



**ST. MARY'S UNIVERSITY
SCHOOL OF GRADUATE STUDIES**

**FACTORS AFFECTING ROUTINE IMMUNIZATION
SERVICE DELIVERY IN PRIVATE HOSPITALS IN
ADDIS ABABA, ETHIOPIA**

BY

ANDARGACHEW MEGRA

JANUARY 2018

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A THESIS SUBMITTED TO ST.MARY'S UNIVERSITY,
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Declaration

I, the undersigned, declare that this thesis is my original work, prepared under the guidance of Mr. Tiruneh Legese. All source of materials used for the thesis have been duly acknowledged. I further confirm that the thesis has not been submitted either in part or in full to any other higher learning institution for the purpose of earning any degree.

Andargachew Megra

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St. Mary's University, Addis Ababa

January 2018

ENDORSEMENT

This thesis has been submitted to St. Mary's University, School of Graduate Studies for examination with my approval as a university advisor.

Advisor

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January 2018

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Acronyms

AEFI	Adverse event following immunization
BCG	Bacille-Calmette-Guerin (Tuberculosis vaccine)
DPT	Diphtheria, Pertussis, Tetanus vaccine
EPI	Expanded Program on Immunization
FIC	Fully Immunized Coverage
HSTP:	Health sector transformation plan
IPV	Inactivated Polio Virus
MoH	Ministry of Health
MDVP	Multi dose vial policy
NIDs	National Immunization Days'
OPV	Oral Polio Vaccines
PEI	Polio Eradication Initiatives
Pentavalent DPT-HepB-Hib	
PHC	Primary Health Care
PCV	Pneumococcal conjugate vaccine
PFSA	Pharmaceutical Fund and Supply Agency
PQS	Performance quality and safety
RHB	Regional Health Bureau
RI	Routine immunization
SIAs	Supplemental Immunization Activities
UNICEF	United Nations Children Funds
WHO	World Health Organization
ZHD	Zonal Health Department

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Abstract

The immunization service provided in private hospitals where there is maternal and child health service. Currently, the Federal Ministry of Health gave a certificate of competency to 20 private hospitals, NGO clinics and middle level clinics to provide immunization service. A descriptive and inferential study design and census sampling technics is used. Primary qualitative and quantitative data, secondary data collected using an interview questionnaire and a record review and observation. SPSS is used for data analyses. The result reveals that all facilities under the study assign at least one focal person and significant of them not trained to render immunization service and lacks standard practice of annual planning and budgeting to service provision which affects service provision quality, performance and sustainability. The immunization service practice in private hospitals is violets standards and recommendation of World Health Organization. The study results indicate gaps which is a tip of the ice-burg of the immunization service provision in private hospitals. In conclusion the factors affecting immunization service in private hospital at input level are lack of standard practice of planning, budgeting, frequent stock out of vaccines, lack of standard equipment for vaccine storage and transportation. The finding is useful to take appropriate measure by the government in collaboration with the private sector in which is strengthening public private partnership.

Key terms:

Immunization, Private hospital, cold chain system, and quality of immunization

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

The Federal Democratic Republic of Ethiopia is the oldest independent country in Africa and the second most populous country in sub Saharan Africa. Ethiopia is the second most populous country in sub Saharan Africa with an estimated population of approximately 94,352, million population in 2017(Federal Democratic Republic of Ethiopia, 2007). Ethiopia is located in the North Eastern part of Africa, also known as the Horn of Africa. It borders six countries - Eritrea, Djibouti, Somalia, Kenya, South Sudan and the Sudan.

The Ethiopian constitution created a Federal government structure composed of nine Regional States: Tigray, Afar, Amhara, Oromia, Somali, Southern Nation Nationalities and Peoples Region (SNNPR), Benishangul-Gumuz, Gambella, and Harari; and two City Administrations council of Dire Dawa and Addis Ababa(*Constitution of the Federal Democratic Republic of Ethiopia*, 1994). The pyramidal age structure of the population has remained predominately young with 47% under the age of 15 years, individuals in the age 15-64 account for 48%and individuals age 65 and older account for 4% (Central Statistic Agency, 2016). Ethiopia economy registered rapid growth since the past decade (2004/05 -2014) with GDP of 10.8% annual average growth rate. (Africa Development Bank Group, 2016).

The government of Ethiopia is empowering the divers' population of Ethiopia through decentralization and realization of the right and power of the people. The health policy of Ethiopia gives high priority for less privilege and rural population(“Health Policy of the Transitional Government of Ethiopia,” 1993).

The primary health care services in Ethiopia include preventive, promotive and basic curative service. The government introduced three-tier health care system for effective implementation of the primary health care service. The three-tier system characterized primary health care unity,

secondary (General hospital) and tertiary health care (Referral hospitals)(Admasu, 2015). A total estimate of population served in primary health care unit is 25,000 people, while a district and a zonal hospital are each expected to serve 250,000 and 1,000,000 people respectively. The health sector introduced health service extension program to serve the population and increase the access for health care service(Admasu, 2009). In addition to the public sector the private sector is expanding rapidly though the distribution of private hospital is skewed towards the urban areas. The Federal Ministry of Health reported in 2017; 5401 primary clinic, 1308 medium clinic, 536 specialized clinics, 62 hospitals at national level out this a total 179 primary clinic, 458 medium clinics, 361 specialized clinics and 25 hospitals located in Addis Ababa(*Federal Ministry of Health Health and Health Related Indicators 2008 EFY (2015 / 2016) October , 2016, 2016*).

The health policy focuses on disease prevention of strategies (“Health Policy of the Transitional Government of Ethiopia,” 1993). One of the diseases prevention strategies is run by expanded program on immunization. Ethiopia launched the expanded programme on immunization in 1980 with the objective of increasing the coverage by 10% annually. However, the coverage in the first 20 years was very low although during the 1990’s good progress was observed through Universal Child Immunization (UCI). Ethiopia joined the polio eradication initiative in 1996 and since then the Ministry of health implemented number of supplementary immunization polio vaccines for under fifteen and under five children to eradicate the polio virus(*Ethiopia National Expanded Programme on Immunization on Comprehensive Multi-Year Plan 2016 - 2020 Federal Ministry of Health , Addis Ababa, 2016*).

The EPI program aim in reducing under five child mortality and morbidity through immunization for prevention of vaccine preventable diseases. Under the EPI program, 4 traditional vaccines: (BCG, Measles, OPV, TT) and 4 new vaccines DPT-HepB-Hib(Penta), PCV, Rotavirus Vaccine , and IPV) are provided routinely. Since its launching in 1980, the National EPI program has shown measurable progress; DPT3 administrative coverage has increases from as low of 42% in the 1990s to more than 90% in 2015. In 2013/2014 (2006 Ethiopia Fiscal Year (EFY)), immunization coverage markedly improved and a coverage of 91%, 87% and 83% reported for administrative coverage of Pentavalent 3, Measles and fully immunized children. Ethiopia introduced PCV in 2011 and Rotavirus vaccine in 2013, and IPV and HPV (as a demonstration project) in December 2015. The country has also successfully

switched the use of tOPV to bOPV in the routine immunization synchronizing with the global community as of May 1, 2016(*Ethiopia Routine Immunization Improvement Plan EFY 2006-2007, 2013*).

In Ethiopia the immunization service provided in all public health facilities through static and outreach strategies to avail the service in hard to reach and pastoralist communities. The service also provided in private hospital where there is maternal and child health service. Currently, the Federal Ministry of Health gave a certificate of competency to 20 private hospitals, NGO clinics and middle level clinics to provide immunization service. The immunization service in public sector is provided for free, but in private sector with minimum additional payment for the service only. All private hospitals get vaccine and supplies from the government without payment.

For good governance to prevail there is a need for strong leadership and commitment by governments, robust participation of civil societies and involvement of the private sector in upholding the principles of good governance. Scale up training and development of health professionals based on health needs taking into account current stock, demand, supply, skill mix and distribution in public and private sectors, as well as local and global labor markets. The health sector transformation plan is a sector-wide approach with national health targets and vast resource requirements. It cannot be implemented by the public sector alone, but must also involve the concerted efforts of development partners, the private sector, non-governmental organizations and the community at large(Admasu, 2009).

Factors which affect immunization service are capacity of health professional, availability of vaccine and supplies, cold chain equipment and social mobilization. Identifying factors which affects service quality and increase dropout rate in public and private sector contributes to increase immunization coverage.

1.2 Statement of the Problem

The immunization program annually saves millions of children from death at global level. It is also considered the cost effective strategies in controlling and prevention of vaccine preventable diseases. The government of Ethiopia has been implementing the strategy since 1980. The immunization program contributes in reducing under five child mortality enable the country to achieve the millennium development goal-4(Tao, Petzold, & Forsberg, 2013).

The immunization program success achieve when the coverage of vaccinated children in a country reaches 95% and above to increase population immunity. In Ethiopia, out of the expected under-five deaths per year, vaccine preventable diseases account for a substantial portion of under-five mortality. Pneumonia, Diarrheal disease and Measles are among the leading causes of under-five mortality. However due to routine and campaigns based measles vaccination, there has been a significant reduction in the number of under-five deaths due to measles(*Ethiopia Routine Immunization Improvement Plan EFY 2006-2007*, 2013).

Immunization service provision has shown gradual increase since 2004 reaching 88% administrative coverage of Penta 3 in 2013. Yet for the last five years the national administrative coverage has been observed stagnant. The service provision and the immunization coverage in hard to reach and remote areas is low(*Ethiopia Routine Immunization Improvement Plan EFY 2006-2007*, 2013).

The immunization service delivered both in public and private health institution. The immunization service requires trained health worker, cold chain equipment, safe and potent vaccine and supplies, and independent room to deliver the service effectively(Canavan, Sipsma, Kassie, & Bradley, 2014). However delivering immunization service in private hospitals incurs finance and other resources, the government declares it is free of any payment. The immunization service delivery in private hospitals should regularly monitor and supervised to quality service delivery. Hence assessing the challenge in delivering immunization in private sector is helpful to put recommendation and take intervention measures.

The assessment of routine immunization service delivery practice by government health facilities at regional, zonal and woreda conducted in number of times to investigate the quality, performance and challenges of in the program for appropriate intervention. The challenges in the

public health facilities are frequent interruption of routine immunization, low coverage and high dropout rate, stock out of vaccines, lack of transport, absence of reliable cold chain system, temperature monitoring practice and data management (3, 10, 14).

The challenge in the private hospitals is not documented as compare to the public facilities. Hence, it is imperative to document the practice in the private facilities to take appropriate mitigation measures for identified challenges. Therefore, identifying the gaps and challenges in service provision is critical for quality and performance improvement. The study focused in identifying factors affecting routine immunization service delivery in private hospitals at input and process level and recommended mitigation strategies for strengthen the private public partnership in the sector.

1.3 Research Questions

The study generate evidence based information for decision makers by answering the below questions.

- 1 Are private hospitals delivering immunization service as per World Health Organization recommended standard?
- 2 What are the factors affecting delivering immunization service in private hospitals?
- 3 Are private hospitals delivering reliable and uninterrupted immunization service?
- 4 Is there association of in-service training on immunization and knowledge of health worker in immunization

1.4 Objectives of the Study

1.4.1 General Objective

The general objective of the study is to identify factors affecting immunization service delivery practice in private hospitals

1.4.2 Specific Objectives

The study attempts to achieve the following specific objectives.

- 1 To investigate the proper implementation of recommendation by private hospitals
- 2 To investigate frequency, reliability and adequacy of immunization service in private hospitals
- 3 To assess association of in-service training on immunization and knowledge of health worker in immunization
- 4 To assess knowledge of health workers in immunization service delivery

1.5 Significance of the Study

The immunization program is cost effective strategy to prevent and control vaccine preventable disease. Globally vaccination saves millions under one children life annually. The immunization service in private hospitals is increasing recently. Hence, knowing the immunization service practice is critical to identify gaps in quality and performance of facilities for appropriate measures. In addition, there is no assessment conduct specific to this study objective. Therefore, it is useful for policy makers and providers to strengthen the service provision and public private partnership. The study contributes in putting appropriate recommendation to strengthen the contribution of the private sector as part of public private partnership.

1.6 Scope of the Study

The study conducted in all 20 private hospitals located in Addis Ababa which provide immunization service; Tekle Haymanot, Betel, Bras, Betsegah, Adis Hiwot, Kadisko, Koriya, Yerer, Amin, Afran, Hemen, Adis Maternal and Child Health center, Abebech Gobena, Ethio-Sudan, Zenbaba, Landmark, Bethzata, Ethiotebib, Girum and Meriestope hospital. The study conducted starting from August 2017 to November 2017 Gregorian calendar. The data collected using questionnaire and direct observation from 20 private hospitals which deliver the service during the study period. The study respondents for the interview are health workers who are in charge to deliver immunization service in 20 private hospitals.

1.7 Limitations of the Study

A research design and sampling technics develop so as to minimize bias and weakness for informative results. The limitation for this study is the study excludes private hospitals located in other regions and clinics located in Addis Ababa by focusing only in private hospitals located in Addis Ababa. The private hospitals located in Addis Ababa provided immunization service for majority of maternal and child health service.

1.8 Definition of Key terms

1. **Cold chain system:** a network of refrigerators, cold stores, freezers and cold boxes organized and maintained so that vaccines are kept at the right temperature to remain potent during vaccine orders and supplies, their transportation, storage and distribution from factory to the point of administration to the target population.
2. **Dropout Rate:** a comparison of the number of children or women who start receiving immunization and the number who do not receive later doses for full immunization.
3. **Temperature monitoring Device:** A device which monitors the temperature of spaces used to store or transport temperature sensitive products.
4. **Full immunization:** A child who has received doses of the standard six antigens BCG, Penta (3 doses), polio (3 doses) and measles vaccines and yellow fever.
5. **Unimmunized:** a child of one year of age who has not received his/her immunizations as stipulated by the national immunization schedule for <1 children.
6. **Vaccine:** biological product prepared from killed or attenuated (weakened) virus or bacteria or their toxins, used for vaccinating people to induce specific immunity against an infectious disease
7. **Water-pack:** Flat plastic container, filled with water, which can be used as a frozen water-pack (ice-pack), a cool water-pack or a warm water-pack.
8. **Phase chaining material ice pack:** A substance (other than water) with a high heat of fusion that melts and solidifies at a certain temperature and is capable of storing and releasing large amounts of energy. Heat is absorbed or released when the material changes from solid to liquid and vice versa. The phase-change materials used for vaccine transport typically change state at around +5°C.

- 9. Multi dose vial policy:** All opened WHO-prequalified multi-dose vials of vaccines should be discarded at the end of the immunization session, or within six hours of opening, whichever comes first, UNLESS the vaccine meets all four of the criteria; The vaccine is currently prequalified by WHO, the vaccine is approved for use for up to 28 days after opening the vial, as determined by WHO, the expiry date of the vaccine has not passed, the vaccine has been stored 2 to 8⁰C.
- 10. Adverse event following immunization:** The World Health Organization (WHO) defines an AEFI as a medical incident that takes place after an immunization. AEFI is causes concern to clients, parents, community and to the health workers and requires investigation to find its cause (vaccine or injection reaction, programme error, coincidental or unknown event).

Source for definition of key terms is World Health Organization. Available from: <http://www.afro.who.int/ARD/IVD>

1.9 Organization of the Study

The study report organized in to five chapters each addresses and review major points.

Chapter one: It has eight sub sections to clearly address the background of the study, statement of the problem, scope of the study, research question and objectives, significance of the study, limitation of the study and definition of terms. It provides information on the study and using published source and other secondary materials.

Chapter Two: It deals with reviewing publish research which are similar or related to the study objectives. It comprises theoretical concepts and empirical studies which are critically reviewed evidence based information to strengthen the significance of the study and its result.

Chapter three: It provide detail information on the research methods; study design, target population and sampling techniques, types of data and tools applied, procedure used for data collection and data analysis methods. Moreover it gives information on ethical considerations and validity and reliability of the study result.

Chapter Four: It reveals the study result and discuss and compares the result with related published articles to show reliability and increase acceptance of the study for appropriate intervention measures.

Chapter Five: This chapter provides major conclusions based on key study findings. It also proposes recommendation for organizations for appropriate intervention and action.

CHAPTER TWO

LITERATURE REVIEW

2.1 Expanded Program on immunization

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. Immunization is an effective method for controlling and eliminating life-threatening vaccine preventable diseases. It is one of cost effective diseases prevention strategies for all population even in hard to reach areas. It has a scientifically proven target population, schedule can be delivered effectively through outreach activities; and vaccination does not require any major lifestyle change.

The universal declaration strategy on health developed and issued by World Health Organization in 2000. The immunization was one of the essential components of the WHO strategy to achieve health for all. The EPI program is established by World Health Assembly in May 1974 to ensure that all children, in all countries, benefited from life-saving vaccine. Initially the EPI program launched by the use of vaccines to protect against six diseases: tuberculosis (BCG), diphtheria, tetanus, pertussis (DTP vaccine), measles and poliomyelitis. The global immunization policies and goal for providing universal immunization were established. Immunization prevents illness, disability and death from vaccine-preventable diseases including cervical cancer, diphtheria, hepatitis B, measles, mumps, pertussis (whooping cough), pneumonia, polio, rotavirus diarrhoea, rubella and tetanus.

The immunization is a proven toll for controlling, elimination and eradication of vaccine preventable disease in under five children. The EPI program is successfully eradicating small pox by carried out campaign from 1967 to 1977. In addition to this, eradication of polio from the global level is on track. Since the launch by WHO and its partners of the Global Polio Eradication Initiative in 1988, infections have fallen by 99%, and some five million people have escaped paralysis. Immunization is the safest, cost effective ad powerful means of

preventing death and improving lives of all age group. . Immunization programme is now routinely reaching over 80 percent of children under one year of age(“WHO | The Expanded Programme on Immunization,” 2013).

Immunization is the core component of human right to health. Each year immunization averts 2.5 million children death. Through vaccination more than five million death were averted between 2010 and 2015.(WHO Vision and mission) Immunization plays critical role in the prevention, control, elimination and eradication of vaccine preventable diseases and it is considered as cost effective investment in country’s future(World Health Organization, 2017a).

In 2017 the World Health Organization classified Ethiopia polio free which is good indicator of the role of immunization in reducing under five morbidity and mortality(“WHO | The Expanded Programme on Immunization,” 2013). The wild polio virus cases continue to fall from 359 cases in nine countries to 37 cases in three countries Nigeria, Afganistan and Pakistan. Ethiopia is also able to eliminate neonatal tetanus through vaccination(World Health Organization, 2017a).

The immunization coverage, introduction and development of new vaccines are increasing in the last ten years. As a result immunization is contributing a lot in combination with other health intervention in the reduction of annual under five children death from an estimated 9.6 million in 2000 to 7.6 million in 2010(World Health Organization, 2017a). The program resulted in a significant increase in global vaccination coverage that leveled off during the 1990s, as increasing vaccination rates became more difficult with higher vaccination coverage. In fact, many African and South East Asian countries faced a decline in national vaccination coverage during this period, partly due to reduced funding(Shen, Fields, & McQuestion, 2014).

The world’s 19.5 million children did not receive 3 doses of diphtheria-tetanus-pertussis containing vaccines (DTP3) because of the coverage remain stagnant at 86% since 2010. The 2016 diphtheria-tetanus-pertussis containing vaccines (DTP3) coverage result indicate the world is off track to achieve the 90% coverage in 2015. The coverage estimate reveal that one in ten infant worldwide do not have access to vaccination, not having received even the first DTP-containing vaccine dose (DTP1) (World Health Organization and UNICEF, 2016).

2.3 Immunization Program Strategy and Success

The Global Immunization Vision and Strategy (GIVS) 2006-2015 was developed by the World Health Organization (WHO) and the United Nations Children's Fund (UNICEF) to protect as many people as possible against more diseases by expanding the reach of immunization to every eligible person and ensuring that immunization is high on every health agenda (*Global Immunization Vision and Strategy, 2006-2015*, 2005). Globally, vaccination prevents an estimated 2.5 million deaths each year. The Global Vaccine Action Plan (GVAP) was launched on the success and 10-year demonstrated experiences of GIVS. Achieving the goals of GVAP requires effective immunization supply chain systems (World Health Organization, 2011).

A strong routine immunization platform has the potential to benefit the overall health system by generating policy and financing innovations, robust logistic and cold chain systems, and skilled human resources, particularly in the areas of management, surveillance, and regulation. Routine immunization creates opportunities to educate parents about the benefits of vaccines and other health services. Engaging the community in planning, financing, and delivering the program can increase equity and build trust in the government's ability to deliver immunizations. Immunization trust can lead to generalized trust and rising expectations for other government services (Shen, Fields, & McQuestion, 2014). The provision of routine immunization service for children protects vaccine preventable diseases. Strong and effective routine immunization service increase coverage rates sustain gains from vaccination campaigns and provide foundation for new vaccine introduction (JSI Research & Training Institute, 2012).

Ethiopia achieved the millennium development goal 4 through feasible child survival interventions. The immunization service is one of the major strategies for improving child survival. Ethiopia achieved the MDG4 goal of reducing under-five mortality by 2/3 from the 1990 baseline in 2012 three years before the 2015 target year (World Health Organization, 2015c).

In Ethiopia, out of the expected under-five deaths per year, vaccine preventable diseases account for a substantial portion of under-five mortality. Pneumonia, Diarrheal disease and Measles are among the leading causes of under-five mortality. However due to routine and campaigns based measles vaccination, there has been a significant reduction in the number of under-five deaths

due to measles. It is believed that the introduction of pneumococcal conjugate vaccine (PCV) in the country's routine EPI program recently, contributed in significant reduction of pneumonia related under-five mortality(*Ethiopia Routine Immunization Improvement Plan EFY 2006-2007, 2013*).

The immunization service coverage challenged because of underutilization of service and default rate which can be caused from; poor counseling of mothers, unsupportive provider-client relationships, poor immunization service arrangements, and lack of systems for tracking defaulters. Efforts to reduce defaulter rates from the immunization program need to focus on improving counseling of mothers and strengthening the health systems, especially with regards to service arrangements and tracking of defaulters(*Zewdie, Letebo, & Mekonnen, 2016*).

The vaccination coverage between countries attributed from factors such as; staffing shortages, management of health facilities, and quality of care available, community communication, transportation and supply chain system. To improve vaccination coverage it is very important implementing tailored interventions. The first contact with mothers is a critical time to provide basics information about the use vaccination for the child which decrease drop put rate. In addition, special attention should be given for women deliver in home to reach children with appropriate vaccination(*Canavan et al., 2014*).

In many low and middle income countries the balance between the private- public sector practices of the health care over the past decade has tilted towards the former. Expanding private sector reduces the burden on the government, of ever increasing demand for health care, offers consumers choice and competition. It is helpful for the health sector to improve efficiency and quality and can contribute to health equity. Those able to pay use private services while public resources are targeted to reach those who cannot afford to pay. Expansion of private facilities on the other hand will increase cost and may induce unwanted demand. Interaction of a set of factors like input market conditions, internal competition within the sector, provider payment mechanisms, government regulations and demand factors like increasing demand for health care, income and utilizing pattern and behavior of consumers etc are likely to determine the shape and characteristics of private health sector. Understanding these factors is essential to influence the growth of this sector. These insights is useful for policy makers to design and introduce mechanisms to monitor and regulate this effectively(*Devi, 2011*).

The quality and utilization antenatal care in private health facility is poor as compare to public health facilities which is required by World health organization(Chen et al., 2013). Families of children with underlying diseases and low birth weight attended immunization service in private hospitals than in public health facilities. Parents who chose hospital have perception of hospitals are safer which lay a substantial role in the choice of health care providers and inappropriate consultation(Pandolfi, Graziani, Ieraci, Cavagni, & Tozzi, 2008).

The provision of health care service in public and private hospitals argued in terms of role and quality of service. The argument is among those who need safe universal health care service and advocates of private health sector to provide service in areas where the public sector failed. International donors recommended government to strengthen the public private partnership to improve quality of health service in low and middle income countries. One of the major precondition to get loan from the international monetary fund is countries should increase the scope of private sector provision in health care(Basu, Andrews, Kishore, Panjabi, & Stuckler, 2012).

The members of private sector can classify as; for-profit and not-for-profit civil society organizations (CSOs), nongovernmental organizations (NGOs) and faith-based organizations (FBOs). All private sector members has different role in strengthening health sector and immunization program. The non-government health sector is contributing a lot in the immunization program regardless of the recognition by government. The exchange of information and working in collaboration with government and private sector is weak. The weak link makes difficult to estimate the contribution of the private sector in increasing the immunization coverage. ‘‘In low and middle income countries (LMICs) and in some high income countries (HICs), mechanisms to enforce quality standards for vaccine storage and administration, and reporting of adverse events following immunization (AEFI) are limited in the nongovernmental sector, due to human and financial resource constraints and limited competencies(World Health Organization, 2017b).

The global vaccine action plan recommended strengthening coordination between government and private sector for new vaccine introduction, vaccine preventable diseases surveillance, increase coverage and ensure quality of vaccination in the public and private sectors (World Health Organization, 2011), 27).The contribution of the private sector in increasing

immunization coverage to achieve national and global level goal are important. The optimal private sector contribution can be achieved through clearly define role and responsibility with national EPI policy(World Health Organization, 2017b).

The immunization service delivery in private facilities is unregulated and gaps in knowledge and practice documented. The immunization service provision in can be improved through strong collaboration between public and private partnership. The major quality problem identified are knowledge and practice in proper cold chain management, temperature monitoring, transportation, injection safety and waste disposal, multi dose vial policy application and documentation of client vaccination status(Soeung, Grundy, Morn, & Samnang, 2008).The immunization practices in private facilities are unregulated and get little supervisory support from the public sectors which minimize the opportunities to strengthen the service(Patel et al., 2015).

The public–private partnership is encouraged to provide sustainable and universal health access. The partnership is establish to satisfy public health service demand because of the public sectors inability to provide public goods entirely on their own, in an efficient, effective and equitable manner(Public – private 'partnerships' in health – a global call to action). The challenges in public-private partnership are ethical and operational. Ethical challenges such as impartiality in health fear in withdrawal of social safety nets, conflict of interest, redirecting national health policy. Operational challenges are weak legislative frameworks, polices and operational strategies, unclear Governance structures, skewed Power Relationships and unclear accountability(Nishtar, 2004).

The private health sector in Ethiopia is expanding through time with active role of the government to strengthen public private partnership. The factors which contributed for expansion of private health sector are increased income of community, increased literacy rate, infrastructure, and population growth. The private sector also faced with challenges such as; availability of trained health workers, cost and availability of drug and supplies, and escalation of service cost. The sector is vulnerable for market imperfection, since the government and professional association regulation and guide is not as strong as the growth trend in sector. In Ethiopia private hospitals are concentrated in urban setting. The expansion of the private hospitals reduced the burden in public facilities which also enable the government to meet the

growing demand of health service. A strong public private partnership will enable to provide efficient and quality service. Expansion of private facilities on the other hand will increase cost and may induce unwanted demand. Interaction of a set of factors like input market conditions, internal competition within the sector, provider payment mechanisms, government regulations and demand factors like increasing demand for health care, income and utilizing pattern and behavior of consumers etc are likely to determine the shape and characteristics of private health sector. Understanding these factors is essential to influence the growth of this sector. These insights will help to policy makers to design and introduce mechanisms to monitor and regulate this effectively(Devi, 2011).

National governments typically have the responsibility for leading and overseeing routine immunization. However, immunization is best seen as a shared responsibility of individuals, communities, and governments. Many other partners may be involved. For example, the public sector is often responsible for purchasing routinely recommended vaccines and providing these to both public and private-sector providers (nonprofit and for-profit). Maintaining active representation from all partners and keeping the focus on routine immunization has been a continuing challenge(Shen, Fields, & Mcquestion, 2014).

The private health sector plays an important role in Ethiopian health care delivery system. Through a wide network of health care facilities, this sector caters to the needs of both urban and rural populations and has expanded widely to meet increasing health care demands. There are several factors affecting the growth of private hospital sector in Addis Ababa. There has been a significant increase in private hospital sector especially in Addis Ababa during the last 5 years(Devi, 2011)

2.3 Conceptual Framework

The challenges in delivering immunization service for private sector are starting from ordering vaccine, transporting and storing. A survey done in Colombia indicated that majority of the vaccines delivered to the facilities either in cold boxes or in vaccine carriers; however, a significant proportion was transported by regular boxes or other means. Almost 90% of facilities that stored vaccines did so in electric refrigerators; however, only one-third monitored the temperature. Only 15% of the facilities that stored vaccines used safety boxes to dispose of used needles and syringes, while 83% reported that waste disposal was not a problem. lack of knowledge on how long a multi-dose vial could remain open was commonly reported(Soeung et al., 2008)

The immunization service requires health professional trained on immunization service, vaccine management, communication and it requires World health organization performance, quality and safety approved cold chain equipment and vaccine stock management system. The inputs for the immunization service are trained personnel, vaccine and supplies, cold chain equipment and temperature monitoring system (Shen, Fields, & Mcquestion, 2014). All private sectors which deliver maternal health service recommended providing at least birth dose of BCG vaccine. The service provision expense and the requirement may compromise the quality in private sector. To investigate the factors affecting the immunization service I used a conceptual frame work of a system components which input, process and outcome. The below figure 1.1 was applied for the study.

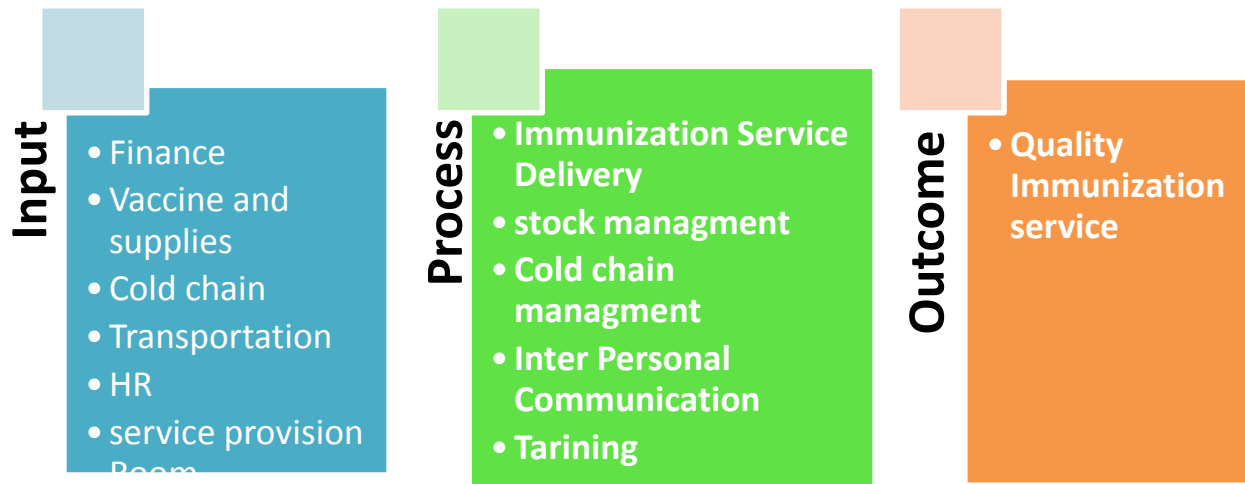


Figure 0-1 Conceptual Framework; the required Input, Process and Outcome for routine immunization

Source: *JSI Research & Training Institute, Inc.*; Available from: Web: www.arise.jsi.com

CHAPTER THREE

REASERCH METHODOLOGY

3.1 Research Design

A descriptive and inferential statistics was used to conduct assessment on factors affecting immunization service delivery in private hospitals from 20 sub city of Addis Ababa. A conceptual framework used for systemic data collection, organizing and analysis. The study identified factors affecting immunization service at input and process level.

3.2 Population and Sampling Techniques

Immunization service delivery assessment conducted in all 20 private hospitals located in Addis Ababa. A census sampling technics is used to collect data from all 20 private hospitals which deliver immunization service in Addis Ababa.

3.3 Types of Data and Tools

A qualitative and quantitative Primary data collected using a standard questionnaire and direct observation during service delivery and secondary data collected from immunization service record review. The integration of questionnaire, observation and record review increases data quality through triangulation.

3.4 Procedure of Data Collection

An interview questionnaire developed to collect data at input and process level of the service. A Pretest of the questionnaire conducted to improve the data collection quality. The health facilities informed about purpose and significance of the study and requested their willingness to be part the study. All the health facilities approached for the interview was volunteered to be part of the assessment. A survey questionnaire was used accompanied by direct observation of service provision during morning immunization session to investigate; knowledge and practice of health worker. A secondary data also collected through immunization record review and inspecting cold chain, vaccine availability, and temperature monitoring practice.

3.5 Data Analysis Methods

The raw data was cleaned and organized in excel sheet to make ready for analysis. The data properly coded to the analysis. SPSS tool used to do descriptive, correlation and regression analyses of the raw data. The qualitative data organized and the result of the study was presented in way to understand the result; table, graph and pie chart were used.

3.6 Validity and Reliability

The study conducted in 20 private hospitals out of 20 private hospitals which covers 41% of private hospitals provided immunization service. The result in immunization service delivery in all 20 private hospitals is similar and frequent. The study applied data collection instruments which enable to collect reliable and quality data. In general, other studies found out similar results in quality and practice of immunization health service in private hospitals. The result from the study can be generalized for private health facilities located in Addis Ababa.

3.7 Ethical Considerations

The study complies with standard norms and conduct during the data collection and analyses. To minimize ethical violation in data collection a pre-test conducted and the questionnaire reviewed. Consent was obtained for interviewing private-sector practitioners through face to face

communication one week before data collection. The data collected anonymously from 20 private hospitals. The study result will be disseminating after critical review by senior experts.

CHAPTER FOUR

4 DATA PRESENTATION, ANALYSES and INTERPRETATION

The study focused on identification of factors which affect the immunization service in private hospitals at input and process level. To render the immunization service the major required inputs are Finance with proper planning, trained human resource, vaccine, supplies and cold chain availability, soap and antiseptics, health management information system tools, service provision room and waiting areas for care givers and mothers. The study reveals the major factors in delivering immunization service in private hospitals.

Table 4.1 Basic information of Health workers interviewed

Gender		Educational status		Health worker years of experience	
Female	Male	BSC Nurse	Diploma Nurse	Two years	Three years & above
100%		40%	60%	20%	80%

The study conducted in 20 private hospitals which provides immunization service located in Addis Abba. Table 4.1 shows that health worker participated in the study 60% are BSC nurse and 40% are diploma nurse. The study respondents who have three years and above experience are 80% and two years' work experience are 20%. The general characteristics of majority of the study respondents are females with BSC nurse background and work experience of three and more years.

Specific Objective one: To investigate the proper implementation of recommendation by private hospitals

Table 4.2 Health worker training and year of training took in immunization practice investigated through interview

Number of EPI focal person per hospital		Health Worker trained in immunization practice		Years of health worker trained			
One focal person	Two Focal person	Yes	No	Didn't get in-service training	One years before	Two years before	Three years before
70%	30%	60%	40%	40%	40%	10%	10%

Trained human resource is important component in delivering quality immunization service. Table 4.2 study indicate all private hospitals in the study assigned one EPI focal person and 30% assigned at least two EPI focal person to provide immunization service. Out the assigned focal persons only 60% gets in service training and out this 40% trained one year before. The numbers of health workers who are not trained immunization practice is high which compromise quality of service.

Table 4.3 Availability of standard Cold chain equipment & temperature monitoring device in health facilities investigated through observation

Health facilities used WHO PQS approved Refrigerators		Availability of Cold box, vaccine carrier with foam pad			Availability of Continuous or dial thermometer for temperature monitoring	
Yes	No	Vaccine carrier with foam pad available but no cold box	Vaccine carrier without foam pad available & no cold box	Vaccine carrier without foam pad available & no cold box	Dial thermometer	Continuous monitoring device
0	100%	50%	40%	10%	100%	0

Table 4.3 shows all private hospitals in the study do not have WHO performance, quality and safety approved refrigerators for storing vaccines in 2 to 8 °C. To ensure quality of vaccines during storage and transportation the World Health Organization recommends use of WHO approved refrigerators technologies and temperature monitoring devices (World Health Organization, 2013a). The facilities use dial thermometer to monitor temperature of the refrigerators to prevent exposure of vaccine from temperature excursion of above 8°C and below 2°C. The World Health Organization recommends use of continuous temperature monitoring device over dial thermometer(World Health Organization, 2015b). The facilities use vaccine carriers for vaccine transportation and to conduct immunization session. Half the health facilities have foam pad with vaccine carrier which is core component to conserve cold air and prevent light sensitive vaccines from sun light. Only 10% health facilities has cold box for transportation and vaccine collection from higher level of the system. The quality of vaccines can be affected during transportation, to prevent vaccine exposure to extreme temperature the WHO recommends use of cold box with appropriate cold water packs(World Health Organization, 2015a)

Table 4.4 Practice of Annual Planning and Forecasting of vaccine and supplies in Health facilities investigated through document review

Availability of Annual immunization plan		Annual & monthly vaccine & supplies forecasting practice	
Available	Not available	Available	Not available
	100%		100%

The study result indicates all private hospitals included in the study do not have annual work plan, micro plan and allocated budget for immunization service. The lack of annual plan affects the reliable and continuous availability of the immunization service. The World Health Organization considers planning for immunization service is a key component for quality and reliable service and for performance improvement (Nishtar, 2004) & (World Health Organization, 2013d).

Table 4.5 Vaccine and Supplies Availability in the Health Facilities investigated through interview, document review and observation

Health facilities avail all Vaccine in day of visit		Health facilities avail Supplies (Syringe & safety box) in day of visit		Percent of health facilities experience Vaccines stock out for three weeks in the last three month		
All vaccines available	At least one vaccine stock out	All supplies available	At least one supply stock out	One vaccine stock out	Two vaccines stock out	Three vaccines stock out
70%	30%	100%		20%	30%	50%

The continuous availability of reliable cold chain and quality vaccines and supplies are imperative for the delivery of the service for children and pregnant mothers. The result from Table 4.5 indicate 30% health facilities were stock out at least one vaccine in the day of the visit and 50% of health facilities experienced stock out three vaccines for more than three weeks in the past three month. The frequent stock of vaccines observed in private hospitals which expose the frequent interruption of child vaccination. The interruption of vaccination sessions increase the number of children missed vaccination and the program lost the opportunity to increase the

immunization coverage to improve population immunity to prevent disease outbreak. The World Health Organization recommends health facilities to ensure vaccine availability and minimize stock out through establishing and improving vaccine and supplies inventory management which increases care givers confidence in the service (World Health Organization, 2013e).

Specific Objective two: To investigate frequency, reliability and adequacy of immunization service in private hospitals

Table 4.6 Immunization service Adequacy and interruption of the session investigated by interview and record review

Frequency Immunization session delivery in health facilities		Immunization Session Interruptions in the Last Three Month and Reasons	
Once for BCG & Measles & three times per week	Once for BCG & Measles & daily for other vaccines	Interrupted because of vaccine shortage	No interruption
80%	20%	70%	30%

The routine immunization service provided in all private hospitals is three times a week to daily for all vaccines except BCG and Measles vaccines which is given one per week to minimize vaccine wastage. Table 4.6 shows all EPI focal persons perceive that the immunization session frequency per week is adequate. In 70% of health facilities the routine immunization service interrupted in the past three months because of vaccine stock out. The findings clearly show there is frequent vaccine stock out which leads to service interruption. The result in above Table 4.5 also shows the frequent stock out of vaccines for more than three weeks.

Table 4.7 Challenges in vaccine collection and experience in refrigerator breakdown and temperature monitoring practice investigated through interview and record review

Challenges in Vaccine Collection from Government Facilities		Refrigerator break down		Presence of Contingency plan		Continuous Temperature monitoring practice		Temperature excursion in the last month	
Vaccine shortage	No challenge	No Refrigerator breakdown	Refrigerator breakdown	Available	Not available	Available	Not available	No excursion	There was excursion
100%	0	100%	0	100%			100%	100%	0

Table 4.7 results show the cold chain and vaccine management and temperature practice. All private hospitals under the study have contingency plan during refrigerator breakdown and all the health workers conduct regular temperature monitoring twice daily and seven day a week using dial thermometer. The facilities experience shortage of vaccines in government storage facilities during vaccine collection which contribute for frequent sock out of vaccines. The health facilities refrigerator was functional and do not experiences break down in the last three month. The cold chain management, vaccine management and temperature monitoring is critical component which determines the quality of vaccination service to children and mothers(World Health Organization, 2015b).

Specific Objective three: To assess knowledge of health workers in immunization service delivery

Table 4.8 Knowledge of health workers in the key five immunization messages investigated through interview

Knowledge on Five Key Immunization Message for Care Givers			
Know the key two messages	Know the key three messages	Know the key four messages	Know the key five messages
30%	40%	20%	10%

The study finding indicated in Table 4.8 in knowledge of health workers in key immunization messages for care givers and mothers shows 10% of health worker knows the five messages, 20% knows four messages, 40% knows three messages, and 30% knows two messages. The communication component of the immunization program is critical to ensure mothers and care givers importance safety of vaccination to minimize dropout rate and increase immunization coverage in the community to boost population immunity for vaccine preventable diseases(World Health Organization, 2013b).

Table 4.9 Knowledge of health workers in immunization practice and recommendation investigated through direct observation

Knowledge on Multi dose vial policy		Knowledge on injection safety		Knowledge in Making Correct Decision on Contra indication for Vaccination		Knowledge of on cause, investigation, reporting of Adverse event following immunization		Knowledge on utilization of Foam Pad during immunization session		Knowledge on use of Phase Changing material Ice pack other than water pack		Vaccine wastage monitoring knowledge & practice	
Know	Don't Know	Know	Don't Know	Know	Don't Know	Know	Don't Know	Know	Don't Know	Know	Don't Know	Know	Don't Know
60%	40%	100%		50%	50%	40%	60%	20%	80%	40%	60%	20%	80%

Table 4.9 shows only 60% health worker correctly implement the multi dose vial policy and 60% of health workers knows correct contraindication for vaccination The knowledge of health workers in making correct decision on vaccination contraindication and effective implementation of multi dose vial policy is critical to avoid adverse event following immunization. The majority of health workers do not implement the multi dose vial policy as per WHO recommendation

which increase occurrence of adverse event following immunization(World Health Organization, 2014).

All health workers avoid recapping of needles and knows proper disposal of injection wastes. The knowledge of health workers in cause, identification and reporting of adverse event following immunization is low. Only 40% knows the mandatory identification, investigation and reporting of adverse event following immunization which cause sever fever, anomalies and to death of the client. Only 20% health worker has the knowledge and utilization of foam pad and vaccine wastage monitoring practice. The immunization safety is determined by quality cold chain system used during transportation, storage and immunization sessions, and knowledge and practice of health workers delivering immunization service (World Health Organization, 2013c). The violation of recommendations or lack of knowledge for proper implementation compromises the quality of immunization service. The study clearly shows lack of proper implementation of recommendations and standard practice.

In addition to this all private hospitals health workers do not have knowledge on use of phase chaining materials ice packs other than water pack but in 40% of private hospitals there were phase chaining material ice pack. The phase chaining material ice pack used and recommended by World Health Organization for one time transportation from manufacturer to procurement organization. The use phase chaining ice packs during storage and transportation damages vaccine by exposing to temperature below 2⁰C (World Health Organization, 2015a).

Specific objective four: To assess association of in-service training on immunization and knowledge of health worker in immunization

Table 4.10 Pearson Correlation Matrix between Each Health Worker Knowledge and Training

Knowledge of Health Worker in immunization	Health worker Trained in immunization	
	Pearson Correlation	Sig. (1-tailed)
HWs Knowledge on Five key immunization messages for care givers	.736**	.008
Health Worker Knowledge on MDV implementation	1.000**	.000
HWs Knowledge on cause, investigation and reporting of AEFI	.667*	.018*
HW knowledge to making correct decision on Contra indication for vaccination	.000	.500

** . Correlation is significant at the 0.01 level (1-tailed). * . Correlation is significant at the 0.05 level (1-tailed).

Table 4.10 shows relationship between the four types of knowledge in immunization practice with health worker training in immunization. The result indicate there are significant correlation with health workers knowledge on five key immunization messages for care givers ($r= 0.736$, $P < 0.01$), knowledge on multi dose vail implementation($r= 1.000$, $P < 0.01$) and knowledge of cause, investigation and reporting of adverse event following immunizations ($r= 0.667$, $P < 0.01$) with health worker trained in immunizations. There was no correlation of health worker trained with health worker to make correct decision on contra indication for vaccination ($r= 0.000$, $P > 0.05$). Therefore health worker trained in immunization practice has knowledge in the provision of immunizations service in terms of telling key immunization messages for care givers, multi

dose vial implementation and cause, investigation, and reporting of adverse event following immunization.

In order to verify the prediction effect of the independent variables on the dependent variables the study conducted regression analysis. The below three tables Table 4.11, 4.12 and 4.13 shows the regression analysis result of the association of training on over all knowledge of health worker in immunization practice.

Table 4.11 Result of Regression Analyses: Health Worker Training on over all knowledge of health workers in the five key immunization messages for care givers

Variable	R	R Square	Adjusted R Square	Std. Error of the Estimate	F	Sig F	Beta	t	Sig F
Health Worker trained	.736 ^a	.541	.484	.714	9.437	.015 ^a	.736	3.072	.015

a. Predictors: (Constant), HW Trained in immunization

Table 4.11 shows the R square value of .541 indicate that 54.1% of the variation on the knowledge of health worker in the five key immunization messages for care givers accounted for health worker training on immunizations practice. This implies the other 45.9% of the variation explained by other variables.

The F statistic of 9.437 is statistically significant at the 0.01 level which confirm there is less than 1% probability for 9.437 large score occurred by chance. Based on the finding, it can be concluded that training on immunization practice variable significantly explain 54.1% of the variation in the overall knowledge of health workers in the five key immunization messages for care givers. The Beta value of .736 and the t test result of 3.072 showed training in

immunization practice have significance at 0.01 level and it is the best predictor knowledge of health workers in the five key immunization messages for care givers.

Table 4.12 Result of Regression Analyses: Time of Health Worker trained in immunization on over all knowledge of health workers in Cause, investigation and reporting of AEFI

Variable	R	R Square	Adjusted R Square	Std. Error of the Estimate	F	Sig F	Beta	t	Sig F
Time of Health Worker trained in immunization	.900 ^a	.811	.787	.238	34.286	.000 ^a	.900	5.855	.000

a. Predictors: (Constant), When does the HW trained in immunization

The regression analysis of knowledge on cause, investigation and reporting of adverse event following immunization and the time of the training on immunization showed in Table 4.12. The R square value of .811 indicate that 81.1% of the variation on the knowledge of health worker on cause, investigation and reporting of adverse event following immunization accounted for the time health worker trained on immunizations practice. The result showed 18.9% of the variation explained by other variables.

The F statistic of 34.286 is statistically significant at the 0.01 level which verify there is less than 1% probability for 34.286 large score occurred by chance. Based on the finding, it can be concluded that time health worker trained on immunizations practice variable significantly explain 81.1% of the variation in the overall knowledge of health workers on cause, investigation and reporting of adverse event following immunization. The Beta value of .900 and the t test result of 5.855 indicate training in immunization practice have significance at 0.01 level and it is

the good predictor knowledge of health workers on cause, investigation and reporting of adverse event following immunization.

Table 4.13 Result of Regression Analyses: Health Worker trained in immunization on over all knowledge of health workers in Cause, investigation and reporting of AEFI

Variable	R	R Square	Adjusted R Square	Std. Error of the Estimate	F	Sig.	Beta	T	Sig F
Health Worker trained in immunization	.667 ^a	.444	.375	.408	6.400	.035 ^a	.667	2.530	.035

a. Predictors: (Constant), HW Trained in immunization

Table 4.13 result indicate the R square value of .444 that is 44.4% of the variation on the knowledge of health worker on cause, investigation and reporting of adverse event following immunization accounted for health worker training on immunizations practice variable. The 55.6% of the variation is explained by other variables.

The F statistic of 6.400 is statistically significant at the 0.05 level which confirm there is less than 5% probability for 6.400 large score happened by chance. Based on the finding, it can be concluded that training on immunization practice variable significantly explain 44.4% of the variation in the overall knowledge of health workers on cause, investigation and reporting of adverse event following immunization. The Beta value of .667 and the t test result of 2.530 showed training in immunization practice have significance at 0.05 level and it is the best predictor knowledge of health workers on cause, investigation and reporting of adverse event following immunization.

The inferential statistics indicate there is significant correlation with health workers trained in immunization and knowledge health worker on multi dose vial policy implementation, knowledge in five key immunization messages for care givers and knowledge on cause, investigation and reporting of adverse event following immunization ($r= 1.000$, $P < 0.01$), ($r= 0.736$, $P < 0.01$) and ($r= 0.667$, $P < 0.01$). However there is no significant correlation health worker trained in immunization with health worker making correct contra indication for immunization. The same result found in the private sector immunization service assessment, which reveals the private sector demonstrated a lack of quality of care and management in terms of health workers' knowledge of immunization schedules, wastage management and vaccine management practices, and exchange of health information with the public sector (Soeung et al., 2008).

CHAPTER FIVE

CONCLUSION and RECOMMENDATION

5.1 Key Findings

The study reveals the below key findings in immunization service provision in private hospitals located in Addis Ababa.

- Lack of trained health worker in immunization service provision
- Absence of WHO quality, safety and performance approved cold chain equipment and continuous temperature monitoring device
- Lack of annual planning and forecasting of vaccines
- private hospitals experience frequent stock out vaccines which leads to interruption of immunization sessions
- Inadequate knowledge of health workers in proper implementation of multi dose vial policy, knowledge on adverse event following immunization identification, investigation and reporting, knowledge in Making Correct Decision on Contra indication for Vaccination, knowledge on communicating five key immunization messages, knowledge on utilization of Foam Pad during immunization session, knowledge on use of Phase Changing material Ice pack other than water pack and Vaccine wastage monitoring.
- There is statistically significant association of training on immunization and adequate knowledge of health worker in immunization practice

5.2 Conclusion

The study investigates factors affecting immunization practice and the association of training and health worker knowledge in immunization practice in 20 private hospitals out of 20 private hospitals located in Addis Ababa.

The study identifies factors affecting routine immunization service provision in private hospitals using the conceptual framework at input level and process level. The result reveals that all facilities under the study assign at least one focal person and significant of them not trained to render immunization service and lacks standard practice of annual planning and budgeting to service provision which affects service provision quality, performance and sustainability. In addition all health facilities experience frequent stock out at least one vaccine, do not have standard World Health Organization approved refrigerators, and very few have cold box for vaccine transportation and vaccine carrier with foam pad which will compromise quality of vaccine in transportation, storage and immunization session. In conclusion the factors affecting immunization service in private hospitals at input level are lack of standard practice of planning, budgeting, frequent stock out of vaccines, lack of standard equipment for vaccine storage and transportation.

The private hospitals delivered adequate immunization service but frequently interrupted because of vaccine stock out. The health workers who are not trained in immunization practice do not have adequate knowledge on the implementation of multi dose vial policy, key immunization message for care givers and cause and investigation and reporting of adverse event following immunization which compromise the immunization service provision. Moreover, there is significant association of training and knowledge of health workers in immunization practice. The study concludes all private hospitals provides adequate immunization service in terms of number of session but the quality of the service is compromised because of lack of knowledge and frequent stock out of vaccines. The factors affecting the immunization service at process level are lack of training in immunization for health worker, frequent stock out of vaccines, poor quality and lack of cold chain equipment for storage and transportation of vaccines, in

appropriate use phase changing ice pack, absence of vaccine wastage practice, and vaccine shortage from central government storage sites.

5.3 Recommendation

Private hospitals should developed annual plan and microplanning with estimated budget to improve the immunization service provision. The availability of annual plan is imperative for quality improvement and continuous availability of immunization service. Assigned health worker should be trained in immunization and private hospitals should facilitate training for health workers who are not trained on immunization to render quality service. The knowledge and practice of immunization service is determined by knowledge of health work in immunization service delivery. The finding also shows that knowledge in immunization practice is associated with training. Hence, regular training should be facilitated for health worker in private hospitals. Therefore, government in collaboration with private hospitals should identify new graduates and health workers who are not trained in immunization and provides regular training.

Based on the study finding, the quality of cold chain used during vaccine storage and transportation is critical component to maintain quality of vaccines. Hence, all health facilities should use cold chain equipment which passes World Health Organization performance, quality and safety standards. Moreover, health facilities should use cold box for transporting vaccines and vaccine carrier with foam pad and avoid using phase chaining ice packs other than water ice packs to maintain quality of vaccines. The use of continuous temperature monitoring device is critical to ensure vaccine quality and minimize wastage.

The availability of vaccines is imperative to continuous immunization service. Therefore, private hospitals should develop annual and monthly demand forecast to minimize frequent stock out of vaccines and interruption of vaccines. In addition, regular vaccine wastage monitoring enable health facilities to minimize wastage, stock out through increasing accuracy of demand forecasting. The government should regularly monitor the immunization service provision in

private hospitals and enforce appropriate measures to ensure quality of the service. The quality of immunization is also determined by regular identification, investigation and reporting of adverse event following immunization. Therefore the government should establish and enforce reporting of suspected AEFI cases. It is highly recommended to conduct regular supportive supervision and on job training for health workers to improve health worker knowledge.

The final recommendation is to undertake further studies in immunization practice in private health facilities located in all over the country to set appropriate recommendation and to take intervention measures by the government and private sector to strengthening public-private partnership.

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Appendix A

In-depth Interview Questionnaire on Factors Affecting Routine immunization Service in 20 private hospitals located in Addis Ababa, Ethiopia

Saint Mary's University, Business Administration Department

Introduction

The immunization program annually saves millions of children from death at global level. It is also considered the cost effective strategies in controlling and prevention of vaccine preventable diseases. The government of Ethiopia has been implementing the strategy since 1980. The immunization program contributes in reducing under five child mortality enable the country to achieve the millennium development goal-4.

The immunization program success achieve when the coverage of vaccinated children in a country reaches 95% and above to increase population immunity. In Ethiopia, out of the expected under-five deaths per year, vaccine preventable diseases account for a substantial portion of under-five mortality. Pneumonia, Diarrheal disease and Measles are among the leading causes of under-five mortality. However due to routine and campaigns based measles vaccination, there has been a significant reduction in the number of under-five deaths due to measles.

Immunization service provision has shown gradual increase since 2004 reaching 88% administrative coverage of Penta 3 in 2013. Yet for the last five years the national administrative coverage has been observed stagnant. The service provision and the immunization coverage in hard to reach and remote areas is low.

The immunization service delivered both in public and private health institution. The immunization service requires trained health worker, cold chain equipment, safe and potent vaccine and supplies, and independent room to deliver the service effectively. However

delivering immunization service in private hospitals incurs finance and other resources, the government declares it is free of any payment. The immunization service delivery in private hospitals should regularly monitor and supervised to quality service delivery. Hence assessing the challenge in delivering immunization in private sector will help to put recommendation and take intervention measures.

The assessment of routine immunization service delivery practice by government health facilities at regional, zonal and woreda conducted in number of times to investigate the quality, performance and challenges of in the program for appropriate intervention. The challenges in the public health facilities are frequent interruption of routine immunization, low coverage and high dropout rate, stock out of vaccines, lack of transport, and absence of reliable cold chain system, temperature monitoring practice and data management.

The immunization program is cost effective strategy to prevent and control vaccine preventable disease. Globally vaccination saves millions under one children life annually. The immunization service in private hospitals is increasing from recently. Hence, knowing the immunization service practice is critical to identify gaps in quality and performance of facilities for appropriate measures. In addition, there is no assessment conduct specific to this study objective. Therefore, it is useful for policy makers and providers to strengthen the service provision and public private partnership. The study contributes in putting appropriate recommendation to strengthen the contribution of the private sector as part of public private partnership.

Objective of the Study

The study attempts to achieve the following specific objectives.

1. To investigate the proper implementation of recommendation by private hospitals
2. To identify factors affecting immunization service delivery practice in private hospitals
3. To investigate frequency, reliability and adequacy of immunization service in private hospitals

4. To assess association of in-service training on immunization and knowledge of health worker in immunization
5. To assess knowledge of health workers in immunization service delivery

Questionnaire

Dear Respondents,

I would like to express my pleasure and gratitude for your willingness and corporation to take part of the study. The study is intended for partial fulfilment of Masters of Business Administration at Saint Mary's University Department of Business Administration. The questionnaire is designed to identify factors affecting routine immunization service in private hospitals. It helps to identify major affecting factors for routine immunization service in private hospitals which enable government and partners to support in identified areas to strengths the service. The questionnaire organized in three parts; one part general information, part two input level questions in immunization service and part three process level questions.

I would like to confirm you that, the result of the questionnaire is confidential. Please do not include your name in the questionnaire.

Part I. General Information

Date of visit ____/____/____
Sex_____
Educational Background_____ Year of Experience in EPI_____
Position & Responsibility_____
Name of the Region: _____ Sub city: _____ Woreda: _____
Type of the Facility (Hospital) _____
Name of the Facility: _____
Total catchment population: _____
Number of HWs working on EPI _____
Number of HWs trained on EPI_____

Part II: Inputs required for Immunization Service

		Yes	
	Does the HC provide routine immunization service?	No	
	Is the facility has allocated annual budget for routine immunization service? If yes check annual plan and budget.	Yes	
		No	
	Designated EPI focal person available? If yes, how many in number_____	Yes	
		Yes	

	<p>Is the focal person trained on immunization in practice or EPI program?</p> <p>If yes when does he/she took the training _____</p> <p>Before one year <input type="checkbox"/> Before two years <input type="checkbox"/> Before three years <input type="checkbox"/></p>	No	
	<p>Is there waiting area during vaccination sessions for mother and child?</p>	Yes	
	<p>Are there soap and/ or disinfectant for washing hands?</p>	No	
	<p>Is there chair and table for health worker and caretaker?</p>	Yes	
	<p>Is the facility face challenge in vaccine collection?</p> <p>If yes Specify the challenges in vaccine collection _____</p>	Yes	
	<p>Is the facility has WHO PQS approved refrigerator?</p>	No	
	<p>If yes, is it adequate enough for the facility?</p>	Yes	
	<p>Is the facility has continuous temperature monitoring device?</p>	No	
		Yes	

	Is the facility has cold box for transportation and collection of vaccines	No	
	Is the facility has vaccine carrier to conduct Routine immunization session?	Yes	
		No	
	Is the vaccine carrier has foam pad for vaccine handling during immunization session?	Yes	
		No	
	Is the facility use phase changing material ice packs other than water packs?	Yes	
		No	
	Is the responsible person on vaccine and cold chain management knows advantage and disadvantage of phase changing chemicals and water ice packs?	Yes	
		No	

Availability of vaccines and supplies on the day of the visit

	Vaccine and supplies	Available on the day of the visits (yes /no)	Out of stock in the last three month?-if yes write number of days	Enough for a month (yes /No)	Note impotent vaccines (expired, VVM >=discarding point, vaccines that needs to be discarded after 6 hours MDVP not properly applied and other remark
	AD Syringe (0.05ml)				
	AD Syringe (0.5ml)				
	Syringe (2ml)				
	Syringe (5ml)				
	Safety Boxes				
	BCG				
	OPV				
	DTP-HepB+ Hib				
	PCV				

	Rota				
	Measles				
	TT				
	IPV				
	Monitoring chart				
	Vaccination card				
	Registers				
	Tally sheets				

Part III: Process level questions for delivering immunization service

	Is there static immunization session in the facility?	Yes	
		No	
	Are frequencies of static sessions adequate? If yes, # of static sessions per week and month_____	Yes	
		No	
	Has the planned immunization schedule been interrupted in the last 3 months? If yes, how many sessions were missed _____ Write reasons for interruption_____	Yes	
		No	
Planning for Routine Immunization			
	Dose the facility has annual work plan and updated quarterly Micro-Planning for routine immunization? If yes take picture.	Yes	
		No	

	Dose the facility has Map of the area with EPI sites?	Yes	
	If yes take picture of map.	No	
	Dose the facility has Micro plan and posted Session plan available?	Yes	
	If yes take pictures.	No	
Inter Personal Communication			
	Dose the health officer in charge knows five key immunization messages for care givers during and after vaccination?	Yes	
	If yes ask him to specify the five key messages.	No	
Vaccine and Cold chain Management			
	Dose the facility forecasted annual and monthly vaccine and injection supply needs correctly?	Yes	
		No	
	Dose the facility has plan preventive refrigerator maintenance?	Yes	
		No	
	Dose the facility encountered breakdown of the refrigerator in the last 3 months? If yes specify number of days_____	Yes	
		No	
	Dose the facility has contingency plan for power /supply failures displayed?	Yes	
		No	
	Dose the personnel record temperature twice daily for seven days?	Yes	
		No	
	Did personnel in charge take appropriate action for temperature excursion in the last month?	Yes	
		No	
	Did personnel in charge load vaccines correctly in refrigerator?	Yes	
		No	
	Is the EPI officer use foam pad properly during immunization sessions?	Yes	
		No	
	Dose the personnel in charge of vaccine management practice bundling properly?	Yes	
		No	
	Dose the facility monitor vaccine wastage?	Yes	

		No	
Knowledge and Practice in immunization program			
	Observe the health officer is avoiding recapping needles?	Yes	
		No	
	Did the health officer dispose of syringe safely in to safety box?	Yes	
		No	
	Dose the facility dispose of injection waste correctly?	Yes	
		No	
	Dose the health officer make correct decision on contra-indications of vaccination? Ask to specify some of the contraindications for immunizations.	Yes	
		No	
	Is multi-dose vial policy correctly implemented? If yes check vaccine stored in the refrigerators and observe. Take a picture if appropriate.	Yes	
		No	
	Do they use safety box appropriately (Filled 2/3 or less than 2/3 etc.)?	Yes	
		No	
	Does the health officer know causes of AEFI?	Yes	
		No	
	Does the health officer know an AEFI that needs to be investigated?	Yes	
		No	
	Did the health officer see AEFI case in the past three month?	Yes	
		No	
	Dose the facility reported AEFI which occur in the past three month?	Yes	
		No	

Thank you very much indeed

Appendix B

Regression Analyses: Health Worker Training on over all knowledge of health workers in the five key immunization messages for care givers

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.736 ^a	.541	.484	.714

a. Predictors: (Constant), HW Trained in immunization

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4.817	1	4.817	9.437	.015 ^b
	Residual	4.083	8	.510		
	Total	8.900	9			

a. Dependent Variable: Knowledge of HW on Five key immunization message for care givers

b. Predictors: (Constant), HW Trained in immunization

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.917	.684		1.340	.217
	HW Trained in immunization	1.417	.461	.736	3.072	.015

a. Dependent Variable: Knowledge of HW on Five key immunization message for care givers

Regression Analyses: Time of Health Worker trained in immunization on over all knowledge of health workers in Cause, investigation and reporting of AEFI

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.900 ^a	.811	.787	.238

a. Predictors: (Constant), When does the HW trained in immunization

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1.946	1	1.946	34.286	.000 ^b
	Residual	.454	8	.057		
	Total	2.400	9			

a. Dependent Variable: HW Knowledge on cause, investigation, reporting, of AEFI

b. Predictors: (Constant), When does the HW trained in immunization

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		

	(Constant)	.789	.158		5.006	.001
1	When dose the HW trained in immunization	.324	.055	.900	5.855	.000

a. Dependent Variable: HW Knowledge on cause, investigation, reporting of AEFI

Regression Analyses: Health Worker trained in immunization on over all knowledge of health workers in Cause, investigation and reporting of AEFI

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.667 ^a	.444	.375	.408

a. Predictors: (Constant), HW Trained in immunization

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1.067	1	1.067	6.400	.035 ^b
	Residual	1.333	8	.167		
	Total	2.400	9			

a. Dependent Variable: HW Knowledge on cause, investigation, reporting of AEFI

b. Predictors: (Constant), HW Trained in immunization

Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		

1	(Constant)	.667	.391		1.706	.126
	HW Trained in immunization	.667	.264	.667	2.530	.035

a. Dependent Variable: HW Knowledge on cause, investigation, reporting of AEFI