بسم الله الرحمن الرحيم

**Sudan Medical Specialization Board**
**Pharmacy Specialization Board**

# Evaluation of the Objectives of Central Medical Supplies to Establish Revolving Drug Funds in the States (2011)

**By:**

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# Dedication

*This thesis is dedicated to*


*My parents, brothers and sisters,*


*My small family,*


*My friends,*


*And  CMS*

*\* \* \**

*For encouragement and support,*

# Acknowledgements

*Thanks and gratitude to all the people who helped me in the completion of the search*

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*And*

*Alawal pharmacy*

# ABBREVIATIONS

| | |
|---|---|
| **BI** | Bamako Initiative |
| **CHAM** | Christian Health Association Of Malawi |
| **CMS** | Central Medical Supplies |
| **DIC** | Drug Information Center |
| **EML** | Essential Medicines List |
| **MOH** | Ministry Of Health |
| **NGOs** | Non Governmental Organization |
| **PHC** | Primary Health Care |
| **RDFs** | Revolving Drug Funds |
| **STGs** | Stander Treatment Guidelines |
| **VHVs** | Village Health Volunteers |
| **VRDFs** | Village Revolving Drug Funds |
| **WHO** | World Health Organization |

# Abstract

Central Medical Supplies public corporation is the agency that is responsible for purchasing, storing and distribution of medicines in good quality, of proven efficiency and affordable price for individuals and community.

## Objective:

The study was conducted to evaluate the main objectives of establishing a revolving drug fund in the states in 2011 (thirteen states).

## Methodology:

It was a cross sectional CMS-RDFs based-study. The information was collected by using a questionnaire to the key persons of the states of RDFs and document. 53 key medicines were selected to be included in the study.

## Result and conclusion:

The average of availability of the key items in the states was (66.7%) which is requiring more effort to increase.

CMS had achieved a remarkable success to improve the affordability (79.2%), and to distribute the services of CMS to (92.9%) of the states in Sudan but the average of coverage in the states was very low, so CMS needs more spread to its services.

Since 2001 only two states had self-finance, and one state had loans while the financial performance of the five states was good.

This study showed that CMS failed to implement rational use of medicines in the states as there were no Standard Treatment Guidelines (STGs) in all the states, however all states had essential medicines list (EML).

(61.5%) of key persons made order of medicines according to essential medicines list, only about (38.5%) of the states had Drug Information Center (DIC) and drug information activities in coordination with Ministry of Health in the states.

In all the states there were no prescribing guidelines, while only about (46.2%) of the states had dispensing guidelines.

Only (30.8%) of the states had continuous training, while (38.5%) of the states had system of monitoring the prescribers.

In case of stock-out at CMS, all the states purchased medicines from companies of medicines.

# الخلاصة

## المقدمة:

الهيئة العامة للامدادات الطبية المركزية(CMS) هي المسؤولة عن شراء وتخزين وتوزيع الأدوية ذات النوعية الجيدة والكفاءة المطلوبة والسعر المناسب لكل الأفراد والمجتمع.

## الهدف:

أجريت الدراسة لتقييم الأهداف الرئيسية التي من اجلها تم انشاء صندوق الدواء الدوار بالولايات للعام 2011.

## الطريقة:

هذة الدراسة هي دراسة وصفية تم جمع المعلومات عن طريق استبيان تم توزيعة على رؤساء الدواء الدوار بالولايات وعن طريق مستندات وقد تم اختيار 53 صنف من الأصناف الاساسية التي تم ادراجها في الدراسة.

## النتائج والخلاصة:

متوسط الوفرة الدوائية في الولايات (66.7٪) و هي اقل من النسبة المطلوبه ، حققت الهيئة العامة للإمدادات الطبية المركزية نجاحا ملحوظا في تحسين القدرة علي تحمل التكاليف (79.2٪) وتوزيع الخدمات في ( 92.9 % ) من ولايات السودان لكن بلغ متوسط التغطية في الولايات منخفضة جدا لذلك يحتاج الى مزيد من الانتشار في خدماته.

منذ عام 2001 اثنان فقط من الولايات لها تمويل الذاتي ، وولاية واحدة لها قرض في حين أن الأداء المالي للولايات الخمس كانت جيدة.

أظهرت هذه الدراسة أن الهيئة العامة للإمدادات الطبية المركزية لم تنفذ الاستخدام الرشيد للأدوية في الولايات وذلك لانه لم تكن هناك إرشادات العلاج القياسية (STGs) في جميع الولايات ، ولكن كل الولايات لها قائمة أدوية الأساسية (EML).

(61.5٪) من الموظفين المسؤلين يقوموا بعمل طلبية الأدوية وفقا لقائمة الأدوية الأساسية ، حولي (38.5٪) فقط من الولايات لها مركز المعلومات الدوائية (DIC) وأنشطة معلومات دوائية بالتنسيق مع وزارة الصحة في تلك الولايات.

لم تكن هناك ارشادات وصف للادوية في كل الولايات ، في حين كان حوالي (46.2٪) فقط من الولايات  لها ارشادات صرف للادوية.

وجد ان (30.8٪) فقط من الولايات لها تدريب مستمر ، في حين أن (38.5٪) من الولايات  لها نظام رصد لواصفي الادوية.

في حالة نفاد المخزون في الهيئة العامة للإمدادات الطبية المركزية تقوم جميع الولايات بشراء الادوية من شركات الأدوية .

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# Introduction and literature review

# 1- Introduction:

## 1-1 Background

The importance of good medicines supply system is to insure availability of low-cost medicines at recognized standards of quality at all levels of the health system.

Well medicines supply system help to ensure that funds available for purchasing medicines are used effectively and efficiently. Failure in supply system can lead to life-threatening shortage of medicines and waste of scarce resources (1).

Purchasing of medicines by Central Medical Supplies public corporation (CMS) in bulk leads to decrease and unify the price of medicines at all states of Sudan. Also the distribution of medicines by CMS keeps medicines in good condition, and maintains constant supply of medicines.

Central Medical Supplies public corporation is the agency that is responsible for purchasing, storing and distribution of medicines in good quality, proven efficiency and affordable price for individuals and community.

Central Medical Supplies became public corporation within the scope of responsibilities of the Ministry of Health since February 1991 "public corporation" allowing them to exercise the greatest possible autonomy within the framework of the Government of Sudan.

Authority granted independence under the "Law of the Central Medical Supplies public corporation for the year 1991," called: the law."
Ministry of Health under its commitment to provide health services to all population of Sudan delegate a major amount of the functions to the Central Medical Supplies public corporation including selection of the required medical supplies and purchase, storage and distribution(2).

The Bamako Initiative was a formal statement adopted by African health ministers in 1987 in Bamako, Mali, to implement strategies designed to increase the availability of essential medicines and other healthcare services for Sub-Saharan Africans, aimed at solving the problems in the financing of primary health care in sub-Saharan Africa. The African ministers of health present at the meeting adopted a resolution, in which they called for the acceleration of primary health care by defining and implementing self-financing mechanisms at district level, encouraging social mobilization and, ensuring a regular supply of medicines (3).

The definition of World Health Organization (WHO) of the essential medicines list is that to satisfy the priority of health care needs to the population. Essential medicines are intended to be available within the context of functioning health system at all times. The idea of defining essential medicines was developed from a report made to the 1975 World Health Assembly. These efforts were aimed to increase the range and availability of medicines for population with poor access. In 1977 the first report of the expert committee was published which included:

- Criteria for determining if a medicine fit the definition of an essential medicine.
- The first model Essential Medicines List (EML) (4).

National drug policy adopted the concept of essential medicines and its principles in selecting essential medicines to make them available, insure their quality and make them easily accessible to those who need them (5).

Pharmaceuticals are essential for preventive and therapeutic health services. Unfortunately, significant demand, limited funds and high prices contributed to the frequent shortages of medicines in many public health programs. One method for financing pharmaceutical supplies has been the establishment of revolving drug funds (RDFs) in which, after an initial capital investment, drug supplies are replenished with monies collected from the sale of drugs. All too often however, the funds actually recovered are insufficient to replenish supplies and the fund is soon depleted.

Experiences from a variety of countries suggest several causes for the failure of some RDFs, under-estimation of capitalization costs,  prices set below true replacement cost,

frequent failure to collect payment, delays in cash flow which make funds unavailable for replenishment of medicine stocks, rapid program expansion for which additional capital funds are not available, losses due to theft and deterioration of medicines, unanticipated price increases due to inflation or changes in parity rates and foreign exchange purchase restrictions. Common too many of these problems is the lack of a business like orientation to RDFs and, in particular, lack of careful financial planning and management (6).

The objectives of (CMS) to establish Revolving Drug Funds (RDFs) are:

- Increase coverage of essential medicines.
- Continuing in self –finance of medicines.
- Rational use of medicines.
- Prevent the circulation of medicines from unreliable sources.
- Raise the level of services provided in government health facilities.
- Affordability of essential medicines in all health facilities in the country.
- Delivery and disseminating the pharmaceutical service anywhere in the Sudan.


The Project of Revolving Drug Funds (RDFs) in the Sudan has played a prominent role in the increasing coverage of medicines in the states and contributed with support of the states governments in the provision of essential medicines at the level of primary health care institutions in most states of Sudan in required quality, at right time and affordable price by all citizens.

Revolving Drug Funds (RDFs) in the Sudan has positive impact in the reduction of illegal practices to distribute counterfeit drug in places not licensed to deal with medicines and has been proven through research studies and some of which by the World Health Organization, the positive impact of the project of RDFs in the provision of medicines and easily obtainable by citizen at the right price.

The project was implemented in three stages, the initial phase in 2002, included:

Gezira state, Gadarif state, Red Sea state, South Darfur state, Northern state, White Nile state, North Kurdofan state.

The second phase in 2003, included:

River Nile State, Kassala State, Blue Nile State, Sinnar state, North Darfur state, South Kurdofan state, West Kurdofan state, Bahr El Gabal state, Upper Nile state, Western Bahr El Ghazal state.

Phase three in 2005, and included:

Unity State, West Darfur state

To cover all the northern states of Sudan and four of the southern states.

Summary of agreements signed:

Commitment from Central Medical Supplies public corporation to provide each state the following:

- Primary seed capital in the form of medicines.
-  Payment by check based on limited ceil equal to the capital cost.
- Trucks to transport and distribute medicines to the states.
- Small vehicles for supervision activities.
-  Training the employees of the project.

Commitment from the state Ministries of Health to provide the following:

- Rehabilitation of the stores so as to fit specifications to save medicines.
- Rehabilitation of hospital pharmacy and delivered to the project management in the state.
- Provide the project with sufficient human resources.

In 2011 the Revolving Drug Funds (RDFs) project included:

Gezira state, Gadarif state, Red Sea state, South Darfur state,Northern state, White Nile state, West  Kurdofan state, River Nile State, Kassala State, Blue Nile State, Sinnar state, North Darfur state, West Darfur state(7).

The role of the department of RDF in CMS in 2011 was technical and administrative supervision, included:

- Evaluation activities in accordance with the performance standers.
- Collection and analysis of quarterly states reports.
-  Reviewing and approving monthly supply requests and documentation of issues medicines to the states.
- Training the staff at the states level.
- Assistance in solving the problems faced by states in the application of procedures.

## 1.2 Literature Review:-

Literatures review data was collected from different Websites, pub med, Google Scholar, and others.

A study was carried out in Kazakhstan on the revolving drug fund developing and fact finding mission to Bishkek, Kyrgyzstan in October 1995. This study focused primarily on the revolving drug fund and the environment and structure of Kyrgyzstanpharmaciya pharmaceutical company, and the role they might play in any future RDF. The following preliminary findings and recommendation:

- Setting up an effective and efficient Revolving drug fund in Kyrgyzstan will not be an easy task, and the Ministry Of Health (MOH) will need to make some significant changes in policy in order to ensure cost recovery for the program .

- Kyrgyzstanpharmaciya, the new national joint-stock pharmaceutical company, has significant strengths, including organization, personnel, property, equipment, knowledge, management, and leadership to make such a RDF successful.

- A revolving drug fund is a strong need in the Issyk-Kul Oblast, and the Karakol IDS would be an excellent demonstration site for a trial of any new RDF to be developed on a national level (8).

A study was conducted in 2002 in Nigeria to assess the Effect of the Bamako-Initiative drug revolving fund on availability and rational use of essential drugs in primary health care facilities in south-east Nigeria. To compare the level of availability and rational use of drugs in primary health care (PHC) facilities where the Bamako Initiative (BI) drug revolving fund programmed has been operational, with PHC centers where the BI-type of drug revolving fund programmed is not yet operational.

The study was undertaken in 21 PHC centers with BI drug revolving funds and 12 PHC centers without BI drug revolving funds, all in Enugu State of Nigeria. Data were collected on the essential and non-essential drugs stocked by the facilities. Drug use was

determined through analyses of prescriptions in each health center. Finally, the proportion of consumers that were able to remember their dosing schedules was determined.

It was observed that the BI facilities had a better availability of essential drugs both in number and in average stock. However, the BI has given rise to more drugs prescribing, which could be irrational. The findings call for strategies to ensure more availability of essential drugs especially in the non-BI PHC centers as a strategy to decrease medical costs and improve the quality of PHC services, while promoting rational drug use in all PHC centre's.(9).

A study was done in 2008 in Viet Nam To understand the impacts of the Bamako Initiative (BI) type Revolving Drug Find (RDF) program on people's medicines use; to analyze the process of achieving one of aim of the BI type RDF, i.e., 'to foster better health by promoting behavioral change at the household level'; and to create a possible intervention to promote proper drug use at household level by using Pre-survey for cohort study with comparison series.

Two general communities were selected for the study: one is the Yen Phu commune where a BI type RDF program has already been initiated, and the other is the Dong Hoa commune where the new type of RDF has not been introduce yet. In both communes, the household's survey was conducted by visiting randomly selected households; the number was 34 and 41 respectively.

Compared to the people in Non-BI type RDF area, people in BI type RDF area are:

The BI type RDF contributed to lowering drug prices, thus drugs became more accessible in terms of cost, and regular community meetings for the program provided a chance to exchange information on medicines use among community people for example (more likely to depend on self-medication based on self-diagnosis and keep antibiotics, ORS, and antipyretics/analgesics and give their leftovers to other patients) (10).

A Study was conducted in Malawi in 2006 to a review of the performance and impact of community drug revolving fund in Lilongwe district.

A team of four members reviewed 18 sampled DRFs out of 94 DRFs existing in Lilongwe district. These included RDFs formed under government program and those under non-governmental organization (NGOs) and Christian health association of Malawi (CHAM).

Among the established agents of DRFs CHAM had the highest proportion (78%) of active DRFs and ministry of health had the lowest (48%).All the 18(100 %) of DRFs that were assessed had no constitution to guide their operations. Also found that there was inadequate documentation of DRF drugs and money at both community and district levels. Some drugs which were on the recommended DRF drug list were not available. 66% of the respondents who had used DRFs considered DRF drugs to be affordable and cheaper (11).

A Study was carried out in Lao in 2008 to assess availability of essential drugs and sustainability of village revolving drug funds in remote areas of Lao RDF.

They used across-sectional design in remote area in two provinces in Lao, to explore the views on the performance and sustainability of village revolving drug funds (VRDFs) among the (VRDF) committees and community members. Four remote districts of Khammouane and Champasak provinces were purposely selected and five villages were randomly selected within each district. Four data collection methods were used: a) Survey of revolving drug funds and private pharmacies, b) Structured interviews with village health volunteers  (VHVs), and with 400 randomly selected household heads (20 in each village), c) Checklist to assess the performance of VRDFs , and d) Group discussions with community members and VRDF committees to explore their needs, and to services and management of VRDF. We found that the average availability of 10 selected essential drugs at VRDFs was 37%. For three out of four villages the availability of EDL was higher in the village where a private pharmacy existed than in the village with only VRDF. The management system of VRDFs was weak and characterized by a lack of necessary guidelines and equipment for VHVs, no report and feedback system, no

regular monitoring, and not functioning supervision. The VHVs did not have enough knowledge and experience to manage the VRDF in a better way. When a family member was sick, care was sought in the VRDFs in 29% of cases, at private providers (pharmacies, clinics) in 34% and at public health facilities in 30%.

They concluded that the low availability of good quality ED in the VRDFs seems to be due to poor management. A comprehensive management mechanism system should be established to ensure availability of good quality drugs accessible for people in the remote areas (12).

A study was done in Cambodia in 2010 to evaluation of the Revolving drug fund project of patient information center has attempted to look at the organizational structure, drug supply system and financial system of the revolving drug fund management of MOPOTSYO. In addition it also has addressed the relevant of the member's demographic profiles of MOPOTSYO. This research is based on the primary data and secondary data which were gathered from: interviewing the key concerned personnel of MOPOTSYO and interviewing with people with diabetes enrolled with MOPOTSYO.

The secondary data which gathered from the information source of MOPOTSYO NGO, which included the annual reports of management revolving drug fund of NGO and it was conducted based on real expenditures and based on consumption data through patient invoices since mid 2008 when the MOPOTSYO stared its Revolving Drug Fund project.

Based on the research study, the Revolving Drug Fund (RDF) protect of MOPOTSYO has been achieved such as:

- The RDF structure which attributed to its small and flexible structure, it combines social objectives with private style management. The key factor for success has been financial autonomy and funding from cash sales with a small staff at RDF.
- People living with diabetes and hypertension can access to the most affordable of good quality essential drug in the place where the RDF project located. The most of the member of MOPOTSYO have an RDF facility reasonably close and within walking distance.

- People living with diabetes can access to cost effective for their medical consultation. (13).

A study was carried out in the Sudan in 2004 to assess the impact of the RDF on accessibility of medicines, by used different method to collect relevant data to answer the question. Four methods, which together comprise the research design, structured interviews with heath facilities users, semi-structured interviews with health care providers, verification of archival and statistical records, and systematic observations using checklist to check the availability of medicines and their quality during health facilities visits.

The research revealed that the RDF is continuing to meet its original objectives by maintaining a self-financing medicine supply system which provides quality medicines at affordable prices near to where people live in Khartoum state in both rural and urban areas. Also showed the utilization of RDF health facilities has steadily increased over time.

The main achievements and strengths of Khartoum state RDF are:

Regular supply of medicines, adequate coverage of MOH Khartoum state health facilities, below-market prices of quality medicines, efficiency and equity implications of the RDF, improvement in the quality of health care services increased utilization of public health facilities and increased health insurance coverage in Khartoum State (14).

Study was done in 2007 in the Sudan on How to establish a successful revolving drug fund: the experience of Khartoum state in the Sudan

Interviews were conducted with 14 senior policy-makers at the Ministry of Health to explore their perceptions about the effects of the RDF on accessibility to medicines and factors that have determined the survival of the RDF. A total of 27 practitioners were also interviewed to gather information about the availability of quality medicines.

The qualitative information was cross-checked with quantitative data collected from 93 patients and 93 households for the available time and resources. In addition, archival

records were verified to enable the gathering of data about availability of medicines. Finally, systematic observations were conducted using checklists to check the availability of medicines during visits to health facilities. This information was collected from two sets of health facilities.

The interviews with the policy-makers and practitioners revealed that the RDF is responsible for maintaining a regular supply of medicines in its health facilities compared with non-RDF ones. The average availability rate of key items, which were determined before the fieldwork, was greater (97%) in the RDF facilities than in non-RDF facilities (86%).

The RDF has strongly improved geographical equity of access to medicines. It has expanded from a project designed to supply only 60 health centers to an independent foundation responsible for the distribution of pharmaceutical products to almost all Ministry of Health facilities in Khartoum state. The RDF medicines were usually considered affordable by users. The average cost of a prescription (3.01 Sudanese pounds) at the RDF facilities amounted to only 2% of the lowest monthly government salary.

This evaluation identified some areas of weaknesses that still need to be considered to ensure the RDF's sustainability. This study showed that 6% of prescriptions presented to selected RDF health facilities were not dispensed for financial reasons. The RDF also failed to extend access in geographical terms: 26% of health centers and 200 dispensaries in rural areas in Khartoum state still do not have the RDF. Administrators of RDF health facilities or neighborhoods health committees have no role in the financial management of the RDF at their facilities (15).

A study was done in 2008 by directorate general of pharmacy with World Health Organization (WHO) financial support to evaluation the revolving drug fund (RDF) project in the Sudan, the aim of this study to generate data regarding the accessibility to essential drug, the affordability and willingness of patients to pay and satisfaction regarding the RDF services in North Sudan.

It was carried as cross-sectional facility based study and was conducted in the following states: Gezira, White Nile, Kassala, Blue Nile, and Gadarif.

Two baskets of drugs were selected to be included in the study. The first basket which included 16 key drugs was investigated for availability, presence expired drugs, price and duration of out of stock. A basket that included 15 supplementary drugs has been selected to measure availability, verify the existence of drugs due to expire or have been expired.

The main value of the key drugs available in public sector was found to be 92.6% and in the private sectors was found to be 90%. The mean value of the availability of supplementary drugs in the public sector was 84.3%, while in the private sectors it was found to be 80.5%. The mean value of the key drugs available in the main medical stores with RDF services was 91.7%. The mean value of out of stock duration (in days) of key drugs in RDF main stores was 22.8 days.

The RDF health care facilities were described as easily accessible by 64.8% of the study participants and 70.6% of the participants have declared their satisfaction regarding the availability of prescribed drugs. In addition 71.7% of the interview subjects stated that they are able to buy their prescribed medications. Overall 84% of the candidates stated that they were satisfied with the service delivered to them through the RDF health care facilities.

Although the performance of the RDF system seems to be satisfactory according to the result obtained (16).

RDF in the Sudan is one of the most important projects to ensure supply of medicines in required quality and affordable price. Recently there were many problems facing the project in the implementation of their objectives so this study is designed to evaluate the situation and to determine these problems for more improvement and reforms.

## 1.3 Objectives:

## 1.3.1 General objective:

To evaluate the main objectives to establish revolving drug funds in the states.

## 1.3.2 Specific objectives:

1- To assess the availability of essential medicines.

2- To compare affordability of essential medicines of CMS with other companies.

3- To determine the distribution of CMS services in the states.

4- To assess a system of self financing-medication.

5- To assess rational use of medicines.

6- To find out the method of prevent the circulation of medicines from unreliable sources.

# Chapter Two
# Methodology

## 2- Methodology:

### 2.1 Study design:

Cross sectional CMS and RDFs - based study.

### 2.2 Study population:

- Key persons in all states of RDFs.

### 2.3 Sample size:

Total coverage of all key persons in the states of RDFs.

### 2.4 Study time and location:

The study was conducted from October 2012 to May 2013.

### 2.5 Data collection:

By using questionnaire appendix (46) and document from CMS center and states

### 2.5.1 Questionnaire:

Questionnaire was modified after performed a pilot study, and the data was collected from the key persons of the RDFs in the thirteen states to assess rational use of medicines and prevention of the circulation of medicines from unreliable sources appendix (46). The questionnaire was prepared in 10-11-2012 and distributed to the key persons by hand during their presence in CMS center in the Khartoum.

## 2.5.2 Document:

Key medicines (53 items) were selected table (2.2) from the emergency group in the CMS to be in the study according to the essential medicines list in the CMS, and were used to assess the availability of essential medicines from the document in the states.

Price comparison used to assess affordability of medicines by used key medicines (53 items) and compared the price of CMS with the Private companies.

Annual reports from the states were used to measure distribution of CMS services in the states, and also to measure a system of self financing medication.

## 2.6 Data analysis:

Statistical Package for Social Science (SPSS) was used for data analysis.

## 2.7 limitation of the study:

1. Accessibility was not included in the study as it needs more human and financial resources

2. Data collected for affordability only by comparison of prices because the study in 2011 so it require more study.

## 2.8 Ethical consideration:

General Manager of CMS and Key persons in the RDFs had been clearly informed verbally about the academic purpose of the study.

## 2.9 Definition of variables and indicators:

### Table (2.1)

| Variables | indicators | objective |
|-----------|-----------|-----------|
| The availability of essential medicines | - The percent of availability of the key medicines. | 1 |
| The distribution of CMS services | - Percentage of coverage in the states of Sudan.<br>- Percentage of coverage in each state. | 2 |
| The affordability of medicines | - Comparison of CMS prices with private companies in 2011. | 3 |
| system of self financing-medication | - Number of the states has self financing.<br>- Loans. | 4 |
| Rational use of medicines | -Presence of protocols in each state.<br>- Presence of essential medicines list.<br>-Order according to essential medicines list.<br>-Monitoring the prescribers. | 5 |
| The Prevention of unreliable sources | -Purchase from reliable sources.<br>- Purchase from organizations.<br>- Control. | 6 |

## 2.10 Key medicines:

## Table (2.2) Key medicines

| No | Item | strength | Dosage form |
|----|------|----------|-------------|
| 1 | Acyclovir sodium | 250mg | Vial |
| 2 | Amiodarone hydrochloride | 50mg/ml in 3ml | ample |
| 3 | Amoxicillin trihydrate suspension | 125mg/5ml | Bottle |
| 4 | Amoxicillin trihydrate suspension | 250mg/5ml | Bottle |
| 5 | Artemether | 40mg/ml | Ample |
| 6 | Atropine sulphate | 1mg/ml | Ample |
| 7 | Azithromycin dihydrate | 200mg/5ml | Bottle |
| 8 | Benzyl penicillin  sodium | 1mega IU | Vial |
| 9 | Ceftriaxone sodium | 1gm | Vial |
| 10 | Ceftriaxone sodium | 500mg | Vial |
| 11 | Cephalexin  monohydrate | 125mg/5ml | Bottle |
| 12 | Cephalexine suspension. | 250mg/5ml | Bottle |
| 13 | Chloramphenicol eye drop | 0.5 % | Bottle |
| 14 | Chloramphenicol Sodium succinate | 1gm | Vial |
| 15 | Chlorpheniramine maleate | 10mg/ml | Ample |
| 16 | Cimitidine | 100mg/ml in 2 ml | Ample |
| 17 | Ciprofloxacin | 2mg/ml | Drip |
| 18 | Co-trimoxazole susp. | 240mg/5ml | Bottle |
| 19 | Dexamethasone sodium phosphate | 4mg/ml | Ample |
| 20 | Dextrose (Ds)5% in 0.9 sodium chloride (Ns) | Ds 5%+Ns9% in 500 ml | Drip |
| 21 | Dextrose 5% in water drip | 5%  in 500ml | Drip |
| 22 | Diazepam | 5mg /ml | Ample |
| 23 | Diazepam | 5mg | Tablet |
| 24 | Diclofenac sodium | 25mg/ml in 3ml | Ample |
| 25 | Enoxaparin Sodium | 2000 IU | prefilled syringe |
| 26 | Erythromycin ethyl succinate | 125mg/5ml | Bottle |

| 27 | Erythromycin ethyl succinate | 250mg/5ml | Bottle |
|----|------------------------------|-----------|--------|
| 28 | Ferrous +folic | 150mg+.5mg | Capsule |
| 29 | Ferrous sulphate syrup | 200mg/5ml | Bottle |
| 30 | Furosemide | 10mg/ml in 2ml | Ample |
| 31 | Gentamycin sulphate | 40mg/ml | Ample |
| 32 | Insulin soluble human rDNA | 100 IU/ml in 10 ml | Vial |
| 33 | Insulin zinc | 100 IU/ml in 10 ml | Vial |
| 34 | Lidocaine HCl | 2% in20ml | Vial |
| 35 | Metoclopromide | 10mg/2ml | Ample |
| 36 | Metronidazole suspension | 200mg/5ml | Bottle |
| 37 | Metronidazole drip | 5mg/ml | Drip |
| 38 | Multivitamine syrup | | Bottle |
| 39 | Nalidixic acid tablet | 500 mg | Tablet |
| 40 | O.R.S(Oral Rehydration Salt) | | pieces |
| 41 | Paracetamol | 120mg/5ml | Bottle |
| 42 | Promethazine hydrochloride | 25mg | Tablet |
| 43 | Promethazine hydrochloride | 25mg/ml | Ample |
| 44 | Quinine dihydrochloride | 300mg/ml | Ample |
| 45 | Ranitidine | 50mg/2ml | Ample |
| 46 | Ringer Lactate | | Drip |
| 47 | Salbutamol nebulizer solution | 5mg/ml | Bottle |
| 48 | Salbutamol sulphate syrup | 2mg/5ml | Bottle |
| 49 | Salbutamol sulphate aerosol inhaler | 100mcg/dose | Bottle |
| 50 | Sodium chloride 0.9%  solution for IV. | 0.9%  in 500ml | Drip |
| 51 | Tetracycline Hcl eye ointment | 1% | Tube |
| 52 | Vancomycin hydrochloride | 500mg | Vial |
| 53 | Water for injection | Purified water 5ml | Ample |

# Chapter Three

# Results

## 3. Results:

## 3.1 Availability of essential medicines

From of the key medicines (53 items) the average availability in the states was 66.7% as shown in the table (3.1).

## Table (3.1) availability of key medicines in each state

| No | States | Percentage of availability |
|---|---|---|
| 1 | Blue Nile state | 99.7% |
| 2 | White Nile state | 92.9% |
| 3 | North Darfur state | 92% |
| 4 | Gadarif state | 92% |
| 5 | Kassala  state | 91.4% |
| 6 | Northern state | 75.8% |
| 7 | River Nile state | 74.6% |
| 8 | Gezira state | 60.9% |
| 9 | South Darfur state | 60.7% |
| 10 | Red Sea state | 56.7% |
| 11 | Sennar State | 30.4% |
| 12 | West Kurdofan state | 27.1% |
| 13 | West Darfur state | 12.4% |
| **14** | **Average** | **66.7%** |

## 3.2 Affordability of essential medicines:

## 3.2.1 Number of key medicines in CMS has price decrease, and increase from other companies

From of the key medicines (53 items), (79.2%) of medicines have price decrease from other companies and 20.8% have price increase as shown in the tables (3.2), (3.3), (3.4).

## Table (3.2) Comparison of CMS price with other companies

| Key medicines | Percentage |
|---|---|
| Item in CMS have price decrease from other companies | 79.2% |
| Item in CMS have price increase from other companies | 20.8% |

## Table (3.3) percentage of CMS price decrease from other companies

| Number of item in CMS have price decrease from other companies | Percentage of decrease |
|---|---|
| 6 items | 100% -75% |
| 12 items | 74% - 50 % |
| 15 items | 49% - 25% |
| 9 items | < 25% |
| 42 items | 79.2% |

**Table (3.4) percentage of CMS price increase from other companies (by direct purchase)**

| Number of item in CMS have price increase  from other companies | percentage of increase |
|---|---|
| One item | >50% |
| 3    items | 50 % - 25% |
| 7    items | <25% |
| 11 items | 20.8% |

## 3.3 Distribution of CMS services

## 3.3.1 Distribution of CMS services in the states of Sudan

From fourteen states in Sudan, (92.6%) of the states have CMS services as shown in the tables (3.5).

## Table (3.5) percentage of coverage of CMS services in all states

| Number of states have service | Percentage of coverage |
|---|---|
| 13 states | 92.9% |

## 3.3.2 Distribution of CMS services in each state

CMS distribute the services to the thirteen states , the average of coverage in the states was 55 % in the hospitals and 29 % in the primary health centers as shown in the tables (3.6).

**Table (3.6) percentage of coverage of CMS services in each state**

| States | Percentage of coverage in the hospitals | Percentage of coverage in the primary health centers |
|---|---|---|
| Gezira state | %93 | %10 |
| Sinnar State | %88 | %21 |
| White Nile state | %86 | %1.50 |
| West Kurdofan state | %71 | %45 |
| Red Sea state | %66 | %70 |
| Blue Nile state | %53 | %40 |
| West Darfur state | %50 | %0 |
| Gadarif state | %50 | %12 |
| River Nile state | %45 | %52 |
| Kassala  state | %39 | %65 |
| Northern state | %35 | %55 |
| South Darfur state | %28 | %0 |
| North Darfur state | 10% | %0.80 |
| Average | 55% | 29% |

### 3.4 System of self financing-medication:

Two states have self financing and one state has loans as in the tables (3.7), (3.8), (3.9).

### 3.4.1 States have self financing

### Table (3.7) number of the states has self financing

| number of states has self financing | percentage |
|---|---|
| 2 states | 15.4% |

### 3.4.2 Loans

### Table (3.8) number of the states has loans

| number of states has loans | percentage |
|---|---|
| One state | 7.7% |

### 3.4.3 Use of capital cost in a year

### Table (3.9) Percentage of use of the capital cost

| States | Percentage of use of the capital cost |
|---|---|
| Northern state | 141.90% |
| Gezira state | 99.30% |
| Red Sea state | 82.53% |
| South Darfur state | 57.82% |
| River Nile state | 56% |
| Gadarif state | 48.43% |
| Blue Nile state | 38.05% |
| Kassala  state | 34.55% |
| North Darfur state | 34% |
| West Darfur state | 32.44% |
| West Kurdofan state | 31.60% |
| Sinnar State | 23.11% |
| White Nile state | 10.23% |

## 3.5 Rational use of medicines (from thirteen states):

## 3.5.1 General information from questionnaire about key persons of RDFs:

There was no Standard Treatment Guidelines (STGs), all states had essential medicines list (EML) , 61.5% of the states made orders according to essential medicines list, 38.5% had Drug Information Center (DIC), there was no prescribing guidelines, 46.2% had dispensing guidelines, 30.8% had continuous training, and 38.5%  monitor the prescribers as shown in the tables from (3.10) to (3.23).

### 3.5.1.1 Qualification

### Table (3.10) frequency and percentage of qualification

| Qualification | Frequency | Percentage |
|---------------|-----------|------------|
| Graduate | 10 | 76.9% |
| Post graduate | 3 | 23.1% |
| Total | 13 | 100% |

### 3.5.1.2 Duration of service in RDFs

### Table (3.11) frequency and percentage of duration

| Duration | Frequency | Percentage |
|----------|-----------|------------|
| 1-3 years | 5 | 38.5% |
| 4-6years | 3 | 23.1% |
| Above 6years | 5 | 38.5% |
| Total | 13 | 100% |

**3.5.2 Information about rational use of medicines from key persons of RDFs**:

**3.5.2.1 Availability of Standard Treatment Guidelines (STGs)**

**Table (3.12) frequency and percentage of availability of STGs**

| Availability (STGs) | Frequency | Percentage |
|---|---|---|
| No | 13 | 100% |

**3.5.2.2 Availability of essential medicines list (EML)**

**Table (3.13) frequency and percentage of availability of EML**

| Availability of (EML) | Frequency | Percentage |
|---|---|---|
| Yes | 13 | 100% |

**3.5.2.3 Orders according to EML**

**Table (3.14) frequency and percentage if orders according to EML**

| Order according to (EML) | Frequency | Percentage |
|---|---|---|
| Yes | 8 | 61.5% |
| No | 5 | 38.5% |
| Total | 13 | 100% |

## 3.5.2.4 Having Drug Information Center (DIC)

**Table (3.15) frequency and percentage of having DIC**

| Having (DIC) | Frequency | Percentage |
|:---:|:---:|:---:|
| Yes | 5 | 38.5% |
| No | 8 | 61.5% |
| Total | 13 | 100% |

## 3.5.2.5 Having trained staff if yes in table (3.15)

**Table (3.16) frequency and percentage of having trained staff**

| Having trained staff | Frequency | Percentage |
|:---:|:---:|:---:|
| Yes | 4 | 30.8% |
| No | 1 | 7.7% |
| Total | 5 | 38.5% |

## 3.5.2.6 Having drug information activity if yes in table (3.15)

**Table (3.17) frequency and percentage of having drug information activity**

| Having drug information activity | Frequency | Percentage |
|:---:|:---:|:---:|
| Yes | 5 | 38.5% |

### 3.5.2.7 Types of activity

**Table (3.18) frequency and percentage of activity**

| Activity | Frequency | Percentage |
|---|---|---|
| Lectures | 1 | 7.7% |
| Lectures and publication | 2 | 15.4% |
| Lectures, publication, and workshops | 2 | 15.4% |
| Total | 5 | 38.5% |

### 3.5.2.8 Having prescribing guidelines

**Table (3.19) frequency and percentage of having prescribing guidelines**

| Prescribing guidelines | Frequency | Percentage |
|---|---|---|
| No | 13 | 100% |

### 3.5.2.9 Having dispensing guidelines

**Table (3.20) frequency and percentage of having dispensing guidelines**

| Dispensing guidelines | Frequency | Percentage |
|---|---|---|
| Yes | 6 | 46.2% |
| No | 7 | 53.8% |
| Total | 13 | 100% |

### 3.5.2.10 Availability of continuous training

**Table (3.21) frequency and percentage of availability of continuous training**

| Continuous training | Frequency | Percentage |
|---|---|---|
| Yes | 4 | 30.8% |
| No | 9 | 69.2% |
| Total | 13 | 100% |

### 3.5.2.11 monitoring to the prescribers

**Table (3.22) frequency and percentage of monitoring the prescribers**

| Monitoring to the prescribers | Frequency | Percentage |
|---|---|---|
| Yes | 5 | 38.5% |
| No | 8 | 61.5% |
| Total | 13 | 100% |

### 3.5.2.12 Frequency of monitoring in a year

**Table (3.23) frequency and percentage of monitoring in a year**

| Monitoring in a year | Frequency | Percentage |
|---|---|---|
| One time | 1 | 7.7% |
| 2-3 times | 1 | 7.7% |
| > 3 time | 3 | 23.1% |
| Total | 5 | 38.5% |

## 3.6 Prevention of unreliable Sources (from thirteen states):

76.9% of the states had policy to purchase medicines, while no low to impose RDFs to procure medicines from CMS, 92.3 % had plan or system for purchase in case of stock-out at (CMS), in case of stock –out Drugs companies was the only source to purchase medicines, 30.8% of the states had supervision from CMS as shown in the tables from (3.24) to (3.30).

## 3.6.1 Having policy of purchase

**Table (3.24) frequency and percentage of having policy of purchase**

| Policy of purchase | Frequency | Percentage |
|---|---|---|
| Yes | 10 | 76.9% |
| No | 3 | 23.1% |
| Total | 13 | 100% |

## 3.6.2 Having a law which imposes RDFs to procure medicines from the (CMS)

**Table (3.25) frequency and percentage of having a law which imposes RDFs to procure medicines from the CMS**

| Having low | Frequency | Percentage |
|---|---|---|
| No | 13 | 100% |

## 3.6.3 Categories of medicine should be procured from (CMS)

**Table (3.26) frequency and percentage of each category of medicines should be procured from (CMS)**

| Categories of medicines | Frequency | Percentage |
|---|---|---|
| All medicine | 8 | 61.5% |
| Essential medicine list | 5 | 38.5% |
| Total | 13 | 100% |

### 3.6.4 Plan or system for purchase in case of stock-out at CMS

**Table (3.27) frequency and percentage of having plan or system for purchase in case of stock-out at (CMS)**

| Plan of purchase | Frequency | Percentage |
|---|---|---|
| Yes | 12 | 92.3% |
| No | 1 | 7.7% |
| Total | 13 | 100% |

### 3.6.5 Source of purchase

**Table (3.28) frequency and percentage of source of purchase**

| Source of purchase | Frequency | Percentage |
|---|---|---|
| Drugs companies | 13 | 100% |

### 3.6.6 Supervision from (CMS)

**Table (3.29) frequency and percentage of supervision from (CMS)**

| supervision | Frequency | Percentage |
|---|---|---|
| Yes | 4 | 30.8% |
| No | 9 | 69.2% |
| Total | 13 | 100% |

### 3.6.7 Frequency of monitoring in a year

**Table (3.30) frequency and percentage of frequency of monitoring in a year**

| Monitoring in a year | Frequency | Percentage |
|:---:|:---:|:---:|
| One time | 3 | 23.1% |
| 2-3 Times | 1 | 7.7% |
| Total | 4 | 30.8% |

# Chapter Four

# Discussion

# 4.1 Discussion

Project of RDFs in the states aimed to provide sustainable medicines in states of the Sudan as it is very wide country and there are many difficulties in the distribution of medicines in required quality.

Many efforts in trying to supply medicines to everybody in the Sudan for healthy community for equal distribution of medicines in all the states. This project still needs money and political support to provide the required service.

## 4.1.1 Availability of essential medicines

The percentages of availability of medicines were calculated by dividing the number of medicines by total the number of medicines and multiplied by 100 (17).
Availability of essential medicines should be hundred percent as in the reference of WHO (18) but it accept in 95% as in the statistic (the percent of error is 5 %).

The average availability of the medicines in the thirteen states was 66.7%, the availability in the states was low because some states like Sinnar State, West Kurdofan state, and West Darfur state were very lower percentage (lower or equal than 30%) for different reason like, political problems and loans. While the availability of Blue Nile state, White Nile state, North Darfur state, Gadarif state and Kassala state (five states) were found to be more than 90%.

The result of five states, the availability more than (90%) as shown in the study was done in 2008 by directorate general of pharmacy to evaluation the Revolving Drug Funds (RDFs) project in the Sudan, but in contrast with the found in the other eight states (16).

## 4.1.2 Affordability of essential medicines

Forty two items (79.2%) of the key medicines had CMS price less than other companies, six items were decrease from (100-75%), twelve items (74-50%), fifteen items (49-25%), and nine items (lower than 25%).

About eleven items (20.8%) of the key medicines had CMS price higher than other companies, one item was increased (more than 50%), three items (50-25%), and seven items (lower than 25%). For affordability this result need more study as it was took only document of price list because the study in 2011.

It was confirmed by study was done in 2008 by directorate general of pharmacy to evaluation the Revolving Drug Fund (RDF) project in the Sudan (16).

CMS price had fewer prices because CMS purchased medicines by open tender but in some cases such as shortage CMS purchased medicines by direct purchase this can lead to increase prices from other companies.

## 4.1.3 Distribution of CMS services in the states

 (92.9%) of the states in Sudan had CMS services, the average of coverage of the states was (55%) in the hospitals and (29%) in the primary health centers, some states need to increase the coverage in the hospitals and primary health centers such as Northern state, South Darfur state and, North Darfur state. For only three states that coverage of hospitals (more than 80%) the result as shown in the study was carried out in Sudan in 2004 to assess the impact of the RDF on accessibility of medicines in Khartoum state (14).

## 4.1.4 System of self-financing medication

Only two states (15.4%) had self finance, while one state (7.7%) had loans.
On the use of capital cost (in the form of medicines) that it must be use four times in a year, three states the use of the capital cost were (above 80%), two states (79-50%), six states (49-25%), and two states (below 25%).

The percent of self financing was very low this due to political interference, low performance and use capital cost for purpose other than purchasing medicines. For three states that  use of the capital cost (above 80%) the result as shown in the study was carried out in Sudan in 2004 to assess the impact of the RDF on accessibility of medicines in Khartoum state (14).

### 4.1.5 Rational use of medicines

### 4.1.5.1 Qualification and Duration of service in RDFs

By using questionnaire to the key persons of RDFs states, the qualifications of key persons were (76.9%) graduate, and (23.1%) postgraduate. To some extend there was going toward development of skill.

High percent of duration among the key persons above 6years (38.5%), while (38.5%) from (1-3) years, and (23.1%) from 4-6 years, this was good indicator to stabilize of employees and low turnover.

### 4.1.5.2 Availability of Standard Treatment Guidelines (STGs)

There was no STGs in all the states, but it found in the global fund program like malaria and tuberculosis (TB).

### 4.1.5.3 Availability of essential medicines list (EML)

All the states had EML (100%), which published by the Federal Ministry of Health.

### 4.1.5.4 Orders according to EML

Most of key persons (61.5%) made orders of medicines according to EML, compared to (38.5%) of key persons didn't made orders according to EML. This because some states didn't consider the Federal Ministry of Health regulation.

### 4.1.5.5 Having Drug Information Center (DIC)

Only (38.5%) of states had DIC, with coordination with ministry of health in the states. In most of states (61.5%) there hadn't DIC.

## 4.1.5.6 Having trained staff if yes in (4.1.5.5)

The percentage of having trained staff in DIC was (30.8%) from the total (38.5%).

## 4.1.5.7 Having drug information activities if yes in (4.1.5.5)

All the states that had DIC, had drug information activities (38.5%).

## 4.1.5.8 Types of activity

The activities of drug information in the states were lower percentage in lectures (7.7%), and equal percentage in (lectures and publication) (15.4%), and (lectures, publication, workshops) (15.4%).

## 4.1.5.9 Having recording system for prescribing guidelines, dispensing guidelines

Complete absence of recording system for prescribing guidelines in all the states, and only about (46.2%) had dispensing guidelines.

## 4.1.5.10 Availability of continuous training

Only (30.8%) of states had continuous training, this reflects the weakness in the training.

## 4.1.5.11 Monitoring to the prescribers and frequency of monitoring in a year

(38.5%) of states had system to monitor the prescribers, from this percent the frequency of monitoring in a year (23.1%) above 3 times, (7.7%) 2-3 times, and (7.7%) one time in a year.

In spite of few states had system of monitoring the prescriber, there were high percent of monitoring above 3 times (23.1%).

## 4.1.6 Prevention of unreliable Sources

The majority of the states had policy to purchase medicines (76.9%), but all the states hadn't a law to impose RDFs to procure medicines from (CMS).

About (61.5%) of the states purchased all medicines from CMS, while (38.5%) of states purchased only EML.

(92.3%) of the states had plan or system for purchasing in case of stock-out at CMS, with compared to (7.7%) of states hadn't system for purchasing.

In case of stock-out at CMS, all the states purchased medicines from companies of medicines, but it need system to insure the prevention of circulation of medicines from unreliable sources.

Supervision from CMS was very weak, only (30.8%) of the states, from this percent (23.1%) of the states were monitoring one time in a year and (7.7%) of the states were monitoring from (2-3) times in a years.

## 4.2 Conclusion

The average availability of key medicines was high in the five states but in the majority of the states was low.

CMS had achieved a remarkable success to improve the affordability, and to distribute the services of CMS to the majority of the states in Sudan but the average of coverage in the states was very low, so CMS needs more spread to its services.

Since 2001 only two states had self-finance, and one state had loans while the performance of the five states was good.

This study showed that CMS failed to implement rational use of medicines in the states as there were no Standard Treatment Guidelines (STGs) in all the states, however all states had essential medicines list (EML).

About two thirds of key personnel made order of medicines according to essential medicines list, only about one third of the states had Drug Information Center (DIC) and in all the states there were no prescribing guidelines. While less than half of the states had dispensing guidelines.

About one third of the states had continuous training, while more than one third of the states had system of monitoring the prescribers.

For Prevention of unreliable Sources the study found that there was no law to impose RDFs to procure medicines from (CMS).

The majority of the states had plan or system for purchased in case of stock-out at CMS, also the study explained that all the states purchased medicines only from reliable sources, despite the weak supervision from (CMS).

# 4.3 Recommendations

1. More effort is needed to increase the availability of medicines in the states.

2. CMS need to expand coverage at the level of hospitals and primary health care centers.

3. Encouragement and motivation of the states for self-financing.

4. Political support is very important to ensure the continuity of projects.

5. Implementation of Standard Treatment Guidelines (STGs) and Drug Information Center (DIC) in coordination with Ministry Of Health in all states can improve rational use of medicines.

6. RDFs department in CMS can set and /or activate system for recording prescribing guidelines and dispensing guidelines in the states.

7. Employees of the states need more training.

8. Establishment of a law to impose RDFs to purchase medicines from CMS.

9. Implementation of a system for Supervision through the year.

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تقرير السنوي للدواء الدوار

# Appendix

**Sudan Medical Specialization Board**

**Pharmacy Specialization Board**

Evaluation of the Objectives of Central Medical Supplies to
Establish Revolving Drug Funds in the States
(2011)

**QUESTIONAIRE**

Serial number ---------

General information about key personal of **RDFs**:

Name------------------------------------        Date--------------------

Telephone number----------------------

State name--------------------------------------------------------------

Qualification:  Graduate     ☐     Postgraduate     ☐       Other     ☐

Specify ---------------

Duration of service in **RDFs**        ☐     year

# Rational Use of Medicine In 2011

1- Are Standard Treatment Guidelines (STG) available?

Yes        ☐                No        ☐

2- Is there essential medicines list?

Yes ☐                    No ☐

3- Are orders according to essential medicines list?

Yes ☐                    No ☐

4- Do you have Drug Information Center?

Yes ☐                    No ☐

If yes

5- Is there trained staff?

Yes ☐                    No ☐

6- Is there drug information activities?

Yes ☐                    No ☐

7- If yes

-Lectures ☐

-Workshops ☐

-Publication ☐

8- Do you have prescribing quid line?

Yes ☐                    No ☐

9- Do you have dispensing quid line?

Yes ☐                    No ☐

10- Is there continuous training?

Yes ☐                          No ☐

11- Is there monitoring to the prescribers?

Yes ☐                          No ☐

12- Frequency of monitoring in a year?

> 3time ☐          3-2 times ☐          1 time ☐

**Questionnaire no (2)**

## Prevention of Unreliable Sources In 2011

1-Do you have policy of purchase?

Yes ☐                     No ☐

2- Is there a law which imposes **RDFs** to procure medicines from the

Central Medical Supply?

Yes ☐                     No ☐

3- Which categories of medicine should be procured from CMS?

-All medicine ☐

- Essential medicine list ☐

4-In case of stock-out at **CMS** is there any plan or system for purchase?

Yes ☐                     No ☐

5- What are the other sources that you purchase your items from?

- Drugs companies ☐

 - Non Governmental Organization NGOs ☐

- Other ☐

 Specify----------------------------------

6- In case of purchase from Non Governmental Organization (NGOs) is there any way to insure the quality of medicine?

Yes ☐                     No ☐

7- If yes

- Sent sample to the national Quality Control Laboratory (NQCL)    ⬜

- Purchase only registered items    ⬜

- Others (please specify)------------------------------------

8- Is there supervision from **CMS**?

Yes    ⬜                    No    ⬜

9- Frequency of monitoring in a year?

&gt; 3 times    ⬜          3-2 times    ⬜    1 time    ⬜