



COST-EFFECTIVENESS ANALYSIS OF SWITCHING TO LOCAL GENERIC MEDICATIONS IN THE JORDANIAN ROYAL MEDICAL SERVICES (JRMS): IMPACT ON MEDICATION PRICES AND RESOURCE ALLOCATION.

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ABSTRACT

1. Introduction: Worldwide, healthcare costs are a major concern, especially for nations with limited financial resources. In Jordan, the Jordanian Royal Medical Services (JRMS) plays a critical role in providing healthcare to military personnel and their families. The cost of pharmaceuticals, especially brand-name drugs, is one of the biggest contributors to healthcare expenses. One strategy to lower pharmaceutical costs while guaranteeing the same level of care is to switch from brand-name pharmaceuticals to locally made generic equivalents. Generic drugs given that they are bioequivalent to their brand-name counterparts provide a more affordable option and can be expected to result in significant savings. The purpose of this research is to assess the cost-effectiveness of this policy and how it affects the allocation of resources within JRMS.

2. Objective: This study's main goal is to evaluate the cost-effectiveness of the JRMS policy, which consisted of moving from brand-name to locally made generic drugs. The research attempts to:

1. Determine the financial savings that JRMS was able to achieve using this policy.
2. Assess how these savings affect JRMS's overall budget and resource allocation.
3. Describe the policy's broader consequences for healthcare systems in comparable circumstances.

3. Methodology: A cost-minimization analysis (CMA) framework, suitable when comparing the costs of interventions that produce comparable outcomes, will be used in this study. The financial data gathered from JRMS procurement records for 2023 will be the main focus of the analysis. The study will specifically examine the costs of pharmaceuticals both before and after the move to generics, the amount of these drugs consumed annually, and the savings that resulted. A quantitative approach will be used to compile and analyze the data using Excel Sheet Software, calculating the overall cost difference for each medication and calculating the savings for all medications examined. The study will also look into the possibility of reallocating the resources that have been saved within JRMS, taking into account the wider implications for healthcare quality and access.

Keywords: Generic medications, cost-effectiveness, healthcare resource allocation, Jordanian Royal Medical Services, pharmaceutical cost savings, healthcare policy, medication pricing, brand-name drugs, healthcare systems, economic evaluation.

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1. INTRODUCTION

The rising cost of pharmaceuticals, which account for a large portion of healthcare expenditures, remains an increasing challenge to healthcare systems worldwide. In countries with limited financial resources, where healthcare budgets must be carefully managed to ensure the delivery of essential services, these rising costs can be particularly concerning. In numerous instances, patients and healthcare systems face the need to make difficult decisions about how best to allocate resources owing to the high cost of brand-name pharmaceuticals^[1].

These difficulties have affected the Jordanian Royal Medical Services (JRMS), which is responsible for providing medical care to Jordan's armed forces and their families. JRMS examined several strategies for reducing expenses without giving up the standard of care in response to growing pharmaceutical costs and the requirement to continue providing full healthcare services. Replacing brand-name drugs with generic equivalents, which are usually offered at much lower costs, is one of the most promising strategies^[2].

Pharmaceutical products classified as generics share the same active ingredients, dosage forms, strengths, and methods of administration as their brand-name equivalents. The same strict requirements for efficacy, safety, and quality set by regulatory agencies including the Jordan Food and Drug Administration (JFDA) and the U.S. Food and Drug Administration (FDA) must be met by them^{[2], [9]}. Generic medications are less expensive than brand-name medications because they do not need to undergo the same lengthy clinical trials that are necessary for brand-name medications, which have already been shown to be safe and effective^[1].

JRMS's decision to switch its policy in 2023 from brand-name to locally manufactured generic drugs is a major attempt to make the best use of the scarce healthcare resources available. This policy is part of a larger global trend in which increasing the use of generic drugs has allowed many healthcare systems to successfully reduce drug costs. Research has demonstrated, for instance, that the use of generic medications can result in significant cost savings for healthcare systems without sacrificing patient outcomes^[6, 7]. By utilizing locally produced generics, which are not only more affordable but also more easily accessible domestically, the JRMS policy seeks to accomplish comparable results by decreasing the

need for imported medications while encouraging local economic development^[9].

Nevertheless, switching from brand-name to generic drugs is not without its difficulties. Acceptance of generic medications may be significantly hindered by patient perception of them. The perception of generic medications as inferior by certain patients and healthcare providers can impact treatment adherence and overall patient outcomes, even though they are pharmacologically equivalent to brand-name drugs^{[4], [5]}. Furthermore, a general shift to generics may negatively affect the pharmaceutical industry, especially companies that manufacture brand-name drugs and could result in less innovation and a decrease in the availability of certain pharmaceuticals^[4].

In this regard, it is critical to evaluate how JRMS's policy affects resource allocation and cost savings inside this organization. This study aims to assess the cost-effectiveness of the JRMS policy through an analysis of the implications for resource allocation and the decrease in medication prices. In addition to determining whether this policy could serve as a model for other healthcare systems facing similar financial pressures, this analysis will help determine whether the move to generic medications can maintain or even improve the quality of healthcare services provided by JRMS.^{[9], [3]}.

Specifically, this study addresses the following research questions:

1. What are the cost differences between brand-name and generic medications after the policy change?
2. How has the switch to generic medications affected the overall budget allocation within JRMS?
3. What broader implications do these findings have for healthcare policy and practice in Jordan and similar contexts?

By providing answers to these queries, this research hopes to provide important new information about the cost-effectiveness of generic drugs and their potential to optimize the distribution of healthcare resources in low- and middle-income nations.

2. METHOD

Data Collection:

The JRMS procurement records for the year 2023 provided the data used in this study, which was mainly concerned with drugs that were switched

from the brand-name to locally manufactured generic alternatives. The drugs examined in this

study are listed in Table (1).

Table 1: Examined drugs in the study

Medication Name	Medication Name
Buscopan Ampules 20mg/ml	Valsartan 160mg+ Hydrochlorothiazide 12.5mgTab
Esomeprazole IV 40mg Injection	Hibor 3500 IU PFS
Natrilix S.R 1.5mg Tablet	Clexan 6000 IU,0.6ml Vial
Cordarone Ampules 50mg/ml	Xarelto 15mg tab
Omnice Caps 0.4mg	Xarelto 20mg tab
Diovan Tabs 160mg	Eliquis 2.5mg Tab
Micardis Tablet 80mg	Eliquis 5mg Tab

Cost-Effectiveness Analysis:

There were different stages to the analysis. First, the annual consumption multiplied by the unit price was used to determine the total cost of each medication. This was carried out both before and after the switch to generic drugs. The amount saved on costs as a result of the policy is shown by the difference between these two totals.

To establish the policy's overall financial impact, the savings from every medication were combined in the second stage. Then the analysis of the policy's cost-effectiveness involved comparing the overall savings with the possibility of reallocating resources within JRMS.

Economic Evaluation Framework:

This study employs a cost-minimization analysis (CMA) framework, which is a suitable method of economic evaluation in situations where the costs of two or more interventions vary but the outcomes are equivalent [8]. Because generic drugs are considered to be bioequivalent to their brand-name equivalents, CMA was selected as the best approach to assess the JRMS policy. With this approach, the costs of brand-name and generic drugs can be easily compared without taking variations in clinical efficacy or safety into account.

Limitations and Ethical Considerations:

The study does not take into consideration possible differences in clinical outcomes between brand-name and generic medications; instead, it is restricted to the financial data supplied by JRMS. One ethical concern is making sure that switching

to generic drugs won't negatively impact patient care. This is something that the current regulatory framework addresses by making sure generics meet strict quality standards prior to being used in clinical practice [2].

3. RESULTS

Cost Savings Analysis:

Table 1 provides an overview of the significant cost savings that were found during the analysis for all of the medications examined. The year following the policy change witnessed a total of 1,685,637.132 JOD in cost savings for JRMS.

- **High-Impact Medications:** Xarelto 20mg tablets, which alone accounted for 487,504.080 JOD in savings, were among the high-consumption medications that showed the greatest savings. With reductions of 105,077.484 JOD and 215,030.400 JOD, respectively, Diovan Tabs 160mg and Valsartan 160mg with Hydrochlorothiazide were among the other medications that made a significant contribution to the overall savings.
- **Low-Impact Medications:** Although the cost of all medications dropped, some, such as Buscopan Ampules 20 mg/ml and Cordarone Ampules 50 mg/ml, contributed less to the total savings, with corresponding differences of 1,287.264 JOD and 6,158.016 JOD. However, in light of the complete budget, these savings are still noteworthy (Figure 1).

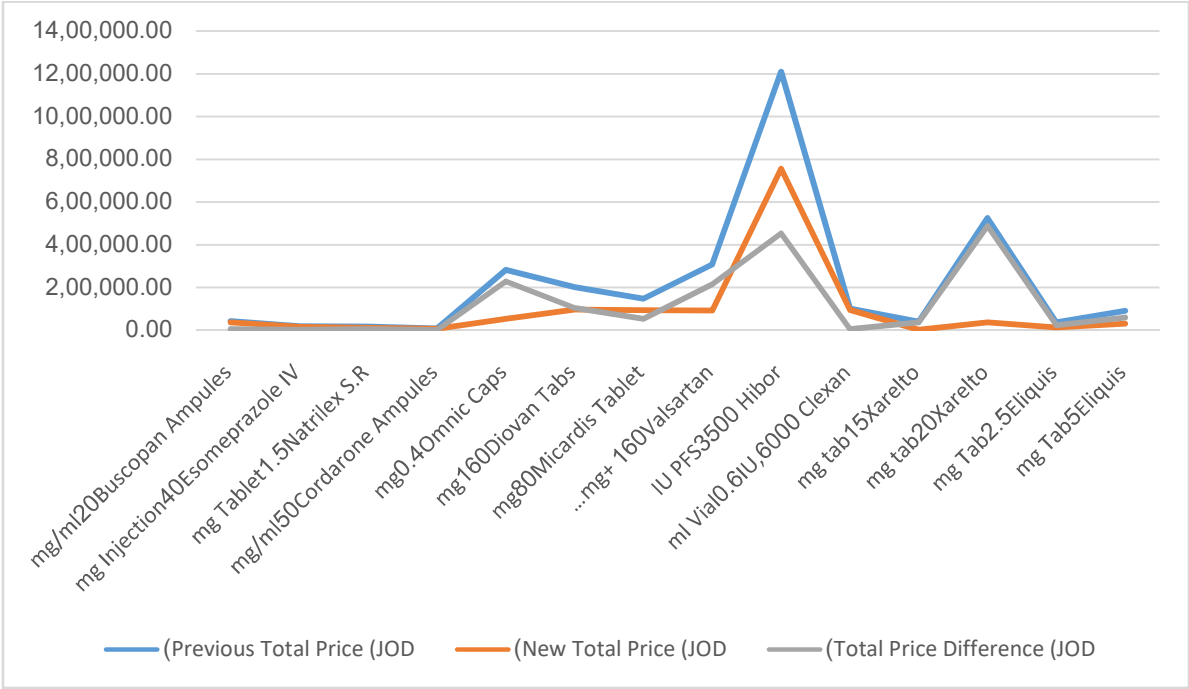


Figure 1: patterns of drug price

Table 2: Cost Analysis of Medication Switch

Medication Name	Previous Price (JOD)	New Price (JOD)	Yearly Consumption	Previous Total Price (JOD)	New Total Price (JOD)	Total Price Difference (JOD)
Buscopan Ampules 20mg/ml	0.167	0.143	256,584	42,849.528	36,691.512	6,158.016
Esomeprazole IV 40mg Injection	2.500	2.139	7,440	18,600.000	15,914.160	2,685.840
Natrilix S.R 1.5mg Tablet	0.024	0.016	690,672	16,576.128	11,050.752	5,525.376
Cordarone Ampules 50mg/ml	0.343	0.290	24,288	8,330.784	7,043.520	1,287.264
Omnicep 0.4mg	0.138	0.026	2,042,400	281,851.200	53,102.400	228,748.800
Diovan Tabs 160mg	0.071	0.034	2,839,932	201,635.172	96,557.688	105,077.484
Micardis Tablet 80mg	0.129	0.082	1,144,056	147,583.224	93,812.592	53,770.632
Valsartan 160mg+ Hydrochlorothiazide 12.5mg Tab	0.093	0.028	3,308,160	307,658.880	92,628.480	215,030.400
Hibor 3500 IU PFS	4.000	2.500	302,304	1,209,216.000	755,760.000	453,456.000
Clexan 6000 IU, 0.6ml Vial	1.778	1.665	57,000	101,346.000	94,905.000	6,441.000
Xarelto 15mg tab	1.585	0.099	25,080	39,751.800	2,482.920	37,268.880
Xarelto 20mg tab	1.585	0.112	330,960	524,571.600	37,067.520	487,504.080
Eliquis 2.5mg Tab	0.615	0.213	58,680	36,088.200	12,498.840	23,589.360
Eliquis 5mg Tab	0.615	0.213	147,000	90,405.000	31,311.000	59,094.000

Budget Reallocation Potential:

The significant savings in expenses observed indicate a promising possibility for resource reallocation within JRMS. The money saved could be used to fund the expansion of patient services, new medical technology purchases, or

infrastructure improvements, among other important projects. Maintaining the standard of care offered by JRMS may depend on this reallocation potential, particularly in light of the continuous financial pressures [9].

Impact on Healthcare Access and Quality:

The policy's financial effects go beyond simply decreasing costs. By reducing expenditures on drugs, JRMS may be able to increase its beneficiaries' access to healthcare by freeing up more funds for other vital services ^[3]. Furthermore, since generic medications must adhere to the same strict regulatory requirements as brand-name medications, switching to generics does not negatively impact the quality of care ^[2] (Table 2).

4. DISCUSSION

Implications for JRMS and the Jordanian Healthcare System:

This policy's effective implementation at JRMS offers an insightful case study for more complex healthcare systems. Owing to the substantial cost savings achieved, this policy might be extended to other areas of the Jordanian healthcare system, which might result in broad cost savings. This is especially important in a country where financial resources are frequently limited and healthcare costs are an increasing source of concern ^[6].

Generalizability to Other Healthcare Systems:

The implications of the study's findings extend beyond the borders of Jordan. A lot of healthcare systems around the world, especially those in low- and middle-income nations, deal with issues such as growing pharmaceutical costs and restricted funds. These systems could take inspiration from the JRMS policy, which shows that major cost reductions are possible without sacrificing care quality ^[3]. It is imperative, nevertheless, to customize the strategy to the unique circumstances of every country, taking into account elements like the accessibility of local generic producers and the legal structure controlling medication authorization and consumption ^[9].

Challenges and Considerations:

Although switching to generic drugs clearly results in cost savings, there are some difficulties with the policy. Patients' perceptions of generic drugs, which are pharmacologically equivalent to brand-name drugs yet are occasionally viewed as inferior, are among the main causes of concern ^[7]. This belief may have an impact on patients' compliance with recommended care, which may affect clinical results. To solve this, JRMS and other healthcare providers should contribute to patient education

initiatives to make sure that the advantages of generic drugs are made evident ^[5].

The possible effects on the pharmaceutical sector are another factor to take into account. Healthcare costs can be decreased by switching to generics, but pharmaceutical companies that depend on sales of brand-name drugs may face difficulties as a result ^[4]. This dynamic may have an impact on future drug availability, especially if producers decide to stop producing less profitable products.

Future Research Directions:

Future research should concentrate on a more thorough analysis that takes into account both financial and clinical outcomes, given the limitations of this study. Studies with a long-term focus that monitor patient health outcomes may offer important new perspectives on the long-term consequences of moving to generic drugs ^[8]. Furthermore, comparative analyses with other healthcare systems may be capable of confirming that the results are generally applicable and provide best practices for applying the same policies in various settings ^[6].

5. CONCLUSIONS

The Jordanian Royal Medical Services' policy of switching from brand-name to locally produced generic drugs has shown to be very cost-effective. The switch has resulted in significant cost savings, which could enhance JRMS's resource allocation and allow the organization to improve other aspects of healthcare delivery without sacrificing patient care. This policy demonstrates that strategic modifications in drug procurement can result in significant financial benefits, making it a useful model for other healthcare systems facing comparable difficulties ^[9].

Limitations of the Study: The primary drawback of this research is that it focused solely on financial results, not considering clinical outcomes like better patient health or possible negative reactions. Moreover, the analysis is constrained to one year of data, which might not adequately capture the policy's long-term effects. To provide a more thorough evaluation of the policy's impact, future research should take an extended time frame and a wider range of outcomes into account ^[8].

Conflict of Interest: The authors declare no conflict of interest in the preparation and execution of this study.

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