___ Don't know

Cluster No: _____	Mother No: _____	Child No: _____

10. For each day, ask the number of doses of malaria medicine that were given, and the amount each dose.

	Number of doses	Amount each dose
Day 1	____ 1 ____ 2 ____ 3 ____ >3 ____ None ____ Unknown	___ ¼ tablet ___ ½ tablet ___ 1 tablet ___ None ___ ½ teaspoon ___ 1 teaspoon ___ 1½ teaspoon ___ Unknown
Day 2	____ 1 ____ 2 ____ 3 ____ >3 ____ None ____ Unknown	___ ¼ tablet ___ ½ tablet ___ 1 tablet ___ None ___ ½ teaspoon ___ 1 teaspoon ___ 1½ teaspoon ___ Unknown
Day 3	____ 1 ____ 2 ____ 3 ____ >3 ____ None ____ Unknown	___ ¼ tablet ___ ½ tablet ___ 1 tablet ___ None ___ ½ teaspoon ___ 1 teaspoon ___ 1½ teaspoon ___ Unknown

11. Did you take the child anywhere for treatment?
___ Yes
___ No -> **go to 17**

12. Where did you take your child for treatment?
___ Government Hospital *
___ Health Center/Dispensary *
___ Private Hospital/Clinic *
___ Chemist/Pharmacy
___ Village Health Worker
___ Herbalist/Trad Healer
___ Other, specify: _____

*If the child went to a health facility was he admitted?
___ Yes
___ No

13. On which day of the fever did you take your child for treatment?
___ Day 1
___ Day 2
___ Day 3
___ Day 4 +
___ Don't know

Cluster No: _____	Mother No: _____	Child No: _____

14. What did the child get there as treatment for the fever?

Antimalarial: ___ tablet -> **go to 15**
___ syrup
___ injection

___ Antibiotic
___ Paracetamol
___ Unknown Medicine
___ Other, specify: _____
___ Don't know

15. For how many days did the child take the malaria medicine?

___ Child still taking malaria medicine
___ 1 day
___ 2 days
___ 3 days
___ 4 days
___ 5-7 days
___ 8-14 days
___ Don't know

16. **For each day, ask the number of doses of malaria medicine that were given, and the amount each dose.**

	Number of doses	Amount each dose
Day 1	____ 1 ____ None ____ 2 ____ Unknown ____ 3 ____ >3	___ ¼ tablet ___ ½ teaspoon ___ ½ tablet ___ 1 teaspoon ___ 1 tablet ___ 1½ teaspoon ___ None ___ Unknown
Day 2	____ 1 ____ None ____ 2 ____ Unknown ____ 3 ____ >3	___ ¼ tablet ___ ½ teaspoon ___ ½ tablet ___ 1 teaspoon ___ 1 tablet ___ 1½ teaspoon ___ None ___ Unknown
Day 3	____ 1 ____ None ____ 2 ____ Unknown ____ 3 ____ >3	___ ¼ tablet ___ ½ teaspoon ___ ½ tablet ___ 1 teaspoon ___ 1 tablet ___ 1½ teaspoon ___ None ___ Unknown

Cluster No: _____	Mother No: _____	Child No: _____

17. Do you know what causes malaria?

___ Sun
___ Overwork
___ Mosquitoes
___ Standing water
___ Other, specify: _____
___ Don't know

18. Do you know what can be done to prevent malaria?

Do not prompt. Tick ALL answers given by mother

___ Remove standing water
___ Use mosquito nets
___ Use insecticide spray
___ Wear protective clothing
___ Stay indoors at night
___ Use Mosquito coil
___ Screen on windows
___ Other, specify: _____

This is the end of Part V

Start new form for next child, Immunization (Part II)

If last child, go to Tetanus Toxoid (Part VI)

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Barkin Ladi Community Survey

Part VI - Mother's Tetanus Toxoid History

Cluster No: _____	Mother No: _____

Fill out a form for each MOTHER.

Interviewer:
Record Name of Youngest Child: _____

Date of birth (if available) or age:

____ / ____ / ____ OR
Day Month Year

___ less than 6 months
___ 6-11 months
___ 1 year
___ 2 years
___ 3 years
___ 4 years
___ Don't Know

Now I am going to ask you some questions about yourself.

1. How old are you?

___ less than 15 years
___ 15-19 years
___ 20-24 years
___ 25-29 years
___ 30 years or more

2. What is your educational status?

___ None
___ Primary school
___ Secondary school
___ Post secondary

3. From whom/where did you receive care when you were pregnant with your youngest child?

___ TBA/VHW
___ Government Hospital
___ Health Center/Dispensary
___ Private Hospital/Clinic
___ Herbalist/Trad healer
___ Other, specify: _____

4. How many times did you go for antenatal visits during that pregnancy?

____ No of visits

____ Don't know

Cluster No: _____	Mother No: _____

5. Did you ever buy or receive an antenatal card or book?
   ___ Yes
   ___ No -> **go to 6**
   ___ Don't know -> **go to 6**

   If yes, do you have it now?
   ___ Yes
   ___ No-> ___ Lost
   ___ Kept by hospital after delivery
   ___ With husband
   ___ Other reason

6. Did you receive any immunizations during that pregnancy?
   ___ Yes
   ___ No
   ___ Don't know

7. **Interviewer: Ask to see the mother's or the youngest child's immunization card. Copy the <u>dates</u> of tetanus toxoid injections. If there is no card, ask the mother whether she received tetanus toxoid while pregnant with her youngest child.**

Vaccine	Date from card	Mother's history Yes/No
TT 1		
TT 2		
TT 3		
TT 4		
TT 5		

Interviewer: If dates obtained from card, record type of card.
   ____ Mother's card
   ____ Child's card

8. Where did you deliver your last baby?
   ____ Home
   ____ Hospital/Maternity Clinic
   ____ Other, specify: _____

9. Did you take any medicine during your last pregnancy to prevent you from getting malaria?
   ___ Yes
   ___ No
   ___ Don't know

END OF INTERVIEW

Appendix C

Barkin Ladi Government Officials and Health Department Staff

Government Officials

Mr. Jock D. Alamba	Chairman
Dr. Luka Lobadunze	Secretary
Mr. Yakubu Gang	Vice-Chairman
Mr. Yusufu Chuwang	Supervisor for Health

Primary Health Care Department Staff

Alhaji Tanimu Dogora	Director, PHC
Mrs. Monica Gotip	Deputy Director, PHC, and PHC Coordinator
Mrs. Rifkatu Akims	Asst. Coordinator, Health Ed/Women Affairs
Mr. Bulras Ari	Asst. Coordinator, Immunization/Watsan
Mr. Caleb Gotip	Asst. Coordinator, Planning/M&E
Mrs. Mary Jwander	Asst. Coordinator, MCH/FP/Nutrition
Mr. Dauda P. Rwang	Asst. Coordinator, Essential Drugs/Supplies

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Appendix D

Survey Participants
Barkin Ladi Community Survey

Interviewers	Position
Lois Aristakus	S.N.S.
Simon Auta	Community Health Officer
Jung Bagu	Community Health Supervisor
Bulus Challum	C.H.E.W.
Pam Dachomo	Community Health Supervisor
Ezekiel Dangyang	Community Health Supervisor
Martina Four	Community Health Supervisor
Rose Gokir	Community Health Assistant
Caleb Gotip	A.C.C.O.
Mary Jwandor	Senior Health Supervisor
Luka B. Kwon	C.C.H.E.W.
Sarah Nyak	Community Health Supervisor
Thomas Nyam	Community Health Officer
Markus Pam	Community Health Supervisor
Gyang Ezekiel Pam	Community Health Supervisor
Dauda Rwang	Senior C.H.E.W.
Dogo Sabuwa	P.C.H.E.W.
Daniel Usman	Community Health Supervisor
Elisha Wang	H.E.H.O.
Hanatu Yakzum	Senior Community Health Officer

Supervisors	Position
Kubra Ahmed	Public Health Nurse
Zalm Akor	Principal C.H.O.
Steven Anzaku	Deputy Director, PRS, SMOH
Doreen Bilma	P.E.H. Officer
Daniel Chayi	District Supervisor
Musa Dakahap	Statistician, PRS, SMOH
Augustina Haruna	ACC.H.O.
Mr. Mbong	NMVCD, FMOH
F. Okoh	NMVCD, FMOH
Samual Zagu	P.H.S. II

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