

SURVEY ON THE IMPACT OF ANTICANCER DRUG SHORTAGES ON THE MANAGEMENT OF PATIENTS

Yassine Atbib^{1*}, Hajar ZHAR², Safaa El Marnissi², Yassir Bousliman²

¹Faculty of Medicine and Pharmacy of Marrakech.

²Faculty of Medicine and Pharmacy of Rabat.



*Corresponding Author: Yassine Atbib

Faculty of Medicine and Pharmacy of Marrakech.

DOI: <https://doi.org/10.5281/zenodo.19508703>

How to cite this Article: Yassine Atbib^{1*}, Hajar ZHAR², Safaa El Marnissi², Yassir Bousliman² (2026). Survey On The Impact Of Anticancer Drug Shortages On The Management Of Patients. European Journal of Pharmaceutical and Medical Research, 13(4), 486–499.

This work is licensed under Creative Commons Attribution 4.0 International license.



Article Received on 15/03/2026

Article Revised on 05/04/2026

Article Published on 10/04/2026

ABSTRACT

Introduction: Shortages of anticancer drugs are a growing problem affecting the continuity of treatments and the quality of care for cancer patients. They are mainly the result of production difficulties, economic constraints, logistical weaknesses, and a strong dependence on a limited number of manufacturers. **Methods:** A descriptive survey was conducted with 25 healthcare professionals using a structured questionnaire, highlighting data on the frequency of shortages, the drugs involved, perceived causes, clinical and psychological impacts, as well as management strategies implemented. **Results:** The majority of participants report having encountered several anticancer drug shortages over the past 12 months. The affected molecules are mostly standard chemotherapies. The most frequently cited causes include production problems, supply difficulties, and increased demand. The most notable impacts are: treatment delays, therapeutic adjustments, and resorting to less effective alternatives. **Discussion:** The results confirm the findings of the international literature, showing that anticancer drug shortages are frequent, multifactorial, and have significant consequences. The professionals interviewed highlight the need to improve alert systems, coordination among stakeholders, stock management, and supplier diversification. **Conclusion:** Interruptions of anticancer drugs threaten the continuity of treatments and patient safety. Stable access requires increased production, diversification of sources, better stock management, and optimized communication.

KEYWORDS: Anticancer drugs, interruption, chemotherapy, clinical impact.

I. INTRODUCTION

Anticancer drugs represent a crucial category of medicines in the fight against cancer, one of the leading causes of mortality worldwide. Their continuous availability is essential to ensure effective care and to maintain patients' chances of survival.^[1]

However, shortages of anticancer drugs have become an increasing concern, affecting both developed and developing countries. These shortages frequently involve key medications, including conventional chemotherapies, targeted therapies, and immunotherapies. The causes are multifactorial, ranging from production issues—such as disruptions in supply chains—to economic and logistical factors, including parallel exports and the concentration of manufacturing in a limited number of facilities.^[2,3]

The consequences of these shortages are serious and directly impact patient care. They lead to treatment interruptions or delays, forcing healthcare professionals to adapt treatment protocols using alternatives that may be less effective or more toxic. From a human perspective, these shortages increase anxiety and stress among patients and their families, adding to their emotional and financial burden. Furthermore, they result in increased costs for hospitals and healthcare systems, making resource management more complex.^[4]

In this context, it is essential to thoroughly analyze the causes and impacts of these shortages in order to develop effective strategies to prevent and mitigate their effects. This article aims to explore this issue through a comprehensive approach and practical examples, highlighting the challenges faced by healthcare systems in ensuring optimal care for cancer patients.

II. OBJECTIVES

This study is structured around two main objectives aimed at better understanding and addressing the issue of anticancer drug shortages, which represent a growing threat to optimal cancer patient care.

These objectives are as follows

1. To comprehensively assess the consequences of anticancer drug shortages on patient care

Anticancer drug shortages can affect every stage of cancer management, leading to clinical, psychological, and organizational consequences.

2. To identify the main causes of shortages and propose appropriate solutions

Effective management of anticancer drug shortages requires a thorough understanding of underlying causes in order to implement sustainable solutions.

III. MATERIALS AND METHODS

Study design

This is a cross-sectional descriptive observational study.

Setting

The survey was conducted using a structured questionnaire (see appendix) across various public and private healthcare institutions, including oncology, hematology, internal medicine, and hospital pharmacy departments.

The questionnaire was designed and distributed electronically via Google Forms, enabling anonymous, rapid, and centralized data collection.

Study period

The survey was conducted over a three-month period, from January to March 2025.

Sample

The study sample consisted of 25 healthcare professionals working in hospital settings, including oncologists, hematologists, internists, and pharmacists. All participants were involved in the prescription or management of anticancer drugs.

Inclusion criteria

- Healthcare professionals working in hospital settings.
- Professionals working in departments involved in cancer care (oncology, hematology, internal medicine) or anticancer drug management (hospital pharmacy).
- Individuals with experience in prescribing, preparing, or managing anticancer drugs.
- Participants who voluntarily agreed to take part in the survey via Google Forms.

Exclusion Criteria

- Professionals not working in hospital settings.

- Participants not directly involved in the use or management of anticancer drugs.
- Incomplete or invalid questionnaires.
- Refusal or lack of consent to participate.

Ethical considerations

1. Respect for participants and informed consent

Participation in the questionnaire-based survey was strictly voluntary. Participants were clearly informed, prior to participation, about the study objectives and the use of collected data. Submission of the completed questionnaire was considered as informed consent to participate in the study.

2. Confidentiality and data anonymization

No personal data enabling participant identification (such as name, surname, or specific institution) were collected. Data were aggregated and presented exclusively as descriptive statistics (percentages, graphs) to ensure anonymity.

Questionnaire development and content

A structured questionnaire consisting of 23 questions was developed to collect information on the impact of anticancer drug shortages on patient care. It covered several domains: general information, experience with anticancer drug shortages, impact on patient management, consequences for patients, as well as proposed solutions and recommendations.

The questionnaire was administered online via Google Forms.

IV. RESULTS

General information

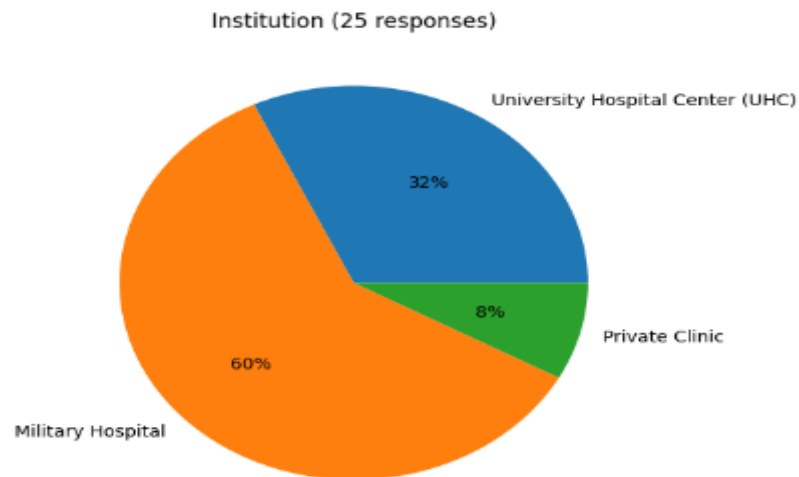


Figure 1: Distribution of participants by type of institution.

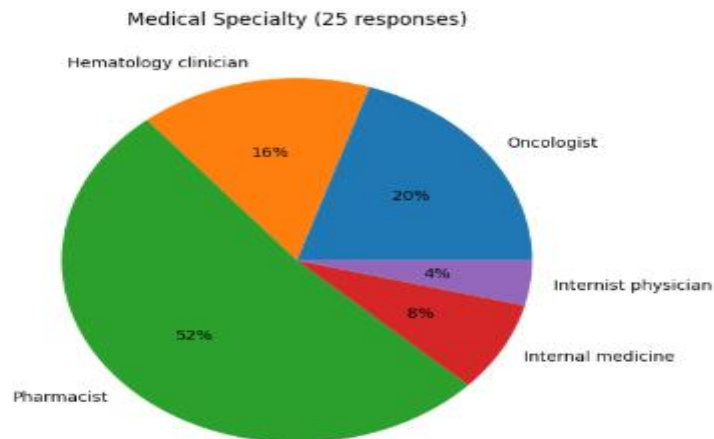


Figure 2: Distribution of participants by medical specialty.

Years of Experience in Prescribing Anticancer Drugs (25 responses)

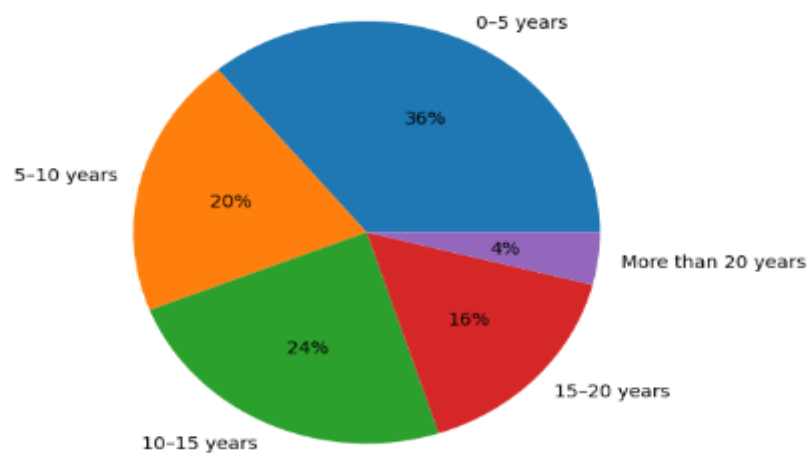


Figure 3: Distribution of participants by years of experience in prescribing anticancer drugs.

Experience of anticancer drug shortages

Have you encountered anticancer drug shortages in the past 12 months? (25 responses)

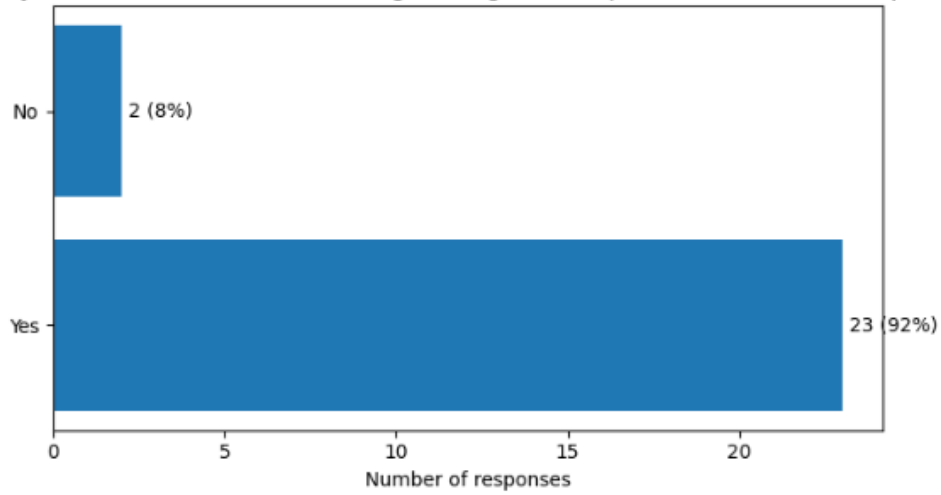


Figure 4: Distribution of participants based on shortages encountered in the past 12 months.

If yes, how many shortages have you observed on average? (25 responses)

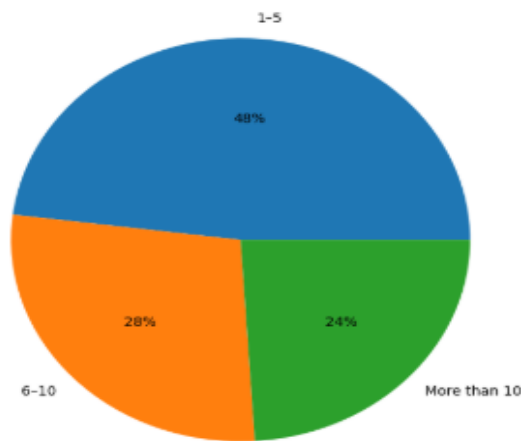


Figure 5: Distribution by average number of shortages observed.

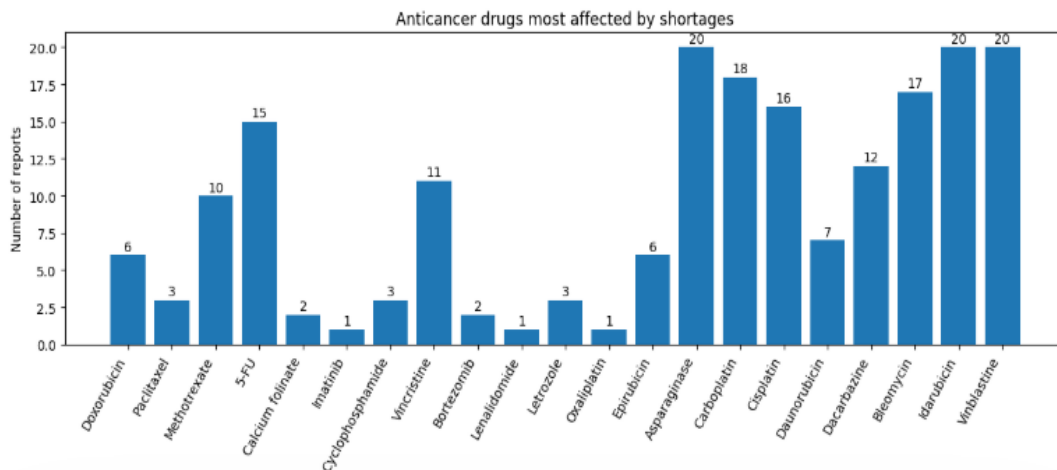


Figure 6: Distribution of anticancer drugs most affected by shortages.

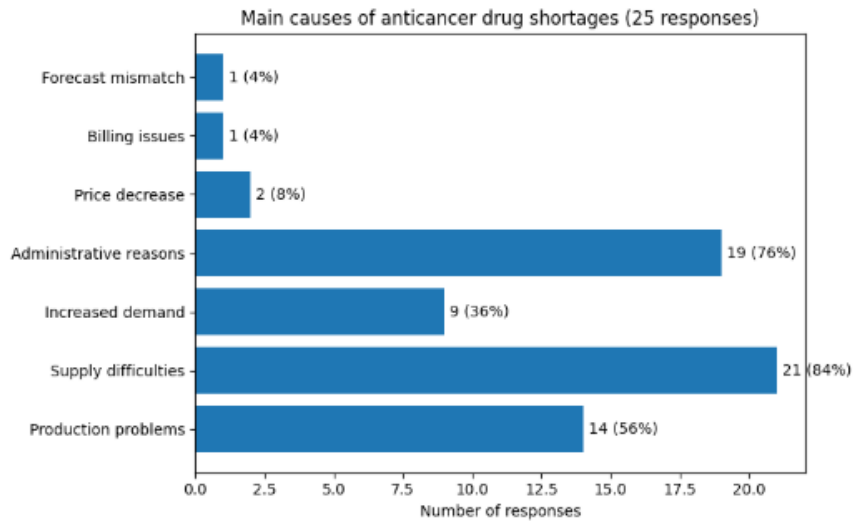


Figure 7: Distribution of main causes explaining anticancer drug shortages

Impact of disruptions on patient care

To what extent have stock shortages affected your patients' treatment? (25 responses)

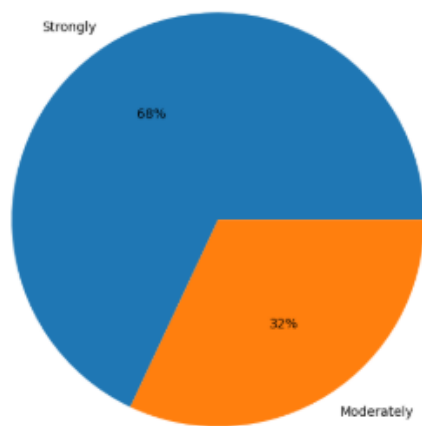


Figure 8: Impact of anticancer drug shortages on patient treatment.

Have stock shortages led to treatment delays? (25 responses)

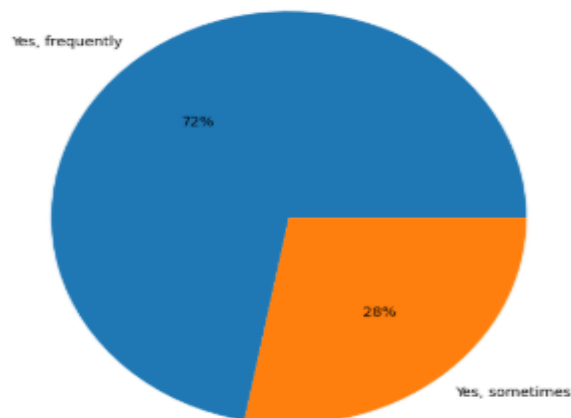


Figure 9: Impact of anticancer drug shortages on treatment delays.

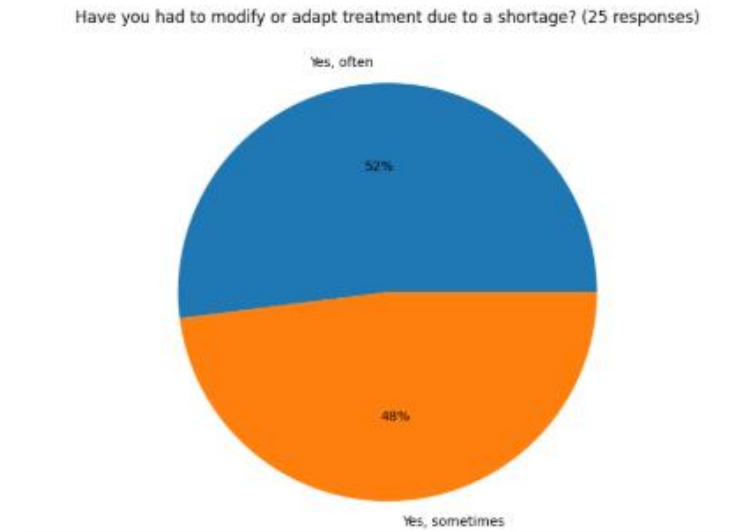


Figure 10: Treatment adjustments due to anticancer drug shortages.

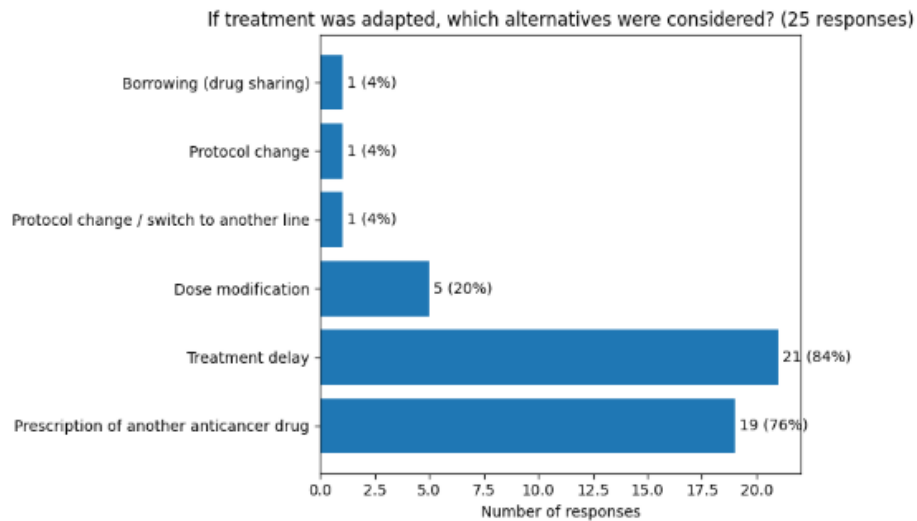


Figure 11: Alternatives considered for adapting anticancer treatment.

Consequences on patients

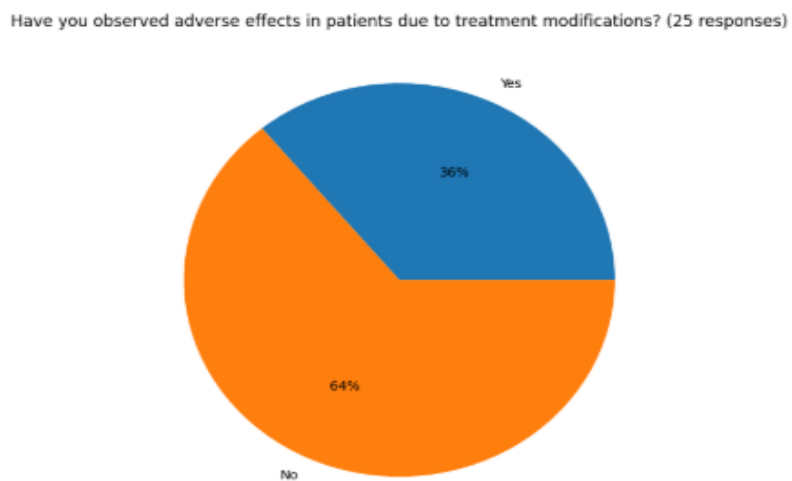


Figure 12: Distribution of participants according to adverse effects observed after treatment changes

Do stock shortages have a financial impact? (25 responses)

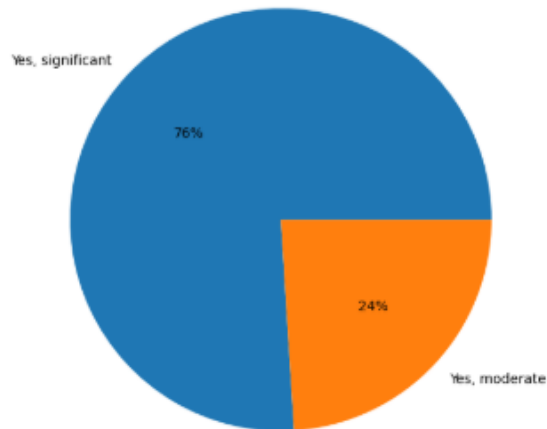


Figure 13: Distribution of participants by perceived financial impact.

Do stock shortages have a psychological impact on patients? (25 responses)

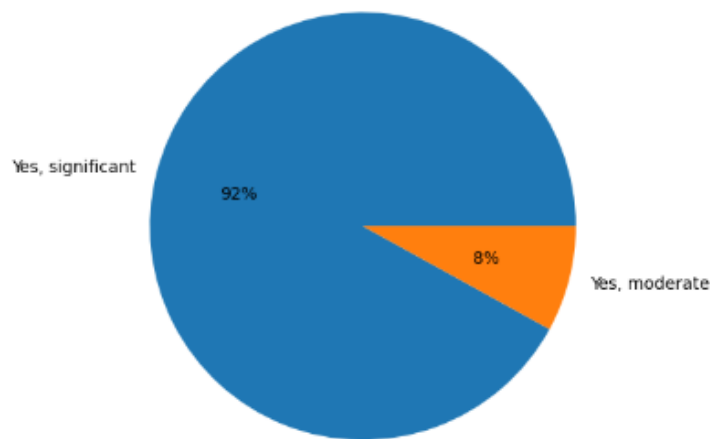


Figure 14: Distribution of participants by psychological impact on patients.

If yes, what reactions have you observed? (25 responses)

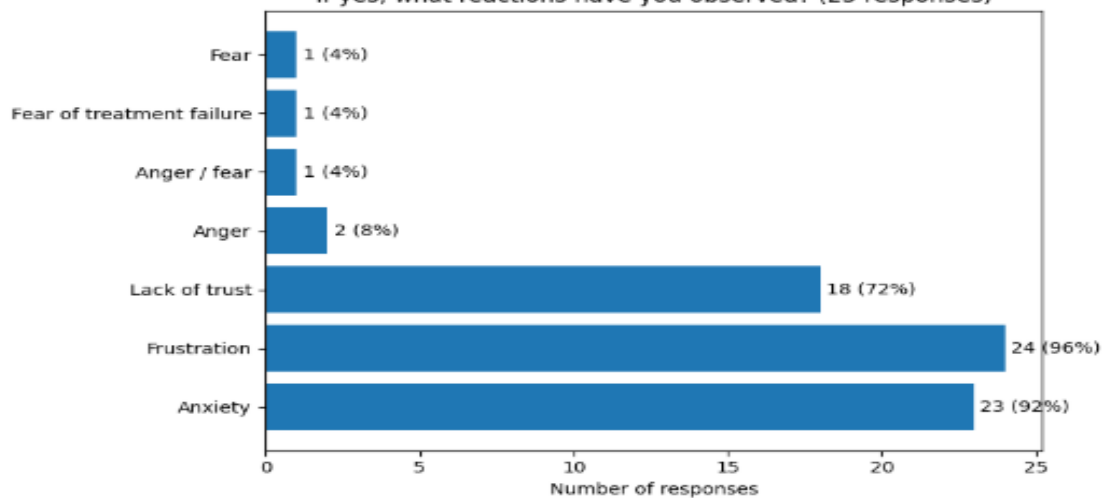


Figure 15: Patient reactions to anticancer drug shortages.

Are you informed about shortages and supply tensions? (25 responses)

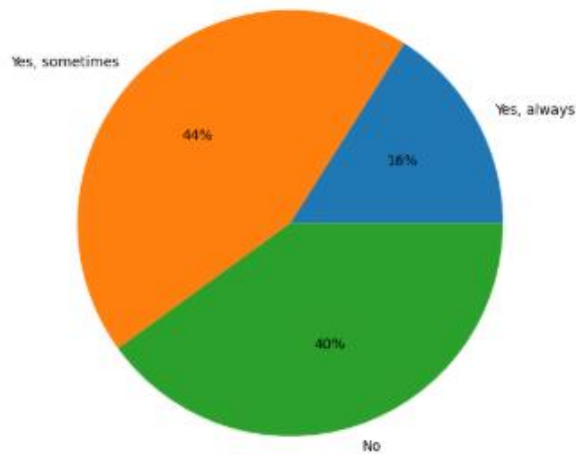


Figure 16: Participant awareness of anticancer drug shortages and supply tensions.

Who informs you about stock shortages? (25 responses)

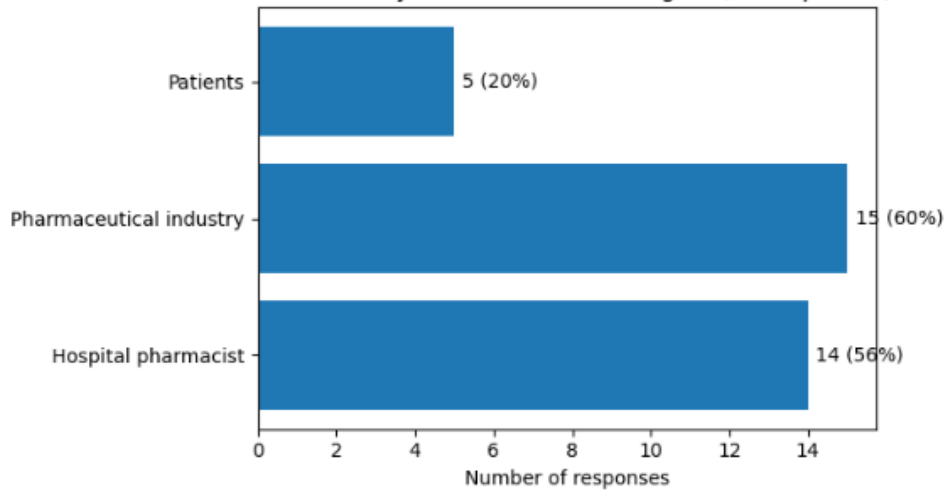


Figure 17: Feedback received regarding anticancer drug shortages.

Do you have information on the duration of shortages? (25 responses)

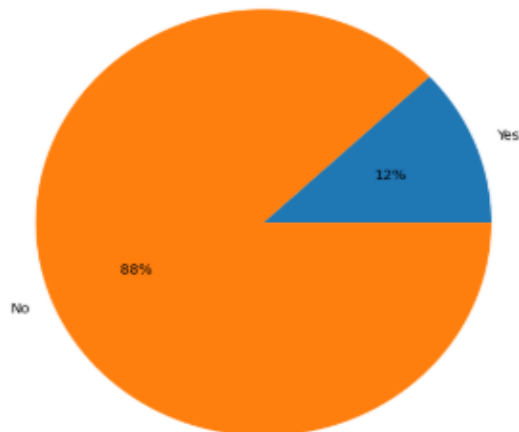


Figure 18: Information available on the duration of anticancer drug shortages.

Solutions and recommendations

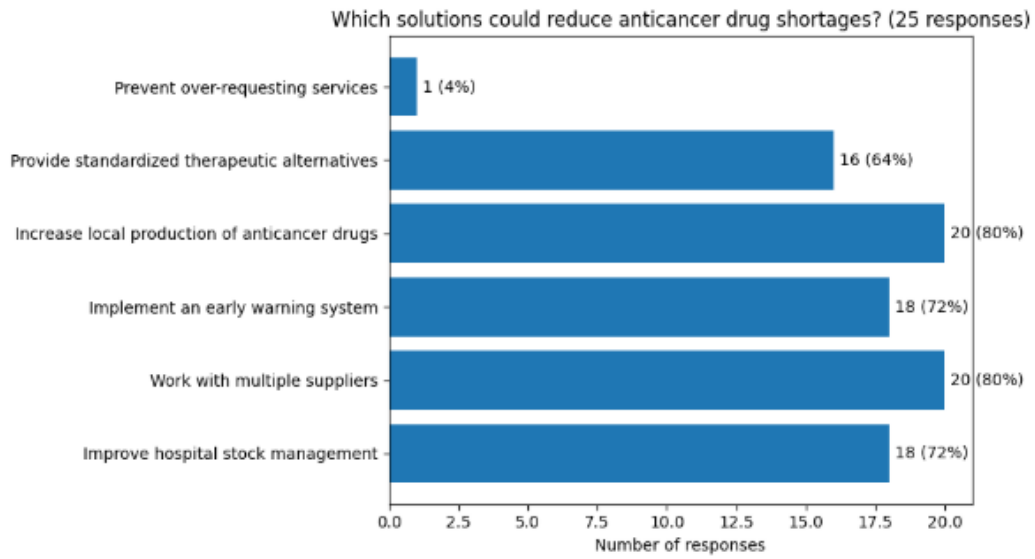


Figure 19: Solutions and recommendations to reduce anticancer drug shortages.

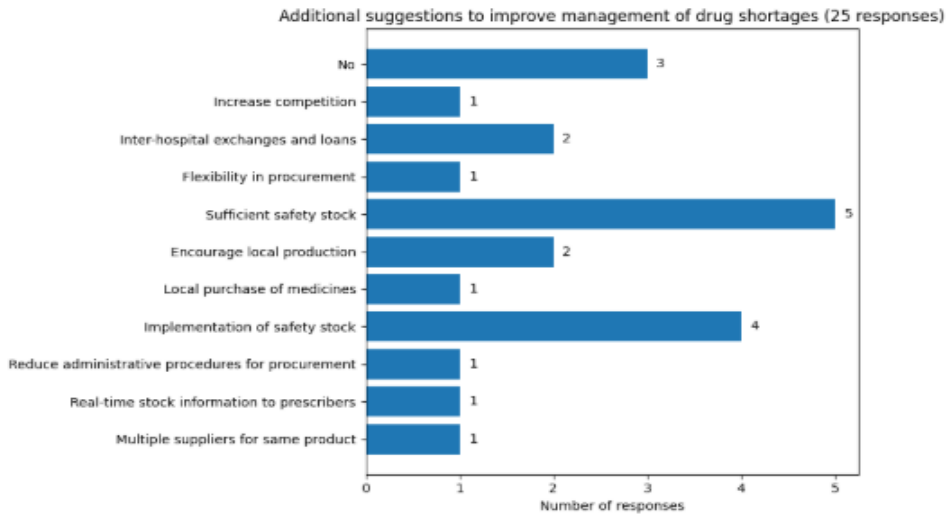


Figure 20: Participant suggestions to improve management of anticancer drug shortages.

Would you support training or regular information on stock shortage management? (25 responses)

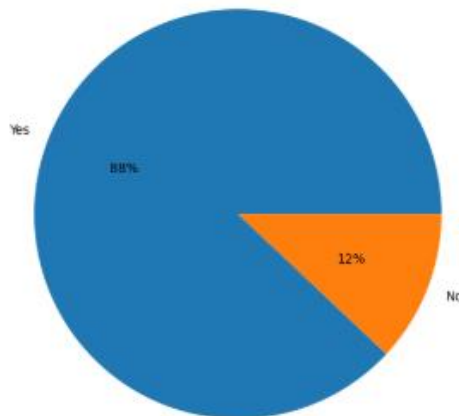


Figure 21: Participants opinions on the need for regular information on stock shortage management.,

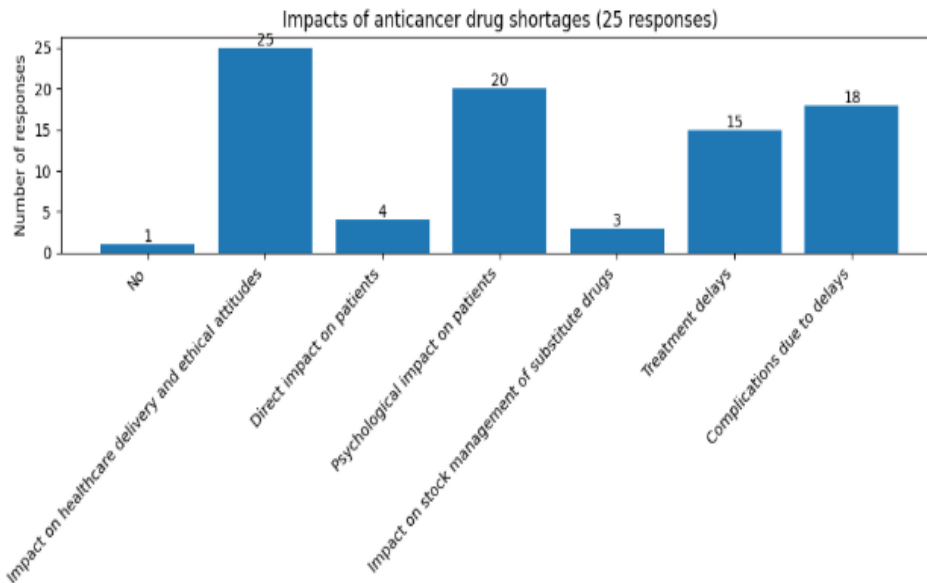


Figure 22: Additional participant comments on anticancer drug shortages and their impact.

V. DISCUSSION

This survey provides valuable and concrete insight into the reality of anticancer drug shortages and their consequences. The findings are consistent with those widely reported in the international literature, while also offering specific details on challenges encountered in real-world practice. This discussion aims to compare our results with existing data, analyze their convergence and implications, and highlight the importance of the proposed solutions.

1. Prevalence and frequency of shortages: a growing global phenomenon

One of the most striking findings of our survey is the near-universal nature of the issue: almost all pharmacists reported experiencing anticancer drug shortages over the past 12 months, with a significant proportion reporting more than 10 shortages during the same period.

These findings are fully consistent with reports from health authorities. The French National Agency for Medicines and Health Products Safety (ANSM), in its annual reports, has repeatedly warned of the continuous increase in shortages and risks of shortages involving essential medicines, particularly anticancer drugs. This issue is not limited to France. Studies conducted in the United States by Fox et al.^[5] already describe drug shortages as a “complex healthcare crisis,” while the European Medicines Agency (EMA) regularly highlights vulnerabilities in medicine supply chains, including anticancer drugs. The high prevalence observed in our study confirms that shortages are not isolated events but rather a systemic and recurring problem.

2. Causes of shortages: alignment with the literature

Our survey identified the main causes of shortages as perceived by hospital pharmacists. The results place “production issues” and “supply difficulties” at the

forefront, followed by “administrative reasons” and “price reductions.” This ranking closely reflects findings reported in the scientific literature.

Global supply chains are increasingly complex and fragile. Studies by Bogaert et al.^[6] and De Weerd et al.^[7] highlight how the concentration of production in a limited number of sites—often located in high-risk regions—combined with just-in-time inventory strategies aimed at reducing costs, creates significant vulnerability. A quality issue at a single production site can rapidly lead to a global shortage.

Economic factors also play a major role. Low profit margins for generic or older drugs—which represent a large proportion of anticancer agents—discourage manufacturers from maintaining continuous production or investing in backup production lines. Administrative factors (such as tendering processes and procurement delays) further point to governance and coordination challenges among stakeholders.

3. Impact on clinical management: significant consequences

The findings clearly demonstrate the impact of shortages on patient care pathways. Most participants reported that shortages had a “strong” or “moderate” impact on treatment and led to delays. The most immediate consequence is treatment modification or adaptation, reported by the vast majority of respondents.

These adaptations are consistent with strategies described in the literature. Substitution with another anticancer drug is the most common approach but carries risks, including reduced efficacy, increased toxicity, or lack of evidence in certain indications. Treatment delays represent another serious consequence that may compromise prognosis, particularly in aggressive

cancers. Dose modification is also a risky strategy, as it may deviate from evidence-based protocols. The literature emphasizes that such adjustments are often made without strong clinical evidence, placing clinicians in situations of therapeutic uncertainty.

4. Human and financial consequences: an increased burden

Beyond clinical implications, our survey highlights the significant human and financial burden associated with drug shortages. Participants reported a major psychological impact on patients, including anxiety, frustration, and loss of trust.

These findings are supported by qualitative studies showing that uncertainty regarding treatment, fear of reduced effectiveness, and perceptions of injustice contribute to substantial psychological distress. This burden adds to the already significant emotional stress associated with a cancer diagnosis. Financial impacts were also frequently reported, resulting from the use of more expensive alternatives, increased hospitalizations due to adverse effects, and prolonged treatment durations.

5. Weaknesses in information and management systems

A key finding of our survey is the lack of adequate information and communication regarding shortages. Nearly half of participants reported not always being informed about supply tensions, and an even larger proportion lacked information about the expected duration of shortages.

Hospital pharmacists appear to be the primary source of information, highlighting both their central role and the absence of structured, reliable communication systems. This aligns with recommendations from the World Health Organization (WHO) and ANSM, which advocate for improved transparency and mandatory early reporting by manufacturers. Without timely and reliable information, healthcare institutions cannot anticipate shortages, plan alternatives, or communicate effectively with patients.

6. Alignment of proposed solutions with international strategies

The solutions proposed by participants are highly relevant and align with major strategic approaches identified in the literature and by health authorities. This reinforces the need for coordinated action.

Three main categories of solutions emerge.

- **Stock management and supplier diversification:** Improving inventory management and working with multiple suppliers reflects recommendations to diversify supply sources and establish strategic reserves.
- **Anticipation and transparency:** The implementation of early warning systems is essential

and aligns with regulatory policies requiring manufacturers to notify authorities in advance of potential shortages.

- **Therapeutic alternatives:** Establishing consensus-based therapeutic alternatives is crucial. Clinicians need validated substitution protocols to avoid inconsistent and potentially unsafe decisions. Collaborative efforts between scientific societies, regulatory agencies, and clinicians are essential to develop standardized substitution guidelines.

VI. SOLUTIONS AND RECOMMENDATIONS

Shortages of anticancer drugs represent a major public health challenge, compromising continuity of care and patient survival. Addressing this issue requires a comprehensive approach that combines improvements in production policies, optimization of stock management, stakeholder collaboration, and international cooperation.

1. Improvement of production and distribution policies

Better coordination between health authorities, pharmaceutical manufacturers, and healthcare institutions is essential to prevent shortages.

First, strengthening collaboration between regulatory authorities and manufacturers helps anticipate potential supply disruptions. This relies on regular information exchange regarding production capacity, logistical constraints, and timelines. Governments can also support production through financial incentives, particularly for complex or low-profit medicines.

Second, diversification of supply sources is a key strategy. Developing local production reduces dependence on global supply chains, while promoting generic medicines helps expand availability, reduce costs, and secure supply.

In addition, improving stock management and distribution systems is crucial. Establishing strategic emergency reserves enables rapid response to crises. At the same time, the use of forecasting tools based on consumption data and predictive analytics helps anticipate future needs. Optimizing distribution networks ensures more equitable access, particularly in remote areas.

Finally, strengthening regulatory frameworks and transparency is essential. Manufacturers should be required to report anticipated shortages, and regular audits should be conducted to ensure compliance with production and quality standards.

2. Stock management strategies

Effective inventory management is critical to ensure the availability of anticancer drugs.

Collaboration among healthcare professionals (physicians, pharmacists, and managers) allows better

anticipation of needs based on therapeutic developments. Information sharing between hospitals and pharmacies improves coordination and helps reduce local shortages.

Logistical optimization relies on a balance between centralized and decentralized stock systems. Strategic reserves should be centralized to address emergencies, while healthcare facilities must maintain stocks tailored to their specific needs.

The integration of advanced technologies (information systems, barcodes, RFID) enables real-time tracking of medications, reducing errors and improving traceability.

Risk management is also essential. It includes supplier diversification, contingency planning, and the implementation of emergency protocols. In addition, strict quality control must be ensured through appropriate storage conditions and regular monitoring.

Finally, continuous staff training and awareness of ethical stock management practices are necessary to guarantee equitable distribution during shortages.

3. Collaboration with manufacturers and suppliers

Close cooperation between healthcare institutions and pharmaceutical companies is essential to ensure a stable supply. Healthcare providers must offer reliable forecasts of their needs, while long-term supply agreements can help secure access to essential medicines.

4. Development of alternative solutions

In the event of shortages, it is crucial to have access to alternative treatment options. Therapeutic protocols should remain flexible to allow the use of substitutes or generic medicines without compromising treatment effectiveness.

The promotion of generic medicines is a viable solution, provided that quality and efficacy standards are strictly maintained.

5. Communication and patient follow-up

Drug shortages also have a psychological impact on patients. Clear and transparent communication is essential to explain shortages and available alternatives. Psychological support should be provided, along with personalized medical follow-up to assess the effects of treatment changes and adjust therapeutic strategies when necessary.

6. International cooperation

As anticancer drug shortages are a global issue, strengthened international cooperation is essential. This involves harmonizing regulations, sharing resources, and coordinating responses to crises.

VII. CONCLUSION

In conclusion, the findings of our survey are highly consistent with international literature. They confirm that

anticancer drug shortages are a frequent and multifactorial phenomenon with significant consequences at multiple levels: clinical (treatment delays and suboptimal adaptations), human (stress, anxiety, loss of trust), and organizational (crisis management challenges).

The study also highlights weaknesses in information systems and the urgent need for concrete solutions. The alignment between field-based recommendations and strategies proposed by health authorities and the scientific literature underscores the necessity for coordinated action.

These findings support the rapid implementation of ambitious public health policies aimed at securing the anticancer drug supply chain, enhancing transparency, and equipping healthcare professionals to manage these critical situations. This is essential to ensure equitable and continuous access to life-saving treatments for patients.

Only a collective response, supported by further research and preventive strategies, will reduce the impact of these shortages and guarantee consistent access to essential anticancer therapies.

BIBLIOGRAPHICAL REFERENCES

1. Bray F. et al. (2018) – Global cancer statistics 2018: GLOBOCAN estimates of incidence and mortality.
2. Gatesman M.L. & Smith T.J. (2011) – *The shortage of essential chemotherapy drugs in the U.S.*
3. Marissa Malta, Matthieu Christian, Amy B Cadwallader(2025)- Penuries de médicaments en oncologie : impacts, réformes politiques et impératifs de plaidoyer doi : 10.1097/PPO.0000000000000784
4. Abby Alpert 1, Mireille Jacobson (2019)- Impact des pénuries de médicaments oncologiques sur le traitement de la chimiothérapie. doi: 10.1002/cpt.1390
5. Fox, ER, Sweet, BV, Jensen, V (2014) Drug shortages: A complex health care crisis. *Mayo Clinic Proceedings*, 89(3): 361-373.
6. Bogaert, P, Bochenek, T, Prokop, A. (2015) A qualitative approach to a better understanding of the problems underlying drug shortages. *PLoS one*, 10(5): e0125691
7. De Weerd, E, Simoens, S, Casteels, M. (2017) Clinical, economic and policy implications of drug shortages in the European Union. *Applied Health Economics and Health Policy*, 15(4): 441-445.

APPENDIX**Questionnaire on Anticancer Drug Shortages**

Objective of the questionnaire: This questionnaire aims to assess the impact of anticancer drug shortages on patient care and to identify measures that could be implemented to mitigate these impacts.

General Information

1. Institution.
2. Medical specialty.
3. Years of experience in prescribing anticancer drugs.

Section 1: Experience with Anticancer Drug Shortages

5. Over the past 12 months, have you encountered shortages of anticancer drugs?
 - Yes
 - No
6. If yes, how many shortages have you observed on average?
 - 1–5
 - 6–10
 - More than 10
7. Which anticancer drugs were mainly affected? (List of drugs or free-text response)
8. In your opinion, what are the main causes of these shortages? (Select all that apply)
 - Production issues
 - Supply difficulties
 - Increased demand
 - Administrative reasons (e.g., tendering processes, order delays)
 - Price reductions
 - Other (please specify): _____

Section 2: Impact of Shortages on Patient Care

9. To what extent have stock shortages affected your patients' treatment?
 - Very strongly
 - Moderately
 - Slightly
 - No impact
10. Have stock shortages led to treatment delays?
 - Yes, frequently
 - Yes, sometimes
 - Rarely
 - Never
11. Have you had to modify or adapt treatment due to a shortage?
 - Yes, often
 - Yes, sometimes
 - No

12. If treatment was adapted, which alternatives were considered?
 - Prescription of another anticancer drug
 - Treatment delay
 - Dose modification
 - Other (please specify): _____

Section 3: Consequences for Patients

13. Have you observed adverse effects in patients due to these treatment modifications?
 - Yes
 - No
14. In your opinion, do stock shortages have a financial impact?
 - Yes, significant
 - Yes, moderate
 - No
15. In your opinion, do stock shortages have a psychological impact on patients?
 - Yes, significant
 - Yes, moderate
 - No
16. If yes, what reactions have you observed? (e.g., anxiety, frustration, lack of trust, etc.)
17. Are you informed about shortages and supply tensions?
 - Yes, always
 - Yes, sometimes
 - No
18. Who informs you about stock shortages?
 - Hospital pharmacist
 - Pharmaceutical industry
 - Patients
 - Other: _____
19. Do you have information on the duration of shortages?
 - Yes
 - No

Section 4: Solutions and Recommendations

20. In your opinion, which solutions could reduce anticancer drug shortages?
 - Improve hospital stock management
 - Work with multiple suppliers
 - Implement an early warning system
 - Increase local production of anticancer drugs
 - Provide standardized therapeutic alternatives from competent authorities
 - Other (please specify): _____
21. Do you have any additional suggestions to improve the management of drug shortages? (Free-text response)

22. Would you support training or regular information on stock shortage management?

- Yes
- No

Additional Comments

23. Would you like to add any comments regarding anticancer drug shortages and their impact?
(Free-text response)