PERFORMANCE ANALYSIS OF PURCHASER PROVIDER SPLIT AND
DIRECT SERVICE PROVISION UNDER THE NATIONAL HEALTH
INSURANCE FUND IN SUDAN: PRIMARY CARE CASE STUDY IN WHITE
NILE STATE

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การวิเคราะห์ผลการดำเนินงานของรูปแบบการแยกผู้ซื้อและผู้ให้บริการกับการให้บริการโดยตรง
ภายใต้กองทุนประกันสุขภาพแห่งชาติของประเทศซูดาน กรณีศึกษาบริการปฐมภูมิของรัฐไวท์ไนล์

นายไฮดาร์ ซาฟี เอลดิน อับเดลราซิก ซาอัด

Thesis Title	PERFORMANCE ANALYSIS OF PURCHASER PROVIDER SPLIT AND DIRECT SERVICE PROVISION UNDER THE NATIONAL HEALTH INSURANCE FUND IN SUDAN: PRIMARY CARE CASE STUDY IN WHITE NILE STATE
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ไฮดาร์ ซาฟี เอลดิน อับเดลราซิก ซาอัด : การวิเคราะห์ผลการดำเนินงานของรูปแบบการแยกผู้ซื้อและผู้ให้บริการกับการให้บริการโดยตรงภายใต้กองทุนประกันสุขภาพแห่งชาติของประเทศซูดาน กรณีศึกษาบริการปฐมภูมิของรัฐไวท์ไนล์ (PERFORMANCE ANALYSIS OF PURCHASER PROVIDER SPLIT AND DIRECT SERVICE PROVISION UNDER THE NATIONAL HEALTH INSURANCE FUND IN SUDAN: PRIMARY CARE CASE STUDY IN WHITE NILE STATE) อ.ที่ปรึกษาวิทยานิพนธ์หลัก: ศิริเพ็ญ ศุภกาญจนกันติปริญญาเอก, 75 หน้า.

ภูมิหลัง: หน่วยบริการปฐมภูมิในประเทศซูดานซึ่งเสมือนเป็นด่านหน้าทำหน้าที่คัดกรองผู้ป่วยจะมีบทบาทน้อยในแง่การรักษา นอกจากนี้ส่วนมากจะทำงานไม่เต็มกำลังและยังถูกละเลยโดยกระทรวงสาธารณสุข

วัตถุประสงค์: เพื่อศึกษาผลการดำเนินงานของหน่วยบริการปฐมภูมิที่อยู่ภายใต้กองทุนประกันสุขภาพแห่งชาติและหน่วยบริการปฐมภูมิภายใต้สัญญา

วิธีการศึกษา: การศึกษานี้ได้วิเคราะห์ผลการดำเนินงานแบบ 2 มิติ โดยใช้ข้อมูลด้านต้นทุนของปี ค.ศ. 2013 เพื่อวิเคราะห์ต้นทุนการปฏิบัติงาน โดยได้สร้างแบบตรวจรายการเพื่อวัดโครงสร้างของคุณภาพการให้บริการ โดยเลือก 39 หน่วยบริการปฐมภูมิของรัฐไวท์ไนล์เข้าร่วมในการศึกษา และได้มีการรวบรวมข้อมูลต้นทุนทุติยภูมิของหน่วยบริการที่ได้ลงทะเบียน และข้อมูลในแบบตรวจรายการซึ่งรวบรวมได้จากการสังเกตหน่วยที่ให้บริการในเดือนมีนาคม ปี ค.ศ. 2014

ผลการศึกษา: การใช้จ่ายของกองทุนประกันสุขภาพแห่งชาติที่ใช้ในการให้บริการสูงถึงร้อยละ 97 ของต้นทุนทั้งหมด ในขณะที่หน่วยให้บริการตามสัญญากับกองทุนประกันสุขภาพแห่งชาติในการให้บริการปฐมภูมิจะมีค่าใช้จ่ายเหลือร้อยละ 96 และพบว่าคุณภาพของการให้บริการโดยตรงของกองทุนประกันสุขภาพแห่งชาติมีคะแนนคุณภาพสูงกว่าการให้บริการของหน่วยบริการตามสัญญาเพียงเล็กน้อยอย่างไม่มีนัยสำคัญทางสถิติ

ผลสรุปการศึกษาพบว่าโดยรวมแล้วการให้บริการโดยตรงภายใต้กองทุนประกันสุขภาพแห่งชาติจะมีต้นทุนที่สูงกว่าแต่ได้คุณภาพที่ดีกว่า เมื่อเปรียบเทียบกับการให้บริการทางอ้อมผ่านหน่วยให้บริการตามสัญญาที่คุณภาพการให้บริการมีหลากหลายและมีต้นทุนปานกลาง

ข้อเสนอแนะ: การให้การสนับสนุนทางด้านการเงินของภาครัฐสำหรับหน่วยบริการปฐมภูมิ จะช่วยให้เกิดการให้บริการที่มีคุณภาพสูงขึ้น นอกจากนี้ ความโปร่งใสของหน่วยให้บริการก็มีส่วนสำคัญเช่นกัน

สาขาวิชา   เศรษฐศาสตร์สาธารณสุขและการจัดการบริการสุขภาพ   ลายมือชื่อนิสิต _____

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KEYWORDS: HEALTH INSURANCE, COST, FINANCE, PRIMARY HEALTH CARE, PERFORMANCE / PROVIDER PURCHASER SPLIT

HAIDAR SAFI ELDIN ABD ELRAZIG SAAD: PERFORMANCE ANALYSIS OF PURCHASER PROVIDER SPLIT AND DIRECT SERVICE PROVISION UNDER THE NATIONAL HEALTH INSURANCE FUND IN SUDAN: PRIMARY CARE CASE STUDY IN WHITE NILE STATE. ADVISOR: ASSOC. PROF.SIRIPEN SUPAKANKUNTI, Ph.D. , 75 pp.

Background: Gatekeepers in Sudan has a minor role in providing curative care and most of them are inactive and ignored by MOH.

Objective: This paper is interested in assessing the performance of primary care units under National Health Insurance fund owned and contracted by this organization.

Methods: Two dimensions were analyzed to assess performance of those facilities using historical cost data for the year 2013 to analyze the operational cost and a checklist developed by the author to measure the structure of the quality of services provided considering the lack of local accreditation system, a total number of 39 facilities serving in White Nile state were chosen for the study. The secondary cost data were collected from the register of the facilities. Data of the checklist obtained by observation for the available facilities of services provided within the care units was collected in March 2014.

Results: expenditure of the NHIF facilities incurred in services reached 97% of their total costs while it was 96% for the contracted NHIF type of primary care. Considering quality NHIF provider showed also little increase in provided services with no significant variation from contracted ones.

Conclusion: The overall outcomes seems to be direct health facilities provide high-cost services with decent quality of services compared to an acceptable costs for the indirect with variable quality of care.

Recommendation: public financing of primary health care units will support affordable and higher quality of care closer to population homes. Moreover, the governance of those facilities is also need.

Field of Study:	Health Economics and Health	Student's Signature	....
	Care Management	Advisor's Signature	....
Academic Year:	2014		

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Abbreviations

AIDs	Acquired Immuno Deficiency syndrome
ANC	Antenatal Care
CHW	Community Health workers
CMSTC	Central Medical Store Public Corporation
CSR	Country Status Report
FHC	Family Health Centre
FHU	Family Health Unit
FMOH	Federal Ministry of Health
GDP	Gross Domestic Production
GP	General Practitioner
HIV	Human Immuno virus
IMCI	Integrated Management of Child Illness
MDG	Millennium Development Goals
NCDs	Non communicable diseases
NHIF	National Health Insurance Fund
OPD	OUT Patient

CHAPTER 1

Introduction

1.1. Problems and Significance

National health Insurance Fund (NHIF) in Sudan is a governmental body or organization belongs to ministry of welfare and social care. The National Health Insurance Act was in the year 1994. In 1995 NHIF stared in Sinnar state as a pilot for the project followed by most of the rest states 2 years later.(FMOH, 2012b; Liu, Hotchkiss, & Bose, 2008).

In the beginning of the NHIF experience provided services for its enrollee who were the formal sector employee in urban public hospital through contracting at the state level. With the extension of the population coverage the existing services for NHIF enrollee were found to be insufficient. NHIF then headed towards service provision through primary care facilities to provide the first level of medical care in two ways: In areas with high density of population coverage NHIF provided services directly through health care units either publically owned but operated under NHIF management or founded by the NHIF itself which they called direct medical services or centers; And where no high population coverage or is not possible to establish its own services contracting the service package will be the second choice either from public or private facilities.(NHIF report 2004)

In the year 2011 NHIF was announced to stop direct service provision by presidential decision and to reform service for the benefit of MOH. Even though NHIF was facing financial sustainability problems as addressed in (CSR 2012) that the NHIF cost of the services in 2010 exceeded the level of income with total debt 53 million SD (FMOH, 2012a). NHIF has to reach the universal health coverage as well by the year 2030 as committed to cover all Sudanese population.

State areas in Sudan such as White Nile which is identified for this study have problems of infrastructure specially in health care services (FMOH, 2012a). More than 50% of health facilities are equipped less than actually required, in addition to ill-maintenance, the offered services at health facilities inefficient and of poor quality. Sterilizing equipment is present in only 44% of health centers and available functional infrastructure (water and electricity) varies from 100% in Khartoum and peripheral

states which have only 20%. Moreover, there is weakness in management system of health technology and the assessment processes and measures are not well located (FMOH, 2012a).

Performance assessment of primary health centers has a great importance for National Health Insurance fund in Sudan, especially for the cost and quality of service provided at the first curative level which is used as a referral (gatekeeper) to the second level. The analysis of performance will provide an insight about the whole picture of available health services for NHIF to choose from. And because of the financial instability problems facing NHIF currently, in addition to the policy made by the government to postpone owning direct health facilities and reform the current system towards purchasing external providers NHIF has to face the problem of providing access to its enrollee and high quality services, especially in remote areas where population coverage under NHIF umbrella is supposed to extend and lacking infrastructure exist.

1.2. Research question

The study aims to answer what will be the performance of NHIF service delivery at primary health care level: direct and indirect (contracted) provision considering the cost and quality of services.

1.3 Objectives

1.3.1. General Objectives

To assess the performance of the NHIF service provided directly and the contracted ones for primary curative care for the cost and quality of provided services.

1.3.2. Specific Objectives

To analyze and compare the cost and unit cost of operation for the direct and contracted services under NHIF primary curative care.

To compare the unit cost of providers with NHIF payment per case treated.

To assess the structure of service quality observed at both direct and contracted health centers.

To assess the implication of cost and quality of the two types of services provided on NHIF primary care centers.

1.4. The scope of the study

The study was conducted in White Nile state, in national health insurance fund primary curative care health centers, direct and indirect ones that serve at general practitioner level GP. Data for the year 2013 was used, the cost analysis was done from the provider perspective. Data collection with check list for the quality assessment with observation taken in March 2014.

1.5. Hypotheses

The study assuming that there must be some variations under purchasing and direct provision of services, and accordingly:

Direct provision of primary care services has the most desirable cost performance than contracting policy.

Direct provision maintains better quality of services than the contracting policy.

Chapter 2

Background

2.1. Economy of the country

Figure 1. Sudan map

Source: country status report (FMOH 2012).

Sudan is located in the northeast region of Africa connecting the Middle East and sub-Saharan countries, and considered one of the low income countries. According to the World Bank the choice of south Sudan to go for secession shocked Sudan economy. The immediate effect was the loss of most strategic exported product, the oil, which leads to huge deficit in the governmental budget (World Bank 2013).

Inflation increased to 20% in 2011 on average, from 15% in 2010, leading to the rise in prices and the Sudanese currency depreciation. Sudan's budget deficit was 5.0% in 2011, and was estimated to increase to 5.4% of GDP in 2012 due to oil revenue loss, armed conflicts and increased security threats, new states creation and peace

agreements financing. Because of the US sanctions as well as Sudan's debt, external borrowing options are severely limited and internal borrowing is likely to increase (Country Status Report 2012). Following the secession of south Sudan the demography of the country estimated as in the table below:

Table 1. Sudan demographic indicators

Demography indicators	2011
Population (North Sudan)(Millions)	33.5
Population growth annual %	2.24
Rural Population %	51
Urban Population %	49
Land area (sq.km)	1,800,000
Density (Population/sq.km)	18.6
Population 10-24 yrs. (Millions)	10.1
Youth ages 10-24 % total pop	30
Population age <5 %	15
Population age <15 %	43.2
Population age 15-64 years %	53.4
Population > 65 yrs. %	3.4
Elderly support ratio	16
Life expectancy at births (both sexes) years	59
Life expectancy at births (Males) years	58
Life expectancy at births (Females) years	61
Women 15-44 years (Millions)	8.8
Ever married women Age 15-19 %	11
Ever married men Age 15-19 %	2
Total fertility rate	3.9

Source: CSR 2012

2.2. Health system in Sudan
2.2.1. Health system structure

Health services in Sudan are provided by multiple partners, beside Ministry of Health (MOH) there are Ministry of Defense, Ministry of Interior, National Health Insurance Fund (NHIF), private sector and universities. Those partners operate independently(WHO, 2006).

2 .2. 2. Governance of the health system

The health system in Sudan in which MOH is the main controller has 3 levels: federal, state, and locality level. The MOH as well as the other systems has been decentralized from (FMOH) federal ministry of health to (SMOH) state ministry of health and locality system.

The responsibility of FMOH is to develop all health policies and legislation formula on the national level and align with the states to implement national plans. Policymaking, strategic planning, co-ordination, relations with international organizations, central technical support and state guidance are the main activities of FMOH (Nimeiri, Moustafa, & Ali, 2007; WHO, 2006).

At the state level, (SMOH) main responsibility is to implement health policy following the national level, detailed programming of health and the formulation of projects as well as health services provision to the state population. Based on primary health SMOH undertake implementation of the national health policy through the local health system(FMOH, 2012a; WHO, 2006). The state ministry of health is supposed to share FMOH in financing, legislation and planning of the system but because of their weakness of capacities there are some wide gapes, except Khartoum and Gezira ministries of health which have better system performance(WHO, 2006).

The local system has been given more administrative and executive role. The local councils are responsible for controlling and preventing communicable diseases and promote health and also responsible for water and sanitation services. Technically, local health systems are under SMOH direction. It was established to overcome problems of supervision and leadership through capacity building and referral system support, especially at the boundaries. However, the system was constrained because of lacking

resources, weak support of SMOH, doctors instability and lack of community participation (WHO, 2006) .

2.2.3. Health programs priorities

Priority setting for the health system in Sudan as planned by FMOH is Programs for: Maternal health, child health: The Integrated Management of Child Illnesses IMCI and Immunization of children, control of communicable disease; malaria, Schistosomiasis, Tuberculosis, HIV/AIDS, Leishmaniasis, guinea worm, sleeping sickness and lymphatic Filariasis, Blindness control, Non Communicable Diseases NCDs, Health Information System HIS, research, emergency preparedness, and health legislation.

2.2.4. Financing of health care in Sudan

According to the National Health Account (SNHA, 2008) the total health expenditure THE as part from the GDP is 6%. The out of pocket expenditure OOP represents 64.3%. FMOH share with 21.7% the THE total health expenditure is 3.4 billion US$. The expenditure per capita is 111 US$. The government spends 8.7% 0n health of its total governmental expenditure. PHC has only 6% to be spent on from THE, which is around 87.3 million US$. It is apparent that curative care has the biggest share with 84% of THE. Donors share is 4.16% and other private sector is only 2%from THE (SNHA, 2008).

In 1990s Sudan government adopted new policies in health system, and implemented user fee to reduce its spending on health and to ensure sustainable financing of the system which is mainly tax based(WHO, 2006).

2.3. Social health insurance

Health insurance fund has helped raise the financing of health sector through several mechanisms; payroll deduction obtained from the formal sector, and it is equivalent to 10% of employee's total salary. Of which 4% is deducted from employee and 6% from the government subsidy and private employers. Charity donation, investment in health care, informal sector scheme premium and welfare scheme for the poor families which financed by ministry of finance with the full premium (WHO, 2006).

2.3. Federal medical supply

Drugs and medical supplies are under responsibility of Central Medical Stores Public Corporation CMSPC, which is decentralized to states recently runs the operation on cash hand-carry basis, this requires the states to arrange financing their own

procurement of medicines and supplies, transportation, stores and distribution. Moreover, hospitals are autonomous entities financially, so they need to buy their own supplies. Self –help reliance at primary health care level makes health workers to private buying of supplies(WHO, 2006).

Figure 2. Main finance source
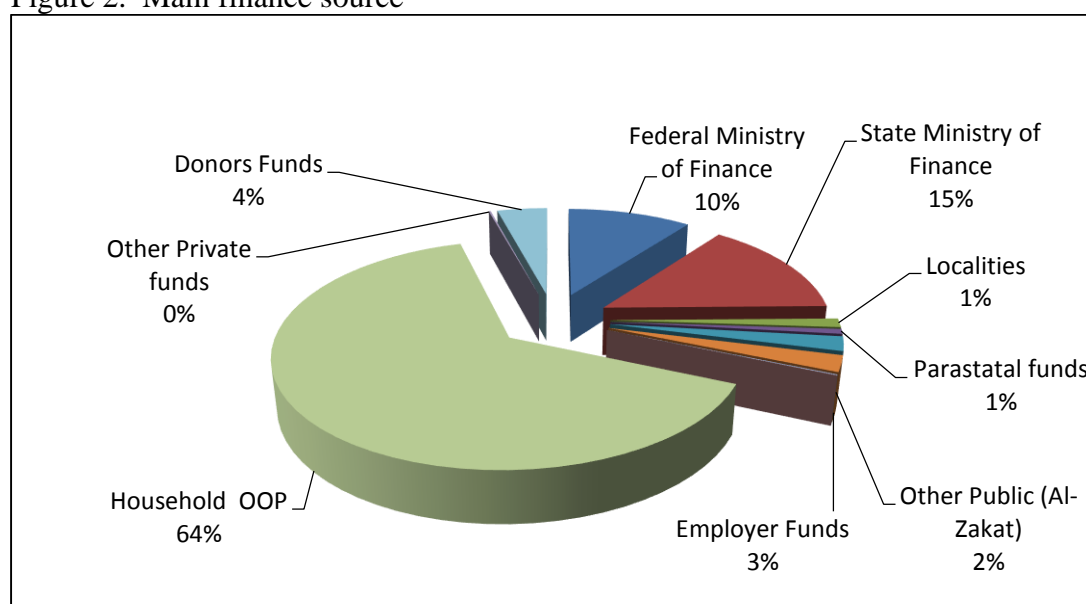
Source: FMOH (2011), SNHA (2008).

2.5. Delivery of health care

 Like most countries, health services are delivered in three levels in Sudan; primary, secondary and tertiary levels. Primary care is provided through a variety of outlets: Primary Health Care Units PHCU, dispensary and a health center. The National Health Policy 2007 put emphasis on primary care and describes the minimum package of services provision (Country Status Report 2012).But the negligence of the Health Authorities and the reliance on curative care function of PHC is limited(Ali et al., April 2012).

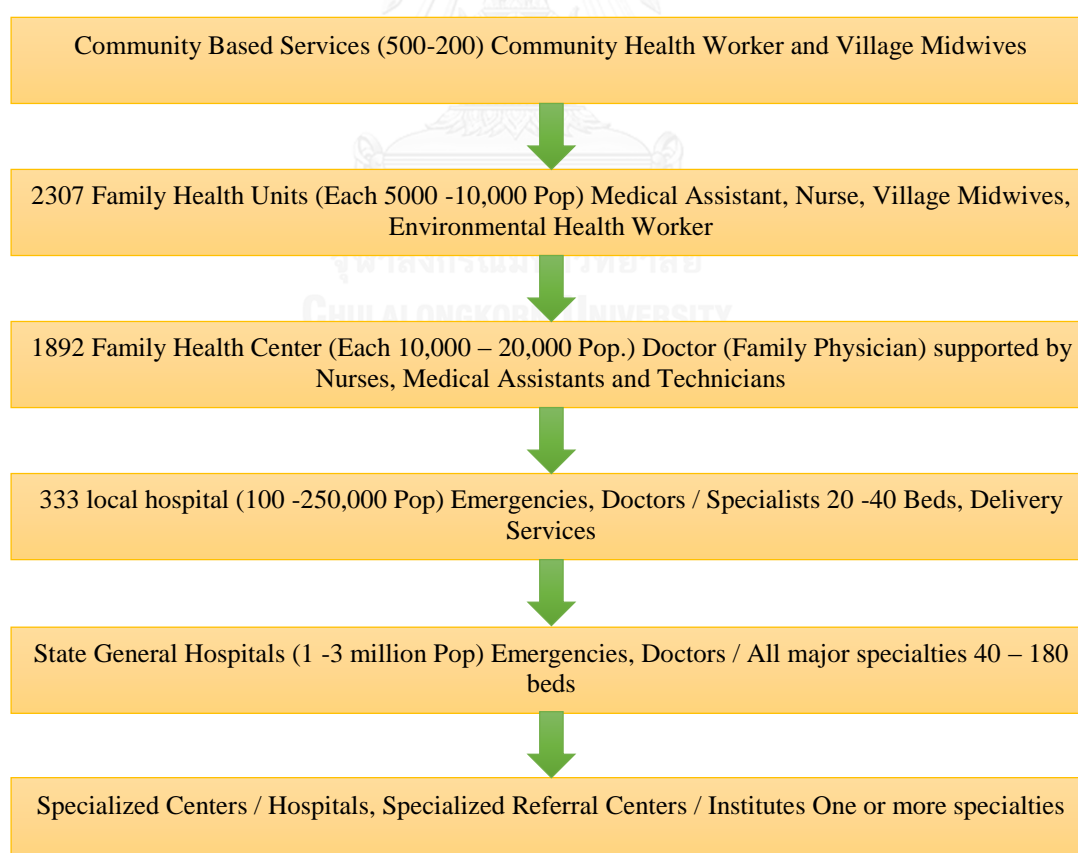Levels of primary health care as shown in the as follows:

Community health worker CHW and Village Midwife are to provide services for population in Family Health Unit FHU with staff includes a medical assistant, nurse, village midwife, and environmental health worker (assistant health overseer). There are 2,307 FHUs according to the health facility survey done in 2010-2011 (Country Status Report 2012)(FMOH, 2012a).

Family Health Centers FHC managed by doctors trained to be family physicians having assistance of other health personnel including nurses, medical assistants, technicians etc. The number of staff and the contents of services package depends on the need of the population served and the case load on the FHC. Currently 1,892 FHC in the country based on the above mentioned survey). This facility also serves as a focal point for IMCI and used as a referral to next level. It consists of rural and urban settings. The later will have laboratory and in some cases an x-Ray. It is run by two medical officers, medical assistant, Lab technician, health visitor, nutrition instructor, and vaccinator. But the rural one has only medical assistant with the same staff. It is named recently by FMOH as FHUs.

Local Hospital LH which is the referral center for all facilities within its catchment area. Current number of facilities is 333 LHs with staff size according to the population served. For other levels of care look at the figure 3 shown below.

Figure 3   Health care delivery in Sudan

Community Based Services (500-200) Community Health Worker and Village Midwives

2307 Family Health Units (Each 5000 -10,000 Pop) Medical Assistant, Nurse, Village Midwives, Environmental Health Worker

1892 Family Health Center (Each 10,000 – 20,000 Pop.) Doctor (Family Physician) supported by Nurses, Medical Assistants and Technicians

333 local hospital (100 -250,000 Pop) Emergencies, Doctors / Specialists 20 -40 Beds, Delivery Services

State General Hospitals (1 -3 million Pop) Emergencies, Doctors / All major specialties 40 – 180 beds

Specialized Centers / Hospitals, Specialized Referral Centers / Institutes One or more specialties

Source: CSR 2012

Table 2 Health status indicators

Year	2011
Crude birth rate (per thousand)	31.2
Crude death rate Total (per thousand)	16.7
Crude death rate Males (per thousand)	17.2
Crude death rate Females (per thousand)	16.3
Rate Natural increase	1.45
Neonatal mortality rate	33
Post neonatal mortality rate per 1,000 LB	41

The table above shows some health indicators about death rates in the year 2011. Like other developing countries, the health profile of Sudan according to WHO 2008 shows that health indicators are lagging behind with life expectancy at birth about 6 years less than average of the region 59 vs. 65 years. Communicable diseases burdening over 50% in Sudan as well as the region, the rest is contributed by non-communicable diseases and injuries(FMOH, 2012a).

Mortality under five is about 78 per 1,000 live births which are higher than the target of 41 to be achieved of MDG by 2015. There are variations between states as well. In the Northern State under five mortality of around 78 in comparison to about 172 in Blue Nile and 148 in Red Sea, Kassala and South Kurdofan . Malaria 25%, prematurity 18% and Pneumonia 16% are the main causes of death. The maternal mortality ratios are around 216 per 100,000 live births which is higher than the MDG target of 134(FMOH, 2012a).

Malaria is the most common cause of morbidity in Sudan among communicable diseases. The estimation of malaria prevalence rate using Rapid Diagnostic Test is at 1.8%. However, there are differences between states. The highest rate reported from Blue Nile 12.5% and West Darfur 7.1%. About 3.1 million malaria cases and 8,844 deaths are reported in 2009. Tuberculosis remains one of important diseases with prevalence rate 120 cases per 100,000. As well as HIV with 122,216 living adult and child in 2009 and was estimated to increase from 0.67% to 1.2% in 2015(FMOH, 2012a)

2.3. National Health Insurance Fund

2.3.1. Direct and indirct services provision

The direct service provision within National Health Insurance setting is meant to be all Health care services provided to insured and completely owned by NHIF. While the indirect service provision is that purchased from external health care providers.(Mustafa, 2013)

2.3.2. Primary health care

Primary medical care in the services brought by NHIF for its consumers plays an important role because it represents the first contact of medical benefits. Also the starting point from which referrals are done to the upper level, the hospital or specialists (NHIF, 2012a).

2.3.3. Primary care curative package

The primary care package within NHIF services are provided at the level of health centers for the curative care only. The general medical practitioner at the health facility provides services for beneficiaries according to medical guidelines of service provision in the setting of NHIF. Services include; visits for the routine and emergency care, laboratory investigation, drug prescription which are mainly generic medicines, admission and follow up and referral to the second level of care specialist, hospitals or referral clinics(NHIF, February 2014)

3.3.4. Services provisioning

The total number of facilities is 1347 out of which 309 direct facilities by 24.8%, and 1038 facility indirect, by 75.2% net increase 95 facility for the year 2011. Moreover, the rate of increase of facilities was 7.6%, distributed to different states as in table 3 (NHIF, 2012a).

Table 3 Health facilities provide services for NHIF

Facility / States	Health Centers		Hospitals		Total
	Direct	Indirect	Direct	Indirect	
Khartoum	0	240	0	44	284
Sinnar	36	18	2	20	76
Gezira	30	172	0	74	276
Gadarif	18	41	0	26	85
Red Sea	4	24	0	12	40
River Nile	22	50	0	31	103
White Nile	23	16	2	22	63
North Darfur	18	5	2	15	40
Blue Nile	10	4	1	16	31
West Darfur/ central	17	0	0	11	28
North Kurd fan	45	22	7	23	97
Northern	11	41	0	30	82
Kassala	13	19	0	13	45
South Kurdofan	11	5	2	11	29
South Darfur/ East	19	5	0	24	48
Western sector	11	0	5	4	20
Total	288	662	21	376	1347

Source: Adopted and translated from NHIF annual report (2012).

3.3.5. Health service expenditures

Table 4. Expenditure on medical services

Year	Expenditure on medical services	Percentage
2006	68,857,292	76%
2007	77,452,050.55	61.5%
2008	58,320,027.79	74.6%
2009	134,801,443	78.2%
2010	191,269,821	85.9%
2011	294,798,068.00	94.5%

Source: NHIF strategic round report

According to department of statistics and information report 2012 the year 2009 the expenditure exceeded the collected funds (109.1%). Information of the next year 2010 showed that 9.4% were allocated to indirect medical services and administration, 85.9% were allocated to direct medical services and only 4.7% for nonfinancial assets of the total expenditure which reached 222.67 million SDG. NHIF generally faces problems of collection of funds that is expected, for example in the year 2011NHIF total collection of funds was 311.031 million SDG equivalents to 89.8% of the expected one 346.36 million SDG. In the context of White Nile State revenue collection reached 19.27 million SDG and the spend amount was 18.63 million SDG(NHIF, 2011).

2.6. White Nile State

The White Nile state lies to the south of Khartoum with population about 2 million. Coverage of population of HI is about 36% of population. The total number of health services outlets is 63 facilities among which there are 23 health centers under NHIF direct management and rest of health centers contracted. There are some difficulties in providing care to the south because of the contact of the state with the Republic of South Sudan and the conflict in the area.

Figure 4. NHIF at the state level
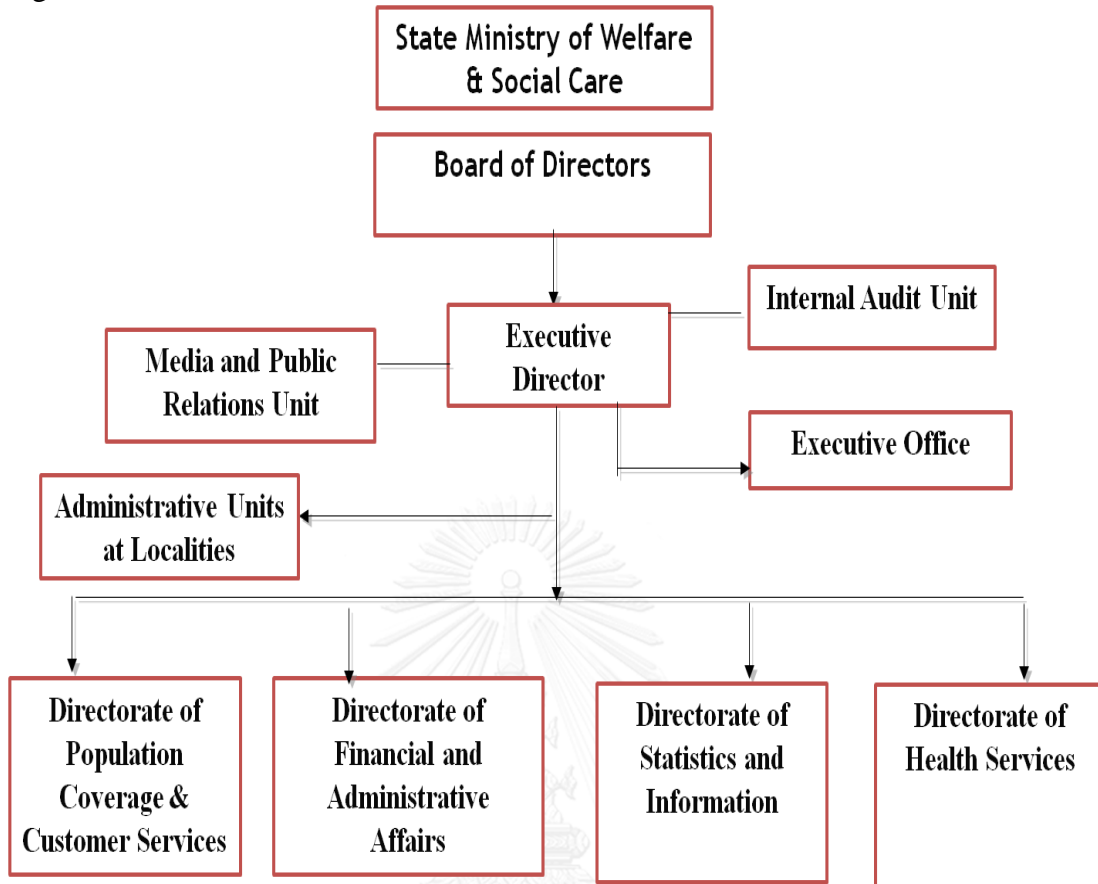
Source: NHIF background 2012

The executive directorate at state level is under supervision of state ministry of welfare and social care but technically related to the Head Quarter. The executive director has the delegation to run plans and the services according to context of the state. However guidelines in planning and population coverage come from NHIF Head Quarter. The subunits of the executive directorates share in the state plans and then the implementation of project and programming(NHIF, 2012b).

Medical services in the state are under the directorate of health services which is responsible for identifying needs of medical services provision, contracting providers, and supervision. Beside that directorate of medical services is responsible for the revision of all claims and correcting them according to contract package. Information flow from all facilities direct and contracted are conducted through NHIF officers within the facilities and up flow to the directorate of statistics and information which is as well responsible for supervision on information flow and NHIF officers' performance. The state under NHIF management is divided into four local executive

units belong to the executive directorate, unlike the state political localities which is divided into 9 units. Local units are staffed in correlation with the executive directorate departments Medical Doctor as manager, statistical unit, administrative supervisor accountant and insurance card unit. The implementation of programs and services are done under direct supervision of local units with collaboration of other departments accordingly (NHIF, 2012b).

Generally, the revenues of the state come from different sources federal and state levels, NHIF Head Quarter collect the 60% of the formal sector from Federal Ministry of Finance, as well as FMOF AL zakat full premium for welfare scheme. State Ministry of finance pays the 40% for formal sector which is equivalent to 4% of employee's salaries. Local employers pays full premium directly to the executive directorate. Other resources of revenues are 25% copayment on drugs, user charges for the uncovered population under NHIF and some private investment in health. Resources are allocated on direct and contracted services, procurement of drugs and medical supplies, administration and nonfinancial assets. The distinction of actual financial allocation on each type of medical services was not reported, however the total spent was around 80% of the revenues (NHIF, 2011).

Chapter 3

Literature review

The aim from this literature review is to focus on the performance of service provision in primary care over the concept of purchaser provider split, competition in health market and contracting for health services provision. Also this study is going to reflect the experience from different countries in this field.

3.1. Health care reform

Many countries start to reform their national health policies and system so as to achieve efficiency in health provision (Diderichsen, 1995) .The core principal of health reform based on the concept that the best model of health provision is a mixture between the public funding and competition between the private and public providers . Moreover, the World Bank motivates the policy which controls the health market instead of being under the control of the market force.

The process of health reform includes the implementation of certain models that are assigned according to the need of each system. For example in the Swedish experience , the reform follow the need for improving the performance of the health system as well as seeking for new policy that result in cost containment (Anell, 2005) .On the other hand , the urgent need for health reform in Thailand so as to increase the accessibility to health services especially the rural poor population(Supasit 2004).

In china , the need for health reform is more critical because the Chinese health system face many problems like increase in demand for health due to the large population , inefficient planning and allocation for health resources and inadequate health care insurance (Wang, Rao, Wu, & Liu, 2013). The response of the Chinese government was to ensure the coverage of both urban and rural citizen under efficient health system .Therefore, the government focused on blinding of the basic medical system, ensuring the pharmaceutical services, increase community participation in health system, reforming the public hospital and implementing the concept of equity in provision of services. The initial result of implementing these elements shows obvious improvement in the national health indictors with expectation to get the full out come by the year 2020.

3.2. Concept of provider purchaser split

Nowadays, Provider purchaser split have been used widely all over the world. The definition of purchaser provider split , called new public management is the arrangement where the purchaser is the agent who decides what will be produced and the provider is the agent who delivers the agreed outputs or outcomes (Ryan, 2000). Another definition is brought by (Tynkkynen, Keskimaki, & Lehto, 2013) which defines this model by the presence of third party payer who is completely separated from the process of health delivery. There are other term that have the same meaning such as new public management, market oriented reform and commissioning (Bailey, 2013),(Porter, Mays, Shaw, Rosen, & Smith, 2013) and (Rosen & Mays, 1998).

When we separate between purchaser and provider an internal market in health care will be created. This is an essential component in the new NHS. The separation between the buyer of the services and the provider aim to introduce quasi-market structure in the NHS and result in economic benefits from its operation. The idea was built on competition occurs between providers in the health market(Shackley. P and Healey, 1993).

That issue is debatable because the notion of competition is not totally feasible in health care, this was due to imperfection in the health care market where asymmetric information, uncertainty, externality and monopoly exist and lead to market failure. So in that case some sort of regulation is always needed from the health authorities and they must intervene heavily to regulate market of health care, which is also considered as one form of market failure in the competitive market. However, the concept of competition is still beneficial(Shackley. P and Healey, 1993).

Monopoly provider can be seen in the health care market having regulations with which will be protected against competition. The monopoly power can be limited if faced by monopoly purchaser who will have the power to negotiate the prices of services, because it owns the control upon the demanders of the services supplied by the provider monopolist(Shackley. P and Healey, 1993).

In this model health authorities will be representative of the consumer in purchasing services and only providers deliver services demanded in competitive way, taking in mind price and quality of the services(Shackley. P and Healey, 1993).

3.3. Contracting for health services provision

The importance of contracting appears from its benefit to the health system. (Ashton, Cumming, & McLean, 2004) explained this benefit in term of improving the quality, quantity and cost of the provided services .Moreover, it can stimulate the competitive provider to bring out their best performance. Contracting also can improve the allocation of resources and give consumers more choices about health providers.

The concept of contracting out based mainly on how to increases managerial autonomy, in addition to increases the effectiveness and efficiency of services through competition. Contracting out also play great role in expanding the access to services quickly, with maintaining the quality of provided services (Lagarde & Palmer, 2009). In general, there are three main types of contracting, the first one is the block contract in which the purchaser pay lump sum on the beginning of the contract period regardless the frequency of patient visits. This type of contact is more common and need less monitoring .The second type is the cost per volume contracting , which like the block contract in the initial payment but in this type there will be additional payment if the number of utilization exceed the agreed on level . The last main type of contracting is the cost per case which is superior on the above types by the specification of information but at the same time, this type of contract may result in cost escalation (Cairns, 1993).

However, the impact of contracting out remains controversial. Some reviews argued that, it's very important to improve the overall performance of service provision. This improvement could be explained by the continuous competition among providers and the power and knowledge of the purchaser that help to maximize the gaining of their real needs of services. On the other hand, some critics said that; contracting out is characterized by its high administrative cost , therefore many countries especially the developing ones will face financial constraint that may result in further fragmentation of the health system; and governments with weak capacity to deliver services may also be weak in a stewardship role (Liu et al., 2008).

Therefore, it's very clear that, the debate about how contracting out should be formulated or organized to maximize its goals. In general, the purchaser can design the service package better because they know well about population needs .Moreover, a separate purchaser can easily make link between what should be provided and the costs and the quality of the services (Liina-Kaisa Tynkkynena, 2013).

Some authorities started to encourage the involvement of the private sector in the PPS process. This step was seen to be more effective in rural area which face obstacles in providing primary services by public sector .These obstacles are like shortage of medical personals due to the in lack of incentives which result continuous exchange of providers. The involvement of private for-profit providers in the delivery of publicly funded primary health care services has many shapes; either by contracting out with physician directly to provide consultation services or contract out the responsibility for providing a range of primary services to a given population (Liina-Kaisa Tynkkynena, 2013).

Many studies have been conducted to evaluate the contracting out process .Some reviews (Liu et al. 2008) concluded that contracting has positive impact on service utilization , but in general there was controversial debate about its impact on the quality and cost of provided services. Therefore, the majority of these reviewers have pointed out the need for additional studies of contracting for service delivery(Anna Heard, 2013).

3.4. Lessons from different countries

In England , (Chambers et al., 2013) conduct a study to find the best mode of commissioning in different situations and for different types of services .The study used 10 single depth interviews with providers from both public and private sector to explore their perception about commission .The conclusion of the study show that the 'negotiated order', managerial performance of providers and disciplinary control are the three media of power used in combination by commissioners. Moreover, the case explains that leadership and resource governance are supported issues in commissioning process.

On the other hand, in the Finnish experience the governmental support play a role in implementing such systems in public health services. And mainly the split improves the cost awareness and cost effectiveness, transparency in administration and finance, operational management, customer orientation, private provider involvement in the service provision. But it has some disadvantages such bureaucracy increase, quality control difficulties and transaction cost (Tynkkynen et al., 2013).

In New Zealand, the government detected some features of malfunctioning in the national health system .These problems were; long waiting in public hospitals,

fragmented fund, difficulty in accessibility, absence of consumer control, lack of equity and in differentiation between providers and purchaser. So as to handle the situation, the government used new policies that include the provider purchaser split concept which was similar to that used in Netherlands, the UK, Sweden and Russia. The provider purchaser split was based on the separation between the provider and the purchaser so as to overcome the conflict of self-interest .Moreover, the new policy allowed the contracting with well-known practitioner and the purchasers have the right to select the providers according to consumers demand .Accessibility for health services was motivated and resources was contained by allowing public facilities to be used by private sector. The ministry of health has a fundamental role in monitoring and evaluating of the new system and there was specific indicators for quality assurance (Borren & Maynard, 1994) .

One of the interesting study was conducted by (D Varatharajan 2004), aimed is to evaluate the performance of 10 primary care centers and 65 sub centers after implementing the decentralization policy in the state. The study used score to rank the quality and accessibility of each facility. The indicators that used to evaluate the quality were ; building structure, toilet, clean running water, electricity, communication and washbasin .The access was assessed by measuring size of the building versus patient load, PHC staff , patient records and waiting area. For costing, salaries, overhead, medical cost, capitals and equipment were included in the cost after converting non-recurrent items into annualized figures .The outcome of the study carried out that, the decentralization has no significance in the health sector in the state .Moreover, there was an obvious evidence of inequality among the selected facilities.

In 2005, an implementation of Family Physician was initiated in Iran. It was the first national attempt to split the purchaser and provider of the primary health-care services in Iran. The aim of this project is to encourage the participation of the private sector in the provision of primary health services. Two years later, (Amirhossein Takian, 2015) conduct study to evaluate the program . The study used 71 face-to-face interviews and three focus group discussions at national, provincial and local levels with different stakeholders. The outcome of the study shows that there was the PPS didn't achieve its goal because of the misconception and lack of coordination between provider and

purchasers. Moreover, the study concluded that, it's very important to take more preparations before expanding this project.

In Malawi, the government introduced a new policy in 2002 to increase access to health services and to improve equity, quality and financial protection for poor population. The agreement include to contract out with non-governmental agency to provide services for the target population. Later on, an interesting study was conducted to evaluate the impact of this reform .The study used quantitative and qualitative methods to assess the contracting out mechanism. The outcome of the study shows that, there was a positive improvement in accessibility to health services and financial protection. However, the study observed that there was little evidence of meaningful improvement in quality and efficiency. This was explained by the fact that, the government focused more on demand side factors, and paid little attention to supply factors, which make the providers under financial constraint that impact negatively the quality of provided services.

3.5. Measurement of primary care

The World Health Organization (WHO) describes primary care as: essential healthcare based on practical, scientifically sound, and socially acceptable methods and technology made universally accessible to individuals and families in the community by means acceptable to them and at a cost that the community and the country can afford to maintain at every stage of their development in a spirit of self-reliance and self-determination.

There is an obvious relationship between primary health care PHC and better health. One study found that people receiving good PHC are 10-15% more likely to live in good health when compared to those receiving poorer PHC.

Nowadays, many challenges are facing the decision makers about the appropriate policies for maintaining the provision of primary services in efficient and effective way. These challenges include the global demographic changes where most of population are getting older and therefore there are greater disease complexity. This demographic change was more complicated by the continuous growing of medical expenditures especially with the problem of scarce resources. All these factors together made many policy makers search about new reform that help health systems to achieve their goals with proper performance(Olena Kalinichenko, 2013).

Evaluations of the performance of primary services increasingly play a role in health care reforms. There is an urgent need for evidences that help the stakeholder in best resource allocations. This requires evaluation of the responsiveness of health services from the patients' perspective. Another important issue that should be held with the evaluation process is to adjust the country context. This adjustment will help much to achieve the best road map for health reform since every society has its own resources and needs that affect usually the performance and the ongoing reform(Mosquera, 2013). In addition to that, before starting the evaluation process, it's very useful to adopt a proper framework from which measures are developed. This framework should contain relevant baseline indicators that will help to bring out accurate result after the evaluation process.

There are many approaches that have been developed for assessing the performance of health systems. The aim of these evaluations is to determine the basic needs so as to improve the efficiency and maximize population benefits. Moreover, the assessment process will facilitate the effort to improve accountability, quality, appropriate use of resources, and patient outcomes and to lower the risk of adverse events (Castro, Knauth, Harzheim, Hauser, & Duncan, 2012).

3.6. Measurement of quality of primary health care services

The definition of quality in primary healthcare is difficult because quality is complex and has multi-dimensional aspects. There is an obvious variation in the concept and perception of quality of primary health services from one place to another. This variation based mainly on the different needs of each population, socioeconomic and other ethical factors.

One of the main rationales for adopting the provider purchaser model is to improve the quality of health services. This improvement could be achieved when the providers delivered the service package according to the specification of the contract. Also, another factor that increases the possibility of quality improvement is the monitoring process from the purchaser side(Xingzhu Liu, 2004).

Measurement of quality of primary health services is fundamental. There was a direct link between quality and the cost of provided services. Therefore, the assessments of the quality of primary care should consider the four dimensions of primary care: the

first contact experience, longitudinally, coordination, and comprehensiveness (Castro et al., 2012).

(D. Varatharajan, 2004) conduct study to assess the performance of decentralized primary health centers in in Kerala, India. The study was conducted in three stages to evaluate the quality of health services by using chick list with scores. The chick list included different aspects like Infrastructure, staff, medical equipment, drugs, supplies, water supply, electricity, waiting area, patient privacy and communication. Each of these aspect have been weighted according to its impact (varying from 3-5).The study concluded that, most of primary health care centers didn't benefit much from the decentralization strategy. This was explained by the fact that, the local government fund small group of the primary centers only – which revealed better improvement- while the remaining large portion of facilities are out of fund. The recommendation of the study reflected the importance for the decision maker in the local government of Kerala to pay more attention about resource allocation for their primary health care.

(Anna Heard, 2013), carried out a study in Chittagong, Bangladesh to compare between public funded health centers and other facilitates that was contracted with non-governmental partners. The study examines the differences in efficiencies, quality and cost of services. For the quality assessment, the study used facility score that made up of different evaluating components like; Infrastructures (publicity signs, clean premises, electricity, running water), Drug supply (availability of essential drugs like Penicillin tablets for example), presence of medical equipment and availability of different health services like maternal and child programs. The score also evaluate the knowledge of medical staff and their orientation about referral systems. The outcome of facilities survey shows significant differences in the ability of the health facilities to deliver PHC services. The contracted out   facilities were more likely to have working equipment, essential drugs and the necessary infrastructure. They also provide more volume of services when compared to the other types of facilities. One of the interesting finding of the study is that, the contracted facilities received more supervision visit in compared to the public ones. This may explain why it seems more efficient and effective than the others.

3.7. Cost of primary health services

One of the biggest challenges that face decision makers is how to allocate the scares resources in health system. Limited budgets are mostly allocated by government without costing the services to be provided(P. Hatcher, S. Shaikh, H. Fazli, S. Zaidi, & A. Riaz, 2014).

Although there are many methods for estimating the unit cost of services, but there is no best unique method to conduct the exercise. Many reviews conclude that, every study should select the appropriate method based on its context and objectives of each study (P. Hatcher et al., 2014).

Many countries started to reform their health systems by adopting the provider purchaser split , but still there is no much focusing about the costing of contracted out services(P. Hatcher et al., 2014).

(Patricia Akweongo & Rainer Sauerborn, 2013), conduct a cross-sectional study to determine the cost in twelve public primary health centers in Ghana. The study used step-down allocation approach that was recommended by World Health Organization for the analysis. The outcome of the study shows that, the average annual cost of operating a health center was $136,014 US. Moreover, Personnel accounted for the largest proportion of cost 5%. Overall, ANC 17% and delivery 8% were responsible for less than a quarter of the total cost of operating the health centers. The average recurrent cost was found to represent about 93.7% of the total cost. This study also revealed that, the unit cost of Antenatal visit was 18 $ US and 63 $ US for normal delivery. This high unit cost indicate that, there was underutilization of the existing capacities of health centers and it reflect the need to encourage patients to use health centers.

(Muhammad Ashar Malik, 2015), try to examine the detailed cost of primary services in six basic health unit that were selected randomly from five districts in Pakistan. The study design a questionnaire to record expenditure on salaries of staff, equipment, furniture, medicine and other supplies. The result of the study reflects that, Staff salaries constituted 90% of recurrent cost. On the other hand, the study revealed that, the estimated recurrent cost of basic health units was six times higher than average consultation charges with the private general practitioner GP in the country. Moreover, the performance of most of the basic health units was lower than the Performance target 50 patients per day set in the sixth five-year plan of the government of Pakistan.

Another costing study from Pakistan was conducted by (P. Hatcher et al., 2014).The aim of this study is to determine provider costs of maternal health services at two government Rural Health Centers RHCs contracted out to a non-governmental organization. The study collects data from the records of the facilities by reviewing resource inputs and service volumes. Then the study analyzes the collected data and determines the unit costs based on actual costs and volume of maternal services. The study found that, the unit costs for the projected volumes of services were lower due to best allocation and utilization of resources. Moreover, the study detected that, the distribution of expenditures at both facilities was largest for salaries of staff, followed the operating costs, medicines, medical and diagnostic supplies.

Chapter 4

CONCEPTUAL FRAMEWORK

The conceptual framework of this study demonstrates the financing and expenditures and utilization of primary care units under NHIF services in White Nile State for the year 2013. Direct health centers stands for the primary care facilities owned by the National Health insurance fund and indirect health center stands for contracted primary care facilities.

The direct health centers revenues as shown in the conceptual framework come from state executive directorate which is the fund holder provides the its own facilities with find in terms of in kind procurement of medical supplies drugs and laboratory supplies. Moreover, all managerial expenditures and services are paid by the executive directorate. Furthermore, the NHIF health centers get revenues from selling services to population with total price of care for uninsured populations and only co-payment on drugs prices from insured sector.

Contracted facilities receive funds from State Ministry of Health, reimbursement from NHIF, insured population co-payment on drugs price and total price of uncovered population services. Claims are reported prospectively on monthly basis then NHIF refund contracted facilities 75% of drugs prices and total doctor visit and laboratory service prices. Cost analysis of both types of services and unit cost calculation against population served in each setting and compared to assess objectives of the study. Analysis is taken from the provider perspectives.

Figure 5. Conceptual Framework of Financial Sustainability of NHIF Primary Curative Care Services 2013
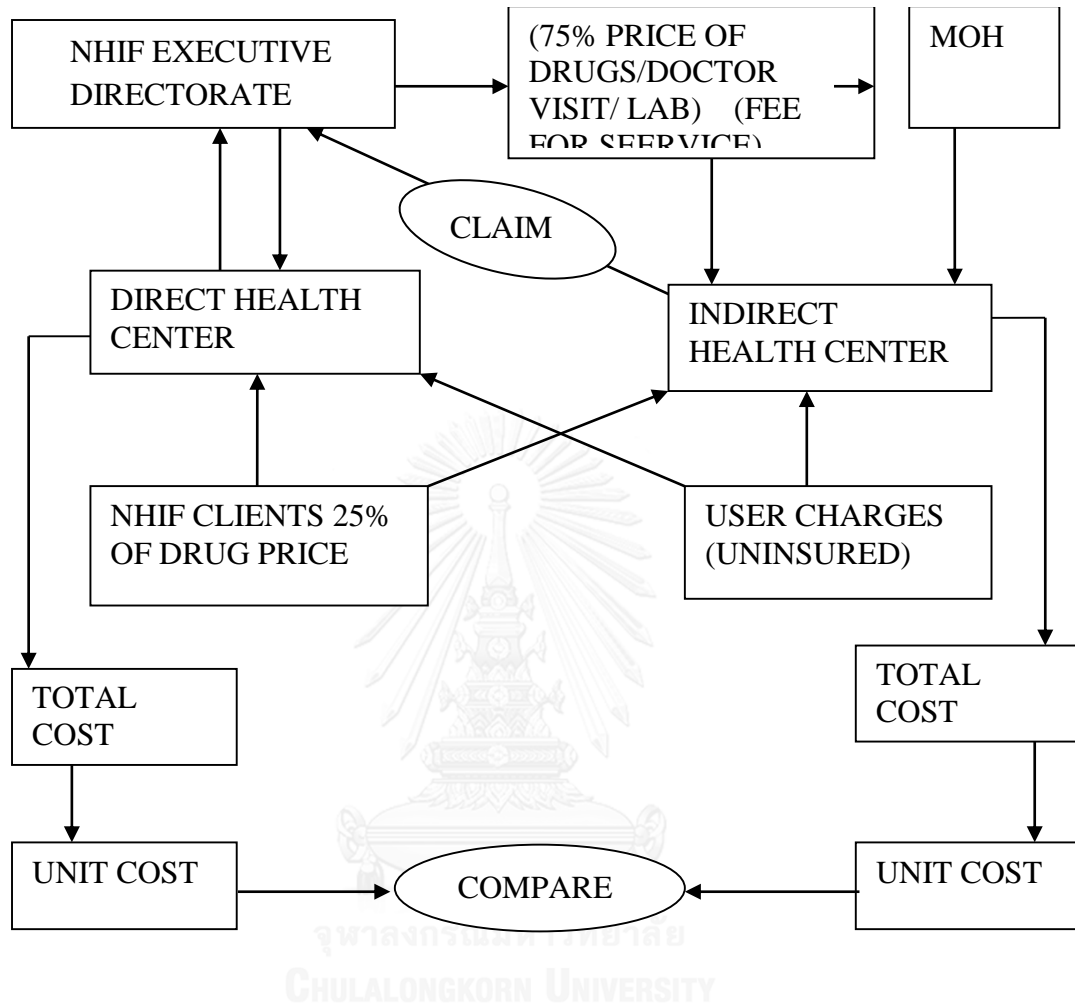
Chapter 5

Methodology

5.1. Study design

This study includes retrospective analysis using quantitative data analysis taken from the financial system of NHIF primary curative care contracted and directly owned. Moreover, statistics of all study population. Also prospective analysis using check-list and scoring technique and to examine the quality of services delivered considering the structure. In the beginning collection of all financial data and resource inputs. Secondly assessment of the quality of the services.

5.2. Study population and sample selection

Total number of direct and contracted primary health centers serve at GP level under NHIF services provision in White Nile state are 39, out of which 23 direct health centers and 16 contacted health centers.

Multistage sampling for the study will have 8 clusters for the 4 localities and with the distinction of urban rural setting of health centers. In the first stage one urban area and one rural were excluded, because they do not contain both direct and indirect health centers.

Table 5. Total number of direct and contracted health centers

Kosti urban	Kosti rural	Aljabalein urban	Aljabalein rural	Eldueim urban	Eldueim rural	Algitaina urban	Algitaina rural
Kosti 1st direct	Altawila direct	Rabak 1st direct	Gezira Aba direct	7thneighborhood direct	Umjar indirect	Algitaina 1st	Hind direct
Satti direct	Guli direct	Alamara direct	Tahir direct	Ridaa direct	Alkireida indirect		Drader direct
Tigani direct	Alrawat indirect	Railways direct	Alshifa indirect	Abu Jabra direct	Altagwa indirect		Jamalab direct

Ahmed Abdelgader 28 (direct)		Alsalam Rabak indirect	Tugaba indirect	Abdelmuneim (direct)			Wad jar Elnabi indirect
Aymen Taha (direct)			Alsalam kenana	Buraee (indirect)			Sh. Elsiddig indirect
University (direct)							Neima indirect
Tandalti (direct)							
Railways (direct)							
Elhikma (indirect)							

The second stage choosing every second health centers ranked in the table using simple random sampling 16 health centers were chosen: 1. Satti (direct), 2.Ahmed Abdelgader direct, 3.University direct, 4. Railways (direct), 5. Altawila direct, 6. Alhikma indirect, 7. Alamara direct, 8.Tahir direct, 9. Tugaba indirect, 10. Alsalam rabak indirect, 11. Ridaa direct, 12. Abdelmuneim direct, 13. Hind direct, 14. Jamalab indirect, 15. Sheikh Elsiddig indirect, 16. Drader indirect.

5.3. Data collection
5.3.1 Data for quantitative analysis

Secondary was collected using excel form the accounting system in NHIF executive directorate of White Nile for the direct health centers. All the available cost data was

collected from its related department for the cost of services. Statistics related to direct facilities was collected from the statistic and information department.

The indirect health centers data collection of costs and statistic was done in the setting of the health facilities from the responsible personals and was taken from their manuals of accounting and statistic censuses.

5.3.2 Data for qualitative analysis

Primary data using check list was used to obtain data through direct observation from both types of direct and indirect NHIF health centers.

5.3.3. Cost analysis methods

Cost was defined from the providers' perspective accordingly:

Cost of direct health centers is calculated as all budget form the NHIF+ revenues of other services – loss or profit incurred from operation.

Indirect health centers cost is all SMOH budgets + revenues of services + claim of NHIF – loss or profit incurred from operation

Unit cost is equal to cost / number of patients

Descriptive analysis for fund provided and criteria for allocation.

Descriptive analysis and cost of services provision for direct and contracted health centers compared to the volume in each of the settings.

5.3.4 Method for quality analysis

Assessment of the quality of the services provided was done using check list of quality indicators focusing on structure related to the following dimensions: Patient care, Safety, Support services, Information management and Facility management. Those dimensions were divided into sub areas of selected care targets as follows:

Patient care included:

General cases, Hypertension, Diabetes Mellitus, Antenatal care, Child care, Clinic.

Safety included: Sterilization and Environmental.

Support services possessed of:

Emergency care, Laboratory, Pharmacy and housekeeping.

Information management included medical records only

Facility management sub areas were:

Facility building, water supply, toilet, HR.

Then each sub area included variable number of indicators out of the total number of 28 selected according to its relation to the referred service and the indicators were:

Free Anti-malaria, Sphygmomanometer, Antihypertensive, Insulin, Glebenclamide, Ferrous supplement, Paracetamol syrup, Stethoscope, Thermometer, Scales, Water and soap, Glove, Safety box, I.V fluids, Hydrocortisone, Microscope, Colorimeter, Pharmacy, Refrigerator, Cleanliness, Registration, Building, Clean water supply, Toilet, Doctors, Nurse, Technologist, Pharmacist.

Indicator points attached according to the table below from 0 to 2 points the total. The sub area score is the summation of its indicators scores. The dimensions is the summation of the related subareas. Finally the overall score of the facility will be considered as quality score and it's equal to summation of dimensions scores. The full score for each level of quality is the summation of the full score times the number of facilities.

Quality check list and definitions

Dimension	Sub-area	Indicator	Definition	Full score	Total
Patient care	General cases	Free Anti-malaria	a. Available	2	
			b. Available but expired	1	
			c. Not available	0	
	Hypertension	Sphygmomanometer	a. Available and functioning	2	
			b. Available but not functioning	1	
				0	

			c. Not available		
		Antihypertensive	a. Available	2	
			b. Available but expired	1	
			c. Not available	0	
	Diabetes mellitus	Insulin	a. Available	2	
			b. Available but expired	1	
			c. Not available	0	
		Glebenclamide	a. Available	2	
			b. Available but expired	1	
			c. Not available	0	
	Antenatal care	Ferrous supplement	a. Available	2	
			b. Available but expired	1	
			c. Not available	0	

	Child care	Paracetamol syrup	a. Available	2	
			b. Available but expired	1	
			c. Not available	0	
	Clinic	Stethoscope	a. Available and functioning	2	
			b. Available but not functioning	1	
			c. Not available	0	
		Thermometer	a. Available and functioning	2	
			b. Available but not functioning	1	
			c. Not available	0	
		Scales	a. Available	2	

			and functioning	1	
			b. Available but not functioning	0	
			c. Not available		
Safety	Sterilization	Water and soap	a. Available	1	
			b. Not available	0	
		Gloves	a. Available	1	
			b. Not available	0	
	Environmental	Safety box	a. Available	2	
			b. Available but not used	1	
			c. Not available	0	
Support services	Emergency	I.V fluids	a. Available	2	
			b. Available but expired	1	
			c. Not available	0	

		Hydrocortisone	a. Available	2	
			b. Available but expired	1	
			c. Not available	0	
	Lab	Microscope	a. Available and functioning	2	
			b. Available but not functioning	1	
			c. Not available	0	
		Colorimeter	a. Available and functioning	2 1 0	
			b. Available but not functioning		
			c. Not available		
	Pharmacy	Pharmacy	a. Available	1	
			b. Not available	0	

		Refrigerator	a. Available and functioning	2	
			b. Available but not functioning	1	
			c. Not available	0	
	Housekeeping	Cleanliness	a. Clean	1	
			b. Not clean	0	
Information management	Patient records	Registration	a. Record Availability	1	
			b. No recording	0	
Facility management	Facility	Building	a. Old	0	
			b. New	1	
	Water	Clean water supply	a. Available and continuous	2	
			b. Available but interrupted	1	
			c. Not available	0	

	Toilet	Toilet	a. Available and clean	2	
			b. Available but not clean	1	
			c. Not available	0	
	HR	Doctors	a. Less than 30 patient	2	
			b. 30 to 40	1	
			c. More than 40 patient	0	
		Nurse	a. Present	1	
			b. Not present	0	
		Technologist	a. Present	1	
			b. Not present	0	
		Pharmacist	a. Present	1	
			b. Not present	0	

Chapter 6

RESULTS

6.1. Results of the study

Facilities under National Health Insurance Fund in White Nile state (direct and contracted) provide primary curative care are very simple ones in their structure. The general composition of those health care units is quite the same they were designed to provide services for the first level of care on outpatient (OPD) basis, hence according to their function they possess of clinics, laboratory and pharmacy departments. However, there are some variations between those health care units such as short stay ward, resident housekeeping and security which is not seen in some of them. Staff of facilities includes general practitioners, pharmacists or pharmacy assistants, laboratory technicians, lab assistants, housekeepers and security personals.

The main medical staff are general practitioners GP who are directors of those units. They provide all types of care in same clinics without differentiation and patients who deserve further care will be transferred to the needed type of health care. Furthermore, the GP is responsible for the direct control of the facility. Under NHIF owned facilities they are responsible for the management of the facility reporting, supervision and determine the basic needs of services provided with limited financial authorization all procurements are provided by NHIF higher management. The situation is different in the contracted services some of those are fully autonomous run under GP control or under some control of State Ministry of Health SMOH. Hence GPs are more authorized in controlling facilities and responsible for their procurements and facility needs.

Because of the simple structure of those health care units and their function and the way they are controlled the facility is divided into three main areas in this study clinic, laboratory and pharmacy as main service provision area. Moreover because those are the main generating revenue centers of the facilities.

NHIF accounting system and information's is located at the executive directorate level while the contracted facilities serve their expenditures and information by themselves. From the available data acquired from both type of facilities that NHIF provides under its services results are shown here into two main parts:

1. Financial incomes and expenditure of the services.

2. Quality assessment results.

6.1.1 Financial incomes and service expenditures of the primary care facilities

Figures in the next section showing revenues and expenditures of both types NHIF owned primary care facilities and contracted ones are given in the local Sudan currency SDGs. A total number of 16 facilities data provided 11 NHIF direct services and 5 contracted primary care units analyzed and results are shown here.

6.1.2 Revenue sources of primary care facilities

The following table shows the main revenue sources that primary health care facilities rely on for incomes. Patient visits payments with their different types of insurance status, National Health Insurance Fund NHIF payments and the State Ministry of Health are the major elements of revenues or funds of those facilities. Annual incomes reached 749,280 SDGs for directly owned NHIF facilities and it is only the cash inflows does not include in kind services which pooled into NHIF accounting system. While indirect or contracted ones collected 1,087,262 SDGs as annual revenues.

Table 5. General Facility revenue sources

	Direct NHIF facilities	Indirect NHIF facilities
Doctor visits	46332	162019
Doctor visits as % of total income	6.2	14.9
lab visit	61724	135106
Lab visits as % of total income	8.2	12.4
Uninsured drug payment	107275	305896.1
Uninsured drug payment % of total	14.3	28.1
Insure copayment	533949	25202.2
Co-payments as % of total income	71.2	2.3
Claims (reimbursement)	0	224938.1
Claims as % of total income	0	20.7
SMOH funds	0	234100.2
SMOH funds as % of total income	0	21.5
Total income	749280	1087262

6.1.3 Patient visits incomes

Generally revenues from patient visits include income that accrue from doctor fee paid by patients upon having consulted with the doctor. The laboratory also is an important

revenue generating center as large proportion of patients who consulted with the doctor usually have some laboratory investigations for diagnosis. The last station of patient is the pharmacy where drugs are dispensed is an important revenue generator.

Primary health care units under NHIF services provide services to the public so insured and uninsured populations can be seen in both direct NHIF facilities as well as indirect facilities. Uninsured patients usually pay full price of services they receive in both setting through out of pocket, while the insured population will only pay 25% as co-payment of the prescribed drugs price.

Revenues described above represent 6.2% for the doctor visits, 8.2% for laboratory income, and 14.3% for uninsured drug payments out of the total money inflows of the NHIF direct facilities while the major portion comes from the co-payments of insured population reaches 712% of total inflows. In the contracted facilities doctor visits, lab and insured drug incomes serves as 14.9%, 12.4%, and 2.3% out of their total income consecutively. The largest percentage of revenue source for indirect facilities comes from the drug selling to uninsured populations represented 28.1% of total revenues.

6.1.4 Claims of primary care facilities

National Health Insurance Fund contracted primary facilities reimburse services provided to insured population prospectively. The claim being remitted to facilities will include doctor visit, laboratory services and 75% of the dispensed drugs prices which was as much as 20.1% of annual total revenues. Refunds for direct NHIF primary care facilities of all dispensed services will be in kind which is equal to the actual expenses of the delivered services to the facilities.

6.1.5. The State Ministry of Health

Additionally, the state ministry of health (SMOH) support some of the contracted facilities with funds equal to 21.5% of their incomes in terms for salaries of the employees. While it has no role in direct financing of NHIF staff salary payments.

6.2. Population served at the primary care facilities

As mentioned before all types of populations according to their insurance status were served in both primary care service settings. The table below shows that the NHIF direct services provided to 1433320 of population of which 93% were covered under NHIF umbrella and only 7% were uninsured, which is more likely that insured population are registered in those facilities. With respect to the Contracted NHIF facilities they served 48846 of population which represent only one third as those serves under NHIF settings. However, contracted facilities received closer numbers of both insured and uninsured populations which explains why they had greater revenues from this portion of population. The table below shows the number of visits to the facilities expressed both in number and in percentages.

Table 6. Frequencies of population served in primary care facilities

	Direct NHIF facilities	Indirect NHIF facilities
Insured	133357	21017
Insured as % of total visits	93%	43%
Uninsured	9963	27829
Uninsured as % of total visits	7%	57%
Total visits	143320	48846

6.3. Capital, recurrent and total costs of the primary care facilities

In the next part the operating expenditures incurred by both types of facilities gotten from available information are classified into recurrent and capital costs or expenditures. Recurrent cost included all cost incurred to provide services. Hence, the support services staff and supplies were allocated here. Capital costs included the fixed assets and equipment.

6.3.1 Recurrent cost of the primary care facilities

The table below shows the annual total expenditures incurred on services various components. Categorical cost structures of facilities were referred to utilities which included electricity and water services expenditures, administrative expenditures included rents of facilities, bookshop and cleaning stuffs, waste collection fees, transportation, managerial expenses and maintenance costs. Costs of drugs procured and laboratory material and reagents were allocated to medical supplies. Annual direct

NHIF primary care units' recurrent expenses was 2,417,850 SDGs and on average per facility was 219,804.5 SDGs. While it was 800,239.5 SDGs annual recurrent expenditures, and per each facility 160,047.9 SDGs. The recurrent cost of direct NHIF facilities represents 97% of their expenditures in comparison to 96% recurrent cost incurred by contracted facilities.

6.3. 2Utilities

Both settings spending on water and electricity services represented only a small portion of their expenditures 2.3% and 2.5 for direct and contracted facilities consecutively. Despite of the low figures there the amount spent is considerable Sudan situation and lack of these service especially in peripheral areas. Averagely NHIF facility spent 5269 SDGs annually and 4218.4 SDGs for contracted providers on utilities.

6.3.3 Administrative expenditures

Concerning the components of our classification on administrative expenditures, NHIF providers have two rented facilities and one contracted may be because of absence of publicly owned facilities in their areas. Rental expenditures was around 1% of both settings. Additionally, spent amount of money on other needs was 1.6% on bookshop material and cleaning stuff within NHIF facilities and only 0.2% for contracted services. Moreover, primary care facilities has some minor expenditure on transportation, maintenance and other managerial issues. The low amounts of budgets spent on previous items may be because of the lack of information especially for the contracted services which are directed by GPs and supposed to get the benefits.

Average staff hired in both setting was 9.6 and 9.4 employee in a row for direct and indirect NHIF facilities. The largest percentage of spending was on staff salaries on both NHIF providers and contracted services reached 23.6% and 46.95% successively. On average spending on staff salaries for NHIF providers was 53,736.67 SDGs per each facility annually. Contracted services annual expenditure on staff salaries was higher as 78,094.58 SDGs. This result might reflect the increase of contracted NHIF facilities costs, in spite of the lesser amounts of served, expenditure on staff was higher compared to NHIF direct providers annually.

6.3.4 Medical supply

Medical supplies include laboratory stuffs and drug procurement. The primary care facilities owned by NHIF receive all needed supplies from the NHIF executive directorate while contracted manage supplies by themselves. This part of primary facilities expenditures represent the larger portion out of all spending on running services the NHIF providers Incurred 151258.3 SDGs per facility annual costs for procured medical supply which is around 66.5% of total expenditures. While in contracted settings the spending on procurement was lesser than NHIF providers it reached 69544.72 SDGs with 41.7% as part of their total expenditures.

Table 7. Recurrent costs of primary care facilities

Category	Direct	Indirect	% direct	%indirect
1. Utility				
Water	27360	832	1.1	0.1
Electricity	30600	20260	1.2	2.4
Total	57960	21092	2.3	2.5
2. Administrative				
Rent	22200	7200	0.9	0.9
Bookshop & cleaning stuffs	41,045.27	1753	1.6	0.2
Salary	591,103.4	390,472.9	23.6	46.9
Garbage	8700	0	0.3	0.0
Transport	0	2105	0.0	0.3
Management	33000	1030	1.3	0.1
Maintenance	0	28863	0.0	3.5
Total	696049	431424	27.7	51.9
3. Medical Supplies				
Materials laboratory	104,937.4	47,571	4.2	5.7
Drug	1,558,904	300,152.6	62.3	36
Total	2417850	800239.5	97	96

6.3.5 Capital cost of primary care facilities

The below table describes the total capital costs of the facilities for both the direct and indirect primary health care centers. The assets refers to the value of the building, furniture and equipment. Building assumed to have 40 years age. Corresponding depreciation for each of the categories is described in the coming table Furniture and equipment were also classified as capital cost because their use will elapse for 5 year and their current value. The value of the depreciation as calculated based on the standard specification in Sudan specification. Capital costs within NHIF providers

setting as high as 3% of their total annual costs compared to 4% for contracted facilities. Land opportunity costs is not included in capital costs.

Table 8. Capital Costs

Asset	Direct	Indirect
Building		
Total value	1,630,000	720,000
Depreciation	40,750	18,000
% of total cost	1.63%	2.16%
Furniture and Equipment		
Total value	218490	75,175
Depreciation	43698	15,035
% of total costs	1.75%	1.80%

6.4 Costs comparison of NHIF direct and contracted primary care facilities

Obviously, NHIF providers' costs are higher as totals than contracted providers on average NHIF facilities cost was 227481.6 SDGs which is around three times of contracted facilities which was around 75752.23 SDGs per facility annual costs. However NHIF services had more utilization of services which more likely to reduce their cost of services rather than contracted ones. Moreover the result provide clearly that NHIF provider expenditure focus was the service provision seen in the recurred costs. Extra more their fixed costs was almost the same. The table below shows the annual total costs incurred by both facilities under NHIF services.

Table 9. Total costs of the primary care facilities.

	Direct facilities	Indirect facilities
Recurrent costs	2,417,850	800,239.5
Recurrent costs as % of total cost	97	96
Capital costs	84448.0	33,035
Capital costs as % of total cost	3	4
Total costs	2,502,297.9	833,274.5

6.5 Financial allocation and unit costs calculation

The table below shows summary of previous results on revenues, total expenditures, patients seen within primary care facilities. The previous information used here to show the outcome of the services in terms of unit cost and profits gained by both types.

The revenues in NHIF owned ones as mentioned before come from insured population drug co-payment and total prices from uninsured populations but NHIF primary care facilities also receive in kind procurement of medical supplies, staff salaries and other expenditures of service from the NHIF executive directorate at the state level. Indirect NHIF providers of primary health care revenue source were the State Ministry of Health SMOH, insured population drugs co-payment, claims from NHIF and uninsured population total price payments.

The NHIF facilities pool all revenues to the accounting system at the executive directorate level and get paid as mentioned before so the difference between the revenues and the expenses is actually covered by their higher management because the facilities only provide services and are not fund holders. The negative sign because services are partially free for insured population.

6.6 Unit cost at both settings of primary care facilities

The NHIF facilities incurred 17.5 SDGs to provide services to individual patient seen in those facilities annually. While the contracted facilities served ingle patient with 17 SDGs per year. This shows increase in NHIF cost of services although primary care facilities owned by NHIF were more utilized than contracted ones. Despite of the result shown in the table below revealed that contracted facilities are making some profits but the difference is not that high to allow those providers to maintain services and facilities in the long run.

Table 10. Unit cost

	Direct	Indirect
Total revenue	749,280	1,087,261.6
Total expense	2,502,297.9	833,274.5
Rev– Expense	-1,753,018	252,662.1
Total Visits	143320	48846
Unit Profit	-12.2315	5.2
Unit cost	17.5	17

6.7. Quality assessment of the primary health facilities

Table 11. Quality score of the facilities per indicator

Dimension	Sub-area	Indicator	Direct NHIF facility	Indirect NHIF facility	Full score for direct	Full score for indirect
Patient care	General cases	Free Anti-malaria	38	16	44	24
	Hypertension	Sphygmomanometer	42	20	44	24
		Antihypertensive	44	22	44	24
	Diabetes mellitus	Insulin	26	10	44	24
		Glebenclamide	44	22	44	24
	Antenatal care	Ferrous supplement	42	22	44	24
	Child care	Paracetamol syrup	36	20	44	24
	Clinic	Stethoscope	43	21	44	24
		Thermometer	2	11	44	24
		Scales	27	18	44	24
Total of patient care			344	182	440	240
Safety	Sterilization	Water and soap	13	8	22	12
		Gloves	20	8	22	12
	Environmental	Safety box	20	7	44	24
Total safety			53	23	88	48
Support services	Emergency	I.V fluids	42	22	44	24
		Hydrocortisone	40	18	44	24
	Lab	Microscope	44	23	44	24
		Colorimeter	41	16	44	24
	Pharmacy	Pharmacy	22	10	22	12
		Refrigerator	32	8	44	24
	Housekeeping	Cleanliness	1	4	22	12
Total of support services			222	101	264	144
Information management	Patient records	Registration	22	12	22	12
Facility management	Facility	Building	7	3	22	12
	Water	Clean water supply	37	13	44	24
	Toilet	Toilet	22	15	44	24
	HR	Doctors	28	20	44	24
		Nurse	20	9	22	12
		Technologist	19	8	22	12
		Pharmacist	4	0	22	12
Total of facility management			138	69	220	120
Total score of			778	386	1056	576

The table above shows the total score of all facilities participated in the study, scores of

individual facility were accumulated to each indicator of services compared to the full

scores of all scores in each setting.

6.7.1 Quality level of facilities in terms of inputs

Provision of services under NHIF directly owned primary care facilities and contracted ones is determined here through their infrastructures and input of services. The coming indicators used here are just tools assumed in their presence the facility capacity is enough to produce related services. Moreover, the level of score will show the level of quality at the identified indicator for each setting of primary care facilities. The following table shows the indicators average score for primary care facilities and indicators measures from the figures show there we can see that there are some variation between levels of input in directly provided services and contracted ones. Chi square test was performed to check if the seen variations have some significance in the level of quality per indicator shown per suggested type of service. Generally the difference seen at the level of inputs has no significance for all 28 indicators of facilities.

Table 12. Indicators' average scores

indicator	Average direct	Average indirect
Free Anti-malaria	1.7	1.3
Sphygmomanometer	1.9	1.7
Antihypertensive	2.0	1.8
Insulin	1.2	0.8
Glebenclamide	2.0	1.8
Ferrous supplement	1.9	1.8
Paracetamol syrup	1.6	1.7
Stethoscope	2.0	1.8
Thermometer	0.1	0.9
Scales	1.2	1.5
Total of patient care	15.6	15.2
Water and soap	0.6	0.7
Gloves	0.9	0.7
Safety box	0.9	0.6
Total safety	2.4	1.9
I.V fluids	1.9	1.8
Hydrocortisone	1.8	1.5
Microscope	2.0	1.9
Colorimeter	1.9	1.3
Pharmacy	1.0	0.8
Refrigerator	1.5	0.7
Cleanliness	0.0	0.3

Total of support services	10.1	8.4
Registration	1.0	1.0
Building	0.3	0.3
Clean water supply	1.7	1.1
Toilet	1.0	1.3
Doctors	1.3	1.7
Nurse	0.9	0.8
Technologist	0.9	0.7
Pharmacist	0.2	0.0
Total of facility management	6.3	5.8
Total score of	35.4	32.2

All indicators were tested using Pearson chi2 as follows the calculated chi2 values taken from Stata/SE 12.0 program were compared to critical chi2 values corresponding to the degree of freedom df and calculated probability in chi2 distribution table. The next example of the indicator shows the result of sits significance. The rest of table will be shown in the appendices.

Table 13. Anti-malaria scoring

Type	free anti malaria			
	Not available	Available but expired	Available	Average score
Direct	3	0	19	1.7
Indirect	4	0	8	1.3
Total	7	0	27	

Pearson chi2 = 1.8426   P= 0.175   df= 32   T= 20.599

From the table above the result of calculated Pearson's chi2 was 1.8426 for the free anti malaria indicator the corresponding critical chi2 to df= 32 and P= 0.175 was 20.599 from the chi2 distribution table. The calculated Pearson chi2 was smaller than the corresponding critical chi2 which indicates the insignificance of the indicator variation between direct and indirect NHIF providers for this suggested measure of quality. Moreover, the variation is only because of a matter of chance and not attributed to certain variable.

6.7.2 Table of sub areas of facility inputs and services

The table below shows accumulation scores of the direct and contracted facilities in a higher unit or facility inputs and services the same pattern of previous indicators is shown here.

Table 14. Accumulative Scores

Dimension	Sub-area	Direct	Indirect	Full score of direct	Full score of indirect
Patient care	General cases	38	16	44	24
	Hypertension	86	42	88	48
	Diabetes mellitus	70	32	88	48
	Antenatal care	42	22	44	22
	Child care	36	20	44	22
	Clinic	72	50	144	72
Total of patient care		344	182	452	236
Safety	Sterilization	33	16	44	24
	Environmental	20	7	44	24
Total of safety sub area		53	23	88	48
Support services	Emergency	82	40	88	48
	Lab	85	39	88	48
	Pharmacy	54	18	66	36
	Housekeeping	1	4	22	12
Total of support services subarea		222	101	264	144
Information management	Patient records	28	12	22	12
Facility management	Facility	7	3	22	12
	Water	37	22	44	24
	Toilet	22	15	44	24
	HR	71	37	110	60
Total score of sub area		778	386	1056	576

6.7.3 Dimensions of services provided in the primary care units

The dimension of the primary health care facilities assessed here are patient care, safety, support services information management and facility management. This part of the result represent the main area of facility quality of care provided in which ascending cumulative scores from attributed indicators meet. The table below shows the levels of different type of facilities. From the general view of the table variation between the types of services seem to be clearer. Chi2 was also done here to check the significance of variation here.

Table 15. Quality scores of the primary care facility accumulated to dimensions.

Dimension	Direct	Indirect	Full score of direct	Full score of indirect
Patient care	344	182	452	236
Safety	53	23	88	48
Support services	222	101	264	144
Information management	22	12	22	12
Facility management	137	68	220	120
Total	778	386	1056	576

Table 16. Average quality score of primary facilities

Dimension	Average of direct facilities	Average of indirect facilities
Patient care	15.6	15.2
Safety	2.4	1.9
Support services	10.1	8.4
Information management	1.0	1.0
Facility management	6.2	5.7
Total	35.4	32.2

The table above shows the average quality level per dimension of primary health care facilities.

6.7.4 Patient care

The level of patient care is higher in NHIF directly owned providers on average as seen in the above table this variation from indirect NHIF facilities was tested also using Pearson's chi2 the result showed that the variation was significance at this level of care. The table below shows the results of the test.

Table 17. Tabulation of var2 by patient care

var2	Patient care										
	6	11	12	13	14	15	16	17	18	19	20
Direct	0	1	0	2	7	0	7	0	4	1	0
Indirect	1	1	1	0	0	1	4	1	1	1	1
Total	1	2	1	2	7	1	11	1	5	2	1

Pearson chi2 = 14.9722   P= 0.133   df = 10   Table critical value= 4.865

The calculated Pearson chi2 here is greater than the corresponding chi2 critical value which signifies that the variation between the dimensions of different type of provision here can be attributed to certain variable. The distribution here shows that NHIF providers has higher frequencies than contracted ones beside the higher average score in this dimension.

6.7.5 Safety

The level of safety varied between the direct NHIF provision of services and the contracted provided services the outcome of Pearson chi2 showed significance of that variation. Moreover, NHIF provision showed better improvement in this area than the contracted services. The result reflect the attitude of provision of health care towards the patients and the environment.

Table 18. Tabulation of var2 by safety

var2	Safety				
	0	1	2	3	4
Direct	1	6	5	3	7
Indirect	2	2	5	1	2

Total	3	8	10	4	9

Pearson chi2 (4) =   3.4701   P = 0.482   df = 4   Table critical value= 1.064

6.7.6 Support services

In this dimension also the variation showed that NHIF that supportive services of the primary care facilities within NHIF settings provided better services than in contracted ones. The performed chi2 approves the significance of the variation here, the outcome of this dimension confirms the connectivity of all parts of services generated into the proposed setting.

Table 19. Tabulation of var2 by support services

Support services						
var2	5	7	8	9	10	11
Direct	0	2	1	5	0	13
Indirect	1	5	0	3	1	0
Total	1	7	1	8	1	13

Pearson chi2 = 16.6152   P = 0.011   df= 5   Table chi2 critical value= 12.833

6.7.7 Information management

The dimension of information in both type of services was quite similar and generated no variation between primary care facilities.

Table 20. Tabulation of var2 by information management

Information management	
var2	1
Direct	22
Indirect	12
Total	34

6.7.8. Facility management

Significant variation appear in this dimension chi2 as shown below proves that NHIF facilities were better directed than contracted ones. The improvement of management of primary care facilities reflects that the NHIF services care extends even to service surroundings.

Table 21. Tabulation of var2 by facility management

var2	5	6	7	8	9
Direct	5	8	8	1	0
Indirect	2	3	1	0	2
Total	7	11	9	1	2

Note: The table header row "Facility management" spans above all columns.

Pearson chi2 = 14.2986   P = 0.014   df= 4   T= 11.143

Chapter 7

Discussion and conclusion

7.1. Discussion

The performance of the primary care direct service provision and purchased ones under NHIF services in White Nile State assessed in this study showed some useful indicators from both costs and quality dimension used to distinguish their outcomes. Concerning the financial side and their allocation of resources the study found that despite the situation that those facilities are public units there is some variations in funds received by those facilities NHIF are totally under public sector responsibility. The thing maintains their services yet they serve more populations for free the insured. While purchased providers mainly have self-reliance financing and they depend on resource generated from their services. The State Ministry of Health has minor role provided to those facilities(D Varatharajan, Thankappan, & Jayapalan, 2004).

The limited sources of financing of both types of facilities might affect the performance of those units and face financial constrains especially those not under NHIF management it was clear that there was absence of important elements such as community participation in the support of service which may help improve provision.

 Even though the NHIF facilities incurred more expenditures on recurrent costs they benefited more of the high utilization of services which reduced their fixed costs the unit cost was higher compared with contracted services(Dalaba et al., 2013). On the other hand the higher costs may be because of the behaviors of personals but it seems to be due to the good resource allocation(Peter Hatcher, Shiraz Shaikh, Hassan Fazli, Shehla Zaidi, & Atif Riaz, 2014).

Administrative expenditures were higher in the purchased services due to higher staff payment portion. Nevertheless the situation of NHIF providers salaries come in the second place after drug supply while that is not the case for purchased providers drug supply come the second place which explains clearly that contracted providers services were underutilized. Moreover, this situation give some signals to an important issue that those providers are still making revenues because they cut down some of expenditure to reduce costs and or they pay higher to maintain their staffs(Dalaba et al., 2013).

Furthermore the study assessed the quality of the primary care facilities in terms of inputs as levers of service provision the process revealed that in spite of the variations seen at the detailed indicators used in the assessment infrastructure deficiencies were seen in both setting of the NHIF direct service provision and purchased services nonetheless with a lesser extent for NHIF facilities. The assessment was divided in accumulative manner to assess the quality of services provision as a whole the in five chosen dimension represent major primary health care items. Results of this part showed significance in the quality of care produced within the NHIF setting. According to the context of Sudan the result was reasonable where and have some significance due to the lack of assessment tool and measures that can be used in primary health care provision. Moreover, knowing the performance or at least general indicators of such service provision can encourage the government to provide critical needs(Heard, Nath, & Loevinsohn, 2013).

7.2. Conclusion

In this part illustration of finding and outcomes will be shown concerning the performance of the primary care service provision.

The publicly funded primary care facilities provide services under national Health Insurance Fund and the contracted health centers in White Nile State represent the base line or the initial points from which consumers seek medical care. The service provision embedded under their capacity are designed on OPD basis to produce health care and bring it near population homes.

Primary care facilities attributed to NHIF have no problems of sustained financing. Hence their performance concerning the costs and expenditures of services and the quality level of care generated higher figures. The unit cost was high and the incurred higher recurrent costs represented around 97% of their total costs and they received large numbers of population on annual basis. Moreover, the generated level of quality was better in their settings and showed significant variation particularly at the facility dimension patient care, safety, support services and the facility management.

For the contracted primary care facilities mainly rely on their revenues generated from the service provided there. However, contracted receives some support from State Ministry of Health, their performance on expenditure and quality of care can be seen as

average levels. Costs showed more allocation on administrative areas rather than the core of service and some individual facilities showed under provision of basic needs.

In conclusion NHIF providers generated better quality of care at the dimension of facilities with more expensive costs. On contrast contracted providers services incurred lesser cost and average level of quality of care.

7.3. Recommendations

The health system authority in Sudan should give primary care facilities some significance by activating services provided there and because of current status of primary care facilities curative care which is ignored gatekeepers cost of health care went high and hospitals suffers from over crowdedness and by financing and supporting those small units health will be brought closer to population homes and reduces cost of care and raise the level of provided quality of services.

Quality of care accreditation system is an important issue should be developed to fit the context of Sudan with national standards of care for various types of care. Moreover, more care on governance system especially for supervision and accountability of health care providers will generate better services at different levels.

7.4. Limitation of the study

Results of this study will be confined to White Nile State setting because of all data information were retrieved from its settings. Moreover, the information and results fit primary care facilities only.

Analysis is also restricted in one year 2013 for the cost data because of difficulty of data collection issues serial data would provide sequence on cost behavior of facilities. Additionally not all economic evaluation were done.

Considering the assessment of quality we only relied on structure and inputs of services other level should also be considered and from different perspectives too.

The tool for quality assessment used should be a comprehensive survey which will give more accurate results rather than a simple selective check list like the one used in this study.

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APPENDIX

Appendix A

 CHECK LIST FOR QUALITY OF PRIMARY HEALTH FACILTY

Facility Name: …………………………………………………………..

Location: ……………………………………………………………….

TYPE: DIRECT (   )   INDRECT (   )

1) Building

   a. Old   b. New

1. Clean water supply

   a. Available and continuous   b. Available but interrupted   c. Not available

2. Toilet

         a. Available and clean   b. Available but not clean   c. Not available

 3. Cleanliness of facility

         a. Clean   b. Not clean

4. Registration.

      a. Record Availability   b. No recording

2) CLINIC

1. Number of Doctors……………….

2. Average Patient load or volume per day……....

3. Patient / doctor's ratio

   a. Less than 30   b. 30 to 40   c. More than 40

4. Nurse

   a. Present   b. Not present

5. Stethoscope

   a. Available and functioning   b. Available but not functioning   c. Not available

6. Thermometer

   a. Available and functioning   b. Available but not functioning   c. Not available

7. Sphygmomanometer

   a. Not available   b. Available but not functioning   c. Available and functioning

8. Scale

      a. Available and functioning b. Available but not functioning   c. Not available

9. Water and soap

    a. Available   b. Not available

3). Laboratory

 1. Technologist

      a. Present   b. Not present

2. Microscope

 a. Available and functioning b. Available but not functioning   c. Not available

3. Colorimeter

  a. Available and functioning b. available but not functioning   c. Not available

4. Gloves

   a. Available   b. Not available

5. Safety box

   a. Available   b. Available but not used   c. Not available

4).Pharmacy

1. Pharmacy

    a. Available   b. Not available

2. Pharmacist

    a. Present   b. absent

3. Hydrocortisone

   a. Available   b. Available but expired   c. Not available

4. Intravenous fluid

   a. Available   b. Available but expired   c. Not available

5. Ferrous supplement

  a. Available   b. Available but expired   c. Not available

6. Paracetamol Syrup

a. Available   b. Available but expired   c. Not available

7. Refrigerator

a. Not available   b. Available but not functioning   c. Available and functioning

8. Insulin

a. Available   b. Available but expired   c. Not available

9. Glebenclamide

a. Available   b. Available but expired   c. Not available

10. Anti-hypertension

a. Available   b. Available but expired   c. Not available

11. Free anti Malaria

a. Available   b. Available but expired   c. Not available

Appendix B

Revenues shown for each direct and contracted NHIF facilities

Facility	Type of facility	Visits income uninsured	lab income	Drugs income uninsured	copayment	claims indirect	SMOH	total revenues
Satti	direct	18547.0	21100.0	33068.0	132056	0.0	0.0	204771.0
Ahmed Abdelgader	direct	8621.0	14619.0	6519.0	118250	0.0	0.0	148009.0
university	direct	2631.0	2405.0	6683.0	20762	0.0	0.0	32481.0
Railways Kosti	direct	1098.0	538.0	2400.0	9408	0.0	0.0	13444.0
Hikma	indirect	36875.0	16570.0	133461.7	13068.2	75194.4	0.0	275169.3
Amara	direct	4490.0	6970.0	5185.0	59916	0.0	0.0	76561.0
Tahir	direct	145.0	340.0	760.0	23065	0.0	0.0	24310.0
El-salam Rabak	indirect	19500.0	58500.0	172434.4	12134	71392.9	0.0	333961.3
Tugaba	indirect	69809.0	0.0	0.0	0.0	18974.0	208608	297391.0
Abdelmuneim	direct	571.0	365.0	5547.0	40129	0.0	0.0	46612.0
Ridaa	direct	1884.0	1782.0	11850.0	36520	0.0	0.0	52036.0
Abu Jabra	direct	4445.0	3960.0	9785.0	36040	0.0	0.0	54230.0
Hind	direct	950.0	1300.0	17984.0	18540	0.0	0.0	38774.0
Drader	direct	2950.0	8345.0	7494.0	39263	0.0	0.0	58052.0
Jamalab	indirect	17835.0	24000.0	0.0	0.0	12240.0	11904	65979.0
El-Sheikh Elsiddig	indirect	18000.0	36036.0	0.0	0.0	47136.8	13588.2	114761.0

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Appendix C

Costs centers for both types of primary care facilities under NHIF services

Items	DIRECT FACILITY	INDIRECT FACILITY
Facility	11	5
Staff		
Total	106	47
Average/ facility	9.6	9.4
Rent		
Total cost(SDGs)	22,200	7,200
% of total cost	0.89%	0.86%
Water		
Total cost(SDGs)	27360.0	832.0
% of total cost	1.09	0.10
Electricity		
Total cost(SDGs)	30600.0	20260.0
% of total cost	1.22	2.43
bookshop & cleaning stuffs		
Total cost(SDGs)	41,045.3	1,753.0
% of total cost	1.64%	0.21%
Salary		
Total cost(SDGs)	591,103.4	391,797.9
% of total cost	23.62%	46.94
materials laboratory		
Total cost(SDGs)	104,937.4	47,571.0
% of total cost	4.19%	5.70%
Waste collection fee		
Total cost(SDGs)	8700.0	0
% of total cost	0.35%	0
Maintenance		
Total cost(SDGs)	0	28,863.0
% of total cost	0	3.46%

Transportation		
Total cost(SDGs)	0	2,105.0
% of total cost	0	0.25%
Managerial cost		
Total cost(SDGs)	33,000.0	1,030.0
% of total cost	1.32%	0.12%
Drugs procurement		
Total cost(SDGs)	1,558,903.9	300,152.6
% of total cost	62.30%	35.96%

Capital, recurrent and total costs of primary care facilities

facility name	Recurrent costs	capital cost	Total costs
Satti	502344.8	12785.0	515129.8
Ahmed Abdelgader	459175.2	11196.0	470371.2
University	100846	9196.0	110042
Railways Kosti	85934.44	4788.0	90722.44
El-Hikma	207001.7	5823.0	212824.7
Amara	257576.7	4412.0	261988.7
Tahir	170744.8	5132.0	175876.8
El-salam Rabak	229817	2734.0	232551
El-Tugaba	310983	13358.0	324341
Abdelmuneim	184656.8	6836.0	191492.8
El-Ridaa	191025.8	13114.0	204139.8
Abu Jabra	179294.9	4763.0	184057.9
Hind	119607.8	5946.0	125553.8
Drader	166642.8	6280.0	172922.8
El-Jamalab	17340	3600.0	20940
Sheikh Elsiddig	35097.84	7520.0	42617.84

Appendix D

Patients' visits

category \ Facility	Type under NHIF	uninsured volume (visits)	insured volume (visits)	total volumes (visits)
Satti	Direct	3950	31719	35669
Ahmed Abdelgader	Direct	1906	29783	31689
University	Direct	561	6496	7057
Railways Kosti	Direct	294	4489	4783
El-Hikma	Indirect	7375	6492	13867
Amara	Direct	898	14673	15571
Tahir	Direct	38	3940	3978
El-salam Rabak	Indirect	3900	4499	8399
Tugaba	Indirect	3987	3056	7043
Abdelmuneim	Direct	128	9805	9933
Ridaa	Direct	393	9817	10210
Abu Jabra	Direct	955	12699	13654
Hind	Direct	250	5033	5283
El-Drader	Direct	590	4903	5493
El-Jamalab	Indirect	3567	2556	6123
El-Sheikh Elsiddig	Indirect	9000	4414	13414

Appendix E: person chi 2

type	Building	
	Old	new
Direct	15	7
	15.5	6.5
Indirect	9	3
	8.5	3.5
Total	24	10
	24	10

Pearson chi2 = 0.1739 P=0.677   T= 20.599

type		Clean water supply		
Direct		Not available	Interrupted	Available
		1	5	16
		3.9	3.9	14.2
Indirect		5	1	6
		2.1	2.1	7.8
Total		6	6	22

Pearson chi2 = 7.5946 P = 0.022 T= 46.979

Type	Toilet		
	Not available	Available but not clean	Available
Direct		22	0
		20.1	1.9
Indirect		9	3
		10.9	1.1
Total		31	3
		31	3

Pearson chi2 = 6.0323 P= 0.014 T= 46.979

Type	Cleanliness	
	Not clean	Clean
Direct	21	1
	18.8	3.2
Indirect	8	4
	10.2	1.8
Total	29	5
	29	5

Pearson chi2 = 5.1302 P= 0.024   T= 46.979

Type	registration
Direct	22
	22
Indirect	12
	12
Total	34

	Patient doctor ratio		
Type	Less than 30	30 to 40	More than 40
Direct	4	8	10
	2.6	7.8	11.6
Indirect	0	4	8
	1.4	4.2	6.4
Total	4	12	18
	4	12	18

Pearson chi2 = 2.8620 P= 0.239   T= 43.773

Type	Nurse	
	Not present	Present
Direct	2	20
	3.2	18.8
Indirect	3	9
	1.8	10.2
Total	5	29
	5	29

Pearson chi2 = 1.5668 P = 0.211 T= 46.979

type	Stethoscope		
	Not available	Not functioning	Available and functioning
Direct	0	1	21
	0.6	1.3	20.1
Indirect	1	1	10
	0.4	0.7	10.9
Total	1	2	31
	1	2	31

Pearson chi2 = 2.1478 P= 0.342 T= 43.773

Type	Thermometer		
	Not available	Not functioning	Available and functioning
Direct	21	0	1
	17.5	0.6	3.9
Indirect	6	1	5
	9.5	0.4	2.1
Total	27	1	6
	27	1	6

Pearson chi2 = 9.9167 P = 0.007 T= 50.892

type	Sphygmomanometer		
	Not available	Available but Not functioning	Available and functioning
Direct	1	0	21
	1.9	0	20.1
Indirect	2	0	10
	1.1	0	10.9
Total	3	0	31
	3	0	31

Pearson chi2 = 1.4181 P= 0.234 T= 46.979

type	Scales		
	Not available	Available but Not functioning	Available and functioning
Direct	7	3	12
	5.8	3.2	12.9
Indirect	2	2	8
	3.2	1.8	7.1
Total	9	5	20
	9	5	20

Pearson chi2 = 0.9158 P= 0.633 T= 20.599

type	water and soap	
	Not available	available
Direct	9	13
	8.4	13.6
Indirect	4	8
	4.6	7.4
Total	13	21
	13	21

Pearson chi2 = 0.1887 = 0.664 T= 20.599

Type	Technologist	
	Not present	Present
Direct	3	19
	4.5	17.5
Indirect	4	8
	2.5	9.5
Total	7	27
	7	27

Pearson chi2 (1) = 1.8426 P= 0.175 T= 20.599

type	Microscope		
	Not available	Available but Not functioning	Available and functioning
Direct	0		22
	0.6		21.4
Indirect	1		11
	0.4		11.6
Total	1		33
	1		33

Pearson chi2 = 1.8889 P = 0.169 T= 20.599

type	Colorimeter		
	Not available	Available but Not functioning	Available and functioning
Direct	1	1	20
	2.6	1.9	17.5
Indirect	3	2	7
	1.4	1.1	9.5
Total	4	3	27
	4	3	27

Pearson chi2 = 5.0919 P= 0.078 T= 40.256

Type	Gloves	
	Not available	Available
Direct	2	20
	3.9	18.1
Indirect	4	8
	2.1	9.9
Total	6	28
	6	28

Pearson chi2 = 3.1400   P= 0.076   T= 40.256

Type	Safety box		
	Not available	Available	Available but not used
Direct	11	2	9
	12.3	1.9	7.8
Indirect	8	1	3
	6.7	1.1	4.2
Total	19	3	12
	19	3	12

Pearson chi2 = 0.9478   P = 0.623   T= 20.599

Type	Pharmacy	
	Not available	Available
Direct	0	22
	1.3	20.7
Indirect	2	10
	0.7	11.3
Total	2	32
	2	32

Pearson chi2 = 3.8958   P= 0.048   T= 43.773

Type	Pharmacist	
	Present	Absent
Direct	18	4
	19.4	2.6
Indirect	12	0
	10.6	1.4
Total	30	4
	30	4

Pearson chi2 = 2.4727   P = 0.116   T= 46.979

Type	Hydrocortisone		
	Not available	Available but expired	Available
Direct	2	0	20
	3.2	0	18.8
Indirect	3	0	9
	1.8	0	10.2
Total	5	0	29
	5	0	29

Pearson chi2 = 1.5668   P = 0.211   T= 46.979

Type	Intravenous fluids		
	Not available	Available but expired	Available
Direct	1	0	21
	1.3	0	20.7
Indirect	1	0	11
	0.7	0	11.3
Total	2	0	32
	2	0	32

Pearson chi2 = 0.2012   P= 0.654   T= 20.599

Type	Ferrous supplement		
	Not available	Available but expired	Available
Direct	1	0	21
	1.3	0	20.7
Indirect	1	0	11
	0.7	0	11.3
Total	2	0	32
	2	0	32

Pearson chi2 = 0.2012   P= 0.654   T= 20.599

Type	Paracetamol Syrup		
	Not available	Available but expired	Available
Direct	4	0	18
	3.9	0	18.1
Indirect	2	0	10
	2.1	0	9.9
Total	6	0	28
	6	0	28

Pearson chi2 = 0.0123   P = 0.912   T= 18.493

Type	Refrigerator		
	Not available	Available but expired	Available
Direct	6	0	16
	9.1	0	12.9
Indirect	8	0	4
	4.9	0	7.1
Total	14	0	20
	14	0	20

Pearson chi2 = 4.9749 P = 0.026   T= 18.493

Type	Insulin		
	Not available	Available but expired	Available
Direct	9	0	13
	10.4	0	11.6
Indirect	7	0	5
	5.6	0	6.4
Total	16	0	18
	16	0	18

Pearson chi2 = 0.9462 P = 0.331   T= 20.599

Type	Glebenclamide		
	Not available	Available but expired	Available
Direct	0	0	22
	0.6	0	21.4
Indirect	1	0	11
	0.4	0	11.6
Total	1	0	33
	1	0	33

Pearson chi2 = 1.8889 P = 0.169   T= 20.599

Type	Antihypertensive		
	Not available	Available but expired	Available
Direct	0	0	22
	0.6	0	21.4
Indirect	1	0	11
	0.4	0	11.6
Total	1	0	33
	1	0	33

Pearson chi2 = 1.8889 P= 0.169   T= 20.599

Tabulation of var2 by patient care

	Patient care										
var2	6	11	12	13	14	15	16	17	18	19	20
Direct	0	1	0	2	7	0	7	0	4	1	0
Indirect	1	1	1	0	0	1	4	1	1	1	1
Total	1	2	1	2	7	1	11	1	5	2	1

Pearson chi2 = 14.9722　P= 0.133　　　df = 10　　　T= 4.865

VITA

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