Review of immunization service provision in non-state ethnic actors controlled areas, eastern Myanmar

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Myanmar

51st International Course in Health Development/Master of Public Health (ICHD/MPH)
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KIT (ROYAL TROPICAL INSTITUTE)
Vrije Universiteit Amsterdam
Amsterdam, The Netherlands

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A thesis submitted in partial fulfillment of the requirement for the degree of Master of Public Health

By:

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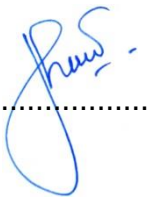
Signature: 

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Abbreviations

AEFI	Adverse Events Following Immunization
AMI	Aide Médicale Internationale
BCG	Bacillus Calmette-Guerin
BMA	Burma Medical Association
BPHWT	Back Pack Health Worker Team
CBO	Community Based Organization
CHW	Community Health Worker
cMYP	Comprehensive Multi Year Plan
CSO	Civil Society Organization
DPT	Diphtheria-Pertussis-Tetanus
EAO	Ethnic Armed Organization
EPI	Expanded Program on Immunization
GAVI	Global Alliance for Vaccine and Immunization
GDP	Gross Domestic Product Government Expenditure
GGHE	General Government Health Expenditure
GVAP	Global Vaccine Action Plan
HDI	Human Development Index
Hep B	Hepatitis B
Hib	*Haemophilus influenzae* B
HISWG	Health Information System Working Group
HPA	Health Poverty Action
IDP	Internally Displaced Person
IHLCS	Integrated Household Living Conditions Survey
IMR	Infant Mortality Rate
INGO	International Non-Governmental Organization
IP	Immunization Program
IRC	International Rescue Committee

KDHW	Karen Department of Health and Welfare
KNU	Karen National Union
MCH	Maternal and Child Health
MDG	Millennium Development Goal
MHC	Mobile Health Clinic
MICS	Multiple Indicator Cluster Survey
MMR	Maternal Mortality Ratio
MMR	Mumps-Measles-Rubella
MOH	Ministry of Health
MR	Measles-Rubella
MTC	Mae Tao Clinic
NCIP	National Committee on Immunization in Practice
NGO	Non-Governmental Organization
NHP	National Health Plan
NIP	National Immunization Program
NSEA	Non-State Ethnic Actor
OOP	Out Of Pocket
OPV	Oral Polio Vaccine
SEAR	South-East Asia Region
THE	Total Health Expenditure
TT	Tetanus Toxoid
U5MR	Under Five Mortality Rate
UNDP	United Nations Development Programme
UNHCR	United Nations High Commissioner for Refugees
UNICEF	United Nations Children's Fund
VPD	Vaccine Preventable Disease
VTHC	Village Tract Health Center
WHO	World Health Organization

Glossary

Immunization is the process whereby a person is made immune or resistant to an infectious disease, typically by the administration of a vaccine. Vaccines stimulate the body's own immune system to protect the person against subsequent infection or disease. (1)

Immunization coverage: Proportion of individuals in the target population who are immunized. (2)

Target population: Group of individuals who are included in the immunization services based on their age and the area in which they live. (2)

Immunization coverage target: A goal that is prepared for a health facility that states what proportion of individuals in the target population will be immunized with specific vaccines in a given time period. (2)

Cold chain is the process used to maintain optimal conditions during the transport, storage, and handling of vaccines, starting at the manufacturer and ending with the administration of the vaccine to the client. The optimum temperature for refrigerated vaccines is between +2°C and +8°C. For frozen vaccines the optimum temperature is -15°C or lower. In addition, protection from light is a necessary condition for some vaccines. (3)

Adverse event following immunization is any untoward medical occurrence which follows immunization and which does not necessarily have a causal relationship with the usage of the vaccine. If not rapidly and effectively dealt with, can undermine confidence in a vaccine and ultimately have dramatic consequences for immunization coverage and disease incidence. (4)

Fixed Strategy: Regular routine immunization services provided at hospitals, health centers or sub health centers. (5)

Mobile Strategy: Monthly routine immunization services provided by a midwife (health staff) away from his/her resident village in areas which are easily accessible. These areas should be within 5 miles distance or 1 hour traveling time. (5)

Outreach Strategy: Routine immunization services provided by a midwife (health staff) away from his/her resident village in area which are not easily accessible or beyond 5 miles. Services may or may not be given monthly, but a minimum of 6 times a year. (5)

Abstract

Background: According to multiple indicator cluster survey (MICS) (2009-2010), in Kayin State, Myanmar, 97.6% of children received all vaccinations and DPT3 immunization coverage was reported as 98.4%. However, the figures from MICS do not represent the whole Kayin State since it was mentioned that non-state ethnic actors (NSEA) controlled areas were excluded from the survey. Little has been known about the availability of immunization services, immunization coverage and barriers to access immunization in NSEA controlled areas of Kayin State.

Objective: This study will explore the provision of immunization services in NSEA controlled areas in Kayin State, eastern Myanmar in order to make recommendations to ministry of health to strengthen EPI coverage as well as to advocate donors to continue supporting existing health programs in NSEA controlled areas of Myanmar.

Methodology: The study is conducted by using literature review method. To assess the immunization coverage in NSEA controlled areas of Kayin State, the secondary data review is done using the immunization program data obtained from Karen Department of Health and Welfare (KDHW).

Findings: The immunization coverage in NSEA controlled areas of Kayin State is significantly lower compare to the coverage in Kayin State and the coverage nationally. The underlying unique political situation in NSEA controlled areas is the main obstacle that limits access to basic health services. The major barriers described in this review include parental knowledge and awareness regarding vaccination, family characteristics, geographical remoteness, transportation difficulties, weakness in the immunization program as well as in service delivery and weakness in communication and information delivery.

Conclusions and Recommendations: Not only health related barriers but also underlying conflict and political barriers need to be resolved to strengthen EPI coverage in NSEA controlled areas of Myanmar. Due to the multiplicity of the barriers identified, no single strategy or intervention can tackle all the barriers. A multi-faceted strategy is essential to ensure that the immunization services reach the unreached children in Myanmar.

Keywords: immunization, EPI, barrier, access, Myanmar

Word count: 12,950

Introduction

I have been working in the public health field since I graduated as a medical doctor in 2008. During my last position, I worked as a reproductive health program manager in Community Partners International (CPI) (Yangon Office) for three years. CPI has another sub-office based in Mae Sot, Thailand-Myanmar border area, and the office works in close collaboration with ethnic health organizations (EHOs) and community based organizations (CBOs) from non-state ethnic actor (NSEA) controlled areas of eastern Myanmar. I learned about those organizations and their health program operations to provide healthcare to population residing in conflict areas and NSEA controlled areas where the government health services are unavailable or inaccessible. Before I came to study this master course in Amsterdam, I learned that one of the CBOs from NSEA controlled area of Kayin* State tried to advocate and coordinate with Ministry of Health (MOH), Myanmar, for immunization service provision but due to political complexity of the situation, no concrete decision had been made. This is the main reason that triggered me to choose this specific topic for my thesis to learn more about the current situation in provision of immunization services in NSEA controlled areas of Myanmar.

Immunization is a highly cost effective measure to improve child health by preventing vaccine preventable diseases (VPDs) that can lead to achieving millennium development goal (MDG) 4 for reducing child mortality. (6) Globally, immunization coverage is increasing - about 84% (112 million) of infants worldwide received 3 doses of diphtheria-pertussis-tetanus (DPT) vaccine in 2013. (7) Despite the significant progress worldwide, VPDs remain a major cause of morbidity and mortality. (8) In 2008, nearly 17% of all deaths in children under five (0 to 59 months) globally were vaccine preventable. (9)

According to WHO, Myanmar is one of the seven countries in South-East Asia region (SEAR) that have achieved >90% DPT3 coverage at national level and 89% of all districts have achieved 80% of DPT3 coverage in

* 'Kayin' is used as the government official name of the Kayin State. However, many local ethnic people and ethnic health orgnizations in Kayin State used the name 'Karen' instead of Kayin. 'Kayin' and 'Karen' pronounce the same in local language. They both refer to Kayin State here in this study.

2009. (6) In Kayin State, 97.6% of children received all vaccinations and DPT3 immunization coverage is reported as 98.4% multiple indicator cluster survey (MICS). (10) However, the figures from MICS are not representing the whole Kayin State since it was mentioned that non-state ethnic actors (NSEA) controlled areas were excluded from the survey. (10) Little has been known about the immunization services availability, immunization coverage and barriers limiting access to immunization in NSEA controlled areas of Kayin State, Myanmar. If the coverage is low in those areas, the children residing in particular areas are at higher risk of transmissions of VPDs and VPDs outbreak which can result in high child morbidities and preventable deaths. (11, 12, 13) Therefore, it is important to understand the routine immunization service provision status in NSEA controlled areas of Myanmar to define strategies to strengthen EPI provision in achieving universal access to immunization.

This study aims to explore the provision of immunization services in NSEA controlled areas in Kayin State, eastern Myanmar in order to make recommendations to MOH to strengthen EPI coverage as well as to advocate donors to continue supporting existing health programmes in NSEA controlled areas of Myanmar.

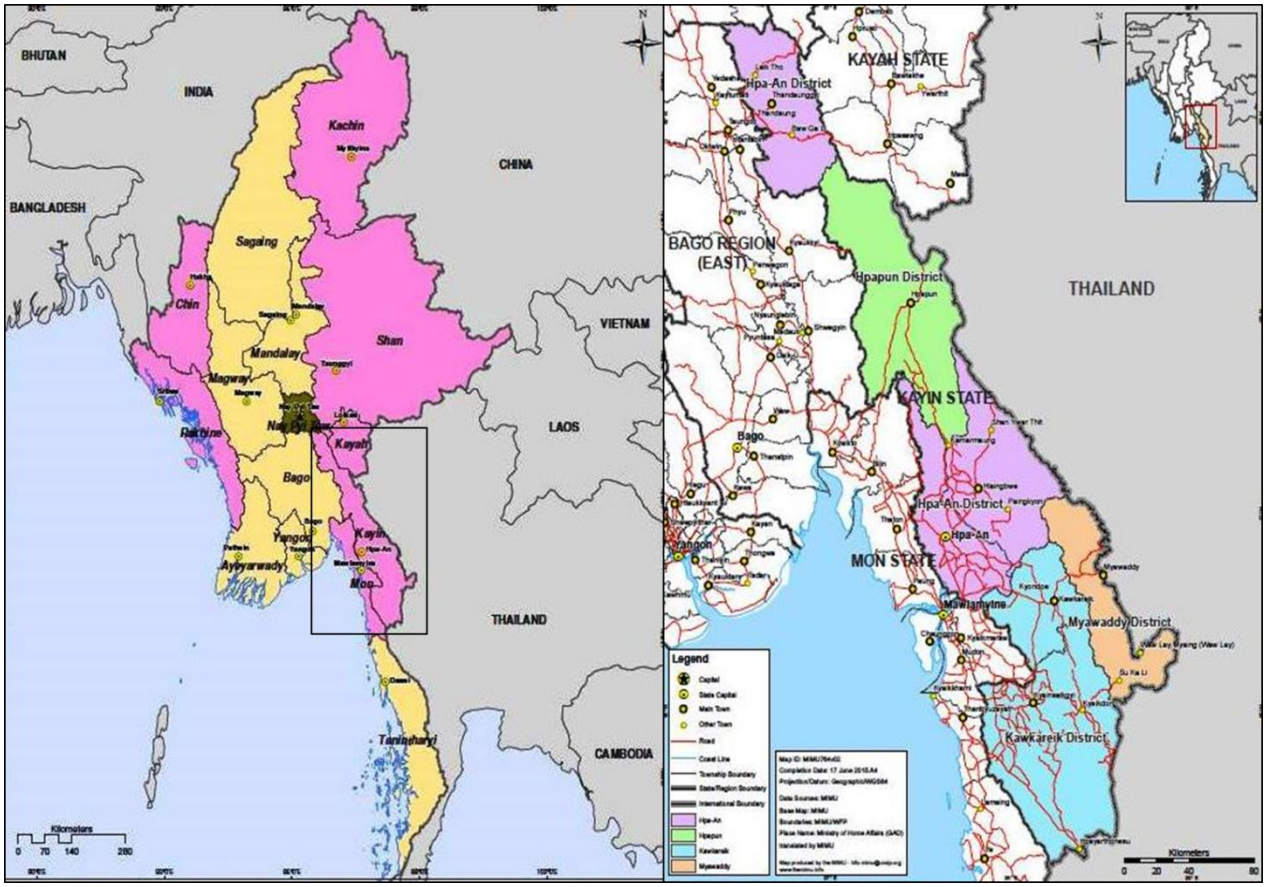
Chapter 1

1 Background Information

1.1 Geographical profile of Myanmar

The Republic of the Union of Myanmar is located in South-East Asia region (SEAR). It is bordered by Republic of India and People's Republic of Bangladesh in the West, People's Republic of China in the North and East and Lao People's Democratic Republic and the Kingdom of Thailand to the East. (14) (See figure 1-1) Administratively, the country is divided into a Union Territory which is Nay Pyi Taw Council Territory, seven States and seven Regions. Both the States and Regions are inhabited by more than one ethnic group with Bamar, the dominant ethnic group, inhabiting mostly in the Regions and ethnic minorities residing in the States. (15). The States and Regions consists of 74 Districts, 330 Townships, 398 Towns, 3065 Wards, 13,619 Village Tracts and 64,134 Villages. (14)

Figure 1-1: Map of Myanmar by State and Region (Left) and Map of Kayin State (Right)



Source: *Myanmar Information Management Unit (MIMU), 2013*. (16)

1.2 Socio-demographic profile of Myanmar

The population of The Republic of the Union of Myanmar is 51.48 million according to Myanmar Population and Housing Census conducted in 2014. (17) This figure also includes an estimated 1.2 million people from the parts of the States of Rakhine, Kachin and Kayin where the census could not be conducted. The census did not cover some parts of Northern Rakhine State and Kachin State due to security measures from on-going conflicts. It was also not enumerated in some parts of Kayin State, eastern Myanmar, and the total number of households and population by sex was provided by the non-state ethnic armed organization (EAO), Kayin National Union (KNU). (17) The total population of Kayin State is 1.57 million including nearly 70,000 population data provided by KNU. (17)

Around 30% of the total population lives in urban areas and the rest are in the rural areas of the country. The total fertility rate in Myanmar is 2.29. (17) Myanmar is one of the most ethnically diverse countries in the world with 135 ethnic groups speaking over 100 languages and dialects across the country. There are eight major ethnic groups: Kachin, Kayah, Kayin, Chin, Bamar, Mon, Rakhine and Shan. Population migration and displacement of people are significant in the country where migration is mostly for economic reasons and displacement is due to natural disasters and conflicts. (18)

1.3 Socio-economic profile of Myanmar

In Myanmar, the literacy rate among male is 92.6% and among female is 86.9%. The literacy levels are reported to be lowest in Shan, Kayin and Chin States at 65%, 74% and 79% respectively. (17) Approximately 90% of the population is Buddhist. Christians and Muslims constitute 5% and 4% of the population respectively. (15)

Myanmar is undergoing a rapid transformation where economic reform is one of its processes. (19) The economy begin to accelerate with a GDP growth estimated to have been 6.5 percent in 2013 from 5.9 percent in 2011. Agriculture is the main economic activity of the country. (20) Although there is slow progress, Myanmar remains one of the world's least developed countries. According to the United Nations Development Programme's (UNDP) Human Development Report 2014, Myanmar's Human Development Index for 2013 ranked at 150 out of 187 countries and territories. (21) According to the latest integrated household living conditions survey (IHLCS), around 25% of the population falls below the poverty line. There is a wide variation between urban and rural areas and

84% of total poverty is contributing from rural areas. A large variation is also present between States and Regions with the highest poverty incidence at 73% in Chin State. (22)

1.4 Political context

The Republic of the Union of Myanmar was formerly under military dictatorship for over half a century and was one of the world's most repressive countries. (23) Ethnic conflict has afflicted Myanmar since its independence in 1948. (24) The underlying reason of the ethnic conflicts is to claim governance, legitimacy and power over populations. (25) The main areas affected by ethnic conflict include Kachin State, Shan State, Kayin State, Kayan State, Mon State and Tanintharyi Region from eastern (northeast, east, southeast) Myanmar and Chin State from western Myanmar. (25) The communal violence that broke out between Buddhists and Muslims, especially the minority Muslim Rohingya, in Rakhine State (northwestern Myanmar) in 2012 is also another concern for political stability in the country. (23)

Since the new government took office in 2011, the country has been undergoing rapid democratic transformation with a series of political, economic and administrative reforms. (19) By mid-2012, ceasefire agreements have been signed with 10 of the country's 11 largest ethnic armed organizations (EAOs), including the Karen National Union (KNU) and the Shan State Army-South from eastern Myanmar. However, ethnic tension still persists with EAOs demanding for genuine autonomy or the establishment of a strong federal state replacing the current centralized form. (19) Conflicts between government and EAOs seeking autonomy have led to a large number of displaced people within ethnic States and alongside the border areas with China and Thailand as well as in the refugee camps. (24) This is further leading to loss of life, insecurity, psychological distress and displacement while limiting access to services and livelihood options thus pushing people deeper into poverty. (26)

1.5 Health profile of Myanmar

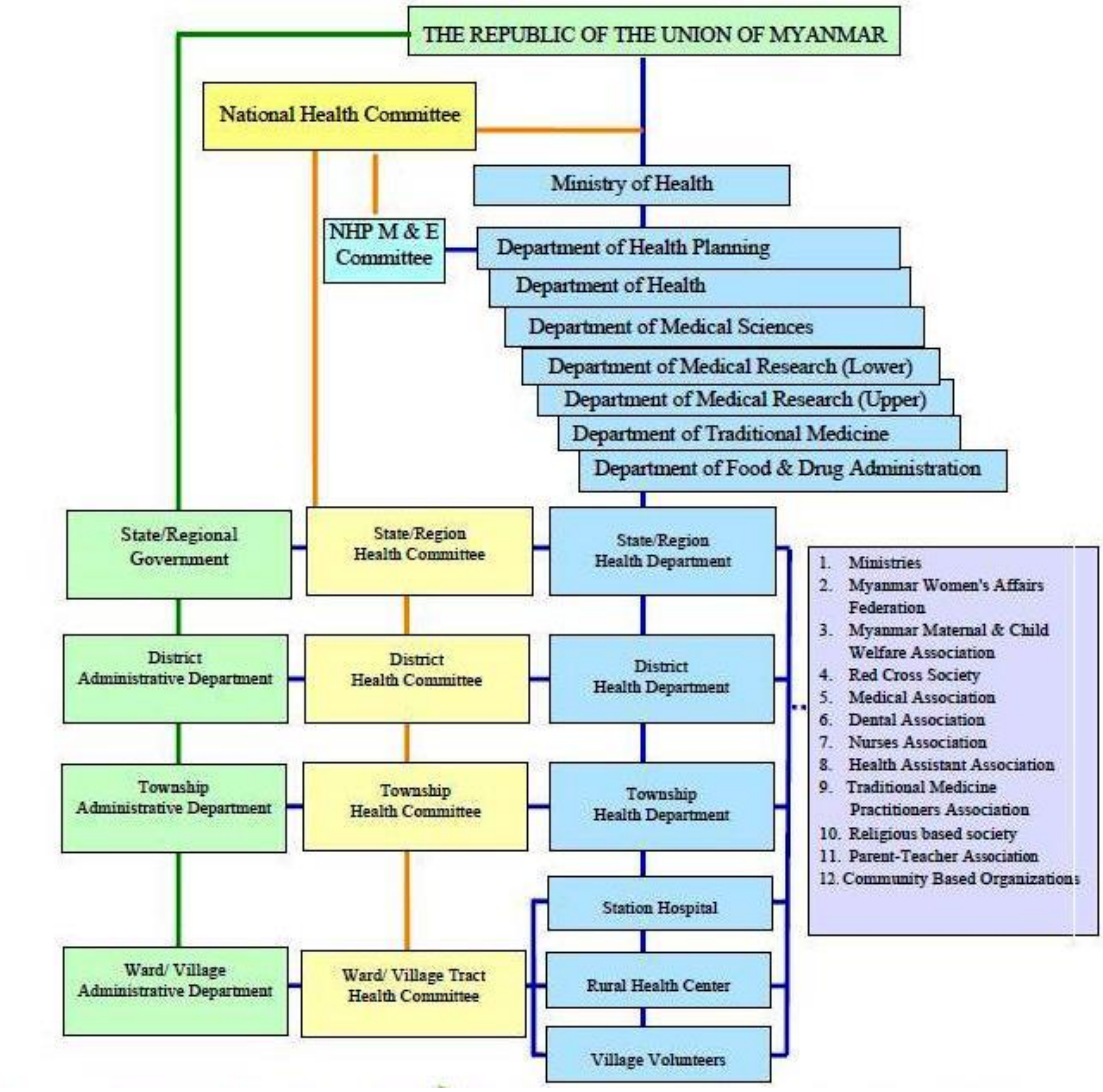
1.5.1 Healthcare system

The Government of Myanmar is committed to improving access and quality of health as part of its reform agenda for health. The health care system in Myanmar has a mix of public and private system in both financing and service provision. MOH is the major actor as a governing agency and also as a provider of comprehensive health care. (14) The MOH has seven departments and the Department of Health (DOH) takes a major role in in providing comprehensive health care throughout the

country. Health service provision is carried out through a network of healthcare facilities at different administrative levels. (See figure 1-2) (14) It was estimated in 2011-2012 that there are 1.49 health workers (doctors, nurses and midwives) per 1,000 people, which is below the WHO minimum recommendation of 2.3 health workers to support in reaching the Millennium Development Goals (MDG). (27)

The NSEA controlled areas are standing outside the national system and MOH has had no presence there for many years. (23) The access to the public social service system or official international humanitarian assistance is very limited for the displaced population and ethnic minorities hence forcing them to rely on community development programs set up and run by members of the communities themselves. (28)

Figure 1-2: Organization of health service delivery



Source: *Health in Myanmar, MOH. 2014*. (14)

1.5.2 Health financing

In Myanmar, the government is the major source of financing for the provision of healthcare services along with minor sources such as external aid, user charges and community contributions. In 2013-2014, general government health expenditure (GGHE) as a percentage of gross domestic product (GDP) was 0.89% and GGHE as a percentage of general government expenditure (GGE) was 3.15%. (14) Donor contributions remain essential which account for 7% of total health expenditure (THE) in 2011 and it was reported to be half of the GGHE. Household out of pocket (OOP) payments are the main source of funding for the health system contributing to nearly 80% of THE. (15)

1.5.3 Health situation

Improving maternal and child health (MCH) and reducing maternal, new-born, and child morbidity and mortality is one of the priority issues included in National Health Plan (NHP). (14) Health indicators like the maternal mortality ratio (MMR) are gradually improving from 520 in 1990 to 200 in 2010. (29) In 2009, according to Multiple Indicators Cluster Survey (MICS), infant mortality rate (IMR) was estimated at 37.5 per 1,000 live births and under five mortality rate (U5MR) was estimated at 46.1 per 1,000 live births. (10) The maternal, infant and under five mortality rates are higher in rural areas than in urban and regional variation in the values are also observed. (10, 15) The major causes of deaths among children under five were diarrhoea, acute respiratory infections (ARI) and malaria. Underlying malnutrition in children worsens the condition and contributes up to 50% of these deaths. (18) The mortality rates are a lot higher in eastern Myanmar border areas and according to the retrospective household survey conducted in 2013, MMR was 711 per 100,000 live births, IMR was 77 per 1,000 live births and U5MR was reported at 139 per 1,000 live births. (30)

1.6 Expanded Programme on Immunization (EPI) profile of Myanmar

During the 27th World Health Assembly in 1974, the Expanded Programme on Immunization (EPI) was established to make sure that children from all countries benefitted from life-saving vaccines. At that time, EPI was launched and targeted to protect against six VPDs: tuberculosis, diphtheria, tetanus, pertussis, measles and poliomyelitis. (31) Immunization is one of the essential basic healthcare provisions. (32)

The EPI in Myanmar was launched in 1978 and at that time Bacillus Calmette-Guerin (BCG), diphtheria-pertussis-tetanus (DPT) and tetanus toxoid (TT) vaccines were introduced. In 1987, measles and polio vaccines for infants were included in the EPI program. Introduction of Hepatitis B (HepB) vaccine started in 2003 and the coverage was extended to the whole country in 2005. (33) A pentavalent vaccine including DPT, HepB and *Haemophilus influenzae* B (Hib) was also introduced in 2012. (34) Currently, the routine EPI programme in Myanmar includes vaccination against Diphtheria, Pertussis, Tetanus, Tuberculosis (TB), Polio, Measles and Hepatitis B. (33) National immunization schedule in Myanmar can be seen in the Table 1-1. In January 2015, the national Measles Rubella (MR) vaccination campaign was launched in order to meet the goal of measles elimination and rubella control in Myanmar. In addition, plans have been made to include rubella vaccination in the routine EPI program replacing measles vaccine given to children at 9 months of age with MR vaccine. (35) The funding for material inputs for EPI is mainly dependent on international assistance and major donors for EPI in Myanmar are United Nations Children's Fund (UNICEF), World Health Organization (WHO), GAVI (Global Alliance for Vaccine and Immunization) and other Japanese sources. (5) The government financed 56% of vaccine costs as well as 23% of routine immunization costs. (36)

Globally, the immunization coverage with the third dose of DPT vaccine (DPT3) in children by age 12 months is used as a key indicator in measuring performance of the immunization programme. (37) Overall immunization coverage in Myanmar is showing significant improvements and according to 2011 data, DPT3 and HepB coverage are reported to be 86% and measles first dose is reported at 88% nationally. (33) According MICS (2009-2010), 88.6% of children are fully immunized by age one and DPT3 immunization coverage was reported as 95.9%. (10) However, provision of health services including routine EPI services is not reaching to the NSEA controlled areas in eastern Myanmar and children among internally displaced population and ethnic minorities are not receiving any of the recommended childhood immunization in those areas. (13, 23)

Table 1-1: National immunization schedule in Myanmar

Target groups	Time of immunization	Antigen
Child	Birth	HepB birth*
	6 weeks	BCG, DPT1**, oral polio vaccine1** (OPV1), HepB1*
	10 weeks	DPT 2**, OPV2**, HepB2*
	14 weeks	DPT 3**, OPV3**, HepB3*
	9 months	Measles 1
	18 months	Measles 2***
Pregnant woman	1st antenatal contact	Tetanus toxoid 1st dose (TT1)
	4 weeks after first dose	Tetanus toxoid 2nd dose (TT2)
*Birth dose of HepB is given only in big hospitals with a paediatric ward. In these instances, the child is given HepB 2nd dose at 6 weeks and 3rd dose at 14 weeks of age. **DPT and OPV schedule changed in November 2012 to 2 months, 4 months and 6 months. (96) ***Routine measles 2nd dose introduced from 2012.		

Source: *EPI: comprehensive Multi Year Plan (cMYP), 2012*. (33)

Chapter 2

2 Problem statement, Justification, Objectives, and Methodology

2.1 Problem statement

Immunization is a highly cost effective measure to improve child health by preventing VPD that can lead to achieving MDG 4 for reducing child mortality. (6) Globally, immunization coverage is increasing - about 84% (112 million) of infants worldwide received 3 doses of diphtheria-pertussis-tetanus (DPT3) vaccine in 2013. (7) Despite the significant progress worldwide, vaccine-preventable diseases remain a major cause of morbidity and mortality. (8) In 2008, nearly 17% of all deaths in children under five (0 to 59 months) were vaccine preventable and among children aged 1 to 59 months, it accounts for about 29% of deaths globally. (9) In 2013, an estimated 21.8 million infants, the number reduced compared to 2012 (22.8 million) (9), are still missing out on vaccinations. (38) Among them, more than one third (9 million) of the infants are from SEAR. (39)

According to WHO, Myanmar is one of the seven countries in SEAR that have achieved >90% DPT3 coverage at national level and 89% of all districts have achieved 80% of DPT3 coverage in 2009. (6) A consistent finding is also observed from MICS (2009 - 2010) showing 88.6% full immunization rate and 95.9% of DPT3 coverage nationally among children aged 12-23 months old. According to the official MICS report, in Kayin State, 97.6% of children received all vaccinations and DPT3 immunization coverage is reported as 98.4%. (10)

However, it is not certain that the figures from MICS reflect the actual coverage. The survey mentioned a tendency of over reporting the immunization status of population since midwives were involved in data collection process. Midwives are also mainly responsible for immunization service provision and reporting and the use their immunization records for the survey can affect data quality. (10) MICS (2009 – 2010) is a nationally representative survey designed to provide estimates at national level. However, forty clusters (out of 975) selected for enumeration, including 3 clusters (out of 43) from Kayin State, were not visited because of the security concerns of the areas. Those areas were substituted which was not a recommended MICS procedure. Since the difficult areas were excluded from the study, the MICS figures representing immunization coverage for Kayin State is questionable. (10) In addition, the health services availability by both government and international organizations

are very limited in NSEA controlled areas of eastern Myanmar including that of Kayin State. Thus, it is reasonable to assume that the coverage may be lower in those areas. Little is known about the immunization service availability and immunization coverage in NSEA controlled areas of Kayin State, Myanmar. (23) According to the retrospective household survey conducted in eastern Myanmar in 2013, U5MR is reported to be 139 per 1,000 live births. (30) Therefore, the availability of routine immunization services for children under five in those areas can be one of the effective interventions to tackle the high child morbidity and mortality. (6, 13)

2.2 Justification

Immunization is one of the most cost effective health interventions in reducing child mortality as well as in averting illness and long-term disabilities in children due to vaccine preventable diseases. (40) When high immunization coverage is achieved and maintained, it leads to the development of herd immunity which provides indirect protection to unvaccinated individuals against VPD. The term herd immunity is explained as "the risk of infection among susceptible individuals in a population is reduced by the presence and proximity of immune individuals". (41) Globally, immunization saves the life of 2 to 3 million children each year from deadly diseases such as diphtheria, hepatitis B, measles, mumps, pertussis, polio and tetanus. (8) All children should have the right to access routine immunization services and be protected from VPDs. (38)

In Myanmar, national child immunization coverage trends are positive but these figures may masks local inequities and challenges. (33, 42) Since MICS did not represent NSEA controlled areas of Kayin State and the government immunization service provision is limited in those areas, the immunization coverage is expected to be very low in those areas. The children from displaced and mobile population residing in NSEA controlled areas with low immunization coverage are at higher risk of transmissions of VPDs and VPDs outbreak which can result in high child morbidities and preventable deaths. (11, 12, 13) Without the adequate immunization coverage, it is difficult to establish herd immunity in low coverage areas to reduce the risk of transmission of VPDs among susceptible children which can also lead to increase child morbidities and mortalities. (41) Therefore, it is important to understand immunization service availability and immunization coverage in NSEA controlled areas of Kayin State, Myanmar. In addition, the barriers to access immunization services also need to be explored in order to make recommendations to strengthen EPI

coverage with priorities given to the most vulnerable and excluded ethnic communities.

2.3 Objectives

2.3.1 General objective

To explore the provision of immunization services in NSEA controlled areas of Kayin State, eastern Myanmar in order to make recommendations to MOH to strengthen EPI coverage as well as to advocate donors to continue supporting existing health programs in NSEA controlled areas of Myanmar

2.3.2 Specific objectives

1. To explore the extent of healthcare provision in general and immunization service provision in particular among NSEA controlled areas of Kayin State, eastern Myanmar
2. To assess the immunization coverage in NSEA controlled areas of Kayin State, eastern Myanmar and compare with national rates from MICS
3. To identify the barriers in accessing routine immunization services in Myanmar and in South-East Asia countries that can be reflected to Myanmar context
4. To review the best available strategies in improving routine immunization coverage to reach the hard-to-reach population in low income countries
5. To recommend MOH on the best strategies to strengthen EPI coverage to NSEA controlled areas in Myanmar as well as to advocate donors to continue supporting existing health programs in those areas

2.4 Methodology

2.4.1 Study design

The study is carried out by using literature review method. To assess the immunization coverage in NSEA controlled areas of Kayin State, triangulation will be done based on the secondary data review of immunization program data from Kayin State obtained from Karen Department of Health and Welfare (KDHW), immunization coverage in Kayin State from MICS and review of literatures on vaccination coverage in Myanmar.

The literatures were searched using the search engines – Google Scholar and Google and databases search include PubMed and PiCarta. Grey

literatures were searched from government, academic and organizational websites related to immunization service provision in English language. The search also included Myanmar Health System Research Journal (MHSRJ) available from local library which is Central Biomedical Library, Department of Medical Research (Lower Myanmar) for country specific literatures.

The literature search was limited to English language. The search covered a period of 10 years and included articles published from 2005 to 2015. Due to the politically sensitive nature of the topic of interest, there were a very few literatures available in Myanmar. So the literature search was extended to low income countries, particularly from South-East Asia, with similar context and resource limited settings. The initial selection of the literatures was done by filtering title, year of publication, location of the study, the language used and full text availability. The literatures selected are then again reviewed for relevance with the topic of interest based on the information from abstract of the literature and considering the quality of the studies.

A manual search for literatures is done using the keywords in different combinations and detail search strategy can be found in Table 2-1.

Table 2-1: Search strategy table

Literature	Source	Objective 1	Objective 2	Objective 3	Objective 4
Peer-reviewed published articles	Pubmed, Google Scholar, Picarta	"access and health", "access and immunization", "immunization coverage", EPI, Myanmar, "eastern Myanmar" , "eastern Burma"		"immunization and Myanmar", "access and immunization", "barrier and immunization", "immunization and displaced", "conflict", "immunization and quality"	"immunization and strategy", "immunization and intervention", "immunization and effectiveness"
	Key Informant	1 peer reviewed article on 'health and human rights in eastern Myanmar'			
Grey literatures	- Google - WHO, UNICEF, GAVI, UNHCR MOH(Myanmar), KDHW, CPI	"annual report", "program report"	"EPI Myanmar", "immunization Myanmar"	"EPI and report", "immunization and report", "annual report", "progress report"	"EPI and report", "immunization and report", "case study"
	Key Informant	Program report and annual report from KDHW, BPHWT	Multiple Indicator Cluster Survey (2009-2010), Program report from KDHW	3 Survey Reports from NSEA controlled areas of eastern Myanmar	
Immunization Program Data and information	KDHW		Immunization program data	Barriers in provision of immunization services	

2.4.2 Analytical framework

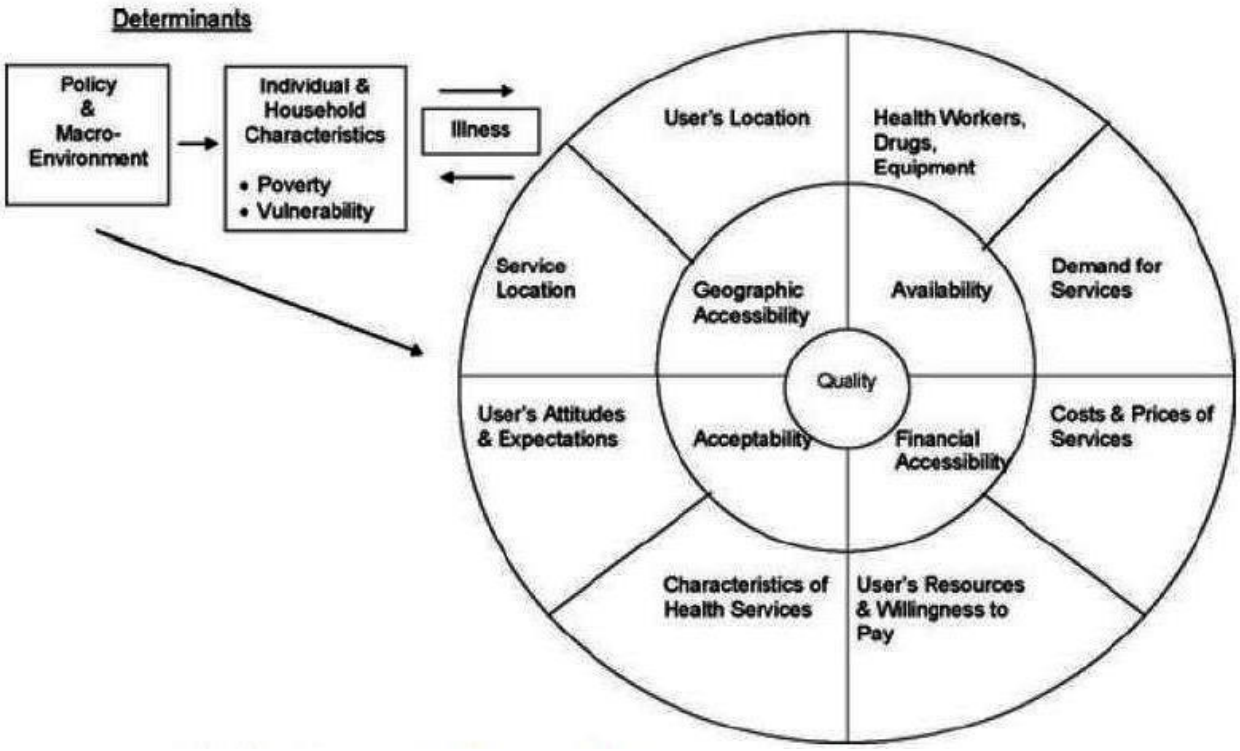
The conceptual framework for 'assessing access to health services' by Peters et al. (2008) (43) is used to guide the literature review and systematically analyses the barriers to access immunization services. This framework is chosen because it clearly incorporated the four dimensions of access; geographic accessibility, availability, financial accessibility and acceptability. Both the demand and supply related barriers for each dimension can be identified by using this framework. It also focused on the poor vulnerable population and the important role of policy and macro-environment in accessing health services which is in line with the context of this literature review to access barriers among marginalized and displaced ethnic community with political instabilities. (See figure 2-1)

The four dimensions of access in this framework are described in details as below: (43)

i. "Geographic accessibility – the physical distance or travel time from service delivery point to the user
ii. Availability – having the right type of care available to those who need it, such as hours of operation and waiting times that meet demands of those who would use care, as well as having the appropriate type of service providers and materials
iii. Financial accessibility – the relationship between the price of services (in part affected by their costs) and the willingness and ability of users to pay for those services, as well as be protected from the economic consequences of health costs
iv. Acceptability—the match between how responsive health service providers are to the social and cultural expectations of individual users and communities"

The quality of care is the integral component of each dimension which is related to the technical ability of health services provided for the people's health. (43) The barriers in assessing and providing quality immunization services can also be identified using the framework.

Figure 2-1: Conceptual framework for assessing access to health services



Source: *Poverty and access to health care in developing countries, 2008.* (43)

2.4.3 Study limitation

The search is limited to English language. Literature search went back to 10 years because of the availability of literatures so some findings are not very recent. Country specific literatures on the topic of interest are very limited especially for the NSEA controlled areas of Myanmar. It is possible that the search strategy may have missed relevant literatures on other languages and relevant documents stored in hard copy files from MOH and other organizations.

Chapter 3

3 Study findings

3.1 Healthcare provision and immunization service provision in NSEA controlled areas of Kayin State

3.1.1 Healthcare provision

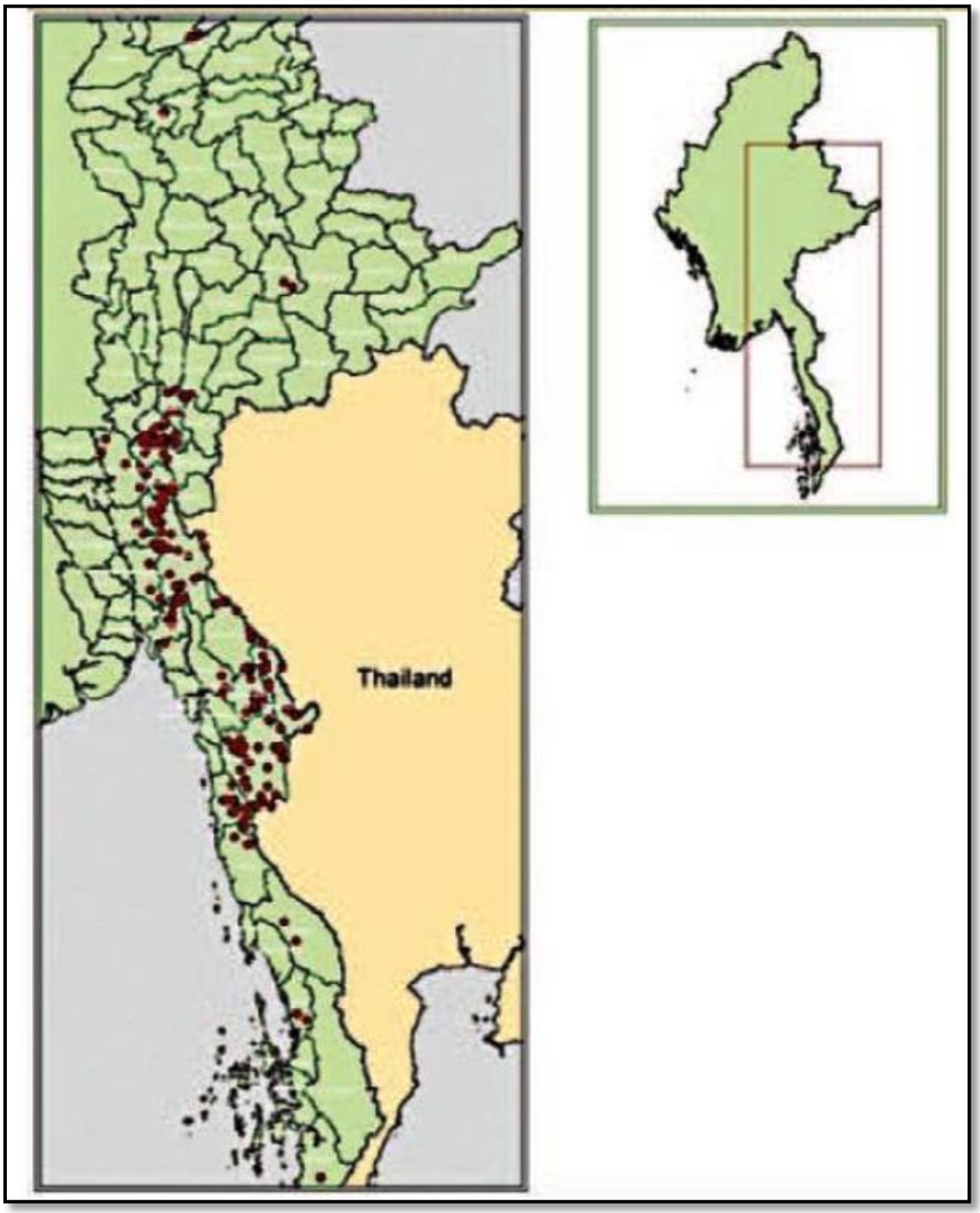
Due to years long conflicts in contested ethnic States in Eastern Myanmar, official government health facilities and services are still unavailable or inaccessible for the vast majority of people residing in remote ethnic areas. (44) Over the past decades, many ethnic groups established their own community-based organizations (CBO) and healthcare provision structures forming their own parallel health systems in NSEA controlled areas. (44, 23) The foundation for these systems and community-based healthcare provision networks were laid by ethnic armed organizations (EAOs) that controlled the area. (25) According to the survey conducted among internally displaced persons (IDPs) and remote ethnic communities in eastern Myanmar (3 States and 2 Regions) in 2013, only 8% of the respondents reported that they had access to government-operated health facilities while 70% of the respondents reported that they depend on the healthcare services delivered by ethnic and community based organizations. (See figure 3-1 for surveyed areas in eastern Myanmar) (44)

The main EAOs controlling non-state areas of Kayin State, eastern Bago Division, parts of Mon State and northern Tanintharyi Division are the Karen National Union (KNU) and the Democratic Karen Benevolent Army (DKBA). The territorial boundaries demarcating the ethnic controlled areas and government controlled areas are mostly fluid with a few official demarcations. (25)

In Kayin State, healthcare services are provided through a collaborative network of ethnic and community based organizations including KDHW, the Backpack Health Worker Team (BPHWT), the Burma Medical Association (BMA) (an independent non-profit organization), and the Mae Tao Clinic (MTC), a community hospital based in Mae Sot, Thailand, serving the Burmese migrant and IDPs. KDHW and BPHWT are the main healthcare providers in the area. (25, 44) The names and boundaries on the official government map of Myanmar are different from the ones that are used by these EHOs where traditional Karen names are mostly used and boundaries are set according to the areas with large Karen population

by EAO, KNU. (45) The health programs operated by these organizations are mainly financed by donor funds. (44) It has been a major challenge for these EHOs and CBOs to obtain adequate and sustainable funding. (45, 46)

Figure 3-1: Surveyed areas for retrospective mortality and morbidity survey in eastern Myanmar



Source: *The long road to recovery, a report by health information system working group (HISWG)*. (44)

KDHW is the health department of Karen National Union (KNU). (47) According to 2011 data, KDHW oversees 50 Village Tract Health Centers (VTHCs) with over 1,000 health workers and operates 14 major health programs. (Table 3-1) (45) KDHW is financed entirely by donors' fund, both individuals and organizations. In 2011, there were nine major donors supporting the VTHCs as well as other organizations and institutions providing technical assistance and supporting specific programs (for example, malaria control, reproductive health).

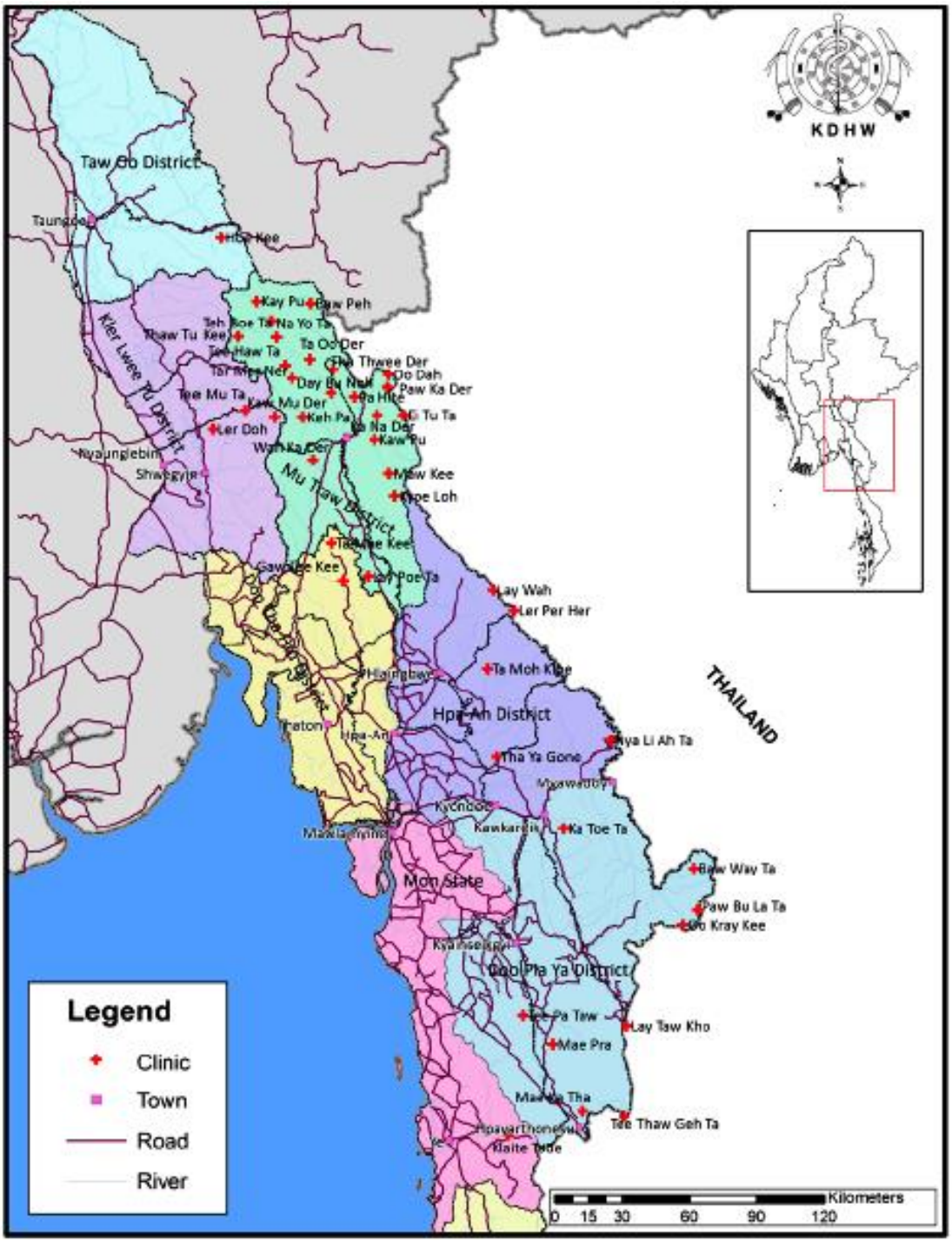
VTHCs are formerly set up as Mobile Health Clinics (MHCs) with the aim to provide outreach healthcare in fragile and under developed areas. (25) The clinics are also based in bamboo structures for easy mobility in case of conflict or attack. Each clinic is staffed with 5 to 10 trained health workers. (47) Most of the major health programs are implemented through MHCs and each MHC runs two to seven programs providing prevention and treatment services (Table 3-1). (45) MHCs are operated in all districts of Kayin State serving a population of over 120,000 according to 2011 data. (Figure 3-2) (45) As per data received from KDHW, the increase in the coverage of KDHW health programs from 2009 to 2014 can be observed in figure 3-3.

Table 3-1: KDHW health programs in 2011

No	Program	Program Areas	Population of Target Areas	Field Program Workers
1.	Mobile Health Clinics/Primary Health Care	50	121,934	1370
2.	Malaria Control	34	32,401	102
3.	Trauma Management	17	54,548	550
4.	Reproductive Health and Family Planning, Gender Based Violence Counseling Pilot Project	13 2	38,169 8,025	229 43
5.	Village Health Worker	16	37,190	246
6.	Tuberculosis	3	11,921	32
7.	Vit A/Deworming - Clinics Vit A/Deworming - Schools	21 245	71,972 21,405	21 31
8.	Lymphatic Filariasis	1	3,548	3
9.	Immunization	7	19,872	25
10.	Targeted Feeding	5	15,008	19
11.	Mine Risk Education	--	2,100	4
12.	Primary Eye Care	Bleet Daweh	--	--
13.	Herbal Medicine	3	--	31
14.	Mental Health	--	--	90

Source: *KDHW Annual Report, 2011*. (45)

Figure 3-2: KDHW Mobile Health Clinics and Primary Health Care Program in Kayin State

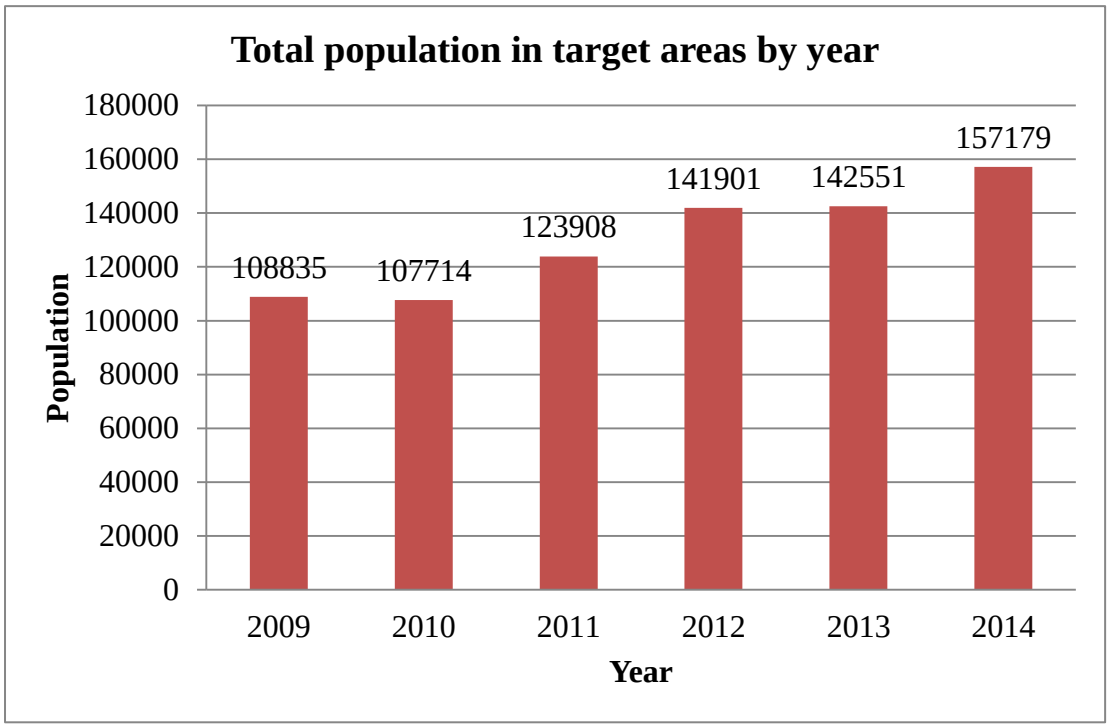


Source: *KDHW Annual Report, 2011*. (45)

BPHWT is a multi-ethnic organization that also delivers healthcare services to Karen communities in the region through over 50 teams of backpack medics consisting over 360 staff. (25) BPHWT operates three main health programs; Medical Care Program (MCP), Community Health Education and Prevention Program (CHEPP), and Maternal and Child

Healthcare Program (MCHP). (46) The teams provide healthcare services to most inaccessible areas that are even limited to KDHW MHCs. BPHWT also depends on donors funding for program operations and the major donors were Canadian International Development Agency (CIDA), Stitching Vluchteling (Netherlands), Open Society Institute (OSI), Department for International Development (DFID) through Christian Aid (CA) and International Rescue Committee (IRC). (46)

Figure 3-3: Target population under KDHW coverage areas



**Population coverage slightly went down in 2010 due to displacement of people as a result of military conflicts and security concerns.*
Source: *KDHW, 2015*.

The qualified health workers (such as doctors and nurses) are mostly unavailable in NSEA controlled areas. EHOs and CHOs trained their own cadre of health workforce, such as medics and community health workers (CHWs) to serve the population. The trainings for different levels of health workers were organized in collaboration with INGOs, including IRC, CPI and Aide Médicale Internationale (AMI), and the MTC. (47, 48) CHWs are the entry-level health workers and were trained for 6 months focusing on primary healthcare. The medic trainings were also organized for the trained CHWs to upgrade them with advanced medical skills. The medic level 1 training lasted for three months including two months theory training and 1 month hospital training. Trained medics are required to complete 9 months internship in their assigned areas to attend medic

level 2 training. The medic level 2 training lasted for 9 weeks with 7 weeks of theory and 2 weeks of clinical training. AMI organized the venue for clinical trainings for both level 1 and 2 at hospitals in Mae La and refugee camps. (45, 46) For senior medics, general medical officer (GMO) trainings were conducted and GMOs are aimed to be the best practitioners available in NSEA controlled areas. (45) Each health program also has its own training component (e.g. malaria, reproductive health, immunization, trauma). CHWs and medics assigned to each health program had to attend specific program related trainings together with six monthly refresher trainings. (45)

3.1.2 Immunization service provision

According to the program reports of EHOs and CBOs, KDHW is the sole organization that is providing immunization services among the mentioned healthcare service providers in NSEA controlled areas of Kayin State. (45, 46, 49, 50)

KDHW initiated the Immunization Program (IP) in late 2008. The guidelines for IP were developed in collaboration with INGOs that had been providing technical assistance to KDHW health programs. (13, 45) In 2009, KDHW started delivering immunization services in three of the MHCs (at that time, VTHC were still called MHC) - Day Bu Noh, Ei Tu Tah, and Ler Per Her. (Figure 3-2) (13) Over the past years, the coverage areas for provision of immunization services expanded and in 2015, there were a total of 16 village tract health centers (VTHC) in 5 townships for provision of immunization services. (Table 3-2) KDHW partnered with MTC which is based in Mae Sot, Thailand, in delivering immunization services through three VTHCs: Pa Hite, Ka Na Der and Kae Pa. (50) Both facility based and outreach service provision are used to deliver immunization services. (45)

Along with the expansion of program services, the IP also has to be suspended in some areas a few times due to military conflict and continuing security concerns. (13, 45) The program resumes later once the situations in the areas are stable. Nonetheless, the immunization program has not been able to expand to reach far more distant and hard-to-reach VTHC areas since the cold chain is not yet possible to maintain for longer than a three day's walk. (13)

Table 3-2: KDHW's VTHCs that provide immunization services

No	Townships (KNU)*	Townships shown in (MIMU)*	Village Tract Health Centers (VTHC)			
1	Boo Tho	Hpapun	Ei Tu Hta	Pa Hite	Ka Na Der	Kaw Pu
2	Lu Thaw	Hpapun	Mae La	Nya Li Ar Hta	Na Yo Hta	Kae Pa
3	Kawkareik	Myawaddy	Paw Bu La Hta	Mae La	Htee Mae Wah Kee	Nya Li Ar Hta
4	Ta Kreh	Hlaingbwe	Lay Wah	Ler Per Her	Joe Phyu	
5	Saw Hteet	Shwegyin	Kaw Mu Der			

**Different names for the townships (Karen names) are used under KNU (EAO in Kayin State) controlled areas.*
Source: *KDHW, 2015.*

The immunization services are provided by trained IP health workers. According to KDHW, the health workers who already finished CHW training and who have two years' experience working as a CHW in the field are recruited for IP. The IP health workers received IP training biannually. The IP health workers are responsible to provide immunization services in the villages under each VTHC targeted areas. The IP health workers are also responsible to collect data after each vaccination and these IP data are sent to KDHW central unit quarterly for data entry and reporting. The VTHCs also keep an immunization card for each vaccinated children for tracking the sequence of immunization status of each individual. (13, 45)

The vaccines provided by KDHW's immunization programme are BCG, OPV, DPT, mumps-measles-rubella (MMR) and Hepatitis B to protect against VPDs. The timeline for the introduction of each vaccine can be seen in Table 3-3. The interval for administration of the vaccine sequence is the same as the routine EPI schedule (Table 1-1). From 2009 to 2012, the IP targeted children from birth to 14 years of age with the aim to achieve mass vaccination coverage among children residing in the area. (See Table 3-4 for KDHW IP schedule) (45) According to KDHW IP, from 2013 onwards, the IP changed the target age group to children under 5 years of age for routine immunization services in order to be in line with WHO guidelines.

Table 3-3: Vaccines provided by KDHW Immunization Program

Vaccines	Vaccines covered by the Programme by Year						
	2008*	2009	2010	2011	2012	2013	2014
BCG	-	Yes	Yes	Yes	Yes	Yes	Yes
OPV (Oral Polio Vaccine)	-	Yes	Yes	Yes	Yes	Yes	Yes
DPT (Diphtheria, Pertussis, Tetanus)	-	Yes	Yes	Yes	Yes	Yes	Yes
Measles	-	Yes	Yes	-	-	-	-
MMR (Measles, Mumps, Rubella)	-	-	-	Yes	Yes	Yes	Yes
HepB (Hepatitis B)	-	-	-	-	-	Yes	-

Source: *KDHW IP, 2015*.

Table 3-4: KDHW IP schedule from 2009 to 2012

Immunization	Age at First Inoculation	Sequence
BCG	Birth - < 5 years	Single inoculation
OPV	Birth - 14 years	4 Consecutive doses
DPT	6 weeks - 6 years	3 Consecutive inoculations
MMR	9 months - 14 years	Single inoculation

Source: KDHW Annual Report, 2011. (45)

3.2 Immunization coverage in NSEA controlled areas of Kayin State

In NSEA controlled areas of Kayin State, KDHW is the only organization that is implementing immunization program. (45, 46, 50) In 2009, the immunization program targeted 5,508 children under 5 years of age (Table 3-5) for vaccination and the coverage of children vaccinated for BCG, DPT1, DPT3, OPV1, OPV4, Measles1, and Measles2 were 28.8%, 34.8%, 2.7%, 33.3%, 0%, 14.7% and 0.2% respectively (Table 3-6). Both the absolute number of children under 5 years of age who received immunization services as well as coverage gradually increased over the past years (Table 3-5) and according to 2014 data, the number of children targeted by IP is 6,481 while the coverage of children vaccinated for BCG, DPT1, DPT3, OPV1, OPV4, MMR1, and MMR4 was 54.3%, 56.5%, 35%, 57.4%, 24.6%, 43.7%, and 26.3% respectively. (Table 3-6)

Table 3-5: Number of vaccinated children under 5 years of age from 2009 to 2014 in NSEA controlled areas of Kayin State

Year	Targeted number of children under 5 years of age	Number of vaccinated children under 5 years of age						
		BCG	DPT 1	DPT3	OPV1	OPV 4	MMR 1	MMR 2
2009	5508	1584	1918	149	1836	0	808*	11*
2010	3045	1888	2248	615	2430	348	992*	18*
2011	3255	1945	2226	793	2323	552	1299	31
2012	4324	2485	2772	875	2953	729	1960	83
2013	6935	3088	3398	1939	3560	1582	2461	902
2014	6481	3519	3659	2270	3719	1593	2832	1702

*Measles vaccination alone
Source: KDHW IP, 2015.

The increase in the number of under 5 children immunized and the immunization coverage from the year 2009 to 2014 can be seen in Table 3-5 and Table 3-6 respectively. The trend in the immunization coverage can also be observed in Figure 3-4 and Figure 3-5. The number of children vaccinated, shows an improved trend over the years from the start of the immunization program up to 2014. However, it is observed that the total number of targeted population, children under 5 years of age, is different from year to year. In 2009, a total of 5508 children are

targeted in program catchment areas but a fall in almost half of the target population can be seen in 2010, resulting in 3045 targeted number of children under 5. The target population gradually rises again in 2011 with a steady increase over the years up to 2014. The fall in the number of targeted population in 2010 and 2011 is mainly due to security reasons. Some of the VTHCs had to close due to military conflict and because of military presence in their areas. (13, 45) It is also observed that a lot of children who received the first doses of vaccines for DPT, OPV and measles are missed out to complete all recommended doses.

Table 3-6: Immunization coverage among children under 5 years of age from 2009 to 2014 in NSEA controlled areas of Kayin State

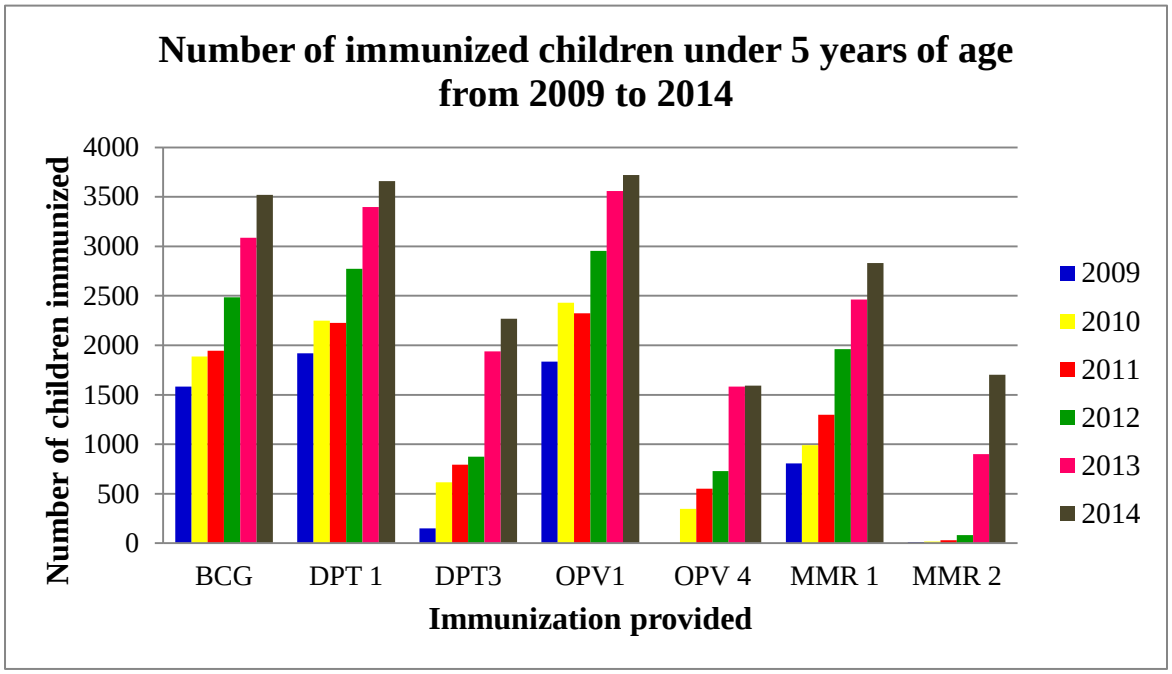
Year	Immunization coverage among children under 5 years of age						
	BCG	DPT 1	DPT3	OPV1	OPV 4	MMR 1	MMR 2
2009	28.8%	34.8%	2.7%	33.3%	0.0%	14.7%	0.2%
2010	62.0%	73.8%	20.2%	79.8%	11.4%	32.6%	0.6%
2011	59.8%	68.4%	24.4%	71.4%	17.0%	39.9%	1.0%
2012	57.5%	64.1%	20.2%	68.3%	16.9%	45.3%	1.9%
2013	44.5%	49.0%	28.0%	51.3%	22.8%	35.5%	13.0%
2014	54.3%	56.5%	35.0%	57.4%	24.6%	43.7%	26.3%

Source: *KDHW IP, 2015*.

Despite the overall increase in the absolute number of children vaccinated over the years, there was a static progress and a slight decrease in number of children vaccinated for DPT1 and OPV1 can be seen in 2011 (Figure 3-4). This can be explained by delay in vaccine procurements for two consecutive quarters because of major flooding in Bangkok, Thailand where the manufacturing of vaccines are done. (45)

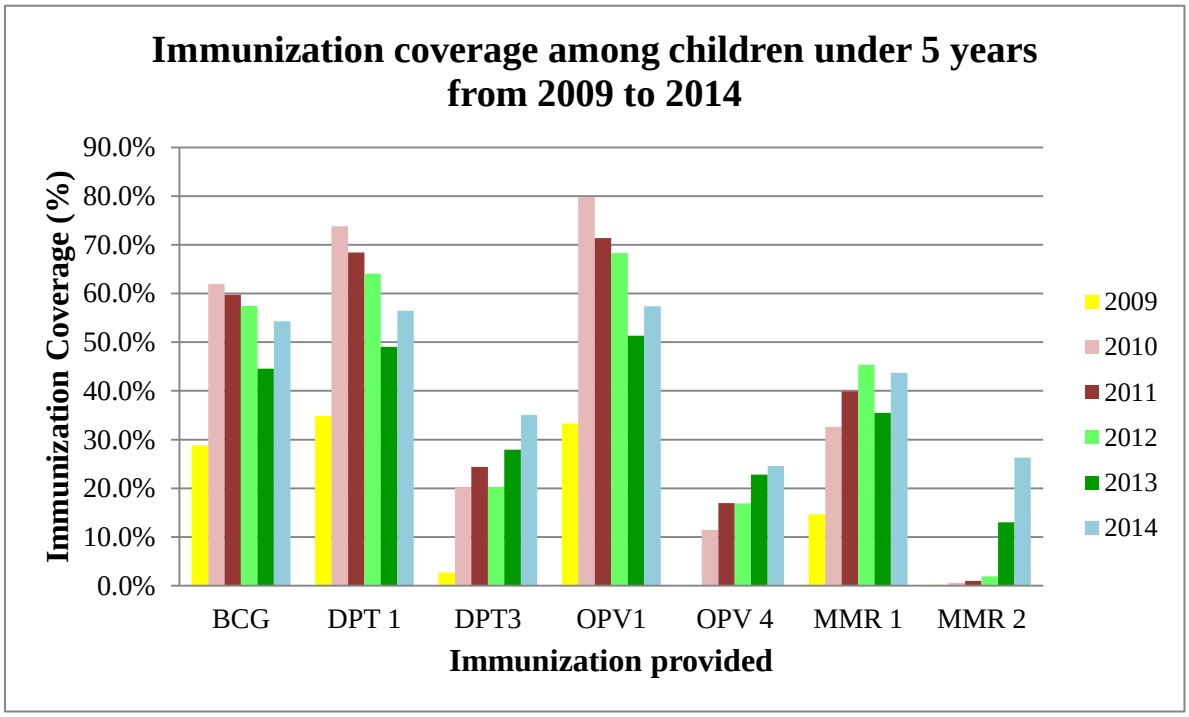
The variations in the trend of immunization coverage from 2009 to 2014 are also observed. The target population (targeted number of children under 5) goes up steadily from 2010 onwards and there is an increasing trend in the number of children immunized over the years but the immunization coverage seems to be not catching up with the expansion of services. The coverage shows a decreasing trend from 2011 to 2013, with a drop in 2013, especially in BCG, DPT1 and OPV1 coverage. (Figure 3-5) An increase in overall immunization coverage is observed in 2014 compared to 2013 coverage. (Figure 3-5)

Figure 3-4: Number of immunized children under 5 years of age from 2009 to 2014 in NSEA controlled areas of Kayin State



Source: *KDHW IP, 2015*.

Figure 3-5: Immunization coverage among children under 5 years from 2009 to 2014 in NSEA controlled areas of Kayin State



Source: *KDHW IP, 2015*.

In 2010, according to MICS, the national immunization coverage rates are high and the immunization coverage in Kayin State is even higher than the national rates. (Table 3-7) However, it was mentioned that MICS did not cover areas with security concerns including those in Kayin State. (10) It is now known that the coverage for Kayin State in MICS did not represent the whole Kayin State. According to KDHW IP data, the immunization coverage in NSEA controlled areas of Kayin State is significantly lower than the figures representing both Kayin State and the national coverage. (Table 3-7) Among the vaccinations, the DPT3 coverage and OPV3 coverage of NSEA controlled areas were found to be approximately one fifth of that of the Kayin State as well as that of the national coverage.

Table 3-7: Comparison of immunization coverage in NSEA controlled areas of Kayin State with national rates from MICS

Coverage Area	Immunization coverage in 2010						
	BCG	DPT 1	DPT3	OPV1	OPV 3*	MMR 1	MMR 2
National Coverage according to MICS	97.2%	96.9%	95.9%	97.5%	95.9%	90.7%	-
Kayin State according to MICS (Government controlled areas)	98.4%	98.4%	98.4%	98.4%	97.6%	98.4%	-
Kayin State according to KDHW IP data (NSEA controlled areas)	62.0%	73.8%	20.2%	79.8%	11.4%	32.6%	0.6%

*OPV4 for KDHW IP

Source: MICS, 2011. (10) KDHW IP, 2015.

3.3 Barriers in accessing routine immunization services

3.3.1 Policy and Macro Environment

Myanmar has adopted EPI as a national policy under the national immunization program (NIP) since 1978. (5) The National Committee on Immunization in Practice (NCIP) was established in 2008 whose main responsibility is to provide technical guidance to national EPI in formulating optimal immunization policies, monitoring progress, conducting research, and updating with new vaccines. (33, 14) In 2003, the Adverse Events Following Immunization (AEFI) surveillance system was also established to monitor the quality of immunization services and reduces the negative impact, maintains confidence, identifies program errors, and creates awareness. (33, 34) Myanmar is one of the 194 WHO member states that endorsed the Global Vaccine Action Plan (GVAP) 2011 - 2020, a framework approved by the World Health Assembly in May 2012, with the goal to accomplish the vision of Decade of Vaccine by providing universal access to immunization. (8) Based on the framework indicated in GVAP, MOH developed national immunization strategies to improve health by achieving the full benefits of immunization equitably. (14)

Starting from 2013, according to the MOH, attention has been given by NIP to the areas that are not reached by routine immunization services including the areas where there are vulnerable population due to displacement and conflicts. (14) A series of advocacy meetings took place and plans have been made with local authority, the leaders of the self-administrative areas (NSEA) in capitals of eastern and northern Shan State and Kachin State to strengthen immunization services in border and hard to reach areas. However, the involvements of Kayin State as well as other ethnic regions along the eastern Myanmar border area were not mentioned. (14) A study in Pakistan in 2012 showed that lack of or poor policy regarding immunization was considered to be one of the major obstacles in providing universal access to immunization. (52) Poor policies and management were also linked with insufficient resources allocation and supervision. (51, 52)

In Myanmar, it was reported that even though the existing service delivery strategies are appropriate for the conditions of Myanmar, some inequities and underserved pockets areas in coverage between townships still remained. (33) A literature review study conducted in Myanmar also observed wide variations in immunization coverage rates despite the policy to expand service provision to rural and border regions. The study revealed that disparities in service delivery can be seen particularly in the

border regions, geographically remote, insecure regions and areas characterized by language and cultural difference. (53) According to the population-based, retrospective mortality and morbidity survey among IDPs and remote ethnic communities in eastern Myanmar conducted in 2005 (54) and 2009 (28), access to state-supported health infrastructure is reported to be restricted.

3.3.2 Individual and Household Characteristics

A secondary data review study in rural areas of Bangladesh showed a significant association between maternal education and the immunization status of children. Rahman and Obaida found that among children of mothers with higher education 70.1% were fully immunized compared to 63.0% of those with secondary education, 60.6% with primary education and 55.5% with no education. (55) This consistent association was also established in several studies conducted in Nepal, India, Pakistan and Philippines. (56, 57, 58, 59, 60, 61) Parental knowledge, particularly maternal knowledge, on immunization influences the immunization status of the child. A cross sectional study conducted among Myanmar migrant mothers in Thailand showed that 95.5% of incomplete immunization status can be seen among children of mothers with low level of knowledge on immunization compared to 4.5% in those with high level of knowledge on immunization. (62) Parent's lack of knowledge and awareness on the importance of immunization has been found to be the major barrier in routine immunization in India. (61) Similar association was also found in other studies. (60, 63, 64, 65) In Myanmar, according to annual progress report 2013, awareness among parents (or caretakers) on the benefits of immunization is reported to be high. (66)

Immunization coverage of the children was higher among mothers with paid job compared to those without job as well as the coverage was found to be higher among mothers whose husbands have well-paid jobs. (55) However, this finding is contradictory to the studies in India and Pakistan. According to the District Level Household and Facility Survey-3 (2007-2008) in India, children were almost half less likely to be immunized if the mothers were employed. (67) Secondary data analysis from Pakistan Demographic and Health Survey (2006-2007) revealed that a higher risk of incomplete immunization is observed in children whose parents are manual workers. (57)

Mothers in the middle age group (20-34 years) were found to be more likely to fully immunized their children than mothers of younger age group

(<20 years) and those of older age group (age ≥35years). (55) A cross sectional study in Nepal showed that middle aged mothers (≥27years) were 6 times more likely to immunize their children. However, there were only two age strata during the analysis, mothers age <27years and mothers age ≥27years, so it is hard to compare the results in different age group. (60) A study conducted in Philippines showed no statistically significant association between maternal age and full immunization status of their children. (61)

Studies in Bangladesh and India found that there is a gender difference in child immunization where male child have a higher chance of being fully immunized than females in rural areas. (55, 58) However, studies conducted in Vietnam, Pakistan and India did not find difference in immunization status due to the sex of the child. (57, 64, 67, 68) According to Myanmar annual progress report 2013, there was no gender difference observed in the immunization status of children. (66)

Children with higher birth order were 2 times more likely to be partially immunized and 4.3 times more likely to be unimmunized. (69) Another studies found out that the children with lower birth order (1 or 2) living in households with fewer under five years old children have a higher chance to become fully immunized. (61, 58) No significant association was found between immunization coverage and birth order of the children in a study in Vietnam. (68) However, this may be due to the household size in Vietnam, which was reported to be 3.8 persons per household in 2009. (70)

Antenatal care visits were found to be significantly associated with the rate of immunization (60) and Rahman M et al. found that 70.9% of children whose mothers received sufficient antenatal care (5 times or more) complete full vaccination compared to 55.0% of those who received no antenatal care. (55) Others studies established similar association (57, 71) and a study in Indonesia showed that both antenatal care and neonatal care were main factors associated with complete routine immunization coverage. (72) Furthermore, place of delivery also influence the immunization coverage of the children. (57, 67, 69, 71) Children who were delivered at home are 3.6 times less likely to receive immunization than children who had institutional deliveries. (69)

3.3.3 Availability

A cross-sectional community based study carried out in a rural Pakistani village shows that availability of health facilities in the area increased the chance of children being immunized. (73) Ghei et al. found that children are twice as likely to be completely immunized in the presence of a health facility with 2km in a slum area. (74) The children were more likely to be fully immunized if the health facility was well-equipped. (67) Insufficient resources (vaccines, syringes, refrigerators, and electricity power) and lack of infrastructure were found to be one of the major barriers in achieving complete coverage of immunization. (51, 61) The availability, supply and distribution of vaccine according to needs also posed a challenge for immunization programs. (75) According to the studies conducted in eastern Myanmar's conflict zones, lack of medical resources (76) and secure funding (48, 77) are the major constraints for the ethnic and community based organizations in delivering basic health services to ethnic community and internally displaced populations. Furthermore, existing mobile clinics in the areas are at risk of being destroyed or burned down by the military troops causing more resource strains. (76)

The shortage of trained staff for the delivery of immunization services was described as one of the major challenges for routine immunization coverage. (51, 67) The presence of a health worker for vaccination services was positively associated with the immunization status of the children in slum areas. (56, 74) In NSEA controlled areas in eastern Myanmar, frequent loss of staff was reported to be the major hindrance factor to meet the basic health needs in these areas. (76, 78, 79) The general security issues and threats of violence were the major stressors for the high health worker turnover rates in the area (76, 78) which is consistent with the findings from other studies carried out in conflict affected setting. (80, 81)

Owais et al. proved that availability and provision of vaccine-related targeted information to mothers increased the demand for infant immunization services thus improving the immunization status of the children. (82) Mothers' exposure to media (television, radio) which contributed to the dissemination of information showed a significant positive association with their children immunization status. (55, 58) Mothers with lack of access to vaccination related information were twice as less likely to fully immunized their children. (57)

According to the annual progress report 2013, EPI program in Myanmar was still unreachable to parts of Kachin, Shan and Kayin States even

though the political situation and security concerns were expected to be improved in many conflict areas. (66) In 2014, MOH signed a Memorandum of Understanding (MOU) with Health Poverty Action (HPA), an INGO that has been working in Kachin and Shan State along Myanmar (Burma)-China border to initiate routine immunization services provision. (66) It was agreed that the government will provide all vaccines and cold chain supplies whereas technical trainings to HPA will be provided by WHO/UNICEF in order to cover routine immunization services in those areas. (66, 14) However, the detail information regarding the improvement in immunization coverage and effectiveness of routine immunization services delivered by HPA in collaboration with MOH is lacking for review.

According to the KDHW IP, the main challenges reported in NSEA controlled areas of Kayin State were the resource constraints and maintenance of existing resources such as solar panels and fridges. In each clinic, the vaccines are well kept with fridge operated through electricity from solar panels and it is very challenging for health workers when the solar and/or fridge are out of service. Due to the storage site failures, vaccines were reordered and the transportation costs for the delivery of vaccines to clinic become double or sometimes triple which is a major constraint in budget limited setting to run the IP. In addition, ordering vaccines was very difficult and there is no secure stock. The programme depends on Thai local pharmacies to purchase vaccines and even though pre-orders were made in very advance, there are frequent stock-outs of vaccines in local pharmacies. Thus provision of regular immunization doses in the field becomes challenging. (13, 45)

3.3.4 Geographical Accessibility

Distance from the health facility was found out to be a key factor that influenced the utilization of immunization services. (55, 65, 83) A study in Bangladesh showed that mothers are more likely to fully immunize their children if health facility is nearby within the distance of <1km. (55) However, a study conducted in an urban area in Pakistan shows no significant association between distance from the health facility and vaccination completion status. (64) The region of residence also played a role in coverage of complete immunization. (57) People residing in rural areas were less likely to immunize their children compared to those living in urban areas. (59) Incomplete immunization status of the children was

observed more in less developed provinces compared to socially and economically developed provinces. (57)

In Myanmar, constraints in access to immunization services were reported to be varied across the country whereas in terms of geographical access, the mountainous areas in the States, the border areas, peri-urban communities in major cities are identified as physically and socioeconomically hard to reach areas. (33, 5) Lim et al. found out that the transportation difficulties due to mountainous jungle areas, disappearing trails and low areas that are prone to flooding during rainy months are major barriers in delivering basic health services in eastern Myanmar. Health workers also reported that the delivery of medicines, vaccines and supplies to the clinics and between clinics and isolated villages are challenging. (76) A study in Nepal showed that the personal safety and restriction of movement is a major concern in difficult terrain where health workers were reluctant to carry the vaccines and travel to remote areas. (84) Loyer et al. stated that people residing in NSEA controlled areas of eastern Myanmar were also reluctant to travel for seeking health services due to the fear of exposing to soldiers, threats of violence and exposing to landmines. (77) A similar finding was also observed where village women were hesitant to visit immunization centres due to insecurity. (84)

According to the KDHW IP, transportation was stated as one of the big challenges especially in rainy reasons. Difficulties were faced since the travels to clinics and villages have to be made by walking while carrying IP supplies and equipment such as cold box, vaccines and batteries. Most of the KDHW clinics for immunization program are situated in hilly regions where IP health workers have to walk for 1-2 days and pass over 3-4 mountains to provide vaccinations to the children in remote villages. The transportation difficulty was further compounded by security issues. Program visits to the villages are risky especially before cease-fire agreements and IP health workers were sometimes guarded by KNU insurgent group particularly for ways that include crossing the main roads where military troops were present. Mobility of the population is also common due to the security concerns of the villagers which make it difficult for the immunization program to follow-up and provide full immunization course to the children under program services. (13, 45)

3.3.5 Financial Accessibility

Siddiqui et al. found that socioeconomic status is independently associated with the child's immunization status where children belonged to families in high socio-economic strata were 3 times more likely to be immunized compared to those in lowest socio-economic strata. (64) A study in Vietnam showed a large gap in immunization coverage between poor and non-poor where children from poor families were 9 times more likely to not receiving any vaccinations as compared to those from the non-poor families. (68) The similar association between the economic status and immunization status was also established in other studies. (55, 57, 67, 72, 83)

Bondy et al. found that even though vaccination services were provided free-of-charge, the economic status was a strong determinant of immunization status. (61) The indirect cost such as time and financial costs to reach to health facilities put burden on individuals and households despite the free healthcare services. (61, 85) There was a significantly higher chance of children being fully immunized if mothers are willing to pay for immunization services. (63) Favin et al. showed that health workers asking illicit charges from mothers for vaccination is one of the barriers for mothers to immunize their children. (86) In Myanmar, EPI services are provided free of costs for all population residing in the country. (66)

3.3.6 Acceptability

The perception of parents, especially mothers, regarding the importance and benefits of immunization has significant association with the children immunization status. (60, 87, 88, 89) Ansari et al. found that parents were reluctant to vaccinate their children at government health facilities due to the perceived quality of the effectiveness of the vaccines. The poor attitude of the staff was also mentioned as a barrier in immunizing the children. (89) The fear and misperceptions of side effects (adverse events following immunization) is a major public concern regarding immunization of the children. (60, 88, 89, 90, 91) Studies conducted among Myanmar migrant workers living in Than-Myanmar border also show that the fear of side effects (particularly fever in one study) is one of the major barriers to immunization among the population. (62, 83)

The religious and cultural beliefs against vaccination were found to be associated with non-vaccination status of children. (85, 86) Belonging to a minority ethnic or religious group was also reported to be associated with

incomplete vaccination status of children. (85, 86) A misbelief was found especially among poor Muslim population that oral polio vaccines cause infertility which has an ill effect in providing immunization services. (64, 67, 89, 91) The role of women in the community plays a critical part in immunization of the children. (87, 91) A qualitative study in Indonesia shows that the inferior role of women in the family and community is a major barrier for mothers to fully vaccinate their children whereas mothers with family support, especially from husband and mother-in-law were more likely to complete the immunization of their children. (87)

Lack of trust in healthcare providers delivering the vaccines (such as health workers, governmental organizations and international agencies) was identified as a major obstacle hindering the routine immunization. (88, 90, 91) A qualitative study in Nepal showed that mothers residing in conflict areas are less likely to immunize their children if the service provider is an external, outsider from urban areas. (84) Language barrier of mothers was also found to be associated with the immunization status of the children. (62, 85, 86) A qualitative study in Thai-Myanmar border identify that the fear of being arrested is a significant barrier among migrant parents residing in the area despite the knowledge on benefits of immunization. (83) Lack of legal documents in the area of residence is also mentioned as a hindrance factor for parents to immunize their children. (64, 92)

Inconvenient or limited service hours and long waiting time were found to be main factors associated with under-vaccination of children. (86) The attitude and behaviour of health staff (e.g. unfriendly, disrespectful, aggressive) towards mothers was found to be associated with incomplete immunization status of children. Lack of motivation of health workers due to limited resources for health services delivery and poor supervision was mentioned as the possible reasons for poor attitude of the health workers. (86)

3.3.7 Quality

The quality of the immunization services is an integral part of the four dimension discussed above. The adequate supply of logistics (vaccines, carriers, batteries), human resources, maintenance of cold chain, accessibility to the health facilities, knowledge and skills of the vaccine providers, including both vaccination service deliveries and dissemination of immunization related information and knowledge of the parents on immunization were used as proxy indicators to access the quality of immunization services in cross sectional studies conducted in India. (92,

93, 94, 95) Unavailability of vaccination supplies and carries, made it difficult for the health workers to store the vaccines at recommended temperature which has a severe effect on the quality of the vaccine. (67, 96) Lack of well-trained health staff and lack of proper supervision can also have negative effect on the quality of immunization services offered to the community. (67) Low health worker knowledge and skill regarding immunization service provision was also found to be associated with incomplete vaccination status of the children. (85, 86, 96) An evaluation study to assess the quality of immunization monitoring systems in 27 countries showed that inconsistent use of monitoring charts; inadequate monitoring of vaccine stocks, injection supplies and adverse events; unsafe computer practices; and poor monitoring of completeness and timeliness of reporting were the major weaknesses in the countries' monitoring systems. (97)

3.4 Best available strategies in improving routine immunization coverage

To improve immunization coverage, it is important to understand the reasons for poor immunization coverage in a local context and define evidence based strategies to overcome the barriers. (42) The barriers can be broadly categorized as supply related factors, demand related factors, or both. Hence, strategies to improve the coverage should aim in improving the supply of immunization services, the demand for immunization services and or both sides. (98, 99, 100) (See table 3-8 for strategy table)

It is important that the supply strategies, such as resource availability including infrastructure, equipment and supplies as well as trained human resources, are in place before generating demand for services. (99) Studies showed that motivation of health workers through classroom training as well as peer training and supportive supervision and monitoring increased the staff performance which has an impact on immunization coverage. (98, 99, 100, 101) The outreach strategies are also used as an alternative way to facility-based (fixed) provision of immunization services to increase the immunization coverage. (98, 99, 100) A study in Afghanistan showed that the outreach and mobile activities increased the coverage of immunization with the benefit of reaching people residing in the remote rural areas where community health infrastructures and services are limited. (71) Outreach strategies are reported to be effective in reaching population residing in conflict areas. (102) Pegurri et al. found that the average cost for outreach strategy using community health workers was less than that carried out by the health facility staff only. However, the study also found that the average incremental costs of outreach teams were higher than the average total costs of routine services. (99)

Networking and partnership strategy is also recommended to achieve shared commitment in improving immunization coverage among district health teams, local government and communities. (100) The government and non-governmental organization (NGO) partnership and collaboration also proved to extend the health services provision to reach the poorest or most vulnerable communities residing in remote areas of the country. (103) A study in Cambodia showed that higher levels of immunization status in children from poor households is observed under NGO contracted health services with compare to those from districts managed by government providers. NGO contracted were already based in the

community and offered more service points for delivery of immunization services thus increasing access to services. (104) Contracting and financing strategies are found to be effective at delivering services to the poor and vulnerable community. However, the policy and formal regulation are needed to be in place to ensure the quality and effectiveness of the services being provided. (105) A case study in Pakistan showed that the partnership between MOH and Civil Society Organizations (CSOs), that are already providing services in marginalized and poorest communities, in providing immunization services found out to be effective in improving immunization coverage to reach the hard-to-reach population (106).

Studies also showed that the use of community health workers (CHWs) in provision of immunization services has a positive impact in improving immunization coverage. (84, 99, 100, 101, 102) Patel et al. showed that the CHW strategies were effective in expanding immunization coverage and yielded a greater impact compared to other strategies. (101) As CHWs are an integral part of the community, their role are significant in overcoming community-specific barriers to increasing coverage of immunization. Due to CHWs knowledge regarding the community and the trust they have gained, they play an important role in reaching vulnerable individuals in rural and remote populations. (100, 101, 102) A study in Nepal showed that employing trained indigenous health workers and equipped them with necessary supplies can improve the immunization coverage during periods of armed conflict. (84) However, Lafond et al. (2014) stated that the success in deploying CHW strategies depend on the level of integration of the health worker within the community and public trust building. (100)

A systematic literature review study in developing countries showed that integration strategy, such as partnering immunization service provision with compatible basic health services, improved the coverage of these interventions. Partnering with high coverage, compatible health service can lead to achieve positive results for poorly performing intervention and also the other way around. However, it is critical to observe the compatibility between programmes before integration. (107)

The community demand for immunization services is essential for utilization of existing accessible immunization services. (102) To increase the demand for immunization services, the strategies mainly focus on community based approaches. (98, 99, 100) Oyo-Ita et al. (2012) showed that facility-based health education and information campaigns increased

the uptake of vaccinations. (98) A literature review study in developing countries revealed that information dissemination regarding benefits of immunization and promotion of participation increase the demand for vaccination. (102) Mass media campaigns including information about logistics (days and places of immunization) is also mentioned as one of the strategies to increase awareness among children's parents thus increasing demand for immunization. (99)

Strategy to introduce incentives can also be used to create demand for immunization services. Ryman et al. showed that introducing food incentives together with mobile outreach activity showed significant increase in immunization coverage but the sustainability of the activity was not reported. (102) A systematic review study showed that introducing incentives, such as cash, gifts, lotteries, free or reduced services price; may seem to have a short-term effect on immunization uptake but it did not have impact on long-term behaviour change in low and middle income countries. (98) Pegurri et al. showed that channelling (or door-to-door canvassing), using health or non-health workers to conduct household visits to identify and refer children with incomplete vaccination status, has the highest impact in achieving full coverage of immunization especially among vulnerable groups. (99) Similar studies showed that home visits for immunization education, referral for immunization, and provision of vaccinations increased the coverage of immunization. (63, 98, 100, 102)

Mass campaigns strategy target both demand and supply side of immunization service provision by providing a number of immunization sites as well as raising awareness of the community through increased communication activities. Mass campaigns can be a better option in areas where local situation and health infrastructure are limited (e.g. geographically hard to reach) to achieve necessary coverage through routine services. (99) Pegurri et al. found that the average incremental cost for mass campaigns was lesser than that of outreach teams but higher than the average total costs of routine services. (99)

Table 3-8: Strategies to improve immunization coverage

	Strategy	Description
Supply related strategy	Strategy to improve health worker motivation	Training of health worker Supportive supervision and monitoring to increase staff performance
	Outreach strategy	Mobile and outreach activities in provision of immunization services
	Partnership strategy	Partnering and collaborating with NGO or CBO that are already based in the community from hard-to-reach areas to increase the immunization coverage
	CHW strategy	Use of trained CHWs in dissemination of immunization related information and service delivery
	Integration strategy	Partnering immunization service provision with high coverage, compatible basic health services provision
Demand related strategy	Information dissemination strategy	Conducting facility based health education as well as mass media campaigns on immunization to increase demand for immunization servies
	Introduction of incentives	Delivering immunization services with incentives (e.g. food, gifts, free service price) to increase uptake of immunization services
	Channelling strategy	Conducting household visits for education, referral for immunization and provision of immunization services
Both supply and demand related strategy	Mass campaigns strategy	Providing a number of immunization sites and raising awareness of the community through increase communication activities.

Chapter 4

4 Discussion

4.1 Current situation of immunization service provision in NSEA controlled areas of Kayin State

The government health facilities and services are still unavailable or inaccessible for the vast majority of the population residing in NSEA controlled areas of Myanmar due to conflict and political tensions between government and EAOs. Therefore, the healthcare services are delivered by ethnic and community based organizations, most of which are the health departments and affiliated organizations of EAOs. (23, 25, 44) In Kayin State, KDHW (health department of KNU) and BPHWT (a CBO) are the major health providers in NSEA controlled areas.

KDHW set up the immunization program (IP) in late 2008 and delivered immunization services through three MHC (now VTHC) in 2009. (13) The IP target areas expand over the year and in 2015, the immunization services are provided through 16 VTHCs in 5 townships of NSEA controlled areas of Kayin State. The children residing in the villages under each targeted VTHC are immunized with BCG, OPV, DPT and MMR vaccines. (13, 45)

Since KDHW is the sole organization providing immunization services in the area, the coverage of KDHW IP represent the immunization coverage of NSEA controlled areas of Kayin State. Despite the variation in target population over the years, the trend in number of children vaccinated with each antigen is steadily increasing over the years. Nevertheless, the trend in percentage of children that are being immunized shows a slow progress and the immunization coverage is not catching up with the expansion of IP services. The coverage of DPT3 and OPV4 is improving over the years but with compare to the initial doses, DPT1 and OPV1, it is obvious that only a few number of children completed all the recommended doses of immunization. The progress of IP in each VTHC needs to be reviewed so that necessary plans can be made to improve existing IP coverage before the expansion of additional catchment areas.

In Myanmar, national child immunization coverage trends are positive but this study has shown that these figures mask local inequities and challenges. According to MICS, immunization coverage rates nationally

and in Kayin State (government controlled area) are high; reaching over 90% for DPT3 and OPV3 coverage in 2010. The MICS, however, did not include the areas with security concerns and the immunization coverage figures are not representative of conflict areas and NSEA controlled areas of Myanmar, including Kayin State. (10) Based on the KDHW IP data analysis, the immunization coverage in NSEA controlled areas of Kayin State is very low with DPT3 and OPV4 coverage of 20.2% and 16.9% respectively in 2010. Considering this, the results of MICS for the whole of Kayin State indicate over-estimation of the coverage and the actual coverage is lower than reported. The same situation is also expected in other NSEA controlled States in Myanmar (for example, in Kachin, Kayah, Mon States) where the immunization coverage can be a lot lower than the regional and national figures represented in MICS. The situation may even be worse if there is no CBO or healthcare delivery structure that is set up to provide basic health services including immunization services as in Kayin State. Further research is necessary to access the immunization coverage in other NSEA controlled areas of Myanmar.

If the coverage is lower, there is a higher chance of transmission and outbreaks of VPDs resulting in increased child morbidities and deaths which are preventable. In addition, without adequate immunization coverage, it is difficult to establish herd immunity. The presence of pockets of children who are not vaccinated are like an open door for infection and once the child is infected, it is difficult to contain the spread of VPDs without herd immunity which can lead to outbreaks of VPDs and more preventable morbidities and mortalities. Therefore, it is essential to deploy strategies to improve the immunization coverage in those areas in order to provide universal access to immunization for the children in Myanmar.

The healthcare delivery structure and system in NSEA controlled areas is an important finding of the study. It is essential to consider the existing local health service provision structure of NSEA controlled areas when developing strategies for pragmatic engagement between the government health system and local healthcare delivery system in NSEA controlled areas to extend the delivery of healthcare, including immunization services.

4.2 Barriers to access immunization services

In this study, multiple barriers, both supply and demand related barriers, limiting the access to immunization services are identified.

Maternal education, maternal (also parental) knowledge on immunization, mother occupation status and maternal age are found to be associated with the immunization status of the children. Maternal education status and knowledge on immunization is positively associated with the immunization status of the children and literate mothers are at more advantage of having basic knowledge of EPI. (63) The overall literacy rate in Myanmar is high but it can be lower in NSEA controlled areas where access to government basic services, including education, is limited. (18) So mothers with low education status are less likely to have basic knowledge of EPI and without proper health education on immunization among the community, mothers are less likely to immunize their children in NSEA controlled areas.

A contradictory finding is observed regarding the mother's occupation status where one study showed higher immunization coverage of children among mothers with paid job (55) and two other studies found that employed mothers are less likely immunized their children. (57, 67) Mothers with paid jobs are usually more educated and they also have regular income which further supports mothers to immunize their children. (55) However, the contradiction arises from the nature of the mother's employment. Mothers who work in informal sector and who are manual workers mostly do not have flexible working hours to vaccinate their children according to immunization service hours. (57, 67) Significant association is also found between maternal age and immunization status of the children. Women in the middle age group may have more knowledge and value on modern healthcare services than the older women as a result of recent development in modern medicine and improvement in educational opportunities that have become available to women. (55) The parental, especially maternal, knowledge and awareness on immunization is found to be the underlying demand-related determinant in improving immunization coverage (82) and proper dissemination of immunization related information play a significant role in increasing the demand for immunization services.

The association between gender of the child and children's immunization status has contradictory findings. Underlying cultural context regarding the gender preference of a male child plays an important role in the

gender discrimination when immunizing children. (52, 55, 58, 64, 67) In Myanmar, it is reported that there was no gender difference in immunization status of the children but there was no sex-aggregated data collected for EPI program. (66) It is important to collect separate data for male and female to properly assess the gender difference in immunization status.

The higher birth order of the child has a negative effect on the child immunization status. The family resources and parental care may not be adequate to cater the health needs of many children and the children with higher birth order are more at disadvantage. (58, 69) However, the association may not be significant among small families with few children. Children of mothers who received antenatal care and of mothers who have institutional deliveries are more likely to receive immunization services. (60, 69) The reason could be that mothers who do not receive antenatal care services and mothers who deliver at home may have less acquaintance with health staff and have less chance in receiving health information including the importance of immunization and its schedule. (57, 60) Integration of immunization service provision with compatible basic maternal health services is one option to consider in improving the vaccination coverage if the existing maternal health services in the target areas already have high coverage. (107)

The availability of health infrastructures, vaccination related resources and trained human resources are the major supply-related barriers to access immunization services. (61, 73) Lack of vaccine-related targeted education and mass media messaging also affect the families' demand for immunization services. (58, 82) Lack of medical resources and sustainable funding is cited as the most common constraints for the ethnic and community based organizations operating in eastern Myanmar's conflict zones. (48, 76, 77) Moreover, frequent loss of staff due to security concerns and threats of violence is also hindering the provision of services. (78) Vaccine shortages and insecure vaccine supplies is also a major challenge for KDHW immunization program. The unique political situation in NSEA controlled areas of Kayin State is the underlying obstacle causing the resource constraints which need to be carefully addressed when developing strategies to strengthen EPI services to those areas. Developing strategies to extend routine health services including routine immunization services in conflict affected areas that deprived of services can contribute not only to attaining universal access to immunization but also to peace building process during this political transformation period. (108)

The distance from the health facility is a key factor that influences the utilization of immunization services, especially in rural and remote areas. (55) However, this association is not significant in urban setting. (64) The region of residence is also associated with immunization coverage where mothers residing in rural areas are less likely to immunize their children. This may be due to scarcity of health facilities in rural area and mothers are unwilling to travel long distances to immunize their children. (59) In addition, population residing in rural area are generally associated with low socioeconomic status (68) and low education level (59), both of which are barriers to access immunization services. In Myanmar, similar situation can be expected as 70% of the population is residing in the rural areas whereas 84% of total poverty is contributing from rural areas. (17, 22) Even though routine immunization services are provided free of costs, there is still the indirect costs (e.g. time spent to travel, transportation costs) associated with immunization (85) and mothers' willingness and ability to pay for these costs play an essential part in the uptake of immunization services. (63)

Transportation difficulties to reach geographically remote areas are most often cited as major obstacles in delivering as well as in accessing immunization services. (5, 76) The situation is worsen by underlying conflict and unstable condition in which both health workers and village community is reluctant to travel for immunization services. (77, 84) Provision of outreach services or provision of immunization services using trained CHW from the community itself are options to consider when improving immunization coverage in difficult to access areas.

Demand-related barriers in acceptability of the immunization services are identified as perceived quality of the vaccine, perceived quality of the immunization services, lack of trust in health care providers and health facilities, fear of side effects, religious and cultural beliefs, belonging to minority ethnic or religious group, language barriers, lack of legal status and role of women in the community. On the other hand, supply-related barriers are identified as inconvenient or limited service hours, long waiting time, poor attitude of health workers and lack of motivation of health workers. (62, 64, 86, 87, 88, 89) Again, the parental knowledge on immunization plays an important role in overcoming the misperception towards immunization and it is important to consider local beliefs and cultural context when disseminating immunization related information. Immunization service hours also need to be tailored according to the local setting. Regular training and supportive supervision of health workers together with the provision of adequate supplies for immunization

services delivery can increase the motivation of health workers. A proper monitoring system for EPI is essential to assure the quality of; the vaccines, the immunization services, and the reporting.

4.3 Quality of the study

KDHW provided the immunization program data in a time series, from 2009 to 2014, to assess the immunization coverage in NSEA controlled areas of Kayin State. The data provided was also used in comparing with the immunization coverage results from MICS which was very supportive in highlighting the differences in coverage between government controlled areas and NSEA controlled areas. The conceptual framework for 'assessing access to health services' was used to guide in identifying barriers in assessing immunization services. The framework helped to look at all four dimension of access from both supply-related side and demand-related side. This is also helpful in determining the strategies to improve access to immunization services from both demand and supply related aspects.

The immunization coverage in NSEA controlled areas of Kayin State is assessed using the IP data from KDHW so the data quality and reliability depends on the data management and quality assurance of KDHW IP. Moreover, underlying unstable situation may also affect data collection and proper monitoring of IP which can affect the data quality.

The peer reviewed published literatures on routine immunization program or EPI in Myanmar is very limited to fully understand the barriers in Myanmar especially for the NSEA controlled areas. The literatures available for the NSEA controlled areas of Myanmar are mostly from studies conducted by EHOs and CBOs in collaboration with international organizations. Since there is no research done in those areas by Myanmar government, the situation has been looked from one side and the findings presented from those studies may prone to bias. Study area is focused on Kayin State, eastern Myanmar but the immunization service provision and barriers in accessing immunization services might be different among ethnic groups along eastern Myanmar ethnic areas and it is important to note this point when generalizing the findings. Studies from countries with same context were reviewed to reflect the situation in Myanmar. However, it may be unlikely that those studies had similar characteristics to the conflict-affected NSEA controlled areas that are the focus of this study.

Chapter 5

5 Conclusions and Recommendations

5.1 Conclusions

The study explores the healthcare provision; particularly immunization service provision, and analyses the immunization coverage in NSEA controlled areas of Kayin State, eastern Myanmar. The barriers encounter to access immunization services are also explored in this study based on the conceptual framework for 'assessing access to health services' which identity barriers from both supply side and demand side using four dimension of access. The strategies to overcome the barriers and improve immunization coverage in hard to reach areas are also explored.

In NSEA controlled areas of Myanmar, the government health facilities and services are still unavailable or inaccessible. The EHOs and CBOs are the main healthcare providers and the foundation for their healthcare provision networks are mostly laid by EAOs. Pragmatic engagement between the government health system and local healthcare delivery system is one of the important steps in extending the delivery of healthcare, including immunization services in those areas.

In Myanmar, national child immunization coverage trends are positive but this study has shown that these figures mask local inequities and challenges. The immunization coverage in NSEA controlled areas of Kayin State is significantly lower compare to the coverage in Kayin State and the coverage nationally. Based on the study findings in Kayin State, the immunization coverage is also expected to be lower in other conflict areas and NSEA controlled areas of Myanmar where access to government health facilities are limited. There is a higher chance of transmission and outbreaks of VPDs in the low coverage areas that may lead to increased child morbidities and deaths which are preventable.

The barriers limiting access to immunization services are also identified in this study. The major barriers emerged from this review include parental knowledge and awareness regarding vaccination, family characteristics, geographical remoteness, transportation difficulties, weakness in the immunization program and service delivery and weakness in communication and information delivery. In NSEA controlled areas of Kayin State, resources constraints in implementing immunization program, insecure funding, insecure vaccines supply and transportation difficulties are found to be the major barriers. In addition, the underlying

unique political situation in NSEA controlled areas is the main obstacle that limits access to basic health services.

Not only health related barriers but also underlying conflict and political barriers need to be resolved to strengthen EPI coverage in NSEA controlled areas of Myanmar.

5.2 Recommendations

It is important to consider the findings of the study to define strategies to improve immunization coverage in NSEA controlled areas of Myanmar. Due to the multiplicity of the barriers identified, no single strategy or intervention can tackle all the barriers. A multi-faceted strategy is essential to ensure that the immunization services reach the unreached children in Myanmar. The priority should be to ensure the availability of routine immunization services in NSEA controlled areas of Myanmar. The following are the recommendations to strengthen EPI coverage in NSEA controlled areas of Myanmar:

<u>Policy Makers and MOH</u>

1. Raise issues concerning health service provision in NSEA controlled areas as a political dialogue in recent peace and cease-fire negotiations between the government of Myanmar and non-state ethnic armed organizations
2. Engage non-state actors, EHOs and CBOs in developing strategies to strengthen EPI coverage in NSEA controlled areas in Myanmar
3. Develop policies to engage and make use of the existing healthcare structures and systems laid by the non-state actors in NSEA controlled areas of Myanmar in delivering EPI services

<u>International donors</u>

4. Encourage coordination and collaboration between MOH and EHOs and CBOs from NSEA controlled areas for provision of immunization services
5. Continue supporting existing health programs including immunization program operated by EHOs and CBOs in NSEA controlled areas to ensure resources and funding security

EPI, MOH

6. Evaluate the effectiveness of existing partnership strategy between MOH, state and non-state actors and NGOs to deliver immunization services in NSEA controlled areas of Kachin and Shan State and strengthen the strategy using the lesson learned from the evaluation before piloting the strategy in other NSEA areas
7. Pilot the partnership strategy in collaboration with non-state actors, EHOs and CBOs from NSEA controlled areas in Kayin State as well as in other NSEA controlled areas to deliver EPI services to strengthen EPI coverage
8. Conduct outreach activities in collaboration with or through EHOs and CBOS in NSEA controlled areas to reach all the children residing under NSEA controlled areas
9. Review and enforce existing strategies to increase EPI service provision, to strengthen supervision and monitoring system and to increase demand for immunization services
10. Encourage further research to study the provision of immunization services in other NSEA controlled areas as well as to have a better understanding of country and region specific barriers to access routine EPI services so that the strategies can be properly defined to overcome the barriers and improve the routine EPI coverage in Myanmar

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