



EXAMINING ALBUMIN CONSUMPTION TRENDS IN THE INTENSIVE CARE UNITS OF THE JORDANIAN ROYAL MEDICAL SERVICES HOSPITALS

Mai Mohammad Faleh Alfalahat¹, Ayat Yousef Hussein Alkawakzeh¹, Baraa Mohammad Faleh Al Falahat¹,
Mohammad Abdelhalim Ahmad Al-Shakhatreh², Hosam Mohd Karim Ayed Alshurafa².

¹Pharmacist, Royal Medical Services, Jordan.

²MD, Royal Medical Services, Jordan.

Submitted on: 29.02.2024;

Revised on: 05.03.2024;

Accepted on: 10.03.2024

ABSTRACT:

Introduction: Albumin is indispensable in managing a spectrum of critical medical conditions. It performs vital functions as a colloid solution, including preserving plasma volume, applying osmotic pressure, and assisting in the movement of vital materials throughout the circulatory system. Its therapeutic significance extends to situations where maintaining and restoring an appropriate blood volume is critical, such as severe sepsis, trauma, and liver cirrhosis. Owing to its diverse applications, it is essential to have a sophisticated understanding of albumin consumption trends in intensive care units (ICUs). This kind of information is useful not only for customizing treatment plans to meet the demands of individual patients but also for wisely allocating healthcare resources so that this priceless drug is used to its fullest potential in order to improve patient outcomes and overall healthcare efficiency.

Objective: The primary objective of this study is to analyze and interpret the trends in albumin consumption within the ICUs of the Jordanian Royal Medical Services Hospitals during the years 2019, 2020, and 2021. By examining the annual variations in albumin usage, we aim to identify valuable insights to enhance resource management in intensive care settings.

Methodology: To achieve our objectives, we conducted a comprehensive retrospective analysis of albumin consumption data obtained from the Jordanian Royal Medical Services Hospitals electronic records for the years 2019, 2020, and 2021. The data set includes specific information on the quantity of albumin administered in each respective year. The findings from this study aim to inform healthcare professionals, administrators, and policymakers about the patterns of albumin consumption, facilitating informed decision-making for resource allocation and patient care strategies within the ICU setting.

Keywords: Albumin, Intensive Care Units, Jordanian Royal Medical Services Hospitals, Critical Care, Trends, Medical Resource Utilization, Albumin Consumption.

Corresponding author: Mai Md Faleh Alfalahat

E-mail: maialfalahat23@gmail.com

Mobile no: +962 7 9784 0490

Indian Research Journal of Pharmacy and Science; 38(2024)2968-2973;

Journal Home Page: <https://www.irjps.in>

1. INTRODUCTION:

1.1 Background

It is impossible to overestimate the importance of albumin in medical treatment. This vital protein is involved in fluid balance regulation, colloidal osmotic pressure maintenance, and the transit of different chemicals in the bloodstream^[1,4,5]. Albumin administration is a frequently used therapeutic strategy in the context of intensive care units (ICUs), where patients frequently experience significant physiological instability^[2,3]. Comprehending the patterns of albumin consumption in the intensive care units of Jordanian Royal Medical Services Hospitals is essential for optimizing medical procedures, improving patient outcomes, and effectively managing healthcare resources.

1.2 Rationale

The rationale for investigating albumin consumption trends lies in the potential impact on patient outcomes and healthcare costs. Because albumin is an expensive and valuable resource, it must be used carefully to ensure the best possible patient care within the confines of healthcare financial resources^[8,9]. By examining the patterns of albumin consumption healthcare professionals and administrators can find areas for improvement, carry out focused interventions, and make well-informed decisions to improve the overall quality of care in intensive care units^[10,11].

1.3 Research Question and Objectives

This study's main research question is: How has albumin consumption varied over the last three years in the intensive care units of the Jordanian Royal Medical Services Hospitals? In order to respond to this inquiry, the following goals have been established:

- In order to analyze trends by hospital, Examining the annual albumin consumption patterns within each hospital, including: Princess Haya Military Hospital (PHMH), Prince Ali bin Al Hussein Military Hospital (PABHH), Prince Hashem bin Al Hussein Hospital (PHBHH), King Hussein Medical Hospital (KHHM), Queen Alia Heart Institute (QAHI), King Talal Military Hospital (KTMH), Queen Rania Pediatric Hospital (QRPH), and Prince Hashem bin Abdullah II Hospital (PHBAH).

- To evaluate general trends: Analyzing the overall quantity of albumin consumed in each of the hospitals selected to find broader trends that might go beyond particular institutional characteristics.
- To interpret results: Providing a thorough analysis of the data, taking into account any variables that can affect albumin consumption, and discuss how the trends we will observe may affect patient care and the allocation of resources.

1.4 Significance of the Study

The possible implications of this study for clinical practices, resource allocation strategies, and the general improvement of critical care in Jordanian Royal Medical Services Hospitals make it significant. Through an understanding of albumin consumption patterns, this study aims to close the knowledge gap between theory and practice, promoting evidence-based decision-making in the delicate field of healthcare.

2. METHOD:

2.1 Hospital Selection and Time Frame

In order to guarantee a thorough assessment of albumin consumption patterns, a deliberate selection of hospitals from the Jordanian Royal Medical Services was carried out. The chosen hospitals serve a variety of patient demographics and offer a wide range of specializations. The following hospitals make up the scope of this study: Princess Haya Military Hospital, Prince Ali bin Al Hussein Military Hospital, Prince Hashem bin Al Hussein Hospital, King Hussein Medical Hospital, Queen Alia Heart Institute, King Talal Military Hospital, Queen Rania Pediatric Hospital, and Prince Hashem bin Abdullah II Hospital.

This study spans from 2019 and 2021. A three-year period was chosen in order to keep track of any long-term patterns or fluctuations in albumin usage within the identified hospitals.

2.2 Data Collection

The study's data were obtained from the selected hospitals electronic records, guaranteeing their authenticity and consistency. Data on albumin use by hospital was gathered for each year (2019–2021). A

detailed examination of albumin consumption in each hospital during this time is shown in Table 1.

Table 1: Albumin consumption in each hospital

Hospital	2019	2020	2021
King Hussein Medical Hospital	2	126	298
Queen Alia Heart Institute	283	327	716
King Talal Military Hospital	8	63	83
Queen Rania Pediatric Hospital	147	132	142
Princess Haya Military Hospital	106	135	161
Prince Ali bin Al Hussein Military Hospital	73	55	64
Prince Hashem bin Al Hussein Hospital	1	24	28
Prince Hashem bin Abdullah II Hospital	51	37	38

In order to provide a comprehensive picture of trends throughout the Jordanian Royal Medical Services, total albumin consumption data from all hospitals was also compiled. The total albumin consumption for the designated years is shown in Table 2.

Table 2: The total albumin consumption for the designated years

Medication	2019	2020	2021
Albumin	671	899	1530
Total	3100		

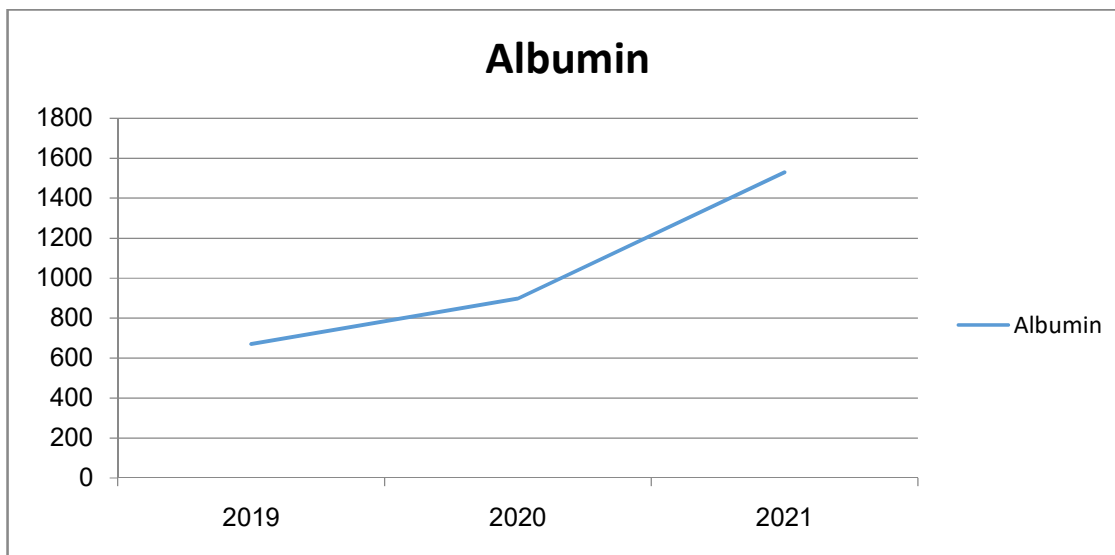


Figure 1: The total albumin consumption for the designated years

2.3 Data Analysis

Descriptive statistical analyses were employed to discern patterns and trends in albumin consumption. Mean values and percentages were calculated to provide a quantitative overview.

Comparative analysis was conducted to evaluate variations in albumin consumption both across different hospitals and over the three-year period

2.4 Ethical Considerations

Our study respects patient privacy and complies with ethical standards. There is not much of a risk to individual's privacy since the study analyzes anonymized and aggregated data. The relevant institutional review board granted ethical approval for the work being performed.

3. RESULTS:

Descriptive statistical and comparative analysis results were as following (Table 3 and table 4):

Table 3: Overall change of albumin consumption

	Overall Change	
	% Change (2019-2020)	% Change (2020-2021)
Albumin	33.98%	70.19%

Table 4: The mean consumption of albumin for study hospitals

Hospital	Mean Consumption (2019-2021)	% Change (2019-2020)	% Change (2020-2021)
King Hussein Medical Hospital	142 units	6200.00%	136.51%
Queen Alia Heart Institute	442 units	15.55%	118.96%
King Talal Military Hospital	51.33 units	687.50%	31.75%
Queen Rania Pediatric Hospital	140.33 units	-10.20%	7.58%
Princess Haya Military Hospital	134 units	27.36%	19.26%
Prince Ali bin Al Hussein Military Hospital	64 units	-24.66%	16.36%
Prince Hashem bin Al Hussein Hospital	17.67 units	2300.00%	16.67%
Prince Hashem bin Abdullah II Hospital	42 units	-27.45%	2.70%

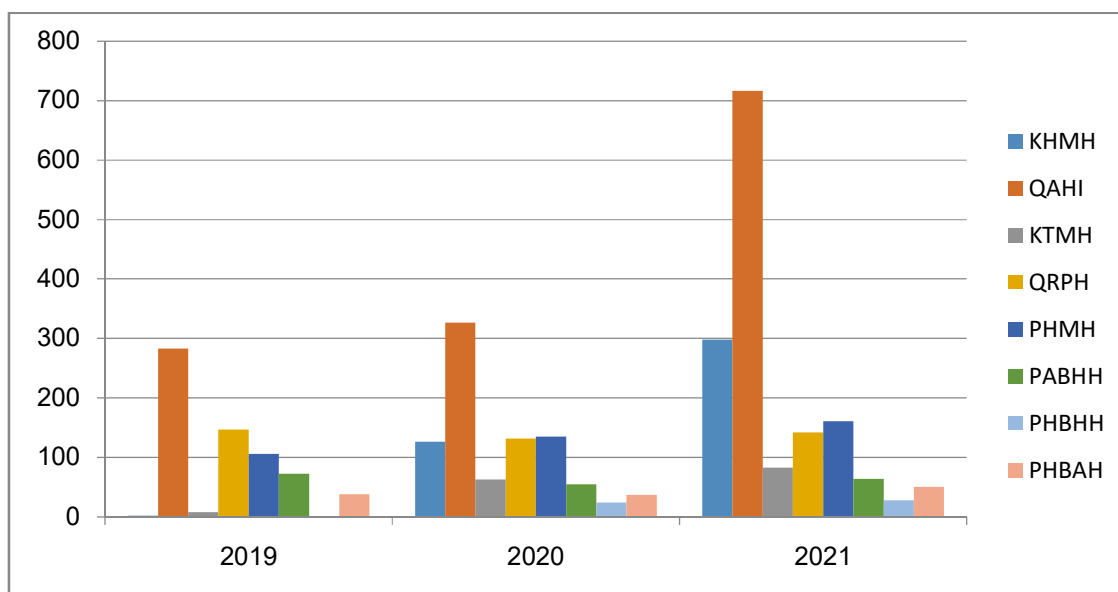


Figure 2: The mean consumption of albumin per year in study hospitals

4. DISCUSSION:

4.1 Interpretation of Percentage Changes:

The three-year investigation into albumin consumption trends provides important new information about the dynamics of intensive care practices in the hospitals that were selected of the Jordanian Royal Medical Services.

4.1.1 Hospital-Specific Trends:

King Hussein Medical Hospital: The hospital's albumin usage has increased dramatically, rising by a startling 6200.00% between 2019 and 2020 and then by an additional 136.51% between 2020 and 2021. Significant changes like this call for a closer look at the patient population, medical procedures, and potentially outside variables like new therapies or changing regulations governing health practices.

Queen Alia Heart Institute: Likewise, the institute shows a steady upward trajectory, rising 15.55% in 2019 and a notable 118.96% in 2020 and 2021, respectively. The fact that this hospital specializes in cardiac care and uses albumin strategically to treat critical cardiovascular conditions may be attributed to this^[9].

Other hospitals: Exhibit varying levels of change, including Princess Haya Military Hospital, King Talal Military Hospital, Queen Rania Pediatric Hospital, Prince Ali bin Al Hussein Military Hospital, Prince Hashem bin Al Hussein Hospital, and Prince Hashem bin Abdullah II Hospital. Numerous factors, such as modifications to treatment procedures, changes in patient populations, or unforeseen events, may have an impact on these differences^[9].

4.1.2 Overall Trends:

The overall analysis, which is shown in Table 3, shows that albumin consumption increased by 33.98% between 2019 and 2020 and then by 70.19% between 2020 and 2021. The general increased trend points to a change in how Jordanian Royal Medical Services Hospitals manage patient care as a whole.

4.2 Implications for Patient Care:

Significant increases in albumin consumption, especially in some institutions, prompt concerns regarding patient outcomes, clinical justifications and possible effects on the use of healthcare resources. Comprehending the rationale behind these alterations is essential for enhancing patient care, guaranteeing

efficient allocation of resources, and harmonizing hospital procedures with evidence-based procedures.

4.3 Factors Influencing Albumin Consumption:

The observed trends may be explained by a number of variables, such as shifts in the prevalence of diseases, adjustments to treatment protocols, improvements in medical technology, or responses to outside events like the COVID-19 pandemic. To identify the contextual elements influencing albumin consumption patterns, more research needs to be done, including qualitative research when appropriate.

4.4 Considerations for Practice and Policy:

The results of this study demand an in-depth examination of hospital protocols and an evaluation of the appropriateness of albumin utilization. Optimizing the usage of albumin could be aided by setting standards for consumption based on patient condition severity and condition-specific criteria. Furthermore, it is imperative to conduct continuous monitoring and frequent reevaluations of albumin utilization procedures to guarantee compatibility with the changeable landscape of critical care.

5. CONCLUSIONS:

Evaluating albumin consumption trends in Jordanian Royal Medical Services Hospitals' intensive care units reveals dynamic patterns that call for more research. Policy development, resource allocation, and patient care are all impacted by the changes that have been observed. Subsequent investigations need to probe more deeply into the contextual elements driving these patterns and investigate pathways for optimizing albumin consumption in critical care environments.

The study encourages ongoing communication between researchers, policymakers, and medical providers in order to maximize albumin utilization and guarantee the provision of high-quality care that is in line with the changing field of critical care medicine.

Limitations of the Study: Even though this study offers insightful information, it is important to recognize its limits. Since the research is based on retrospective data, it is not possible to conclusively determine the cause of the occurrence in question. Furthermore, this study did not specifically examine outside variables that could affect albumin intake,

such as alterations to patient demographics or treatment protocols.

Recommendations for Future Research:

- **Contextual Factors:** More investigation is necessary to determine the contextual factors, such as shifts in patient demographics and treatment protocols which may affect albumin consumption in hospitals.
- **Qualitative Investigation:** By capturing the points of view of administrators and healthcare professionals, qualitative research can offer better insights into the decision-making processes underlying the use of albumin.
- **Longitudinal Monitoring:** To evaluate the long-term validity of patterns detected and to adapt clinical procedures in response to changing patient requirements and evidence, longitudinal investigations and ongoing monitoring are crucial.

REFERENCES:

1. Alobaidi R, Morgan C, Basu RK, et al.. Association between fluid balance and outcomes in critically ill children: a systematic review and meta-analysis. *JAMA Pediatr.* 2018;172:257–268.
2. The SAFE Study Investigators Impact of albumin compared to saline on organ function and mortality of patients with severe sepsis. *Intensive Care Med.* 2011; 37: 86-96.
3. Vincent J-L, Russell JA, Jacob M, et al. Albumin administration in the acutely ill: what is new and where next? *Crit care* (London, England). 2014; 18(4): 231.
4. Ferrer R, Mateu X, Maseda E, et al. Non-oncotic properties of albumin. A multidisciplinary vision about the implications for critically ill patients. *Expert Rev Clin Pharmacol.* 2018; 11(2): 125-137.
5. Hanot J, Dingankar AR, Sivarajan VB, et al.. Fluid management practices after surgery for congenital heart disease: a worldwide survey. *Pediatr Crit Care Med.* 2019;20:357–364.
6. Yano Y, Sakata N, Fushimi K. Establishing a hospital transfusion management system promotes appropriate clinical use of human albumin in Japan: a nationwide retrospective study. *BMC Health Serv Res.* 2019;19:999.
7. Buckley MS, Agarwal SK, Lansburg JM, et al.. Clinical pharmacist-led impact on inappropriate albumin utilization and associated

Conflict of interest: The authors certify that they have no financial or personal ties with any individuals or organizations that would influence how the study is conducted, designed, interpreted, or reported. There was no outside funding or assistance obtained that could have impacted the study's objectives or jeopardized the findings' neutrality.

In the interest of full disclosure, it is crucial to mention that none of the authors have any connections, financial interests, or other ties that would compromise the objectivity and reliability of the study. The principal aim of this study is to provide significant perspectives to the scientific community and healthcare professionals working in critical care environments.

In order to protect the integrity of the research and the highest ethical standards, any potential conflicts of interest will be immediately revealed if they should occur in the future.

- costs in general ward patients. *Ann Pharmacother.* 2021;55:44–51.
8. Guidet B, Mosqueda GJ, Priol G, Aegerter P. The COASST study: cost-effectiveness of albumin in severe sepsis and septic shock. *J Crit Care.* 2007; 22(3): 197-203.
9. Aegerter P, Auvert B, Buonamico G, et al. Organization and quality control of a clinical database on intensive care medicine in central and suburban Paris. *Rev Epidemiol Sante Publique.* 1998; 46(3): 226-237.
10. Sznajder M, Leleu G, Buonamico G, et al. Estimation of direct cost and resource allocation in intensive care: correlation with Omega system. *Intensive Care Med.* 1998; 24(6): 582-589.
11. Guidet B, Beale R. Should cost considerations be included in medical decisions? Yes. *Intensive Care Med.* 2015; 41(10): 1838-1840.
12. Hammond NE, Taylor C, Finfer S, et al. Patterns of intravenous fluid resuscitation use in adult intensive care patients between 2007 and 2014: an international cross-sectional study. *PLoS ONE.* 2017; 12(5):e0176292.
13. Weber R.J, Kane S.L, Oriolo V.A. et al. Impact of intensive care unit (ICU) drug use on hospital costs: a descriptive analysis, with recommendations for optimizing ICU pharmacotherapy. *Crit Care Med.* 2003; 31: 17-24