

Overcoming Drug Shortage in Saudi Arabia Through Applying E-Government

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Abstract – Healthcare sectors in Saudi Arabia (S.A.) still face drug shortage, which is a serious problem that needs to be taken care of. The study aimed to identify the main factors of drug shortage in Saudi Arabia and its impacts on patient care, and how to overcome this issue through applying e-government. A systematic review methodology was conducted in this research. Research results show that drug shortage needs an intervention not only from the institutional level but also from the government. That is why we propose and highlight the importance of applying e-government applications on solving or mitigating drug shortages.

Keywords – e-government, drug shortage, drug availability, patients care.

1. Introduction

Citizen's healthcare and willingness is a crucial topic and concern all over the world. Healthcare is accurate patient's diagnosing, treating patients and managing citizens' well-being physically and mentally [1]. Healthcare system is a vital area that has a major role in affecting the environment, economic and social factors.

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To be more precise, by having a strong healthcare system, it will affect the economy by reducing poverty since all citizens will have jobs. That leads to reducing inequality because every citizen can be treated easily, and it can be considered as human and citizen right [2].

The Kingdom of Saudi Arabia established a 2030 vision that includes the healthcare system as one of the major chapters that will be enhanced and improved, and also it illustrates the benefit of linking and implementing digital transformation in the healthcare sector. It contains 42 initiatives that will shift the quantum leap for citizen healthcare. It focuses on patient and treating quality and safety, hospitals readiness and patient flow, and financial performance [3].

As a result of the continuous implementation and elaboration of 2030 vision and achievement, the Ministry of Health (MOH) in Saudi Arabia works efficiently and effectively in applying E-government in the healthcare sector. E-government in healthcare is encouraging and facilitating governmental decisions and improving patients' experience. Furthermore, it is improving government and healthcare sector readiness of any pandemic such as COVID-19 circumstances. In fact, E-government is considered as one of the most important players that help and facilitate Saudi Arabia's government in managing and monitoring affected areas in an effective and efficient way such as the implementation of Sehaty applications [4] and Tawakkalna [5] E-government. On the other hand, the healthcare sector in Saudi Arabia is facing multiple issues that could be enhanced. This paper illustrates the needed areas of improvement in the healthcare sector, presenting a lecture review of current cases, analyzing the results, and proposing a model as a solution to the existing dilemma.

2. Literature Review

Various studies explore different factors about drug shortage and how to overcome this problem through implementing policies, procedures, strategies, and technical solutions. In addition, other studies show the negative impact of drug shortage on patient care.

In 2018 AlRuthia et. al, found that there are seven main causes related to drug shortages in Saudi Arabia hospitals, one of these causes was having a poor supply chain management (SCM) system in which patients could be at risk by not providing the urgently needed drugs, because of the improper tracking and monitoring of the SCM system and pharmacy inventory. They also mention the importance of having an early warning system to notify about drug shortages in sufficient time [6].

In a Questionnaire-based cross-sectional study conducted by AlRuthia et. al in Riyadh in 2017, where the study results showed that a large percentage of the sectors that follow the Ministry of Health face a daily shortage of drugs compared to other health sectors. Drugs that are in short supply have also been identified significantly. The study also indicated that there are two strategies that are largely implemented by these health sectors to reduce the impact of drug shortages on patient care, which is to recommend alternative drugs and inform hospital staff about the existence of a shortage of medicines [7].

A report by Badreldin and Attalah in 2021 shows that drug shortages become a global issue due to COVID-19 and its impact on patient care and outcomes, where mortality, adverse reactions, medication errors, and hospitalizations are increased. They show the importance of pharmacists' role in mitigating the emerging drug shortages related to the pandemic. In addition, they show the role of policymakers in this pandemic related to drug shortage and how their policy of global lockdown is a potential problem that causes drug shortage and how important it is to collaborate with the pharmacist to mitigate the risks of drug shortage [8].

A scoping review conducted in 2019 by Phuong et. al reported that drug shortages are a complex global phenomenon affecting the economic, clinical, and human outcomes of patients, and more broadly on providers and health care systems. They reported that the failure of supplying proper drugs to consumers resulted in an increase in drug errors, patient harm and mortality from substitution drugs. It also results in an increase in patient out-of-pocket expenses, increased institutional labor and commodity expenditure. Also, they reported that the decrease of patient's quality of life and health improvement are associated with drug shortages [9].

3. Research Methodology

a) Search Strategy

A systematic review was conducted in February 2021 with limitation criteria identified in the next section. We use the following search keywords: drug

shortage causes, drug shortage issues, healthcare drug shortages, Saudi Arabia drug shortages, hospital drug shortages, medicine shortages, medicine shortages in Saudi Arabia, drug shortage impacts, drug shortage on patients, and drug shortage consequences.

b) Papers Selection

The papers selection was determined based on the following criteria:

- Published papers or studies in the English language;
- Published papers between 2017 and 2021;
- Publisher ranking between Q1 and Q3 by SCIMAGO institutions;
- Focus on drug shortage factors in Saudi Arabia;
- Focus on the impact of drug shortage on patients;
- No restrictions on the type of research methodology.

All the resulting papers were examined and we eliminated all papers that did not meet the identified criteria.

c) Data Extraction and Analysis

The selected papers data related to our topic objectives and focusing areas were extracted. In addition, we analyzed the selected papers' findings, discussions, and conclusions to verify the variables related to drug shortage and its impact on the patient's outcome. All the data collected are analyzed, discussed and summarized.

4. Results and Analysis

Drug shortage is a global problem that has existed for decades [6], and currently it has appeared more widely due to the COVID-19 pandemic [8]. Drugs are an important part of healthcare because it improves health and quality of life [9].

Lack of drugs have negative impacts on the patients and also on health care, and despite the serious impact there are few studies on identifying the causes of drug shortage problem [6].

Among the results of the studies that have been reviewed in this research, there are the presence of obstacles and challenges in managing drug supplies, drug safety and stock management, as these obstacles and challenges play a major role in the process of managing and addressing drug shortages [6], [7], [8]. All these obstacles and challenges can lead to inability to forecast actual needed drugs, and also to inability of monitoring and tracking ordered drugs and estimating its receiving time [6].

In some national emergencies cases, it may be required from the Saudi Food and Drug Authority (SFDA) to extend the shelf-life of some critical

drugs. Therefore, it is important to have a robust inventory management system that alerts the healthcare sector and the SFDA in a timely manner to avoid drug shortage [8].

Inventory management is ineffective [6] as there is no inventory system that contributes accurately tracking stock records, which is supposed to help healthcare sectors in monitoring and controlling the stock in terms of validity and quantity of drugs. In addition, it can show any discrepancy between the registered drugs and the drugs used, which may contribute to the detection of embezzlements.

Among the problems that lead to drug shortage is buying from tenders with lower prices which could have a lower quality. This can raise the obstacle of warning and tracking those drugs that require urgent withdrawal from the market and stocks for the fear of affecting patient’s safety [7].

All previous studies indicated the negative impact of drug shortage on a patient’s life. Quality of patients’ care can be affected when providing an alternative drug that may be less effective than the primary one [7]. Also, drug shortages as a result of supply chain disruptions can be identified as a challenge in restarting patients’ surgeries. The higher demands in treating and developing clinical trials for COVID-19 patients caused drug shortages for patients with chronic conditions [8], [9]. Table 1 reflects the drug shortage factors and their impacts.

Table 1. Drug Shortage Factors & Impacts

| Factors | Impacts |
|---|--|
| No proactive warning for drug shortages | <ul style="list-style-type: none"> ▪ Increased drug expenses. ▪ Lower quality of care. ▪ Negative effects of alternative drugs. ▪ Postpone surgery. ▪ Extend admission period. ▪ Deaths. |
| No estimation of actual required drugs | |
| Ineffective drug distribution mechanisms between health sectors | |
| Lack of integration between stakeholder | |
| Lack monitoring of drug validity | |
| Embezzlement | |
| Increasing demands for drugs during national crises | |

5. Discussion and Proposed Solution

Recently, many major difficulties and obstacles have been resolved by applying the E-government concept. E-government provides services to citizens in an easy and affordable manner that is reachable in an integrated platform such as Abshir. On the other hand, it is facilitating governmental monitoring and tracking for each service and reducing administration expenses. Therefore, applying E-government on drug

availability, corruption and safety will be the most optimal solution.

The following section will illustrate a proposed model to be implemented in the healthcare sector that will solve the existing catastrophe by applying E-government in logistic management starting from hospitals drug’s contracts and ending with delivering the drugs to the patient. The targeted result will be governmental mentoring and tracking of drug expenses, hospitals will reach drug availability, and patients will receive drugs efficiently and effectively.

The targeted solution will be reached by conducting the following three E-government solutions:

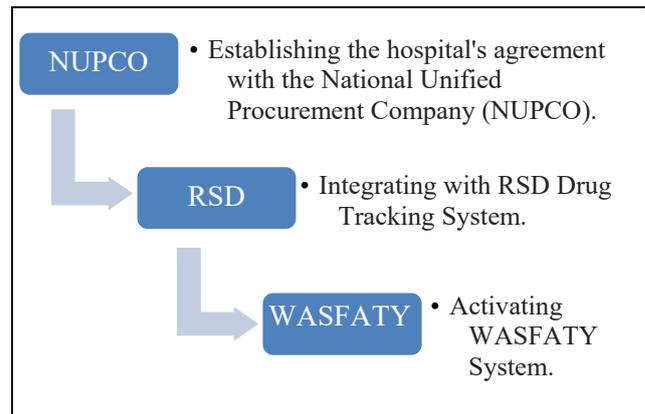


Figure 1. Recommended E-government solutions

First of all, we have to establish the hospital’s agreement with the National Unified Procurement Company (NUPCO). NUPCO is the largest Saudi governmental company that was established in 2009 and it is owned by the Public Investment Fund. It is considered as the leading institution in managing procurement, logistics and supply chain in governmental hospitals for providing medical devices, supplies and drug needs. It is owning and managing 180,000 warehouses, 44,573 items, 54 participating entities in tendering, 12,000,000,000 contracts value and 59,000,000,000 tendering values. In addition, NUPCO is a contributor in 2030 vision by using digital transformation in improving healthcare efficiency and effectiveness and enhancing the efficiency of available resource utilization. NUPCO provides unified procurement for all hospitals and patients requirements, and also logistics and supply chain transportation and warehousing. As a result of applying NUPCO’s services, hospitals will monitor drug level, ensure drug’s quality and safety, and forecast the future needs. On the other hand, they facilitate governmental tracking and monitoring for drug’s budgeting and expenses [10].

Secondly, we have to integrate with the RSD Drug Tracking System that is owned by the Saudi Food and Drug Authority. RSD has been initiated as an initiative to contribute to the National Transformation Program 2020 that is an enabler to

vision 2030 which focuses on improving and enhancing citizens quality of health. One of the most beneficial services that is provided by RSD is Drug Tracking in hospitals warehouses. Hospitals will register their drugs list and enter the received quantity from supplies. After that, Saudi Food and Drug Authority will monitor the drug level, usage and need. In fact, applying such a system gives the government full insight about hospitals drug availability and can forecast patient flow in each hospital in the region. Moreover, it prevents counterfeit and stealing drugs from hospital’s warehouses and pharmacies, since each item and drug accurate quantity has been entered in the system that will display drug flow in the hospital. Furthermore, achieving and ensuring drug safety in real-time can stop and withdraw all the quantity of recalled or with warning drugs [11], [12] .

Finally, we can activate Wasfaty service that is provided by the National Company for the Unified Purchase of Medicines, Devices and Medical Supplies "NUPCO" with the supervision and management of the Ministry of Health in Saudi Arabia. Wasfaty service has been established to be an enabler of 2030 vision that aims to secure and ensure patient’s health improvement, and it will be reachable in all healthcare areas. It is activated and engaged in 180 regions and cities, 2,283 pharmacies, 75 hospitals, 1,468 health centers and prescribes 11.7 million prescriptions. The targeted benefit is offering free drugs for patients, everywhere and at any time. That will facilitate patient’s reaching the nearest hospital or pharmacy to get medication refill and there will be no more suffering from medication availability [13]. Table 2 is mapping results with proposed solutions.

Table 2. Mapping results with proposed solutions

| Issue | Application/Service | Solution Provided |
|-------------------------------------|--------------------------|--|
| Drug Availability | NUPCO | Providing the needed drugs in real time and once it is ordered by the hospital. |
| | Wasfaty | Facilitate prescribed drugs to be refilled, and guide patients to the hospital, pharmacy or healthcare center that offered the required drug. Patients will receive free drugs anytime and anywhere. |
| Stealing and counterfeitin g drugs. | RSD Drug Tracking System | Entering the received drugs quantity in the system and the quantity will be monitored and tracked. |
| Drug safety | RSD Drug Tracking System | Real time stopping and withdrawal of drugs with warning by flagging a certain drug as stopped and hospitals will view the updated flag. |

6. Conclusion

The results of the present study conclude that drug shortage issues and its impacts on patients, need an intervention not only from the institutional level but also from the government. That is why we propose and highlight the importance of applying E-government applications (RSD, NUPCO and WASFATY) in health care sectors to ensure drug availability, safety, eliminate stealing and counterfeiting, forecast actual needed drugs and seamless supply chain management.

At the end of the day, the existing of E-government applications and services is not the key for successful E-government, while spreading the awareness to inform the citizens about the vital aspect to utilize what is provided by the government. Otherwise, it would be wasting efforts without usage.

Further research can be done in other contexts or other countries to see what kind of applications the E-government there are and how they are applied. Other research can measure the efficiency and effectiveness using other methodologies and data gathering (preferably primary data) rather than systematic review.

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