

**FACTORS INFLUENCING ACCESS AND
UTILIZATION OF PREVENTION OF MOTHER TO
CHILD TRANSMISSION (PMTCT) OF HIV
SERVICES IN SUDAN**

Almutaz K.M. Idris

Sudan

48th International Course in Health Development
September 19, 2011 - September 7, 2012

KIT (ROYAL TROPICAL INSTITUTE)
Development Policy and Practice/
Vrije Universiteit Amsterdam

"FACTORS INFLUENCING ACCESS AND UTILIZATION OF PREVENTION OF MOTHER TO CHILD TRANSMISSION (PMTCT) OF HIV SERVICES IN SUDAN"

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

By

Almutaz K.M. Idris

Sudan

Declaration:

Where other people's work has been used (either from a printed source, internet or any other source) this has been carefully acknowledged and referenced in accordance with departmental requirements.

The thesis "**Factors Influencing Access and Utilization of the Prevention of Mother to Child Transmission (PMTCT) of HIV Services in Sudan**" is my own work.

Signature:



48th International Course in Health Development (ICHHD)
September 19, 2011 - September 7, 2012
KIT (Royal Tropical Institute)/ Vrije Universiteit Amsterdam,
Amsterdam, The Netherlands

September 2012

Organised by:

KIT (Royal Tropical Institute), Development Policy & Practice
Amsterdam, The Netherlands

In co-operation with:

Vrije Universiteit Amsterdam/Free University of Amsterdam (VU)
Amsterdam, The Netherlands

TABLE OF CONTENTS

List of Tables	iv
List of Figures	iv
Abbreviations	v
Glossary	vi
Dedication:	vii
Acknowledgments	viii
ABSTRACT	ix
INTRODUCTION	x
1.1. Population characteristics	1
1.1.1 Demographic information	1
1.1.2 Education and literacy levels.....	1
1.1.3 Cultural and Religion	1
1.2 Economy	1
1.3 The Political Situation.....	1
1.4 Health care system	2
1.4.1 Governance of the health system	2
1.4.2 Health services delivery	2
1.4.3 Human resources for Health delivery	2
1.4.4 Finance of the Health Services	3
1.4.5 Major health problems	3
1.5 Epidemic and dynamic of HIV and AIDS in Sudan	5
1.5.1 HIV Epidemic status	5
1.5.2 Drivers of the HIV Epidemic in Sudan	6
1.5.3 National AIDS response	6
Chapter 2: Problem statement, Justification, Objectives, and methodology	7
2.1 Problem statement	7
2.2 Justifications	8
2.3 Study objectives.....	8
2.3.1 Overall Objective.....	8
2.3.2 Specific Objectives	9
2.3.3 Study questions that need to be answered by the review	9
2.4 Methodology	9
2.4.1 Methods.....	9

2.4.2 Search strategy:	10
2.4.3 Limitations	10
2.5 Study Conceptual Framework.....	11
2.5.1 Anderson framework for health seeking behaviour.....	11
2.5.2 The Modified framework.....	11
Chapter 3: Environmental and predisposing factors	14
3.1 Environmental factors	14
3.1.1 National PMTCT Policy	14
3.1.2 National PMTCT Strategic plan	14
3.1.3 National PMTCT Guidelines	15
3.1.4 PMTCT services human resources.....	16
3.1.5 PMTCT services financial Resources	16
3.1.6 Supplies of the PMTCT services	17
3.1.7 HIV related Stigma and discrimination in health facilities.....	17
3.1.8 PMTCT sites infrastructure.....	18
3.1.9 PMTCT services quality	18
3.1.10 Legal Issues	19
3.2 Predisposing factors.....	20
3.2.1 Age of the pregnant women	20
3.2.2 Education level of the pregnant women.....	21
3.2.3 Urban/Rural place of residence of the pregnant women.....	21
3.2.4 Gender Inequality and decision the pregnant women health ...	22
3.2.5 Pregnant women's knowledge and attitude towards PMTCT services.....	22
3.2.6 HIV-related Stigma at an individual level.....	23
3.2.7 Pregnant women belonging to groups at higher risk of HIV infection	24
Chapter 4: Enabling and needs factors	25
4.1 Enabling factors	25
4.1.1 Availability and accessibility of PMTCT Services	25
4.1.2 Affordability of PMTCT Services	25
4.1.3 Acceptability of PMTCT services.....	26
4.1.4 Accommodation of the PMTCT services.....	26
4.1.5 HIV related stigma and discrimination at family/community.... level	26
4.2 Needs Factors	27

4.2.1 Perceived benefit of PMTCT services by the pregnant women ..	27
Chapter 5: Best practice in PMTCT	29
5.1 Kenya: Community base approach.....	29
5.2. Malawi: Provider initiation testing and counselling	29
Chapter 6: Discussion of the findings	31
6.1 Discussion	31
Chapter 7: Conclusion and Recommendations	35
7.1 Conclusion	35
7.2. Recommendations	36
References	38
Annexes.....	46
Annex A: HIV positive cases in Northern Sudan by centres in 2010	46
Annex B: Core Indicators of PMTCT	47
Annex C: Political map of Sudan	48

LIST OF TABLES

Table 1: Sudan Millennium Development Goals (MDGS) 1,3,4,5	4
Table 2: PMTCT services uptake between 2007-2010 in Sudan.....	7
Table 3: Sudan core indicators for PMTCT in 2012	47

LIST OF FIGURES

Figure 1: HIV prevalence in Sudan (15-49 year) up to 2015	5
Figure 2: The modified framework	13
Figure 3: HIV positive pregnant women per PMTCT sites 2010	46

ABBREVIATIONS

AIDS	Acquired Immune Deficiency Syndrome
ANC	Antenatal Care
ART	Antiretroviral Therapy
CHGA	Commission on HIV and AIDS and Governance in Africa
CPA	Comprehensive Peace Agreement
GDP	Gross Domestic Product
HAI	Health Alliance International
HCP	Health Care Provider
HIV	Human Immunodeficiency Virus
HMIS	Health Management Information System
HTC	HIV testing and counselling
HTC	HIV testing and counselling
IEC	Information, Education and Communication
FMoH	Federal Ministry of Health
FSWs	Female Sex Workers
KIT	Royal Tropical Institute
MDGs	Millennium Development Goals
MENA	Middle East North Africa
MoJ	Ministry of Justice
MSM	Men Who Have Sex with Men
MTCT	Mother To Child Transmission of HIV
SNAC	Sudan National HIV and AIDS Council
NGO	Non- governmental Organization
SNPC/GS	Sudan National Population council General Secretariat
PITIC	Provider Initiating Testing and Counselling
PLIHIV	People Living With HIV
PMTCT	Prevention of Mother-to-Child Transmission
PR	Principal recipient
SCBS	Sudan Central Bureau of Statistics
SHHS	Sudan Health Household Survey
SFOH	Sudan Federal Ministry of Health
SNRHP	Sudan National Reproductive Health program
SNAP	Sudan National AIDS Control Programme
SP	Sub recipient
UNAIDS	Joint United Nation Program on HIV and AIDS
UNFPA	United Nations Population Fund
UNDP	United Nations Development Programme
UNICEF:	United Nations International Children's Emergency Fund
UNGASS	United Nation General Assembly Special Session
USAID	United State Agency for International Development
WHO	World Health organization
VCT	Voluntary Counselling and Testing
VU	Vrije University

GLOSSARY

Access: There is many definition of access to health service but for this thesis, the author use the definition made by Andersen Ronald (1995) which says potential access is presence of the enablers and preventers factors i.e. environmental, enabling, predisposing and need factors.

Utilization: It refers to the actual use of the services or percentage of the people making use of the service in given time (Andersen, 1995; Berg, 2011).

Geographical accessibility: The physical space or journey time to reach the services delivery site from the clients location .i.e. urban/ rural, transport cost and the way of transport (Jacobs *et at*, 2011; Berg, 2011).

Availability: Service available to the client when he need the service, in term of the number of trained Health care provider, consumables, referral system, waiting time meet the need of the clients, information of health service (Peters *et al*, 2008; Berg, 2011; Jacobs *et al*, 2011).

Affordability: Ability of the client to pay the cost of service such as resources of the client and agreeable to pay for both direct and indirect service price (Berg 2011; Peters *et al*, 2008; Jacobs *et at*, 2011).

Acceptability: The services meet the expectations of the users in term of cultural and norms preference, skills of the staff, stigma, gender aspect, perceived cost of the services and poor health awareness (Berg, Y., 2011; Peters *et al*, 2008; Jacobs *et at*, 2011).

Accommodation: refers to institution issues such as suitable opening time, arrangements system, and an earlier appointment for the service instruction (Berg, Y., 2011).

Sudan: Refer to North Sudan, see annex 4.

Southern Sudan: Refer to South part of Sudan which is became independent country in July 2011 see annex 4.

DEDICATION:

I dedicate this work to my family, all Royal Tropical Institute staff and all my colleagues in 48th International Course in Health Development (ICHD) 2011-2012, who supported me during the course.

ACKNOWLEDGMENTS

Firstly I like to recognize and give thanks to the Netherland Fellowship program for sponsoring and giving me the opportunity to study in the Royal Tropical Institute (KIT) Amsterdam.

Special acknowledgements to Dr Prisca Zwanikken, the course director, the course coordinators and all KIT staff for their support and guidance throughout the course period. Also, my thanks extend to Rinia the course secretary.

My gratitude also goes to my supervisor and back stopper for their technical support given throughout the course of writing this thesis.

Also, my thanks extend to my colleagues in ICHD course from whom I learned a lot of things.

I like to thank all my family and friend in my country.

ABSTRACT

Background: Access and utilization of Prevention of Mother to child transmission services by the pregnant women in Sudan is very low.

Objective: To explore and analyze the factors that influence access and utilization of PMTCT services by pregnant women (including those in high risk groups) in Sudan.

Method: The Andersen model of health seeking behaviour was adopted and used as a guide for the literature review.

Findings: Socio-cultural factors and health care system factors are more likely to influence the access and use of the PMTCT services. Pregnant women who were younger, lowly educated, living in rural areas and suffering from gender inequalities are less likely to access and use PMTCT services. Furthermore, staff shortage, lack of supplies, lack of confidentiality, limited information, HIV-related stigma and gaps identified in current national PMTCT policy are likely associated with low access and use of the PMTCT services.

Conclusion and Recommendations: Socio-cultural and health system factors are important barriers to access and utilization of PMTCT services in Sudan. It requires raising community awareness about PMTCT, HIV and AIDS. Further research to identify factors influencing access and use of PMTCT services in Sudan should be carried out. Also, there is a need to integrate PMTCT services into existing sexual reproductive health services, particularly in high HIV prevalence areas. Finally, broadening the focus of PMTCT services to provide the full range of comprehensive PMTCT approach with supportive policy in place will be beneficial.

Key word: Access, utilization, PMTCT, HIV, AIDS.

Word count 11,634

INTRODUCTION

Although, the Sudan National AIDS Control Program (SNAP) started PMTCT services in 2007, but till now it is failing to bring the pregnant women need the PMTCT service on board. Also, it is lagging behind in fulfilling the target put by United Nation General Assembly in 2001 to decrease the percentage of HIV infection among infants to 50% by 2010 through providing HIV related intervention to 80% of the pregnant women and their children (WHO, 2010).

Furthermore, I became interested in the PMTCT services in Sudan through the following process: after I graduated from the Faculty of Medicine, University of Gezira in 2000, I worked for the Federal Ministry of Health first as a house officer then as a General Practitioner until 2007. This enabled me to work in different hospitals in different states. After that, I started work as public health officer for the both Sudan National AIDS Control Program (SNAP) and the National Reproductive Program Health Program (NRHP). This is made me come across the challenges and barriers facing the PMTCT services in Sudan.

Through this time, I also conducted a cross sectional study on the socio-demographic factors affecting the acceptance of HIV testing among the pregnant women attending antenatal care, and a case control study on the predictors of HIV positivity among pregnant women.

The knowledge and experience that I learned at the Royal Tropical Institute (KIT) encouraged me to study the factors that influence access and utilization of PMTCT services in Sudan. The recommendation of this study will be shared with SNAP, colleagues and related stakeholders, in order to improve the access and utilization of PMTCT services in Sudan.

CHAPTER I: BACKGROUND INFORMATION ON SUDAN

1.1. Population characteristics

1.1.1 Demographic information

Population of Sudan is estimated at 31.8 million and distributed over 1.4 million square kilometres (SCBS, 2008) with a crude birth rate of 29.2% births per thousand people and growth rate of 2.82% per year (SCBS, 2008). The population aged between 15 to 49 years consists about 47% of the community. Almost 59% of total inhabitants live in rural areas. (SCBS, 2008; SCBS, 2009).

1.1.2 Education and literacy levels

Sudan's National census report of 2008 shows that the literacy rate in Sudan is 57.2% among the population age more than 15 years. Furthermore, there is gender inequality with higher literacy levels in males than females of the same age; 63.3% and 51% respectively (SCBS, 2008; SCBS, 2009).

1.1.3 Cultural and Religion

Sudan's population consist of more than one hundred tribes that speak different languages, thereby giving diversity in cultures, norms and language. The main religion in Sudan is Islam (SFMoH, 2007a).

1.2 Economy

Sudan is a low middle income country (World bank, 2012) and according to the human development index ranking, Sudan ranks 169 among 184 countries (UNDP, 2011). Sudan's economy depends mainly on agriculture and oil production (SFMoH, 2007a). However, the development concentration in the urban areas compared to rural areas lead to movement of community from rural to urban area (SNPC/GS, 2010).

1.3 The Political Situation

Administratively, Sudan is divided into 15 states which consist of 144 localities (SFMoH, 2011a). The Federal and decentralized system has been practiced in Sudan since the mid-1950s and this has been continuously updated until 2003 with the Local Government Act giving more power to the localities (WHO, 2006; SFMoH, 2003; SFMoH, 2007a; Ali, A., 2008). Additionally, the civil conflicts in the country affect the delivery of health services (WHO, 2006; SFMoH, 2003; SPNC/ GS, 2010).

1.4 Health care system

1.4.1 Governance of the health system

The governance of the health system in Sudan consists of three levels including the federal level which deals with the developing of the national policies, plans, supervision of the lower levels. The state level, which consist of 15 states ministries responsible for developing policies, plans and supervising the locality level. The third level is the localities which, is based on district health system and is responsible for policies and plans implementation in term of delivering the health services. There is an imbalance of resource allocation between these three levels (SFMoH, 2003; SFMoH, 2007a).

1.4.2 Health services delivery

In Sudan, health services are delivered through three level: tertiary facilities located in capital cities of the states; secondary facilities or rural hospitals are the first referral point to the tertiary facilities; and primary health facility, which are the first level and the point of first contact with clients. In addition, health services are also provided through universities, civil societies, the private sector, the military and police (WHO, 2006; Elabassi, 2003; SFMoH, 2007a; SNAP, 2010a). There is limited data about access and utilization of the health services in Sudan. However, a study conducted in two cities (Khartoum and Gazira) showed 22% of patients seeking health care go to the private sector (SFMoH, 2011b). Furthermore, the geographical accessibility differs amongst the 15 states. For example, in the North Kordofan state about 32% of the community have access to health facilities compared to 47% in North Darfur state (SFMoH, 2011a).

1.4.3 Human resources for Health delivery

The number of the health care providers (HCP) in Sudan is estimated at 101,453 and characterized by skill mismatches. This is due to imbalances in recruitment, training and retention of HCPs. For example, the ratio of doctors to nurses was 4:1 in 2010 (SFMoH, 2012). As a result of that, allocated human resources for HIV response are very limited. This limitation forced SNAP to depend on part-time health staff and volunteers who have a low capacity to deliver the HIV related services to the target groups (SFMoH, 2011a).

1.4.4 Finance of the Health Services

The oil revenue in Sudan has resulted in the increase of government expenditure on health in the last years. The total government expenditure increased to reach 9% of the total government general expenditure or 2% of GDP allocated on health (SFMoH, 2011a). This is considered low when compared to the Abuja declaration on health expenditure (15%). While out of pocket consist about 66% of health expenditure (Sophie Witter, 2011; SFMoH, 2011a). Thus, user fees were introduced in the mid-1990s as health system financial support strategy in the country. In the same time, health insurance was also implemented to reduce the negative effects of user fees on access and use of the health services especially for the poor population (Mohamed, G., 2007; SFMoH, 2007a). However, the national Health Insurance fund covers only 33% of the population and contributes about 4% to the total health expenditure (SFMoH, 2011a).

1.4.5 Major health problems

In Sudan, both communicable and non communicable disease (double burden) shape the health problems which is driven by many factors such as population movement and ongoing conflicts in many parts of the country (SFMoH, 2007a). This contributes to the poor achievement in Millennium Development Goals (MDGs) indicators such as child health, maternal health, combating HIV and AIDS, malaria, and tuberculosis (SNPC/GS, 2010) (*see table1*).

Table 1: Sudan Millennium Development Goals (MDGS) 1,3,4,5

Goal	Indicators	1990	2004	Achievement		Target 2015
				Current level	Preference year	
Eradicate extreme poverty and hunger	The proportion of the population below the National poverty line	90%	N/D	46.5%	2009	23.2%
Promote gender equality and empower women	Ratio of girls to boys in primary, secondary and tertiary education	Primary	NAD	53.9 to 46.1%	2007	100%
		Secondary	NAD	51.6% to 49.4	2007	100%
		Tertiary	NAD	54.1 female	2008	100%
Reduce child mortality	Under five mortality rate	123(1990)	102(2006)	102	2008	41
Improve maternal health	Proportion of birth attended by skill health personnel	24%(1990)	NAD	57	2006	NAD
	Antenatal care coverage (At least one visit and at least four visits)	70%(2000)	NAD	74%	2010	NAD
Combat HIV and AIDS, malaria and others diseases	HIV prevalence among population aged 15-24 years	NAD	NAD	0.5% male & 1.24% female(north and south)		NAD
	Proportion of the population aged 15-24 years with comprehensive correct knowledge of HIV and AIDS	NAD	NAD	4%	2006	NAD
	Incidence and death rates associated with malaria	7.5 million 35,000(2001)	NAD	3.1 million reported cases 8,844 death cases	2009	NAD

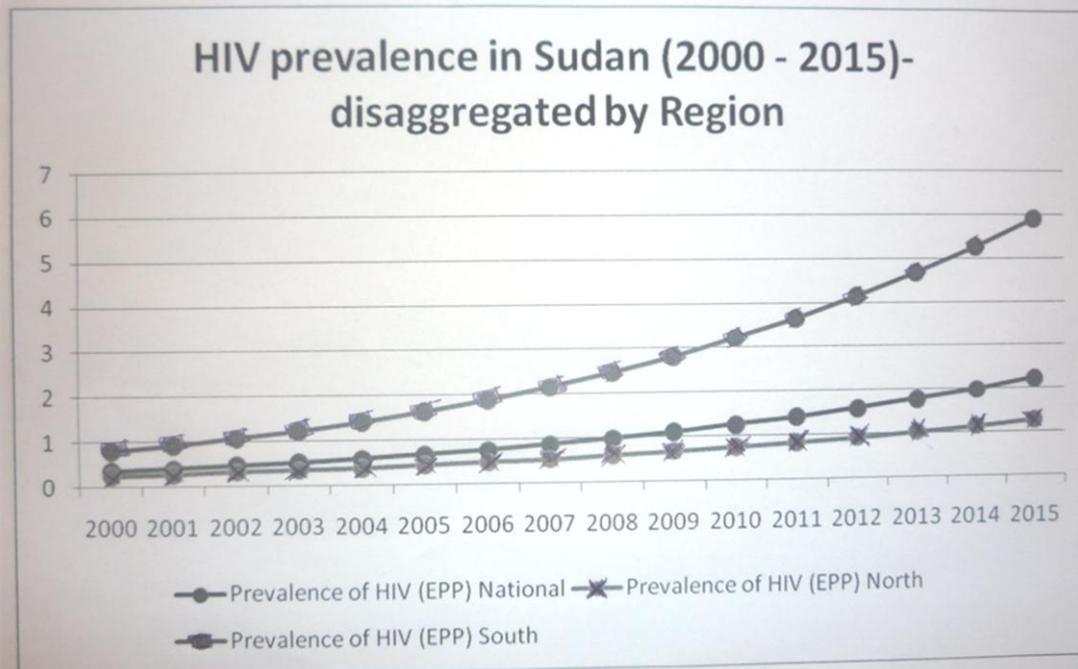
Source: NCP/GS (2010), UNDP (2004), SCBS (2006) and SCBS (2010)

1.5 Epidemic and dynamic of HIV and AIDS in Sudan

1.5.1 HIV Epidemic status

In Sudan, the first case of HIV was detected in 1986. Since that time, HIV infection rates have increased gradually to reach a state of generalized epidemic in the country in 2002 (SNAP, 2002). This is based on results of a national behavioural epidemiological survey conducted in 2002. This survey showed that HIV prevalence among the general population was 1.6%. Furthermore, the HIV prevalence in pregnant women was 1% and among sex workers, 4% (SNAP, 2002). Following that, studies conducted in the HIV infection in Sudan gathered considerable information about the disease. Then, in 2009 a projection modelling exercise was carried out informed by the information made available from these studies. It showed that the overall HIV prevalence in Sudan (north and south together) was 1.1% in 2009 and expected to rise to 2.2% by 2015. However, it is also, showed that HIV infection in north Sudan was low estimated at 0.67% in the general population. With higher HIV prevalence among the population at higher risk of HIV but the rates are below 5%, for example, prevalence among female sex workers (FSWs) was 3.16% and men practicing sex with men (MSM) was 3.64% (SNAP, 2010b, SNAP, 2012) **see Figure 1.**

Figure 1: HIV prevalence in Sudan (15-49 year) up to 2015



Source: SNAP (2010f).

1.5.2 Drivers of the HIV Epidemic in Sudan

Unsafe sex behaviour and inconsistent use of the condoms are driving the HIV epidemic in Sudan, which fuelled by high stigmatization of the HIV infection, the civil conflicts that the country experience population movements and gender inequality. Add to that, misconception about the HIV infection in the general population due to inadequate knowledge about transmission and prevention of HIV infection (SNAP, 2002; SCBS, 2006).

1.5.3 National AIDS response

In 1987, the Sudan National AIDS Control Program (SNAP), established to lead the HIV and AIDS response in Sudan (SNAP, 2004). Because of the little HIV related information, the response was initially small scale and limited to medical and public health responses (SNAP, 2004). Then, in 2002 a national behavioural, epidemiological survey conducted to gather information about HIV in the country. This survey covered 14 states distributed in both North (11 states) and South Sudan (three states) and estimated HIV prevalence at 1.6% in the general population and 1% among pregnant women (SNAP, 2004). Based on that information, multisectoral HIV and AIDS response developed in Sudan in "2003". It guided by the national HIV and AIDS policy and strategic plan towards managing the general HIV epidemic in the Country (SNAP, 2004). According to the results of evidence informed projection modelling in 2009 mentioned above which required adjusting the national HIV responses in Sudan. The national HIV and AIDS strategic plan revised and updated in line with these evidences. However, the national HIV policy was still addressing response to generalized HIV epidemic in the country (SNAP, 2010a).

CHAPTER 2: PROBLEM STATEMENT, JUSTIFICATION, OBJECTIVES, AND METHODOLOGY

2.1 Problem statement

In Sudan, the national AIDS control program (SNAP) started the PMTCT services in 2005, as a pilot project in four different states; three centers in the north and one in the south of the Sudan which, stopped after six months. However, after the comprehensive peace agreement (CPA) between the southern and northern parts of the Sudan in 2005, the health system of the two parts starts to run by different bodies. The SNAP in 2007 started the PMTCT program in seven centers located inside busy maternal facilities. Then it was scaled to reach 70 centers in 2011 in Sudan (SNAP, 2012; SNAP, 2008). The increase in number of the PMTCT sites, in Sudan leads to increase the number of the pregnant women counselled and test. However, there is a difference between the mothers received HIV counselling and who uptake the HIV test See table 2 and annex 2.

Table 2: PMTCT services uptake between 2007-2010 in Sudan

Years	Number of PMTCT centers	Number of pregnant women counselled about HIV	Number of pregnant women tested for HIV	Number of pregnant women tested HIV positive
2007	7	2560	1,608	8
2008	20	30,429	7,515	59
2009	27	75,634	17,320	67
2010	29	85,495	20,729	110
2011	70	ND	28,551	ND

Source: SNAP(2012); SNAP,(2010b); SNAP, (2010c)

The utilization of the PMTCT services still low in Sudan. For example, in 2011 only 1.46% (76) received antiretroviral therapy to reduce HIV infection transmission from mother to her baby, out of 5095 HIV positive pregnant women need the PMTCT services in Sudan in the same year (SNAP, 2012) *see annex 3*.

In Sudan, the expected number of pregnancies is 929 thousand per year out of them about 689 thousand pregnant women attend antenatal services and less than 10% received HIV related counselling (85,495) in 2010 (SNAP, 2010d; SCBS, 2008). This shows that the current PMTCT services fail to serve the needs of pregnant women in the country.

Add, to that PMTCT services provided in 70 sites and there is no referral system in place with other antenatal health facilities whether public or private (SNAP, 2010a; SNRHP, 2011; SCBS, 2010).

In the new HIV epidemiological information in Sudan mentioned earlier, the pregnant female sex workers (FAWs) and pregnant wives of men practicing sex with men (MSM) become necessary clients for PMTCT services in Sudan. For instance, the HIV prevalence among the female sex workers and MSMs are 3.16% and 3.64% respectively (SNSP, 2010a; SNAP, 2012). However, there is no information about HIV prevalence and magnitude of the pregnant female sex worker and wives of MSMs as well as no available information about whether they are access and use the PMTCT services or not in Sudan to locate.

In general, many factors can prevent pregnant women from utilizing PMTCT services which, can be within the community or in the health system. For example, Bwirire and his colleagues, (2008) suggested that barriers of PMTCT services access and utilization were pregnant women being not ready for HIV testing, fear of stigma and discrimination, implication of the HIV test results, husbands not approve testing, and high opportunity costs for follow-up visits.

2.2 Justifications

According to the problem analysis provided above, the PMTCT services in Sudan not provided in all the ANC facilities with no referral structure which leave behind the majority of pregnant women in need of PMTCT services . Understanding, the possible factors that facilitate or prevent the pregnant to access and utilized the PMTCT services are needed; to develop strategies and plans to improve access and utilization of the PMTCT services and inform the expansion of the PMTCT services in Sudan. In addition, to that, there is no review study conducted on these factors apart from two studies on factors affecting acceptance of HIV testing among pregnant women. Provided above are justify the needs for this study to explore and analyze these factors affecting access and utilization of PMTCT services in Sudan.

2.3 Study objectives

2.3.1 Overall Objective

The study focuses on exploring and analyzing the factors influencing the access and utilization of the PMTCT services by pregnant women including those in high risk groups in Sudan, to identify ways to improve access and utilization of PMTCT services for those women.

2.3.2 Specific Objectives

1. To identify the socio-cultural factors affecting access and utilization of the PMTCT services in Sudan including the pregnant women belongs to groups at higher risk of HIV infection
2. To describe the health care system factors affecting the access and utilization of PMTCT services including policy and legal factors
3. To determine the individual factors affecting access and utilization of the PMTCT services in Sudan including the pregnant women belongs to groups at higher risk of HIV infection
4. To analyze the best practices from other countries in PMTCT interventions and how they could be used in Sudan
5. To translate the findings into recommendations to improve the PMTCT services to the Sudan National AIDS program, my colleagues and related organizations and donors

2.3.3 Study questions that need to be answered by the review

1. What are the socio- cultural factors that affecting access and utilization of the PMTCT services by the pregnant women who need the PMTCT service in Sudan?
2. What are the environmental factors in Sudan including health system care and legal aspects?
3. What are the personal factors affecting the access and utilization of the PMTCT services by the pregnant women need the PMTCT service in Sudan?
4. Are there any best practices from other countries for PMTCT can be used in Sudan?
5. What are the options to improve PMTCT services to be accessible by the pregnant women in Sudan?

2.4 Methodology

2.4.1 Methods

Literature review guided by modified model was adopted for The Andersen model of health seeking behaviour.

Inclusion criteria:

- Studies focusing on factors affecting access and utilization of PMTCT services by the pregnant women
- Studies conducted between 2000 and 2012, but some relevant studies before that time were included to enrich the study.
- Documents and reports relevant to the PMTCT services

Exclusion criteria

- Studies that focus on infants feeding
- Studies on PMTCT not focused on access and utilization of PMTCT services by the pregnant women

2.4.2 Search strategy:

A wide rang search done using Google and Google scholar to find studies related to the factors influencing access and utilization of the PMTCT services "in public health websites". These websites included: PubMed, KIT, WHO, UNAIDS, UNICEF, World Bank, Health Alliance International, Sudan National AIDS Control program and Sudan Federal Ministry of Health. In addition, manual searching for books, unpublished articles and reports related PMTCT services in Sudan.

Key words used to search were Sudan, HIV and AIDS, PMTCT, pregnant women, utilization, access, barriers, stigma and discrimination, policies, strategies, gender and acceptability. KIT and VU facilities are used for internet searching.

2.4.3 Limitations

- Limited information about access and utilization of the health service in Sudan in general and particularly for PMTCT services in Sudan
- Few studies conducted in the PMTCT services context in Sudan.
- Available information about PMTCT in Sudan characterised by poor quality and incomplete data.

2.5 Study Conceptual Framework

The study followed an analytical framework, modified from Andersen's health services utilization model phase four. To explore the factors influencing access and utilization of PMTCT services in Sudan.

2.5.1 Anderson framework for health seeking behaviour

In 1960, the Anderson framework for health service utilization developed to provide measures of access and utilization of the medical care. The framework aims to study the interaction between the external environmental, predisposing, enabling and need factors in the access and utilization of the health services; besides, health outcome. It includes the following: firstly, predisposing factors including the socio-cultural features of individuals that present before illness such as demographic, education, gender, age, occupation, ethnicity, social networks, social interactions, and cultural health beliefs.

Secondly, enabling factors include the ability to pay for the services, knowledge of the services, and availability of the health services. Thirdly, the need factors include perceived and evaluated needs. Fourthly, the environmental factors represent the context within which the utilization occurs and it includes health care system and external environment. Fifth, health behaviour includes personal health practice and use of the health service. Finally, the health outcome includes health status improvement and satisfaction of the client by the service provided (Andersen Ronald, 1995; Andersen and Newman, 2005).

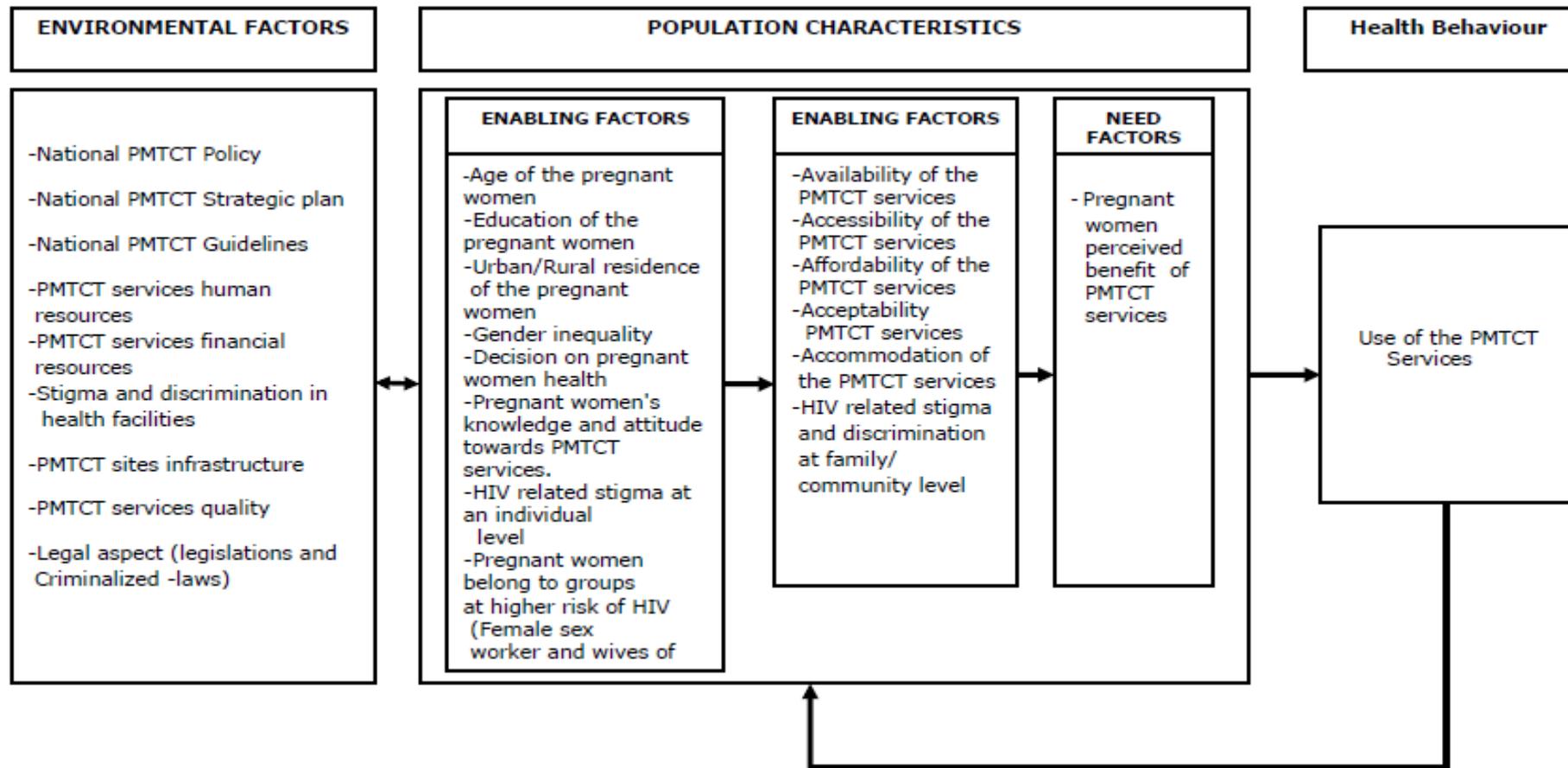
2.5.2 The Modified framework

The author modified the Anderson's health services utilization model. To explore the factors, affecting the access and utilization of the PMTCT services by the pregnant women in Sudan. This modified model includes the following: a) Predisposing factors; Age, education, urban/Rural residents of the pregnant women, gender inequality, decision on pregnant women health, knowledge & attitude towards PMTCT services-HIV related stigma at an individual level pregnant women belongs to population at higher risk of HIV (Female sex worker and wives of MSM). The ethnicity and social interaction, occupation, and the social support left out as they can be explained by the others component.

b) Enabling factors: availability, accessibility, affordability, acceptability, accommodation, and stigma and discrimination at community level. c) Need factors: the author takes the perceived need for PMTCT service and left the evaluated need. Which is about Health Care Providers (HCPs) evaluation of the client need for health. Which explained by the health system factors.

d) Environmental factors include: PMTCT Policies, strategies, guidelines, human and financial resources, PMTCT Supplies, stigma and discrimination in health care settings, PMTCT sites infrastructure, quality of the PMTCT services and legal aspects (legislation and Criminalized laws).

Figure 2: The modified framework



Adapted from: Andersen Ronald (1995)

CHAPTER 3: ENVIRONMENTAL AND PREDISPOSING FACTORS

In this chapter based on the modified framework the author presents the findings of the environmental and predisposing factors.

3.1 Environmental factors

The environmental factors represent the context within which the access and utilization of the PMTCT services occurs.

3.1.1 National PMTCT Policy

The Sudan national HIV policy developed in 2004 based on a national epidemiological, behavioural survey conducted in 2002 as mentioned earlier. This survey results, pointed out Sudan had a generalised HIV epidemic; with HIV prevalence of 1.6% among the general population, 1% amongst pregnant women and the main route of transmission is heterosexual behaviour (SNAP, 2002; SNAP, 2004).

Accordingly, the National HIV policy addresses the PMTCT in Sudan as a priority area. To reduce HIV infection among infants through the following activities: prevention of HIV infection among women at child bearing age, prevention of unsought pregnancies among HIV positive women and prevention of PMTCT during prenatal, intrapartum and breast feeding period as well as making HIV test available for pregnant women (SNAP, 2004). However, the national HIV policy overlooks support to HIV positive mothers their family and their babies. As well as, PMTCT activities targeting pregnant women belong to population at higher risk of HIV infection (SNAP, 2004).

Along the line, the national PMTCT policy does not recognize the role of the society in access and utilization of the PMTCT services "in the country" by stating the PMTCT is an exclusive health issue. In spite, the projection modelling results in 2009 showed that the HIV epidemic is low in Sudan as mentioned earlier the national PMTCT policy was not updated to go with new epidemiological information (low HIV epidemic)(SNAP, 2010a, SNAP, 2010b).

The inadequacy, in addressing PMTCT in national policy could contribute to the low access and utilization of the PMTCT services in Sudan.

3.1.2 National PMTCT Strategic plan

The PMTCT program in Sudan passed through two National strategic plans the first covered the period from 2004-2009 and the other cover the period from 2010 to 2014. The First national HIV strategic plan developed "in line with National HIV policy to cover the period from 2004 to 2009" targeting generalized HIV epidemic in the country (SNAC, 2004).

This national strategic plan includes the PMTCT implicitly within "curb the HIV transmission through appropriate interventions" stated in one of its objectives and called to provide the PMTCT in all facilities (SNAP, 2004). The second, "National HIV strategic plan" made in 2010 for five years based on the new HIV epidemiological information mentioned earlier (SNAP, 2010a). It stated that, the PMTCT services aim to decrease the HIV infection among babies born to HIV-infected mothers from 30% to 10% by 2014; by raising community awareness about PMTCT, increasing the number of the PMTCT sites, training health workers on PMTCT, and by integration the PMTCT with the reproductive health services. Also, it prioritized the groups at higher risk of HIV infection (SNAP, 2010a). Add to that, it recognized the importance of control of HIV infection among them (SNAP, 2010a).

In my opinion, the principle of stating the PMTCT service activities in the national strategic plans, could improve access and utilization of the PMTCT services by the pregnant women in need. For instance, In Ethiopia national strategic plan, that states clearly the PMTCT intervention made progress in PMTCT service regarding access and utilization in the country (Ethiopia, 2010). Even it has a generalized epidemic, but the principle can be adapted to the national strategic PMTCT plan according to the HIV epidemiology in the country.

3.1.3 National PMTCT Guidelines

The national programs use the guidelines, as a tool to convert the national policy into the services delivery sites (Strachan et al, 2004). The first, national PMTCT guideline developed in 2007, and it was focused on the provision of the HIV Voluntary Counselling and Testing (VCT) for pregnant women. Also, these guidelines stated pre test counselling and post test counselling, confidentiality HIV testing of pregnant women, management HIV positive mothers and their exposed children, to be followed in the provision of PMTCT service to the pregnant women (SNAP, 2007).

In 2010, the PMTCT guidelines revised and updated in line, with the national strategic plan, and the focus shifted to the Provider- Initiating Testing and Counselling (PITC) approach. The health care provider offered HIV testing and counselling (HTC) as part of the ANC services for all pregnant women, with their right to opt out in place in order to increase the HIV testing uptake among pregnant women.

However, limited centres were following the guidelines due to limited distribution lack of the follow up as well as poor supervision to the PMTCT centres (SNAP, 2010a).

3.1.4 PMTCT services human resources

Health workers play an important role, in access and utilization of PMTCT services by the pregnant women who in need for the service. In Sudan, PMTCT centers that situated in the tertiary health facility are better staffed and equipped than those in the secondary level, and similarly urban are better resourced than rural centers. The PMTCT staff includes doctors, counsellors, laboratory technicians, pharmacists and supportive staff services (SNAP, 2010c).

In general Sudan suffers from a shortage in the health workers which is mainly due to migration of the health personnel due to lack of training chances and poor working conditions (Sudan FMoH, 2012; Bader, 2005). This shortage in PMTCT providers, compromises the counselling session which is an essential part of the service. The counselling session enables the pregnant women to take a decision regarding HIV infection (UNAIDS 1999). In decreasing counselling session time as well as the reduce the quality of information provided to pregnant women. For example, the time for the pre test counselling and post test counselling session are 15 minutes and 45 minutes respectively, and it takes more time if the client is HIV positive (SNAP, 2007).

The need for adequate, trained number of health personnel to provide PMTCT services has suggested in many studies from other countries. For example, two studies conducted in Uganda and Zambia showed that the shortage of the workforces such as a limited number of the counsellors, midwives and laboratory personnel affects the implementation of PMTCT program (Slavea and Sulzbach, 2006; Biribonwoha *et al*, 2007). Similarly, Olive and lilani (2009) in a study conducted in seven countries concluded the scaling of the PMTCT services needs adequate number of trained staff. The shortage of the trained health care providers in Sudan is also influencing the PMTCT services quality and de-motivates the pregnant women to uptake the PMTCT services.

3.1.5 PMTCT services financial Resources

Availability of adequate funds for PMTCT program is essential to ensure good quality and sustainability of the PMTCT services provided to the clients. The funding of the PMTCT program is mostly public (government and donors). In one hand, the government fund sharing is poor and covers the staff salaries and PMTCT infrastructure (SNAP, 2010d). On the other hand, donors fund allocated for consumables, drugs, HIV test kits and lab materials supplies, Information, Education and Communication (IEC) materials and staff training. The main donor fund for PMTCT services come from the Global Fund to principal recipient (PR) UNDP then to the sub-recipient (SR) UNICEF (SNAP, 2010d).

This reliance on the donors fund probably affects the long run sustainability of the PMTCT services. However, in many African countries financial resources reported as a barrier to in the PMTCT services delivery (CHGA, 2004). In brief, the financial resources are a concern particularly in light of the scarce resources Sudan government allocates for health.

3.1.6 Supplies of the PMTCT services

Prevention of MTCT Supplies and equipments such as HIV testing kits, drugs, laboratory machine, information, education and communications materials and kits needed for delivery of HIV positive pregnant women (gloves, sheets) is an essential in the provision of the PMTCT services. However, in Sudan most of the centers suffer from a shortage of the HIV testing kits and IEC materials (SNAP, 2010a, SNAP, 2008). The reasons for supplies and equipments shortages are not only due to limit resources but also to poor management of the resources at hand. Furthermore, this shortage can de-motivate pregnant women from access and utilize PMTCT services. Rujumba *et al* (2012) in his study "in Uganda" showed that shortage of PMTCT supplies may undermine the PMTCT services provided to the clients. For example, the HIV positive women come for nothing in the facility "in case of the shortage of nevirapine than referred to another facility".

3.1.7 HIV related Stigma and discrimination in health facilities

In Sudan, the stigma and discrimination among health workers against HIV infected patients and related services are high. A study conducted in 2009 in Sudan, sampled 461 HCPs (nurses and doctors) to assess the knowledge, attitude and practice towards HIV and AIDS patients. The Study showed that 27% of the participants avoid seeing HIV patients and 30% give less care for HIV patient. While 60.9% believed that no need for patients to know he has been tested for HIV; 44.9% saw the HIV positive patients file labelled, and 70% said antiretroviral therapy is ineffective to treat HIV infection (SNAP, 2009).

Another, a study conducted in Sudan reflects on the effects of the stigma and discrimination on the health care setting, sampled 38 persons living with HIV infection, showed 53% were discriminated by the health care providers. This negative behaviour makes them not to disclose their HIV status when seeking health care and avoid health care facilities as possible as they can (Christian Aid, 2008).

Similarly, this has been found in studies from other countries for instance, a study conducted in "2009" in Iran which has similar culture and norms to "Sudan". In this study participant reported that negative attitude and practice in health care make them either to avoid or to delay seeking care (Rahmati-Najarkolaei *et al*, 2010).

Also, another study from Nigeria in 2005, reflects on the causes of the negative attitudes and practices of HCPs against HIV patient, and suggested poor information about HIV and treatment among health care providers and also lack of protection materials in the facility were the possible causes (Reis *et al*, 2005).

In sum, these studies agreed on the negative effect of the stigma and discrimination at the health facility on access and utilization of the HIV related health services. As the PMTCT services are one of these services, it is more likely pregnant women access and utilization affected by the negative attitude of HCPs.

3.1.8 PMTCT sites infrastructure.

PMTCT sites infrastructure, has a role to play in access and use of the PMTCT services by pregnant women. In Sudan, the PMTCT services provide in limited space within the existing maternity facilities infrastructure and sharing the same waiting areas with ANC clinics. This infrastructure is already suffered from poor conditions and inadequate counselling and waiting spaces. This is likely result in compromising the confidentiality of clients and quality of the service provided to the clients (SNAP, 2008). That leads to discourage the pregnant women, from accessing and utilizing the PMTCT services. However, Posse *et al* (2008) suggests in a systemic review study, about the barriers to access Antiretroviral Therapy (ART) by people living with HIV in developing countries the inadequate infrastructure is one of the factors that influence access and utilization of the health service. In my opinion, the current infrastructure of PMTCT sites in Sudan is compromising the access and utilization of the pregnant women who need the PMTCT services.

3.1.9 PMTCT services quality

The Institute of Medicine (2001) suggests six dimensions of the quality of care which are patient safety, effectiveness, patient entered timeline, efficiency and equity. For the purpose of this thesis, the author will reflect on these factors in the context of PMTCT services "in Sudan". Firstly, safety "which is about offering" require care and avoid unnecessary care to pregnant women. In Sudan, there is no study conducted to explore this concern; but in my opinion, the HIV testing is offering to all pregnant women attending ANC. In this sense, it is likely that many pregnant women received the HIV test, and they did not need it. Secondly, effectiveness of the PMTCT services, which is about the services that contribute to a better life quality of the pregnant women. Although, there are no data to reflect on; this is likely not happen in current PMTCT service.

Thirdly patient - centred meaning PMTCT care meets the expectation of the mothers who use the PMTCT service in term of needs, values and cultural preference. Here, also there are no data to reflect on that.

For example in my experience, the lack of a referral system links the PMTCT centers in Sudan and other ANC facilities, running out of consumable and inadequate confidentiality undermine the PMTCT service to meet pregnant women's needs and preference. Fourthly, timeliness is concerning about delay and waiting times pregnant women spend to take the PMTCT service. For instance as a result of shortage in health care providers, consumables and poor infrastructure (SNAP, 2010a) more likely the pregnant women experience delay and long waiting time to receive the PMTCT service.

Fifthly, efficiency it is about the better use of supplies and equipment without waste. Again there are no data to reflect on that issue. Six, equity is about the PMTCT service provided to all pregnant women requiring the service in Sudan. The PMTCT services in Sudan do not target the pregnant women belong the groups at risk of HIV infection and geographical area with high HIV prevalence in the country (SNAP, 2010a).

Based on these points, the quality of PMTCT services compromised across all the six dimensions. This is more likely limited access and utilization of the PMTCT services, by the pregnant women in need "in Sudan".

3.1.10 Legal Issues

Here the author discusses the legislations aspects and criminalization laws prevailing in Sudan.

3.1.10.1 Legislations

In line with the government's commitment to international agreements regarding HIV and AIDS, the national HIV policy addresses the right of People living with HIV (PLHIV) in health, other services and legal protection against all forms of discriminations (SNAP, 2004). However, some studies in Sudan showed that negative attitude and practice against PLHIV occurs in the practice (Christian Aid, 2008; SNAP, 2009). This raises the need for a mechanism to enforce these international commitment and policy in the ground. In order to, ensure the protection of those tested HIV positive. This also encourages pregnant women to know their HIV status. For example, HIV positive women usually subjected to domestic violence and rejection from family as well as community. This makes pregnant woman either avoids the PMTCT services or chooses not to disclose her HIV status to others.

A study from Nigeria, sampled 300 HIV positive women showed that 22.1% of the participants experience domestic violence after disclosing their HIV test result to their family (Ilyasu *et al*, 2011).

3.1.10.2 Criminalized laws

Sex work and practicing sex, out of the martial bond criminalized by law and considered illegal (SMoJ, 1991). This makes the female sex workers and MSMs hide their identity as a coping mechanism. These laws are holding this group to be reached by the HIV related prevention activities and preventing them from accessing and utilizing the Health services.

Also, these laws are force the care providers to stop or limit provision of the HIV prevention services to these groups. This is because of fear of being seen as helping or facilitating, the sex work which prohibited by the law in the country (SMoJ, 1991).

In this case, the criminalization laws affect access and utilization of the HIV prevention activities, including PMTCT, both from clients and provider side. The WHO progress report (2011) stated that criminalization laws of the sex behaviour continue to hinder access and use of the HIV prevention intervention by these groups. Nevertheless, these laws need to deal with cautiously with evidence. In order to, make PMTCT services accessible and utilizable to pregnant women belongs to these groups.

3.2 Predisposing factors

The predisposing factors, represent the socio-cultural characteristics of the individuals, that exist before the action of accessing and utilizing health services take place, and have a significant role to play in access and utilization of health services (Andersen, 1995).

3.2.1 Age of the pregnant women

There are many studies, investigating the relation between the age of the pregnant women and access and utilization of PMTCT services provided in the antenatal clinic settings. One, of these studies conducted in the Khartoum in "2007" showed that pregnant women aged twenty six years or above are more willing to have HIV counselling and testing than the younger one (Mahmoud *et al*, 2007). Another study conducted in 2010 " in the same city" pointed out pregnant women age 30 years or above are more willing to accept HIV testing provided in the ANC care (Idris *et al*, 2010).

The same has also been found in other countries. For example, a study conducted among pregnant women presented in labour " in Botswana", showed that pregnant women age 35 years are likely accepting HIV counselling and testing (HTC) than the younger women. The same study suggests that, younger pregnant women, most likely to be in their first pregnancy and first contact with antenatal care clinic compare to the older women (Kowalczyk *et al*, 2002). All, three studies agreed on the age of the pregnant women can influence the utilization of the PMTCT services.

3.2.2 Education level of the pregnant women

The access and utilization PMTCT services are influenced by education level of the pregnant women. For example, in 2010 a study conducted in the Sudan, showed that acceptance of the HIV testing among 500 pregnant women, attending ANC service is high among the educated pregnant women compared to none educated pregnant women (Idris et al, 2010). Also, another study conducted by Wodi (2005), suggested that low literacy of the pregnant women, was one of the factors that prevent pregnant women from utilized the PMTCT services in sub-Saharan Countries.

Regarding, uptake of PMTCT services and education level of the pregnant women belonging to the groups at higher risk of HIV infection, there are no data available to reflect on that. However, a small scale study sampled 65 female sex workers in 2006, showed that 20% of the respondents not educated. This considered high, if compared to the non educated women in the general population (ACORD, 2006).

However, the effect of education could be explained by the fact that, the educated woman is likely to have more access to information about the PMTCT to her and to her infant than uneducated pregnant woman.

Given this, the education level of the pregnant women is a possible factor that increases the access and utilization of the PMTCT services as literacy level among female in Sudan is about 51% (SCBS 2008).

3.2.3 Urban/Rural place of residence of the pregnant women

The residence, of the pregnant women has a role to play in access and utilization of the PMTCT services. The majority (62%) of the population in Sudan live in rural areas (SCBS, 2009). This, associated with the fact that most of the PMTCT centers are located in the urban area. These are contributed to increase the distance to health facilities, as well as increase the cost of transport, particularly for the rural women. Furthermore, the intention to accept HIV testing is associated with the husband approval (Bajunirwe and Muzoora, 2005). This affect access to and utilization of the PMTCT services however, a study conducted in Sudan mentioned earlier, suggested that the uptake of the HIV testing among pregnant women is higher in urban than rural areas (Idris *et al*, 2010).

Also, another study from Tanzania revealed that, the residence of the pregnant women either in urban or rural areas could influence access and uptake of the PMTCT services (Falnes *et al*, 2010). This means, special arrangements are needed to encourage rural pregnant women to access and utilize the PMTCT services in Sudan.

3.2.4 Gender Inequality and decision the pregnant women health

Gender is about assigning the roles, between women and men according to the community culture and norms, and this can be different between and within the communities. Gender inequality, between men and women can act as a barrier for the women's to access and utilize health services (WHO, 2009). For instance, women have to take care of children and home. Also, women usually have limited access to and use of the financial resources of the family. This is usually compromise her ability to by for the expense of transport and health facility fees. Furthermore, she needs to get permission from her husband before she goes to the health facility as well as she cannot move alone (Robert *et al*, 2009; WHO, 2009).

For example, one study conducted among 500 pregnant women in Sudan mentioned earlier, reported that 40% of the participants refused the HIV testing because, they needed their husband approval (Idris *et al*, 2010). Again, gender inequalities also affect the disclosure of the HIV test results to the families because, the women fear domestic violence and loss of the available resources. This more likely undermine the PMTCT services access as well as utilization (WHO, 2004; Kadowa and Nuwaha, 2009; Theuring, 2009). Since, "husbands decide on the pregnant woman's health" we need their involvement in the PMTCT services provision.

Gender inequalities, also affect the women belonging to groups at higher risk of HIV infection (UNDP, n.d.). For example, they suffer from violence, and lack of information about HIV and AIDS also they are lacking support and power. All these make them live as marginalized and hidden groups (UNDP, n.d.; WHO, 2012). This is more likely affect their access and utilization of PMTCT services in Sudan.

3.2.5 Pregnant women's knowledge and attitude towards PMTCT services

The information the pregnant women received, about PMTCT services play an important role in access and utilization of the PMTCT services. However, married women received information from various sources like elderly women in the family, peers and care providers.

In Sudan, the knowledge about MTCT among women is low. The Sudan household Survey in 2006, reported only 54% of the women age 15-49 knew that HIV can transmit from mother to her infant. Similarly, the number of the women who knew all three routes by which, the of HIV infection transmission from mothers to child (during pregnancy, at delivery and through breast feeding) were 26.4%. The same report, showed that women with no education have less knowledge about MTCT compared to those with secondary education, 29.7% and 76.5% respectively (SCBS, 2006). A study conducted in Sudan sampled 53 pregnant women showed that 96% of the respondents did not know HIV infection can transmit from mother to her child (Abuk *et al*, 2010).

Also, some studies showed the knowledge about the PMTCT is more in educated women than uneducated women. For example, study conducted in Addis Ababa by Solomie and Teka (2005) showed that, pregnant women with secondary education and above were more knowledgeable about MTCT and prevention methods.

Another, studies showed that the adequacy of information the pregnant women received from these sources can affect her attitude towards PMTCT services. For instance, Adeneye *et al* (2007) in his study among pregnant women in Nigeria revealed that pregnant women with better information about HIV and MTCT are more willing to use the PMTCT services.

The pregnant women's attitude toward PMTCT services can be influenced by other factors. These factors include knowledge of the MTCT, knowledge of the services, opinion of the partner and the confidentiality provided at the health facility (Bajunirwe and Muzoora, 2005).

However, not all the pregnant women have a positive attitude towards the PMTCT services utilize the PMTCT service. For example, Mahmoud *et al* (2007) revealed in study sampled 1005 pregnant women attending antenatal care in Sudan, about 73% reported their intention to take the HIV counselling and testing; however, only 30% out of them take the HIV test. This difference is the likely result of other factors some of them mentioned in the previous section. For example, age, gender, education and residence factors mentioned earlier, and the author will continue discussing more factors in the coming section.

3.2.6 HIV-related Stigma at an individual level

Stigma, is about having features that undesired by the society norms, which result in devaluing the person who has them by the community (Goffman, 1963). It results in fear of individuals to have this feature, and this differ between cultures (Alonzo and Reynolds, 1995; Parker, and Aggileton, 2002). The stigma, against HIV infection in Sudan is high, and this can be seen in the national survey conducted in 2002. That showed that 31% of the respondents are not willing to nurse HIV patient; similarly 44.3% will not eat with HIV infected person (SNAP, 2002).

A cross sectional study in Sudan, conducted among pregnant women in "2010" pointed out that fear of the HIV related stigma was one of the causes for refusal of HIV testing provided in ANC services (Idris *et al*, 2010). A qualitative study conducted in the rural area in Zambia, is investigating the HIV-related stigma suggested that, fear of the stigma is a key reason that individuals did not step out to know their HIV status (Bond *et al*, 2002).

Another, study conducted in South Africa investigated the association between HIV-related stigma and motivation to have an HIV test in 2008, revealed that, the main barrier was not only fear of knowing one's HIV status but also fear of being stigmatized (Meiberg *et al*, 2008; Kalichman and Simbayi, 2003). Stigma at the individual level may be a barrier to access and utilize of the PMTCT services by the pregnant women in Sudan.

3.2.7 Pregnant women belonging to groups at higher risk of HIV infection

In this study, the author identifies pregnant women belonging to population at high risk of HIV infection, as female sex workers and wives of men practicing sex with men. These groups are more susceptible to HIV infections than the other population categories. These groups are living lacking social and legal support as mentioned earlier (International HIV and AIDS Alliance, 2010). However, in Sudan there is a difference between the FSWs and wives of MSMs, in terms of access and utilization of the PMTCT services. Female sex workers are likely to have self-stigma that may limit their utilization of the PMTCT services. However, the wives of the MSM are more likely access and utilize the PMTCT services as other pregnant women. Because, they are not aware of their husband's risk behaviour. There is no study, on access and utilization of PMTCT services by pregnant female sex workers and wives of MSMs in Sudan to reflect on that.

CHAPTER 4: ENABLING AND NEEDS FACTORS

In this chapter based on the modified frame work the author continue exploring and analyzing the enabling and needs factors.

4.1 Enabling factors

It is about the enabling aspects or conditions to obtain the health care and it depend on the presence of the predisposing factors.

4.1.1 Availability and accessibility of PMTCT Services

In Sudan, the PMTCT services distributed in all fifteen states in large cities "in the urban areas" more than rural areas (SNAP, 2010a). Currently, PMTCT services provided in about 3.1% of the total antenatal health facilities in Sudan. This makes the PMTCT services are unavailable and inaccessible to the majority of the pregnant women in needs in the country. Particularly with no referral system in place linking the recent PMTCT facilities and other ANC facilities (SNAP, 2010d).

A study, conducted in South Africa showed that pregnant women living near the health facility are likely more utilizing PMTCT services than to those residing far from the facility (Neteta *et al*, 2010).

In Sudan, there is no study on the accessibility and availability of PMTCT by pregnant female sex workers and wives of men practicing sex with men.

However, female sex workers and MSM received inconsistent HIV related services, through NGOs which are inaccessible and unavailable for the majority of them (SNAP, 2010a). However, integration of the PMTCT services with existing maternity health facility increase the coverage of the services (AVERT, 2011). This is likely increase the availability and accessibility of the service to pregnant women needs PMTCT services (WHO, 2006).

4.1.2 Affordability of PMTCT Services

Most of the population (46.5%) in Sudan live below the poverty line (SNPC/GS, 2010), which limits their ability to pay for the health services requiring by user fees. In Sudan, antenatal care and PMTCT services provided free of charge plus some investigation for the pregnant women. However, the transport cost to and from the ANC facility should be paid by the pregnant women. A study conducted in Karachi on factors affecting utilization of ANC by pregnant women showed that women with higher income were likely to use ANC more than those with lower incomes (Nasir, 2003).

There is no information available about the effects of the affordability and availability on access and utilization of the PMTCT services by the pregnant women belonging to the groups at high at risk of HIV infection. However, small study conducted in Sudan sampled 321 female sex workers, reported that 86.2% of respondents involved in sex work due to poverty, and lack of financial resources (Abdelrahim, 2010).

4.1.3 Acceptability of PMTCT services

Acceptability defined by Peters (2008) as services meeting the cultural and social expectation of the users. There is no study conducted in Sudan on acceptability or pregnant women's perception of the PMTCT services quality. However, studies from Bangladesh and India suggested that, perception of the service quality by the clients play import role in access and utilization of service (Andaleeb, 2001; Rao etal, 2006).

Furthermore, Painter and his colleagues (2004) in a study conducted in Code d'Ivoire among 27 women, who received HIV positive test results, found that mistrust of the HIV test result made them not to avoid the follow up visit.

In my opinion, the perceived quality of the PMTCT services also depends on the quality of the PMTCT services provided in PMTCT centers. Also, depends on confidentiality, attitude of the health worker, stock-out of supplies and shortage of the trained health care personnel. All, these factors and other factor will discuss in the following section determine whether or not the pregnant women accept to access and utilized PMTCT service. For instance, if the confidentiality is inadequate, and the mothers assume that the HIV test result will be known they will not accept the HIV test.

4.1.4 Accommodation of the PMTCT services

In Sudan, the PMTCT service provide to the pregnant women attending ANC from 8:00 (O'clock) Am to 4:00 (O'clock) six days per week, with no appointment needed before to take the service. This short time is more likely compromised the access and utilization of the pregnant women needs the PMTCT service in Sudan. There are no studies, conducted to explore the effects of the accommodation on pregnant women access and utilization of the PMTCT services to reflect on in Sudan.

4.1.5 HIV related stigma and discrimination at family/community level

Sudan, is one of the Middle East and North Africa (MENA) countries that culture, norms and religion have many taboos about sex, and HIV and AIDS (Robert *et al*, 2009: IRIN, 2005).

Stigma is about the attitude taken by the community collectively towards identifying individuals or groups have undesired feature, and deal with them negatively and collectively, such as devalued group in favour of another group (Goffman, 1963; Parker and Aggleton, 2002, Mahajan *et al*, 2008).

Discrimination follows stigma, and it is about unjust practice towards the individual or groups having or perceived to be having undesired feature. Both stigma and discrimination are differed between communities (Parker and Aggleton, 2002). In Sudan, the stigma and discrimination against HIV infection are higher amongst community; for example, the national.

Survey in 2002 mentioned earlier, showed that 55.5% of the respondents reported they did not buy from a seller with HIV, and 21.6% reported they hid a family member if he has HIV infection (SNAP, 2002).

A long the line, Herek and Aggleton (2002) which suggest stigma at the community level, can lead to avoiding daily contact with HIV positive individuals. Furthermore, Bond and his colleagues in a study conducted in Zambia showed that stigma at the community level prevents the pregnant women from knowing their HIV status and to joining the PMTCT services (Bond *et al*, 2002; Kalichman and simbayi, 2003).

In brief stigma and discrimination, at the community level are more likely discouraging pregnant women from access and utilize the PMTCT services in Sudan.

4.2 Needs Factors

It is about how the pregnant women view their own and babies health and whether or not they perceive benefit from seeking expert help.

4.2.1 Perceived benefit of PMTCT services by the pregnant women

the pregnant woman, perception about benefit of PMTCT services for her and her child is an important factor for accessing and utilizing the PMTCT services. Also, it depends on the factors that mentioned in the previous sections. However, in Sudan there is no study done to explore the effects of the perceived of PMTCT benefit on access and utilization of the PMTCT services. One study, from India conducted among 202 pregnant women, showed that 97% of the respondent did not perceive themselves at risk of HIV infection and because of this only 57% out of them tested for HIV (Rogers *et al*, 2006).

In my opinion, the perception of HIV infection among pregnant women is very low in Sudan. This because, the HIV prevalence among the pregnant women is very low 0.16% (SFMoH, 2010) this is likely lowering the pregnant women's perception about gaining benefits from PMTCT services. For example, if the pregnant women view their own and their

infant benefits from the PMTCT services, more likely they will access and utilize the PMTCT services. The pregnant women perception of the PMTCT benefits is depending on the other factors discussed earlier, and it is likely dealing with these factors will increase the perception of benefit of the PMTCT services.

CHAPTER 5: BEST PRACTICE IN PMTCT

The author refers to two best practices from Kenya and Malawi as evidence of strategies that can improve access and unitization of PMTCT services in Sudan. These are community base approach and provider initiating testing and counselling. Furthermore, the author does not find best practice in PMTCT field from other countries similar to Sudan context to included in this chapter.

5.1 Kenya: Community base approach

One of the best practices in the PMTCT come from Kenya, which related to society base activities. Kenya is an African country that has generalized HIV epidemic. In Kenya, PMTCT services started in "2002" and services made available in the facilities throughout the country. However, the reports showed that low access and utilization of these services. Accordingly, the community base approach introduced in" 2004" to bring the PMTCT services closer to the community. This project based on outreach clinics consists of a health provider, a trained HIV positive person to work as a counsellor and a tradition birth attendant trained on the PMTCT service provision (Population council, 2004). The outreach clinic, moves to the community and provides antenatal care, HCT and encourage pregnant women to follow in ANC and delivery "in the facility". Also, the health care provider, in the facility trained to provide care for pregnant women who come to the facility (Population council, 2004)). This activity leads to increase the utilization of the antenatal care, delivery at the facility, MTCT knowledge among pregnant women and increased uptake of HCT among these communities.

Although, Kenya has generalized HIV epidemic "which is not" similar to Sudan but, this approach can be adapted in Sudan, particularly in targeting the HIV high prevalence geographical areas and population.

5.2. Malawi: Provider initiation testing and counselling

The other, best practice is the Study from Malawi. This study investigates the disadvantages of the provider-initiate testing and counselling strategy in the antenatal care setting. Malawi is one of the African countries with a generalized HIV epidemic. In Malawi, the PITC introduced as a strategy in ANC settings "in 2005" in order, to increase HIV testing among pregnant women. Also, its guideline developed and distributed which, stated clear the right for the pregnant women to opt out (Angotti, 2010).

Accordingly, the number of pregnant women tested for HIV infection increased in the country. However, in 2010 a qualitative Study conducted to assess PITC showed that, most of the pregnant women participate in the study views the PITC as not optional issue but mandatory to receive the antenatal care services (Angotti, 2010). Also, the study suggests lacking of follow up to PITC guidelines evaluation and supervision to the HCPs at service delivery points undermine the PITC strategy (Angotti, 2010).

The PITC introduced in ANC "in Sudan in 2009" as mentioned earlier, However, until now it does not cover all ANC facilities providing PMTCT services (SNAP, 2010a). Similarly, there is poor supervision as well as lacking studies on of PITC at PMTCT sites. In order to, see whether or not the PITC guideline followed.

In my opinion, PITC strategy if implement properly is more likely increased access and utilization of the PMTCT services, by the pregnant women in Sudan in need of the PMTCT services. The PITC needs to be implemented properly in term of training of the HCPs, distribution of the guidelines and follow by supervision and evaluation.

CHAPTER 6: DISCUSSION OF THE FINDINGS

In this chapter the author discusses of the study findings of Environmental, predisposing, enabling and need factors.

6.1 Discussion

The study showed that, pregnant women's place of residence in the rural areas and being younger are more likely have limit access to and utilization of the PMTCT services (Mahmoud *et al*, 2007; Idris, *et al*, 2010; Bajunirwe and Muzoora, 2005). Forty seven percent, of the community in Sudan lives below the poverty line (UNDP, 2011). This affects the ability of pregnant women to pay for PMTCT service related costs. These costs include the transport to and from the health facilities costs. This are normally far for those lives in rural areas. The younger, pregnant women are to be in their first pregnancy, and probably it is their first contact with the ANC compared to older pregnant women. The older women are likely have had more than one pregnancy and be more exposed to the health services.

Also, uneducated pregnant women are less likely to utilize the PMTCT services (Wodi, 2005; Idris, *et al*, 2010). The educated, pregnant women are more likely having access to HIV and AIDS and PMTCT related information. The younger and uneducated pregnant women need to be brought on board, by training the HCPs to give attention to the pregnant women with these characteristics among ANC attendees or by finding the possible ways to reach them in the community. For example, advocating and promoting PMTCT at the community level, through existing mechanisms such as other HIV related community interventions. This brings up the importance of the first approach of the PMTCT "preventing HIV infection among women in child bearing age by raising their awareness about HIV infection and services.

This study review showed that, the limited number of the PMTCT services sites are more likely associated with the low access and utilization of the PMTCT services (Nteta, *et al*, 2010; AVRET, 2012). Currently, the PMTCT services are provided in each state in Sudan. However, the lack of referral system linking PMTCT centres and the other ANC facilities is making the PMTCT services failing to serve the pregnant women attending other ANC facilities both public and private.

The study findings showed that, limited access to and utilization of the PMTCT services is more likely associated with lack of the decision power, limited of control over the resources (Kadowa and Nuwaha, 2009; Theuring, 2009; Robert *et al*, 2009). In Sudan, as in other MENA countries, tradition and norms restrict the movement of the women the husband knowledge. Besides that, the husband pays the cost of the health services so he needs to be aware before of this visit take place (Robert, *et al*, 2009). In this scenario, involvement of the husband in the

PMTCT services is more likely increased access and utilization of the PMTCT services by the pregnant women. However, husband involvement has many downsides. For example, if the pregnant women's test HIV positive it is becoming known to the husband and assuming the husband is tested HIV negative. These scenarios will be harmful for the pregnant women, who may be rejected or divorced in absent of family and community support.

Also, the study suggests that, the correct information the pregnant women have about HIV and the MTCT and knowing how to prevent MTCT is likely associated with more use of the PMTCT services (Adeneye, *et al*, 2007; Solomie and Teka, 2005). For example, if the pregnant woman knows she will protect herself and her baby by using the PMTCT service the chances to uptake the PMTCT services increase. However, the prevailing of the correct information among the pregnant women more likely the access and utilization of the PMTCT will increase.

The literatures reviewed showed that, stigma and discrimination are more likely associated with the low access and utilization of the PMTCT services (IRIN, 2006; Bond *et al*, 2002; Idris, *et al*, 2010). The stigma and discrimination grounded on the wrong knowledge and information about HIV and AIDS and related services (Robert *et al*, 2009; IRIN, 2006). However, this raises the need of sensitizing and mobilizing the community on PMTCT and HIV and AIDS through village midwives, community leaders and religious leaders. In order, to explain the wrong conception about the HIV infection, and reduce the stigma and discrimination against the HIV infection and related services (PMTCT). In addition, advocacy needs to be carried out for women education, empowerment and family and community supportive environment for the pregnant women.

Stigma and discrimination in the health care settings are more likely associated with limited access and utilization of the PMTCT services by the pregnant women (SNAP, 2009; Reis *et al*, 2005). The stigma and discrimination, among the health care providers seems to be resulting from poor knowledge about HIV infection, and lack of the protection materials and treatment in the health facilities (SNAP, 2009; Reis, *et al*, 2005; Christian Aid, 2008). This can be tackled by training the HCPs on PMTCT to improve the information of the health care providers about HIV infection, and making the universal precaution materials available at the facilities.

Furthermore, inadequate trained staff and stock outs of HIV testing kit and consumables are also probably associated with the poor access and utilization of the PMTCT services (Biribonwoha *et al*, 2007; Olive and lilani, 2009, Rujumba *et al*, 2012). The shortage of, HCPs might compromise the quality of the PMTCT services provided to the pregnant women. For example, The limited HCPs and increase in the workload are more likely resulted in long waiting times and shorter consultations.

This result in making the counselling session, which is the most important part of the PMTCT services, limited to short HIV-related information provided to the clients. Usually, it is not adequate enough to enable clients to make decision relate to HIV infection (UNAIDS, 1999). It seems, the access and utilization of the PMTCT services by pregnant women, who in need for the service can be increased by integrating the PMTCT services with reproductive health services with task shifting in place.(WHO, 2006)

This can assist in solving the shortage of trained staff, and ensure availability of the PMTCT consumables as well as decrease the HIV-related stigma among the pregnant women. Furthermore, this also ensures sustainability of the PMTCT services. However, because Sudan has low HIV epidemic, the integration to be cost effective should be introduced to facilities that serve high HIV prevalence areas and communities.

One more, important thing is PITC strategy which adapted from the WHO guidelines (WHO, 2007). This approach, need to be in line with the low HIV epidemiological situation in Sudan, to ensure the counselling and testing is initiating for the women, and not to all women attending ANC. Further, Ensuring it provides pregnant women with proper information to be able decide freely whether to take the test or not (WHO, 2007). If PITC strategy implemented in a wrong way, it is preventing more than facilitating access and utilization to PMTCT service by the pregnant women (Angotti *et al*, 2010). This needs training of the HCPs on the PITC guidelines as well as periodic evaluation and supervision to see if the guidelines followed in the facilities (Angotti *et al*, 2010).

The study, also showed poorly acceptance and poorly perceived quality of the PMTCT services, by the pregnant women probably associated with limited access and utilization of the PMTCT services (Painter *et al*, 2004). The perception of the pregnant women, about the quality of the PMTCT services influenced by the above mentioned factors. Therefore, we need to ensure that these issues dealt with in order, to obtain better perception and acceptance of the pregnant women about the PMTCT services.

There is no enough evidence found neither in Sudan or other countries, to reflect on the pregnant women belonging to higher risk of HIV infection groups and PMTCT services. However, low HIV epidemic and high trend among groups at higher risk of HIV infection in Sudan, as mentioned in the previous sections raises the necessity of targeting these groups by PMTCT services. This could be by conducting studies and surveys, among these groups. In order to, gather information about the possible factors influencing their access and utilization of the PMTCT services. Also, mapping NGOS providing HIV related intervention in term of supporting these NGOs to include the PMTCT services within their intervention to these groups. This is more likely increased the access and utilization of the PMTCT services by the pregnant women belongs to these groups in Sudan.

The researches results could be used in the revision, and updating of the national PMTCT policy. Which the study showed it is more likely associates with poor access and utilization of the PMTCT services. Also, it seems to guide the PMTCT services in Sudan, to provide only third prong of the comprehensive PMTCT approach "the preventing transmission of HIV infection for HIV infected mother to her child". Further, it does not prioritize the pregnant women belong to the groups at higher risk of HIV infection. This is probably due to poor information about these groups.

The policy need to be update and revised in line with, current HIV epidemiological information in the country and to address all component of the comprehensive PMTCT approach. Furthermore, the study findings suggest that criminalized laws, and unsupportive legislation probably limit the access and utilization of the PMTCT services by the pregnant women especially, the pregnant women belong to at higher HIV infection risk groups.

This could be dealt with, by advocacy among the legal authorities as well as community level by using evidences come out of the above mentioned studies. Further, the legal authority should be involved in researches and the result of research in these groups. This is more likely brought them board.

In brief, the author found that the modified frame work for Andersen health services utilization model is useful in answering the research questions and views the interaction between all factors in the process of access and utilization of the PMTCT services. Also, showed effects of health service use on the

CHAPTER 7: CONCLUSION AND RECOMMENDATIONS

7.1 Conclusion

The current PMTCT services in Sudan, are not reaching the pregnant women who need the PMTCT services.

The study has revealed that the access and utilization of the PMTCT services by the pregnant women is very low in Sudan. Furthermore, the PMTCT services mainly focus on one strategy out of the four strategy recommended by the WHO as comprehensive PMTCT strategies.

The current PMTCT services in Sudan are still not reaching the pregnant women in need for the PMTCT services. This mainly due to stigma, limited information about social and cultural factors; health system factors and legal factors influencing access and utilization of the PMTCT service by the needy pregnant women for the PMTCT services.

The access and utilization of the PMTCT services can increase by understanding and addressing these factors in order to promote the facilitators and tackle the barrier factors.

7.2. Recommendations

After the discussion of the study findings the author recommended the following:

At the implementation level

The following recommendations are targeting geographical areas and population with high HIV prevalence (target intervention) and informed with current evidence of the HIV epidemic in Sudan.

Facility level:

- Increase the HIV and AIDs awareness among the HCPs to increase their capacity and decrease the stigma in health care settings through the following: Carry out in-service training with small group represent of all HCPs in the facility to encourage discussion and experiences sharing between the group. In addition ensure availability of universal precaution and PMTCT services consumables at the facilities.
- Integrate the PMTCT with Reproductive health services associated with task shifting. Firstly develop joint team from NRHP and SNAP to start the pilot project in facilities serve areas with high HIV prevalence. Then the project evaluate after 6 month and according to evaluation results the project scales up to others targeting areas.
- Strengthening the referral system between formal and informal facilities.
- Adequate training of HCPs on the PITC and ensure guidelines distribution and follow up to make sure the services are provided according to the guidelines.

Community level:

- Sensitization and mobilization activities targeting the community within which The pregnant women live about HIV and AIDs and PMTCT and addressing the important of the ANC for the pregnant women. This could be through developing appropriate IEC material and educational messages addressing the importance of the PMTCT and ANC for the women.
- Establish an friendly outreach PMTCT services targeting the women belong to groups at higher risk of HIV. This activity provided in coordination with the NGOs working with these groups.

Research recommendations

- Conduct quantitative and qualitative researches among women belong to the group at higher risk of HIV, to understand the current situation, size, residence, health seeking behaviour and their needs. This research should be conducted with coordination with legal authorities, targeting groups and related stakeholders. The results of these researches should be disseminated to all key stakeholders

At the policy level

- Revise and update the national PMTCT Policy to include the four strategic approaches of the comprehensive PMTCT that stated by the WHO. Also, to prioritize the pregnant women belong to the groups at higher at risk of HIV.
- Raise the awareness about the PMTCT, HIV and AIDS among legal authorities such as ministry of justice, ministry of interior and police.

REFERENCES

Abdelrahim, M. S. (2010) HIV prevalence and risk behaviors of female sex workers in Khartoum, north Sudan, *AIDS*, July, 24 (Supp 2), pp 55–60.

Abuk, A. B. *et al* (2010) *HIV prevalence, test acceptability and knowledge among antenatal care (ANC) clinic attendees in a private health centre in Elhag Yousif residential area, Khartoum State*. Khartoum: Sudan AIDS Control Program, PMTCT unit[unpublished].

ACORD (2006) *Qualitative socio economic research on female sex workers and their vulnerability to HIV and AIDS in Khartoum state*. Khartoum: SNAP, Surveillance unit [Unpublished].

Adeneye, A. K. *et al* (2007) Willingness to seek HIV testing & counselling among pregnant women attending ANC in Ogun State, Nigeria, *MEDLINE Journals*. 26 (4), pp. 337-353.

Alonzo, A., and Reynolds, R. (1995) Stigma, HIV & AIDS: an exploration & elaboration of a stigma trajectory, *Social Science & Medicine*. August, 41 (3), pp. 303-315.

Angotti, N. *et al* (2010) An offer you cannot refuse?: provider initiated HIV testing in ANCs in rural Malawi. *Health Policy and planning*. July, 26 (4), pp.307- 315.

Ali, A. O. (2008) *Local government in Sudan during the interim period: input from Switzerland*. Khartoum: Ministry of Federal Governance.

Andaleeb, S. (2001) Service quality perception and patient satisfaction: a study of hospitals in developing countries, *Social Science & Medicine*, 52(9), pp. 1359-70.

Andersen, R. and Newman, J. (2005) Societal & individual determinants in medical care utilization in the U S, *The Milbank Quarterly*, 83(4), pp.1-28.

Andersen, R. (1995) Revisiting the behavioural model and access to medical care: does it matter?, *Journal of Health and Social Behaviour*, 36(1), pp1- 10.

AVERT HIV and AIDS (2011) Prevention of mother to child transmission (PMTCT) in practice, International HIV and AIDS Charity. [Online]. Available from: <http://www.avert.org/pmtct-hiv.htm>. [Accessed 23 June 2012].

Badr, E. (2005) *Brain drain of health professionals in Sudan: magnitude, challenges and prospects for solution*. Khartoum. Human resources observatory unit.[Unpublished].

Bajunirwe, F. and Muzoora, M. (2005) Barriers to the implementation of programs for prevention of mother to child transmission of HIV: a cross sectional survey in rural & urban Uganda, *AIDs Research and Therapy*, October, 2, p. 1-10.

Berg, Y. V. (2011) Health seeking behaviour-access to services, HS and PM. [Handout]. *Utilization and access of health services*. Health system and Policy making. Royal tropical institute 6th Dec.

Biribonwoha, H. *et al* (2007) Challenges faced by the health workers in implementing the prevention of mother to child transmission (PMTCT) of HIV program in Uganda, *J of Public Health*, May, 29 (3), pp.269- 274.

Bond, V. *et al* (2002) Stigma, HIV and AIDS & prevention of mother-to-child transmission in Zambia, *Evaluation and Program Planning*, 25 (2002), pp.347– 356.

Bwirire, L. *et al* (2008) Reasons of loss to follow up: among mothers registered in a PMTCT program in rural Malawi, *Transactions of the Royal Society of Tropical Medicine and Hygiene*, December,102(12), pp. 195-1081.

Christian Aid (2008) *Stigma and support for people living with HIV in Khartoum*: A Christian Aid report. Khartoum: Christian Aid.

CHGA (2004) *Preventing mother-to-child transmission of HIV in Africa: issues and challenges*. Addis Ababa: Commission on HIV and AIDS and Governance in Africa.

Elabassi, M. A. (2003) Public health sector reform: the implementation of federal decentralization in Sudan and its impact upon the sector of public health. Ph.D thesis, Maastricht: Universitarite Per Maastricht.

Ethiopia (2010) *Strategic plan II 2010-2015: for intensifying multisectoral HIV and AIDs response in Ethiopia*. Addis, Ethiopia Federal Ministry of Health.

Falnes, E. F. *et al* (2010) Mothers' knowledge and utilization of the prevention of the mother to child transmission services in North Tanzania, *Journal of International AIDs Society*, , doi:10.1186/1758-2652 , pp. 13-36.

Goffman, E. (1963) *Stigma: notes on the management of spoiled identity*. London: Penguin.

Haddis, M. and Jerene, D. (2006) Brief communication: awareness of ANC Mother-to-child transmission of HIV infection and its prevention in Arba Minch, *Ethiop. J. Health Dev*, 2006, 20 (1),pp.55-8.

- Idris, A. K. *et al* (2010) *Socio-demographic factors affecting acceptance of HIV testing among pregnant women attending antenatal care clinic in Khartoum state*. [Unpublished].
- Iiyasu, Z. *et al* (2011) Domestic violence among women living with HIV and AIDs in Kong, Northern Nigeria, *Afr reprod Health*, September, 15(3), pp. 41- 9.
- Institute of medicine (2001) *Crossing the quality: a new health system for the 21st century*. Washington, DC: National academy Press.
- International HIV and AIDS Alliance (2010) Campaign briefing: who are the vulnerable and most-at-risk population?. [Online]. Available from: <http://www.aidsalliance.org/includes/Document/Prevention%20campaign/Campaign-Policy-Briefing-1.pdf>. [Accessed 23 June 2012].
- IRIN (2006) Middle East: interview with head of UNAIDS-MENA region. 2006 . March 2.[Online]. Available from: <http://www.irinnews.org/Report/26165/MIDDLE-EAST>. [Accessed 13 June 2012].
- Jacobs, B. *et al* (2011) Addressing access barriers to health services: an analytical framework for selecting appropriate interventions in low-income Asian countries, *Health Policy and Planning*, Feb 2011, pp. 1-13.
- Kadowa, I. and Nuwaha, F. (2009) Factors influencing disclosure of HIV positive status in Mityana district of Uganda, *African Health Science*, March,9 (1), pp.26–33, PMID: PMC2932514.
- Kalichman, S. C. and Simbayi, L. C. (2003) HIV testing attitudes, AIDS stigma, and HIV voluntary counselling and testing (VCT) in a black township in South Africa, *Sex Transm Infect*, pp.442–447.
- Kowalczyk, J. *et al* (2002) Voluntary counselling and testing for HIV among pregnant women presenting in labour in Kigali, Rwanda, *Journal of Acquired immune deficiency syndromes*, 31, pp. 408-415.
- Mahajan, A. P. *et al* (2008) Stigma in the HIV/AIDS epidemic: a review of the literature and recommendations for the way forward Anish P, *AIDS*,22 (Suppl 2) pp. 67– 79.
- Mahmoud, M. M. *et al* (2007) Knowledge & attitude toward HIV voluntary counselling and testing (VCT) services among pregnant women attending an antenatal clinic in Sudan, *Journal of Medical Virology*, May, 2007,70 (5), pp. 469- 473.
- Meiberg, A. E. *et al* (2008) Fear of stigma as barrier to voluntary HIV counselling and testing (VCT) in South Africa. *East African Journal of Public Health*, August 5 (2) pp.49-54.

Mohamed, G. K. (2007) Financing health care in Sudan: Is it a time for the abolishing of usercharges?, *Sudanese Journal of Public Health*: January 2007, Vol. 2 (1), pp. 1- 10.

Nisar, N. and White F. (2003) Factors affecting utilization of Antenatal Care among reproductive age group Women (15-49 years) in an urban squatter settlement of Karachi, *J Pak Med Assoc*, Feb, 53(2), pp, 47-53

Nteta, T. P. *et al* (2010). Utilization of the Primary Health Care Services in Tshwane Region, Gauteng Province, South Africa, *PLOS ONE*, 5 (11), e13909.

Olive, N. and lilani, K. (2009) The global strategy to eliminate HIV infection in infants and young children: a seven country assessment of costs and feasibility, *AIDs*, May 23 (8), pp.987-95.

Parker, R. and Aggleton, P. (2002) HIV and AIDS-related stigma and discrimination: a conceptual framework and implications for action, *Social science and Medicine*. July 57(1), pp.13-24.

Peters, D. H. *et al* (2008) *Poverty and access to health care in developing countries*. Ann. N.Y. Acad. Sci. 1136, pp. 161-71.

Population council (2004) *Community based activities complement PMTCT programs in Kenya*. New York: population council.

Posse, M. *et al* (2008) Barriers to access to antiretroviral treatment in developing countries: review, *Tropical Medicine International Health*, July, 31(7), pp. 904-913.

Printer, T. M. *et al* (2004) Women's reasons for not participate in follow up visits before start short course antiretroviral prophylaxis for prevention of mother to child transmission of HIV: qualitative interview study, *BMJ*, September, Vol. 329.

Rahmati-Najarkolaei, F. *et al* (2010) Experiences: stigma in health care setting among adults living with HIV in the Islamic Republic of Iran, *Journal of the International AIDS Society*, 13, (27), pp.1-11.

RAO, K. *et al* (2006) Towards patient-centered health services in India-a sale to measure patient perception of quality, *International Journal for quality in Health care*, September, Vol18, Nu 6: pp. 414-21.

Reis, C. *et al* (2004) Discriminatory Attitudes & Practices by Health Workers toward Patients with HIV/AIDS in Nigeria, *PLoS MEDICINE*, July 2005, 2 (8), pp. 743-752.

Robert, H. *et al* (2009) Gender and care: access to HIV testing, care and treatment, *J Acquir Immune Defic Syndr*, July 1; 51(Suppl 3), pp. 106-10.

Rogers, A. *et al* (2006) HIV-related knowledge, attitudes, perceived benefits, and risks of HIV testing among pregnant women in rural Southern India, *AIDS Patient Care STDS*, Nov,20(11), pp. 803-11.

Rujumba, J. *et al* (2012) Listening to health workers: lessons from eastern Uganda for strengthening the program for the prevention of mother- to-child transmission of HIV, *BMC*, 12 (1), pp.3.

SCBS (2010) *Sudan household survey 2010*. Khartoum: Sudan Central Bureau of Statistics Central Bureau of Statistics .

SCBS (2009) *Statistical book for the year 2009*. Khartoum: Sudan Central Bureau of Statistics.

SCBS (2008) *Sudan fifth population and housing census priority result 2008*.Khartoum:Sudan. Central Bureau of Statistics.

SCBS (2006) *Sudan household survey 2006*. Khartoum: Sudan Central Bureau of Statistics.

Slavea, C. and Sulzbach, S. (2006) *Strengthening human resources for health*: occasional paper series, number 1, April 2006, pp. 1-37.

SFMoH (2012) *National human resources for health: strategic plan for Sudan 2012-2016*. Khartoum: Sudan Federal Ministry of Health, Directorate General of Human Resources for Health Development.

SFMoH (2011a) *National health sector strategic plan 2012-16*. Khartoum: Sudan Federal Ministry of Health, planning unit.

SFMoH (2011b) *Policy market based private health sector*. Khartoum: Sudan Federal Ministry of Health, Health planning Unit.

SFMoH (2010) *ANC HIV sentinel sero-survey: technical report 2010* Khartoum: Sudan Federal Ministry of Health, preventive medicine directorate.

SFMoH (2007a) *Five - year health sector strategy: investing in health and achieving the MDGs 2007-2011*. Khartoum: Sudan Federal Ministry of Health, Health planning unit.

SFMoH(2007b) *Sudan national health policy*. Khartoum: Sudan Federal Ministry of Health, Health Planning unit.

SFMoH (2003) *Twenty five years strategic plan for health sector 2003-2027*. Khartoum: Sudan. Federal Ministry of health, Planning unit.

SMoJ (1991) *Criminal act, c145& c 156*. Khartoum: Sudan Ministry of Justice.

SNAC (2004) *Sudan national strategic plan sectoral on HIV and AIDs 2004-2009*. Khartoum: Sudan National HIV and AIDS Council.

SNAP (2012) *Sudan: global AIDS response progress reporting 2010 – 2011*. Khartoum: Sudan National AIDS Control Program SNAP, Monitor & Evaluation unit.

SNAP (2010a) *National HIV and AIDS Strategic Plan 2010-14*. Khartoum: Sudan National AIDS Control Program, planning unit.

SNAP (2010b) *Sudan: United Nations General Assembly Special Session on HIV/AIDS (UNGASS) report March 2010*. Khartoum: Sudan National AIDS Control Program, Monitor & Evaluation unit.

SNAP (2010c) *National guidelines of prevention mother to child transmission of HIV*. Khartoum: Sudan National AIDS Control Program, planning unit. [Unpublished].

SNAP (2010f) *Multi sectoral HIV and AIDS annual report 2010*. Khartoum: Sudan National AIDS Control Program, Surveillance unit. [Unpublished].

SNAP (2010 d) *National prevention mother to child transmission of HIV report*. Khartoum: Sudan National AIDS Control Program, National PMTCT unit. [Unpublished].

SNAP (2009) *Knowledge, attitudes and practices of Sudanese health care providers towards HIV/AIDS patients in health settings*. Khartoum: Sudan National AIDS Control Program Surveillance unit.

SNAP (2008) *Situation analysis on prevention of mother to child transmission service in North Sudan*. Khartoum: Sudan National AIDS Control Program, PMTCT unit. [Unpublished].

SNAP (2007) *Annual PMTCT report 2007 report*. Khartoum: Sudan National AIDS Control Program, PMTCT unit. [Unpublished].

SNAP (2004) *National policy for HIV and AIDS 2004*. Khartoum: Sudan National AIDS Control Program.

SNAP (2002) *Situation analysis: epidemiological and behavioural surveys and response analysis*, November 2002. Khartoum: Sudan National AIDS Control program, Surveillance unit.

SNPC/GS (2010) *Millennium development goals (MDGs) progress report 2010*. Khartoum: Sudan National Population Council General Secretariat.

SNRHP (2011) *Annual report on antenatal health care facilities*. Khartoum :Sudan National Reproductive Health Program, Planning Unit.

Solomie, J. and Teka, T. (2005) Knowledge & attitude towards mother to child transmission of HIV & it's prevention among post natal mothers in, Addis Ababa. *Ethiop. J. Health Dev.*19(3), pp.211-218.

Sophie Witter (2011) *Summary report: review of free care policy pregnant women and under five in north Sudan*. Khartoum: Federal Ministry of Health.

Strachan, M. *et al* (2004) *An analysis of family planning content in HIV and AIDS, VCT and PMTCT policies in 16 countries*: Policy Working Paper Series, No. 9. January 2004.

Theuring, S. *et al* (2009) Male involvement in prevention of mother to child transmission of HIV services in Mbeya Region, Tanzania, *AIDS and Behaviour*, Jun;13 (Supp 1), pp.92-102.

UNAIDS (1999) *Summary booklet of best practices*. Geneva: Joint United Nations Program on HIV and AIDS.

UNFPA (n. d.) HIV and AIDS, gender and sex work. [Online]. Available from: http://www.unfpa.org/hiv/docs/factsheet_genderwork.pdf. [Accessed 23May 2012].

UNDP (2011) *Human development report 2011, sustainability and equity: better future for all*. New York: United Nations Development Programme.

UNDP (2004) *Sudan Millennium Development Goals(MDGs): interim unified report* December 2004. Khartoum: United Nations Development Programme.

Wodi, B. E. (2005) Gender issues in HIV/AIDS epidemiology in Sub-Saharan Africa, *Wagadu*, Vol. 2, 2005.

WHO (2007) *Guidance on provider-initiated HIV testing and counselling (PITC) in health facilities*. Geneva: World Health Organization.

WHO (2006) *Sudan health system profile: Eastern mediterranean regional health system observatory*, Cairo, World Health Organization, EMRO.

WHO (2009) *Women and health: today's evidence tomorrow's agenda*. Geneva: World Health organization.

WHO (2012) *Gender, women and health: gender inequalities and HIV*, World Health organization.[Online]. Available from: http://www.who.int/gender/hiv_aids/en/. [Accessed 23 June 2012].

WHO (2004) *Gender dimensions of HIV status disclosure to sexual partners: rates barriers and outcomes*. Geneva: World Health Organization.

WHO (2010) *PMTCT Strategic Vision 2010–2015: prevention mother-to-child transmission (PMTCT) of HIV to reach the UNGASS and Millennium Development Goals*. Geneva: World Health Organization.

WHO (2011) *Global HIV and AIDS response: epidemic update and health sector progress toward universal access progress report 2011*. Geneva: World Health Organization.

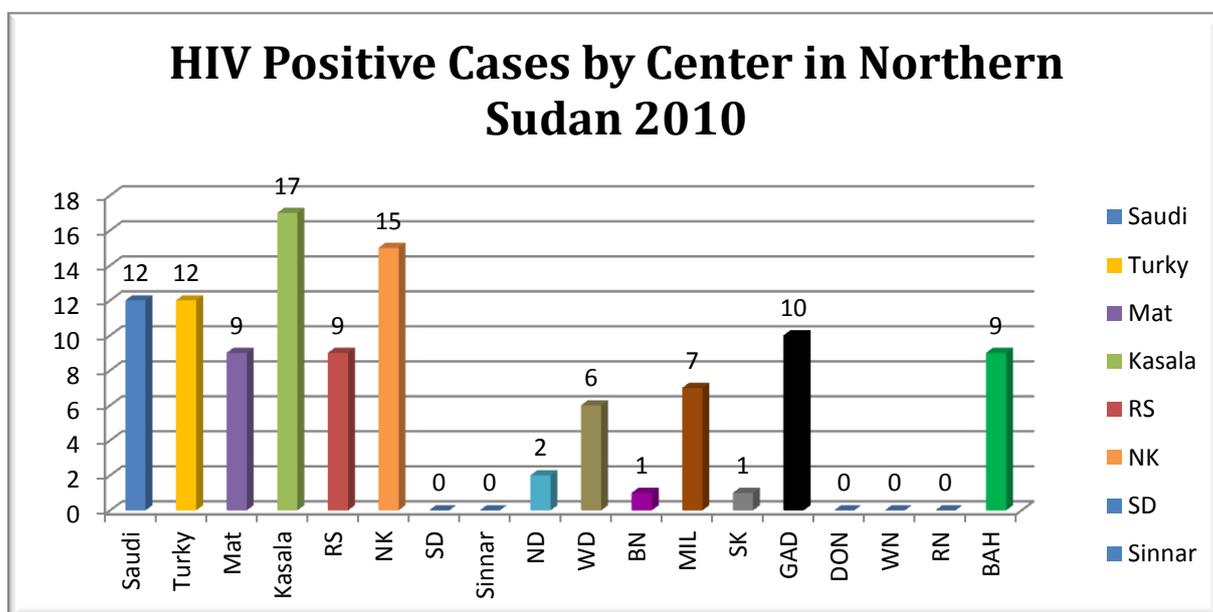
World bank (2012) *Data: countries and economies Sudan*, The world bank groups.[Online]. Available from:
<http://data.worldbank.org/country/sudan>. [Accessed 23 April 2012].

WHO, UNFPA (2006) *Global consultation on strengthening the linkages between reproductive health and HIV and AIDS: family planning and HIV and AIDS in women and children*. Geneva: World Health Organization.

ANNEXES

Annex A: HIV positive cases in Northern Sudan by centres in 2010

Figure 3: HIV positive pregnant women per PMTCT sites 2010



Source: SNAP(2010).

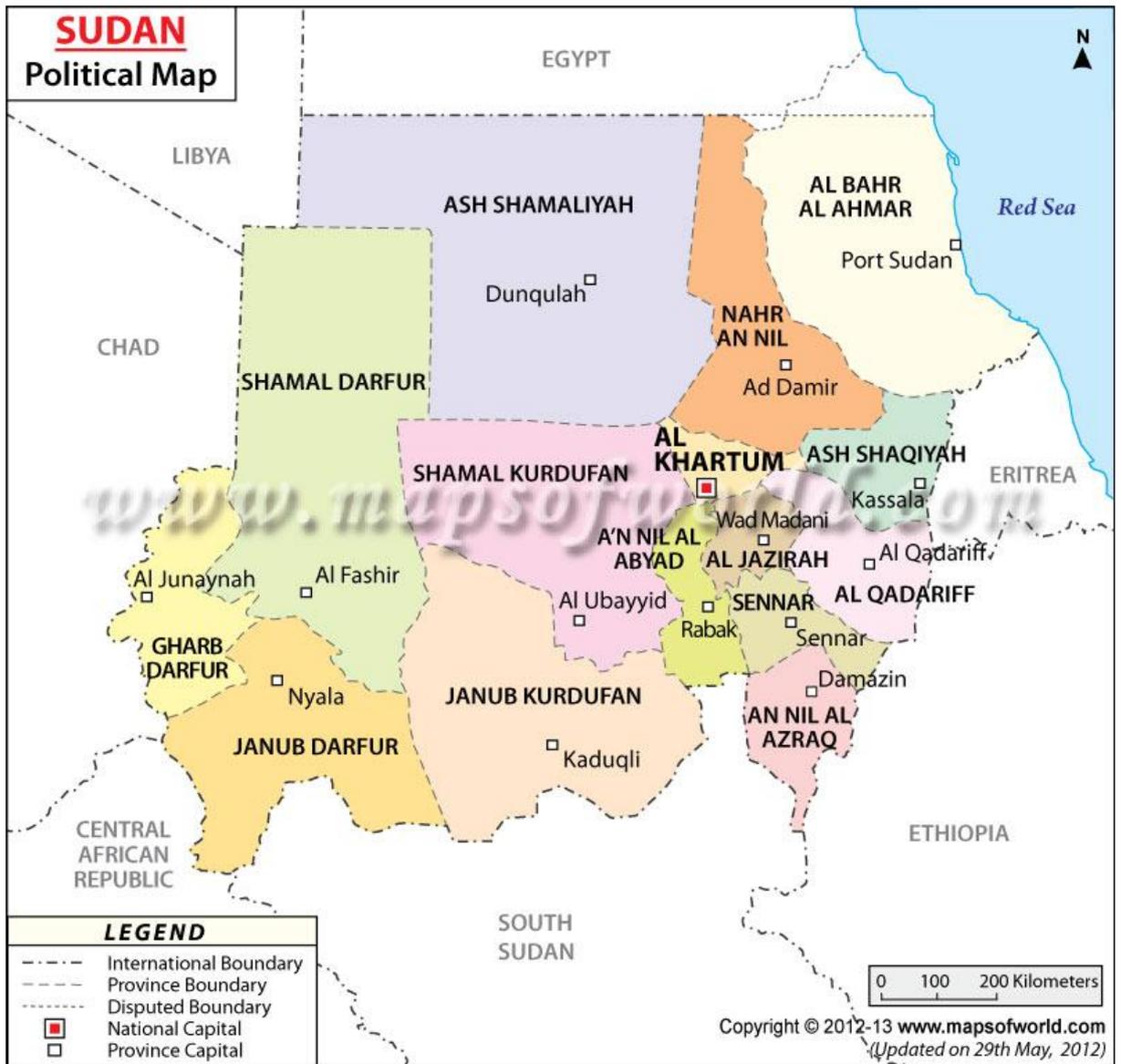
Annex B: Core Indicators of PMTCT

Table 3: Sudan core indicators for PMTCT in 2012

Indicators	Indicator value reported in 2010	Indicator value reported in 2011	Comments
Percentage of HIV positive pregnant women received antiretroviral to reduce the risk of mother to child transmission of HIV	1.72% [N=14,263] 2009 estimates	1.49% [N=5,095] 2011 estimates	Spectrum used to estimate the denominator 2009 estimate is using ANC data for both north and south Sudan
Percentage of infants born to HIV positive women receiving a virological test for HIV within two month of birth	NAD	NAD	Unavailability of the testing (PCR)
Estimated percentage of child infected form HIV positive women delivered in the past 12 month women	29.775% [N=14,263] 2009 estimates	35.74% [N=5,095] 2011 estimates	Spectrum is used to estimate Both denominator and numerator. 2009 estimate is using ANC data for both north and south Sudan

Source: SNAP (2012).

Annex C: Political map of Sudan



Source: <http://www.mapsofworld.com/sudan/sudan-political-map.html#>