In-depth Evaluation of Pharmaceuticals Supply System in Sudan National Health Insurance Fund

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Contents

Introduction

Recently, the National Health Insurance Fund (NHIF) in Sudan started to play highly significant role in health system with more focus on improving the access to healthcare services. The capacity of Health Insurance Fund is not in isolation from the capacity of the health system in the country; both are interlinked and affecting each other. This is particularly valid under the overall policy of the government to achieve the universal coverage of health services, as key pillar of any health system, with more emphasis on primary health care [1]. On the other hand, the supply of medicines and health technologies is essential component of the health systems, and the provision of medicines is key input for better health outcomes of any health insurance system as well. It becomes a necessity that medicines supply and management system to become more efficient to ensure the availability and affordability of quality products for the end users. The supply system of the NHIF should be capable of providing medicines benefits and services in different geographical areas where the health services of insurance fund were provided, with considerations to the safety, quality and prices of the medicines. It is also important to notice that, the procurement of medicines represents around 6% of the annual in the NHIF [2]. With this big purchasing power of the NHIF, it becomes one of the major financing sources of medicines in the country.

In 2011 the NHIF take strategic decision to apply the principle of separating the purchase of the services from the provision of the services and to apply more emphasis on the purchase of the services from the services providers on behalf of the beneficiaries [3]. Still there are some areas where the fund continues the provision of the direct service delivery to the beneficiaries. All of this complicated the situation

regarding the effectiveness, efficiency and quality of medicines supply system that provides the services to NHIF beneficiaries. The government took a decision to harmonize and integrate the fragmented supply systems, including the supply system of the NHIF, into one national system under the direct technical support of the Central Medical Supplies Corporation (CMS) [1]. This includes among others a process to implement the pool procurement, improvement of distribution systems, storage systems and management information system. The changes under this policy should be considered as part of the planned strategic transformation of the NHIF in the next period up to 2016 [3]. More strategic information needed to support the changes needed in this area.

Under this context, it is essential to evaluate the capacity and the performance of the supply and management system of medicines and pharmaceutical products of the NHIF. The evaluation of the supply and management system is important source of information to assess the current situation and to identify the suitable policy options that help in achieving the strategic objectives of the NHIF. Many countries adopted this approach with regard to its supply system and not essentially for the insurance schemes only, however there is clear gap in the available published literature in this area. The continuous monitoring and evaluation of medicines supply system is important part of the improvement cycle of this system. In 2010 a study conducted by J. Carapinha and colleagues in five African countries that aimed to assess the medicines benefits within 33 health insurance programs [4]. The study found that almost all of the programs provide both inpatient and outpatient medicine benefits, with members sharing the cost of medicines in all programs. Some programs use strategies that are common in high-income countries to manage the medicine benefits, such as formularies, generics policies, reimbursement limits and/or price negotiation. It was unknown from this review whether these strategies are effective or not in improving the availability and the

affordability of medicines and in reducing the overall cost of medicines to the program and to the beneficiaries. However, the study highlighted the usefulness of the routine data from the services delivery sites under the insurance system and its role in evaluating these aspects using specific set of indicators.

In 2008 World Health Organization (WHO), through its regional office for Africa, conducted multi-country study “Medicines Policy Analysis in Health Insurance Systems” that aimed mainly to understand the possible policy options that could be adapted and might help in improving the outcomes of health insurance programs in African countries [5]. The study revealed that the overall medicines policy in the country (the National Medicines Policy) is key determinant of the effectiveness of medicines policy inside the insurance systems, however; some health insurance systems succeeded to overcome the key problems affecting the effectiveness of the national policy by using some alternative policy options. The study also flagged important aspects related to the compliance of these schemes to the international good practices related to procurement, distribution and storage of medicines that were developed by the WHO.

Management Sciences for Health (MSH) appreciated the role of the health insurance schemes in increasing the accessibility and availability of the essential medicines to the vast majority of the population especially in remote and underserved areas. MSH highlighted the importance of how the supply management system for medicines is designed. This is clear especially in countries where many health services providers are involved in the health system (the case of Sudan). At its simplest form, medicines supply management cycle consists of four main components of the system. These components include the selection, procurement, distribution and the use of medicines [6].

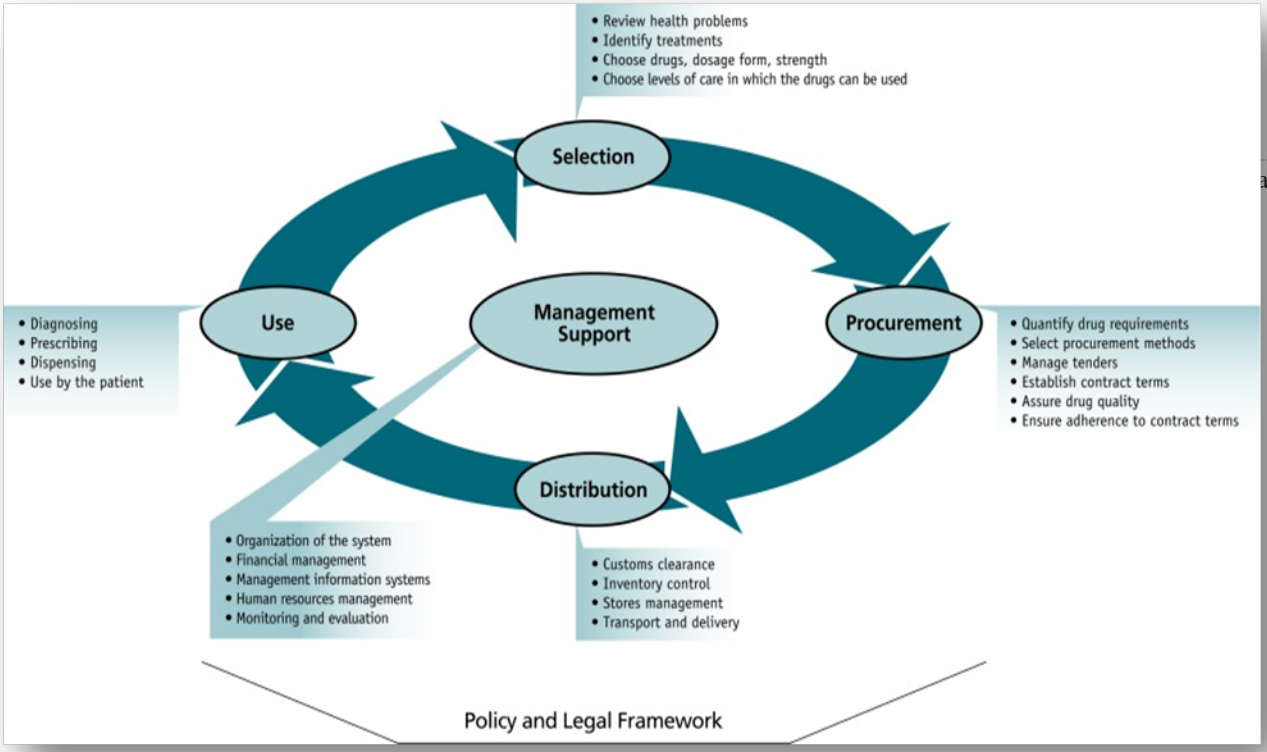


Figure No. 1: MSH Framework for Supply Chain Cycle

Rationale

National Health Insurance Fund is under major transformation process that requires strategic information to understand the current situation in different areas. The information should highlight the strengths and weaknesses of its management systems and to address areas for improvement. Part of these areas is the supply and management system of pharmaceuticals. This study is essential to understand the best mix of strategies that enabled the NHIF to improve the availability and affordability of essential medicines procured and dispensed through health facilities.

Study objective

General:

To evaluate the capacity of procurement and supply management systems of pharmaceutical products in Sudan National Health Insurance Fund in 2013.

Specific:

1. To identify and analyze the supply chain at different levels of the system focusing on the selection, procurement, distribution and utilization of the products;
2. To assess the compliance of NHIF supply system with good practices related to procurement, distribution and storage of medicines;
3. To determine the strengths and weaknesses of the supply system within the NHIF

Methodology

Study design:

A cross sectional study conducted in six states

Sample design:

Based on the stated research objectives and the structure of the study population in terms of homogeneity and geographic proximity of its constituent facilities, the appropriate design is stratified two-stage sampling.

Accordingly the number of facilities(n),to be selected is:

$$n = \left(\frac{Z^2_{\frac{\alpha}{2}}\, P(1-P)}{\varepsilon^2}\right).deff_{sm}$$

where $Z_{0.025} = 1.96$, the confidence coefficient,

P = 0.5, the proportion of facilities with the attribute of interest

$\varepsilon = 0.10$, allowable margin of error,

deffsm= 1.03, the effect of stratified two-stage design.

Substituting into n gives a national overall sample of size 100. The overall sampled facilities was 111

Selection of the Sample:

The study units constituting the target population are direct and indirect health facilities in the sixteen states (excluding Khartoum state).The information required for sampling frame construction (i.e: names and addresses) was obtained from NHIF.

Six states were randomly selected with probabilities proportionate to their number of facilities. The states thus selected are Sennar, Gezira, Northern, Blue Nile, Red Sea, and West Darfur.

Facilities in the selected States were then stratified by type (into direct and indirect facilities).The 111 facilities were allocated proportionately to the six states before further allocating each state's subsample to its two domains. This yields the following:

State / Type of facility	Sennar	Gezira	Northern	Blue Nile	Red Sea	West Darfur	Total
Direct	7	24	6	5	5	8	55
indirect	7	3	16	8	16	6	56
total	14	27	22	13	21	14	111

Facilities within each domain were randomly sampled by simple random sampling.

Second: Stores selection

NHIF stores in each state were targeted and eventually, six warehouses have been surveyed.

Drug sample:

The NHIF essential drug list contains around 600 items representing 18 therapeutic groups. At least one item from each therapeutic group have been selected from within NHIF list and it end up by a list of 34 key medicines. The selection of medicines used the below criteria:

1. Medicines that are globally recommended in standard treatment guidelines for the global priority diseases.
2. Medicines that are nationally used for the health conditions that represent the main proportion of the diseases burden in the country.
3. Highly consumed items based on the recent procurement statistics.
4. Availability of information about international reference prices.
5. Medicines selected are those expected to be available within the primary health care levels especially the rural health centers.
6. Medicines that represent high financial burden for the patients and the insurance system as well.
7. Prescribed medicines only to be considered and not the commonly used over-the-counter items.

Study used WHO tool for the in-depth assessment of the medicines supply management systems (June 2007 version).

The study started on December 2013 till September 2014. All data at state and facility data collected based on 2013 store records and facility (audit report). The study approach was in-depth using mixed of qualitative and quantitative techniques.

Qualitative

The study targeted key informants at NHIF head quarter (supply officer and pharmaceutical department representatives).The key personnel with direct relation to the supply system at state supply officers and key informant like therapeutic committee members at state. A total of five supply officer were interviewed at five states.

Document review for governance documents, supervision reports and selection manual, NHIF policy was done to validate and triangulate findings at central and state level**.**

Results

Results were in general oriented to assess the system from three universal objectives of each system:

1. Improving **efficiency**
2. Improving the **quality**
3. Ensuring **access**

As it will be discussed later, these are interlinked objectives and their performance affect each other. With this consideration, the structure of the results will not follow these objectives, however, these dimensions should be considered in the interpretation of the results.

1. Governance, organization model and policy formation

All Staffs concerned with drug supply have defined responsibilities and term of reference. Division of labor between different levels were addressed and supply management is decentralized system (de-concentration type). This entail that state will take the lead in design making process which necessitate to sustain the capacity at state. The latter were overlooked although NHIF policy emphasized on availing different strategies to support decentralization. Measures to ensure performance accountability were not exercised.

Supervision were mentioned several times as a monitoring tool, however frequency of supervision visit was low as only two supervisory visit conducted by NHIF head quarter in 2013 and 2012 . The scope and state coverage was varied among the states.

Although supervision visits highlighted several corrective actions and stated many recommendations to improve performance still some state didn't take any further actions. For instance issues of storage condition and record keeping were one of the main recommendations in the last supervisory visits however assessment revealed that these poor practices still exist.

Although, core competencies were determined to ensure job performance and capacity building plan were available. However, prevailing human resource issues like inadequacy of staff, turnover and poor performance management system present and challenge organization functions.

NHIF central officer said '*although all tools and governance documents are there to be enforced. However close monitoring and follow up is overlooked, central accountability is weak and enforceability was not exercised, issue like low number of HR at centre (two) and many times we ask some people to help in supervision visit. So not all issues related to state, the central is also has it pitfalls like weak accountability* ".

2. Product selection

Product selection is the first phase in the supply chain and one of the most critical process in supply systems. Some good practices has been identified in this evaluation that reflect the commitment of NHIF to continuously advance this important step. This includes:

1. Defined list of medicine is available and it is in line with National Essential Medicines, 2007 list.
2. The update of essential list is carried every two years.
3. Medicines selection is based on global evidence, expert opinion and available national standard treatment guidelines (STGs).
4. The selection procedure is defined in approved and enforced guidelines; with clearly stated indication for adjustment, omission and addition of the essential list.
5. Selection is governed by a taskforce (scientific committee) that representing all expertise such as public health specialists**,** NHIF representative, physician and sometimes physicians societies.

One of supply officer said '*Product selection carried out by scientific committee that formed of public health specialists, experts, NHIF representative, physician and sometimes scientific communities (like endocrinologist).The process starts with review of guideline where we face problems as most of approved guideline are not implemented …we obtain expert opinion, look for published literature and base on available evidence and accordingly, we add or omit. We look at the list and committee to add, omit or adjust the level of care as primary care, secondary and tertiary each one has its own list'.*
Documents review revealed that selection procedure is well described in selection manual and adherence to essential list is considered as one of key performance indicators.

NHIF central supply officer said' *we have selection manual that explicitly delineate indication for addition and conditions where you need to add level and on which basis you adjust, omit and format to be used included with selection guidelines*'
Below are the main findings from this evaluation in this component of the supply system:

The survey of this evaluation revealed that availability of NHIF list in health facility and outlets was 59%. Only Northern State has 100% list availability and the least figure recorded at Red Sea State (26%.1%) (see figure 2).

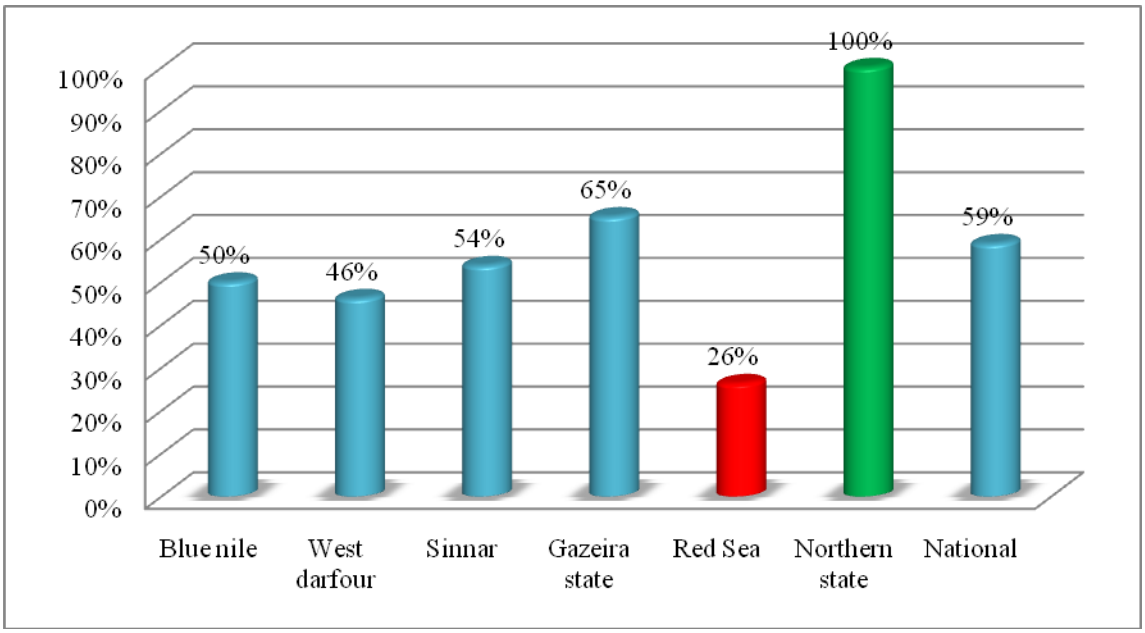


Figure 2: Availability of essential medicine list by state

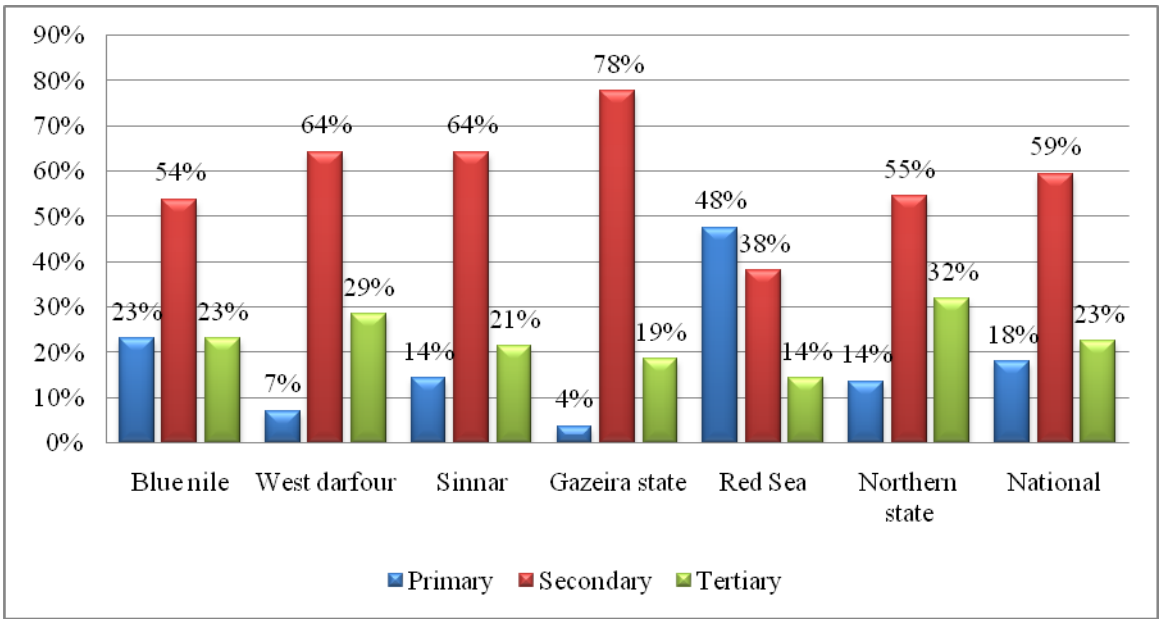


Figure 3: Availability of insurance list by level of care

Analysis by level of care indicated that primary and secondary levels have low availability level in all states compared to tertiary level (figure 3). Other than Red Sea state, all of the other states characterized by lower availability of the list in primary health care facilities.

Moreover, interview with supply officer and therapeutic committee representative at state level reflected some issues of dissatisfaction particularly among prescribers and patient regarding medicines items.

' *from supply side NHIF its large enough, however from demand side (the patient) he has his own view regarding what is needed, for instance taking vitamin B as example we have B12, B6, B1 vitamins, based on 2012 list this product was prescribed in large quantities then we went to Diabetes Association and they indicated that the scientific committee said that there is no evidence that vit B12 has association with improvement of peripheral neuropathy so they suggest to take out this product and we replace it with Gabapentin which is more expensive and effective so till now we face problem like this, as the diabetic patients used of vitamin been given but they don't know how it works !! So for patient with chronic disease who found their drugs they are satisfied but many others are not* '.

Here are selection issues mentioned by state therapeutic committee representatives and NHIF supply officers:

- There was a clear challenge in setting a nationally acceptable and reference drug list, especially before the endorsement and dissemination of the updated National Essential Drugs List for 2013. This is no longer the case. This is highlighting the importance of periodic update of the Essential Drugs List that support all of the stakeholders in their planning.

- Before the development of the standard guidelines, there was a great challenge in defining the process, criteria and approach to include, exclude and to update the NHIF drugs list. Upon the approval and the implementation of the new guidelines, this issue become well managed and clear process.
- While the presence of the Essential Drugs List and the adapted standard guidelines, still the process and outcomes of products selection are affected by varies influence of subjectivity, which in most of the cases is not major issue. Still the process is dependent on expert opinions as important inputs in the process. While all experts bring their previous experience to the process, still there is a room to minimize this in a way that keeps the process more objective and evidence-based.

Regarding adherence to the list, observation reveled that there is high compliance to insurance list. This was justified by state supply officer that list reimbursement will be denied, if health facility prescribed or select a drug out of the list.

state supply officer said *'As health insurance agency the most important is claim management all prescription will be reviewed , any pharmacy we have contracted with or our own pharmacy we review the claim format if drug is outside the list then they will be penalized and cost/expenses will deducted from the pharmacy incentives*'

3. Procurement cycle

3.1. Procurement financing

Considerable healthcare budget is usually spent on buying medicines, NHIF is not an exception. This emphasizes the need for planning, designing and organizing the financing for the procurement plans in general, where the goal of the supply system is to ensure that there is adequate stock of the required items so that an uninterrupted supply of all essential items is maintained. The ABC and VED (vital, essential, desirable) analysis of the procurement (ordering) outcomes of NHIF is important process to assess the outcomes of the system. ABC and VEN analysis can give the annual consumption and expenditure incurred on each item of pharmaceutical department for specific period of time.

We recommend that the ABC and VED techniques to be adopted as a routine practice for optimal use of resources and elimination of out-of-stock situations in the supply system. It was planned to conduct this analysis part of this evaluation, but the study team appreciate the benefits of more systemized approach to build the capacity, rather than to conduct one-time analysis. The study team will conduct technical support session to work with the supply officers through the supply chain to institutionalize this analysis part of the monitoring system. This will help in (i) Resource mobilization and allocation; but also in (ii) Expenditure tracking on different types of supplies.

3.2. Quantification

Guidelines that describe quantification process (when, how, and by whom) were available. According to NHIF guidelines ‘‘quantification should be carried out using consumption data and all formulas should be available at state.

Central level:

While there is supply officer who is overseeing the quantification process at the central level, the NHIF is not responsible of executing the quantification and forecasting activity itself. The central level is more concerned with provision of technical support for state officers and performing quality assurance check before placing the quantities and needs from each state as part of tender documents. Validation exercise by central level showed that it’s mainly focused on assuring that all quantified items are in the NHIF list and overall budget doesn’t exceed the state budget ceiling. This indicated that technical validation and verification were overlooked.

This approach might be considered as strong move towards more decentralized approach of managing the supply system, where the states has more control over its needs and supplies. This however place additional needs for ensuring the availability of adequate competencies at the state level to perform this activity with strong information system in place. The role of the central level in this issue is critical, so that all of the states to benefit from one capacity building program that is sustainable and has added value.

State and facility level:

Since 2004 there were some initiatives introduced by the central pharmaceutical department of NHIF to support the states to improve their ability to achieve better quantification process and to place that based on historical data about consumption. While not all of the states has implemented these initiatives, which were basically computerized programs, still some of the states were part of the implementation. States that were not using the software programs are using excel-based systems to build their quantities based on the historical consumption data.

Quantitative analysis of this evaluation has revealed that state practice at facility level is consistent with quantification policy as 92.2 % indicated that they determine their need based on consumption average. Analysis at six states showed that they mainly use consumption data to inform quantification exercise see figure (4).

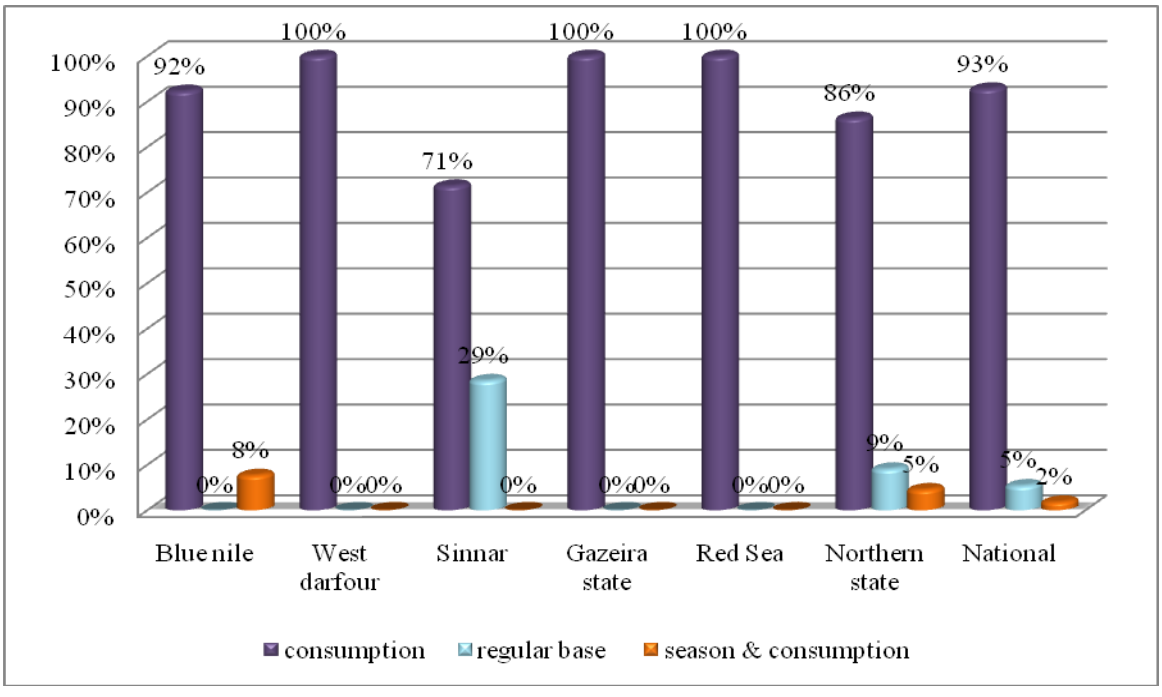


Figure 4: methods of need determination

As indicated before, quantification is state responsibility, whereas validation of quantification exercise is central responsibility.

According to NHIF regulations supply officer is quantification focal person who is responsible for compilation and finalization of the quantification exercise for his/her receptive state. Hence, Competency of state supply officer is a key to ensure valid estimates at state. NHIF head quarter supply manger listed staff turnover and forecasting competency of state supply officer as one of major issues which may jeopardize quantification at states.

3.3. Procurement methods (purchasing/tendering):

The procurement system in Health Insurance Fund was been a subject of continuous improvement since 2004. While the NHIF now has joined the pooled procurement system that is managed by CMS, the purchase and ordering system has witnessed some reforms during the last decade.

- Up to 2004, there was no unified system for collective procurement at central level, as most of the state usually purchase directly from the suppliers. In 2004 the NHIF has established its central procurement system, with quarterly-based tendering cycle. In 2006 this was changed to bi-annual tendering cycle.
- Another major shift was introduced in 2010, where the fund adopt the direct delivery policy. In this new policy, the suppliers will be requested to deliver the medicines directly to states instead of central stores. These new changes has some implications on the cost of medicines, however, this has good values in terms of overall efficiency of the supply system.

- Pooled procurement system is introduced at the end of 2012. Formal agreement/ decree established between the NHIF and central medical store. The system aimed at increasing collaboration between the member organizations with ultimate goal to increase economy of scale with regard to drug purchasing.
- In 2013, the distribution policy was changed to address some challenges around delivering orders with small quantities. The fund adapt the system where each state coordinator become responsible for collecting the orders from CMS.

Analysis revealed that there is a formal statement of goals and objectives of the pooled procurement program. Corresponding terms that clarify roles of NHIF representatives in CMS tendering committee were found, however, mechanisms to regulate financial administration between CMS and NHIF stakeholders were not indicated.

Several issues related to pooled procurement were raised by supply unit officers NHIF head quarter:

- Financial flow from NHIF to CMS against specified orders is not timely; this may result in possible delays in process of procurement from the CMS .Another issue mentioned by Pharmaceutical supply unit officer at NHIF head quarter that "'*Implementation arrangements to ensure prompt payment to the CMS has not been specified, also timely response or delivery by CMS were not indicated thus availability of requested item can not be guaranteed*".

- Booking system not available; Pharmaceutical supply unit officer said '*when we process our request (forecasting) the CMS usually reported that all quantities are available but by the time we want to buy certain items then usually requested items are sold out or the quantities left do not cover our demand. The CMS does not have a booking system, thus we cannot book the requested amount. Many times at final payment stage and actual receipt we encounter issues of unavailability of certain items or even quantities. This contributed to delay in delivery and distribution'.* To address this issue, it was proposed that the CMS should develop a framework agreement with all entities participating in pooled procurement, this agreement should serve as reference document to monitor the supply chain for CMS as well as the participating entities.

- Monitoring system is not fully functioning; monitoring indicators to assess progress toward expected benefit of pooled procurement system were not developed.NHIF central pharmaceutical director said *"Regarding supplier evaluation we used to evaluate the performance of our supplier however now we don't, we still give feedback but its sporadic, I think a presence of M&E framework with objective indicators for this agreement will help for evaluation and ensure that objectives have been achieved (coverage, price reduction) so all we have now is our impression, however we maybe amplifying the problem and it's not that big !!! Some factors may be related to our system not theirs so a clear mechanism to trace, monitor and evaluate is a needed initiative".*

3.4. Orders planning:

Ordering at central level:

As mentioned before, the ordering system of medicines is completely based on tendering process as part of the pooled procurement, with clear arrangements for dispatch and delivery of ordered quantities for each state.

Ordering at state and facility level:

Ordering practice at states showed that almost 44% ordered within month (standard period) however emergency orders were noticed and its relatively high 39.1% (table1). The latter figure revealed inconsistency between procurement guidelines and practice at lower level.

Table 1: Ordering frequency

State	Ordering frequency			
	Weekly (%)	2 weeks (%)	Monthly (%)	Quarterly (%)
Blue Nile	15.4%	46.2%	38.5%	0.0%
West Darfur	0.0%	50.0%	50.0%	0.0%
Sinnar	0.0%	21.4%	78.6%	0.0%
Gazira	3.7%	11.1%	63.0%	22.2%
Red sea	75.0%	5.0%	20.0%	0.0%
Northern	0.0%	77.3%	22.7%	0.0%
All states	16.4%	33.6%	44.5%	5.5%

Overall, Almost two third received their orders within 3 days which is a reasonable lead time to monthly procurement plan. However, some states like west Darfur, Gazira and Sinnar still received one fifth of their orders within 1-3 weeks (table 2).

Table 2: lead time

State	'average time period between ordering and receiving of orders'				
	1-20 hrs	1-3 days	1-3 weeks	4 weeks %	More than month
Blue Nile	53.8%	46.2%	0.0%	0.0%	0.0%
West Darfur	21.4%	57.1%	21.4%	0.0%	0.0%
Sinnar	7.1%	64.3%	28.6%	0.0%	0.0%
Gazira	4.2%	66.7%	20.8%	8.3%	0.0%
Red sea	4.8%	95.2%	0.0%	0.0%	0.0%
Northern	59.1%	31.8%	9.1%	0.0%	0.0%
All states	24.1%	61.1%	13.0%	1.9%	0.0%

4. Distribution

4.1. Delivery &Transport

NHIF standard indicated that distribution should be carried out according to good distribution practice (GDP) for instance 'convenient transportation means where temperature is controlled, vehicles and equipment used to distribute, store or handle pharmaceutical products should be suitable for their purpose and appropriately equipped to prevent exposure of the products to conditions that could affect their stability and packaging integrity, and to prevent contamination of any kind'.

Division of labor regarding distribution was clear between central and state level .NHIF central representative is responsible of overseeing the process of handover of states orders by state coordinators from CMS store whereas, state representatives is responsible from transportation and delivery to receptive state.

States used to outsource delivery either for individuals or company contract, on lesser extent some states they have their own cars. Delivery car was the main mean of drug delivery from state store to mobile clinics, hospital and health centers facility in all state. Interviews with national supply and state coordinators revealed that majority of state used ***a third-party as carriers***.

According to NHIF stated guidelines on third party carries they should develop written agreements with carriers to ensure that appropriate measures are taken to safeguard pharmaceutical products. Measures to ensure quality of delivery and transportation were not found at central and state.

Main companies that have been used to deliver state medicines orders were Sudapost, Aramex, and DHL. Observation revealed that most of these companies' cars are not prepared for pharmaceutical transportation. Interrupted deliveries were reported by state supply officer and central officer.

Delivery and transportation faces many hindrances related to car inconvenience, geographic accessibility (seasonal), security threats, in addition to poor handing of drugs.

Central supply officer said *'Before 2009 distribution was through companies like DHL, Suda-post and Aramex which were not well prepared for drug delivery (convenience) but it was the best available option. since 2009: Suda-post now has more prepared cars which are convenient for drug delivery however handing is still a problem that face distribution especially in far places /states for instance Kordufan state though now transportation by airline save a lot of time but distribution within the state still a matter particularly in rainy season and in conflict area like west Darfur and south Darfur '*

Although overall distribution cost was meager, not exceeding 1%, however the drug price is proportionally influenced by distribution cost at state as transportation cost included in drug price.

Central pharmaceutical department *'means of transportation and whether the state near or far influence the drug price. In the past before 2013 within the direct delivery system, all states pay the same amount for the drug regardless of means of transportation and distance'.*

4.2. Information and inventory management system

All pharmaceutical services documents are emphasized on the importance of documentation and records keeping to the level that is to be readily retrievable, that need to be stored and retained. Achieving process and records shelf life and data cycling are given for each procedure especially in the inventory management. Policy highlights the need for electronic database, instead of paper based information system. Observation showed that information system is traditional paper based which depends mainly on patient format.

Data was fragmented, incomplete and sometimes not valid, thus it raise a question on quality of retrieved information from lower levels.

In contrary, 84% providers at facilities have reported that kept records of all dispensing procedure (figure5). All states have reported high record keeping practice except Red sea state.

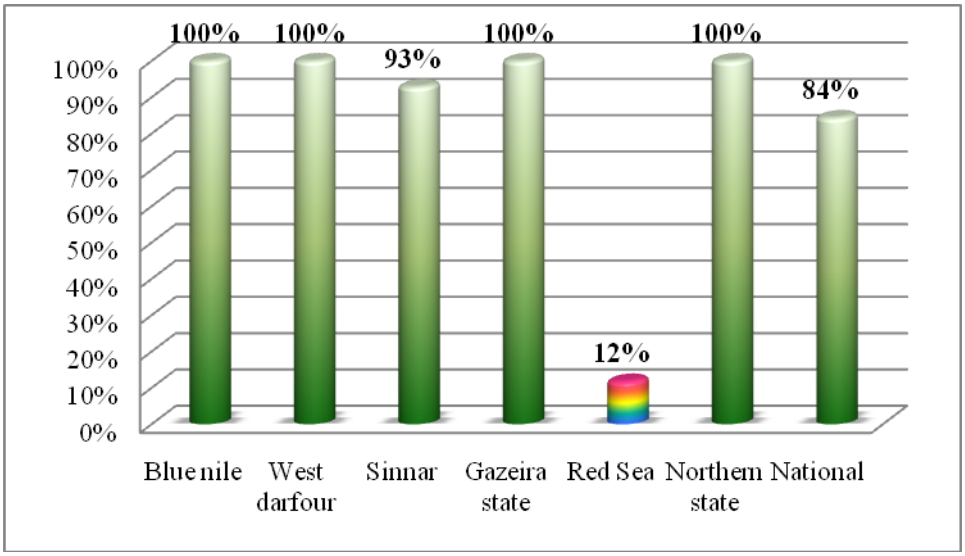


Figure 5: Records keeping

Inventory management is cornerstone in supply chain. The tasks and tools used to manage the stock are well stated and written in detailed way in NHIF drug manual.

Further, an assessment of warehouses records in the six states against inventory management records keeping indicated that only (36%) had good inventory record standard (figure 6).

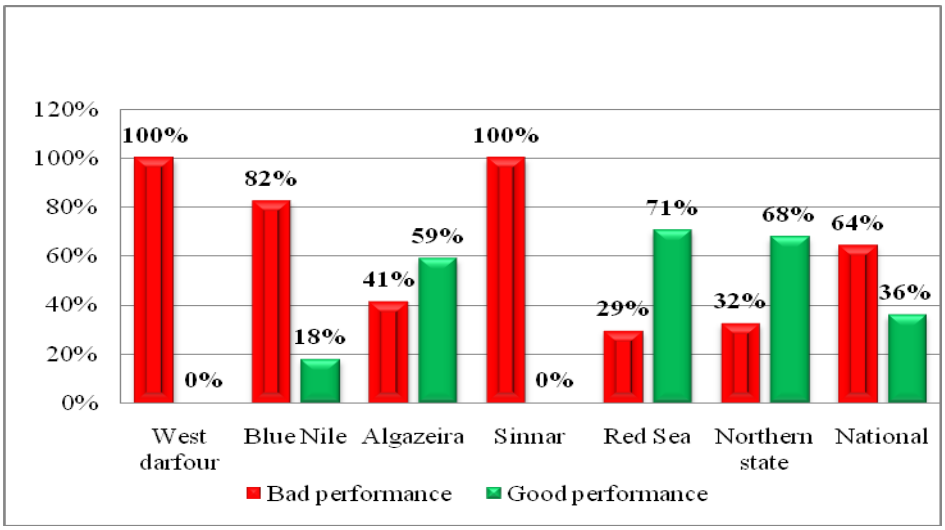


Figure 6: Inventory Management Performance by state

One of State Supply officer said ‘‘*the information system depends on patient form as basis for data generation, and no link between utilization and consumption data however we will start next year to integrate these data set for instance all patient with chronic disease will be registered so when doctor enter the background information the patient medical history and drug history will be readily accessible and utilization pattern can be easily traced’’.*

4.3. Storage capacity

Operational responsibility of the state warehousing are stated and its allotted to warehouse state focal person. Storage conditions and stores management procedures throughout the supply chain and at lower levels (facilities) are indicated to be up to standards.

Warehouses field investigations at states reveled that storage conditions was quite varies among states .Only Gazira and Red sea have comply to high GSP standard particularly in infrastructure and storage condition compared to other states. Inadequate infrastructure and poor storage conditions was prevalent in Blue Nile and Sinnar state.

5. Outcome measures of the supply system:

For the purpose of this evaluation, four major outcome measures were used to provide an overall picture about the efficiency and ability of the supply system. These include:

1. Number of state stores and health facilities that experienced problems of damaged products e.
2. Number of state stores and health facilities that experienced problems of products with short shelf life.
3. Availability of the key medicines at state warehouses and health facilities.

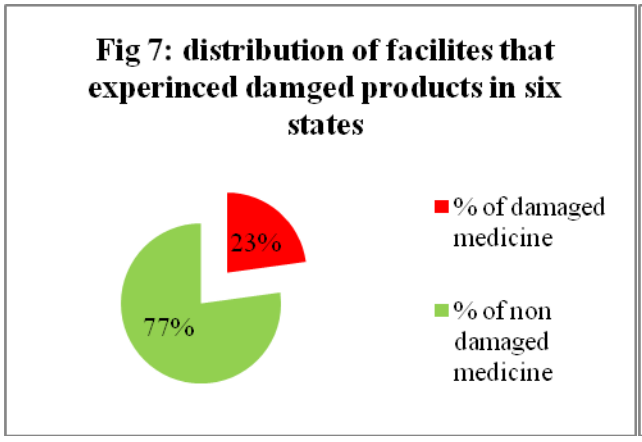
4. Proportion of prescribed medicines that were available and dispensed to patients.

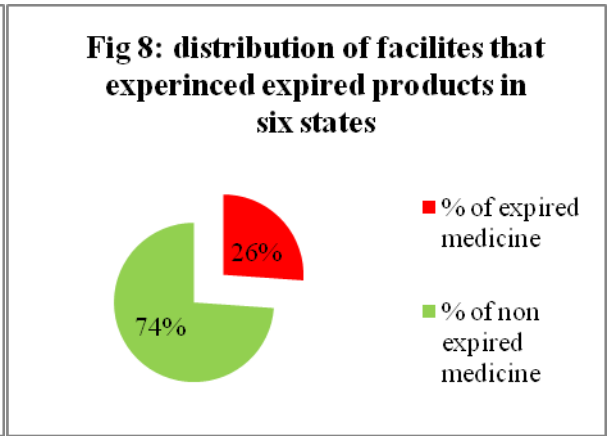
First: Damaged Products and Shelf life issues

Two outcome indicators, damaged and expired items, which are multi-dimensional indicators, were used to measure directly and indirectly different aspects of the supply chain system. They both indicate to what extent the system is able to maintain the quality of the products throughout the supply chain, i.e. during the transportation, handling and storage, while it also indicate the ability of the system to the best possible product specification, quantification and delivery terms.

While the average rates for these two indicators could be considered as acceptable, considering the nature of these indicators, still the rates for Red Sea state and West Darfur State is alarming and needs to be further examined to understand the factors contributing to this observation.

Overall, experiencing of expired or damage items and were less than 26% and 23% respectively. Though analysis per state revealed great variation for instance where Blue Nile reported 0% facility had damaged or expired drug , Red sea's facilities documented 70% of their facilities have experienced damaged items and 71.4 facilities at West Darfur experienced expired items (figure 7&8).





Results indicate that 23% and 26% of overall facilities were experienced damaged and expired products respectively in 6 states.

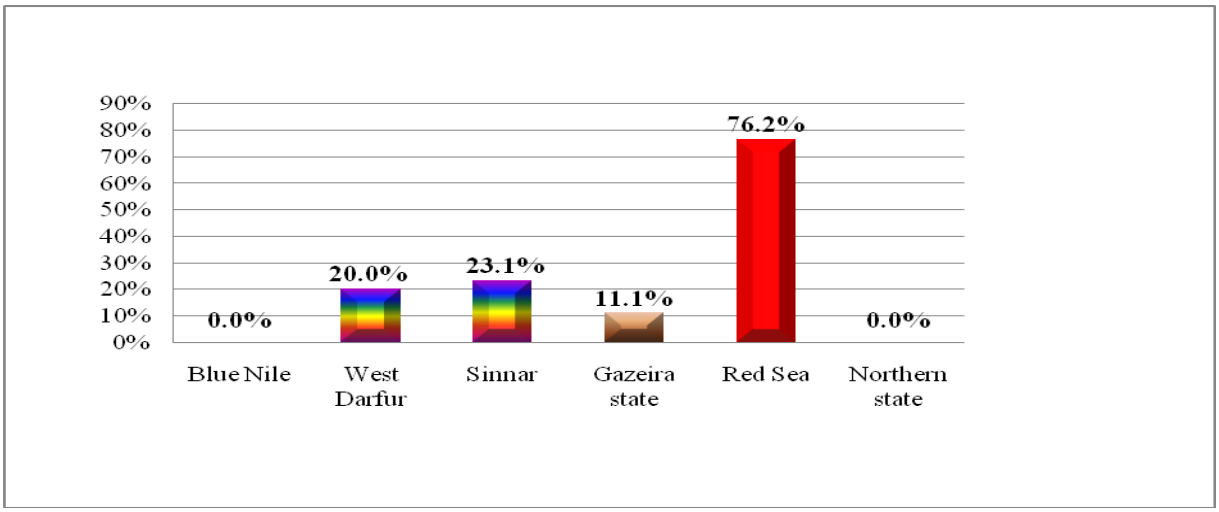


Figure 9: % of health Facilities experienced damaged items by state

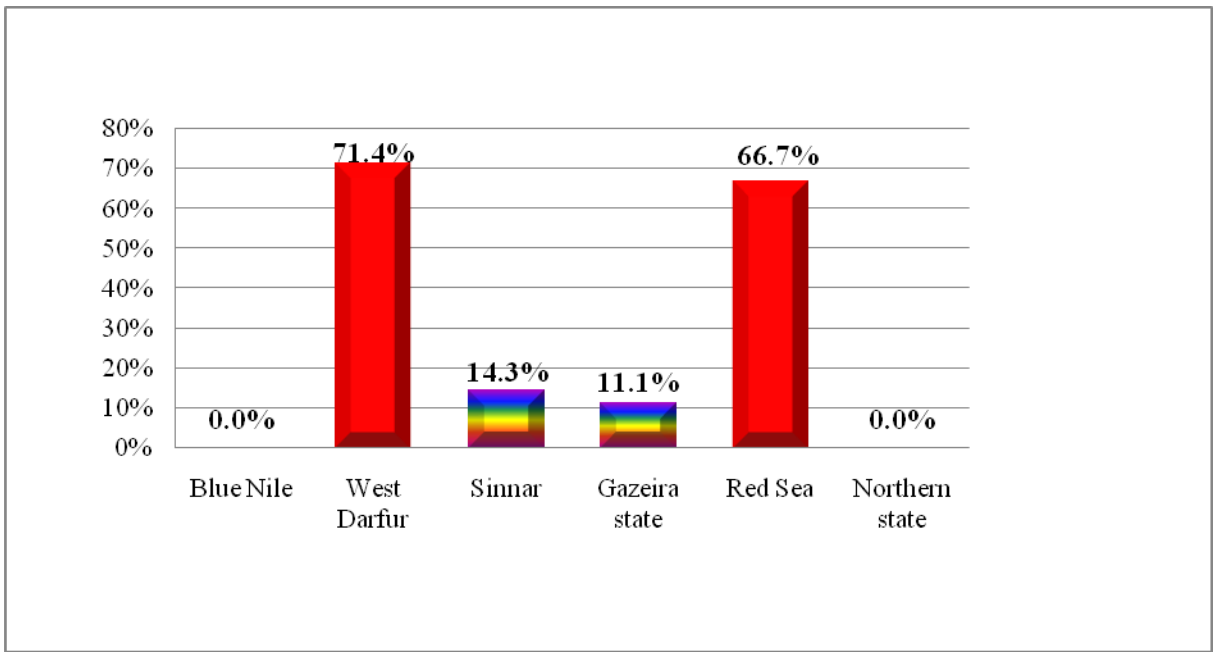


Figure10: % of health Facilities experienced expired items by state

Second: Medicine availability and accessibility

The second outcome dimension selected to assess the system is the availability of key medicines at stores and health facility levels. This dimension can provide good indication about the ability of the system to quantify based on the actual needs, and also the ordering planning and arrangements, where different levels of the system should interact with each other in most efficient manner to ensure the sustainability of supplies, especially for key items.

Figure 12: the availability by health facilities level.

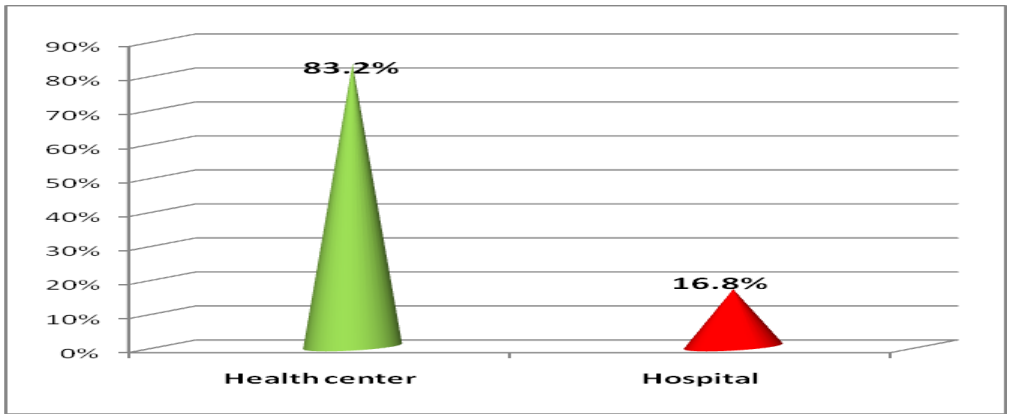
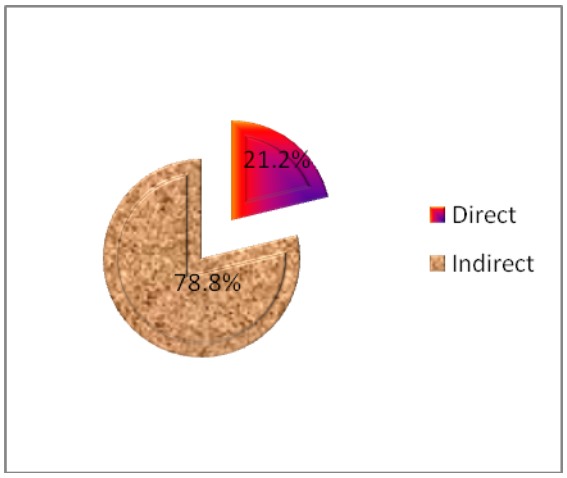


Figure 12: Availability of medicines by health facility level



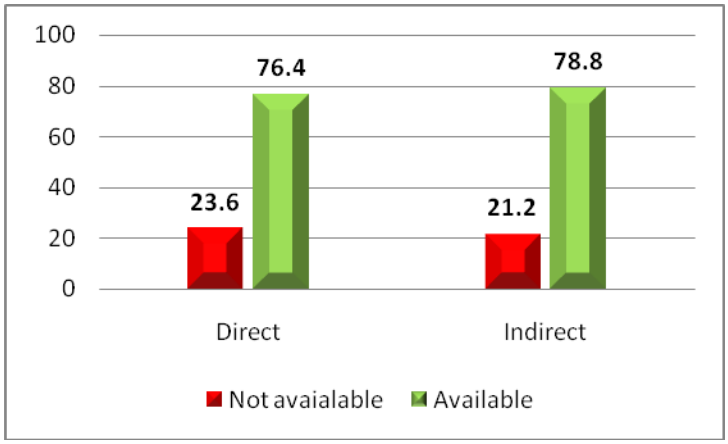


Figure 13: Availability of medicines by type of management

Result shows no much differences when we stratified by type of management (figure 13). These findings might indicate that there are considerable differences in overall management of the drug supply system between these facilities and care levels.

Table 5: Reasons for unavailability

MAIN REASONS	Frequency	Percent
Stock out	183	72.6
Not in insurance list	46	18.3
Patient request	17	6.7
Patient not insured	1	0.4
Other	5	2.0
Total	252	

Stock out is main reason behind unavailability of prescribed medicines accounted for 72%; followed by not included in NHIF drug list.

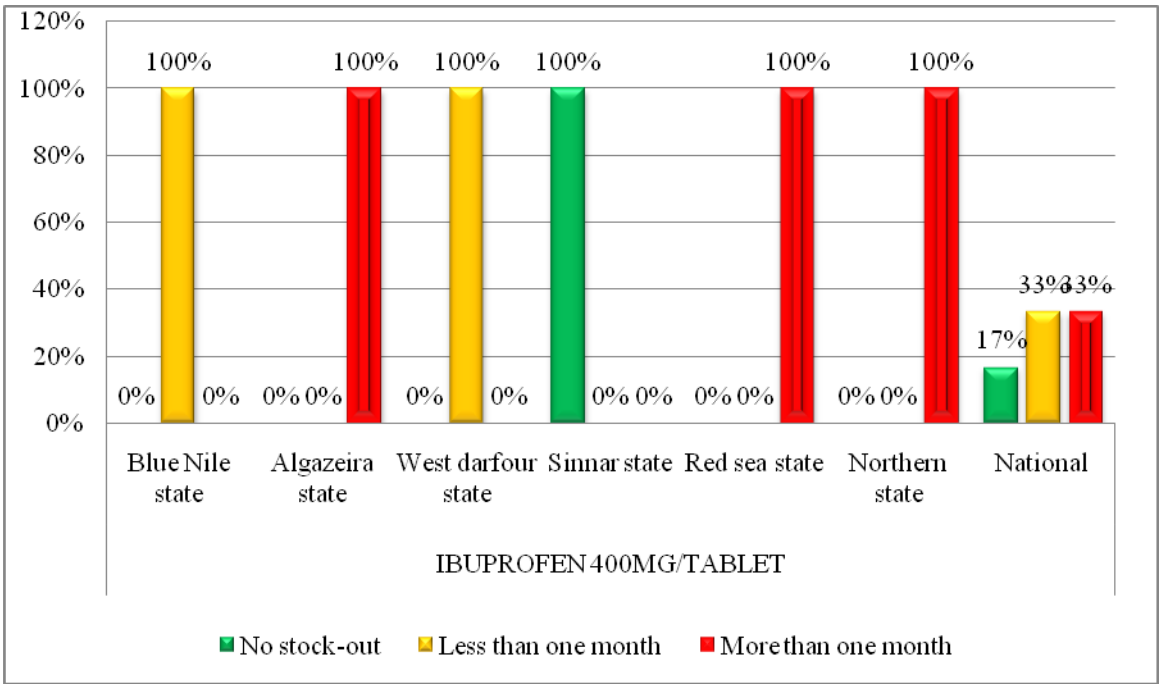
Almost 50% of facilities had experienced no stock out in the 6 states. Stock out duration average in six states was 50.13 days in a year (table 6). Only Blue Nile and Red sea state had been able to maintain no stock out in almost three quarter of their facilities. Stock out duration of more than month was highly prevalent in all states except Blue Nile state. For instance, Gazira and Northern state had experienced drugs shortage for more than month in 64.7% and 73.5 % of their facilities respectively (see figure 14).

Table 6: Stock out mean days

State	Stock out mean days
Blue Nile	4.09
West Darfur	69.59
Sinnar	40.88
Gazira state	67.38
Red Sea	46.15
Northern state	72.68
All states	50.13

Stock out analysis by items revealed that that there is severe shortage in Ibuprofen tabs in Red sea, Northern state and Gazira state for more than month and less than month in Blue Nile and West Darfur (figure 15) .

Figure 15: IBUPROFEN 400MG/TABLET by state



Moreover, stock out of life saving drugs like K citrate powder and Sabluatmol inhalers was prevalent in 4 states that resulted in 67% of facilities in the 6 states reported stock out more than month (figure 16 &17).

Third: Dispensing versus prescription

This dimension is also critical, as it could be considered as one single indicator that measure the degree of sensitivity of the supply system to its users' needs, whether primary users (i.e. the patients), or secondary users (i.e. prescribers). Around 20% of the prescribed medicines in health facilities covered by the insurance funds were not dispensed (i.e. 79.1% dispensed as prescribed).

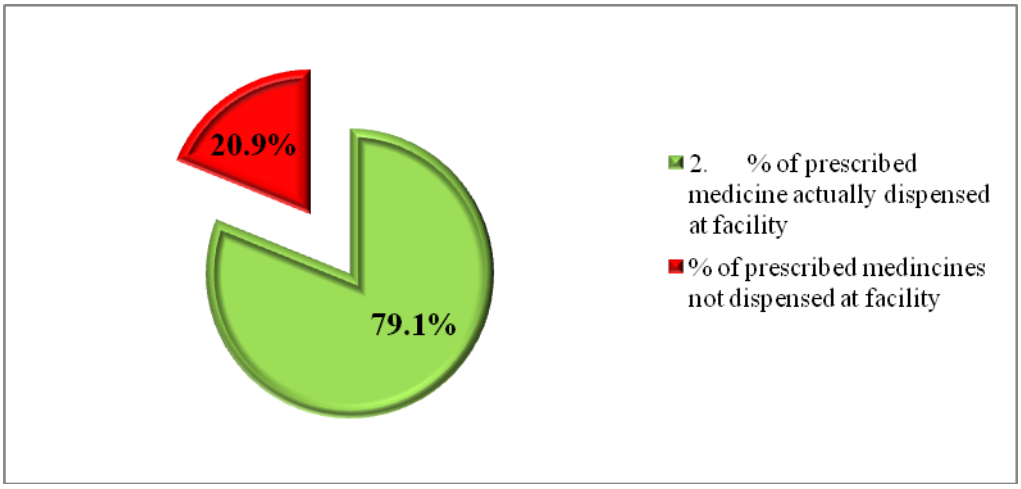


Figure 18: percentage of prescribed medicines dispensing in states

Results: Profile of states:

In-depth Evaluation of Pharmaceuticals Supply System in Sudan National Health Insurance Fund

States Results Profile

Blue Nile State

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Indicator	National level	Blue Nile State	Benchmarking
Availability of medicines list (overall)	59%	50%	50% of the states performing better than this state
Primary level	18%	23%	33% of the states performing better than this state
Secondary level	59%	54%	67% of the states performing better than this state
Tertiary level	23%	23	33% of the states performing better than this state
Uuse of essential data in quantification	93%	92%	67% of the states performing better than this state
Ordering intervals	44% Monthly	46% Monthly	
Lead time for the key medicines to receive orders in HFs*	3 days 85%	3 days 89%	33% of the states performing better than this state
Rented cars used to deliver medicines to HFs	22%	25%	
% of HFs experienced receiving damaged goods frequently	23%	Zero	None of the states performing better than this state (top performance)
% of HFs experienced receiving about to expire goods frequently	26%	Zero	None of the states performing better than this state (top performance)
Stock out duration for the key medicines at HFs	50	4	None of the states performing better than this state (top performance)
HFs with no stock out reported of key medicines	49%	71%	17% of the states performing better than this state
HFs with more than one month stock out reported of key medicines	40%	3%	None of the states performing better than this state (top performance)
Good records keeping practices noticed	84%	100%	83% of the states performing better than this state
Good inventory management Performance	36%	18%	50% of the states performing better than this state

* HFs = Health facilities

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States Results Profile
West Darfur State

Indicator	National level	West Darfur State	Benchmarking
Availability of medicines list (overall)	59%	46%	67% of the states performing better than this state
Primary level	18%	7%	All of the states performing better than this state (least performance)
Secondary level	59%	64%	17% of the states performing better than this state
Tertiary level	23%	29%	17% of the states performing better than this state
Ue of essential data in quantification	93%	100%	None of the states performing better than this state (top performance)
Ordering intervals	44% Monthly	50% Monthly	
Lead time for the key medicines to receive orders in HFs*	3 days 85%	3 days 78%	33% of the states performing better than this state
Rented cars used to deliver medicines to HFs	22%	80%	
% of HFs experienced receiving damaged goods frequently	23%	20%	33% of the states performing better than this state
% of HFs experienced receiving about to expire goods frequently	26%	72%	All of the states performing better than this state (least performance)
Stock out duration for the key medicines at HFs	50	70	All of the states performing better than this state (least performance)
HFs with no stock out reported of key medicines	49%	56%	33% of the states performing better than this state
HFs with more than one month stock out reported of key medicines	40%	35%	50% of the states performing better than this state
Good records keeping practices noticed	84%	100%	None of the states performing better than this state (top performance)
Good inventory management Performance	36%	Zero	All of the states performing better than this state (least performance)

* HFs = Health facilities

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States Results Profile
Sinnar State

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Indicator	National level	Sinnar State	Benchmarking
Availability of medicines list (overall)	59%	54%	33% of the states performing better than this state
Primary level	18%	14%	50% of the states performing better than this state
Secondary level	59%	64%	17% of the states performing better than this state
Tertiary level	23%	21%	50% of the states performing better than this state
Use of essential data in quantification	93%	71%	All of the states performing better than this state (least performance)
Ordering intervals	44% Monthly	78% Monthly	
Lead time for the key medicines to receive orders in HFs*	3 days 85	3 days 76%	83% of the states performing better than this state
Rented cars used to deliver medicines to HFs	22%	37%	
% of HFs experienced receiving damaged goods frequently	23%	23%	67% of the states performing better than this state
% of HFs experienced receiving about to expire goods frequently	26%	14%	50% of the states performing better than this state
Stock out duration for the key medicines at HFs	50	41	13% of the states performing better than this state
HFs with no stock out reported of key medicines	49%	53%	50% of the states performing better than this state
HFs with more than one month stock out reported of key medicines	40%	47%	50% of the states performing better than this state
Good records keeping practices noticed	84%	93%	67% of the states performing better than this state
Good inventory management Performance	36%	Zero	All of the states performing better than this state (least performance)

* HFs = Health facilities

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States Results Profile
Gazeira State

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Indicator	National level	Gazeira State	Benchmarking
Availability of medicines list (overall)	59%	65%	17% of the states performing better than this state
Primary level	18%	40%	17% of the states performing better than this state
Secondary level	59%	78%	None of the states performing better than this state (top performance)
Tertiary level	23%	19%	67% of the states performing better than this state
Use of essential data in quantification	93%	100%	None of the states performing better than this state (top performance)
Ordering intervals	44% Monthly	63% Monthly	
Lead time for the key medicines to receive orders in HFs*	3 days 85	3 days 71%	All of the states performing better than this state (least performance)
Rented cars used to deliver medicines to HFs	22%	11%	
% of HFs experienced receiving damaged goods frequently	23%	11%	33% of the states performing better than this state
% of HFs experienced receiving about to expire goods frequently	26%	11%	17% of the states performing better than this state
Stock out duration for the key medicines at HFs	50	67	83% of the states performing better than this state
HFs with no stock out reported of key medicines	49%	27%	13% of the states performing better than this state
HFs with more than one month stock out reported of key medicines	40%	65%	All of the states performing better than this state (least performance)
Good records keeping practices noticed	84%	100	None of the states performing better than this state (top performance)
Good inventory management Performance	36	59	33% of the states performing better than this state

* HFs = Health facilities

In-depth Evaluation of Pharmaceuticals Supply System in Sudan National Health Insurance Fund
States Results Profile
Red Sea State

Indicator	National level	Red Sea State	Benchmarking
Availability of medicines list (overall)	59%	26%	All of the states performing better than this state (least performance)
Primary level	18%	48%	None of the states performing better than this state (top performance)
Secondary level	59%	38%	All of the states performing better than this state (least performance)
Tertiary level	23%	14%	All of the states performing better than this state (least performance)
Use of essential data in quantification	93%	100%	None of the states performing better than this state (top performance)
Ordering intervals	44% Monthly	75% Weekly	
Lead time for the key medicines to receive orders in HFs*	3 days 85	3 days 100%	None of the states performing better than this state (top performance)
Rented cars used to deliver medicines to HFs	22%	Zero	
% of HFs experienced receiving damaged goods frequently	23%	Zero	None of the states performing better than this state (top performance)
% of HFs experienced receiving about to expire goods frequently	26%	67%	All of the states performing better than this state (least performance)
Stock out duration for the key medicines at HFs	50%	46%	17% of the states performing better than this state
HFs with no stock out reported of key medicines	49%	79%	None of the states performing better than this state (top performance)
HFs with more than one month stock out reported of key medicines	40%	18%	17% of the states performing better than this state
Good records keeping practices noticed	84%	12%	All of the states performing better than this state (least performance)
Good inventory management Performance	36%	71%	None of the states performing better than this state (top performance)

* HFs = Health facilities

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States Results Profile
Northern State

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Indicator	National level	Northern State	Benchmarking
Availability of medicines list (overall)	59%	100%	None of the states performing better than this state (top performance)
Primary level	18%	14%	17% of the states performing better than this state
Secondary level	59%	55%	67% of the states performing better than this state
Tertiary level	23%	32%	None of the states performing better than this state (top performance)
Use of essential data in quantification	93%	86%	83% of the states performing better than this state
Ordering intervals	44% Monthly	77% 2 Weeks	
Lead time for the key medicines to receive orders in HFs*	3 days 85	3 days 90%	17% of the states performing better than this state
Rented cars used to deliver medicines to HFs	22%	33%	
% of HFs experienced receiving damaged goods frequently	23%	33%	All of the states performing better than this state (least performance)
% of HFs experienced receiving about to expire goods frequently	26%	Zero	None of the states performing better than this state (top performance)
Stock out duration for the key medicines at HFs	50	73	None of the states performing better than this state (top performance)
HFs with no stock out reported of key medicines	49%	6%	All of the states performing better than this state (least performance)
HFs with more than one month stock out reported of key medicines	40%	19%	34% of the states performing better than this state
Good records keeping practices noticed	84%	100%	None of the states performing better than this state (top performance)
Good inventory management Performance	36%	68%	None of the states performing better than this state (top performance)

* HFs = Health facilities

Discussion:

Governance, organization model and policy formation

The outcomes of this evaluation has highlighted in different occasions the relationships between central level and states level. It will be very difficult to discuss this relationship with regard to the supply system in isolation from the overall governance framework, policy formulation process and organizational model that regulate this relationship between the two levels and other stakeholders. Still the evaluation team considers the importance of assessing this issue separately and to try later to examine the overall policy aspects that should be considered to shape the governance structures and arrangements.

Product selection

From our results it is clear that medicines selection procedures in Health Insurance Fund is governed by many means such as medicines list and selection manual that explicitly describe process of medicines selection. Integral to product selection procedures is the availability of essential list, as key supply governing document, at all levels of supply chain. Other similar evaluations in Ghana, Kenya and Uganda provided evidence that shows the clear linkage between the availability and utilization of essential list of medicines at all levels and the outcomes of the supply system in terms of availability, utilization and efficient management of distributed medicines [7]. In addition, the availability of essential list is considered as one of proxy indicators to assess adherence to NHIF list.

On the other hand results indicated that around 70% of interviewees in this evaluation perceived that the item were quite satisfactory and adequate, especially after recent

enhancement of the list by adding around 90 new items in 2012/2013. A study reported by IsamEldin Mohammed in 2012 showed significant commitments of healthcare providers in NHIF settings towards the list. 99% of the products prescribed in health facilities surveyed in this study were part of the list, with only few exceptions [8]. This is a very positive outcomes of the system and it gives good indication about the satisfaction by the list and its coverage.

While this sample provided above might be treated as isolated example that can't be generalized to measure the patients' satisfaction, however it still highlights a very important dimension in the feedback process to improve product selection process. Understanding patient satisfaction with pharmaceutical services is key aspect to reorient this services to be patient-focus. Understanding the positive and negative aspects will help the NHIF to achieve better patients-oriented or people-centered services. In 2012, the NHIF supported a study to measure the clients' satisfaction through a national survey that cover many aspects in service provision including pharmaceutical services in terms of availability and affordability of medicines prescribed to them [9]. The study indicated a satisfaction level at 88% in general about NHIF services. However, when it comes to medicines, only 46% were satisfied about the availability of medicines they need in the nearest facility to them. Similar to that, around 43% of the surveyed beneficiaries were satisfied in general about the pharmacy services.

While the general NHIF policies and strategies have emphasized all the central role of primary health care level in services provision, still the findings from this evaluation doesn't provide full reflection of this vision. The results of the evaluation might reflect a relatively poor adherence and compliance of service providers to NHIF supply management guidelines. Further understanding of these aspects need to be attained; and effective actions need to be taken to address this issue.

Procurement cycle

The decentralized approach in quantification and forecasting is good approach for supply system for institutes like Health Insurance Fund. There should be continuous capacity development program to ensure that concerned staff at state and sub-state levels are capable of achieve the best outcomes of this important activity.

Part of the discussions during this evaluation, the importance of monitoring the direct purchase has been flagged, and the needs to integrate this as part of any monitoring system that will be established. The direct purchase will be an important indicator for many aspects of the new procurement system in terms of effectiveness and efficiency.

In 2013, CMS has published its report on a '3-year rapid assessment of reform programme, that focus on lessons learned in this reform [10]. The report is a very rich document that might be used for future evaluations regarding the procurement system. The report could serve the needs for baseline data regarding the performance of the CMS on key performance indicators when it comes to CMS procurement system and its outcomes.

While the procurement as an activity has been deployed to CMS as part of Pooled Procurement Scheme, still there are different activities need to be supported and strengthened at NHIF level, mainly the development of strong and sensitive monitoring system.

Distribution

Like other aspects of the supply system of NHIF, delivery and transport component has been a subject of different trails and changes to improve the efficiency and to maintain the quality of medicines distributed. Since 2004 there were some key changes in means used for distribution, ranging from NHIF owned channel, to complete outsourcing and sometimes a mixture channels.

From the results we have noticed that 84% providers at facilities have reported that kept records of all dispensing procedure. In comparison to other studies, the national pharmaceutical sector assessment in 2013 indicated that health facilities has poor record keeping with only 24% has followed the good practices [11].

Utilization data can't be retrieved easily and not all stores have computerized data. This is one of the main challenges for institutions like the insurance funds, where the utilization data is critical to achieve the better economic outcomes of the system and identify areas for efficiency gains. Linked to this challenge, the consumption data are not linked to utilization thus drug utilization pattern and consumption trend will be not available consequently it may negatively influence drug supply system.

Similar to other main service providers, NHIF and state funds as well, has major challenges regarding the storage capacity in general, not only in term of available spaces, but also the specifications and qualification. The results of 2013 national pharmaceutical sector assessment indicate only 71% of health facilities has appropriate storage conditions for medicines [11]. There are some initiatives in some of the states to improve these capacities, but there are normally owned and derived by the states, with no influence from the central unit. Many factors has contributed to this issue, among others, the scope of the relationship between the central and state levels is technically-oriented with no influence on decisions on supply chain system. In addition, while the supervision and feedback can play important role in such kind of relationships, still the capacity of the central level is limited in terms of personal headcounts to perform such important task. The feedback is not regular and informal. All of these observations could be addressed through one scheme for stores improvement project that targeting the states with least capacities and poor qualifications.

Still there is a room for improvement. NHIF should develop its own quality assurance mechanism to monitor the supply chain system, with more structured and formal feedback and communication channels with state supply officers and delivery agencies

Medicine availability and accessibility:

Data reveals that there was a considerable variations in drug availability results when we compare the health centers versus the hospitals, or when considering the management of the facility whether it is directly or indirectly managed by health insurance. For instance, availability at health centers was almost five fold of hospitals. Also, facilities owned by NHIF (direct) had low drug availability (21.2%) compared to indirect facilities. Nationally, there are a number of studies conducted recently to assess the availability of essential medicines in public health facilities [11, 12]. Only one study has included the state warehouses as part of its sampling scheme to assess the availability, the study confirm the average availability of 85% at RDF state warehouses, same results for health facilities surveyed [12]. The studies showed similar results with regard to the availability of medicines in health facilities. This range between 68% and 85% of the surveyed medicines.

As we mentioned before, the clients' satisfaction survey has indicated an overall satisfaction level at 88% in general about NHIF services. Still only 46% were satisfied about the availability of medicines they need in the nearest facility to them. This is important a significant finding that need to be considered as part of the feedback to improve the outcomes of the supply system.

Stock out of medicines:

As mentioned before Almost 50% of facilities had experienced no stock out in the 6 states. Stock out duration average in six states was 50.13 days in a year (table 6). Recent similar survey, part of the national pharmaceutical sector assessment in 2013, has indicated less average results at 21.4 days in a year at health facilities [11]. Reasons behind the interrupted supply should be analyzed and addressed.

Dispensing versus prescription

Results indicated that around 20% of the prescribed medicines in health facilities covered by the insurance funds were not dispensed (i.e. 79.1% dispensed as prescribed). While other studies indicated comparable results for this indicator (i.e. studies indicate a range of 79% to 85%) [11, 12], still this is one of the critical findings in this evaluation. With the assumptions that all inputs were in place to address patients' needs especially the core list of drugs, this figure is still considered high, but its acceptability should interpreted in line with NHIF policy and overall strategy.

Recommendations (general and specific)

Overall picture of evaluation outcomes:

We understand that this is the first study of its kind to provide independent evaluation of the supply system of the NHIF. This is important step towards the institutionalization of evidence generation to guide policy and reforms in pharmaceutical services as part of the services provided to the beneficiaries. In this regard, the evaluation team has faced great challenge due to lack of external benchmarking and or baseline, but most importantly, internal target and baseline for benchmarking. While there are many studies that has national scope that have been conducted during the last ten years that could be used to compare the findings of this evaluation, still none of these would be of great value to provide robust benchmarking of NHIF system. The study team help by compiling all of the available source of data to give some indications about the outcomes of different supply systems in the country.

In this regard, it will be essential for NHIF pharmaceutical services department to develop or brainstorm two points: (1) a suitable benchmark that could be used to assess the current situation of the system; (2) future strategic targets for each of the indicators used in this evaluation to help assessing the system in the future and to serve as the target for performance improvement efforts.

As we already discussed the direct outcomes of this evaluation above, the study team wanted to provide overall policy discussion about the main findings of this evaluation. The following issues will be discussed below to address some cross-cutting aspects.

1. Focus on primary health care.
2. Focus on quality improvement.
3. Focus on strengthening of monitoring system.
4. Apply a system-approach in supply system strengthening.

Focus on primary health care:

We have already provided a high level conclusion from our assessment that 'while the general NHIF policies and strategies have emphasized all the central role of primary health care level in services provision, still the findings from this evaluation doesn't provide full reflection of this vision'. The commitment of the government towards the expansion of primary health services is central toward better health outcomes in Sudan. In this context, the key opportunity of pharmaceutical departments at National and state HIF is great to reorient the services to support the services providers to strengthen their services at this level.

We cannot separate the pharmaceutical from the wider health system context and effects inside health insurance fund institutions (central, states and localities). For example the discussion about the importance of primary health care and building family-based care is essential, why? Moving the health commodities especially medicines and other key needs is crucial to achieve better satisfaction of the clients (study before the establishment of RDF Khartoum confirmed the importance of this phenomenon). Putting that into the context is also important, issues around the availability of human resources and issues around health regulations should support this.

When assessing supply system of health insurance funds, we can understand well the challenges around this issue, where the fund is no longer the services provider. Still there are issues need to be discussed with partners to emphasize the concept of PHC focus, as an example:

1. Increasing the number of medicines available and dispensed at PHC level.
2. Building mechanism that help ensuring regular supply of vital and essential medicines at PHC level throughout the year, with incentives for achieving this.

3. Training of key services providers at PHC levels in areas like pharmacotherapy and basic pharmacology, rational drug use, medicines supply management, and other similar and relevant areas.
4. Availability and quality of other services at PHC facilities which has direct influence on supply of medicines, i.e. diagnostic services, standard package of PHC services, other related services.

While this in general is policy issue, the pharmaceutical services department should develop clear conceptualization on how to do that when it comes to technical issues. This should be achieved in a wider approach that consider the multidisciplinary required to achieve this, rather than narrow focus on supply system alone.

Focus on quality improvement of supply chain:

We have discuss before the key aspects which this assessment aimed to focus on it, this includes efficiency, quality and access. While the three dimensions are equally important and can't separate from each other, and based on our analysis, quality is the critical area that needs relatively more attention in the next period. We recommend focusing on quality as we considered many factors:

1. When compared with the indicators of other aspects, quality related indicators were reflecting relatively low achievement in this area.
2. The health insurance is major purchaser of health services in the country, with this strong position, the insurance fund could play important role in achieving major quality improvement outcomes in pharmaceutical services of it major service providers in public and private sectors. However, this require a strong monitoring system.
3. Quality improvement in general is one of the area which the NHIF could play central role to attain it through different tools and processes. To great extent the efficiency and access are not under the direct control of the insurance funds, as it usually a matter of service provision.

As mentioned, quality improvement can't achieved without strong monitoring system. This point was flagged many times during the assessment, and even the supply officers inside the NHIF can feel the importance of this monitoring system. While the system may has a wider scope and many aspects to cover, only a well-designed and focused system could help NHIF to achieve tangible achievements in a phased manner. As mentioned above, the quality component of the system is excellent start for establishing this monitoring system.

While the evaluation team recommends this approach, i.e. to prioritize quality at this stage, still the important question will be; how to strengthen the supplies management system? Which areas has opportunities for improvements? What could be done differently?

Focus on strengthening the monitoring system:

Good monitoring system is the heart of any good management information system. While NHIF has managed to build the research culture as part of its decision making and policy development process, when it comes to pharmaceuticals management, the system should be based on clear and well defined monitoring indicators. Attention to monitoring component of the information system is key for effective transition from system-centered approach to people-centered approach. We recommend development of key set of indicators that help the supply chain mangers to continuously monitor the system to ensure that the supply chain system is able to achieve its objective which is 'ensuring the availability of, and accessibility to, and use of quality pharmaceutical products in the most efficient and effective manner'.

While this approach might add some burden on the whole system in terms of demand for human resource time and also for establishing the data collection tools and data sources, still the current efforts to computerized the information system is great opportunity to select few indicators that the system can accommodate and that will be useful and helpful to generate and use.

At this stage of monitoring system development we understand that most of the input indicators are usually generated part of the routine reports (monthly or quarterly reports) generated by different levels of the system. Outcome indicators are better to be monitored in medium term interval through special studies using retrospective or prospective data. Then, for the purpose of regular monitoring at annual and biannual basis, it will be more appropriate to use process oriented indicators to monitoring the performance of the system in general.

Our recommended approach in this regards is simple; as it will better to focus on small and targeted indicators, instead of huge nice to know information. It is advisable to revisit these indicators and further refine and define it to better serve its purpose in the context of NHIF.

The other important issue in this regard, is the utilization of generated information for decision making. While the issues of governance, accountability and organizational model are still the subject of discussions and clarifications, achieving clear understanding of how to use the information generated through the monitoring system is key issue needs to be agreed on among all of the stakeholders. To great extent this was critical issue in our evaluation and it affects our understanding (as evaluation team) on developing appropriate recommendations. While the team has tried to develop some primary recommendations, still these are not meant to be final one, rather they could be seen as tool to initiate some thinking about how to utilize the findings of such evaluations. For the purpose of facilitating this process, the evaluation team has developed what we call state profile. This profile will summarize the key findings for each state, and benchmark that against the national average as well as the performance of other states. This will help the NHIF to start meaningful discussion with each state in more objective approach.

In the newly established monitoring system, it is also advisable to keep using the same key basket of medicines used in this evaluation in all future monitoring and evaluation activities. This approach will help the M&E unity in the pharmaceutical services department to maintain comparable data over a period of time without significant variations in the means for monitoring the performance of the system. Different medicines have different supply-demand profile over a period of time depending on the health status of the population in general, competition and median price of the market, availability of alternative generics and other issues. For these reasons it will be better to keep using the same list in the future.

Supply System Strengthening: System-approach

While this report has provided some interventions (part of the recommendations) that has targeted the narrow scope within the pharmaceutical system, it should be clear that other wider scope interventions that are targeting cross-cutting issues the affect the wider health system should be also considered in any policy dialogue in the future. These recommendations are targeting some of the effective interventions that have been implemented in other countries to improve its pharmaceutical supply system. The list of interventions recommended above was selected with considerations to current context of NHIF, findings of this evaluation and focusing on the concept of 'keeping it simple'. It is important to conducted more **systemic gaps analysis** that should highlight the gap in each state in both infrastructure as well as soft systems in order to strengthen the whole system in balanced manner. Taking fragmented initiatives by individual states will not help in mobilizing more resources to strengthen the pharmaceutical section inside Health Insurance Fund umbrella.

With Strong experience in supporting countries in Africa to strengthen the supply systems, USAID has good experience to share with countries and organization. Global partners like WHO, GAVI, Global Fund and others have utilized many tools and strategies developed by USAID and its partners across the African countries. The study

team encourage the pharmaceutical services department of NHIF to consider some of the proposed approaches by USAID and lessons learned derived from its experience [13, 14, 15].

Specific Recommendations:

- **Governance, organization model and policy formation**

The evaluation team recommends a separate assessment to review the current and potential governance structures and arrangements that help the central level and the states as well to achieve better outcomes from the supply system.

- **Product selection**

Policy issues:

1. Continue observing the compliance of key actors in product selection with the current policy and guidelines. Document all of observations where there are good practices or lack of it, this could be used to update the policy and guidelines.
2. Continue analyzing the compliance and adherence of key actors in service provision with approved list of medicine. This could be done through small but continuous monitoring studies, which could serve as important inputs for effective implementation of the guidelines.
3. Plan for more patient-centered services. Work with the main beneficiary of the services, i.e. the patients, to understand their feedback and satisfaction with the selection decisions. Small but continuous patients' feedback survey through selected outlets will be adequate and useful for this purpose.

Operational issues:

1. Identify the best option(s) to ensure the availability of essential list at all level of care. Ensure this activity to be budgeted in the next planning period. The options may include some electronic or digital media for distribution.
2. Develop better tools to monitor the compliance. There is a clear need for effective tools that help prescribers and dispensers in health insurance facilities to increase their compliance with the essential list. Identify the main areas where there is major lack of compliance issues and understand the reasons for that. Develop clear and simple remedial actions.

- ## Procurement cycle

Policy issues:

1. Develop clear organizational objectives, as part of overall strategy, for NHIF to join the pooled procurement system. These objectives will clarify the main aims, targets and benefits of NHIF participation. While joining the system has become an institutional obligation, still these objectives will serve as organizational objectives that will help NHIF to continuously identify opportunities for improvements on the system.
2. Based on these organizational objectives, NHIF need to develop clear measurement indicators that could be used to monitor the progress and outcomes of the procurement of the system over time. It was not feasible to go in-depth to assess the pooled procurement system for the purpose of this evaluation, as it is newly introduced with considerations for the time period that required for the NHIF to fully join the system with its full operation. However, the evaluation team suggest a more practical approach where the team can help the NHIF to set a baseline indicators that could be used to evaluate the effectiveness and efficiency of the pooled procurement system in pre-defined period. This will

help the NHIF to assess later to what extent the system has supported the NHIF to overcome some of the main challenges and at the same time achieve its collective benefits for the stakeholders, including the NHIF and its state partners (i.e. state funds). The team propose a baseline framework using specific indicators as follows:

1. % of suppliers whom were satisfied with payment arrangements in terms of (value, time schedule and other obligations).
2. % of ordered quantities of selected items that has been delivered to states compared to originally ordered quantities.
3. Negotiated procurement price of selected basket of medicines in comparison with a baseline procurement price of the same basket of medicines of last NHIF tender.
4. Negotiated procurement price (in USD) of selected basket of medicines in comparison with international reference price of the same basket of medicines (MSH information).
5. End-user price (in USD) of selected basket of medicines at the end of 2015 in comparison with end-user price of the same basket of medicines by the end of 2013 or 2012.
6. % change of lead time between date of tender award notification (or other defined timeline in the cycle) to specific suppliers and delivery of the first quantities of selected basket of medicines based on terms of agreement with the supplier.
7. Average stock-out duration of selected key medicines for NHIF that were supplied through the CMS.
8. Performance of key selected suppliers (based on defined before and after the introduction of the new procurement system in terms of contracts compliance, price offers, quality of products and other aspects.

9. Average payment processing time (in days).
10. Number and cost of emergency orders placed by NHIF central level.

Operational issues:

1. It is recommended that NHIF, as one of the main players in pooled procurement system, to lead an initiative to conduct a two-day workshop to discuss the operational challenges they have encountered part of the new procurement system. The workshop should focus on the operational and technical challenges only and should involve the technical staff from all of the concerned entities. Such a workshop will provide good platform to discuss all of the bottlenecks towards efficient implementation.
2. Base on the outcomes of the recommended workshop, the NHIF should aim at revising the contractual agreement with the CMS so that the agreement can accommodate all of the key issues that need to be addressed during the next implementation phase.

6. Distribution

Policy issues:

1. Increase the profile of quality improvement project throughout the supply chain system with adequate and suitable budgetary allocations.
2. NHIF should develop its own quality assurance mechanism to monitor the supply chain system, with more structured and formal feedback and communication channels with state supply officers and delivery agencies.

Operational issues:

1. Develop, implement and monitor a set of Standard Operation Procedure (SOPs), Norms and Standards to support the monitoring of transport agents and their performance.

2. Develop and implement targeted operational plan, based on the results of most recent health facilities assessment survey, to improve the storage conditions in health facilities.
3. Continue observe the quality of distribution and storage conditions through supervision with more targeted and efficient approach.

End of the report

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