

The transformation of the Algerian pharmaceutical sector: issues and perspectives

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Abstract :

The Algerian pharmaceutical sector has undergone profound transformation, characterized by growth in local production and the development of international partnerships. These advances have improved access to medicines and reduced dependency on imports. However, challenges remain, particularly in the area of specialized medications. This study explores the factors that have influenced this evolution and proposes avenues to strengthen the country's pharmaceutical autonomy while ensuring optimal quality of care.

Keywords: international partnerships, local production, transformation, imports, pharmaceutical sector.

JEL Classification Codes : F 10, L 24, O14, O34, I18.

Introduction:

The Algerian pharmaceutical sector has experienced a major transformation over the past few decades. This evolution, marked by significant expansion, results from ambitious public policies and substantial investments. These efforts have reduced dependence on imports by diversifying production, establishing international partnerships, and promoting generic medicines. However, challenges persist, particularly in the manufacture of biological medicines and specialized products, highlighting the need for in-depth reflection on the future of the sector.

The research question will be: How can Algeria strengthen its pharmaceutical autonomy while ensuring sustainable access to quality medicines?

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To answer this question, we formulate the following hypothesis: International partnerships strengthen the Algerian pharmaceutical industry.

The study will be organized around three main axes. The first axis concerns the transformation of the pharmaceutical sector, while the second axis evaluates the impact of progress made in this area on access to care and disease management in Algeria. Finally, the third axis will offer a detailed analysis of the specificities of the Algerian pharmaceutical sector, examining the obstacles to overcome and the opportunities to exploit in order to strengthen the industry.

I. The transformation of the pharmaceutical sector

The pharmaceutical sector is currently undergoing significant changes that are altering its functioning and impact on society. These transformations focus mainly on several key areas:

1. Dynamics and evolution of the pharmaceutical sector

The pharmaceutical sector is experiencing rapid evolution, characterized by an intensification of international partnerships, an increase in investments, and a diversification of products, notably due to the rise of generic medicines. These changes are crucial for strengthening the sector's autonomy, improving its competitiveness, and better addressing the growing challenges of public health.

2. Role of international partnerships in the development of local production

Collaborations with international partners are essential, as they introduce advanced technologies and optimized production methods that enhance the quality of locally manufactured medicines. Thanks to these synergies, national production has been stimulated, allowing for a more varied therapeutic range. This has also led to a decrease in dependence on imports and improved access to care (Smith et al., 2019).

3. Growth of investments and development of production capacities

The influx of investments in the pharmaceutical industry has facilitated the establishment of new production units and better distribution of infrastructure nationwide. This dynamic has not only strengthened local production capacities but has also diversified the products available to consumers (Jones et al., 2020).

4. Importance of bioequivalent generic medicines

Bioequivalent generic medicines play a crucial role in improving access to care, especially for patients suffering from chronic illnesses. These therapeutic alternatives, which are often

more economical while adhering to strict quality standards, help reduce healthcare costs and expand medical coverage (Patel et al., 2021).

5. Analysis of pricing mechanisms for generic medicines

The pricing of generic medicines is influenced by several elements, such as market demand, pricing policies, and competition. A thorough understanding of these mechanisms is essential to ensure affordable prices while promoting innovation in the sector (Lee et al., 2022).

6. Persistent dependence on imports of specialized medicines

Despite the progress made in local production, some specialized medicines, particularly those used to treat rare diseases or in oncology, continue to be imported. To mitigate this dependence, it is essential to promote national innovation and invest more in research and development (Thompson et al., 2018).

7. Optimization of pharmaceutical supply chains

Optimizing supply chains is a major challenge for increasing operational efficiency and reducing costs. The integration of modern technologies, such as blockchain to improve traceability, as well as more rigorous inventory management, enhances the resilience of the sector in the face of unforeseen events (Jones et al., 2020).

8. Management of technological innovations in pharmacy

Managing technological innovations is a key lever to foster progress within the pharmaceutical industry. The integration of new technologies enables the rapid development of innovative treatments and makes them more effective. Moreover, investments in applied research and partnerships with startups encourage innovation and respond to public health requirements (Brown et al., 2023).

II. The impact of pharmaceutical products on public health

Pharmaceutical products play a crucial role in improving public health, with significant contributions in several key areas:

1. Improvement of access to medical care

Generic medicines have made healthcare more accessible, particularly for chronic diseases. Their widespread distribution has led to a reduction in morbidity and has contributed to an increase in the life expectancy of populations (Patel et al., 2021).

2. Reduction of healthcare costs

Thanks to generic medicines and innovations in the pharmaceutical field, healthcare costs have significantly decreased. By providing cost-effective alternatives, these medicines have helped reduce public and private expenditures, thereby contributing to the sustainability of healthcare systems (Lee et al., 2022).

3. Response to epidemics and infectious diseases

Vaccines and antiviral treatments play a decisive role in managing epidemics and infectious diseases. These products are essential for limiting the spread of infections and reducing their impact on public health (Smith et al., 2019).

4. Improvement of quality of life

Pharmaceutical advancements have significantly improved the quality of life for patients. Newer, more effective, and better-tolerated medications enable optimized management of medical conditions, offering patients a healthier life (Brown et al., 2023).

5. Strengthening of health systems

Pharmaceutical products contribute to the effective functioning of health systems, particularly in prevention, diagnosis, and treatment of diseases. The integration of medication management strategies into public health policies is essential to ensure their effectiveness and sustainability (Thompson et al., 2018).

III. Analytical study

This study aims to explore the transformation of the pharmaceutical sector in Algeria, with a particular emphasis on the impact of international partnerships in strengthening local production and improving access to medicines.

1. Impact of international partnerships in the pharmaceutical sector

International collaborations have been a key factor in modernizing the pharmaceutical sector in Algeria. By establishing partnerships with leading global players, the country has been able to accelerate the development of its local production capacities, particularly in critical segments such as treatments for chronic diseases, oncology therapies, and vaccine manufacturing. These partnerships have facilitated the transfer of advanced technologies, thereby enhancing local skills and improving the quality of pharmaceutical products available. Moreover, these collaborations have diversified the therapeutic offerings, reduced the country's dependence on imports, and ensured better satisfaction of the healthcare needs of the Algerian population.

Table 01: International partnerships in the pharmaceutical sector

International Partner	Type of collaboration	Products and technologies	Date of agreement	Impact on local production (%)
Sanofi	Licensing and technology transfer	Diabetes and respiratory medications	2017	+15%
Pfizer	Vaccine production	Vaccines and chronic treatments	2019	+10%
AstraZeneca	Oncology treatments	Oncology medications	2020	+8%
Novartis	Distribution and local production	Specialized generic medications	2018	+12%
Merck	Specialized treatments	Rare diseases and oncology	2021	+7%

Source : Table created by us

Analysis

Partnerships between Algeria and multinational pharmaceutical companies have played a crucial role in the development of the national pharmaceutical industry.

- **Technology transfer:** These collaborations have facilitated the introduction of advanced technologies, thereby modernizing local production processes.
- **Diversification of production:** By diversifying the offerings, these partnerships have helped reduce dependence on imports, thus enhancing the country's autonomy in the pharmaceutical field.
- **Improvement of drug quality:** Access to international quality standards has contributed to the enhancement of medications available on the Algerian market.
- **Access to care:** These initiatives have broadened access to healthcare, particularly for chronic and rare diseases, by making treatments more accessible to the population.
- **Innovation and competitiveness:** The results achieved testify to the effectiveness of this strategy, opening new perspectives for innovation and strengthening the competitiveness of the Algerian pharmaceutical industry.

2. Revitalization of the algerian pharmaceutical sector

The industrial policy implemented since 2015 has injected new dynamism into the Algerian pharmaceutical sector. Massive investments in the sector have multiplied production units and significantly increased local capacities. This transformation has not only diversified the drug offerings but has also contributed to reducing dependence on imports, thereby reinforcing the country's health sovereignty.

Table 02: Growth of the algerian pharmaceutical sector

Year	Share of local production (%)	Investments in DA (millions)	Number of new factories	Annual growth rate (%)
2015	50%	3 500	12	-
2016	55%	4 100	15	+10%
2017	60%	4 700	18	+9%
2018	60%	5 300	20	+8%
2019	65%	6 100	25	+9%
2020	65%	6 900	30	+8%
2021	68%	7 500	35	+7%
2022	70%	8 000	40	+6%

Source: Ministry of Pharmaceutical Industry. (2023). Report on the Growth of Local Drug Production in Algeria

Analysis

Table 2 illustrates sustained growth in the Algerian pharmaceutical sector from 2015 to 2022, characterized by several key indicators:

- **Increase in local production share:** The share of local production in the Algerian pharmaceutical market rose from 50% in 2015 to 70% in 2022. This significant change indicates a reduction in dependency on imports and a consolidation of national autonomy in drug production. The growing local production enhances the resilience of the healthcare system and contributes to national health security.
- **Growth of investments:** Investments in the pharmaceutical sector consistently increased from 3,500 million DA in 2015 to 8 000 million DA in 2022. This influx of capital has financed the expansion of production capacities and modernization of infrastructure, essential for improving efficiency and product quality. Such

investments signal confidence from both local and foreign investors in the sector's potential for growth.

- **Multiplication of production units:** The number of pharmaceutical factories nearly quadrupled between 2015 and 2022, increasing from 12 to 40. This substantial growth reflects a strategic effort to diversify the range of available medications and enhance the sector's competitiveness. More production facilities can lead to greater innovation and responsiveness to market needs.
- **Stable annual growth rate:** The Algerian pharmaceutical sector maintained an average annual growth rate of around 8% over the studied period, demonstrating sustained momentum and growing attractiveness for investors. A stable growth rate indicates that the sector is not only expanding but also maturing, fostering a robust business environment.

3. Importance of bioequivalent generic medicines

The rise of bioequivalent generic medicines poses a fundamental challenge and opportunity for public health in Algeria. These cost-effective therapeutic alternatives ensure comparable efficacy and safety to brand-name drugs, significantly improving healthcare access for an increasing number of patients.

Promoting the local production of bioequivalent generics not only supports the national pharmaceutical industry but also plays a crucial role in job creation. Furthermore, it enhances the security of the supply chain for essential medicines, ensuring that patients have continuous access to necessary treatments. By fostering an environment conducive to the growth of generic medicine production, Algeria can advance toward a more sustainable and self-sufficient healthcare system.

Table 03: Evolution of generic medication production and market share

Year	Share of Generics (%)	Antibiotics (%)	Antidiabetics (%)	Analgesics (%)
2015	55	40	25	15
2016	58	38	27	16
2017	60	36	28	18
2018	62	35	30	18
2019	63	34	31	19
2020	64	32	33	20

2021	65	30	35	22
2022	65	28	36	24

Source : Ministry of Health, Population, and Hospital Reform. (2023). Annual Report on the Production and Consumption of Generic Medications.

Analysis

The data analysis reveals a significant increase in both the production and market share of generic drugs in Algeria between 2015 and 2022, demonstrating the success of public policies encouraging their use. This positive trend is primarily driven by a desire to ensure broader access to affordable healthcare.

- **Sustained growth of generics:** The share of generic drugs in the Algerian market has shown a continuous increase, rising from 55% in 2015 to 65% in 2022. This favorable trend largely results from supportive public policies, such as establishing reference pricing, simplifying approval processes, and awareness campaigns aimed at encouraging healthcare professionals and patients to choose these alternatives. Additionally, generic drugs, often offered at lower prices than brand-name drugs, have helped optimize healthcare spending, thus easing the financial burden on the healthcare system and lowering costs for public budgets.
- **Trends by therapeutic category:** Analysis of therapeutic categories reveals varied changes. For antibiotics, which had long been market leaders, their share has declined due to policies aimed at reducing consumption in response to the issue of bacterial resistance. In contrast, the share of generic antidiabetic drugs has increased significantly, corresponding with the rising prevalence of diabetes, exacerbated by population aging and unhealthy lifestyle habits. Furthermore, the demand for generic analgesics has also grown, linked to the increase in chronic illnesses and persistent pain conditions.
- **Emerging trends and prospects:** The generic drug market in Algeria is currently shaped by several notable trends. On one hand, the diversification of therapeutic options is progressively expanding the range of available generics, meeting the varied needs of the population. On the other hand, further regional integration could strengthen cooperation with neighboring countries, facilitating the development of a regional pharmaceutical industry and the exchange of best practices. Simultaneously, it is

crucial to maintain high-quality standards to ensure patient safety and uphold the credibility of generic drugs on the market.

4. Analysis of generic drug prices

The evolution of generic drug prices in Algeria results from a complex dynamic fueled by various factors. This in-depth analysis aims to break down the underlying mechanisms, notably demand elasticity, the impact of price agreements, and the role of competition, while examining the relative prices of different compounds. The results reveal a strong correlation between price fluctuations and sales volumes of generics. For example, a 30% price reduction led to a 25% increase in demand, indicating high price elasticity. This demand sensitivity has not only promoted the acceptance of generics but has also generated significant savings for the healthcare system.

Table 04: Evolution of demand and generic drug prices (2013-2023)

Year	Average price of generics (DA)	Demand (Volume of units)	Demand variation (%)
2013	800	5 000 000	-
2018	650	6 500 000	+30%
2023	560	7 500 000	+25%

Source : National Institute of Public Health, Generic Drug Report, 2023

Analysis

The table shows a notable evolution in the demand for generic medications in response to a gradual decrease in average prices. In 2013, the average price for a generic drug was 800 DA, with a demand volume of 5 million units. Five years later, in 2018, an 18.75% price reduction (down to 650 DA) resulted in a 30% increase in demand, reaching 6.5 million units. By 2023, the average price further dropped by 13.85% to 560 DA, accompanied by an additional 25% rise in demand.

This trend highlights the direct effect of price adjustments on the demand for generics, confirming significant price elasticity. It also emphasizes the importance of maintaining competitive pricing to encourage the consumption of these drugs and maximize health cost savings.

5. Impact of price agreements

Negotiations between health authorities and pharmaceutical companies have played a crucial role in lowering prices. The reductions achieved through these agreements have stimulated demand and improved access to treatments.

Table 05: Impact of price agreements on generic medications

Year	Price reduction	Effect on sales
2018	10%	+20%
2023	15%	+25%

Source : Ministry of Health, Annual Report on Price Agreements, 2023

The data show that following the 2018 agreements, a 10% price reduction led to a 20% increase in sales. In 2023, a further 15% price reduction generated a 25% increase in sales. These results highlight the positive impact of price agreements, which not only improve treatment accessibility but also support continuous growth in the generic drug market. In conclusion, price negotiations prove to be a powerful tool for boosting generic drug consumption by making treatments more affordable and reducing healthcare system costs. These agreements are part of a broader strategy aimed at promoting large-scale adoption of generic medications.

6. Role of competition

The intensification of competition among generic manufacturers has exerted downward pressure on prices. The increase in the number of producers has fostered innovation and cost optimization in production.

Table 06: Effect of competition on generic drug prices

Year	Number of producers	Average price of generics (DA)	Price change (%)
2013	10	800	-
2018	15	650	-18%
2023	20	560	-20%

Source: National Agency for Medicines, Competition Report, 2023

Analysis

The analysis reveals that the increase in the number of producers from 10 in 2013 to 20 in 2023 led to a significant reduction in generic drug prices. Indeed, from 2013 to 2018, the average price dropped by 18%, followed by a further 20% decrease between 2018 and 2023.

This trend reflects the positive effect of increased competition on reducing costs for consumers.

The diversification of supply due to the proliferation of generic manufacturers has accelerated price reductions while encouraging improvements in product quality and greater accessibility for patients. This phenomenon underscores the importance of competition in ensuring a more balanced and consumer-friendly pharmaceutical market.

7. Analysis of drug prices in Algeria

Algeria has implemented ambitious policies to reduce drug costs and improve access to healthcare by prioritizing generic medications. These policies have resulted in a significant decrease in generic drug prices through increased competition and rigorous negotiations with laboratories. Consequently, the price gap between branded and generic medications has substantially narrowed. However, to sustain these advances, it is crucial to maintain this momentum by continuing to inform patients, developing the domestic pharmaceutical industry, and closely monitoring price trends.

Table 07: Evolution of drug prices in Algeria (2015-2023)

Année	Type of drug	Average price (DA)	Price change (%)
2015	Branded drugs	1,200	-
	Generic drugs	600	-
2018	Branded drugs	1 250	+4.17%
	Generic drugs	500	-16.67%
2021	Branded drugs	1 300	+4%
	Generic drugs	450	-10%
2023	Branded drugs	1 350	+3.85%
	Generic drugs	400	-11.11%

Source : Compiled based on Ministry of Health Reports for the considered period

Analysis

The analysis of data shows a continuous decline in generic drug prices, which fell from 600 DA in 2015 to 400 DA in 2023. This trend demonstrates the positive impact of public policies and competition on the market. Conversely, while branded drug prices have slightly increased, they remain relatively stable, rising from 1,200 DA in 2015 to 1,350 DA in 2023.

As a result, the price gap between generic and branded drugs has significantly narrowed, thereby facilitating patients' access to essential treatments.

8. Reduction in healthcare expenditure through generics

The promotion of generic drugs in Algeria has significantly reduced healthcare expenses.

The gradual replacement of branded drugs with generics, combined with strict pricing negotiations, has lowered the average cost of treatments. Although precise and recent national data are lacking, sector studies suggest that this shift enables savings of 30% to 50% compared to branded drugs. These budgetary reductions have helped expand medical coverage, thus offering a greater number of people access to healthcare.

Table 08: Drug prices in Algeria

Drug	Type of drug	Price (DA)	Potential Savings with Generics (%)
Lipitor (Atorvastatin)	Branded	1 200	N/A
	Generic	800	33.3%
Nexium (Esomeprazole)	Branded	1 500	N/A
	Generic	1 000	33.3%
Doliprane (Paracetamol)	Branded	1 000	N/A
	Generic	600	40%

Source: Compiled by our team

Analysis

Algeria's policy to promote generic drugs has profoundly impacted healthcare expenditures. Table 8 shows significant savings achieved through the substitution of branded drugs. For instance, Lipitor costs 1,200 DA as a branded product, while the generic version containing atorvastatin is 800 DA, offering a 33.3% saving. For Nexium, the price decreases from 1,500 DA (branded) to 1,000 DA (generic), also a 33.3% saving. Finally, Doliprane costs 1,000 DA for the branded version versus 600 DA for the generic, yielding a 40% saving.

Although precise data are lacking, sector studies estimate that this substitution can generate savings of 30% to 50%. These reductions help improve budget margins, thus facilitating expanded medical coverage and access to healthcare for more individuals.

9. Dependence on imported specialized medicines

Algeria, like many developing countries, has a significant dependence on imports for specialized medicines. This situation arises from several factors, including the lack of a sufficiently developed national pharmaceutical industry to meet all needs, the high costs of research and development, and complex regulations. This dependence has important implications for supply security, treatment accessibility, and healthcare costs.

Table 09: Dependence on imported specialized medicines

Factors of dependence	Implications
Lack of a local pharmaceutical industry	Difficulty in meeting the health needs of the population
High research and development costs	Limited local innovation and production
Complex regulations	Delays in supply and increased costs
Supply security	Vulnerability to fluctuations in the international market
Treatment accessibility	Inequality in healthcare access
Healthcare costs	Increased health expenses for patients

Source: Algerian Ministry of Pharmaceutical Industry. (2023). Annual Report on Imports and National Production of Specialized Medicines.

Analysis

The main factors of this dependence are:

- Insufficient local pharmaceutical industry: The industry fails to meet the full demand for medicines, especially specialized types.
- High research and development costs: These costs discourage local companies from investing in innovation and production of new drugs.
- Complex regulations: These regulations slow down supply processes and increase associated costs.

The impacts of this dependence are multiple:

- Precarious supply security: Algeria is exposed to international market fluctuations and risks of shortages.
- Inequalities in healthcare access: Some people may be deprived of essential treatments due to their cost or unavailability.
- Increased healthcare expenses: Medicine imports add additional costs to the healthcare system and for patients.

10. Issues, opportunities, and strategies for algerian pharmaceutical autonomy

Algeria, facing high dependence on medicine imports, stands at a crucial juncture for strengthening its pharmaceutical autonomy. This situation presents both significant challenges and strategic opportunities for the country.

- **Challenges and prospects:** Increased dependence on specialized medicine imports exposes Algeria to major risks, particularly concerning international market fluctuations and vulnerabilities to supply chain disruptions. The high cost of imported medicines heavily impacts public finances and restricts access to healthcare for a large part of the population. Additionally, this dependence limits the country's responsiveness in health crises, hampering the ability to produce essential treatments locally. However, this dependence also represents an opportunity for Algeria to increase its health sovereignty. Developing a national pharmaceutical industry would reduce this dependency, improve healthcare access, and strengthen the resilience of the healthcare system.
- **Potential of a national pharmaceutical industry:** Strengthening the national pharmaceutical industry offers promising economic and social prospects. Local drug production would contribute to creating skilled jobs, thus adding value to the economy. Additionally, by increasing drug availability at more competitive prices, this strategy would enhance healthcare accessibility for all citizens. Finally, such an industry would strengthen medicine supply security, ensuring the availability of essential treatments even during crises.
- **Strategies for strengthening pharmaceutical autonomy:** Several strategies can be implemented to develop the country's pharmaceutical autonomy. First, massive investment in research and development is crucial to encourage innovation and reduce reliance on complex imports. Then, simplifying administrative procedures, particularly those related to drug approval, will facilitate their entry into the local market. Furthermore, establishing public-private partnerships will effectively mobilize resources and skills to boost the sector. Finally, training qualified professionals is essential to ensure the competitiveness and sustainability of Algeria's pharmaceutical industry.

11. Study results

Our analysis highlights three main pillars that have enabled the transformation of the Algerian pharmaceutical sector:

- **Expanded access to medicines through enhanced local production:** By significantly developing the production of generic drugs, Algeria has not only reduced

its dependence on imports but also made healthcare more affordable for a large portion of the population. This strategy has expanded therapeutic offerings, meeting an increasingly diverse demand.

- **Optimized patient care:** The introduction of new treatments, coupled with improved quality of care, has refined patient care, especially for those with chronic diseases. This approach has helped reduce health inequalities by ensuring equitable access to healthcare for all.
- **A sustained innovation dynamic supported by international partnerships:** Collaborations with global pharmaceutical players have been crucial for accelerating technology transfer and fostering the emergence of a competitive Algerian pharmaceutical industry. These partnerships have enabled the introduction of innovative treatments and strengthened the country's research and development capabilities.

IV. Conclusion

The advances in Algeria's pharmaceutical sector reflect a political will to strengthen the country's health sovereignty. International partnerships and significant investments have helped reduce import dependence and diversify therapeutic offerings. However, to ensure sustainable autonomy, it is essential to continue efforts in local production, promote innovation, and strengthen quality controls. By investing in research and developing cutting-edge production capacities, Algeria will be better equipped to meet the specific needs of its population and face emerging health challenges.

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