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CHILDHOOD IMMUNISATION IN THE KINTAMPO SUB DISTRICT: COVERAGE, BARRIERS AND IMMUNOLOGICAL STATUS

BY

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SUBMITTED TO THE SCHOOL OF PUBLIC HEALTH, UNIVERSITY OF GHANA, LEGON, IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE AWARD OF THE MASTER OF PUBLIC HEALTH DEGREE.

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DECLARATION

I declare that all the work in this study has been the result of my own research, except where specific references have been made.

It has not been submitted for any other degree, nor it is been submitted concurrently in candidature for any other degree.

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DEDICATION

This work is dedicated to the memories of my late sister, **MISS VICTORIA EWUSI-EMMIM** and **DR. PAUL ARTHUR**, one of my supervisors who died before final revision was done.

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ACKNOWLEDGEMENT

I wish to express my sincere gratitude to my Academic Supervisors, Dr. Paul Arthur and Dr. Frank Bonsu and my field supervisor, Dr. E.T. Adjase and Dr. Alex Quarshie who advised and critiqued my work. Tragically, Dr. Paul Arthur died before the final revision was completed.

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ABSTRACT

Under-five mortality in developing countries is a major problem. Vaccine preventable disease like measles, tuberculosis, pertusis and tetanus account for a significant proportion. Ghana has therefore set herself the aim of achieving herd immunity for these diseases. The District Health Manager Teams have been provided with resources to enable this noble aim to be achieved and the Kintampo District is no exception.

This study assesses the immunisation coverage of the Kintampo subdistrict of the Kintampo district of the Brong-Ahafo Region of Ghana, the reasons for failure to complete immunisations and seroepidemiological survey for the measles vaccine.

The WHO 30 Cluster method was used to select 217 children between 12 and 23 months old living in the sub-district. Their immunisation cards were inspected after parental consent had been given and the dates for the various antigens recorded. The mothers of those with no cards were asked about their children's immunisation status and these were also recorded.

Blood samples were taken from 102 children after random sampling. The sera was separated and the samples analysed for measles IgG antibodies using an Elisa kit at the Noguchi Memorial Institute of Medical Research.

It was found in the study that 62.67% of the children completed their immunisation schedule before their first birthday. The majority of the children (73.27%) were fully immunised before they ware 24 months and 26.27% were partially immunised.

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The sero-conversion rate for the measles antigen was 90.2%, which gives an idea about the quality of immunisation of the sub-district.

It was recommended that the WHO 30 Cluster method should be used to conduct immunisation coverage at frequent intervals. The immunological status of children should be carried out to ascertain the level sero-conversion. Health education should be intensified for mothers to understand the need and importance of having their children fully immunised.

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ABBREVIATIONS AND THEIR MEANING

EPPI	-	Expanded Programme on Immunisation
WHO	-	World Health Organisation
DHMT	-	District Health Management Team
VPD		Vaccine Preventable Disease
UNICEF	-	United Nations Children Fund
OPV	-	Oral Polio Vaccine
BCG		Bacillus Clamatte Guerin Vaccine
DPT	-	Diphtheria, Pertusis and Tetanus Vaccine
ELISA	-	Enzyme-Linked Immunosorbent Assay
FIC	-	Fully Immunised Child

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DEFINITION OF TERMS

Immunisation Coverage: Proportion of individuals in the target population who are immunised.

Immunisation Coverage Target: A goal that is prepared for a health facility that states what proportion of individuals in the target population will be immunised with specific vaccines in a given time period.

Target Population: Group of individuals who are included in the immunisation services based on their age and the area in which they live.

Cluster: A small group that is part of a population that is being surveyed; for the purposes of evaluating immunisation coverage, a cluster is defined as 7 or more children in the age range being evaluated.

EPI Cluster Sampling Technique: A survey done in 30 systematically selected clusters of 7 or more children to estimate the immunisation coverage of all the children that live in the area.

Fully Immunised Child within 1 year: A child who receives all EPI vaccines at the appropriate age and an interval of at least 28 days between the adjacent doses of the multiple vaccines before age 1 year.

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CHAPTER ONE

1.1 INTRODUCTION

Vaccine Preventable Diseases (VPD) like measles, poliomyelitis, tetanus, diphtheria, pertusis (whooping cough) and tuberculosis account for a significant proportion of under-five mortality and morbidity. Approximately eleven million deaths occurred in the world in 1999 and VPD contributed a significant share (1).

Globally, a child born in 1999 has a 6.75 chance of dying before reaching the age of five years. In Africa, on the average, 15% of new born children die before their fifth year. In Europe less than 2% of children die before their fifth year (2). In Ghana, the under-five mortality has been estimated between 76-122 per thousand live births (urban and rural disparity). In the Brong-Ahafo Region of Ghana, it is estimated to about 120 per thousand live birth (3).

In 1974, the World Health Assembly because of the high morbidity and mortality associated with VPD adopted the Expanded Programme on Immunisation against VPD available to all children by 1990. Before the launch by the World Health Organisation (WHO), less than 5% of the world's children were immunised against the initial six target diseases – diphtheria, tetanus, whooping cough, poliomyelitis, measles, and tuberculosis during their first year of life (4).

By 1990, almost 80% of the 130 million children born each year were immunised before their first birthday, an achievement involving over 500 million immunisation contacts with children throughout the year. Within two decades the EPI was preventing the death

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of at least 3 million children a year. In addition, at least 750, 000 few children were blinded, crippled, mentally retarded, or otherwise disabled (4).

Ghana officially launched her programme in 1978 with the objective of fully immunising 80% of her children aged one year by 1983 (5). A review was done in 1987 and a new target of 80% immunisation by 1990. In 1989, a situational analysis of EPI coverage in Ghana showed that in spite of the success of the EPI, coverage of some vaccinations was still low. Only 50.7% for DPT 3 and 5 and 51.5% for the OPV 3 including a dropout rate of approximately 40% (5). The target set for 1990 is yet to be achieved in the year 2001. Yellow fever immunisation was added to the EPI in 1998. In Ghana, it is expected that a child should have finished the routine immunisation schedule by age one as shown below.

AGE	VACCINE	NO. OF DOSES
Birth	BCG, OPV0	1
6 weeks	OPV1, DPT1	1
10 weeks	OPV2, DPT2	1
14 weeks	OPV3, DPT3	1
9 months	Measles, Yellow fever	1

N/B:
Interval between 2 doses should not be less than 4 weeks.

It is estimated that it costs in the range of US$2-25 to fully immunise a child with the traditional antigens (6). A country like Ghana with a Gross National product (GNP) of between US$200-400, EPI constitutes about 16% of the US$7-10 allocated to the health needs of an individual. Despite a developed immunisation infrastructure, Ghana continues to Experience difficulty in achieving high coverage levels (7).

The standard indicator for a Fully Immunised Child (FIC) is the third dose of the Diphtheria, Pertusis and Tetanus vaccine (DPT 3). The DPT vaccines was chosen

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because it has to be given three times and each time it is given by intramuscular injection which is associated with pain – which implies a mother would have to sent her children to endure pains three times. In Ghana, the national average is 68.9%. It is 70% in the Brong-Ahafo Region (3) and averages around 64.3% in the Kintampo District of the region over the last five years (8).

1.2 STATEMENT OF THE PROBLEM

The Kintampo District has been doing a lot in the drive to achieve the national immunisation coverage objective of the nation. The District Health Management Team (DHMT) facilitates the management of its health programmes including the EPI. The DHMT's annual reports for the last five years show that the district gradually has been increasing her EPI coverage as shown below

	YEAR OF COVERAGE PERCENTAGE									
ANTIGEN	1996	%	1997	%	1998	%	1999	%	2000	%
BCG	3415	59	3905	63	4912	74	5846	86	5899	83
OPV 3	3064	53	3420	55	4571	69	5052	74	5502	78
DPT 3	3064	53	3356	54	4372	66	4857	71	5426	77.4
Measles	3009	63	3613	58	4174	63	4806	70	5844	82
Yellow Fever	1193	21	1493	24	2925	44	4127	61	5522	78

Source: DHMT reports 1996-2000.

The average for the DPT 3 vaccine for the district is 64.3% compared with the national average of 68.9% and the regional average of 70%. There has also not been any in-depth immunisation survey to find out about the accuracy of the reported immunisation coverage over the years.

The district has checked successes in the decline of the reported cases of the VPD as shown by their absence from the top five diseases by attendance at the Kintampo

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hospital. The top five diseases in the district now are Malaria, URTI, Hypertension, Diarrhoea and accidents. However, there have been reported cases of some VPDS in the District. According to the District Disease Control Unit report, one hundred and twenty-one cases of measles were reported in the District in 2000.

1.3 RATIONALE

This study sets out to conduct a coverage survey to determine the immunisation coverage and the factors preventing the utilisation of immunisation services and to conduct a sero-epidemiological survey on measles because none of these has been done in the district since the inception of the EPI.

1.4 LITERATURE REVIEW

The true founder of EPI was the English country doctor Edward Jenner, who in 1796 showed that scratching cowpox virus unto the skin produced against smallpox. Thanks to his scientific demonstration of the efficacy of this procedure, the practice of vaccination (immunisation) has now become wide spread and his been applied to other infections (9). Currently there are vaccines against such childhood disease like measles, tetanus, poliomyelitis, diphtheria, tuberculosis, whooping cough, yellow fever and haemophilus influenzae infection.

Despite the availability of vaccines and the efforts of governments and agencies there are concerns about the levels of immunisation coverage. For example, global immunisation against poliomyelitis was slightly down from 85% in 1991 to 80% in 1992 (10). UNICEF estimates that despite the proclaimed success of its universal childhood immunisation programme efforts in the 1980s, which sought to achieve 80% vaccination

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coverage with the antigen described in the WHO programme has measles vaccine coverage of less than 65% for children aged one year in four countries (11).

Immunisation coverage survey done in India, South Africa, Cameroon, Bangladesh and Mozambique attest to the low level of coverage (12-16).

Factors identified as important for achieving and maintaining adequate levels of coverage include and adequate supply of vaccine (17), accessibility of vaccination sites and convenient hours for vaccination (18-19), short waiting times (20) and the levels of missed opportunities for vaccination (21). However, even when vaccines are readily available and service delivery is good, coverage rates may still be low, owing to problem arising from knowledge, attitudes and perceptions about vaccination (22).

Health workers have employed strategies to improve coverage. Among these are mass immunisation campaigns and health education. While mass campaigns may be attractive politically and many have provided high rates of coverage, several problems have been encountered. These include low coverage among those most in need of attention (14). In Ghana and Tanzania, studies have shown that using teams of health workers to provide basic health services including EPI to rural villages indicate that only 50% of eligible children were likely to attend (23-24).

Attendance at static child welfare clinics also decreases with the distance to the village from the health centre (25).

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A study on the quality of immunisation data in Nepal reported that immunisation reports are generally accepted as the truth and their accuracy not questioned because quality control mechanisms are not port of the immunisation programme (26).

A variable incidence of measles infection among vaccination population of several countries including the United Kingdom (27) the USA (28) Canada, Zimbabwe, Tunisia and Hong Kong (29-32) has been reported. The sporadic outbreak of measles could be explained either by primary vaccination failure attributed to persistent maternal antibodies, important vaccine, improper vaccine storage and administration technique (33). Secondary vaccination failure, which may be due to other reasons: for example, lack of continuous antigenic stimulation, because of which lifelong immunity is not produced.

Alternatively, the outbreaks of measles could be done to accumulate unvaccinated cases, as whether or not infants were vaccinated for measles is an important determining factor for the future outbreak of measles disease.

Measles antibody prevalence after a mass immunisation in Sao Paulo, Brazil, showed that 94.1% of subjects were positive for measles antibody four months after the campaign (34).

Another study of research into the current immunological status of immunised children in Saudi Arabia showed hat the measles vaccine rate was 26.3%. The measles IgM levels were detected significantly in recently vaccinated females (56.9%). The measles IgG positively unaffected by age, sex and residence was found in 87.4% of children (35).

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1.5 RESEARCH OBJECTIVES

The general objective for the study was to assess the childhood immunisation in Kintampo sub-district in the Brong-Ahafo Region of Ghana.

The following specific objectives were examined to:

1. assess the immunisation coverage of the Kintampo sub-district area.
2. find out about the barriers preventing usage of immunisation services in the areas.
3. determine the current immunological status of immunised children been 12 and 23 month of age.
4. make recommendation to the DHMT on how to improve the immunisation coverage.

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CHAPTER TWO

2.1 THE STUDY AREA

Location

The study was conducted in the Kintampo District of the Brong-Ahafo Region of Ghana. It is one of the 13 Districts of the Region. The District lies within 90' and 7.30' and longitudes 2.10' west and east respectively. The district has five boundaries. The northern part of bounded by the Black Volta, the western by Wenchi district, and the eastern by Atebubu district, Techiman district to the south and to the southeast, the Nkoranza district. T he district covers an area of 7162 km².

Geography

The vegetation is mainly of the forest – savannah transition type. There are two rainy seasons: the major season from March – June and the minor from July to November. The main rivers in the district are the Urukwain, the Oyoko, the Nyamba and the Black Volta. The district also has numerous waterfalls. The main ones are the Kintampo and Fuller falls.

Demography

The population of the District for 2002 is estimated at 177287 with an annual growth rate of 2.6% (based on the 2000 census). The population density is 24.75/-sq. km. Males constitute 51% and females 48.3% of the population. The main indigenous ethnic groups are the Bonos and the Mos. There is however, a large immigrant population from the Northern and Upper Regions.

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Socio-economic activities

The main economic activities with the district are in the agriculture and services sectors. Majority of the working class are farmers and/or sellers of agricultural products. The farmers are mostly peasant farmers. The chief crops include maize, yam, cassava, beans and vegetables. Small-scale merchandising and dressmaking from the bulk of the workers in the service sector. The few workers are in government employment. This group includes the civil servants, teachers, nurses and doctors and the district assembly workers.

Transport and Communication

The main Kumasi – Tamle trunk road passes through the district. Kintampo, the district capital serves as the stop over point for vehicles plying the route. Feeder roads serve the rest of the district most of which is unmotorable during rainy season. Various communities are however linked by footpaths. Vehicles plying between the sub-district and the district capital are mostly old and ill – maintained. The communication facilities with the district include telephone, fax and e-mail and Motorola facilities.

Education

There are sixty-nine kindergartens, one hundred and eighteen primary schools, forty-three junior secondary schools (JSS) and two Senior Secondary Schools (SSS). The district also has houses the Rural Health Training School of the Ministry of Health, which trains Field Technicians and Technical Officer for the ministry.

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Housing and Sanitation

The number of houses in the District is estimated at 10,000 of which about 40% are in the district capital. Most of the houses in Kintampo township are build with cement and roofed with aluminium sheets while the houses in the rural communities are either earth block or wattle and dub roofed with thatch. The entire District has no access to pipe-borne water, rivers and streams and hand dug wells. Indiscriminate disposal of refuse is widespread in the District.

Health Service

The district is divided into eight sub-districts by health administration and health services are organised around these sub-districts. The district is served by one government hospital at Kintampo with satellite health centres. There are also trained and untrained traditional birth attendants and a large informal health providers especially traditional healers who play an important role in the management of illness in the district.

The district also houses the Kintampo Health Research Centre of the Ministry of Health. The Centre is currently involve in studies in the impact of Vitamin A supplementation on the health of women in the reproduction age group.

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2.2 SAMPLING DESIGN

Type of Study

The study was both quantitative and qualitative.

Target population

The target population was children between twelve and twenty-three (12-23) months old on the days the research was done and lived in the Kintampo Electoral sub-district. The target population constitute about 4% of the population within the area of study.

Sample size

The WHO/EPI 30 cluster survey method for immunisation coverage was used. This involved selecting 30 clusters from the Kintampo Electoral district and also selecting at least seven children from each cluster giving a total of at least 210 children in the district. Electoral units formed the clusters and Random sampling was used to select the 30 clusters from the units constituting the Kintampo electoral area.

Using a coverage survey containing 30 clusters meets the following standards of reliability:

The results of the survey will have a level of:

- Accuracy of within plus or minus 10%
- The level of confidence of 95%

Sampling technique

A probability sampling was used in selecting the children in the cluster and the first house to enter into. The centre of a cluster was determined through a cursory tour of the cluster with the assistance of the unit chairmen/assemblymen for the area.

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The direction for selecting houses was determined through he spin of a pen. Afterwards the number of houses within the direction chosen was estimated. The first house was randomly chosen. The next house visited was the house whose main gate was opposite the one we came from. This process continued till the number required from the cluster was obtained.

For the serological study, hundred and two children were randomly selected after eliminating those without the measles immunisation.

Data collection techniques and tool

Data collection techniques used were modified childhood immunisation cluster forms, the Road to Health Cards (RHC), summary forms, evaluation forms, in-depth interviews and the collection of serum.

Immunisation cluster from administration

Immunisation cluster forms (modified) were administrated to mothers or guardians whose children were involved in the study. It was used to determine the background characteristics of the mothers, the children, the immunisation status of the children and the reasons for the inability to complete immunisation before the first birthday of the children.

In-depth interview

In-depth interviews were used to explore the contribution of service factors to the problem of non-immunisation in the district. They were conducted on the District Director of Health Services (DDHS), the District Public Health Nurse, and a Community

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Health Nurse involved in immunisation, the Technical Officer in charge of the cold chain and the Health Administrator.

Serum analysis

Blood samples from one hundred and two children were collected among those selected after informed consent from mother. The samples were centrifuged and the serum frozen. The samples were analysed later at the Noguchi Memorial Institute for Medical Research, Legon for measles IgG antibodies using the Measles IgG Elisa kits supplied by Diagnostic Automation, Inc. of USA. This was to assess the level of sero-conversion.

Pre-test

The modified immunisation cluster forms were pre-tested in a cluster not selected for the study and corrections were made. These included rephrasing ambiguous questions, omitting redundant and adding omitted ones.

2.3 DATA COLLECTION

Permission was sought from the Regional Director of Health Services, the District Director of Health Services and the District Assembly before data collection was begun. Thirty research assistants were recruited from the Rural Health Training School in the Kintampo. These students were in the first and second year Technical Officer's class. Working on the study was an incentive to apply what had been taught in research methodology in class. Three supervisors were also recruited.

Fifteen pairs of teams were formed and each five pairs were assigned one supervisor. Each pair worked in a cluster a day. All the assistants and supervisors were trained in

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community entry and in the administration of the cluster forms. The supervisors were trained to receive data from the field and edit them. The training took three days. The period for the collection was two days.

The blood collection took five working days. About 1ml of blood were taken from the selected children after parental consent had been given. The dates of immunisation in the Road of Health Cards (RHC) of the selected children were copied on the immunisation cluster forms (Appendix 4) after they had been collected from the mothers and guardians, where there were no RHC, the mothers were asked if their children have been immunised or not. If they say yes, they were asked when and these were also recorded.

2.4 DATA ANALYSIS

Information from the immunisation forms was transferred to cluster summary forms (Appendix 3). The immunisation coverage for the various antigens/vaccines were calculated. Information on the reasons for incomplete immunisation were copied unto summary from (Appendix 6) and the various reasons tabulated.

2.5 ETHICAL CONSIDERATION

Before the start of the study, the type and purpose of the study were explained to the traditional, administrative leaders and opinion leaders in the area and their consent to carrying out the study obtained. The general population were informed and reasons for the study and the methods to be used explained to them with the help of the assemblymen and the unit chairmen. Individual informed consent was obtained from parents or guardians before subjects were included in any part of the study.

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All information gathered on individuals were considered confidential and treated accordingly. The study was conducted in accordance with principles on Ethics in Human Experimentation and the standards established for Good Clinical practices were adhered.

2.6 LIMITATIONS

The study was conducted on only one electoral sub-district (instead of the six) because of time and financial constraints. The results would therefore apply to only one sub-district, the Kintampo sub-district, the largest of the sub-districts.

Other limitation was that the inability to produce the RHC in some cases. This may affect the 'true' vaccination coverage by causing an underestimate.

With the availability of more funds, logistics and time, a more comprehensive study can be done with this study serving as the pilot study.

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CHAPTER THREE

FINDINGS

This section is the presentation of the finding obtained from the study.

Background characteristics of the children

Table 1: DISTRIBUTION OF MALES AND FEMALES

CHARACTERISTIC	FREQUENCY	PERCENTAGE (%)
SEX		
Male	118	54.37
Female	99	45.63
Total	217	100

Males constituted 54.37% of the study population whiles females formed 45.63%.

Background characteristics of mothers age distribution

Table 2: AGE DISTRIBUTION OF MOTHERS

AGE GROUP (YEARS)	FREQUENCY	PERCENTAGE (%)
15 – 20	32	14.75
21 – 25	38	17.51
26 – 30	52	23.96
31 – 35	41	18.89
36 – 40	21	9.68
41 – 45	5	2.30
46 – 50	1	0.46
Unknown	27	12.44
Total	**217**	

One hundred and ninety (190) of the mothers interviewed knew their ages. Their ages ranged between 16 and 46 years with a mean age of 27.14 years and the standard deviation of 17.57 years.

The majority of the respondents (23.96%) were within the age group 26–30 years. Only one-person representing 0.46% was above 45 years.

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Education Of Level Of Mothers

Table 3: DISTRIBUTION OF HIGHEST EDUCATIONAL LEVEL ATTAINED

EDUCATIONAL LEVEL	FREQUENCY	PERCENTAGE (%)	CUMULATIVE
No education	103	47.50	47.50
Primary	31	14.30	61.80
JSS/Middle	792	33.17	95.00
SSS/Secondary	9	4.14	99.40
Tertiary	2	0.92	100
Total	217	100	

Less than half of mothers (47.5%) had had no education and they formed the majority of the respondents.

Only a small proportion of the mothers (0.29%) had had tertiary education. Those who had had up to JSS/Middle schooling constitute 33.17% of the respondents and they form the majority of those have had formal education.

Immunisation coverage

Table 4: SUMMARY OF IMMUNISATION COVERAGE

Total number of children in study	217
Number of households visited	925
Average household/cluster	30.8
Total retention of RHC	202
Percentage of retained cards	93.08
BCG scar (total)	196
BCG scar (percentage)	90.32

The total number of children in the study was 217 and they total in the retention of RHC was 202 given percentage retention 93.08%.

One hundred and ninety-six (196) of the children sampled had the BCG scar giving a percentage of 90.32.

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Table 5: IMMUNISATION COVERAGE BY ANTIGENS

VACCINE AND DOSE	PERCENTAGE COVERAGE BY CARD	PERCENTAGE COVERAGE BY CARD/HISTORY
BCG	88.85	96.77
DPT 1	89.4	98.16
DPT 2	84.79	95.85
DPT 3	82.49	89.8
OPV 1	87.09	95.39
OPV 2	88.85	95.39
OPV 3	79.26	87.55
Measles	76.04	83.41
Yellow fever	83.87	88.48

The immunisation coverage by cards for all the antigen were in the higher 70s and 80s. The highest antigen by frequency was DPT1, which was 89.4%. The lowest antigen by frequency was Measles, which was 76.04%. DPT3, which is the standard antigen for immunisation was 82.47%.

By history and card, the highest frequency antigen was DPT1, which was 98.16% and the lowers was 83.41% for Measles.

Table 6: IMMUNISATION STATUS (BY CARD ONLY)

STATUS	PERCENTAGE (%)
Not immunised	0.46
Partially immunised	26.27
Fully immunised	73.27
Fully immunised before one year of age	62.67

A high proportion of the children (73.27%) were fully immunised but only 62.67% were fully immunised before one year. The children who were partially immunised constituted 26.27%, whiles one child constituting 0.46% of the study was never immunised.

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Table 7: SOURCE OF IMMUNISATION

	PERCENTAGE (%) OF FACILITY/IMMUNISATION SOURCE			
ANTIGEN	HOSPITAL	HEALTH CENTRE	OUTREACH	PRIVATE
BCG	74.76	1.43	1.9	1.56
DPT1, DPT2, DPT3	40.92	2.56	42.05	1.65
OPV1, OPV2, OPV3	50.33	6.62	36.29	1.16
Measles	48.06	2.21	44.75	1.14
Yellow Fever	47.9	1.56	43.23	2.39

For all the antigens apart from BCG, the hospital and outreaches were the most frequent source for immunisation. For example, for DPT immunisation 49.02% were in the hospital and 42.05% from outreaches. For measles 48.06% were in the hospital and 44.75% was from outreaches. Most of all BCGs (74.76%) were given in the hospital.

Reasons For Not Completing Immunisation

Three broad classifications were used for this purpose. The classifications were lack of information, lack of motivation and obstacles. Lack of information constituted 25.36% of reasons for not completing the immunisation, lack of motivation constituted 3.45% and obstacles 70.69% as shown on the next page.

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Reasons For Not Immunising Children

Table 8: REASONS FOR NOT COMPLETING IMMUNISATION

LACK OF INFORMATION	NUMBER	PERCENTAGE (%)
Unaware of need for immunisation	6	10.34
Unaware of need to return for other immunisation	5	8.62
Place and/or time of immunisation not known	2	3.45
Fear of side effects	0	0
Wrong ideas about contra indications	0	0
Others	2	3.45
Sub Total	15	25.86
LACK OF MOTIVATION	**NUMBER**	**PERCENTAGE (%)**
Postponed until another time	1	1.72
No faith in immunisation	1	1.72
Rumours	0	0
Others	0	0
Sub Total	2	3.45
LACK OF MOTIVATION	**NUMBER**	**PERCENTAGE (%)**
Place of immunisation	3	5.17
Time of immunisation inconvenient	3	5.17
Vaccinator absent	1	1.73
Vaccine not available	5	8.62
Mother too busy	11	19.99
Family problem including illness of mother	5	8.62
Child ill-not brought	2	3.74
Child ill-brought but not given immunisation	1	1.72
Long waiting time	0	0
Others*	10	17.24
Sub Total	41	70.69

* Eight mothers representing 14.03% gave travelling out from sub-district as the reason for not completing immunisation.

Table 9: RESULT OF ELISA TEST FOR MEASLES IgG

RESULT	NUMBER	PERCENTAGE (%)
Positive	92	90.20
Negative	9	8.80
Equivocal	1	0.98
Total	102	100

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The majority of the children (90.2%) selected for the serological test sero-converted for measles vaccination, whiles 8.80% did not sero-convert. There was only one case of equivocal which constitute 0.98%. Sensitivity of the test is 99.3% and the specificity 91.1% according to the literature accompanying the Elisa kit.

In-depth interview findings

All the health workers were conversant with the immunisation schedule, the vaccines used and the sites of immunisation.

Immunisation sessions were mainly cancelled because of official activities such as attending workshops and natural phenomenon like rainfall because the terrain becomes difficult and mot of the sessions are also held under tree especially during outreaches. The problem faced by the health workers included accessibility, isolation, and being at the mercy of the weather.

The mothers do not bring their children for immunisation because of the attitudes of the health workers, being busy on their farms, migration after the farming seasons and wrong misconception and financial accessibility as well as beliefs.

Coverage could be improved by working mostly taboo days, mopping up and by health education.

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CHAPTER FOUR

DISCUSSION

Characteristics of the children

Measles represented 54.37% of the children in the survey whiles females constituted 45.62%. This reflects the male female distribution of the population in the district of 51.7% - 48.3% per the 2000 population census.

Background characteristics of mothers

Age distribution

Most of the women who knew their age were between 26 – 30 years of age with only one woman above 45 years. About 12% of the women interviewed did not know their age.

Educational level

Less than half of the women (47.5%) had had no formal education. They were the majority. Only 0.92% of the respondents had had tertiary education. This may have an implication in the ability to access the health service.

Immunisation coverage

The average household per cluster was 30.8, which gives an idea for future panning and provision of health services.

There was a high level of the RHC retention thus 93.08%. This is a high figure compared with 20% in a study in India (12).

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Immunisation coverage by antigens

By using cards only, values for the coverage were in the higher 70s and 80s for all the antigen.

The DPT3 (the standard indicator for immunisation) was 82.49%. This is higher than the national figure of 68.9%.

Measles had the lowest coverage of 76.04%. Though measles and yellow fever are supposed to be given at the same time, the coverage of yellow fever of 83.87% far exceeds that of measles.

The coverage by card and history were high in all instances than by card alone as expected. The percentage of BCG scar of 90.32% equates more to the 88.85% by card alone than the 96.77% of card and history. This implies relying on history has some limitations in accessing true coverage.

Immunisation status by card only

Only one child (0.46%) was not immunised at all. About 26.27% were partially immunised. The majority of the children (73.27%) were fully immunised, however, 62.67% of children had had all the required immunisation for the district schedule by the age of one year. This represents the true level of fully immunised children.

Source of immunisation

The use of the hospital and outreach accounted for the greater number for the source of immunisation. For example, for BCG the hospital accounted for 74.76%, DPT1-3 the hospital accounted 49.02%, Outreach 42.05%, OPV1-3 the hospital accounted for

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50.33%, Outreach 36.29%, Yellow fever the hospital accounted for 47.9% and Outreach 43.23%.

The high level of the hospital may be accounted for by the fact that, the Maternal and Child Health Centre in the hospital was equated to receiving the antigens at the hospital.

Reasons for not completing immunisation

This refers to only the mothers of children who were not immunised or were partially immunised. There were only 57 in total. The reasons were broadly classified into lack of information, lack of motivation and obstacles.

Under lack of information, 10.34% of the women claimed they were unaware of the need of immunisation. 8.62% of the women claimed they were unaware of the need to return for the second and third doses of immunisation. Surprisingly, the fear of side effects and wrong idea about immunisation were not mentioned at all.

Lack of motivation was not a major reason for not completing immunisation. Only 3.45% of the mothers gave this as a reason for not immunising.

Obstacles accounted for 70.69% of reasons why immunisation were not completed. Some of the women (19.99%) claimed they were busy. Travelling outside the sub-district by mothers accounted for 14.03% of the reason why immunisation were not completed. There was no complaint about the waiting time as a reason for not completing the immunisation.

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Elisa Test

A high proportion of the children (90.2%) sero-converted after the measles immunisation. A minority children (8.8%) did not sero-converted. They were 3 boys and 6 girls. The level of sero-conversion compares favourably with the 90.1% value for a similar study in children less than 2 years who had received one dose of measles vaccine in Saudi Arabia (35).

The 8.8% sero-negativity compared with the 9.8% in the same study. A similar study in Brazil gave a sero-conversion of 94.1% (34).

The high sensitivity level of 99.9% and the specificity of 93.1% for the kits used for the Elisa test makes it very reliable.

The sero-conversion of 90.2% suggests that virus circulation would be very low in the study population. It has, however, been suggested that for permanent control of measles within a population collective immunisation levels of at least 94% would be required (36-37).

This implies the district should not rest on her oars.

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CHAPTER FIVE

CONCLUSION AND RECOMMENDATIONS

CONCLUSION

The DHMT is doing a good job in terms of the high immunisation coverage in the Kintampo sub-district.

The high level of immunisation coverage and the retention of RHCs inspite of the high level of illiteracy in the sub-district.

In the Kintampo sub-district the history of BCG immunisation in the absence of an immunisation card and the presence of a BCG scar could be used as a confirmation.

Missed opportunities, as a reason for inability to complete immunisation is very low in the district.

Measles immunisation was the lowest in terms of antigen frequency in the sub-district. The DPT3 value of 84.79% exceeds the national figure of 68.90%. Only 62.67% of the children studied had completed their immunisation by age 1 year.

The hospital and outreaches are the main source of immunisation in the Kintampo area. Obstacles in the form of mother being too busy or travelled outside the sub-district during immunisation sessions accounted for 70.69% for the inability to complete immunisation.

Lack of motivation in the form of no faith in immunisation and rumours about immunisation were not given as reasons for not completing immunisation.

Most children vaccinated against measles in the Kintampo sub-district sero-converted.

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RECOMMENDATIONS

The following recommendations are being made to the DHMT to enable them deal with the conclusion of the as it relates to the childhood immunisation in the Kintampo sub-district:

1. Immunisation coverage using EPI, WHO cluster survey method is simple and cheap and should be used often to access coverage level by the DHMT.

2. Exploring the immunological status of children after the immunisation should be carried out on regular basis to ascertain the true level of sero-conversion

3. Health education should be intensified for mother to understand the need and importance of having their children immunised before first birth days.

4. Mothers should be advised to take their children's RHCs with them when they are travelling outside the district to enable them continue the immunisation schedule.

5. Immunisation sessions as much as practicable should be held on taboo days when there are no farming activities to enable maximum participation.

6. Assemblymen and Unit Chairmen should liaise with and inform health workers about new arrivals in their communities and new communities under their authority.

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REFERENCES

1. Cleason M and Waldiman R.J (2000). The evaluation of child health programme in developing countries: from targeting diseases to targeting people. Bulletin of the WHO 78(10): 1237.
2. Ahmad O.B, Lopez A.D., Inoue M (2000). The decline in the child mortality: a reappraisal. Bulletin of WHO 78(10): 1179.
3. Ghana Statistical Service and Macro International Inc. (1998). Ghana Demographic and Health Survey Report: 85.
4. WHO and UNICEF (1996). The State of the Worlds vaccine and immunisation.
5. MOH, Ghana (1989). Report on the Accelerated EPI activities in Ghana.
6. World Bank Report (1993). World Development Report: Investing in Health; Poverty Reduction and Immunisation: 4.
7. Brugha R and Kenvany J (1996). Maximising immunisation coverage through home visits: a controlled trial in urban areas of Ghana. Bulletin of the WHO.
8. The Kintampo District Health Management Team (1998). Annual Health Report of the Kintampo District.
9. Bland J and Clements J (1998). Protecting the Worlds Children: the story of WHO's Immunisation Programme. Worlds Health Forum 19:162.
10. UNICEF (1994). The State of the World's Children Report: 12.
11. UNICEF (2000). The State of the World's Children Report: 92-95
12. Singh J, Jain D.C., Shama R.S. and Verghese T (1996). Evaluation of immunisation coverage by lot quality assurance sampling compared with 30

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cluster sampling in Primary Health Care in India. Bulletin of the WHO 71(11): 33-39.

13. Coetzee D.J. Ferrinho P and Reinach S.G. (1993). A vaccination survey using the EPI methodology to evaluate the impact of a child health outreach programme in an urban area of South Africa. Bulletin of the WHO 71(11): 33-39.

14. Mc Bean A.M, Foster J.O, Herrmann K.L and Gateff C. (1976). Evaluation of a mass measles immunisation campaign in Yaounde, Cameroon: Trans R. Soc. Trop Med. & Hyg. 70:206-212.

15. Perry H., Weisrback R and Hussan I (1997). Childhood immunisation coverage in Zone 3 of Dhakar city: The challenge of reaching improvised household in urban Bangladesh. Bulletin of the WHO 68: 199-208.

16. Cutts F. (1990). The use of evaluation to improve the Expanded Programme on Immunisation in Mozambique. Bulletin of the WHO 68:199-208.

17. Subramanyam K. (1989). Vaccine distribution: An operations research study. Reviews of Infectious Disease, 11(suppl. 3) S623-628.

18. Belcher D.W et al (1978). A mass immunisation campaign in rural Ghana: factors affecting participation. Public Health Reports. 93:170-176.

19. Cutts F. (1989). Evaluation of factors influencing vaccine uptake in Mozambique. International Journal of Epidemiology 18:427-433.

20. Unger J-P (1991). Can intensive campaigns dynamise front line health services? The evaluation of an immunisation campaign in Thies health district, Senegal. Social Science and Medicine 32:249-259.

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21. Loevinsohn B.P (1998). Missed opportunities for immunisation during visits for curative cure: practical reasons for then occurrence. American Journal of Tropical Medicine and Hygiene. 41:235-258.

22. Streatfield M, Singarimbun M (1988). Social factors affecting use of immunisation in Indonesia. Social Science and Medicine. 27:1237-1245.

23. Van Der Mei J, Belcher D.W. (1974). Comparing under 5 programmes in a hospital based clinic and in satellite mobile clinics. Trop. Geog. Medicine 24:449-456.

24. Bornstein A, Kreysler J. (1972). Social factors influencing the attendance in under five clinics. Environ. Child Health 18:150-157.

25. Arhin C.D., Ross A.D. and Kuffour F. (1993). Cost of Vitamin A supplementation: the opportunity for integration with immunisation in Ghana. Health planning and policy. 8(4) 339-348.

26. Onta S.R., Sandbroe S. and Hanse E.H.(1998). The quality of immunisation data from Primary Health Care reports: A case from Nepal. Health Planning and Policy. 13(2): 131-139.

27. Hicks W.R. (1980). Misplaced loss of confidence in measles vaccination: an investigation in a primary school. J.R.C. General Practitioners. 39: 151-152.

28. Weekly Epidemiological Records (1990). WHO no. 43-26: 334-6.

29. Kanbarami R.A. Nathoo K.J. and Nkrumah F.K. (1991). Measles epidemic in Harare, Zimbabwe despite high measles immunisation coverage rates. Bulletin of the WHO. 69: 213-9.

30. Weekly Epidemiological Records (1990). WHO no. 37-14: 284-6

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31. Weekly Epidemiological Records (1990). WHO no. 42-19:323-5

32. Weekly Epidemiological Records (1990). WHO no. 49-7:379-87

33. Markowitz L.E., Prebeld S.R, Fine P.E.M. and Orenstien W.A. (1990). Duration of live measles vaccine-induced immunity. Paediatric Infectious Disease Journal. 9:100-110.

34. Pannuti C.S., Moraes J.C., Camargo M.C.C., Hildalgo N.T.R. and others (1991). Measles antibody prevalence after mass immunisation in Sao Paulo, Brazil. Bulletin of the WHO. 69(5): 557-560.

35. Hagazy J.S., Al-begari T.H, Al-Amri A.H. Woeman S.A., Qureshi N.A. Abdelgadir M.H. (1994). A sero-epidemiological study of measles: some practical implication for measles immunisation programme, Kingdom of Saudi Arabia. Saudi Arabia Infectology.

36. Hethcote H.W. (1983). Measles and Rubella in the US. American Journal of Epidemiology. 117:2-11.

37. Sejda J 1987). Four years of measles elimination in the Czech Socialist Republic. Journal of Hygiene, Epidemiology, Microbiology and Immunisation 31:391-392.

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APPENDIX I

BACKGROUND INFORMATION

Child's no. in cluster	Mother's name	Age (year)	House number	Educational level	Child's name	Sex	History of Measles
1							
2							
3							
4							
5							
6							
7							
8							

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Cluster Form: Infant Immunisation in Kintampo

(1) Cluster number: _____										Total	
(2) Date: _____ (3) Area: _____ (4) Range of birth dates: From: _____ Until:	(5) NAME									Card	Card plus history
Child member in cluster		1	2	3	4	5	6	7	8		
(6) Birth date											
(7) Immunisation Card	Yes/No										
(8) BCG	Date/+/0										
	Scar Y/N/A										
	Source										
(9) DPT1	Date/+/0										
	Source										
DPT2	Date/+/0										
	Source										
DPT3	Date/+/0										
	Source										
(10) OPV1	Date/+/0										
	Source										
OPV2	Date/+/0										
	Source										
OPV3	Date/+/0										
	Source										
(11) Measles	Date/+/0										
	Source										
(12) Yellow Fever	Date/+/0										
	Source										
(13) Immunisation Status	Not										
	Partially										
	Fully										
(14) Fully immunised before one year of age	Yes/No										

(15) Tally of household visited: _____

(16) Name of interviewer: _____

Signature: _____

KEY: Date/0+

Date = copy date of immunisation from card, if available
+ = mother reports immunisation was given
0 = immunisation not given

Source

OUT = Outreach
HOS = Hospital
HC = Health Centre
PRIV= Private/non-governmental

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APPENDIX II

Cluster Form: Reasons for immunisation failure in Kintampo

(1) Cluster number: _____ (4) Range of birth date: From: _____

(2) Area: _____

(3) Date: _____ Until: _____

NOTE: ASK ONLY ONE QUESTION: "Why was not child not fully immunised? Mark (X) single most important reason according to your judgement.

	Child number in cluster		1	2	3	4	5	6	7	8	TOTAL
(5)	Immunisation status	Not immunised									
		Partially immunised									
		Fully immunised									
(6)	Lack of information	a. Unaware of need for immunisation									
		b. Unaware of need to return for 2nd or 3rd dose.									
		c. Place and/or time of immunisation unknown.									
		d. Fear of side reaction.									
		e. Wrong about contraindications									
		f. Other									
	Lack of motivation	g. Postponed until another time.									
		h. No faith in immunisation.									
		i. Rumours									
		j. Other									
	Obstacles	k. Place of immunisation too far.									
		l Time of immunisation inconvenient.									
		m. Vaccinator absent.									
		n. Vaccine not available.									
		o. Mother too busy.									
		p. Family problem including illness of mother.									
		q. Child ill – not brought.									
		r. Child ill – brought but not given immunisation.									
		s. Long waiting time									
		t. Other									

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APPENDIX III

IN-DEPTH INTERVIEW FOR HEALTH WORKERS

This in-depth interview is been administered to health workers to get an idea about the contribution of service providers to the EPI of programme.

I am using a tape recorder what you are going to say.

Thank you.

Name: _____ Date of interview: .../.../...

Category of health worker: _____

1. What vaccines are given to children before their first birthday?
2. What is the immunisation schedule for the district?
3. Do you know of the cancellation of planned immunisation session and why?
4. What problems do you encounter during immunisation?
5. Do you k now of any reasons why people do not come for immunisation?
6. What do you think could be done to improve upon immunisation coverage?

SUMMARY FORM
INFANT IMMUNIZATION

(2) Date of first interview: _____
Date of last interview: _____
(3) Area _____
(4) Age group evaluated: _____

Cluster Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	TOTAL
(6) Number in cluster																															
(7) Card - Yes																															
(8) BCG card																															
Card plus history																															
BCG scar																															
Source HOS																															
HC																															
OUT																															
PRIV																															
(9) DPT 1 card																															
Card plus history																															
DPT 2 card																															
Card plus history																															
DPT 3 card																															
Card plus history																															
Source HOS																															
HC																															
OUT																															
PRIV																															

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(10) OPV 1 card																															
Card plus history																															
OPV 2																															
Card plus history																															
OPV 3																															
Card plus history																															
Source: HOS																															
HC																															
OUT																															
PRIV																															
(11) Measles card																															
Card plus history																															
Source: HOS																															
HC																															
OUT																															
PRIV																															
(12) Yellow Fever card																															
Card plus history																															
Source: HOS																															
HC																															
OUT																															
PRIV																															
(13) Not immunized																															
Partially immunized																															
Fully immunized																															
(14) Fully immunized before one year age																															
(15) Households visited																															

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EVALUATION FORM
INFANT IMMUNIZATION

Area:_____
Date of last interview: _____
Number in survey:_____

Age group evaluated:_____
Date of last interview:_____

	TOTAL CARD		TOTAL CARD PLUS HISTORY	
	Number	**Percentage**	**Number**	**Percentage**
BCG				
BCG scar	_____	_____	_____	_____
Source: HOS	_____	_____	_____	_____
HC			_____	_____
OUT			_____	_____
PRIV			_____	_____
DPT 1	_____	_____	_____	_____
DPT 2	_____	_____	_____	_____
DPT 3	_____	_____	_____	_____
Source: HOS			_____	_____
HC			_____	_____
OUT			_____	_____
PRIV			_____	_____
OPV 1	_____	_____	_____	_____
OPV 2	_____	_____	_____	_____
OPV 3	_____	_____	_____	_____
Source: HOS			_____	_____
HC			_____	_____
OUT			_____	_____
PRIV			_____	_____
Measles	_____	_____	_____	_____
Source: HOS			_____	_____
HC			_____	_____
OUT			_____	_____
PRIV			_____	_____
Yellow Fever	_____	_____	_____	_____
Source: HOS			_____	_____
HC			_____	_____
OUT			_____	_____
PRIV			_____	_____
Not immunized	_____	_____		
Partially immunized	_____	_____		
Fully immunized	_____	_____		
Fully immunized before one year age	_____	_____		

Total number of households:_____

Average number of households per cluster:_____

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EVALUATION FORM
REASONS FOR IMMUNIZATION FAILURE

Area:_____ Age group evaluated:_____
Date of last interview: _____ Date of last interview _____

	TOTAL	PERCENTAGE
Partially/notimmunized		
Lack of information		
a. Unaware of need for immunization	_____	_____
b. Unaware of need to return for 2nd or 3rd dose	_____	_____
c. Place and/or time of immunization unknown	_____	_____
d. Fear of side reaction	_____	_____
e. Wrong about contraindications	_____	_____
f. Other	_____	_____
Subtotal	_____	_____
Lack of motivation		
g. Postponed until another time	_____	_____
h. No faith in immunization	_____	_____
I. Rumours	_____	_____
j. Other	_____	_____
Subtotal	_____	_____
Obstacles		
k. Place of immunization too far	_____	_____
l. Time of immunization inconvinient	_____	_____
m. Vaccinator absent	_____	_____
n. Vaccine not available	_____	_____
o. Mother too busy	_____	_____
p. Family problem including illness of mother	_____	_____
q. Child ill - not brought	_____	_____
r. Child ill - brought but not given immunization	_____	_____
s. long waiting time	_____	_____
t. Other	_____	_____
Subtotal	_____	_____

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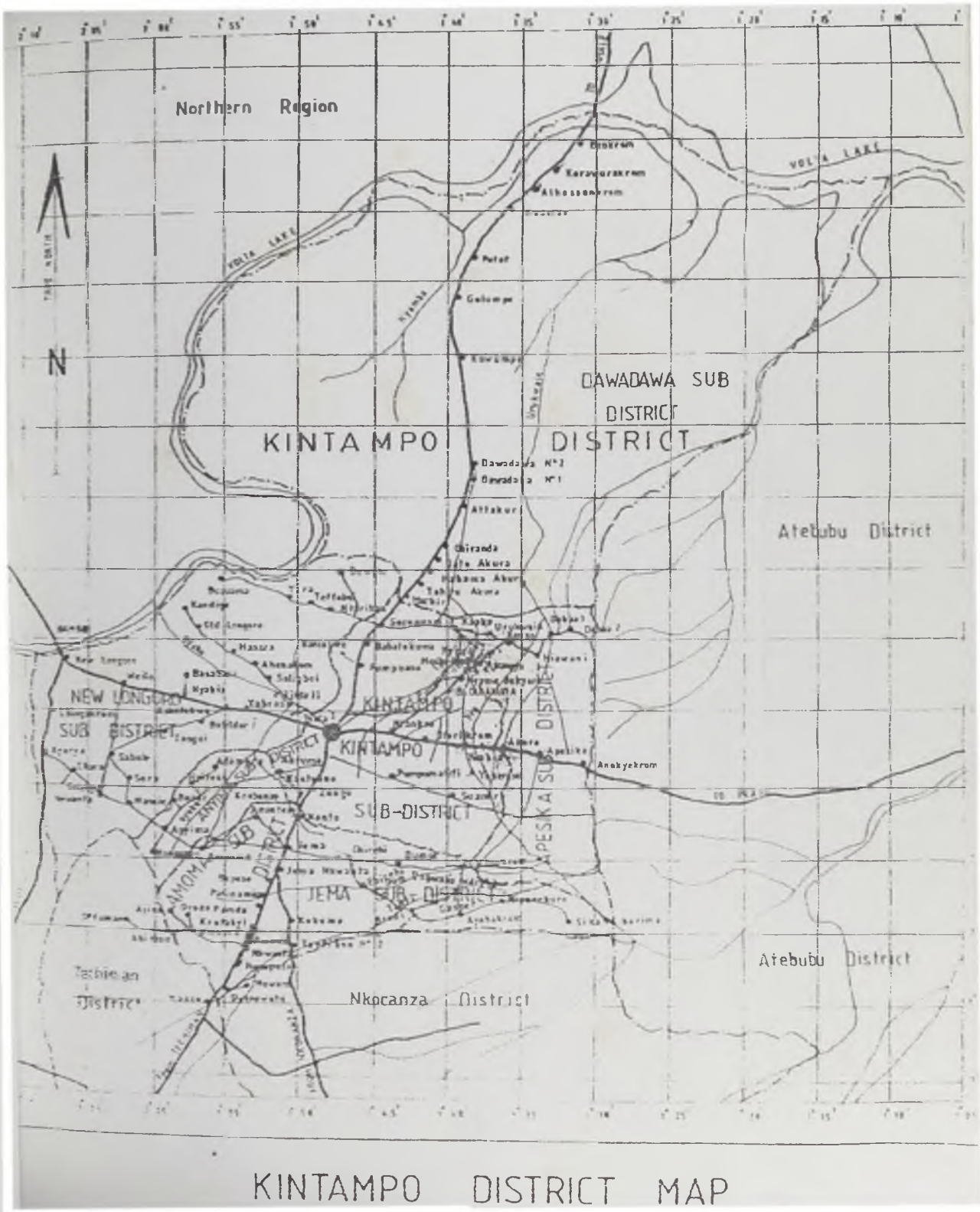

KINTAMPO DISTRICT MAP