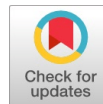


# Statistical Overview of Drug Shortage in Syria

Reem Antakly, Fatima Najjar, Ayat Abboud



**Abstract:** Access to medications is a fundamental aspect of healthcare and vital for human well-being. Medicine shortages are widespread and impact countries across all income levels. This research aimed to monitor the characteristics of drug shortages in Syria through a distributed survey. 76% of the sample were females. 88.9% of the sample were 20-29 years old. A high percentage of the participants were single (86.6%). 62% were students. Pharmacy is the profession or field of study for most participants (83.4%). Half of the participants live in the city (51%). Most participants work at a local pharmacy. The majority (79.5%) have fewer than 5 years of experience. Most participants were well-informed about medication shortages and personally experienced the impact of this issue in their professional or personal lives. A shortage of baby supplies, specifically baby milk, was reported by 70.33% of the surveyed parents. Tablets and capsules are the pharmaceutical formulations that experience shortages most commonly. Shortages were reported in all categories of medications. Participants identified the shortage of raw materials and low profit margins as significant factors contributing to drug shortages. Further research into drug shortages in Syria is warranted to address this issue.

**Keywords:** Drug Shortage, Syria, Knowledge, Survey

## I. INTRODUCTION

Medicine shortages are widespread and impact countries of all income levels, from low to high [1]. Numerous countries have devised varied approaches to address this issue [2].

Various medications, including essential life-saving drugs [3], cancer treatments [4], antibiotics [5], analgesics [6], heart medications [7], radiopharmaceuticals [8], and injectable products, are at risk of short supply [9].

The Food and Drug Administration (FDA) describes a drug shortage as when there isn't enough supply of a specific medication to meet the demand at the user level [10].

The definition of drug shortages can vary depending on regulatory authorities [11]. Drug shortages can be attributed to two main factors: the demand side [12] and the supply side [13].

Among all types of pharmaceutical forms [14],

sterile injectable medications are more susceptible to shortages than others [15].

Medication shortages can have various effects [16], particularly on individuals who rely on them for their health [17]. Patients experience challenges such as heightened monitoring [18], inadequate treatment with alternative therapies [19], delayed medical care [20], transferring to different facilities [21], longer hospital stays [22], readmissions due to adverse events or treatment failures [23], and possible fatalities [24]. No matter the reason behind it [25], the consequences of medicine shortages are far-reaching, impacting numerous healthcare professionals [26].

Various factors may contribute to drug shortages [27]. Due to the complexity of drug production [28], the main reason for drug shortages is often unclear [29]. Additionally, these shortages can have widespread impacts on various parties involved [30], including financial and reputational consequences [31].

The medication shortage can impact patients' outcomes [32], including their medical and financial situation, because of fluctuating costs [33]. The drug shortage could also affect community and hospital pharmacies and physicians less knowledgeable about alternative medications [34].

In recent years, Syria has faced drug shortages due to inadequate local pharmaceutical production [35], heavy dependence on imported medications [36], and a poorly developed supply chain management system [37]. These issues have prompted the healthcare sector in Syria to recognize the urgent need to address and prevent drug shortages [38].

Few research studies have been conducted on the issue of drug shortages in Syria [39]. This study aimed to analyze the specific characteristics of drug shortages in Syria and assess Syrians' understanding of them.

## II. METHODS

A survey was circulated on social media between March and April 2024 to assess Syrians' understanding of the medication shortage. The research study contained various questions to gather information on the participants' demographic details and evaluate their knowledge about medication shortage.

## III. RESULTS

### A. Demographic Attributes of Participants

This study included a total of 208 responses. Table I displays the demographic attributes of the participants.

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**Table 1: Demographic Characteristics of Participants in the Survey**

Demographic Characteristics		Total Number of Participants (208)	%
1. Age	20-29 years	185	88.90%
	30-39 years	14	6.70%
	40-49years	8	3.80%
	50-59years	0	0%
	>60 years old	1	0.50%
2. Sex	Male	50	24%
	Female	158	76%
3. Social situation	Single	180	86.80%
	Married	27	13.20%
4. profession	Student	129	62%
	Employee	12	5.80%
	Self-employment	67	32%
5. Is your profession or study related to healthcare?	Pharmacist	131	83.40%
	Doctor	20	12.70%
	Nurse	6	3.80%
6. Place of residence	City	106	51%
	Village	102	49%
7. Place of Work	Community Pharmacy	120	82.20%
	Hospital Pharmacy	0	0%
	Hospital	19	13.10%
	Clinic	6	4.10%
8. How many years of experience do you have?	<5 years	132	79.50%
	5-10 years	22	13.30%
	11-15 years	5	3%
	>15 years	7	4.20%

The survey included participants from different age categories. The largest group of participants was within the 20- to 29-year-old age range, making up 88.9% (185 participants).

The study included 50 males, accounting for 24% of the participants, and 158 females, making up 76% of the participants. Most participants, 86.8% (180), were in a single social situation. 62% (129) of the participants were students. For most participants, with 83.4% (131), pharmacy is the profession or field of study. 51% (105) of the participants live in the city, which accounts for half of the total participants. Most participants work at a local pharmacy. Most participants, 79.5% (132), have fewer than 5 years of experience.

**B. Participants' Knowledge about Medication Shortage**

Table II shows the survey results regarding the knowledge about medication shortage among the surveyed participants.

**Table 2: Knowledge of Participants in the Survey about Medication Shortage**

Questions	Options	Total Number of Participants (208)	%
9. Are you aware of the drug shortage?	Yes	197	94.70%
	No	11	5.30%
10. Is drug shortage a problem at work or at home?	Yes	185	88.90%
	No	23	11.10%
11. How many times have you experienced a shortage of medication?	Daily	74	35.60%
	Weekly	46	22.10%
	Monthly	42	20.20%
	Rarely	22	10.60%
	Not sure	24	11.50%

12. Are you a parent experiencing a shortage of baby supplies?	Yes	19	70.37%
	No	8	29.63%
13. What was the type of baby supplies in shortage?	Milk	150	98.70%
	Baby food	17	11.20%
	Diaper	17	11.20%
14. Do you agree with the statement: The shortage of medicines where I live/work harms patient care?	Strongly agree	134	64.40%
	Agree	72	34.60%
	Disagree	1	0.50%
	Strongly disagree	1	0.50%
15. Have the patients been inconvenienced by the availability of medications?	Yes	202	99.50%
	No	1	0.50%

94.7% (197) of the participants were aware of medication shortage, while 5.3% (11) reported no awareness. 185 respondents, representing 88.90%, reported drug shortages at their workplace or home.

Regarding the number of times the surveyed participants experienced a shortage of medicines, 35.6% encountered this issue daily, whereas approximately 20% experienced it weekly or monthly.

Of the participating parents, 70.33% (19) faced shortages of baby supplies. The major issue identified by 98.7% of surveyed parents was the shortage of baby milk.

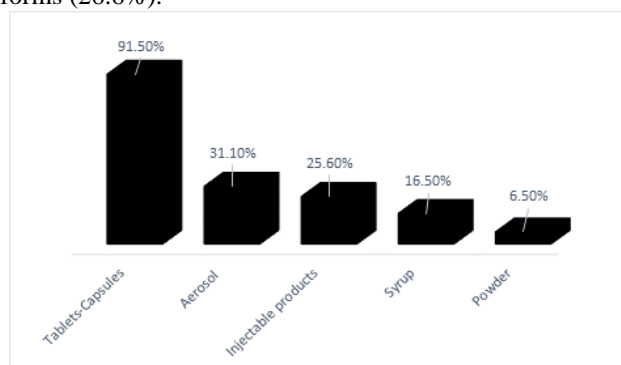
64.40% of participants agreed with the statement ‘drug shortages adversely impact the patient care system’. All participants knew that the lack of medication availability had caused serious problems for the patients.

**IV. DISCUSSION**

This study aimed to evaluate the knowledge about medication shortages in Syria.

Drug shortages may arise from several factors, such as problems in medication manufacturing and quality [40], delays in medication manufacturing [41], and discontinuations of medication production [42].

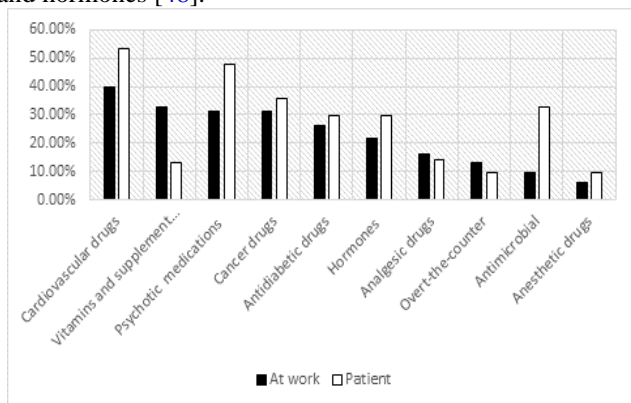
The results monitored the shortages in various medication dosage forms (Figure 1). The participants indicated that the highest shortage was observed in tablets and capsules (91.5%), followed by inhaled forms (31.1%), and injectable forms (26.6%).



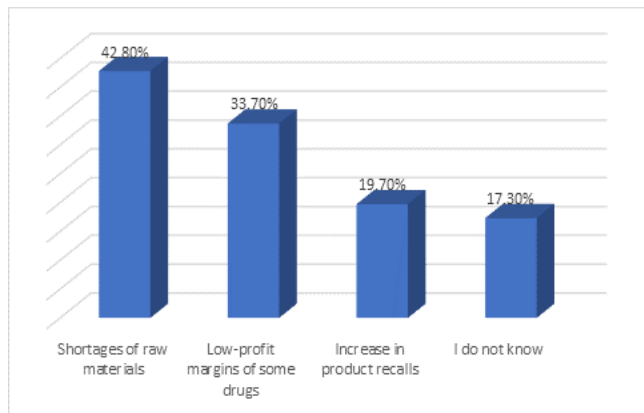
**[Fig.1: Participants' Responses Regarding the Question: What was the Type of Medications in Shortage? (Multiple Options Available)]**



In the workplace or as a patient, the study revealed that the shortage included different categories of medications: cardiovascular, psychiatric, anti-cancer, and antidiabetic medications (Figure 2). The most prevalent shortages occurred in cardiovascular drugs, followed by psychotic drugs, anti-cancer medications, antidiabetics, and hormones, accounting for more than 30%. These results are consistent with the obtained findings of a study performed in Columbia [43]. This study reported a shortage of several categories of drugs including cardiovascular medications, nervous system medications, and antitumor medications. Many studies showed shortages of cardiovascular drugs [44], psychotic drugs [45], anti-cancer medications [46], antidiabetics [47], and hormones [48].



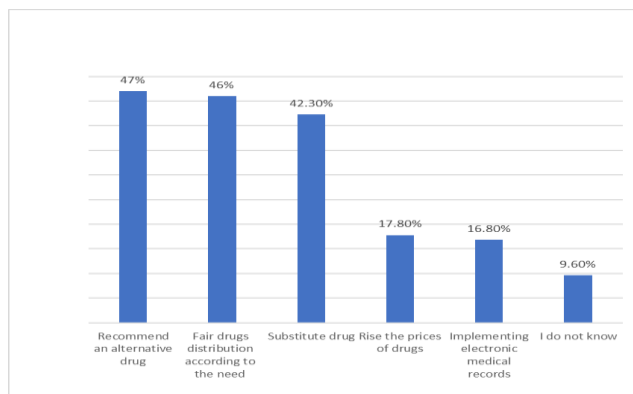
[Fig.2: Participants' Responses Regarding the Question: What is the Main Area of Medicine with the most Shortages at Work or as Patients? (Multiple Options Available)]



[Fig.3: Responses of Participants Regarding the Question: in your Opinion, what are the Reasons for Medication Shortage? (Multiple Options Available)]

Several manufacturing challenges could lead to medication shortages, such as limited availability of raw materials [49], narrow profit margins and a rise in drug recalls [50]. Participants identified two primary reasons for medication shortages in Syria (Figure 3): 42.8% cited a scarcity of raw materials, while 33.7% attributed the issue to low profit margins [51].

Various strategies can be suggested to alleviate the problem of medication shortages [52]. The findings indicated that recommending alternative medications (47%), adjusting distribution based on demand (46%), and substituting medications (42.3%) were identified as effective strategies for reducing medication shortages (Figure 4).



[Fig.4: Participants' Responses Regarding the Question: in your Opinion, what are the Strategies that can Lead to Decreasing the Issue of Medication Shortages? (Multiple Options Available)]

## V. CONCLUSION

Medication shortages are a very serious problem in many countries including Syria. A survey was conducted among Syrians to assess their knowledge about this problem. Tablets and capsules are the most common pharmaceutical forms impacted by shortages. Unfortunately, shortages were reported across all medication categories. It is imperative to implement multiple preventive measures to prevent drug shortages. Healthcare professionals should use alternative drugs to manage any unexpected shortages in medication supply effectively.

## DECLARATION STATEMENT

After aggregating input from all authors, I must verify the accuracy of the following information as the article's author.

- **Conflicts of Interest/ Competing Interests:** Based on my understanding, this article has no conflicts of interest.
- **Funding Support:** This article has not been sponsored or funded by any organization or agency. The independence of this research is a crucial factor in affirming its impartiality, as it has been conducted without any external sway.
- **Ethical Approval and Consent to Participate:** The data provided in this article is exempt from the requirement for ethical approval or participant consent.
- **Data Access Statement and Material Availability:** The adequate resources of this article are publicly accessible.
- **Authors Contributions:** The authorship of this article is contributed equally to all participating individuals.

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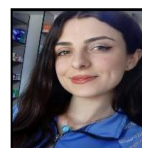
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