



**SAINT PAUL'S HOSPITAL
MILLENNIUM MEDICAL COLLEGE
DEPARTMENT OF PUBLIC HEALTH**

**Immunization coverage and Factors associated with incomplete immunization
among children age 12-23 month's Mekelle Tigray, north Ethiopia, 2017**

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A THESIS SUBMITTED TO THE DEPARTMENT OF PUBLIC HEALTH, IN
PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE
OF MASTER'S OF PUBLIC HEALTH IN FIELD EPIDEMIOLOGY

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Ethiopian Field Epidemiology Laboratory Training Program (EFELTP)

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Approval Form:

As members of the Board of Examiners of the final body of work with thesis open defense, we certify that we have read and evaluated the thesis prepared by Desta Birhane Tesfay under the title “Immunization coverage and Factors associated with incomplete immunization among children age 12-23 month's Mekelle Tigray, north Ethiopia, 2017” and recommencement for the degree of Master of Public Health in Field Epidemiology.

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Final approval and acceptance of the thesis is contingent upon the submission of the final both hard and soft copies of the body work with thesis to the department of public health.

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Acronomys:

ADI	Addis Declaration on in Immunization
BCG	Bacillus Calmette- Guirin
CSA	Central Statistical Agency Of Ethiopia
CDC	Communicable Disease and Control
DOR	Dropout Rate
DPT	Diphtheria, Pertussis and Tetanus
EDHS	Ethiopia Demographic Health and Survey
EPI	Ethiopian Public Health Institution
EPI	Expand Immunization Program
FPP	Family Planning Program
HIB	Haemophilus Influenza Type B
LMIC	Lower Medium Income Country
MDG	Millennium Development Goal
MNT	Maternal and Neo-Natal Tetanus
OPV	Oral Polio immunization
PCV	Pneumococcal Conjugated Immunization
PENT	Penta Valet
RV	Rota Viruses
SPHMMC	St. Paulus Hospital Millennium Medical College
TAT	Tetanus Toxoid
TRHB	Tigray Regional Health Bureau

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Abstract:**Background:**

Immunization is estimated to avoid between 2 to 3 million deaths globally each year. Immunization preventable diseases can affect in prolonged disabilities and can ensure a financial lost because of lost time at work, psychological anxiety or long-term disability care. In Ethiopian children from 12-23 ages' prevalence total immunization coverage 39 % and 16% was not taken any immunization all over the nation Ethiopia. However the aim is to assess the incomplete immunization in 12-23 age year children in the stated study area with in the study period.

Objective:

To assess complete immunization and factors associated with incomplete immunizations coverage in children 12-23 months in mekelle town.

Methods:

Community-based cross-sectional study design conducted in children aged 12 to 23 months. The data collectors were visited at home and interviewed using pre-tested questionnaire about socio-demographic, economic status and other variables. Systematic random sampling technique was used. 573 sample calculated by single proportion formula after addition of design effect and 10% non-response rate by taking critical value at 95% confidence level of certainty from the actual figures for source population and power 80%. Data entered in to Epi info version 7.2.1.0. And analyzed by taking crud and adjusted odds ratio with 95% confidence intervals. Ethical clearance was obtained and consent form asked willingness to the eligible people.

Result: Of the 573 children, 542 (94.59%) were ever acquired one or more doses of vaccine and 31 (5.41%) had not vaccinated at list one dose, 69(12%) had immunized maternal recall only, about 473 (82.54%) have vaccination Card. The multivariate logistic regression analysis shows that; distance of immunization center, antenatal care, time of immunization inconvenient, concerned of immunization side effect, go to holy water after sick, variables were remained significantly associated with incomplete children immunization.

Conclusion and recommendation: Overall the average complete immunization status was low. Based on the key finding there is need to increase the number of health facilities with Health workers, strengthening integrated community awareness and infrastructure.

Key words: immunization, mekelle town, children aged 12-23 months

1. Introduction

1.1. Background:

Global study shows approximately 45% of less than 5 age and nearly 86% of neonatal deaths occurring in developed countries. Early immunization of children and mothers had one way of intervention show reduced early child mortality. Working effectively in immunization has decrease the maternal and child mortality over the past two decade. An estimated 23 % neonatal death worldwide are infections causes and maternal under immunization (1).Immunization is one of the public health importance's to show as weather the morbidity and mortality is increased or decreased with time period and wealthy and effectively cost utilization. immunization have the power to save nearly 2 and 3 million deaths globally each year(2).

In Africa nearly three million children less than five year age dead because of children was not receive immunization.one in five children does not receive immunization due to low coverage health institution, infrastructure and lack awareness of about immunization.(3) In February 2016, minister's representativeness of African region singed agreement in immunization in Addis Ababa Ethiopia. Know a day 49 African country sing the agreement immunization. Additionally, three testimonial of support was signed by civil society organizations, religious leaders and parliamentarians to support implementation of the aid and reach every child in Africa with essential immunization.(4)

Ethiopia immunization program started 1980 with the aim of increasing 10% yearly. Though in the first 20 years very slow increment. The expansion to every health facility process has implemented in the meantime 2004 with low coverage and high dropout. so through this way Ethiopia shows an improvement in 2003 DPT coverage from 53% to 87% in 2014.even though the difference coverage among Ethiopia regions present massive.(5). between 1999 - 2013 around 15 million women age (15-49) in 62 Ethiopian regions received TT immunization in three round except Addis Ababa, Harare and dire dawa .after receiving this TT immunization the supplemental immunization activities (SIAS) assessed the high risk zones in Ethiopia in 2011 animate pre-validation assessment. so the nation to some extent validated to have eliminated neonatal tetanus (5). In EDHS 2016 all Ethiopian children from 12-23 age prevalence total immunization coverage were 39 % and 16% were not taken any immunization all over the nation(6). In early assessment of the immunization coverage show gap in from region to region

especially for those who are pastoralists persistently inequalities backward from the others. So the ministry of health collaboration with the other stack holders like UNICEF and other EPI focal were discussed on how to implement in the periphery health institutions on how to give immunization with consistency agreed and signed in julay2014. (5)

The aim of this study was to assess immunization coverage and identify factors affecting incomplete immunization among 12-23 month children, in addition to determine the socio-demographic, socioeconomic, and other factors associated with complete immunization in Tigray region, municipal of mekelle city, north Ethiopia.

1.2. Statement of the problem in immunization

Immunization is an important tool for children to live healthier and to eliminate or minimize the infectious diseases and also decreased approximately 2 to 3 million deaths in each year worldwide. absence of immunization in children is not only related directly to mortality and morbidity but also a big problem in economical crisis(7). Between 2000 and 2013 only measles received immunization prevents 15.6 million children globally. study shows in 2015 in every day 16,000 children less than 5 year continues to die mostly from infectious diseases globally(8).

In Africa shows numerous reasons have been given for the occurrence of lost chance for immunization in low and middle income countries. these include; health systems factors, services provider factors, child type factors, caretaker factors, cultural factors, low parental education, non-availability of immunizations, failure by facilities to immunize on all days of the week, or negative pa-rental beliefs, inappropriate health worker practices; including not opening a multi dose immunization for a small number of persons to avoid immunization wastages; and logistical problem.(9)

In Ethiopia during 2012-2016 survey shows the total less than five year age mortality 67 deaths per 1,000 children live births when compared with the previous study 2002-2006 it shows a remarkable decrement 116 deaths per 1,000 live births.so Ethiopia records a knew improvement in children death from time to time. (6).according to the 2016 EDHS study shows the whole nation age 12-23 which does not immunization at list one dose were sixteen percent. BCG, pentavalent1, polio, PCV1, rotavirus1 and measles in average from 54-81% were immunized(6).

The Tigray regional health bureau was not studded in mekelle zone about immunization status. So this is an install or baseline study to fill the gap in the factors affected incomplete immunization coverage in children age 12-23 category. In this context, understanding the risk factors for immunization is key to increase immunization and infection prevention in children.

1.3. Rational of the study

As clearly stated that in the statement of the problem, the prevalence of immunization and its risk of causing death is greater and common in different part in developing world especially in Ethiopia. Different reasons contribute for the deaths of childrens.So, identifying immunization coverage and associated common factors with incomplete immunization support for the interest

of health planners to control the problem. So this is important to make appropriate prevention and reduceing communicable diseases and deases.

In addition to the above, little is known about risk factors of immunization in our country. Therefore, this study serves as base line information about factors associated with incomplete immunization in the country. These studies also help researchers as input for other studies which conducted on the related subject matter in the future.

2. Literature review:

2.1. Immunization coverage Globally, Africa and Ethiopia

Globally 19.5 million infants were not received immunization DPT. sixty percent of the challenges found in Angola, Brazil, the Democratic Republic of the Congo, Ethiopia, India, Indonesia, Iraq, Nigeria, Pakistan and South Africa.(10). Measles, Rota and Rubella are common infectious viruses disease which common in children. by the end of 2016 globally immunization coverage were,85% one dose, 25% and 47% respectively(10).

Even though in Africa a wonderful improvement has made in the past four decades .but still know a big challenge in children who did not take immunization in morbidity and mortality. Approximately 22 %(4.3 million) less than one year age globally not immunized are found in Africa (Democratic Republic of the Congo, Ethiopia, Nigeria and South Africa). (11) . studies in Nigeria shows about 96 percent of mothers were ANC (antenatal care) follows and 63% of the children age between 12-23 months approved immunization cards(12). WHO-UNICEF regional Africa estimated the DPT3 Africa coverage in 2014 was 77%.this is less than 60 % found in 5 countries, 90% found in 18 countries. the same to that measles also 14 countries have coverage of 90% or more; seven countries have coverage levels of less than 60%(13)." in 2014, 7.4 million infants in the WHO African region did not receive the third dose of DPT immunization, out of an annual birth cohort of 32.7 million approximately 23%"(13).

"Overall in Ethiopia 2011 EDHS, 24 percent of children age 12-23 months was fully vaccinated at the time of the survey. while this represents a 19 percent increase from the level reported in the 2005 EDHS, the percentage of children who are fully vaccinated remains far below the goal of 66 percent coverage set in the HSDP IV (MOH, 2010)" (14).study shows in rural southwestern Ethiopia, 78% of children age 12-23 had ever been immunized at least one type of immunization. however, only 37% of children age 12-23 months had received all basic recommended immunization.(15) Similar to this study in Ethiopia Somalia Jigjiga 74.6% of the children surveyed were ever vaccinated at list one dose; whereas 36.6% was fully vaccinated. the immunization coverage rate from card assessment for bacillus calmette-guérin, oral polio immunization zero, oral polio immunization one, oral polio immunization two, oral polio immunization three, and measles were not greater than approximately 25%(16).

2.2. Factors affecting complete immunization

In Haiti children received in supplementary immunisation activity(ASI) survey measles and rubella immunization in age category 1-4 years were lower (31%) significantly because of low educational level in caretakers.(17)

There are a lot of factors that makes immunization low coverage according to the study same of them are parents lack access because of poor quality health services, long distances or lack of money. Other may not trust vaccines or the healthcare workers who provide the immunization, or they may not understand importance for immunization due to a lack of information or false propaganda about how immunization work and the diseases they can prevent(18).Studs in low and middle income countries regular outreach immunization may improve full immunisation coverage (OR 3.09, 95% CI 1.69 to 5.67)(19). in 2014 study shows in urban Uganda Kampala only 33% of served caretaker or respondents were agreeable to receive the immunization after waiting of three or more hours(20).

In east Africa Kenya Pokot the main factor make low immunization were, place where the chilled birth, literacy level, children with in their family ($p=0.02$, $OR=1.61$.), knowledge on the immunization schedule ($p= 0.0000$, $OR= 9.04$), nomadic life style ($p= 0.0000$ $OR = 11.06$).Family income ($p= 0.0037$, $OR= 2.71$) and area of residence ($p=0.0000$, $OR = 12$) (21).

In the survey EDHS 2016 study indicates the immunization affects by mothers educational status as well as household wealth that means when the education and economic status of the Mather increases corresponding to the child immunization also increases(6).

In Ethiopia the immunization coverage were more affected by factors where in Tigray, Addis Ababa, and Diredawa administrative. Mothers who know immunization program, never married. Female children, live highlanders, Orthodox followers, single parity and first birth order, husbands' secondary education, born at health facility, mothers attended ANC and mothers who have a postnatal check-up within 2 months after birth had full vaccination coverage in the country(22).

Conceptual frame work (23)

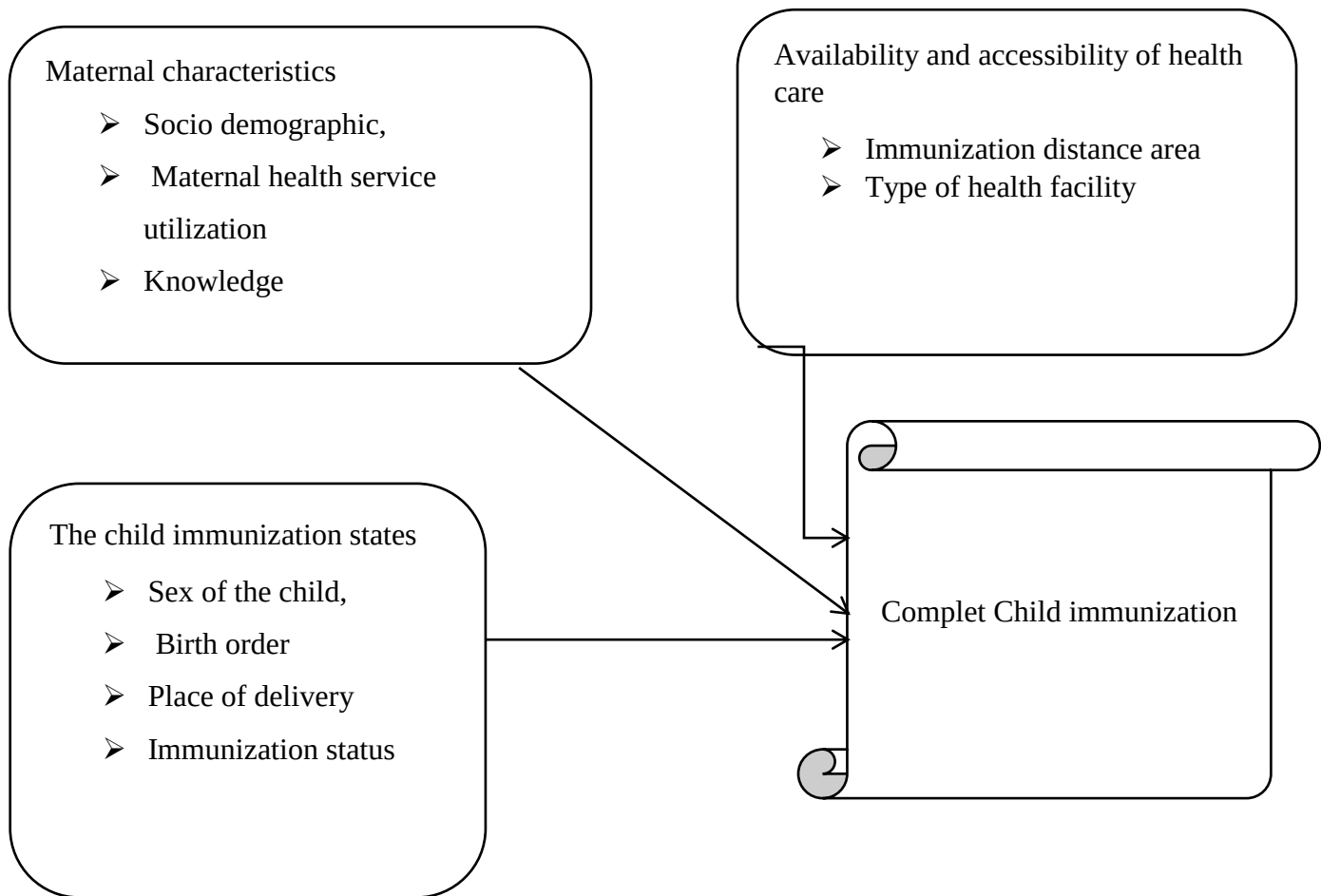


Figure 1:- Conceptual framework for factors affecting immunization status of the children aged between 12-23 months.

3. Objectives:

3.1. General objective

To assess complete immunization and associated factors with incomplete immunization among children aged 12-23 months in mekelle town, Tigray region, north Ethiopia.

3.2. Specific objectives

To determine the immunization coverage among children aged 12-23 months.

To identify factors associated with incomplete immunization among children aged 12-23 months.

4. Methods and materials

4.1. Study area and period

This study was conducted in Mekelle special zone, northern Ethiopia. Mekelle is the capital city in the northern Tigray region of Ethiopia. It is located around 780 kilometers north of the Ethiopian capital Addis Ababa, at a latitude and longitude of 13°29'n 39°28'e, with an elevation of 2084 meters above sea level and temperature above 18°C. Administratively, Mekelle is considered a special zone, which is divided into seven sub-cities (districts). These are Addi-Hak'i, Ayder, Haddinet, Hawelti, Qedamay Weyyane, Kwiha, and Semien. Based on the 2007 census conducted by the central statistical agency of Ethiopia (CSA), this town has a total population of 334,260 people (164,134 men and 170,110 women). (24). There are 3 hospitals (1 specialized, 1 zonal & 1 district), 10 health centers. The study was conducted from August 30, 2017 to February 30, 2018 in Mekelle town, Tigray region, north Ethiopia.

4.2. Study design

Community-based cross-sectional study design was conducted among children aged 12 to 23 months.

4.3. Source population

All children age between 12-23 months in Mekelle zone.

4.4. Study population

Children age between 12-23 months in selected cluster

4.5. Study unit

Selected children aged between 12-23 months found in individual households.

4.6. Sample size determination

The sample size was determined for first objective based on sample size calculation for single population.

$$n = \frac{(Z\alpha/2)^2 P(1-P)}{D^2} = 366$$

Adjust to population size (N) –if (N<10,000), where n_0 is the calculated sample size

$$n = \frac{n_0}{1+n_0/N} \quad n = \frac{366}{1+366/6653} = 346$$

Since multistage sampling multiply by design effect $n=346*1.5=519$

And also the total sample size consider the non-responding rate 10% total $n=573$.

Where,

p = proportion of children who did complete immunization (39%) (EDHS 2016)

d = margin of error = 0.05

n = minimum sample size

$Z_{\alpha/2}$ = confidence level required and $Z_{\alpha/2}$ at 95% CI = 1.96

DE=design effect is taken as 1.5 (complex cluster or multi stage design)

Since the sample size was taken from relatively small population ($n < 10,000$) $n=6653$ the required minimum sample size was obtained by making adjustment using population correction formula. the total of 573 children aged between 12-23 months was targeted for the study after addition of design effect(1.5) and 10% non-response rate (loss of subjects) by taking critical value at 95% confidence level of certainty from the actual figures for source population and power 80%.

Additionally sample size for the second objectives was calculated based on sample size calculation by double population proportion. such as factors associated with incomplete immunization using Stat calc Epi info by taking previous study variable antenatal care follow up (exposed 62.9% and unexposed 37.1% $n=132$)(23). So the sample size for the first objective was the largest one **573** was taken as a final sample size for this study.

4.7. Sampling procedure

A multistage sampling procedure was used. From the seven mekelle town woredas (mekelle special zone) three woredas cluster was selected randomly. Since those three woredas were the places where the same (homogeneous) to the others woreda was have a representative sample taken. Each district included no less than five kebeles areas within 1-5 k/m Radius of mekelle town. Each of them was have in average at least involved 206 households which have 12-23 age children.

As clearly shown below in the figure (2) all the fourteen kebele who have the eligible age group household was selected directly from the above three districts (woredas). by making sample proportion calculation against the total sample size the study unit was taken .all respondents was consider homogenous in terms of being alien to the place of study as a result immunization status

areas served to have a representative sample. Households study unit from each kebele respondents was selected by systematic random sampling technique from the previous 2008 lists of health extension registration book that have eligible criteria to the study. The sampling interval was selected per each kebele example aynalem has total 196 children inorder to select 40 children needs interval 5 down the list.

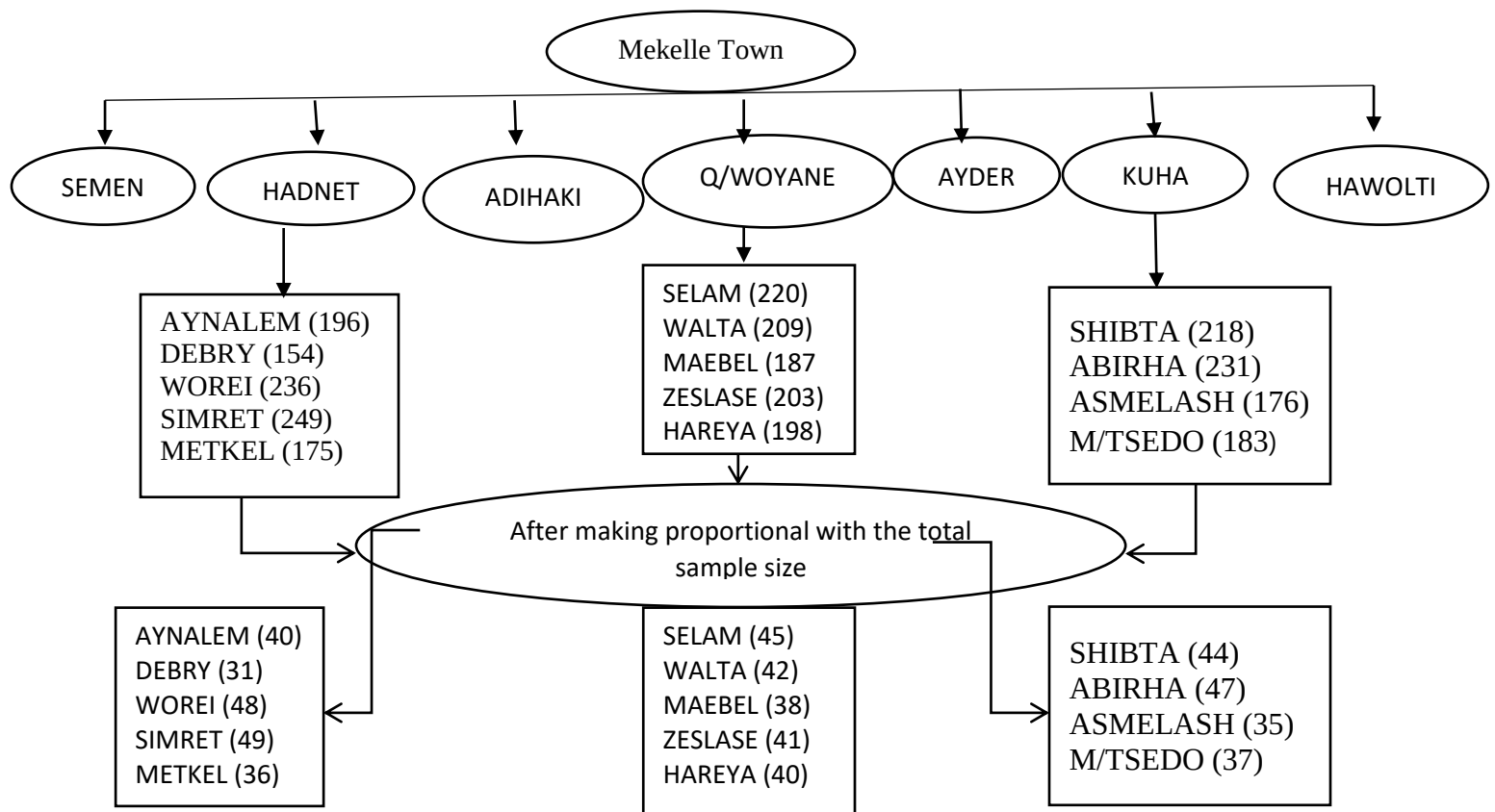


Figure 2: Sampling procedure from work

4.8. Date Collection Procedure

Ten health extension workers who know the kebeles or areas well with a commitment to face challenges was review or collected the data from house to houses from the eligible study units. Socio-demographic, availability of immunization center, knowledge of caretakers related questions and variables apply to immunization coverage was gathered using a structured questionnaire. A medical immunization ID card or by asking question was used to review employed to gather information.

4.9. Data quality control

The questionnaire used for study was adopted from Ethiopia demographic health survey (EDHS) and from the previous researches done in other places. Questionnaire was translated from English to Tigrigna and back to English as well to reaffirm consistency. Training was given to data collectors and supervisor before data collection for one day. The questionnaire was pre-tested for 20 households in adihaki kebele other than my study kebele to see the completeness and appropriateness to the local context and as per correction was taken seriously.

4.10. Inclusion criteria

Children who are between 12-23 month age group

4.11. Exclusion criteria

Children age 12-23 month whose parents/caretakers was not willing to give consent and children whose parents/caretaker could not have both immunization card and not remember the number or type of vaccine they had received.

4.12. Study variables

4.12.1. Dependent variable (outcome variable)

Children age 12-23 month immunization status

4.12.2. Independent variable

Socio-demographic characteristics

Time of travel to reach the nearest health facility

Maternal health care utilization

Health service availability and related characteristics of respondents

Knowledge of mothers/caretakers

4.13. Data processing and analysis

Data was entered into Epi info version 7.2.1.0 and analyzed using SPSS version 21. Summary statistics such as, tables, percentages, graphical techniques for descriptive and logistic regression were used to test the association between the independent and the outcome variables. All explanatory variables that were associated with the outcome variable in bivariate analyses were included into multivariate logistic regression to avoid confounding variable, to determine

factors that are significantly associated with immunization incompleteness rate. P-value of 0.05 was considered as a cut-off point for statistical significance.

4.14. Ethical clearance

Ethical clearance was obtained from St. Paul's hospital millennium medical college department of public health, institutional review board (IRB). The IRB reviewed the above mentioned research proposal and made decision approved on October /04/2017. So lastly official letter was written the decision is valid for 12 months and given to the organization where the study was conducted TRHB (Tigray regional health bureau (mekelle zone, under mekelle zone health facilities & health offices). The consent with the people participated in the study was asked their willingness as in the annex I part expressed. After agreed the data collection was started.

4.15. Dissemination of the study or finding

The finding was prepared and shares the written report of both hard and soft copies to St. Paul hospital millennium medical college department of public health (SPHMMC), Tigray regional health bureau (TRHB), mekelle special zone health department and all visited woreda health offices, and, resident advisors in EPHI coordinator. The finding was also being presented for different work-shops and seminars and will be published in a peer reviewed journals.

4.16. Operational definitions

Complete (full) immunization: the childhood immunization status once a child has received all recommended immunizations, including BCG, three doses of pentavalent, and four doses of polio and one dose measles, 3 dose Rota immunizations, 3dose PCV by the age of 12 months as in Ethiopian context

Dropout rate (DOR): the percent of children who received the initial dose immunization (PCV, Oral Rota viruses, OPV1, pentavalent1) but not the final dose immunizations (Example: pentavalent2 or 3).

Incomplete (partial) immunization: the childhood immunization status if the child missed at least one of the recommended 10 immunizations.

Missed opportunities: if an eligible child visited the selected health facility or outreach site but didn't receive any or all of the immunizations for which he/she is eligible.

Knowledge of immunization: If mother/caretaker has awareness about immunization and answers the question above mean score = considered as very good knowledgeable, below mean

score = considered as poor knowledgeable, in the mean score = considered as moderate knowledgeable.

UN immunization: a child who does not receive any dose or type of the immunization

Measurement of distance by time = less than 10 minutes = very near distance; 16 to 30 minutes= near distance; 31 to 60 minutes = moderate distance; Grater than one houre = far distance (21)

5. Results

5.1. Descriptive part of the results

5.1.1. Socio- demographic characteristic of the Primary guardians of children 12-23 months, Mekelle Town, Northern Ethiopia

Of the 573 children studied 542 (94.59%) were ever took one or more doses of vaccine and 31 (5.41%) had not vaccinated at list one dose by maternal recall and immunization card checking, 69(12%) had immunized maternal/caretaker recall only. Children from these about 473 (82.54%) had vaccination card during the study. Of the 573 children studied 72% were ever took full immunization with immunization card only. Socio demographic characteristics of respondents showed that a total of 573 (with 100% response rate) were included in the study. The mean age of caregiver's and children were 28.55(min16 to max75) years, and 16.68 months, respectively. The sex distribution of children shows that 276 (48.17%) males and 297(51.83%) of were females. With regard to types of caretakers of the children, both mothers and fathers 468(81.68%), mothers 94(16.40%), father 9(1.57%) and other than parents 2(0.35%).Majority of the marital status of the caretaker indicates that 513(89.53%) were married. The educational level of caretakers 112(19.5%) had no formal education, 207(36.13%) grades1-8, and 254(44.32%) grade 9 and above.

Most of the children's mothers were 558(97.38%) attended antenatal care clinic during pregnancy and 546 (95.29%) delivered in a health facility. With regard to child birth order 232(40.49%) were born in the first,150 (26.18%) second birth order, 97(16.93%) third birth order, and 94(16.40%) greater than third birth order. Respondent children household family size indicated that 194(33.86%) first family size, 174 (30.37%) second, 87(15.18%) third family size, and 118 (20.59%) were had more than four family size. The mean children household family size was approximately 3 with minimum 1 and 9 maximum.

Majority 325 (56.72%) of these caretakers were unemployed, and 553 (96.51%) were of the Christian faith as shown in table 1.

Table 1 : Socio- demographic characteristic of the Primary guardians of children 12-23 months, Mekelle Town, Northern Ethiopia

Name of variables categories		Frequency n=573	Percent
Primary Care taker age category	16-25Age	203	35.43%
	26-40Age	360	62.83%
	> 41Age	10	1.75%
Woreda of the Primary Care taker	Hadnet	204	35.60%
	Kuha	163	28.45%
	Q/Weyyane	206	35.95%
Educational status of the Primary Care taker	Illiterate	61	10.65%
	Read and write	51	8.90%
	Grade 1-8	207	36.13%
	Grade 9-10	176	30.72%
	College and university	78	13.61%
Religion of the Primary Care taker	Muslim	20	3.49%
	Orthodox Christian	553	96.51%
Mothers Marital Status	Divorced	21	3.66%
	Married	513	89.53%
	Single	33	5.76%
	Widowed	6	1.05%
Occupation Primary Care taker	Daily laborer	65	11.34%
	Farmer	24	4.19%
	Government /privet employ	72	12.57%
	Housewife	325	56.72%
	Merchant	83	14.49%
	Others	4	0.70%
Children family size ever born	1	194	33.86%
	2	174	30.37%
	3	87	15.18%
	4	74	12.91%
	>5	44	7.67%
Birth order of children	First	232	40.49%
	Second	150	26.18%
	third	97	16.93%
	Greater than three	94	16.40%
Children who live in life	1	196	34.21%
	2	175	30.54%
	3	94	16.40%
	4	66	11.52%

	>5	42	7.33%
Have you ever had your child immunization	Yes	542	94.59%
	No	31	5.41%
Immunization with card	Yes	473	82.55%
	No	100	17.45%

5.1.2. Health service availability and related characteristics of respondents

The availability and accessibility of health facility for immunization was measured by presence of the service and average walking time to reach the health facility. All 100% of the respondents were reported that they had access to the health facility that provides immunization services and majority of the reported 433(75.57%) that they were more access to health center followed by hospital 116(20.24%) and the remaining 7(1.22%) in health post. Respondents walking time to reach the nearest health facilities for immunization was <10 minutes 98(17.10%), 16 to 30 minutes 323(56.37%), 31 to 60 minutes 116(20.24%), >1 hours 12(2.09%) and they did not know the time 24(4.19%). About 558(97.38%) of mothers had followed at least one ANC follow up while pregnant her last birth child. With regard to Place of mother deliver her last child, 546 (95.29%) were delivered at health institutions, 22(3.84%) at home and Privet or NGO health facility 5(0.87%). The majority of mothers of the children were 500(87.26%) immunized tetanus toxoid (TT) while pregnant (Show Table 2).

Table 2: Health service related characteristics of Primary Guardians of children aged 12-23 months, Mekelle Town, Northern Ethiopia, 2017

Types of variable		Frequency	Percent
Nearest health facility for immunization	Yes	573	100.00%
Type of health facility for immunization			
Hospital	Yes	116	20.24%
	No	457	9.76%
Health center	Yes	433	75.57%
	No	140	24.43%
Health post	Yes	7	1.22%
	No	566	98.78%
Time to reach the nearest immunization center	< 10 minutes	98	17.10%
	16 to 30 minutes	323	56.37%
	31 to 60 minutes	116	20.24%
	>1 hours	12	2.09%
	I did not know	24	4.19%
Mothers ANC follow up while pregnant	Yes	558	97.38%

Number of ANC follow up	No	15	2.62%
	1	2	0.35%
	2	29	5.11%
	3	81	14.29%
	4	281	49.56%
	>5	127	22.40%
Place of mother deliver her last child	I did not know	38	6.63%
	Health facility	546	95.29%
	Home	22	3.84%
	Privet or NGO health facility	5	0.87%
Did the Mather ever immunized TT	Yes	500	87.26%
	No	73	12.73%
How many times receive TT	1	2	0.35%
	2	29	5.11%
	3	81	14.29%
	4	281	49.56%
	5	86	15.17%
	>6	21	3.70
	I did not know	47	8.29%

5.1.3. Characteristics of immunization status among children aged 12-13 months, Mekelle Town, Northern Ethiopia, 2017

The outcomes of each type immunization 12-23 month age children by checking vaccination card was show as follows: approximately all types of immunization were the same in dropout rate except low in OPV₀ 72% flowed Measles 79.7%. By district Children of full immunization coverage with checking cards were recorded for 26.35% Hadnet followed by kuha 24.60%, and, Qedamay Weyyane district 20.76 % (as showed inTable 3).

Table 3: Characteristics of immunization status among children aged 12-13 months, Mekelle Town, Northern Ethiopia, 2017

Variable Immunization type		Frequency n=573	Percent
BCG	Yes	461	80.45%
	No	112	19.55%
OPV0	Yes	413	72.08%
	No	160	27.92%
OPV1	Yes	464	80.98%
	No	109	19.02%
OPV2	Yes	463	80.80%

	No	110	19.20%
OPV3	Yes	465	80.80%
	No	110	19.20%
DPT HepB Hib1(Pentavalent1)	Yes	466	81.33%
	No	107	18.67%
DPT HepB Hib2(Pentavalent2)	Yes	464	80.98%
	No	109	19.02%
DPT HepB Hib3(Pentavalent3)	Yes	463	80.80%
	No	110	19.20%
PCV1	Yes	465	81.15%
	No	108	18.85%
PCV2	Yes	465	81.15%
	No	108	18.85%
PCV3	Yes	461	80.45%
	No	112	19.55%
ROTA1	Yes	465	81.15%
	No	108	18.85%
ROTA2	Yes	462	80.63%
	No	111	19.37%
MEASELS	Yes	457	79.76%
	No	116	20.24%
Vitamin A	Yes	262	45.72%
	No	311	54.28%
Hadnet	Yes	151	26.35%
Kuha	Yes	141	24.60%
Qedamay Weyyane	Yes	119	20.76%

Immunization related Questions by recall history children caretaker respondents, Mekelle Town, Tigray Northern Ethiopia, 2017

Majority of respondents they did not know the right answers whether the child received the immunization with the right dose or not by remembering the past time. The core reasons children did not get or drop out their immunization were expressed the respondents as follow; I did not know the advantage of vaccine 109(19.02%), Being unaware of the need to return for subsequent doses 63 (10.99%) and Time of vaccination inconvenient with respondents 37(6.46%) as shown below tables 4.

Table 4: Immunization related Questions by recall history children caretaker respondents, Mekelle Town, Tigray Northern Ethiopia, 2017

Variables		Frequency	Percent
Child received BCG vaccine on the right hand scar	Yes	10	1.75%
	No	563	98.25%
Did your child received Polio vaccine oral drop	Yes	14	2.44%
	No	559	97.56%
How many times your child did receive polio vaccination	1	10	1.91%
	2	53	10.11%
	3	126	24.05%
	4	243	46.37%
	>5	4	0.76%
	I did not know	88	16.79%
Your child received measles vaccine at the age of 9 months on the left leg	Yes	530	92.50%
	No	31	5.41%
	I did not know	12	2.09%
Reason children did not get their immunization			
I did not know the advantage of vaccine	Yes	109	19.02%
	No	464	80.98%
Being unaware of the need to return for subsequent doses	No	510	89.01%
	Yes	63	10.99%
Did not know where and when to get vaccination	Yes	27	4.71%
	No	546	95.29%
Concerned about side effects	Yes	16	2.79%
	No	557	97.21%
Distance from the clinic was too far	Yes	31	5.41%
	No	542	94.59%
Time of vaccination inconvenient	Yes	37	6.46%
	No	536	93.54%
Shortage of vaccine	Yes	5	0.87%
	No	568	99.13%
Family problem illness of the mother lack of husband support	Yes	11	1.92%
	No	562	98.08%
Long line Waiting time	Yes	15	2.62%
	No	558	97.38%

5.1.4. Knowledge assessment of children caretakers' age 12-23 month in Mekelle Town, Tigray Northern Ethiopia, 2017:

Majority of respondents were heard about immunization from health workers 220(38.39%), radio 78(13.61%), TV 74 (12%) and the remaining from other sources. The main type of information respondents get were about advantage of immunization 246 (42.93%), followed by campaign immunization 81(14.14%). Respondents knowledge on schedule of vaccination indicates that 64(11.17%) had low knowledge on schedule of vaccination. respondent's about immunization side effects were not heard 553 (96.51%) and 20(3.49%) had the heard about immunization side effects. The majority of guardians were answers the question when start child immunization; after birth 24 hours 385(67.19%), greater than one week after birth 97(16.93%), after birth from 2 day to one week 49(8.55%), and I did not know 42(7.33%).

The majority of guardians were believed immunization of children's preventing disease 537(93.72%). Respondents level of satisfaction on immunization service showed that 484(84.47%) =Good, 51(8.90) =Medium, 29(5.0%) = I did not know, and 9 (1.57%) = No response.

Table 5 : Knowledge assessment of children caretakers' age 12-23 month in Mekelle Town, Tigray Northern Ethiopia, 2017

Variables		Frequency	Percent
Did you get any information about immunization	Yes	291	50.79%
	No	282	49.21%
Radio	Yes	78	13.61%
	No	495	86.39%
Television	Yes	74	12.91%
	No	499	87.09%
Health worker	Yes	220	38.39%
	No	353	61.61%
From Community meeting	Yes	65	11.34%
	No	508	88.66%
1 to 5 network leader	Yes	62	10.82%
	No	511	89.18%
Health extension worker	Yes	12	2.09%
	No	561	97.91%
What kind of information did get about immunization			
Campaign vaccination	Yes	81	14.14%
	No	492	85.86%
Advantage of vaccination	Yes	246	42.93%

	No	327	57.07%
Where to get regular immunization	Yes	82	14.31%
	No	491	85.69%
Do you know the eligible age of children to get vaccine	Yes	4	0.70%
	No	569	99.30%
Vaccination schedule	Yes	64	11.17%
	No	509	88.83%
New vaccines	Yes	12	2.09%
	No	561	97.91%
In your opinion when did the child start immunization	After birth from 2 day to one week	49	8.55%
	After birth in 24 hours	385	67.19%
	Greater than one week after birth	97	16.93%
	I did not know	42	7.33%
Do you think vaccines can prevent diseases	No	1	0.17%
	Yes	537	93.72%
	I do not know	35	6.11%
Do you Heard the side effect of vaccine	Yes	20	3.49%
	No	553	6.51%
Satisfaction rate in immunizations service	Good	484	84.47%
	I do not know	29	5.06%
	Medium	51	8.90%
	No response	9	1.57%
Where did you go when the child sick			
Health facility	Yes	556	97.03%
	No	17	2.97%
Holy water	Yes	32	5.58%
	No	541	94.42%

5.2. Analysis part of the results

5.2.1. Binary Logistic Regression Analysis:

The children 12-23 month age immunization status bi-variate analysis showed that, the Sex of caretaker of children, mothers ever TT immunized, did not know the advantage of immunization, Unaware of the need to return for subsequent doses, did not know where and when to get vaccination, time of immunization inconvenient, worried of immunization side effect, confirmation of birthday, Go to health facility after sick, Go to holy water after sick, Pregnant women follow up clinic(ANC), were variables significantly associated with incomplete childhood immunization and then filtered for multivariate analysis.

Some of the Factors associated with incomplete immunization among children aged 12 – 23 months by cured Odds ratio. The odds of incomplete immunization were high for children

caretaker female sex than male [(OR = 2.02; 95% CI: 0.9 – 4.3)]. Children mothers who were immunized TT during pregnant period were less times incomplete immune to their child than those who did not immunize TT [(OR= 0.04; 95% CI: 2.03-6.21)]. Additionally children of mothers who had with immunization cared at the data collection time were preventable association than those mothers without immunization cared [(OR = 0.01; 95% CI: 1.0 – 15.3)]. Children caretakers who were worried of side effect immunization 23.2 times more likely to be incomplete immunized compared to children caretakers who did not worry of side effect immunization [(OR=23.2(8.0-67.3)].

However most of the other variables like; Educational status of the Primary Care taker, Marital status, religion of the Primary Care taker, Occupation Primary Care taker, Children family size ever born, type of health facility for immunization, Did you get any information about immunization, religion, birth order of the children, were not associated with incomplete immunization.

5.2.2. Multivariate logistic regression analysis

The multivariate logistic regression analysis variables like shows that; did not know the advantage of immunization, did not know where and when to get vaccination, distance of immunization center, time of immunization inconvenient with caretaker, worried of immunization side effect, children go to holy water after sick, pregnant follow-up clinic during pregnancy time variables were stayed to be significantly associated with incomplete children immunization.

Caretaker of the children's did not know the advantage of immunization were more associated with children incomplete immunization than those caretakers who know the advantage immunization [AOR=18.17 (95% CI: 7.5 – 43.6)]. Children of guardians who did not know where and when to get vaccination were more significantly associated with incomplete immunization than those guardians who know the place and time [AOR=2.7 (95% CI: 0.75 – 10.5)]. Children who live in far distance from health institution immunization center were more likely associated with incomplete immunization than near lived. [AOR=26.1 (95% CI: 14.2 – 102.1)]. In addition mothers of the children who had time inconvenient for immunization children were more likely 5.5 times associated with immunization incompleteness than mothers had convenient time [AOR= 71.0 (95%CI: 16.8-130)].

Furthermore, Children who had go to holy water after sick were 21.4 times more likely to incomplete immunization status compared to children who were not go to holy water after sick.

[(AOR=21.4(95%CI: 4.9-92.8)].Mothers or caretakers who were had worried of in appropriate awareness on immunization side effect were 3.4 times more likely to be their children to incomplete immunization than mother who had not worried of immunization side effect trust. [(AOR: 3.4(95% CI: 2.8 - 6.29)].Children who were born from mothers who had pregnancy follow-up (ANC) visit during pregnancy were less times to incomplete immunization compared to infants who were born from mothers who had not antenatal care visit during pregnancy [AOR= 0.01 (95%CI : 0.002 - 0.064)].

However variables like Mather's ever TT immunized, sex of caretakers, do you have immunization card, Unaware of the need to return for subsequent doses about in immunization, confirmation of child birthday and go to health facility after child sick were measured as the confounder in adjusted rigration.

Table 6 : Bi-variate and Multivariate analysis of immunization status among children 12-23 age months live in Mekell town, Northern Ethiopia, 2017

Variable		Immunization Status		Cured OR (95% CI)	Adjusted OR (95% CI)
		No	Yes		
Sex	Female	21	276	2.02(0.9-4.3)	0.8(0.28-1.08)
	Male	10	266		
Mother immunized TT	Yes	15	478	0.04(2.03-6.21)	NI
	No	16	64		
Do you have immunization card	Yes	0	473	0.01(1.0 – 15.3)	NI
	No	31	69		
Did not know the advantage of immunization	Yes	23	86	18.17(7.5-43.5)	44.1(2.4 – 83.6)
	No	8	456		
Unaware of the need to return for subsequent doses	Yes	20	52	5.15(2.7-16.32)	0.29(0.02-3.2)
	No	11	490		
Did not know where and when to get vaccination	Yes	8	27	6.6(12.8-184.9)	2.7(0.75-10.4)
	No	23	515		
Distance of immunization center was far	Yes	22	33	37.7(16.7 – 88.0)	13.4(14.2 – 102.1)
	No	9	509		
Time of immunization inconvenient	Yes	13	24	15.5(6.84-35.47)	71(16.8-130)
	No	18	518		
Worried of immunization side effect	Yes	8	8	9.0(3.6-22.3)	3.4(2.8-6.29)
	No	23	534		
Heard of any information about immunization	Yes	9	20	10.6(4.3-26.0)	16.4(3.8-69.4)
	No	22	522		
Confirmation of child birthday	Yes	22	479	0.32(0.14-0.72)	1.0 (.35 -5.54)
	No	9	63		
Go to health facility after sick	Yes	27	529	0.16(0.05-0.54)	.092(.01-.50)
	No	4	13		
Go to holy water after sick	Yes	9	23	9.23(3.82-22.27)	21.4(4.9- 92.8.)
	No	22	519		
Pregnant follow up clinic	Yes	25	533	0.07(0.023-0.21)	0.01(.002 -.06)
	No	6	9		

* CI-confidence interval significant at 95%

NI-not included

6. Discussion

The study confirm that by checking card and recall mothers the proportion of children age 12-23 month immunization status of mekelle town were 94% ever taken at list one type of vaccine the remaining had not received any dose of immunization. The children complete immunization coverage by checking immunization cards only was 72%. So this result is high when comparing to the national immunization coverage 39 percent of received all basic immunization and sixteen percent had not received any vaccinations (6). Additional study complete immunization coverage in this study is higher than what was reported from Jigjiga 74.6% were ever vaccinated, 36.6% fully vaccinated and 25.4% not vaccinated at all(16).The observed variation could be due to geographical variation and health service coverage including immunization services.

The study shows that the immunization coverage among children aged 12-23 months for each immunization type by checking cards were BCG 80.55%, OPV0 72.08%, Pentavalent1 81.33%, PCV1 81.15%, Rota1 81.15%, Measles 79.76%; was fully vaccinated. The immunization coverage significantly no difference among the immunization type and the children, this could be due to no interruption immunization supply. this study coverage lower than the study conducted in Ethiopia routine EPI coverage (Penta1 87% & Measles 84%) 2014, Ethiopia (Administrative & Survey data)(5). Furthermore study WHO 2016 shows, worldwide coverage of measles, 64 % , polio 85%,PCV 42%,Rota25% (10). This markedly difference could be due to country geographical location, political and economic status, and other believes.

The dropout rate from OPV0, 72.08% to OPV3, 80.89% in the present study was 8.81% which is comparatively similar than that in other study pre urban Kenya the drop-out rate between the first and third vaccine coverage was 8.9% (25). The difference might be due to high percentage of defaulters, in OPVo lack of awareness when to start the immunization and no local health educators for reminding or distance on health institution for immunization center, and time inconvenient.

The study identified the main factors affecting incomplete immunization coverage. Care takers where that live in far distance to reach health facility for immunization center were more likely to associate with children incomplete immunization. This study is similar with the study conducted in east Pokot, Baringo, Kenya(21).this could be suggested that the care takers which live in distance to health facility were difficult to immunize the children.

Children care takers did not know the advantage of immunization were more likely associated with children incomplete immunization. So this study is similarly with the study conducted in Arbegona District, southern Ethiopia(26).this might be advocated that there was deficiency of health education in the community.In addition schedule of immunization health facility inconvenient time with children caretakers was more likely associated with incomplete immunization of children. this study was lined with the study conducted in South western Ethiopia (15).The reason could be certain of the children caretakers dwellers leaved in far pre urban near to mekelle town and lack of modern transportation .

Maternal health care follow-up in pregnancy time (ANC) were found preventive association in incomplete immunization children. These factors have been similarly demonstrated in Machakel Woreda, East Gojjam Zone and Ethiopia national study (27)(14). These findings advocate the need to alert women to follow health care services during pregnancy.

The study shows that children guardians or caretakers Concerned of immunization side effect were more likely to associated to children incomplete immunization than those who did not had concerned of immunization side effect. This study is the same to the study conducted in Arbegona district, southern Ethiopia, "due to fear of common vaccine side effects were at a higher risk of incomplete vaccination than children of mothers who perceived common vaccine side effects positively" (26).

Children caretakers who believe after sick go to holy water were more likely associated with child incomplete immunization than who did not go to holy water. When this study compared with the study conducted at juba teaching hospital similarly many children miss immunization in South Sudan because of the wrong believed in immunization(9).

The study limitation:

The study was cross-sectional study, so that cannot make causal inferences. In addition, some of the data was obtained from maternal recall, not all women had vaccination cards for their children. As such, the result was on mothers' report which is subject to recall bias. Further more in the Adjusted odds ratio the gap between confidence interval and odds ratio was large because the sample size in the out come variable in 2 x2 table not enough.

7. Conclusion:

Overall the average complete immunization status was low from the national immunization plan. Immunization status of children were influenced by not knowing the advantage of immunization, not knowing where and when to get vaccination, distance to health facility, caretakers time inconvenient with immunization, concerned of immunization side effect, go to holy water after sick, variables were the major factors that obstacle stayed to be significantly associated with incomplete children immunization.

8. Recommendation:

Based on the key finding all the basic improvement action in immunization should be done as follows:

- ❖ Strengthening national capability, regional organization and delivery of immunization programmes by FMOF and ROHB
- ❖ District health office and health facility should be improving the immunization coverage especially on those low immunization coverage by zonal and district health office manager.
- ❖ For those who distance dwellers to health facility immunization center additional health facility in surrounding should be done by regional health bureau.
- ❖ Strengthen advice on ANC (antenatal care) follow up during pregnancy should be continuing by health extension worker.
- ❖ Health extension workers should be providing awareness for mothers on immunization side effects and like negative beliefs.
- ❖ Continuous immunization Campaign by district health office also important to increase improvement on children's immunization.
- ❖ Guidance information should be important in immunization time inconvenient mothers or children caretakers to arrange their time for immunization.

❖ Further research has to be important.

9. Reference:

1. Meulen AS, Duclos P, McIntyre P, Lewis KDC, Damme P Van, Brien KLO, et al. Assessing the Evidence for Maternal Pertussis Immunization : A Report From the Bill & Melinda Gates Foundation Symposium on Pertussis Infant Disease Burden in Low- and Lower-Middle-Income Countries. 2016;63(Suppl 4):123–33.
2. ETHIOPIA W. Ethiopia | Immunization - WHO | Regional Office for Africa Ethiopia. 2017;11–3.
3. World Health Organization (WHO) Africa. <http://www.afro.who.int/en/media-centre/afro-feature/item/7620-1-in-5-children-in-africa-do-not-have-access-to-life-saving-vaccines.html>. 2015;
4. AFRICA MCOII, Africa I in. <http://immunizationinafrica2016.org/>. 2016;
5. Ababa A. ETHIOPIA NATIONAL EXPANDED PROGRAMME ON IMMUNIZATION COMPREHENSIVE MULTI- MULTI - YEAR PLAN 2016 - 2020 Federal Ministry of Health , Addis Ababa. 2016;
6. Survey H, Indicators K. Ethiopian demographic and health survey. 2016.
7. Organization W health. <http://www.who.int/topics/immunization/en/>. 2017.
8. UNDP. http://www.undp.org/content/undp/en/home/sdgoverview/mdg_goals/mdg4.html. 2017;
9. C.mulual DAU of J. prevalence and factors associated with missed opportunity for immunization in children attending pediatric outpatient clinic at juba teaching hospital. 2012;(January).
10. World Health Organization. Immunization coverage. 2017.
11. Mihigo R, Anya B, Okeibunor J, Poy A, Machingaidze S, Wiysonge CS, et al. Health monitor in the African. 2015;
12. Adedire EB, Ajayi I, Fawole OI, Ajumobi O, Kasasa S, Wasswa P, et al. Immunisation coverage and its determinants among children aged 12-23 months in Atakumosa-west district , Osun State Nigeria : a cross-sectional study. BMC Public Health [Internet]. 2016;1–8. Available from: <http://dx.doi.org/10.1186/s12889-016-3531-x>
13. Region WA. Improving Immunization Coverage and Equity. 2016.
14. Raji Tajudeen Mohammed, professor Tanya Dohaerty DLK. Assessment of factors associated with incomplet immunization among children aged 12-23 months in Ethiopia. 2015;(November).
15. Wado YD, Afework MF, Hindin MJ. Childhood vaccination in rural southwestern Ethiopia : the nexus with demographic factors and women ’ s autonomy. 2014;17(Supp 1):1–6.

16. Mohamud AN, Feleke A, Worku W, Kifle M, Sharma HR. Immunization coverage of 12 – 23 months old children and associated factors in Jigjiga District , Somali National Regional State , Ethiopia. 2014;1–9.
17. Tohme RA, François J, Wannemuehler K, Magloire R, Carolina M, Flannery B, et al. measles and rubella elimination. 2015;19(9):1105–15.
18. Hmr A, Glenton C, Lewin S. Parents ’ and informal caregivers ’ views and experiences of communication about routine childhood vaccination : a synthesis of qualitative evidence (Review). 2017;(2).
19. Cs W, Oringanje C, Ce N, Oduwale O, Mm M. Interventions for improving coverage of childhood immunisation in low- and middle-income countries (Review). 2016;(7).
20. Babirye JN, Engebretsen IMS, Rutebemberwa E, Kiguli J, Nuwaha F. Urban settings do not ensure access to services : findings from the immunisation programme in Kampala Uganda. BMC Health Serv Res [Internet]. 2014;14(1):1–12. Available from: BMC Health Services Research
21. Ngure R. Factors Influencing Low Immunization Coverage Among Children Between 12 - 23 Months in East Pokot , Baringo. 2015;1(2):1–6.
22. Lakew Y, Bekele A, Biadgilign S. Factors influencing full immunization coverage among 12 – 23 months of age children in Ethiopia : evidence from the national demographic and health survey in 2011. 2015;1–8.
23. Etana B, Deressa W. Factors Affecting Immunization Status of Children Aged 12- 23 Months in Ambo Woreda , West Shewa Zone of Oromia Regional State. 2011;
24. Wikipedia F. Mekelle From Wikipedia, the free encyclopedia. In 2017. p. 1–7.
25. Lilian Chepkemai Maina, Simon Karanja JK. Immunization coverage and its determinants among children age 12-23 months in a peri-urban area of Kenya. 2013;8688:1–7.
26. Negussie A, Kassahun W, Assegid S, Hagan AK. Factors associated with incomplete childhood immunization in Arbegona district , southern Ethiopia : a case – control study. BMC Public Health [Internet]. 2016;1–9. Available from: <http://dx.doi.org/10.1186/s12889-015-2678-1>
27. Melaku Kindie Yenit SA and H abrha. Factors Associated with incompleet childhood Vaccination among children 12-23 monthes of age in machakel woreda,East Gojjam zone. 2017.

Annex 1 : Questionnaires in English Version

1. A questionnaire for the study of immunization and associated factors among children aged 12-23 months in mekelle town, north Ethiopia, 2017.

St.paul's Millennium Medical, College, department of public health informed consent statement.

My name is_____.I was conduct a study on complete immunization and associated factors in mekelle town with sponsored SPHMMC Addis Ababa. We are interviewing randomly selected mothers and care takers that have children aged 12-23 months to assess determinant factors for immunization incomplection. For this purpose certain questions which are thought to be important was asked. You are kindly required to respond to these questions.

We want to assure you that your answers were strictly kept secret. We are also doing not keep a record of your name or address. Participation in this survey is voluntary and you have the right to refuse participation at any time or not to respond to questions that you are not willing to answer. However, your honest answers to these questions were help us in identifying determinant factors of immunization incomplection and improve immunization service in the future. We would appreciate your help in responding to these questions, and the interview was not taken more than 30 minutes. If you have any concern or question please contact me at 0920429370 tell phone number or destabirhane2015@gmail.com email address.

I have read the above description of the research project and I give my consent to participate.

Signature

Date

A. ID Number _____ GPS: _____

B. Are you willing to participate in the study? 1. Yes 2.no

C. Selected household having children age 12-23 months. 1= yes 2= no

D. Time/day / month / year of interview (etc):-----

E. Study area: - zone----- woreda/Town----- kebele-----house number-----

F. Name of data collector: _____Signature _____

Date /____Month____2017

Part I: socio demographic

S.N	Questions	Answers	Skip
1.	Sex of your child (12-23months years old)?	1.Male 2.FEMALE	
2.	How old is your child (12-23months years old)?	[____ ____] month	
3.	When was his/her birthday date (12-23months years old)?	[____/____/____] date /month /year	
4.	Confirm his birthday date by referring his /her birthday certificate or immunization card	1. confirmed 2. Not confirmed	
5.	What is the birth order of the child (first ̄second etc)?	[____ ____]	If your answer is 1 go to question 7
6.	What is the age of the youngest child? If there is no youngest child fill 99	[_____] month	
7.	Who is the caregiver of the child mostly?	1.mother 2.father 3.both 4.other than parents	
8.	Is the caregiver gave answer for the questioner? You don't have to ask the participants	1.Yes 2. No	
9.	What is the age of the caregiver?	Year [____] 99. I don't know	
10.	What is educational status of caretaker?	1.illiterate 2.read and write 3.grade 1-8 4.grade 9-10 5.college/university	
11.	What is the religion of the Primary Caretaker?	1.Orthodox 2.Muslim 3.Protestant 4.Catholic 5.Non Religion 6. Other Christians. 7.Other _____	
12.	Mother's Marital Status	1. Single 2.Married 3. Divorced 4.Widowed	
13.	Occupation Primary Caretaker	1.Government/private institution worker 2.Merchant 3.House wife 4.Student 5.Farmer 6.Other	

14.	How many children do you have? (it include child who died after birth)	1. Male [] 2. female [] 3.Total[]	
15.	Children who live in life	Number[]	
Part II: Health service availability and related characteristics of respondents			
16.	Do you have nearest health facility for immunization center? (if there is no health facility write "00")	1.Yes 2.No	
17.	Where did the child get the last vaccine?	1.Hospital 2.Health center 3.Health post 4.Privet clinic 5.Campaign 5.Other 99.I don't know	
18.	How long it take to reach the nearest immunization center? If it is below 1 hour write it in minute	Minute [____] HOUR [____] 88.I don't know 99.I don't know if there is immunization center	
19.	Have you ever go to health facility to get a vaccine while you were pregnant?	1.Yes 2. No 99.I don't remember	→22
20.	If yes how many times?	In number. [____]	
21.	Where did the mother deliver her last child?	1.Home 2 Relative/Neighbor's Home 3. Health Post /Health Center/Hospita 4.Private Or Ngo Facility 5.Other Specify_____	
22.	While you take your child to health facility to get health facility other than vaccination, did your child get vaccine?	1.Yes 2.No 3.No ,because he completed all the vaccine 4.noī because I didn't take the 5.child with me 99.I don't remember	
23.	Have you ever refused a vaccination for your child(Missed opportunities)	1.Yes 2.No 99.I don't remember	
24.	What were the reasons for refusing? (Please select all that apply)	1.Too much needle 2.My child was sick 3. Waiting time to get the vaccine 4. I don't like the health worker 5.Other	

		99.I don't know	
25.	Did the mother ever taken any immunization?	1.Yes 2.No	
Part III. The child immunization states			
26.	Have you ever had your child immunization?	1.Yes 2.No 99.I don't know	→40
27.	Do you have your child immunization cared? If the answer is yes verify by asking to show you the cared?	1.Yes 2.No 99.I don't know	→40
28.	Write the date of each immunization by referring the cared (if the vaccine the child received marked but no date immunization cared write "44") a)BCG b) OPV 0 c) OPV 1 d) OPV 2 e) OPV 3 f) DPT-HepB-Hib 1 g) DPT-HepB-Hib 2 h) DPT-HepB-Hib 3 i) PCB1 j) PCB2 k) PCB 3 l) ROTA1 m)ROTA2 n) MEASELS o)Vitamin A	<u>Date/Month/Year</u> BCG _ _ _ _ _ OPV 0 _ _ _ _ _ OPV 1 _ _ _ _ _ OPV 2 _ _ _ _ _ OPV 4 _ _ _ _ _ DPT-HepB-Hib 1 _ _ _ _ _ DPT-HepB-Hib 2 _ _ _ _ _ DPT-HepB-Hib 3 _ _ _ _ _ PCB 1 _ _ _ _ _ PCB 2 _ _ _ _ _ PCB3 _ _ _ _ _ ROTA1 _ _ _ _ _ ROTA2 _ _ _ _ _ ROTA3 _ _ _ _ _ MEASELS _ _ _ _ _ Vitamin A _ _ _ _ _	If the child completed all the vaccine skip to 30
29.	Did your child get any vaccination including campaign vaccination? If the answer is yes fill from "29"	1.Yes 2.No 99.I don't know	→42
30.	If the answer is yes	1.Regular vaccine 2.Campaign vaccination 99.I don't know	
	Can you list the vaccination your child received?	question 31a – 38g	
31.	Did your child received BCG vaccine (on the right hand secar)?	1.Yes 2.No 99.I don't know	
32.	Did your child received Polio vaccine (oral drop)?	1.Yes 2. No	→34

		99.I don't know	
33.	How many times your child did receive polio vaccination?	In numbers [_____] 99.I don't know	
34.	Did you child receive penta (it will be given together with polio and on the leg)	1.Yes 2.No 99.I don't know	→36
35.	How many times your child did receive penta vaccination?	In number [_____] 99.I don't know	
36.	Did your child receive PCV (It will be given usually together with penta and on the right leg?	1.Yes 2.No 99.I don't know	→38
37.	How many times your child did receive PCV vaccination?	In number [_____] 99.I don't know	
38.	Did your child receive Rota vaccine (oral drop use to prevent diarrhea)	1.Yes 2.No 99.I don't know	→40
39.	How many times your child did receive Rota vaccination?	In number [____ ____] 99.I don't know	
40.	Did you child receive measles vaccine at the age of 9 months (on the left arm)?	1.Yes 2.No 99.I don't know	
41.	Following the participant answer and immunization card review if the child didn't get the vaccine or completed the vaccine ask the following question What are the reasons the child did not get the vaccine? (Please select all that apply)	<u>a)</u> I did not know the advantage of vaccine <u>b)</u> being unaware of the need to return for subsequent doses <u>c)</u> Did not know where and when to get vaccination <u>d)</u> Concerned about side effects <u>e)</u> Distance from the clinic was too far <u>f)</u> Time of vaccination inconvenient <u>g)</u> The health profesional was not there <u>h)</u> shortage of vaccine <u>i)</u> family problem (illnes of the mother;lack of husband support) <u>j)</u> long Waiting time <u>k)</u> other <u>l)</u> I didn't t know	
Part IV: knowledge assessment			
42.	Have you ever heard the side effect of vaccine?	1.Yes 2. No	
43.	Did you get any information about vaccination with in the last three months?	1. Yes 2. No	45

44.	Question 44, if yes by which media do you get?	1.Radio 2.TV 3.Newspaper 4.Flier 5.Health worker 6.Community meeting 7.1 to 5 leader 8.Health extension worker 9.Nabors 10.Other _____	
45.	What kind of information did you get about vaccination	1.Campaign vaccination 2.Advantage of vaccination 3.Where to get regular vaccination 4.Eligible age of children to get vaccine 5.Vaccination schedule 6.New vaccines (BCG/Rota) 7.Other 99. I don't know	
46.	In your opinion, at what age children start vaccine?	[____ ____] month 99.I don't know	
47.	Do you know how many times you should go to health facility for vaccination?	Number [_____] 99.I don't know	
48.	Do you think vaccines can prevent diseases?	1.Yes 2.No 99.I don't know	
49.	How do you rate the satisfaction you get immunization service?	1.Good 2.Medium 3.Bad 4.No Response 5. I Don't Know	
50.	Where do you take your child when he/she is sick?	1.Health facility 2.Holy water 3.Herbal medicine 4.Church 88.Other 99. I don't know	

Thank you very much for your participation!

T2	End time of data collection	____:____	
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Annex 2: Questionnaires in Tigrigna Version

ጥዕና ሳይንስ ኮሌጅ ህብረተሰብ ጥዕና ትምህርቲ ክፍሊ ናይ ክትባት መጠነ ምቁራጽ ዝተተሓሓዘ ፀገማት ንምፅናዕ ዝተዘጋጀዎ መጠየቂ ነሐሴ፣ 2009 ዓ.ም ናይ ስምምዕነት ቅጽ፤

ስመይ ደስታ ብርሃነ ይባሃል፡፡ናይ ቅዱስ ጳውሎስ ሚሊኒየም መዲካል ኮሌጅ ብዘካይዶ ዘሎ ሳይንሳዊ ፅንዓት ውሽጢ ናይ ፅንዓት ቡድን ኣባል ብምኡን ኣብ ምስራሕ ይርከብ፡፡ክትባት ጀሚሮም ዘቋረፁ በዝሒ መጠንና ዝተተሓሓዘ ዘለዎም ምክንያታት ኣብ መቀለ ከተማ ፅንዓት የካይድ እዩ ዘለኩ፡፡ኣብቲ ፅንዓት ዝሳትፉ ብኣጋጣሚ ዝተመረፁ ዕድሜኦም ካብ 12-23 ኣዋርሕ ዝኮኖም ህጻናት ዘለዉን ኣዴታት ወይም መዕበይቲ እነትኮኑ ነዚ ዓላማ ከብሃል ዝተዘጋጀዉ ንእሽተይ ጥያቄታት ንምምላስ ንክትተሓባብሩና ኣቀዲምና ንጥይቅ፡፡ንዝህቡና መልሲ ኣቀዲምና ነመሰግን ብሚስጥር ዝተሓዘ ስለ ዝኮነ ስም ኮነ ኣዲራሻ ተመዝጊቡ ኣይተሓዘን ፡፡ኣብቲ ፅንዓት ንዘይምስታፍ መብትኩም ዝተሓሎወ ክም ዝኮነ፤ ከመኡዉን ኣብ ዝደለኩምዎ ጊዜ ዘይምስታፍ፤ መልሲ ከህቡሎም ዘይደልዩ ጥያቄ ዘይምምላስ ይከእሉ እዮም፡፡ ኮይኑ ግና ዝህብዎም እውነተኛ መልሲ ኣብ ክትባት ምቁራፅ ዙሪያ ዘለዉ ዋና ዋና ዕንቅፋት ንምፍላጥ ንክትባት ኣገልግልት ንዝበለፀ ምምሕያሽ ዓብይ ጠቀሜታ ከምዘለዎ ከረጋግፀልኩም ይፈቱ ፡፡ኣብ መወዳእታ ንዝህብዎ መልሲ ኣቀዲመ እናመሰገንኩ ብኣጠቓላሊ እቲ መጠየቂ ካብ 30 ደቂቃ ንላዕሊ ከምዘይወስድ ከገልፀልኩም ይፈቱ፡፡ንዝኮነ ሓበረታ በስልክ ቁፅሪ 0920429370 ወይም በኢሜል፡ destabirhane2015@gmail.com ክትረከቡኒ ትከእሉ እኩም ፡፡

እዚ ናይ ክትባት ፅንዓት ኣንቢበዮ እዩ ተረዲኡኒ ዉን እዩ ሰለዚ ድማ ንክሳተፍ ይፍርም ኣለኩ

_____	_____
ፊርማ	ዕለት
A. መ/ቁፅሪ _____ ጀፒኤስ: _____	
B= ኣብዚ ፅንዓት ንምስታፍ ፍቓደኛ ድዮም 1=እወ 2=ኣይፋሉን	
C=ኣብ ዝተመረፀ መኖሪያ ቤት ውሽጢ እድሜኦም ካብ 12-23 ኣዋርሕት ዝኮኑ 1=ኣለዉ 2= የለዉን	
D=ናይ ተሳታፊ መኖሪያ ቦታ ኣድራሻ 1=ዞን _____ 2=ወረዳ/ከተማ _____ 3=ቀበሌ _____	
ናይ ገዛ ቁጥረ _____ 6=መጠይቂ ዝተመልከሉ ማዕልቲ _____	

ክፍሊ ሐይ :-አብ ማህበራዊና ስነ ህዝቢ መጠየቁ ቅጥዒ			
ተ.ቁ	ሕቶ	መልሲ ከዴ	ይሐለፉ
1.	ናይ ህፃን ጾታ	1= ተባዕታይ 2= ተነሰተይቲ	
2.	ናይ ህፃን ዕድመ ብወርሒ	[_____] ወርሒ	
3.	ናይ ህፃን ልደት ማዓልቲ መዐዝዩ	[_____/_____/_____] ማዓልቲ/ ወርሒ/ዓ/ም	
4.	ናይ ህፃን ልደት ማዓልቲ ፤ናይ ልደት ወይም ከትባት ካርዲ ብምርኣይ የረጋግፁ	1.ተረጋገፁ 2..ንምርገጋፁ አይተከአለን	
5.	መበል ከንደ ቆልዐ እዩ (1ይ፤2ይ...)	[_____] መልሱ 1ይ፤ተከይኑ	→7
6.	ናይ ምንአስ ወደን/ጓለን ዕድመ ከንደይ እዩ ብወርሒ ይምልኡ፤ምንአስ ተዘየለ 99 ይምልኡ	[_____] ወር	
7.	ናይ ህፃን ዋና መዕበይ/ተንከባካቢ መን እዩ?	1=አደኡ 2=አቦኡ 3.ከልቲአም 4. ካሊእ_____	
8.	እቱ መጠይቅ ዝምልስ ዋናመዕበይ/ተንከባካቢ ድዩ ከይጠየቁ ይመዝገቡ?	1= እወ 2=አይፋሉን	
9.	ዋና መዕበይ/ተንከባካቢ ዕድመ ከንደይ እዩ?	[_____] ዓመት 99=.አይፈልጥን 88 መልሲ የለን	
10.	ዋና መዕበይ/ተንከባካቢ ትምህርቲ ደረጃ	1=ዘይተምሃረ 2=ምንባብ ምፅሐፍ ዝከእል 3= ካብ 1ይ-8ይ ክፍሊ 4= ካብ9ይ-12ተ ክፍሊ 5=ኮሌጅ እና ዩኒቨርስቲ	
11.	አየነዋይ ሃይማኖት ተኸተላይ እዩም?	1=ኦርቶዶክስ2=ሙስሊም 3=ፕሮቴስታንት 4=ካቶሊክ 5=ሀይማኖት የብለይን 6=ካሊእ ክርስቲያን 7= ካሊእ__	
12.	ናይታ አዶ ናይ መርዓ ኩነታት ?	1= ባዓልቲ ሐዳር 2= ዘይተመረጠወት 3= ሰብአያ ዝሞታ 4=ዝተፋተሐት	
13.	ዋና መዕበይ/ተንከባካቢ ዋና ስራሑ ታይ እዩ ?	1=የቤትእመቤት2=ሐረስታይ 3=ናይመንግስቲ ሰራሕተኛ 4=ነጋዴ 5= ማዓልታዊ ሰራሕተኛ 7=ካሊእ __	
14.	እታ አዶ ከንደይ ጊዘ ጠኒሳ ምስ ሀዚ ዘሎ፤አብ ጥንሲ ዝሞተ ሐዊስካ ብዝሐት ከንደየ እዩ ?	ብቁፅሪ [_____]	
15.	ብታ አዶ ዝተወለዱ ህጻናት በዝሒ (ምስተወለደ ዝሞተ ሐዊስካ)?	1.ወዳት 2.አነስትዮ 3.ጡ/ድምር [_____]	
16.	በሕይወት ዘለዉ ህጻናት ቁፅሪ	ብቁፅሪ [_____]	

ክፍሊ ከልተ: - ናይ ክትባት ኣገሌግልት ተበፃሕነት ፅርዮት ዘርኢ መጠይቅ					
17.	ብቀረባ ዝርከብ ናይ ክትባት ኣገሌግልት ዝህብ ጥዕና ተቋም ኣሎዶ?	1=እወ 2=የለን			
18.	ብዝሓለፈ ናይ ክትባት ጊዘ እቲ ህፃን ኣበይ ተከቲቡ?	1=ሆስፒታል 2=ጥዕና ጣቢያ 3=ጥዕና ኬላ 4=ናይ ግሊ ክሊኒክ 5.ካምፓይን 6.ካሊእ 88=መልሲ የለን 99= ኣይፈልጥን.			
19.	ኣብ ጥዕና ተቋሙ ንምብፃሕ ከንደይ ጊዜ ይወስዳልኩም ብደቂቃ? ጥዕና ተቋሙ ተዘይየልዩ “00” ይመዝገቡ	ደቂቃ [____] ሰዓት [____] 88=መልሲ የለን 99= ኣይፈልጥን.			
20.	ናይ ህፃን ኣደ ኣብ መወዳእታ ጥንሲ ቅድሚ ምዉላዳ ናይ ጥንሲ ክትትል ትገብር ነይራዶ ?	1= እወ 2= ኣይፋሉን			→22
21.	እንተገይራ ከንደይ ጊዘ ገይራ?	ብቁፅሪ [____]			
22.	ናይቲ ህፃን ኣዶ ናይ መወዳእታ ቆልዓኣ ኣበይ ዎሊዳዮ?	1=ገዛ 2=ጎሮቤት ገዛ 3=ጥዕና ኬላ 4=ጥዕና ጣቢያ/ሆስፒታል 5=ናይ ግሊ ወይ NGO ክሉኒክ 6=ካሊእ_____			
23.	እቲ ህፃን ከሓምም ከሎ ኣብ ጥዕና ተቋም ይሕከም ዶ ንእግረ መንገዱ ተከቲቡ ዶ ይፈልጥ?	1= እወ 2= ኣይፋሉን			
24.	እቲ ህፃን ኣየክትብን ኢለን/ኢሎም ይፈለግ ዶ?	1= እወ 2= ኣይፋሉን			→26
25.	ቁፅሪ 24 እወ ተኮየኑ መልሲ ታይ ነይሩ ምክንያቱ	1.መረፍእ ስለ ዝበዝሐ 2.ሐሚሙ ስለ ዝነበረ 3.ኣብ ክትባት ጊዘ ትፅቢት ስለ ዘለዎ 4.እቶም ናይ ጥዕና ሰራሕተኛ ስለ ዘይፈትዎም 5.ካልእ 88=መልሲ የለን			
26.	ናይ እቲ ህፃን ኣዶ ዘመናዊ ክታበት ኣገልግሎት ተጠቂሞ ትፈልጥዶ?	1=ኣወ 2=ተጠቂሞ ኣይትፈልጥን			
ክፍሊ ሰለስተ: - ናይ ህፃን ክትባት ኩነታት					
27.	እቲ ህፃን ክትባት ወሲዱ/ዳ ይፈልጥዶ ?	1=እወ 2=ኣይፈልጥን			→40
28.	27 ሕቶ መልሲ ኣወ እነተኮይኑ ናይ ክትባት ካርዲ ኣሎ ዶ?	1= ኣዎ 2= የለን			→40
29.	ኣብቲ ካርዲ ዘሎ መልእክቲ በቲ ሕቶ መሰረት ገልብጥዎ ? (እታ ኣዶ ናይቲህፃን ክትባታት መኣዝ ከም ዝወሰደ እንተኣስታዊሳ ካብ ቃል ይመዝገብ ወይ ካብ ጥዕና ተቋም መዝገብ ዝተረከበ መረዳእታ ይምሉኡ) (እቲ ህፃን ክትባት ወሲዱ ነገር ግን ማዓልቲ ተዘይ ተመዝጊቡዎ 44 ይምልኡዎ)	ክትባት	መዓልቲ	ወርሒ	እነደሐር ተከቲቡ ወዲኡ →30 ሕለፍ
		BCG			
		OPV ₀			
		OPV1			
		OPV2			
		OPV3			
	PENTA 1				

		PENTA 2				
		PENTA3				
		MEASLES				
		PCV 1				
		PCV 2				
		PCV 3				
		ROTA1				
		ROTA2				
		ROTA3				
		Vitamin A				
30.	እቱ ህፃን ከትባታት ረኪቡ ዶ ምሶ ብካምፓይን(ብሕብረት ዝተዉሃበ ሓዊሶካ)	1=እዉ 2=አይተውሃበን 99= አይፈልጥን 88=መልሲ የለን				→42
31.	ቁፅሪ 30 እዉ እንተኮይኑ መልሲ ታይ ዐይነት ነይሩ	1.መደበኛከታበት 2.ብካምፓይን(ብሕብረት) 3. 99= አይፈልጥን 88=መልሲ የለን				
32.	BCG ክትባት ናይ ቲቢ ሕማምን ንምክልካል ኣብ የማናይ ኢድ ማእገር ብመርፍእ ዝተዉሃበ ንብዙሕ ጊዜ ጠባሳ ዝሓድገ እዩ	1=እዉ 2=አይተውሃበን 88=መልሲ የለን 99 አይፈልጥን				
33.	ምስተወለደ ፖሊዬ ክትባት ኣብ ክልተ ሰሙን ዉሽጢ ዝተዉሃበ	1=እዉ 2=አይተውሃበን 88=መልሲ የለን 99 አይፈልጥን				→35
34.	ናይ ፖሊዬ ክትባት ብኣፍ ዝወሃብ ወሲዱዶ? ንክንደይ ጊዜ	ብቁፅሪ [] 99. አይፈልጥን.				
35.	ናይ ፔንታ ክትባት ወሲዱዶ?	1=እዉ 2=አይተውሃበን 88=መልሲ የለን 99 አይፈልጥን				→37
36.	ቁፅሪ 35 እዉ እንተኮይኑ ንክንደይ ጊዜ	ብቁፅሪ [] 99. አይፈልጥን				
37.	ናይ ፒሲቪ ክትባት ወሲዱዶ? (ምስ ፔንታ ኣብ የማናይ እግሪ ዝወሃብ)	1=እዉ 2=አይተውሃበን 88=መልሲ የለን 99 አይፈልጥን				→39
38.	ናይ ፒሲቪ ክትባት ወሲዱዶ? ንክንደይ ጊዜ	ብቁፅሪ [] 99. አይፈልጥን				
39.	ናይ ሮታ ክትባት ብኣፍ ዝወሃብ ወሲዱዶ?(ካብ ተቅማጥ ዝከላከል)	1=እዉ 2=አይተውሃበን 88=መልሲ የለን 99 አይፈልጥን				→41
40.	ናይ ሮታ ክትባት ወሲዱዶ? ንክንደይ ጊዜ	ብቁፅሪ [] 99. አይፈልጥን				
41.	ናይ ጸረ ሽድሽተ ክትባት ኣብ 9 ዝወሃብ (ግራ እግሪ ብመርፍእ ዝተዉሃበ) ወሲዱ/ዱ ዶ?	1.እዉ _____ 2.አይተውሃበን _____				

		88=መልሲ የለን _____ 99 አይፈልጥን	
42.	ህፃናት ክትባት ንክይወደኡ (ንምቁራፅ) ምክንያት ዝኮን ታይ እዩ?(ካብ ሓደ ንላዕሊ መልሲ ይከኣል እዩ)	1.ጥቅሙ ብዘይ ምፍላጥ 2.ተመሊሱ ንካልኣይና ንሳልሳይ ጊዜ ከምዝከተብ ዘይምፈላጥ 3.አገሌግሎት ዝወሃበሉ ሰዓትና ቦታ ዘይምፍላጥ 4. ካልኣት ተዛመድቲ ፀገማት ፍርሐ እዩ 5.ኣብ ክትባት እምነት ስለዘይብለይ 6. ክትባት መውሃቢ ቦታ ሩሑቅ እዩ 7.ክትባት መውሃቢ ሰዓት ኣይምቐዉን 8.ክታቢ ሰብ ኣይርከብን 9.ሕፅረት መድሐኒት ስለዘለሎ 10.ዝሕግዝ ቤተሰብ ስለዘየለ 8.እቲ ክትባት ሰልፊ ስለዘለዎ 9=ካሊእ _____ 88=መልሲ የለን _____ 99 አይፈልጥን	
ክፍሊ አርባዕተ : - ኣብ ክትባት ኣገሌግሎት ፍልጠት ዝምልከት			
43.	ክትባት ንህፃን ዘምፅኦ ናይ ጥዕና ፀገም ሰሚዖም ይፈልጡ ዶ ?	1= እወ 2=ኣይሰማዕኩን 99= አይፈልጥን 88 መልሲ የለን	
44.	ስለ ክትባት ዝኮነ ወረ ኣብዙ 3ተ ወርሒ ዉሽጢ ሰሚዖም ይፈልቱዶ ?	1= እወ 2=ሰሚዖ አይፈልጥን	
45.	ን44 ጥያቄ መልሲ እወ እንተኮኑ ካበይ ሰሚዖም? (ካብ ሓደ መልሲ ንላዕሊ ይከኣል እዩ)	1. ሬድዮ 2.ቲቪ 3.ጋዜጣ 4.ሸንቸር 1.ካብ ሕ/ሰብ 2.ካብ ጥዕና ባዓል ሞያ 7. ካብ ቀበሌ ኣማሓደርቲ 8.ካብ 1 ን 5 ነትዎርክ 9. ካሊእ ____99= አይፈልጥን 88 መልሲ የለን	
46.	44 ሕቶ መልሱ ኣወ እንተኮይኑ ብዛዕባ እነታይ ዝምልከት ነይሩ ዝሰማዕኩም	1=ክትባት ጥቅሚ 2=ክትባት ኣዋጅ 3=ክትባትሙሉእ,ብሙሉእ,መኣዝ ከምዝውዳእ 4=ክትባት ዝወሃበሉ ቆፀሮ 5=ስለ ሓደሽቲ ክትባት 6. ስለ ክትባት ፕሮገራም 6= ካሊእ _____ 88=መልሲ የለን 99. አይፈልጥን	

47.	ብናተን/ም አራአእያ እቱ ሀጸን ክትባት ዝጅምረሉ መአዝ እዩ?	ብጊዘ [_____] 99= አይፈልጥን 88 መልሲ የለን	
48.	ንክትባት ኢሎም/ን ናብ ጥዕና ተቐም ከንደይ ጊዘ ከምዝክዱ ይፈልጦዎ ዶ	1= እወ 2= እንድዒ 99= አይፈልጥን 88 -መልሲ የለን	
49.	ብናተን/ቶም አራአእያ ክትባት ሕማም ይከላከል ዶ ?	1= እወ 2= እንድዒ 99= አይፈልጥን 88 መልሲ የለን	
50.	ብዝረከብከምዎ ናይ ክትባት አገልግሎት ዓጊብኩምዶ?	1=ፅቡቅ 2=ማእከላይ 3=ሕማቅ 88=መልሲ የለን _____ 99 አይፈልጥን.	
51.	ናበይ እኩም ትወስድዎ ቆልዐኩም ተሓሚሙ	1.ናብ ጥዕና ተቐም 2.ናብ ፀበል(ማጮሎት) 3.ናብ ሐበሻ መድሐኒት 6= ካሊእ _____ 88=መልሲ የለን 99. አይፈልጥን	
ንዝገበርኩምሌይ ምትሓብባር ብጣዕሚ እየ ዘመሰግን			
T2	ፀብፃብ ዝተወደአሉ ጊዘ	____:____	

ብመረዳእታ ዝአከበ ዝምላእ
 መረዳእታ ዝአከበ ስም-----
 ናይጉጅለ ኮድ-----
 ፊርማ-----
 ማዓልቲ-----
 ብተቆፃፃሪ ዝምላእ
 ናይ ተቆፃፃሪ ስም-----
 ዘለዉ ክፍተታት -----
 ንክፍተታት ዝተዉሃበ መአረምታ -----

Annex 3: Map of mekelle Town

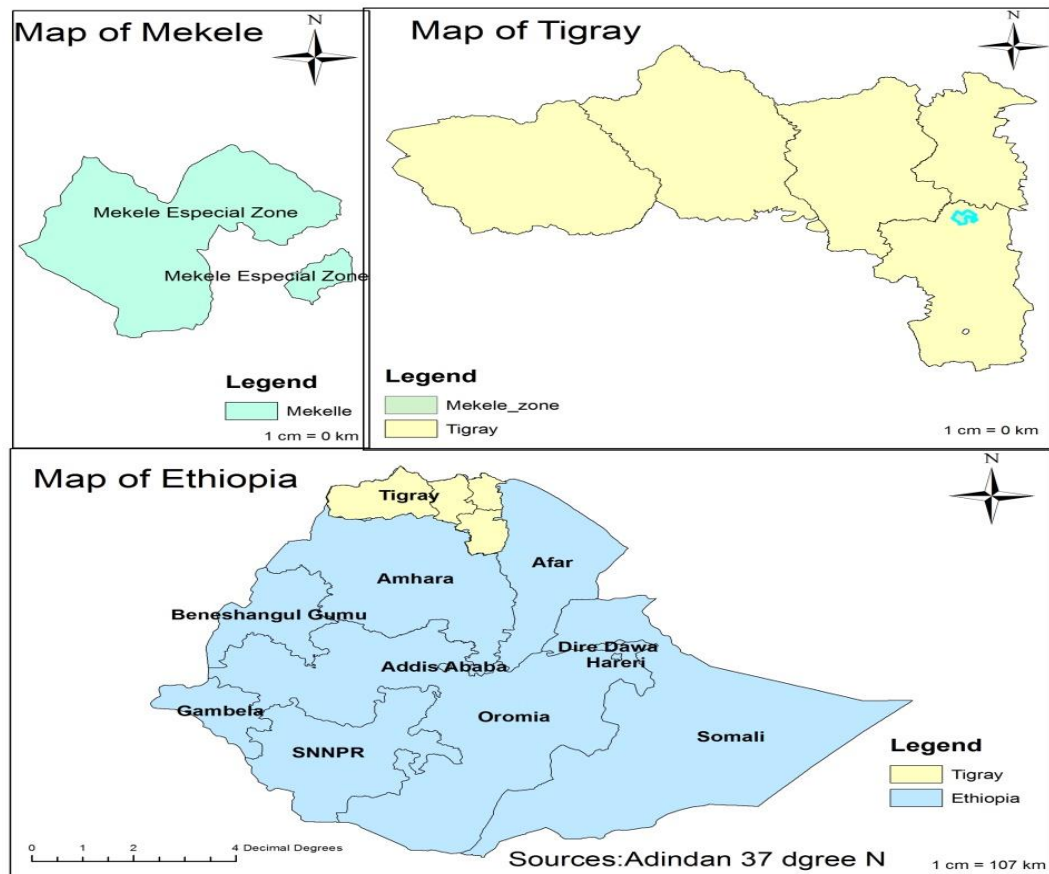


Figure 3: Map of mekelle special zone (Town)

ክብ 2007 ዓ/ም ክብ 2012 ዓ/ም ትምህርት በህሊ ህዝብ ከተማ መቸለ ዘመናዊነት																		
ክብ	2007			2008			2009			2010			2011			2012		
	ፊደር	ተባባሪ	አገልግሎት	ፊደር	ተባባሪ	አገልግሎት	ፊደር	ተባባሪ	አገልግሎት	ፊደር	ተባባሪ	አገልግሎት	ፊደር	ተባባሪ	አገልግሎት	ፊደር	ተባባሪ	አገልግሎት
1	5,991	3,050	2,941	6,053	3,387	3,266	7,315	3,724	3,591	7,976	4,061	3,916	8,638	4,398	4,241	9,300	4,735	4,565
2	36,855	14,589	14,066	31,820	16,200	15,620	34,986	17,817	17,174	38,152	19,424	18,728	41,318	21,036	20,281	44,483	22,647	21,836
3	33,247	17,028	16,719	37,475	18,910	18,566	41,204	20,791	20,413	44,932	22,672	22,260	48,661	24,553	24,108	52,389	26,435	25,955
4	39,475	19,065	20,371	43,793	21,172	22,621	48,149	23,278	24,972	52,506	25,384	27,122	56,863	27,491	29,373	61,220	29,597	31,623
5	49,446	21,938	27,508	54,908	24,361	30,547	60,371	26,785	33,585	65,834	29,209	36,625	71,296	31,632	39,664	76,759	34,056	42,703
6	50,339	23,942	26,297	55,901	26,587	29,314	61,462	29,232	32,230	67,024	31,877	35,146	72,585	34,522	38,063	78,147	37,168	40,979
7	35,338	17,462	17,876	39,242	19,391	19,851	43,146	21,321	21,826	47,050	23,290	23,801	50,955	25,179	25,776	54,859	27,108	27,750
8	22,060	11,944	10,117	24,487	13,263	11,234	26,935	14,583	12,352	29,372	15,902	13,470	31,809	17,212	14,587	34,246	18,541	15,705
9	38,219	9,284	9,035	29,343	10,309	10,033	22,367	11,335	11,032	24,390	12,361	12,030	26,414	13,386	13,028	28,438	14,412	14,026
10	12,398	6,575	5,413	13,313	7,302	6,011	14,637	8,028	6,900	15,962	8,755	7,207	17,286	9,481	7,805	18,611	10,208	8,407
11	3,770	4,878	1,854	10,807	5,417	5,341	11,883	5,956	5,927	12,958	6,495	6,463	14,033	7,034	6,999	15,108	7,572	7,536
12	5,058	3,402	5,402	6,950	4,000	4,050	9,840	4,398	5,442	10,731	4,796	5,935	11,621	5,194	6,427	12,511	5,592	6,920
13	5,867	2,614	2,253	6,515	1,903	2,613	7,364	3,191	3,472	7,812	3,480	4,332	8,460	3,769	4,691	9,108	4,058	5,051
14	3,738	1,244	2,214	5,936	2,492	3,329	6,345	2,740	3,655	6,974	2,988	3,986	7,552	3,236	4,117	8,131	3,483	4,647
15	3,095	1,798	2,321	4,476	1,896	2,570	4,921	2,085	2,836	5,366	2,274	3,092	5,811	2,462	3,349	6,257	2,651	3,606
16	5,070	1,503	1,590	3,900	1,669	2,321	4,387	1,835	2,552	4,784	2,001	2,783	5,181	2,167	3,013	5,578	2,333	3,244
17	4,011	1,481	1,321	4,457	2,034	2,421	4,900											

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Annex V: Data Collection Tool infant immunization card

110291

Infant Immunization Card

Name of Infant: Yeh dawa Card number: WCE 475 443 19 Telephone: 8794 4444

Date of birth: 22/11/19 Sex: F Address: Quile
 Name of Mother: Yeh dawa Name of Father: Yeh dawa
 Birth date (Age) of mother (for TT vaccination): 22/11/19
 Name of Father: Yeh dawa

Words: Shabe
 H/A: Shabe
 Mobile: Shabe
 Name of Clinic: Shabe
 H/A: Shabe

Vaccine	Trainer's name	Date of birth	Trainer's name	Date of birth
BAC 100	Yeh dawa	22/11/19	Yeh dawa	22/11/19
DTaP 1	Yeh dawa	22/11/19	Yeh dawa	22/11/19
DTaP 2	Yeh dawa	22/11/19	Yeh dawa	22/11/19
DTaP 3	Yeh dawa	22/11/19	Yeh dawa	22/11/19
DTaP 4	Yeh dawa	22/11/19	Yeh dawa	22/11/19
DTaP 5	Yeh dawa	22/11/19	Yeh dawa	22/11/19
DTaP 6	Yeh dawa	22/11/19	Yeh dawa	22/11/19
DTaP 7	Yeh dawa	22/11/19	Yeh dawa	22/11/19
DTaP 8	Yeh dawa	22/11/19	Yeh dawa	22/11/19
DTaP 9	Yeh dawa	22/11/19	Yeh dawa	22/11/19
DTaP 10	Yeh dawa	22/11/19	Yeh dawa	22/11/19
DTaP 11	Yeh dawa	22/11/19	Yeh dawa	22/11/19
DTaP 12	Yeh dawa	22/11/19	Yeh dawa	22/11/19
DTaP 13	Yeh dawa	22/11/19	Yeh dawa	22/11/19
DTaP 14	Yeh dawa	22/11/19	Yeh dawa	22/11/19
DTaP 15	Yeh dawa	22/11/19	Yeh dawa	22/11/19
DTaP 16	Yeh dawa	22/11/19	Yeh dawa	22/11/19
DTaP 17	Yeh dawa	22/11/19	Yeh dawa	22/11/19
DTaP 18	Yeh dawa	22/11/19	Yeh dawa	22/11/19
DTaP 19	Yeh dawa	22/11/19	Yeh dawa	22/11/19
DTaP 20	Yeh dawa	22/11/19	Yeh dawa	22/11/19
DTaP 21	Yeh dawa	22/11/19	Yeh dawa	22/11/19
DTaP 22	Yeh dawa	22/11/19	Yeh dawa	22/11/19
DTaP 23	Yeh dawa	22/11/19	Yeh dawa	22/11/19
DTaP 24	Yeh dawa	22/11/19	Yeh dawa	22/11/19
DTaP 25	Yeh dawa	22/11/19	Yeh dawa	22/11/19
DTaP 26	Yeh dawa	22/11/19	Yeh dawa	22/11/19
DTaP 27	Yeh dawa	22/11/19	Yeh dawa	22/11/19
DTaP 28	Yeh dawa	22/11/19	Yeh dawa	22/11/19
DTaP 29	Yeh dawa	22/11/19	Yeh dawa	22/11/19
DTaP 30	Yeh dawa	22/11/19	Yeh dawa	22/11/19
DTaP 31	Yeh dawa	22/11/19	Yeh dawa	22/11/19
DTaP 32	Yeh dawa	22/11/19	Yeh dawa	22/11/19
DTaP 33	Yeh dawa	22/11/19	Yeh dawa	22/11/19
DTaP 34	Yeh dawa	22/11/19	Yeh dawa	22/11/19
DTaP 35	Yeh dawa	22/11/19	Yeh dawa	22/11/19
DTaP 36	Yeh dawa	22/11/19	Yeh dawa	22/11/19
DTaP 37	Yeh dawa	22/11/19	Yeh dawa	22/11/19
DTaP 38	Yeh dawa	22/11/19	Yeh dawa	22/11/19
DTaP 39	Yeh dawa	22/11/19	Yeh dawa	22/11/19
DTaP 40	Yeh dawa	22/11/19	Yeh dawa	22/11/19
DTaP 41	Yeh dawa	22/11/19	Yeh dawa	22/11/19
DTaP 42	Yeh dawa	22/11/19	Yeh dawa	22/11/19
DTaP 43	Yeh dawa	22/11/19	Yeh dawa	22/11/19
DTaP 44	Yeh dawa	22/11/19	Yeh dawa	22/11/19
DTaP 45	Yeh dawa	22/11/19	Yeh dawa	22/11/19
DTaP 46	Yeh dawa	22/11/19	Yeh dawa	22/11/19
DTaP 47	Yeh dawa	22/11/19	Yeh dawa	22/11/19
DTaP 48	Yeh dawa	22/11/19	Yeh dawa	22/11/19
DTaP 49	Yeh dawa	22/11/19	Yeh dawa	22/11/19
DTaP 50	Yeh dawa	22/11/19	Yeh dawa	22/11/19
DTaP 51	Yeh dawa	22/11/19	Yeh dawa	22/11/19
DTaP 52	Yeh dawa	22/11/19	Yeh dawa	22/11/19
DTaP 53	Yeh dawa	22/11/19	Yeh dawa	22/11/19
DTaP 54	Yeh dawa	22/11/19	Yeh dawa	22/11/19
DTaP 55	Yeh dawa	22/11/19	Yeh dawa	22/11/19
DTaP 56	Yeh dawa	22/11/19	Yeh dawa	22/11/19
DTaP 57	Yeh dawa	22/11/19	Yeh dawa	22/11/19
DTaP 58	Yeh dawa	22/11/19	Yeh dawa	22/11/19
DTaP 59	Yeh dawa	22/11/19	Yeh dawa	22/11/19
DTaP 60	Yeh dawa	22/11/19	Yeh dawa	22/11/19
DTaP 61	Yeh dawa	22/11/19	Yeh dawa	22/11/19
DTaP 62	Yeh dawa	22/11/19	Yeh dawa	22/11/19
DTaP 63	Yeh dawa	22/11/19	Yeh dawa	22/11/19
DTaP 64	Yeh dawa	22/11/19	Yeh dawa	22/11/19
DTaP 65	Yeh dawa	22/11/19	Yeh dawa	22/11/19
DTaP 66	Yeh dawa	22/11/19	Yeh dawa	22/11/19
DTaP 67	Yeh dawa	22/11/19	Yeh dawa	22/11/19
DTaP 68	Yeh dawa	22/11/19	Yeh dawa	22/11/19
DTaP 69	Yeh dawa	22/11/19	Yeh dawa	22/11/19
DTaP 70	Yeh dawa	22/11/19	Yeh dawa	22/11/19
DTaP 71	Yeh dawa	22/11/19	Yeh dawa	22/11/19
DTaP 72	Yeh dawa	22/11/19	Yeh dawa	22/11/19
DTaP 73	Yeh dawa	22/11/19	Yeh dawa	22/11/19
DTaP 74	Yeh dawa	22/11/19	Yeh dawa	22/11/19
DTaP 75	Yeh dawa	22/11/19	Yeh dawa	22/11/19
DTaP 76	Yeh dawa	22/11/19	Yeh dawa	22/11/19
DTaP 77	Yeh dawa	22/11/19	Yeh dawa	22/11/19
DTaP 78	Yeh dawa	22/11/19	Yeh dawa	22/11/19
DTaP 79	Yeh dawa	22/11/19	Yeh dawa	22/11/19
DTaP 80	Yeh dawa	22/11/19	Yeh dawa	22/11/19
DTaP 81	Yeh dawa	22/11/19	Yeh dawa	22/11/19
DTaP 82	Yeh dawa	22/11/19	Yeh dawa	22/11/19
DTaP 83	Yeh dawa	22/11/19	Yeh dawa	22/11/19
DTaP 84	Yeh dawa	22/11/19	Yeh dawa	22/11/19
DTaP 85	Yeh dawa	22/11/19	Yeh dawa	22/11/19
DTaP 86	Yeh dawa	22/11/19	Yeh dawa	22/11/19
DTaP 87	Yeh dawa	22/11/19	Yeh dawa	22/11/19
DTaP 88	Yeh dawa	22/11/19	Yeh dawa	22/11/19
DTaP 89	Yeh dawa	22/11/19	Yeh dawa	22/11/19
DTaP 90	Yeh dawa	22/11/19	Yeh dawa	22/11/19
DTaP 91	Yeh dawa	22/11/19	Yeh dawa	22/11/19
DTaP 92	Yeh dawa	22/11/19	Yeh dawa	22/11/19
DTaP 93	Yeh dawa	22/11/19	Yeh dawa	22/11/19
DTaP 94	Yeh dawa	22/11/19	Yeh dawa	22/11/19
DTaP 95	Yeh dawa	22/11/19	Yeh dawa	22/11/19
DTaP 96	Yeh dawa	22/11/19	Yeh dawa	22/11/19
DTaP 97	Yeh dawa	22/11/19	Yeh dawa	22/11/19
DTaP 98	Yeh dawa	22/11/19	Yeh dawa	22/11/19
DTaP 99	Yeh dawa	22/11/19	Yeh dawa	22/11/19
DTaP 100	Yeh dawa	22/11/19	Yeh dawa	22/11/19

Figure 5: Infant Immunization Card