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The efficiency of inefficiency: Medicine distribution in Sudan Abdeen

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Abstract
The strategy of price liberalisation and privatisation had been implemented in Sudan over the last decade, and has had a positive result on government deficit. The investment law approved recently has good statements and rules on the above strategy in particular to pharmacy regulations. Under the pressure of the new privatisation policy, the government introduced radical changes in the pharmacy regulations. To improve the effectiveness of the public pharmacy, resources should be switched towards areas of need, reducing inequalities and promoting better health conditions. Medicines are financed either through cost sharing or full private. The role of the private services is significant. A review of reform of financing medicines in Sudan is given in this study. Also, it highlights the current drug supply system in the public sector, which is currently responsibility of the Central Medical Supplies Public Corporation (CMS). In Sudan, the researchers did not identify any rigorous evaluations or quantitative studies about the impact of drug regulations on the quality of medicines and how to protect public health against counterfeit or low quality medicines, although it is practically possible. However, the regulations must be continually evaluated to ensure the public health is protected against by marketing high quality medicines rather than commercial interests, and the drug companies are held accountable for their conduct.

Keywords: counterfeits medicines, drug importers, quality of medicines, regulatory authorities

Introduction
The World Health Organisation [1] has defined drug regulation as a process, which encompasses various activities, aimed at promoting and protecting public health by ensuring the safety, efficiency and quality of drugs, and appropriateness accuracy of information [1]. Medicines regulation is a key instrument employed by many governments to modify the behaviour of drug systems. The regulation of pharmaceuticals relates to control of manufacturing standards, the quality, the efficacy and safety of drugs, labelling and information requirements, distribution procedures and consumer prices [2]. To assure quality of medicines, in most countries registration is required prior to the introduction of a drug preparation into the market. The manufacturing, registration and sale of drugs have been the subject of restricts regulations and administrative procedures worldwide for decades [3]. Nobody would seriously argue drugs should be proven to be 100% safe. No set of regulations could achieve that goal argue, because it is impossible and all drugs carry some risk [4].

Stringent drug regulation was introduced across many countries in the 1960s following the thalidomide disaster, and had since been embraced by the industry as a commercial essential seal of safety and quality [5]. In spite of the measures, many countries, especially developing one face a broader range of problems. In several developing countries drug quality is a source of concern. There is a general feeling of high incidence of drug preparations that are not of acceptable quality [6]. For example, about 70% of counterfeit medicines were reported by developing countries [7]. Reports from Asia, Africa, and South America indicate 10% to 50% of consider using prescribed drugs in certain countries may be counterfeit [8]. For instance, in Nigeria fake medicines may be more than 60 -70% of the drugs in circulation [9], and 109 children died in 1990 after being administered fake Paracetamol [10]. In Gambia the drug registration and control system resulted in the elimination of 'drug peddlers' and certain 'obsolete and harmful' drugs, as well as a large decrease in the percentage of brand and combination drugs [11]. The percentage of drugs failing quality control testing was found to be zero in Colombia, but 92% in the private sector of Chad [12]. Hence, it is very difficulty to obtain accurate data. The proportion of counterfeit drugs in the USA marketplace is believed to be small - less than 1 percent [12]. In [13] reported two cases of counterfeit medicines that found their way into legitimate medicine supply chain in the UK in 2004.

Poor quality drug preparations may lead to adverse clinical results both in terms of low efficacy and in the development of drug resistance [14]. Regulations are the basic devices employed by most governments to protect the public health against substandard, counterfeit, low quality medicines, and to control prices. Thorough knowledge of whether these regulations produce the intended effects or generate unexpected adverse consequences is critical. The World Health Organisation (WHO) undertook a number of initiatives to improve medicines quality in its member states and promote global mechanisms for regulating the quality of pharmaceutical products in the international markets. Yet, there are not any WHO guidelines on how to evaluate the impact of these regulations. There are numerous reports concerning drug regulations [15], but the published work on the impact of these regulations on the quality of medicines moving in the international commerce has been scarce.

Findings from most published studies lack comparable quantitative information that would allow for objective judging whether and by how much progress on the various outcomes have been made by the implementation of the pharmaceutical regulations. To ignore evaluations and to implement drug regulation based on logic and theory is to expose society to untried measures in the same way patients were exposed to untested medicines [15].

The present policy of the national health–care system in Sudan is based on ensuring the welfare of the Sudanese inhabitants through increasing national production and upgrading the productivity of individuals. A health development strategy has been formulated in a way that realises the relevancy of health objectives to the main goals of the national development plans. The strategy of Sudan at the national level aims at developing the Primary Health Care (PHC) services in the rural areas as well as urban areas. In Sudan 2567 physicians provide the public health services (554 specialists, 107 medical registrars, 1544 medical officers, 156 dentists, and 206 pharmacists). Methods of preventing and controlling health problems are the following:

- Promotion of food supply and proper nutrition;
- An adequate supply of safe water and basic sanitation;
- Maternal and child health-care;
- Immunisation against major infectious diseases;
- Preventing and control of locally endemic diseases; and
- Provision of essential drugs.

This will be achieved through a health system consisting of three levels (state, provincial and localities), including the referral system, secondary and tertiary levels. Pharmacy management should be coordinated and integrated with other various aspects of health. The following are recommended:

The community must be the focus of benefits accruing from restructures, the legislature should protect community interest on the basis of equity and distribution, handover the assets to the community should be examined; and communities shall encourage the transfer the management of health schemes to a professional entity.

The private sector should be used to mobilise and strengthen the technical and financial resources from within and outside the country to implement the services, with particular emphasis on utilisation of local resources.

The government should provide the necessary financial resources to guide the process of community management of pharmacy supplies. The government should be a facilitator through setting up standards, specifications and rules to help harmonise the private sector and establish a legal independent body by an act of parliament to monitor and control the providers. Government should assist the poor communities who cannot afford service cost, and alleviate social-economic negative aspects of privatisation.

The sector actors should create awareness to the community of the roles of the private sector and government in the provision of health and pharmacy services.

Support agencies should assist with financial and technical support, training facilities, coordination, development and dissemination of health projects, as well as evaluation of projects.

Aim and Objectives

The main purpose of this study is to analyse and determine the opinion of a group of pharmacists who are the owners or shareholders in the Sudanese medicine importing companies and their perception concerning the effects of the government's new Pharmacy, Poisons, Cosmetics and Medical Devices Act has had on the quality of medicines in Sudan. To achieve this purpose the following questions would be answered:

1. Do the Sudan pharmacy legislations prohibit marketing of low quality medicines?
2. What is the impact of the transfer of veterinary medicines registration system to the Ministry of Animal Resources after the approval of the Pharmacy and Poisons Act 2001?
3. Does pre-marketing analysis of medicines help to detect the counterfeit medicines?
4. Does importation of non-registered[1] medicines by the government and non- governmental organisations exacerbate the problem of low quality medicine if any?

In Sudan, the researchers did not identify any rigorous evaluations or quantitative studies about the impact of drug regulations on the quality of medicines and how to protect public health against counterfeit or low quality medicines, although it is practically possible. However, the regulations must be continually evaluated to ensure the public health is protected against fake medicines by ensuring the exclusive marketing of high quality medicines rather than commercial interests, and the drug companies are held accountable for their conducts [16].

Discussions

Health and Pharmacy Systems

The health system in Sudan is characterised by heavy reliance on charging users at the point of access (private expenditure on health is 79.1 percent), with less use of prepayment system such as health insurance. The way the health system is funded, organised, managed and regulated affects health workers' supply, retention, and the performance. Primary Health Care was adopted as a main strategy for health-care provision in Sudan and new strategies were introduced during the last decade, including:

- Health area system.
- Polio eradication in 1988.
- Integrated management of children illness (IMCI) initiative.
- Rollback malaria strategy.
- Basic developmental need approach in 1997.
- Safe motherhood, making pregnancy safer initiative, eradication of harmful traditional practices and emergency obstetrics' care programmes.

The strategy of price liberalisation and privatisation had been implemented in Sudan over the last decades, and has had a positive result on the government deficit. The investment law

[1] All medicines should be registered by the General Directorate of Pharmacy to get marketing approval. Each manufacturer or importer must present extensive information on the product (or products) submitted to allow Technical Standing Committee for drug registration evaluates the quality, safety, efficacy and price of medicines.

[17] approved recently has good statements and rules on the above strategy in particular to health and pharmacy areas. The privatisation and price liberalisation in healthy fields has to re-structure (but not fully). Availability and adequate pharmacy supplies to the major sectors. The result is that the present situation of pharmacy services is far better than ten years ago.

The government of Sudan has a great experience in privatisation of the public institutions, i.e., the Sudanese free zones and markets, Sudan telecommunications (Sudatel) and Sudan airlines. These experiences provide good lessons about the efficiency and effectiveness of the privatisation policy. Through privatisation, the government is not evading its responsibility of providing health-care to the inhabitants, but merely shifting its role from being a provider to a regulator and standard setter. Drug financing was privatised early in 1992. Currently, the Federal Ministry of Health (FMOH) has privatised certain non-medical services in hospitals such as catering services, security and cleanings.

The overall goal of the CMS ownership privatisation is to improve access to essential medicines and other medical supplies in order to improve health status of the inhabitants particularly in far states (e.g., Western and Southern States).

Establishment of alternative ownership for the CMS can be achieved by selling the majority of shares to the private sector. This will achieve the following objectives:

- High access to essential medicines of good quality and affordable prices to the states' population and governments.
- Efficiency and effectiveness in drug distribution system to avoid the serious pitfalls and incidences that was reported during the last ten years in the CMS.
- Equity by reaching all remote areas currently deprived from the formal drug distribution channels.
- Improvement of the quality and quantity of delivery of medicines to the public health facilities.

The above objectives are expected to:

- Increase geographical and economic access to essential medicines in all states (i.e., in both rural and urban areas) to reach at least 80% of the population (currently less than 50% of population have access to essential medicines).
- The tax collection from the new business becomes more efficient and will increase after privatisation. The tax revenues could be used to finance other health-care activities.
- If the government reserves some shares (not more than 50%) in the new business, then its shares' profit could be used to finance free medicines project in hospitals outpatients' clinic, and other exempted medicines, e.g., renal dialysis and haemophilic patients' treatment.

Public sector medicines supply system

In Sub-Saharan Africa countries discussions about medicine distribution system reform have concentrated on ways to improve sustainability and quality of access to essential medicines. These discussions also include debate on the impact of privatisation of public drug supply organisations on effectiveness, efficiency, quality and cost of medicines in the public health facilities, as well as on the respective role of the public and private sectors.

Until the mid 1980s, some governments in Africa (i.e., Mali and Guinea) assumed responsibility for providing drugs to their citizens. The private distribution of all drugs including aspirin was illegal. In many countries, including Sudan there were two parallel government distribution systems. The public health network of hospitals and health centres gratuitously distributed drugs. In the public sector pharmacies, the drugs were sold to the public at subsidised prices.

During the 1990s, Sudan initiated a number of initiatives to establish drug-financing mechanisms as part of the health reform process and decentralised decision-making at a state level. In 1992 when a law was passed, medicines were no longer free of charge (i.e., privatised) in the public health system. The aim of the government is to increase equitable access to essential medicines, especially at the states' level. As a result the Central Medical Stores, which was responsible for medicines supply system of the public health facilities, became an autonomous drug supply agency, and was renamed as the Central Medical Supplies Public Corporation (CMS) and operated on cash-and-carry basis. It was capitalised and an executive board was installed. Since states and federal hospitals have to buy their own medicines, and other medical supplies. They organised their own transport means and distribution to their primary health-care facilities and hospitals. In addition, all hospitals became financially autonomous entities and have had to organise their own medicines procurement system.

The public drug supply system has not been working well throughout Sub-Saharan Africa and this includes Sudan. There are serious shortages or no medicines at all, particularly in rural areas. A study in Cameroon found the rural health centres received only 65% of the stock designated for them, and 30% of the medicines that arrived at the centres did not reach the clients. The loss rate after arrival in hospitals was estimated at 40%. In Sudan, Graff and Evarard (2003) who visited the country on a WHO mission reported, "Although the cash-and-carry system took off well, but lack of sufficient foreign exchange hampered the CMS procurement activities and resulted in low stock levels of all medicines and even stock out of life-saving products. Hospitals had to purchase the medicines from elsewhere and often had to buy from private sector. Overall hospitals' budgets were tied to allocate drug budget and sales income was not sufficient to cover the purchase of needed medicines supplies. This resulted the medicines were not available most of the times. The in- or outpatients with their prescriptions were directed to the private pharmacies. In 2003, Khartoum Teaching Hospital-the biggest hospital in Sudan (not further than 5 km away from the CMS) had a medicine stock of only LS 83,000 (US$ 31). This would not fill one prescription for an anaemic patient as a result of renal failure. This is a common practice that patients or their relatives are given prescriptions to buy any pharmaceutical supplies that are needed including drugs and other disposables from private sector pharmacies.

Many ministries of health, services' providers and researchers have identified many characteristics that lead to poor performance in Africa public drug supply systems. These characteristics include:

1. **Absence of competition:** Competition is the best way to ensure the goods and services desired by the consumer are provided at the lowest economic cost. Given the customers

(i.e., public health facilities) freedom of choice enables market forces to provide sustained pressures on companies to increase efficiency. Privatised companies generally operate in a competitive market environment.

2. **Insufficient funding:** For example in Sudan with exception of Khartoum, Gezira and Gedaref states, all other states do not have enough funds to establish an efficient drug supply system. In spite of being profit-making organisation, the CMS failed to avail such funds during the past 14 years.
3. **Inefficient use of available resources:** Since CMS was established in early 1990s working as a profit-making organisation. Due to the absence of privatisation the CMS engaged in an instalment of repackaging joint venture pharmaceutical factory in 1999 and recently announced its commitment to build a pharmaceutical city with not less than US$ 20 million, despite the lack of life-saving medicines in the public health facilities. Such amount could be sufficient to establish a reliable supply system for all states of Sudan. The lack of prioritisation is a typical symptom and sign of most public organisations.
4. **Poor management:** There are a number of constraints inherent in operating government drug supply service. These constraints comprise:
    a) Civil servants are hired, rather than persons with business experience and skills. Managers confront different challenges in public setting. They are not easily hired or fired. The lack of accountability results from the lack of shareholders, who would be free to remove incompetent administrators.
    b) Even if the services can recruit outside of civil service, the wages are often too low to attract experienced managers. In addition, the managers do not share in dividends or other monetary activities as do private managers and incentives for doing well are often attenuated in a bureaucracy.
    c) There are cultural and structural conditions that promote corruptions including enormous pressure of wages earners to support an extended family and a strong incentive to more than their fixed government wage, traditional gift giving practice and a proprietary view of public offices.

Medicines Supply System

The Act, for the first time in Sudan has given the responsibility of veterinary medicines to separate committees. The Ministry of Animal Resources took the law "in hand", and started the registration of veterinary medicines and the licensing of the veterinary medicines premises. The conflict in the shared authorities between the Ministry of Health and the chairman of the FPPB lead to the freezing of the Board since October 2002. The FGDOP continues in the process of medicines registration, inspection of the pharmaceutical premises and the licensing as before establishment of the FPPB.

The Act also obliges the states' governments to take all steps necessary to ensure compliance with marketing of registered medicines in licensed premises. But, the weaknesses of the regulatory infrastructure and lack of political commitment at state levels, the leakage of low quality, unregistered medicines to those states are highly suspected. This left the door widely opened for informal marketing of medicines particularly in far states. The states regulatory authorities should take the advantage of the legal authority granted by the Sudan constitution and the Pharmacy, Poisons, Cosmetics and the Medical Devices Act 2001 to enforce the regulations and increase the frequency of the inspection visits to drug companies and retail pharmacies.

Experience has shown the poor regulation of medicines can lead to the prevalence of substandard, counterfeit, harmful and ineffective medicines on the national markets and the international commerce. The Sudanese pharmaceutical legal framework was described as one of the strictest pharmaceutical system in the region. One of the great loopholes in this system was found to be the increased number of non-registered medicines-governmental sources such as the Central Medical Supplies Public Organisation (CMSPO) and not-for-profit non-governmental Organisations (NGOs). Respondents were hopeful the double standard of rules enforcement would be lifted after the new national unity government take over, arguing the current situation in which public organisations (such as the CMSPO) sell non-registered medicines to the private pharmacies could enhance trading of counterfeit medicines and create unfair competition environment.

One of the respondent reported, *"It is disturbing, in spite of the existence of appropriate legislation, illegal distribution of medicines by the CMSPO. The CMSPO continues to flourish, giving the impression the government is insensitive to harmful effect on the people of medicines distribution unlawfully, and some are of doubtful quality"*. During the past three years the CMSPO started to sell unregistered medicines to the private pharmacies. The CMSPO practice (he added) *will undermine the inspection and medicines control activities and ultimately jeopardise the health of the people taking medication*.

Not surprisingly all respondents strongly agreed the increased number of sources of non-registered medicines will lead to entrance of low quality medicines. This result is inline with the WHO recommendation, which encourages the regulatory authorities and state members` government to register all medicines before the marketing. The medicines imported by public sector organisations are not excluded [18].

The FGDOP should define the norms, standards and specifications necessary for ensuring the safety, efficacy and quality of medicinal products. The availability, accuracy and clarity of drug information can affect the drug use decisions. The FGDOP does not have a well-developed system for pre-approval of medicines labels, promotional, and advertising materials. The terms and conditions under, which licenses to import, manufacture and distribute will be suspended, revoked or cancelled. This should be stringently applied to public, private and not-for-profit NGOs drug supplies organisations.

The predominant view, shared between the medicines' importers is the current pharmacy legislation to some extent satisfactory and managed to prohibit the marketing of low quality medicines. The recent post-marketing study carried by the National Drug Quality Control Laboratories, suggested the power of the current regulation is overestimated [19]. The finding of this approach indicates the application procedures of the current measures to ensure the quality of medicines

should be revisited. The technical complexity of regulations, political, commercial and social implications, makes necessary a degree of mutual trust between concerned stakeholders (i.e., suppliers, doctors, pharmacists, consumer representatives and government agencies).

Worldwide there are different systems for providing pharmacy services. Most countries have some element of state assistance, either for all patients or selected groups such as children, and some private provisions. Medicines are financed either through cost sharing or full private. The role of the private services is therefore much more significant. Nationally, there is a mismatch between the numbers of pharmacists and where are they worked, and the demand for pharmacy services. The position is exacerbated locally where in some areas of poor; there is a real need for pharmacy services, which is not being met and where pharmacists have little spare capacity. Various changes within the health-care system require serious attention be given to the pharmacy human resources need. In order to stem the brain drain of pharmacists, it is, however, necessary to have accurate information regarding the reasons that make the pharmacists emigrate to the private sector. Such knowledge is an essential in making of informed decisions regarding the retention of qualified, skilled pharmacists in the public sector for long time. There are currently 3000 pharmacists registered with the Sudan Medical Council of whom only 10% are working with the government. The pharmacist: population ratio indicates there is one pharmacist for every 11,433 inhabitants in Sudan, compared to the World Health Organisation (WHO) average for industrialised countries of one pharmacist for 2,300 inhabitants [20]. The situation is particularly problematic in the Southern states where there is no pharmacist at all. The distribution of pharmacists indicates the majority are concentrated in Khartoum state. When population figures are taken into consideration all states except Khartoum and Gezira states are under served compared to the WHO average. This mal-distribution requires serious action as majority of the population is served in the public sector. This study reveals the low incentives, poor working conditions, job dissatisfaction and lack of professional development programmes as main reasons for the immigration to the private sector. The objective of this article is to highlight and provide an overview of the reasons that lead to the immigration of the public sector pharmacists to the private sector in Sudan. The survey has been carried out in September 2004. Data gathered by the questionnaires were analysed using Statistical Package for Social Sciences (SPSS) version 12.0 for windows. The result have been evaluated and tabulated in this article. The data presented in this paper can be considered as nucleus information for executing research and development for pharmacists and pharmacy. More measures must be introduced to attract pharmacists into the public sector. The emerging crisis in pharmacy human resources requires significant additional effort to gather knowledge and dependable data that can inform reasonable, effective, and coordinated responses from government, industry, and professional associations.

Conclusion and Recommendation

The study reveals the need for further research to find out how efficient the regulatory authorities at both federal and state levels are. The research also needed to discover whether or not counterfeit medicines are sold on the Sudanese market.

From the data obtained in this article some general inferences could be made:

1. The broad outlines remain intact, but preventing drug smuggling across national borders (Sudan shares frontiers with 9 countries) is hard to police.
2. The enforcement of the Act and its regulation governing the manufacture, importation, sale, distribution and exportation of medicines are not adequate enough to control the illegal importation and sale of medicines in Sudan.
3. The splitting of the drug regulatory authority between two ministries and the marketing of unregistered medicines by public drug suppliers (namely the CMSPO, and RDFs), and NGOs undermine the quality of medicines and ultimately jeopardise the health of the people taking medication.

In the light of the findings the following recommendations could be useful at various levels:

1. There is an urgent need for government to implement the provisions of existing Act.
2. The government should adequately equip and fund the National drug Analysis laboratories to start active post-marketing surveillance.
3. A more spirited effort need to be made by the FGDOP and the States' Departments of Pharmacy to ensure all the medicines on the pharmacies' shelves are registered and come from legal sources.
4. The states' departments of pharmacies are not in existence should be re-established and invigorated. They should be adequately funded to be able to acquire the necessary facilities for their operations.
5. The CMSPO should stop importation, manufacture and distribution of unregistered medicines. It should also cease selling the tenders' product to the private pharmacies. The latter practice undermines the inspection outcomes, because it makes inspectors task too difficult (i.e., cannot identify the source of medicine whether it is CMSPO or not).

The public sector is rigid, bureaucratic personnel-management practices, low incentives, poor job satisfaction and unsupportive work environment compared to the private sector. Such situation demoralised pharmacists and encourages them to join the private sector. Many (65%) of surveyed private-sector pharmacists claimed they were public sector pharmacists migrated to the private sector. Although information on migration is sparse, anecdotal evidence persuasively underscores the problem. An internal flow of pharmacists plagues all states, since pharmacists move from poorer states to wealthier ones and from the public sector to the private. Strategies to meet current and future challenges in pharmacy human resources are urgently needed. Approaches that focus on the training of individuals, which do not take into account the job satisfaction (i.e. the nature of the work itself) and pharmacists' mobility, can enjoy only limited success. Increased production alone cannot compensate for

weak motivation, high attrition and increasing mobility. To reverse decades of neglect, policy-makers in both (state and federal level) should begin now, first by recognising the problem and secondly by fixing it through the immediate implementation of potentially effective strategies. Although, we do not advocate the creation of new barriers to the movement of pharmacists between private and public sectors, steps should be taken to redress the unbalanced situation. Ten immediate steps are recommended:

- Large-scale advocacy is needed to achieve heightened political awareness within states and at federal level. One potential outcome of large-scale movement would be the beginnings of introduction of pharmacy care concept, which reshapes the pharmacy services around the patients in hospitals and community pharmacies. This concept will benefit the health care system users and motivate pharmacists to do a good job to their clients and employers. The employers need to foster an organisational culture that recognises and values staff contribution. Central to the delivery of effective recognition are employees' immediate bosses, where a participative and considerate management style is shown as a major predictive factor of retention.
- The Federal Ministry of Health (FMOH) needs to learn from the past experience of Khartoum, Red Sea, Northern, and Algadarif States and current Gezira State then, identify success stories. Pharmacists and their organisations, and Ministries of Health have not remained passive in confronting the crisis in pharmacy workforces. The goodwill and commitment of public sector pharmacists to provide quality care despite low wages (30% of the average private salary) and medicines supply shortages at times of appalling conditions should not be overlooked.
- *Pharmacist job satisfaction:* Job satisfaction is how people feel about their jobs. Experiencing job dissatisfaction leads to withdrawal cognition and employee turnover. Job dissatisfaction can be caused in many ways, including high centralisation, routinisation, low integration, low communication and policy knowledge. Pharmacy education has a key role to prepare pharmacy student for practice and must anticipate the changing professional role. New strategies need to be developed with the participation of pharmacy professionals associations, unions, universities and ministries of health and higher education representatives to meet both; the short-term and long-term needs of pharmacists as pharmacy care providers. Technology will, no doubt give opportunity to join postgraduate studies (e.g., P.G. diploma or M.Sc. courses) from overseas via e-learning or continuing pharmacy professional development programmes.
- *Salaries and incentives structure*: This includes the process of creating new jobs, addressing low wages, as well as developing incentives structure that supports pharmacists over the course of their working lives. In order to stem the flow of pharmacists to the private sector and increase their performance, the Ministry of Health needs to pay incentives to its pharmacy staff on a semi-private basis. Introduction of the employment contract and the application of the incentive budget line opposite performance proved to be effective in Khartoum State experience. The obligations of each part (employer and employee) should be written in non-ambiguous language and transparent reward system should be in place. When transparency of reward system is poor, its credibility will be questioned and pharmacists might not respond to the explicit incentive system at all. IDS, 2000 pointed the lack of training and potential career development is a particularly important contributor to voluntary resignations. Uncompetitive pay is often debated as a reason for employee turnover. The perception of receiving a fair salary is a determinant of retention. It seems to be important both at the recruitment stage and subsequently as a determinant of retention rates is the perception that employees are receiving a fair salary. It is important to note this doesn't necessarily equate to a large salary, since people often compare themselves with peers in the same occupations or with friends and family rather than with better paid or higher skilled workers. Also, when promises are broken and expectations are perceived (haven't been met), employees take actions to withdraw from the organisation, which may include actually quitting jobs.
- *Pharmacy staff motivation:* In addition to financial incentives, Ministry of Health should continue to invest in improving the working conditions to ensure the suitable qualified and skilled pharmacists are retained for longer periods. Recruitment of qualified pharmacists (which may include looking outside the public services). A clear definition of job assignments (staff at hospitals` level enter into written contracts to perform according to MOH guidelines) and regular supervision will assist MOH to achieve a good staff performance. MOH should provide transport to pharmacists (senior and specialised pharmacists could be offered private vehicles) from their residence to the place of work to increase their motivation. Company-paid private medical insurance, and a company car for senior staff, child day care facilities, pension and retirement plans are the most desired and lead to employee retention.
- *Redistribution of Pharmacy workforces:* To address the problems of pharmacy profession in Sudan, an increase in access to essential medicines is insufficient. Far more important is the need to strengthen the pharmacy workforce in localities, states and federal health institutions to address the challenges and to use the resources and interventions for provision of effective pharmaceutical services.
- *Small staff and efficient teamwork:* The pharmacy workforces are divided into two levels (1) Department of pharmacies at Ministry of Health, and (2) Hospitals. The Department of pharmacy at state level should consist of 6 pharmacists at maximum and 25 at federal department of pharmacy including drug analysis laboratory. The hospitals` department of pharmacies classified as follows:
  i) *Group A* includes big hospitals (e.g., Khartoum and Omdurman hospitals). The numbers of pharmacists in Group A hospitals are 15 pharmacists in addition to pharmacy assistants and other supportive staff to cover all shifts. One manager, 3 pharmacist work in Drug Information Centre, three for internal hospital pharmacy, two in outpatient pharmacy, three in people

pharmacy and one in clinical pharmacist;

ii) *Group B* includes medium hospitals and capital cities hospitals (e.g., Ibrahim Malik, and Medani Hospitals). The Hospital Pharmacy Department (HPD) this group managed by 4 to 6 pharmacists;

iii) *Group C* includes small and rural hospitals. Two pharmacists could run the HPD in these hospitals. Paying attention to create more flexible and efficient system for PHRs management in the government institutions might help improve the condition of shortages of pharmacists in the public sector. The advantages of small staff can be easily managed, trained and financed, and teamwork could be developed. This also improves the performance and productivity of the public sector pharmacists thereby reduces the number of PHRs needed to provide satisfactory pharmaceutical services in the public sector institutions. The best indicators of staff retention are the fostering of friendships at work, and managers in health cares should take time to get knowing people and foster opportunities for friendship and socialising.

- National leadership at the highest level is essential and will only come to heighten the awareness of the fundamental importance of pharmacists in health care in general and in the pharmaceutical care in particular, and the development of new methods and strategies.
- Continuing pharmacy professional development: The most important element of National Drug Policy (NDP) and 25 years pharmacy strategy has yet to be tackled. MOH should fully recognise its 25 years pharmacy strategy goals could be achieved through people's (especially pharmacists) expertise. Appropriate training and development is the key to reach those goals and make strategy visions become reality. A wide variety of external (e.g., distance or e-learning in the developed world) and internal training and development programmes for pharmacists should be introduced. A pharmacist's career or pathway should be developed. A policy for active selection of training fields should be formulated according to the priorities of health care needs. The career development relies on individual training and development to enable employees to move into more challenging roles and can provide enhanced rewards for those who are promoted.
- Pharmacy staff discipline and accountability system: Disciplinary procedures, which provide a range of possible responses (from warnings through dismissal, depending on the severity and frequency of the offence should be clearly stated in the new work contracts). Pharmacy managers and team leaders in different settings (administration or care providing, at both state and federal levels) should be trained to invoke disciplinary procedures and to bring criminal charges when necessary.

Improving effectiveness of the public pharmacy is by switching resources towards areas of need, reducing inequalities and promoting better health. Unless there are clear incentives for pharmacists, they can move away from public sector. Findings innovative approaches to stop brain drain of the pharmacists from the public sector and to increase their productivity and performance might be more appropriate strategies to solve the problem in Sudan. These strategies comprise, for instance, monitory incentives, continuing professional development, working condition and job satisfaction of civil service PHRs.

The study may help the Ministry of Health to better look at the real issues of PHRs in the public sector and formulate more relevant and useful policies and plans to retain qualified and skilled pharmacists in the public sector on a solid evidence base. Monitoring and evaluation of information provided to MOH.

The data must be accurate and up to date. The study revealed low salaries, job dissatisfaction in relation to the pharmacy practice and bureaucracy, working conditions, lack of recognition for contribution at work, and lack of professional development training programmes are the main factors influencing the brain drain of the PHRs. These factors affect PHRs immigration and retention concurrently rather than in insolation. Given the time constraints required to get the new contracting arrangements in place, there is a risk that good practice developments in options for change for change field sites may not be used effectively (continue to evaluate and disseminate the lessons that emerge from these sites).

References

1. Ministry of Health (MOH). Act 2001: Pharmacy, Poisons, Cosmetic and Medical Devices. Ministry of Health (MOH): Sudan. 2001.
2. Alubo SO. Death for sale: A study of drug poisoning and deaths in Nigeria. Social Science & Medicine. 1994; 38(1):97-103.
3. Andalo D. Counterfeit drugs set alarm bells ringing. Pharmaceutical Journal. 2004, 273-341.
4. Bryman A. Social Research Method. (2nd Edition). Oxford University Press. 2004.
5. Elfadil AA. Quality assurance and quality control in the CMSPO. 2005.
6. Erhun WO, Babalola OO, Erhun MO. Drug regulation and control in Nigeria: The counterfeit drugs. Journal of Health and Population in Developing Countries. 2001; 4(2):23-34.
7. Gamal KM, Omer AM. A prescription for improvement: A short survey to identify reasons behind public sector pharmacists' migration. World Health and Population. 2006, 1-24.
8. Helling-Borda M. The role and experience of the World Health Organisation in assisting countries to develop and implement national drug policies. Australian Prescriber. 1995; 20 (Supp. 1):34-38.
9. Jallow M. Evaluation of national drug policy in the Gambia, with special emphasis on the essential drug programme. University of Oslo: Norway. 1991.
10. Lexchin J. Drug makers and drug regulators: Too close for comfort. A study of the Canadian situation. Social Science and Medicine. 1990; 31(11):1257-1263.
11. Lofgren H, Boer R. Pharmaceuticals in Australia: developments in regulation and governance. Social Science and Medicine. 2004; 58:2397-2407.
12. Ministry of Health (MOH). 25 years Pharmacy Strategy (2002-2027). Khartoum: Sudan. Unpublished Report. 2003.

13. National Drug Policy (NDP). Ministry of Health (MOH): Sudan. 1997.
14. Osibo OO. Faking and counterfeiting of drugs. West African Journal of Pharmacy. 1998; 12(1):53-57.
15. Ratanwijitrasin S, Soumerai SB, Weerasuriya K. Do national medicinal drug policies and essential drug programmes improve drug use? A review of experiences in developing countries. Social Science & Medicine. 2001; 53:831-844.
16. Rudolf PM, Bernstein IBG. Counterfeit Drugs. New England Journal of Medicine. 2004; 350(14):1384-1386.
17. Shakoor O, Taylor RB, Behrens RH. Assessment of the substandard drugs in developing countries. Tropical Medicines and International Health. 1997; 2(9):839-845.
18. Sibanda FK. Regulatory excess: The role of regulatory impact assessment and the Competition Commission. In: Proceedings of the Pro-Poor Regulation and Competition Conference hosted by the Centre of Regulation and Competition (CRC), University of Manchester, UK, and the School of Public Management and Planning, University of Stellenbosch, Cape Town. 2004, 7-9.
19. WHO. Counterfeit drugs: guidelines for the development of measures to combat counterfeit drug. Geneva: World Health Organisation. 1991. WHO/EDM/ QSM/1990.1.
20. World Health Organisation / Drug Action Programme (WHO/DAP). Comparative analysis of international drug policies. Report from the second workshop Geneva. 1996.