

FACTORS INFLUENCING THE INCIDENCE OF MEASLES IN HO DISTRICT

FRANCIS YANKEY

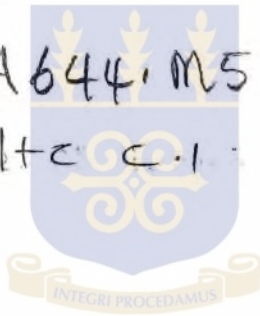


**A dissertation submitted to the School of Public Health in partial
fulfillment for the award of the MPH degree
September, 1999**

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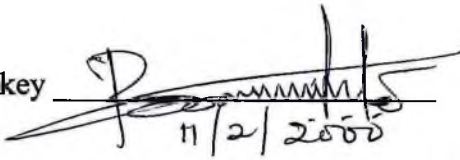
DECLARATION

I declare that this dissertation is the result of my own research and no one else can be held accountable for the ideas and arguments presented. All sources cited have, however, been dully acknowledged. Further, this dissertation has not been presented in whole or in part to any educational institution for a degree.

Signed:

Francis Yankey

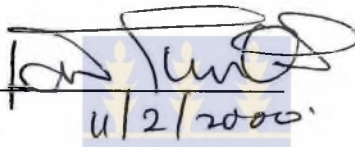
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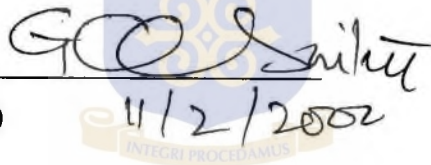
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11/2/2002

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DEDICATION

Dedicated to Dad and Mom who struggled to finance my primary and secondary education and to Rita, Hulldah, Frances, Jephthah and Seth for their moral support.

ACKNOWLEDGEMENT

I wish to thank the following persons for the assistance given to me during the preparation of this dissertation:

- ◆ PPAG for providing the funds for this research
- ◆ Professors L. Osei and G. Ashitey, my academic supervisors, for guiding the preparation of this work from its conceptualization to the final print out
- ◆ Prof. S. Ofori-Amaah, Prof. R.B. Biritwum and Dr. K. A. Koram for reviewing parts of the work..
- ◆ Dr. McDamien Dedzo, District Director of Health Services (Ho District) who was my field supervisor, for constantly reviewing the progress of work.
- ◆ The staff of the District Health Administration especially the Community Health Nurses who devoted lots of time to collect data on cases identified
- ◆ Miss Mercy Kudjordzi for typing the script and to
- ◆ All the people of the Volta Region who provided some form of assistance to me during the fieldwork.

LIST OF ABBREVIATIONS

ANC	-	Ante-Natal Clinic
CHN(s)	-	Community Health Nurse(s)
CWC	-	Child Welfare Clinic
DDCU	-	District Disease Control Unit
DDHS	-	District Director of Health Services
DHA	-	District Health Administration
DHMT	-	District Health Management Team
EPI	-	Expanded Program of Immunization
JSS	-	Junior Secondary School
MCH	-	Maternal and Child Health
MOH	-	Ministry of Health
PHC	-	Primary Health Care
PHN	-	Public Health Nurse
PPAG	-	Planned Parenthood Association of Ghana
RHMT	-	Regional Health Management Team
SPH	-	School of Public Health
SSS	-	Senior Secondary School

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EXECUTIVE SUMMARY

Ho District has the second largest land area and the largest population among the twelve Districts of the Volta Region. Ho doubles as the capital of both the district and the region.

Over the past five years the incidence of measles has been increasing and has come to be among the top ten diseases in the district. This research was organized to study the characteristics of measles cases and their families in order to find out who were affected, where within the district they are coming from, what their family backgrounds are and what can be done to stop the increasing trend.

A total of 76 cases from the Ho District Hospital admitted from January 1998 to June 1999 were studied. Their records were reviewed and their mothers were interviewed to ascertain their children's immunization status, their social background and beliefs and practices with regard to measles. Twenty-nine CHNs were also interviewed with regard to their knowledge and practice of the cold chain and their workload.

The cases studied were equally distributed between rural and urban areas. However irrespective of the place they came from the background characteristics of their mothers were strikingly similar: mostly married, christian, educated up to JSS (average of 9 years of education), either farming or trading and earning less than ₵100,000 each month.

They are characteristically the rural and urban poor.

The mean age of cases was 26.7 months but about 17% had measles before the recommended age for vaccination of 9 months; 21% of cases had been fully immunized. Many mothers did not know the mode of transmission for measles; almost all mothers accepted that immunization is the best way to prevent measles; 35% of mothers of children who were not immunized claimed to be too busy or had traveled at the time the child was due for immunization.

From the CHNs it was learnt that almost half do not reach their target communities regularly because of transport difficulties. Three sub-districts do not have cold storage facilities and therefore those from far away communities collect their vaccines, keep them overnight in vaccine carriers and use them the next day for immunization sessions. This can possibly result in a break in the cold chain at the very last level.

It was recommended that:

- ◆ The DHA make all possible efforts to provide the needed logistics especially transport and cold storage facilities to support the immunization program.
- ◆ CHNs should organize occasional mini mass immunization for isolated communities in order to catch up with those who miss opportunities.
- ◆ An incentive system should be developed to motivate the field staff and
- ◆ Use should be made of the new local government system to improve community participation in Child Welfare Clinics.

CHAPTER ONE

1. INTRODUCTION

1.1 Background Information

Measles is a viral infection, which affects mostly children, though there have been occasional infection of adults especially during epidemics. It is a highly contagious disease that spreads through direct contact with nose or throat secretions from an infected person or indirectly through contact with freshly soiled articles, and also through the air. It is caused by a single stranded six-protein RNA virus classified as a member of the genus morbilli-virus in the family paramyxovirididae. The genotype is stable with very little evidence of variation in antigen (1).

The origin of the disease is not known and Francis Black (1976) has suggested that its appearance on the global scene could have been in 2500 BC. Rhazes, a Persian Physician, wrote the first authentic record of measles that differentiated it from smallpox in approximately AD 910. In 1758 Francis Home clearly demonstrated that measles was an infectious disease and in 1869 Henry Koplik published a description of Koplik's spots as one of the signs of measles infection. Kipple has suggested that measles could have existed on the African continent before contact with Europeans. Evidence for this derives from the fact that unlike American Indians or Pacific Islanders Sub Saharan-Africans did not die in wholesale fashion

after contact with Europeans (2). Measles has an incubation period of 10 days from the time of exposure with a range of 8 to 13 days.

Worldwide the disease is said to afflict about 40 million people and causes over 1million deaths annually (3). Generally there is evidence of much under reporting especially in developing countries, with estimates that only 5% of cases are reported.

Infants usually acquire passive immunity, which lasts between 6 and 9 months from their immune mothers. Life long immunity is acquired either through an infection or vaccination.

The early signs and symptoms of a measles infection typically include fever, cough, coryza and conjunctivitis. Small whitish specks on reddened areas of the mucosal lining of the mouth known as Koplik's spots appear. This continues for 3 -7 days, followed by the characteristic rash, which starts from the head and spreads over all the body. This lasts for 4 - 7 days and if uncomplicated, the signs and symptoms begin to recede. Complications usually caused by viral replication and bacterial infection include middle ear infections, pneumonia, laryngotracheobronchitis and diarrhoea. Diagnosis is usually made on clinical and epidemiological grounds although laboratory confirmation is preferred.

Research leading to the development of a measles vaccine began as early as 1911. In 1954 Enders and Peebles isolated the measles virus and by 1958 a vaccine was produced.

After field trials the first vaccine consisting of an attenuated measles virus, was licensed for general use in 1963 in the USA. The establishment of the EPI by WHO in 1974 enabled the measles vaccine to be introduced into national immunization programmes.

The objective of the EPI was to achieve measles immunization coverage of at least 90% of one year olds at country, district and community levels and reduce case fatality rates to less than 10% in all countries by 1995 (4).

Although none of these objectives have been achieved, measles cases and deaths have been significantly reduced worldwide. Foege has argued that it is possible to globally eliminate measles, comparing it with smallpox (5).

The reasons for this are

- An effective and safe vaccine has been available since 1963 and has been used widely.
- Measles vaccination confers lifelong immunity and therefore improves herd immunity.
- The disease has no animal reservoir and
- No chronic carrier state among humans.

Generally there are two types of immunization schedules used worldwide.

- A two - dose regime administered at different ages depending on the situation in the country. As an example the current recommendation in the USA is a routine 2-dose schedule with the initial dose at 12 - 15 months of age and the second given at school entry (4 - 6yrs)

- A single dose usually administered at 9 months of age. Based on results from various studies WHO recommends this schedule for African and most developing countries (6). In community outbreaks the recommended age may have to be lowered irrespective of the dosage schedule.

A recent analysis of available statistics by Tulchinsky and others suggests a return to the 2-dose schedule. He reviews policies in U.K., Saudi Arabia, Bahrain and Papua New Guinea and concludes: "The case for action is strong and adoption of the 2-dose policy on an international scale is overdue"(7). Others have made similar observations (8,9).

Researchers continue to look for the ideal vaccine - one that can be given at an earlier age (<9months), is non-injectable, thermostable and ready for use without the need for reconstitution. Many options are currently being tested using animal models and the hope of scientists is that clinical trials will not be in the too distant future.

1.2 Study Area

Ho District is a triangular area of about 2564sq. km. situated in the middle of the Volta region. The district is bounded on the east by the Republic of Togo, on the west by Hohoe and Kpandua districts and on the south by North Tongu and Akatsi districts. The district capital, Ho, also doubles as the regional capital of the Volta region. The district with a total population of 256,058 (1999 population projected from 1984 census data) is divided into six sub-districts as follows: Tsito (44,078), Abutia (39,868), Adaklu (39,380), Kpetoe (45,152), Ho-Shia (48,056) and Kpedze-Vane (39,524). See Map 2.

MAP 2: A MAP OF HO DISTRICT SHOWING THE SUB-DISTRICTS

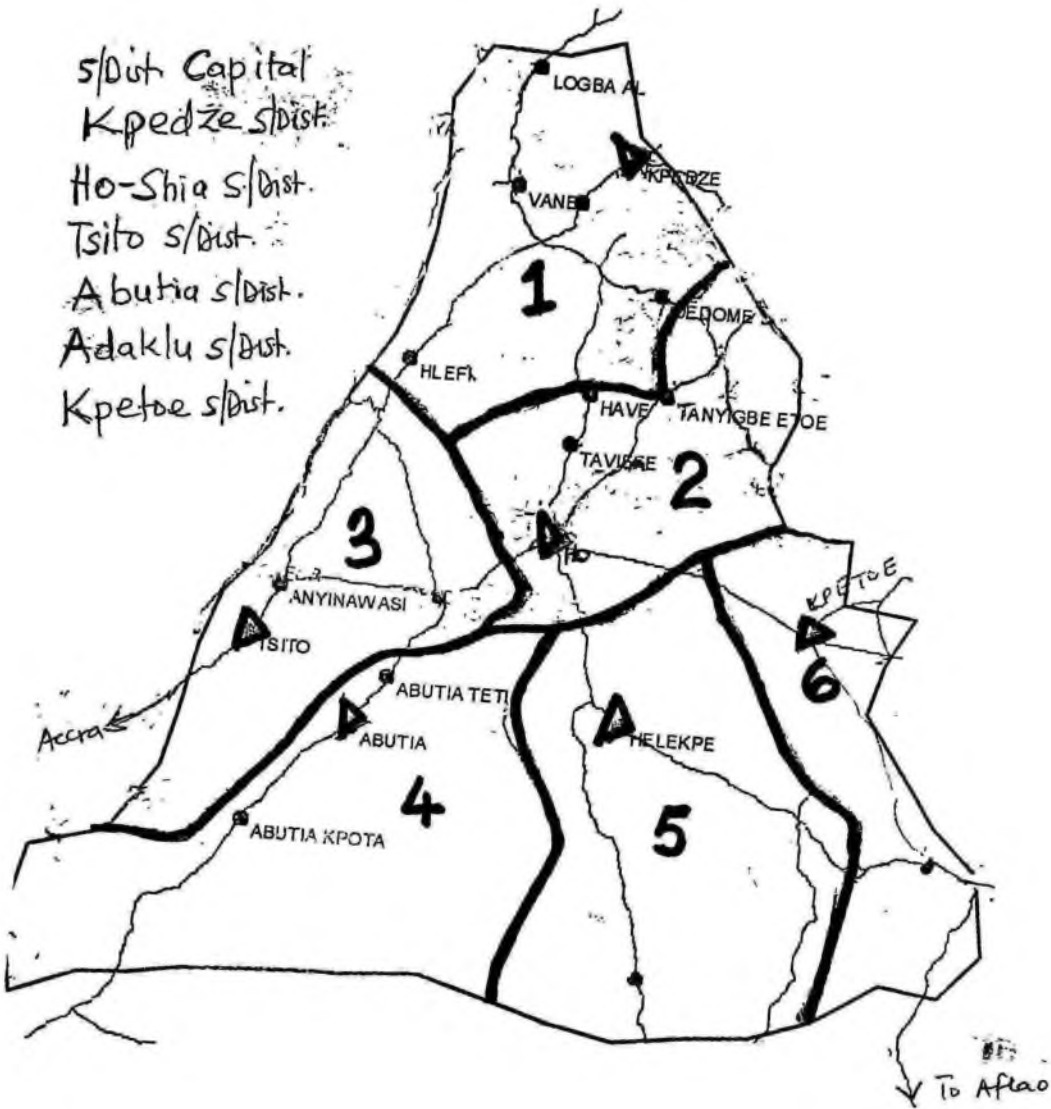
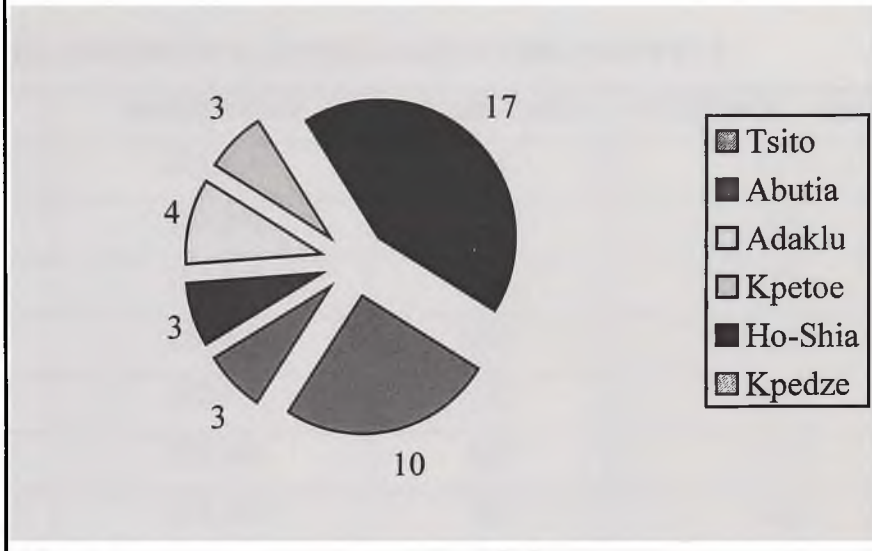


Figure 1.1: Distribution of Health facilities by sub-district



The district has 40 health facilities with 42.5% of them located in the Ho sub-district. (Figure 1.1). It is covered by forest in the north, mixed savanna in the central and grassland in the south. There are three main seasons: the rainy season from April to July, the wet season from August to October and the dry season from November to March.

The Ewes, Agotimes and Avatimes are the main tribes in the district, which also has three traditional councils.

1.3 Statement of the Problem

Data from the Ho District indicate that the incidence of measles has been increasing in recent years (Table 1.1).

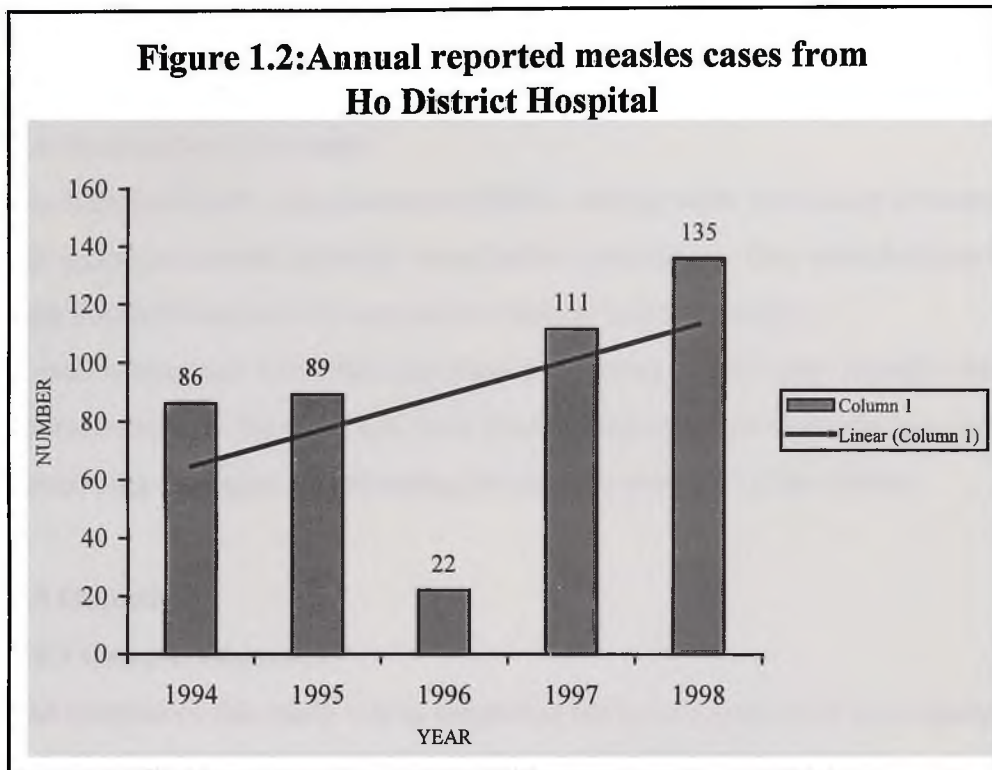
Table 1.1: INCIDENCE OF MEASLES IN HO DISTRICT

YEAR	POPULATION	NO. OF CASES	INCIDENCE (Per 1000)
1992	225,890	44	0.19
1993	229,992	N/A	N/A
1994	234,169	460	1.96
1995	238,422	925	3.88
1996	242,718	172	0.71
1997	247,083	672	2.72
1998	251,530	765	3.04

N/A: Not Available

Source: District Annual Reports

Records from the Ho District Hospital also show an increasing trend in the number of reported measles cases since 1994 (Figure 1.2). Over the past two years measles has become one of the top ten diseases in the district.



These facts raise a number of disturbing questions:

- ◆ Who are affected?
- ◆ Which parts of the district are they coming from?
- ◆ What are their socio-demographic characteristics?
- ◆ What is the socio-economic status of their families?
- ◆ What factors are likely to influence their condition?

These questions need clear, definite answers to enable the District Health Administration plan and implement strategies that will reduce the incidence

of measles in the district. This research was therefore designed to answer these questions.

1.4 Rationale for the study

The District Health Administration (DHA) noticed with increasing concern the trends in measles infection described in section 1.3. This was discussed with the MPH student who agreed to research into the problem.

It was anticipated that when completed the study would help identify the characteristics of the cases and their families and therefore open the way for developing strategies of addressing the measles problem in the district.

1.5 Objectives

1.5.1 General Objective

The purpose of this study was to determine the main factors that were likely to influence the incidence of measles in the Ho District.

1.5.2 Specific Objectives

The study specifically sought to determine:

- ◆ The socio-demographic characteristics of children who got measles in 1998/99 in the district.
- ◆ The socio-economic status of the families of these children.
- ◆ Beliefs and attitudes of their mothers towards measles.
- ◆ Any problems related to the management of vaccines in the District.

CHAPTER TWO

2. LITERATURE REVIEW

2.1 Introduction

The incidence of measles in a community is influenced by many factors, proximate among them being the immunization and nutritional status of the child. One of the early studies on measles in West Africa was done by Morley, Woodland and Martin. In their study, measles was found to be the most serious of the acute infectious diseases experienced by children in a Nigerian village participating in a longitudinal study aimed at tracing child growth and development from birth to five years. The incidence and severity statistics mirrored those recorded in the period before 1920 in the industrialized countries. Of particular concern among the Nigerian children studied was the extensive weight loss associated with measles (10).

2.2 Immunization

Immunization status has been identified as the single most important factor that determines whether a child will have measles or not. The introduction of measles immunization in rural Senegal reduced the incidence for children under 10 years of age by 96% and the risk of dying by 91% as reported by Samb (11). A similar study by Desgrees showed that even with no improvement in socio-economic status, immunization reduced death from measles (12).

In rural northern Ghana both the incidence and fatality of measles were reported to be higher in unvaccinated than vaccinated children. The same study found low paternal education, and malnutrition as significant factors influencing the high incidence of measles (13). Interestingly, Vitamin A supplementation was not found to be a significant factor.

A study by Goudiaby in Guinea Bissau suggests that while surviving from a natural measles attack provides immunity, children who survive measles infections are at greater risk of dying in the following few years than those who have been vaccinated. The authors explained that “Reduced general cell mediated immunity may contribute to the higher long term mortality...”(14). Many other researchers confirm the positive role immunization plays in child survival through the reduction of the incidence of measles (15, 16).

2.3 Socio-Cultural Factors

It has been documented that a number of other socio-economic, demographic and cultural factors influence the incidence of measles through their positive or negative effect on immunization coverage. In Nigeria, Odebiyi and Ekong found that belief about the cause and supposed alternative source of preventing measles and the literacy level of mothers influenced their acceptance or non-acceptance of vaccination. They concluded: “As long as people defined disease within the supernatural context, they will be reluctant to use scientific measures”(17).

Other studies have confirmed this and the influence of culture/beliefs on measles has been noted worldwide. In India it is believed that the goddess Matta causes the disease; in Bangladesh infected children undergo religious purification; among the Akambas of Kenya milk and water are withheld from sick children (18-20). In Ghana many traditional groups have similar beliefs. The Gas think that the disease is caused by the gods; Nzemas believe that bathing the sick child will aggravate his/her condition. In many places it is thought that an abundance of rash is a sign of recovery and therefore all kinds of concoctions are drunk or given as enema to the child to supposedly hasten the eruption of the rash.

Brugha and Kevany concluded after a study in the Eastern region of Ghana that higher education, ante-natal clinic (ANC) attendance, improved economic status, lower parity (<5), and urban residence contribute to better use of Primary Health Care (PHC) services (particularly immunization) by mothers (21). Coetzee et al, however, found that in a peri-urban township near Cape Town in South Africa, mothers' level of education was not associated with measles vaccination status (22).

2.4 Overcrowding

Crowding, especially in situations where siblings sleep together, increases the intensity of exposure to infection. In Guinea-Bissau, this often led to clustering of deaths and made people believe that certain households were haunted or plagued with misfortune (23).

In a cross-cultural study involving four African countries, Aaby concluded that differences in measles mortality are closely related to overcrowding (26).

2.5 Nutrition

Many researchers including Whittle have found a positive association between malnutrition and the incidence and intensity of measles infection (25). This association logically follows from the fact that severe malnutrition reduces the child's ability to fight infections and therefore makes him/her more susceptible not only to measles but to all other infections.

2.6 Other Factors

The relationship between sex and the incidence of measles is rather inconclusive. Some authors have found females to be at a higher risk than males (26-28); others found no difference between the two sexes (29).

A rather curious finding from Senegal is that children in families with a boy and a girl had significantly higher mortality than children in families with two boys or two girls (30). Van den Broeck identifies the cause of this to be neglect of the female child. He explains, "the chance that 1 or 2 successive children will be neglected by preference for the other sex, is obviously greater if the two children are of opposite sex than if they are of the same sex. Consequently child neglect is more frequent in families with siblings of opposite sex" (31).

2.7 Conclusion

The review of the literature on factors influencing the incidence and intensity of measles infection indicate that no one factor or group of factors could account for the global situation. Sometimes the facts seem contradictory as in the case of sex.

However, it is noted that each study reflects the socio-cultural, economic and geographical circumstances of the community studied and therefore the influencing factors are bound to be different. It is therefore necessary to determine the influencing factors in our study population with the uniqueness it deserves so as not only to draw out the similarities but also the differences it has with other communities reviewed.

CHAPTER THREE

3. METHODOLOGY

3.1 Study Population

The study was limited to children 0-5 years who were diagnosed as measles cases from the Ho District Hospital. This age limitation was adopted for two reasons:

1. It forms the target of the district's activities organized at the various child welfare clinics (CWCs).
2. Such children are more vulnerable and are therefore more likely to suffer from the serious consequences of a measles attack than their older siblings.

3.2 Study Design

This is a descriptive study of measles cases admitted to the Ho District hospital from January 1998 to June 1999. Cases seen and diagnosed by qualified medical officers were selected on the assumption that medical officers were more likely to correctly diagnose a case than any other health staff in the hospital. This is because their training enabled them to differentiate between the signs and symptoms of measles and those of other diseases more accurately. The selected cases also met the case definition stated below:

- ◆ Generalised maculo-papular rash of 3 or more days duration AND
- ◆ History of fever 38°C (101°F) or more (if not measured, HOT to touch), AND
- ◆ At least one of the following: cough, coryza or conjunctivitis (4).

3.3 Selection of Study Population

The hospital records of all reported cases aged 0-5 years were collected for review. Each card was examined to identify the signs and symptoms written by the doctor on it. A total of 87 cases that met the criteria of age and case definition were selected. However 11 of the cases could not be reached because of reasons stated in section 3.10.

3.4 Variables:

Characteristics of cases

- ◆ Disease outcome
- ◆ Age at time of illness
- ◆ Sex

Characteristics of Mothers

- ◆ Place of Residence
- ◆ Age of mother
- ◆ Educational level of mother
- ◆ Possession of electronic equipment
- ◆ Religion
- ◆ Income/Occupation
- ◆ Marital status

Influencing factors

- ◆ Distance from nearest health centre
- ◆ Immunization status of child

- ◆ Nutrition (Breast feeding/weaning practices)
- ◆ Mother's Perception of cause, treatment and prevention of measles
- ◆ Number of siblings and other children in the house who have ever had measles
- ◆ Number of people sleeping in one room with the child
- ◆ Fertility Behaviour (Parity, Birth interval, family size)

3.5 Data Collection Techniques

- ◆ The hospital records of all selected cases were reviewed for any information that will be relevant to the study. The information yielded at this level was sex, age at the time of illness and place of residence.
- ◆ Using the addresses provided in folders of selected cases, the mothers of these cases were traced and interviewed regarding the socio-economic characteristics of their families and their attitudes and perceptions towards certain factors that are likely to influence the incidence of measles among their children.
- ◆ In - depth interviews were conducted with three supervisors of CHNs and three staff responsible for keeping the freezers/refridgerators at Health centres .
- ◆ Self-administered questionnaires were completed by 29 CHNs to ascertain their knowledge of the cold chain system and their workload.

3.6 Training/Pre-testing

Ten Community Health Nurses were selected from the sub-districts where cases came from. They were selected on the basis of their long experience

in community health work and their familiarity with the social and physical environment.

The training was provided by a team of two (the student and a staff from the Disease Control Unit) at the facility where the CHNs were based. These were Ho MCH/FP centre (4), Kpetoe Health centre (2), Adaklu Helenkpe Health centre (1), Tsito Health centre (2) and Dzolo Gbogame Health centre (1). Each training session took a day to complete and involved a review of the questions in English by the student, translation into Ewe by the DCU staff and a practice session with the CHN. This approach, not only, made it possible to give individual attention to the trainees but also proved to be cheaper, the only expenditure being the cost of fuel for one motor bike to travel to the Health centres. The training, however, took five days instead of the planned two days.

Pre-testing was done immediately after the training session using mothers who attended the clinic on that day. The questionnaires were reviewed over the weekend after the training sessions and data collection started the following week.

3.7 Data Collection

Data collection took one month, two times the period planned for it, because of the difficulty in tracing cases from incomplete addresses.

The student and the staff of the Disease Control Unit supervised the process. They worked with each CHN during the data collection period at least once.

Completed questionnaires were submitted to the student on weekly basis. These were immediately discussed with the interviewer and mistakes corrected. A few were occasionally taken back for reinterviewing

3.8 Data Entry /Analysis.

These were done by the student, using EPI INFO Version 6.0 computer program. Out of a total of 87 cases selected 76 were contacted and interviewed. The main analytical methods used were frequency tables, graphs and cross – classification of relevant variables e.g place of residence and immunization status and a chi-square analysis of these classifications.

3.9 Quality Control

To ensure that data were of the highest quality possible, a number of measures were taken:

- The questionnaire was made as simple as possible, avoiding skips where possible.
- Training was decentralized to Health centre level so that individual weakness could be addressed.
- Data was edited in the field.
- Each questionnaire was entered twice at different times to produce two data sets. Two sets of tables were then produced and compared for inconsistencies and subsequent correction.
- A listing by the computer also ensured any questionnaire entered twice in the same data set was detected and corrected

3.10 Limitations/Constraints of the study

The main limitation for this study was the fact that the measles cases studied were not confirmed by laboratory analysis. However, the strict adherence to the clinical definition of measles by the WHO provided an assurance of the genuineness of the cases used in this study.

Another important constraint experienced during the study was the difficulty faced in tracing cases because of inadequate addresses which stated only the residential areas without any house numbers or other identifying marks. Communities had to be visited a number of times resulting in a longer data collection period and increased transport cost. As expected however, the problem was more acute in Ho than the other communities most of which were in rural areas.

Some families had moved from the location, while others were said to have had the disease while visiting relatives in the Volta region and had therefore gone back to where they came from.

Two women simply denied that their children ever had measles even when neighbours and the hospital records confirmed it.

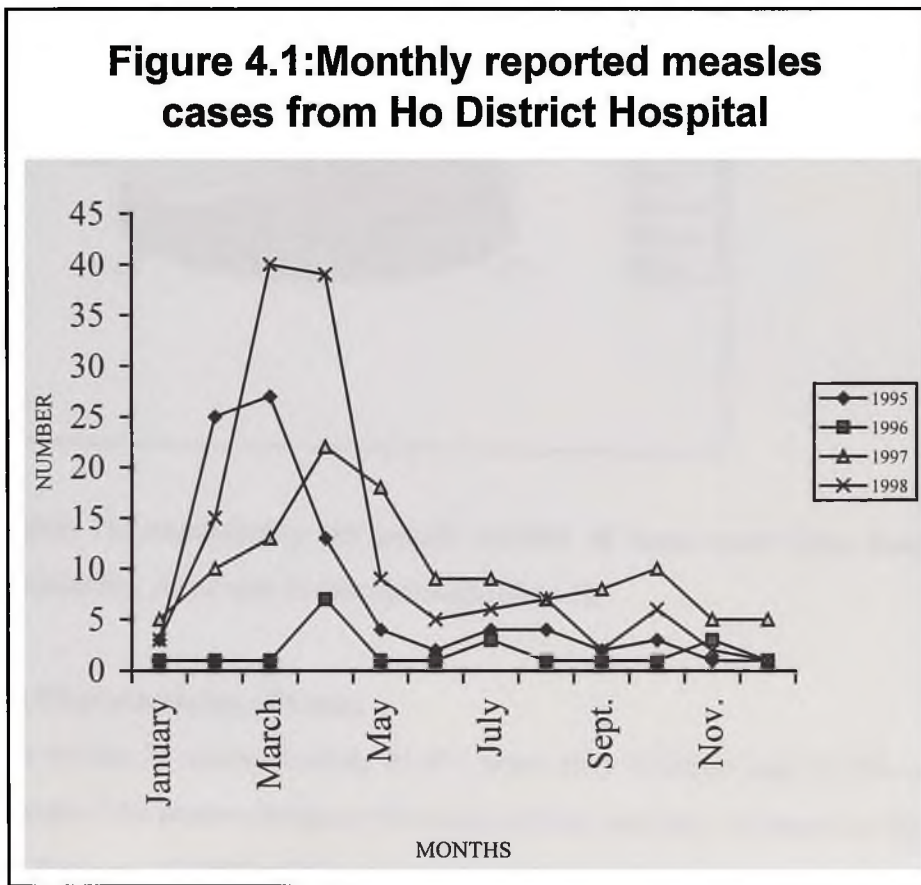
CHAPTER FOUR

4. PRESENTATION OF RESULTS

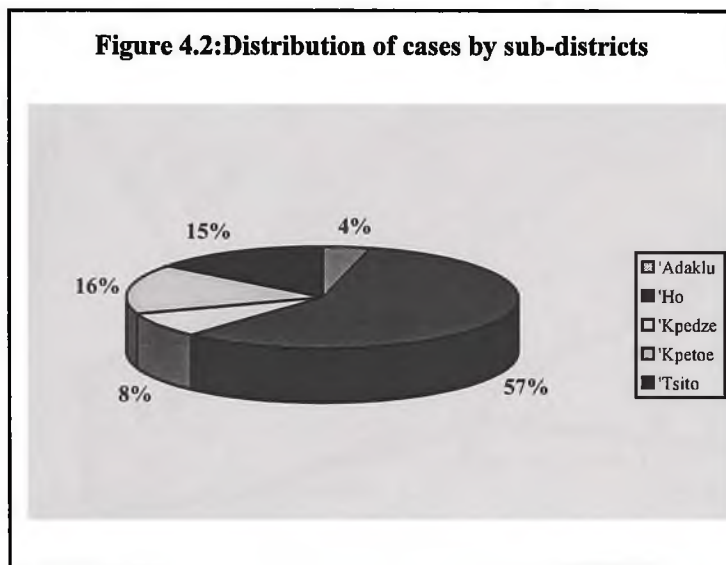
4.1 Introduction

Data from the District Hospital indicate that the highest number of cases occur towards the end of the dry season from February to April each year.

Figure 4.1 gives a graphical presentation of this trend for the years 1995-98.



A total of 76 cases occurring in 1998/99 were located and their mothers were interviewed. The cases were distributed as follows: 43.4% were from urban communities, 6.6% from peri-urban and 50% from rural areas. In terms of the sub- districts more than half of the cases came from Ho-Shia and no case was reported from Abutia. The distribution is shown in Figure 4.2 below:



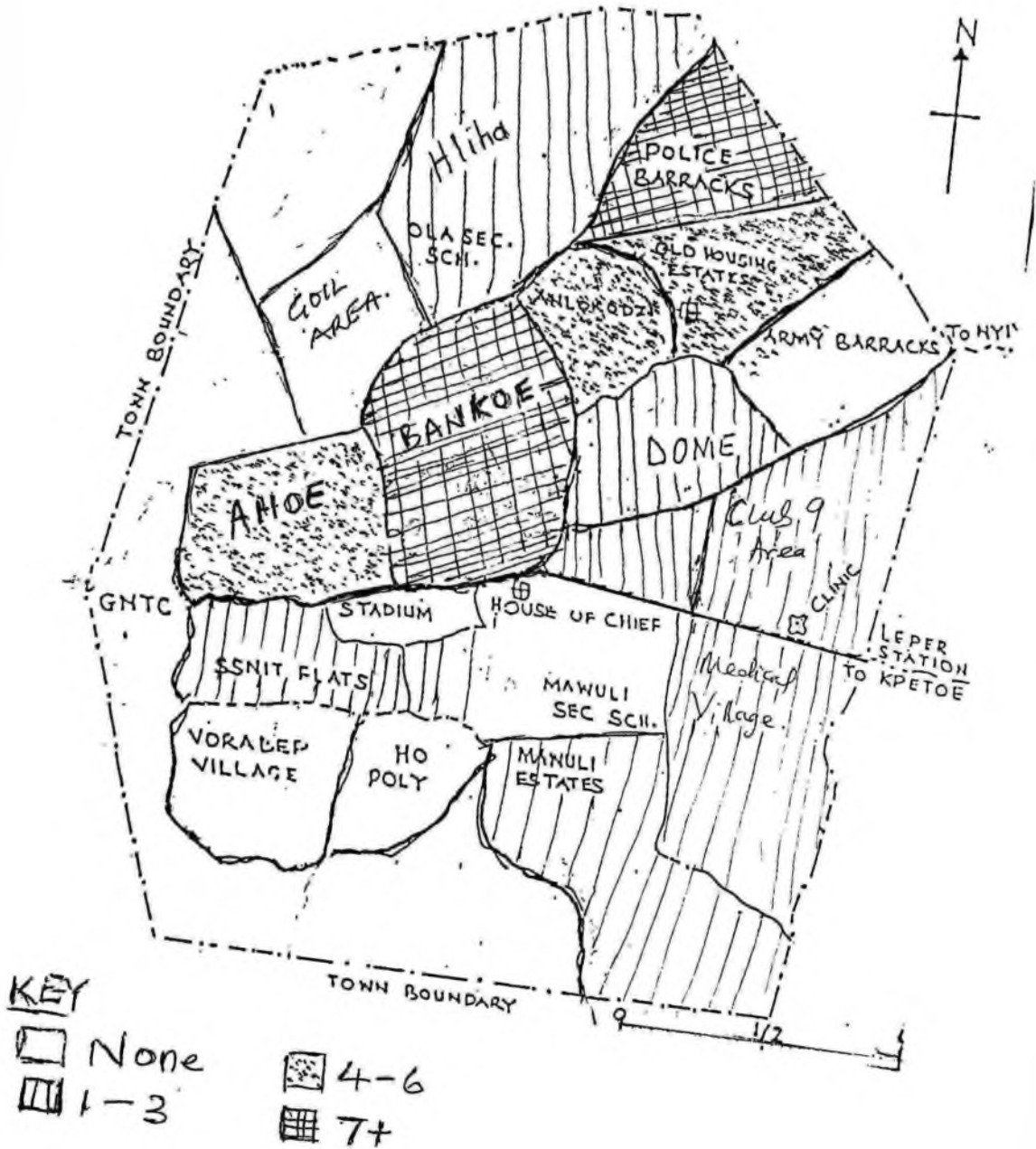
Within Ho municipality the largest number of cases came from Bankoe, Anlokordzi, Ahoe and Police barracks (Map 3).

4.2 Characteristics of Cases

Out of the 76 cases studied, 61.8% were male children and 38.2% were females. The pattern of age distribution exhibit a number of important facts:

- Thirteen (17.1% of the cases were less than 9 months.
- 42.1% were above 2years.

MAP 3: DISTRIBUTION OF MEASLES CASES WITHIN HO MUNICIPALITY



- The mean age of the cases was 26.7months, the most frequently reported age being 5yrs (Table 4.1).

Table 4.1: Age distribution of cases

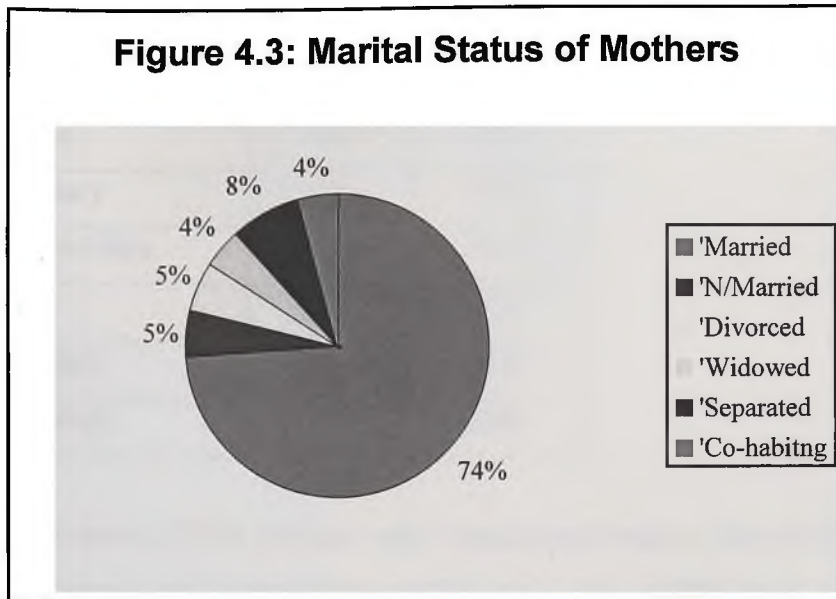
Age(months)	No.	Percent	Cumm. %
6-8	13	17.1	17.1
9-12	10	13.2	30.3
13-24	21	27.6	57.9
25 and above	32	42.1	100
TOTAL	76	100	100

Twenty-seven (27) out of the 76 cases studied were first-born children, 18 were second-born, 9 were third-born, 4 were fourth-born and 17 were fifth- born and above. Seventy-two children (94.7%) recovered from the attack, one (1.3%) died and three (4.0%) were still on admission. No disabilities resulting from measles were reported.

4.3 Characteristics of Mothers

The age of mothers interviewed ranged from 18 to 48 years with an average of 32 years; 11.8% were teenagers and 31.6% were above 35years.

Most respondents (77.6%) were in some form of union (married or co-habiting); only 5.4% had never married (Figure 4.3).

Figure 4.3: Marital Status of Mothers

Approximately half of the mothers have had one or two children. The mean number of children ever born by mothers is 3; the highest of course being eight children.

The data indicate that the mean birth interval was 3 years; 63.9% of mothers waited for a minimum of 2 years before having the next child.

On the educational status of mothers, 66 out of 76 (i.e. 86.8%) were found to have had some form of formal education. However only six (9.1%) attended SSS and three (4.5%) have had tertiary education (Table 4.2). The average number of years spent in school was 9 years.

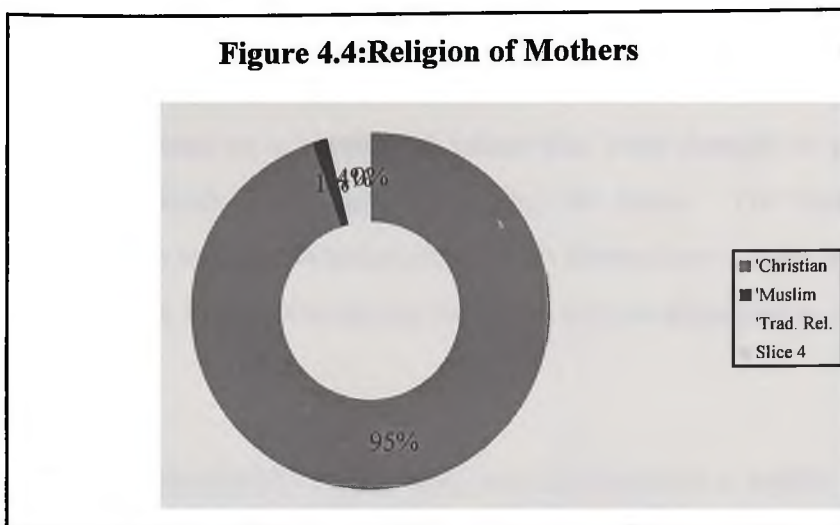
Table 4.2: Educational level of mothers

Level	No.	Percent
None	10	13.2
Primary	10	13.2
JSS/Middle	47	61.8
SSS	6	7.9
Tertiary	3	3.9
TOTAL	76	100

Fifty-seven (75%) mothers were farmers and traders, four (5.3%) were in the formal sector (teaching, clerical etc.), five (6.5%) were seamstresses, four (5.3%) were housewives, two (2.6%) were hairdressers and the rest (5.3%) claimed to be unemployed.

The religion of respondents is provided in Figure 4.4. Ninety-five percent of respondents (95%) claimed to be Christians.

Four out of five households possessed some form of electronic equipment, the majority being radio (46%). All those who owned television (21%) also had radios.



With regard to the income level of respondents 68% earned less than ₵100,000. Table 4.3 provides details of the income distribution of mothers.

Table 4.3: Monthly income of mothers (cedis)

Income Level ('000)	Freq.	Percent
None	6	7.9
Less than 100	51	67.2
100- 149	14	18.4
150- 199	2	2.6
200 or more	2	2.6
No Response	1	1.3
TOTAL	76	100

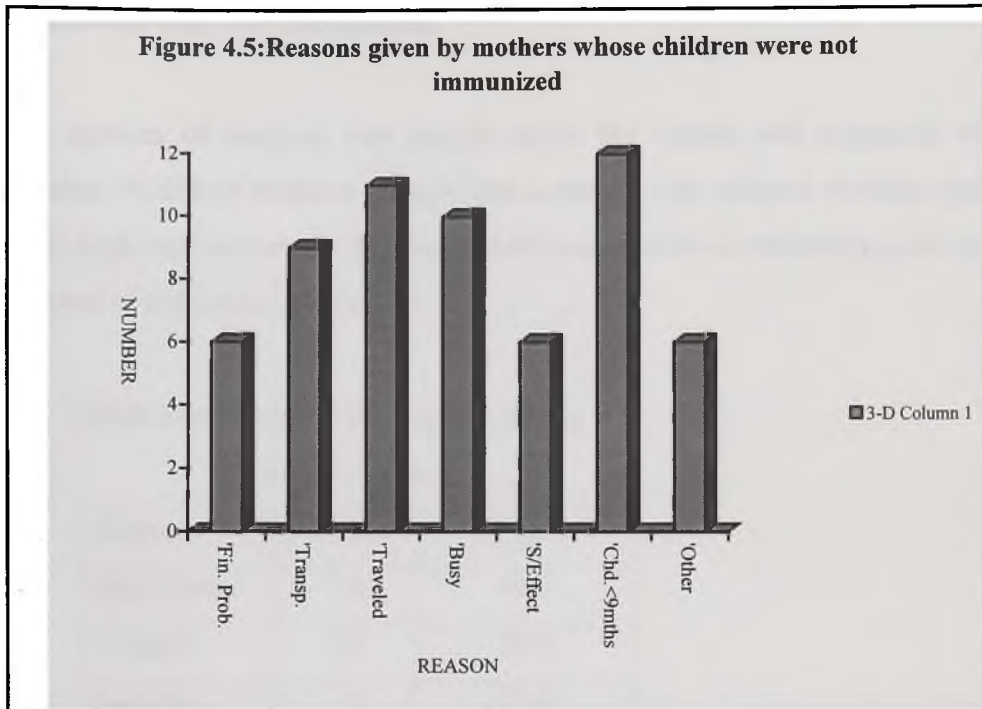
4.4 Influencing Factors

Data was collected on a number of issues that were thought to possibly influence the incidence of measles among the cases. The results are presented in this section. Whether or not such factors have strong influence on the incidence of measles among the cases will be discussed in the next chapter.

56.8% of the households lived within one kilometer of a health facility, 23.3% lived within 1-4 kilometers while 19.9% lived beyond four kilometers of a health facility. The shortest distance traveled is 0.2 kilometers and the longest is 15 kilometers. The average distance traveled by mothers to a health centre was ---

About one-fifth (16) of the cases studied had been immunized against measles as indicated on their CWC cards. Out of the 16 immunized cases, 7 came from the Ho sub-district and 9 from the others. Sixty children (79.9%) had not been immunized. Mothers gave a number of reasons for this, the majority claiming to be either busy (16.7%) or they traveled (18.3%). Figure 4.5 gives the details.

The mean breast feeding period recorded was 20.6 months; 3.9% of mothers breast fed for less than 12 months, 89.6% for 12 –24 months and 6.5% did so for more than 24 months. 17% of mothers gave water to their babies at birth; 57% did so before the MOH recommended period of 6 months and by six months all mothers had given water to their babies.



Fifty percent (50%) of mothers gave other foods to their children before age 6 months. The main type of food given was porridge made from maize (71.1%); 13.2% gave weanimix; 9.2% gave cerelac/lactogen and 1.3% gave mpotompoto.

Twenty-six percent (26%) of households had a member who got measles before the case studied; 35% of cases also lived in compounds where a child had had measles before.

Thirty-two percent (32%) of cases slept with 4 or more people. The average household size was approximately 7 with 75% of children living in households with 5 or more people.

The opinion of mothers was sought about the causes and treatment of measles: 56.5% of mothers thought that a person was infected through bad air or high temperature; 32.9% mentioned contact with an infected person as a source of infection. (Table 4.4)

Table 4.4: Mothers' Perception of the Cause of measles

Cause	No.	Percent
High Temp	34	44.7
Contact	25	32.9
Bad Air	9	11.8
Don't know	4	5.3
Other	4	5.3
TOTAL	76	100

A majority of mothers (72.4%) said they would send their children to the clinic if they had measles. However 14.5% would use herbs while 9.2% preferred buying drugs from the chemical shop (Figure 4.6). To prevent measles more than three-quarters of mothers said they will immunize their children, while 10.5% mentioned keeping the environment clean as the main preventive measure (Table 4.5).

Figure 4.6: Mothers' perception of the treatment for measles

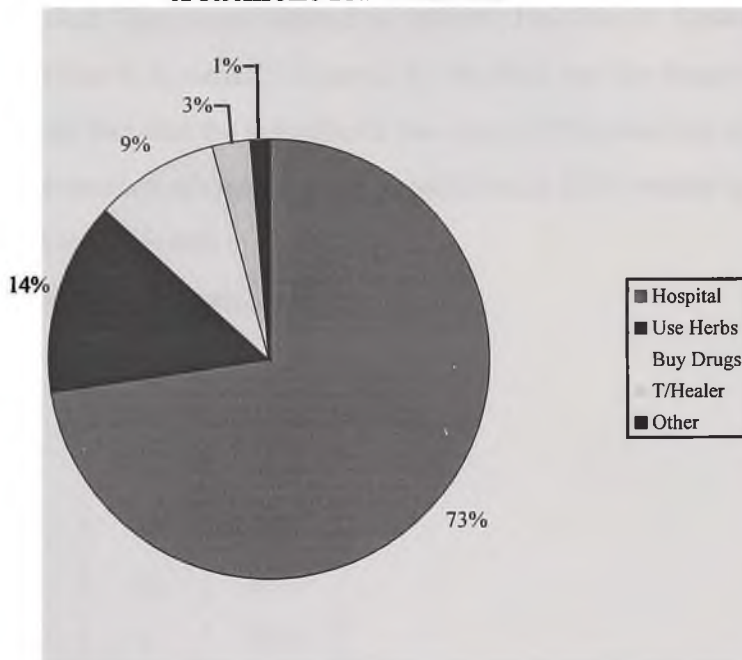


Table 4.5: Mothers' perception of the prevention of measles

Preventive method	Number	Percent
Immunize child	58	76.3
Avoid contact	6	7.9
Keep environ. clean	8	10.6
Don't know	2	2.6
Other	2	2.6
TOTAL	76	100

4.5 Results of Questionnaires from community Health Nurses.

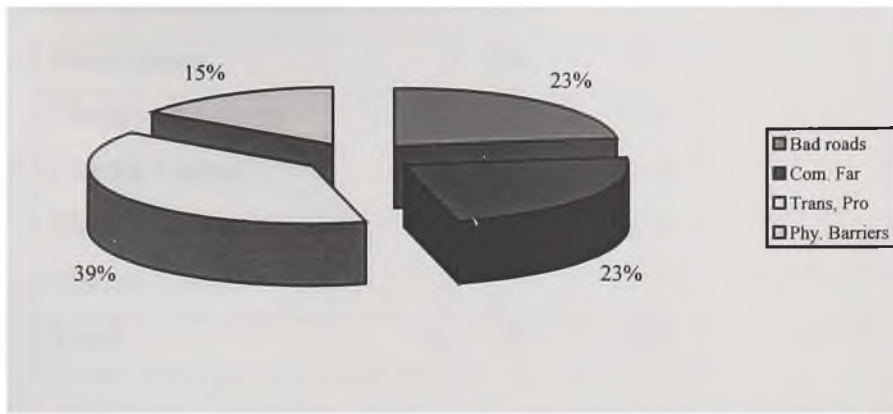
Twenty-nine CHNs from the six sub-districts were interviewed during the research period. They were selected as follows: Ho-Shia: 9, Adaklu: 3, Abutia: 4, Tsito: 4, Kpedze: 5, Kpetoe: 4. Ho-Shia had the largest number in view of the fact that the sub-district has more CHNs than any other sub-district. The number of communities in which each CHN works is categorized in Table 4.6.

**Table 4.6: Number of communities
per CHN**

Number	Freq.	%
3 – 5	8	27.6
6 –10	6	20.7
11 – 15	12	41.4
16+	3	10.3
Total	29	100

The majority of CHNs work eleven or more communities, the minimum being three and the maximum twenty-two. Forty – five percent are not able to reach their communities regularly. The reasons for this situation are presented in Figure 4.7. Asked whether they had seen a vaccinated child who later developed measles, 78.6% said yes. On the average each CHN had seen 4 such cases.

University of Ghana <http://ugspace.ug.edu.gh>
Figure 4.7: Reasons why some CHNs cannot reach their comm. regularly



Some of the possible reasons given by the CHNs for this situation include:

- Poor nutrition
- Break in cold chain
- Poor sanitation
- Overcrowding
- Loss of potency of vaccines

The equipment mentioned as being available to CHNs were vaccine carriers, trays, gallipots, forceps, weighing scales, kidney dishes and hand washing bowls. No mention was made of any equipment for measuring the temperature.

Respondents were requested to list the major checks conducted before leaving for an immunization session (cold packs, expiry date, vaccine arrangement, quantity and temperature). Table 4.7 indicates the outcome.

Table 4.7: Checks conducted by CHNs

Description	No.	%
Checks all 6 items	8	27.6
Checks 5 items	9	31.0
Checks 4 items	11	37.9
Checks 3 items	1	3.5
Total	29	100

The majority mentioned 4 checks, these being expiry date, cold packs, vaccine arrangement and equipment. One respondent mentioned three items. However most of them were more concerned about the quantity (52%) and the expiry date (42%) than any other check.

Respondents were asked to describe how they pack their vaccines for immunization sessions. The responses are provided in Table 4.8.

Table 4.8: How CHNs pack vaccines

Description	No.	%
Correct	23	79.3
Incorrect	3	10.3
Not clear	2	6.9
No response	1	3.5
Total	29	100

Seventy-nine percent (79%) of them correctly did this; 10% provided incorrect answers while the response of 7% were unclear.

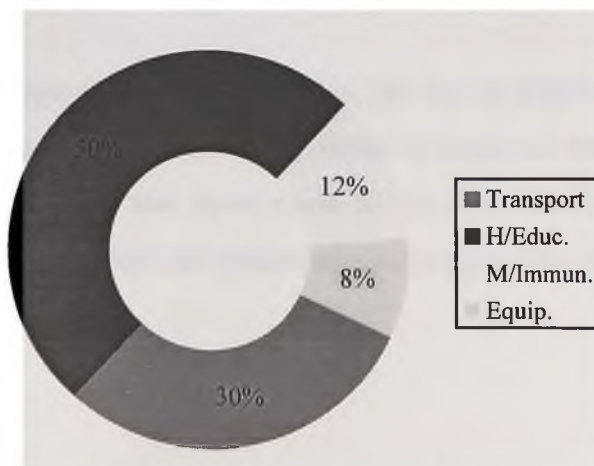
Generally CHNs did not re-use vaccines which were opened but not finished during an immunization session; 93% of them indicated that such vaccines were discarded, usually buried or thrown into the community pit latrine. Most of them (27 out of 28) also said that the most effective way of ensuring that vaccines were potent was to keep them at the right temperature.

Suggestions given by the CHNs for increasing immunization coverage included the provision of transport, intensifying health education on EPI within the communities and organizing mass immunization campaigns in isolated communities (Figure 4.8).

4.6 The Cold Chain in the District.

The cold chain is a system of people and equipment, which ensures that the

Figure 4.8: Suggestions for increasing immunization coverage



correct quantity of potent vaccine reaches the women and children who need it (32).

Within the District those involved in maintaining the cold chain are the Public Health Nurse (PHN) at Ho MCH/FP centre and CHNs in all MCH/FP centres. Information on the cold chain was therefore collected from these staff through a self-administered questionnaire and in-dept interviews. A total of 29 CHNs, 3 EPI supervisors and 3 staff in charge of the cold chain were interviewed.

Distribution procedure: Three centres, Ho, Tsito and Kpetoe have storage facilities. Vaccines are collected from the regional cold room and stored at the Ho MCH/FP centre first. Tsito and Kpetoe then collect from Ho for storage in their facilities. CHNs in Tsito and Kpetoe collect their vaccines from these centres for their programmes. All other sub-districts collect vaccines from Ho each morning before immunization sessions or overnight if they are far away. At the storage centres only Ho has other equipment apart from the thermometer as a means of cross checking the temperature of storage facilities. Generally discussions with the EPI supervisors and staff in charge of the cold chain in the district confirmed this.

The supervisors, like the CHNs, felt that to improve the cold chain as many Health facilities as possible should be equipped with storage facilities.

They agreed that there could be possible breaks in the chain especially during overnight movement of vaccines from Ho to the communities.

CHAPTER FIVE

5. DISCUSSION

5.1. Introduction

In the previous chapter the results of this study were presented. In this chapter some comments are provided on the most significant findings coming out of the study.

5.2 Characteristics of Cases

Most of the cases came from the Ho–Shia sub-district though they are equally distributed between rural and urban areas. The location of the District Hospital in Ho makes it reasonable that only very serious cases from the other sub-districts and rural areas would be sent there. Most other cases could be sent to the nearest Health centre.

Compared with studies in the 1970s the median age of cases has more than doubled while the case-fatality rate has reduced (33). These findings confirm Aaby et al suggestion that “as measles vaccination increases herd immunity and diminishes clustering of cases, it may reduce mortality even among unvaccinated children who contract the disease” (34).

While measles infection at ages lower than 9 months is not unexpected a proportion as high as 17% as found in this study is reminiscent of an

epidemic as occurred in Ibadan and reported by Adu and others where the proportion under 9 months was 20% (35).

In the Tsito sub-district such an outbreak was reported in 1998 at Anyarawase and in 1999 at Bame.

Further analysis of the data indicates that most cases were high-risk pregnancies with regard to parity, family size and the age of mother. Fifty-nine percent (59%) was either first born or of a parity of over four; 75% came from large households and 43.4% belonged to either teenagers or mothers above 35years. **High parity, large family size and Mother's age (less than 20 and greater than 35 years) may therefore be considered as high risk factors for contracting measles among the cases.** Similar findings have been noted in many studies in family planning. Reasons assigned to these include the following:

- First pregnancies usually occur to mothers who have little experience in childcare especially teenagers.
- High parity children are given less attention because of the already large number of children in the family.
- Older mothers are likely to be mothers of many children especially in the African context and therefore less likely to give children the needed attention.

5.2. Characteristics of mothers

With regard to a number of variables the mothers of cases can be considered to be a fairly homogenous group:

She is most likely to be married, a Christian who is a primary or JSS/ Middle school graduate, self-employed (farming or petty trading) and earns not more than ₵100,000 per month. She most likely lives in a brick house and owns a radio set. These are more typical of the rural population than the urban. Thus although 50% of mothers studied came from urban areas, they are more likely to be from among the urban poor rather than the classical middle income urban population.

Mothers exhibit similar attitudes and behaviour towards immunization, weaning practices, causes/treatment of measles etc. irrespective of their background characteristics (residence, income, education etc). For example a chi-square analysis (p-value = .05) of immunization status of child against a number of background variables showed no significant differences among the mothers (Table 5.1).

Table 5.1: Background characteristics of mothers and immunization status of child

Background Variable	P-value	Comments
Marital status	.42694	Not Significant
Level of Education (Sch./No sch.)	.29235	“ “
Residence (rural/urban)	.19464	“ “
Occupation (Formal/Informal)	.65574	“ “
Age of Mother	.25028	“ “
Sub-district	.07367	“ “

5.4 Main Influencing Factors

The data clearly shows that the majority of cases were not immunized making this an important factor in measles transmission. Thirteen cases were below nine months and were therefore technically not due for immunization according to MOH policy. Of the remaining 63 only 16 had been immunized, 47 had not.

The reasons given by mothers for not immunizing their children indicate that there are a substantial number of missed opportunities and **many mothers give their businesses a higher priority over the health of their children.** This requires that health care providers plan Health Education strategies to address these issues.

Another area of concern is the fact that although 16 of the children had been immunized against measles they still contracted the disease. As noted earlier CHNs in the district confirmed this. They indicated that close contact with infected persons as occur in outbreaks as well as possible breaks in the cold chain could account for this situation. In the Ibadan outbreak referred to earlier, 52% of cases were immunized and the authors argued that poor vaccine quality accounted for this.

Misconceptions about the mode of transmission of measles are high among mothers and this could lead to the spread of the disease within

the population. Some said that measles was transmitted through drinking bad water, others thought it was genetic. This further emphasizes the need to plan new strategies of Health education to address these misconceptions. However the fact that most mothers agreed that the clinic was the best source of treatment is a positive sign which can be exploited by health workers to ensure early reporting of measles cases.

Again, the fact that 13 children had the disease before they were “officially” due for immunization suggests that in some communities early immunization based on the 2-dose schedule could be useful.

Malnutrition could also have had a strong influence in the contraction of the disease among the cases studied. Most were not exclusively breast fed for the recommended 4-6months. Unfortunately the supplementary food given was mostly “plain koko” which was of very little nutritional value to the child.

For most mothers the best way to prevent measles is through immunization but they did not act on this knowledge. Many researchers in Health Education have noted the difficulty in translating knowledge into action especially because of a number of hurdles that have to be overcome. Mothers in this study have explained that their problem, among others, was making the time for immunization programmes. The District Strategy for immunization could take note of this.

5.5 Responses from CHNs

These were administered generally to find out some aspects of the knowledge of CHNs on the cold chain and how they apply these. The results generally showed that most nurses knew what to do and applied their knowledge to their work. However a few require refresher training to enable them adequately execute the task ahead of them.

The finding that 17% did not know how to properly pack vaccines for immunization may be a mere coincidence with the fact that 21% of all measles cases are immunized. It may also however be a pointer to the fact that **what CHNs do to ensure a good cold chain can contribute to the reduction of the incidence of measles in the Ho District.**

CHAPTER SIX

6. RECOMMENDATIONS AND CONCLUSION

6.1 Recommendations

The following recommendations are made in line with the findings of the study.

- The District Health Administration has begun two processes that are important for increasing coverage of the immunization programme, namely, the supply of motorbikes and of fridges to the sub-districts. These two programmes should be accelerated so that each facility would have at least one motorbike and two fridges – gas, electric or kerosene.
- All other equipment especially those that are used in checking vaccine temperature should be provided for CHNs during outreach immunization sessions.
- CHNs should make efforts to trace defaulters. This should not be difficult since they already have the names and addresses of all children and their mothers who registered for MCH services in their target communities.
- Mini mass immunization programmes should be organized for deprived and isolated communities so that many more children can be reached.
- The District should make use of the new local government structures particularly the unit committees, to improve community participation in Child Welfare Clinics.

- Sub-districts should create more outreach centres in an effort to expand geographical accessibility of child welfare services into deprived communities.
- CHNs should intensify and re-orientate their health education strategies to meet the needs of mothers. Particular attention should be given to the need for mothers to have more time for the health of their children.
- An incentive package should be developed for hard working successful CHNs and sub-districts. This may include annual Best Worker/Sub-district Award.
- Continuous in-service training should be provided for all Community Health Nurses especially on their role in maintaining an effective cold chain.
- CHNs should re-organize their working hours to make it possible for them to meet as many mothers as possible during CWCs.
- There is absolutely no male participation in the provision of child welfare clinic services at the family level. An intensive education on male participation should be mounted in the district with the aim of getting fathers to send their children to the clinics when the mothers are not available.
- In communities where there is evidence of early measles infection (before 9 months) the District Health Administration should ensure that the policy of introducing the 2-dose regime for measles vaccination is implemented.
- Recorders should be encouraged to complete all information on patients' cards including their addresses. The district should then team up with the

RHA to analyze data generated by the health facilities and use these to improve service provision.

- Family Planning education and services should be intensified to help reduce high-risk pregnancies.

6.2. Conclusion

This study examined the records of measles cases in the Ho District Hospital and interviewed their mothers. A number of exciting findings have been revealed including the fact that many cases have not been immunized.

However a number of important areas are still opened to further investigation including:

- An overall evaluation of the EPI in the District
- Improving community participation in the EPI.
- Sero-conversion of vaccines in children in the district. This study is particularly important because poor sero-conversion may be equated to non-immunization. Interestingly studies have found varied rates of sero-conversion of vaccines in some West African countries (36,37).

It is my fervent hope that the findings and recommendations will be implemented by the DHA for improving not only health education and immunization coverage but also maximum efficiency in the cold chain.

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APPENDIX I**WORK PLAN**

NO.	ACTIVITY	DATE	RESEARCH STAFF RESPONSIBLE
1	Preparation of Research Proposal.	March 7 – 31	Francis Yankey
2	Submission of proposal to SPH	April 2	Francis Yankey
3	Meeting with DHMT. (Ho)	May 21	Francis Yankey
4	Meeting with other staff e.g. Hospital.	May 21	F. Yankey
5	Training and Pre-testing	May 24 –28	F. Yankey/ S. Agbesi
6	Data Collection	June 1-30	MCH staff (10)

7	Data Editing/Entry	July 1 – 9	Francis Yankey
8	Data Analysis	July 9 – 11	Francis Yankey
9	Report Writing / Typing	July 12 – 26	Francis Yankey / Secretary
10	Presentation to RHMT/ DHMT	July 28	Francis Yankey
11	Finalizing Report	August 2 – 24	Francis Yankey
12	Submission of Report To SPH	August 25	Francis Yankey

APPENDIX II**QUESTIONNAIRES****QUESTIONNAIRE FOR MOTHERS**

Serial No. _____

Name of Interviewer _____

Name of Respondent _____

Name of Child _____

Name of Community _____

Type of Community: Urban [] Peri-Urban [] Rural []

Sub-District: Abutia [] Adaklu [] Ho-Shia [] Kpedze [] Kpetoe []

Tsito []

CHARACTERISTICS OF CHILD

101. Sex: Male [] Female []

102. How old was child when she/he had measles? _____

(Record from card, confirm during interview).

103. How many children have you ever given birth to? _____

104. How many were born before (name of child)? _____

105. How many years are there between him/her and the child before
him/her? _____

106. Disease outcome: Recovered [] Not yet recovered [] Died []

Disabled []

107. If disabled state type of disability _____

CHARACTERISTICS OF MOTHER

201. How old are you? ____
202. Can you please tell me the month and year in which you were born?

203. What is your marital status? Married [] Divorced [] Widowed []
Never Married [] Separated [] Co-habiting [] Other (specify)

204. Have you ever been to school? Yes [] No []
205. If yes what was the highest level reached? Primary [] JSS/Middle []
SSS [] Tertiary [] Other (specify)_____
206. How many years have you spent in school? ____
207. What work do you do for a living? Farming [] Trading []
Teaching [] Office [] Other (specify)_____
208. Estimated income per month: <¢100,000 [] ¢100,000-¢149,000 []
¢150,000-¢199,000 [] ¢200,000 and above [] None []
209. What religion do you belong to? Christianity [] Islam []
Traditional Rel. [] Other (specify)_____
210. Housing type (observe): Mud [] Sticks [] Bricks [] Cement
blocks [] Other (specify)_____
211. Do you (or your husband) own any of the following? Radio []
Television [] Video [] Radio/Cassette player [] None []
Other (specify)_____

INFLUENCING FACTORS

301. Where is the nearest health facility from your community?

302. How far away is it? _____

303. Has your child been immunized against measles? Yes [] No [].

(If yes check card).

304. If yes, where did you go for the immunization? _____

305. If no, why was child not immunized? Financial [] Transport []

No idea about immunization [] Husband opposes [] I don't accept it []

Other (specify) _____

306. If you don't accept state reason: Side effects [] Religion [] Have alternative [] (state the alternative)

Other (specify) _____

307. For how long did you breastfeed your child? _____

308. As a baby how long did it take before you gave him/her water? _____

309. At what age did you introduce other foods to him/her? _____

310. What food did you give him/her? _____

311. Did any member of your household get measles earlier? Yes [] No []

312. Has anyone in the compound ever had measles? Yes [] No []

313. How many other people does the child sleep with? _____

314. Apart from your children are there any other people living with you?

Yes [] No []

315. How many are you all then in the household? _____

316. What do you think makes a child get measles? High temperature
Bad air Sleeping with an infected person Using materials from an infected person From the gods Other(specify)_____
317. If a child gets measles what should be done first in treating him/her?
Use herbs Buy drugs from the chemical shop Send him to the clinic Go to the traditional healer Other (specify)_____
318. What will you do to prevent your child from getting measles?
Immunize him Use herbs Don't use materials from an infected
Don't sleep with an infected person Keep environment clean
Other (specify)_____

QUESTIONNAIRE FOR FIELD STAFF (CHNs)

Station: _____

Sub District: _____

Respondent: _____

101. How many communities are you expected to cover?

102. Are you able to reach all of them?

103. If you are what have helped you to do this?

104.If you are not what are the problems?

105. Have you come across any vaccinated child who later had measles?

106. If yes how many of such cases have you seen?
107. What do you think is the reason for this situation?
108. List the equipment available to you for conducting outreach immunization sessions?
109. What checks do you conduct before leaving for the session?
110. Describe briefly how you pack vaccines in the cold box before leaving for an immunization session?
111. What do you do with vaccines opened but not used?
112. What do you think can be done to ensure that vaccines are always potent?
113. What can be done to increase the coverage of immunization in the district?
114. Any other comments you would like to make concerning the immunization programme including the cold chain system.

QUESTIONNAIRE FOR EPI SUPERVISORS

101. From where do you receive vaccines for your immunization programme?
102. Describe the condition in which they come.

103. In your opinion are these adequate to keep the vaccines potent?
104. If no what are your reasons
105. Describe briefly the procedure for ordering vaccines and supplies.
106. Do you find any problems with it?
107. If yes state these.
108. List the equipment you have to keep the cold chain working.
109. Are these adequate?
110. If not what is missing?
111. What problems (if any) do you have with the equipment listed?
112. Who have been trained to use the equipment?
113. What in your opinion can be done to improve the cold chain system in the district?
114. How often do you experience emergencies such as power failure?
115. What do you do under such circumstances?

116. Are you able to reach all your target population?

117. If yes what factors have helped you to do this?

118. If no what problems do you face in trying to do this?

119. What can be done to increase the coverage of immunization in the district?

120. Any other comments you would like to make

**QUESTIONNAIRE FOR STAFF IN-CHARGE OF
REFRIDGERATORS AND FREEZERS**

Station: _____

Sub district: _____

Respondent: _____

101. How many of the following does this center have? Freezer ___ Cold
box _ Refrigerator ____ Other (specify) _____

102. What is the highest and lowest temperature within which you keep
your vaccines?

103. Which of these do you use to monitor the temperature of your storage
facilities? Thermometer [] Temperature Chart [] Cold chain
Monitor [] Freeze watch indicator [] Other (specify) _____

104. How many times each day do you read the temperature of your
fridge/ Freezer?

105. Which type of materials/vaccines do you load in the following
parts of your fridge/freezer:

Freezing compartment:

Top compartment:

Middle compartment:

Lower compartment:

Door:

106. Do staff sometimes keep food in the fridge/freezer?
107. How many times do you open the fridge in a day?
108. What do you do with vaccines taken out of the fridge but not used during an immunization session?
109. What do you do when the temperature in the main compartment of the fridge is too cold?
110. What do you do when it is too hot?
111. Which vaccines do you keep in the freezer?
112. What do you do with vaccines when your fridge is not working?
113. How do you do defrosting to ensure that your vaccines do not lose their potency?
114. Have you received any training in how to maintain the cold chain?
115. What problems do you face in ensuring that vaccines are properly stored?
116. If a fridge or any other equipment under your care breaks down what procedure do you follow to have it repaired?
117. How do you get it replaced?
118. Are you satisfied with the procedures?

119. If not what should be done to improve it?

120. Any other comments you wish to make.