

# Procurement Systems of Health and Pharmaceuticals in Hospitals during COVID-19 Pandemic: A Systematic Literature Review

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## ABSTRACT

**Background:** Due to the rise of the COVID-19 pandemic, medical health care plays a more crucial role in handling the increase. Countries worldwide accidentally collapsed because of unpreparedness in facing COVID-19, which caused a hospital panic phenomenon to stock medical equipment.

**Objective:** To describe the procurement system for health and pharmaceutical supplies in hospitals during pandemic COVID 19.

**Method:** A Systematic literature review. In a literature search from 2019 to 2022, the investigation found as many as 92 papers extracted using PRISMA guidelines, and a total of fourteen articles were selected for review.

**Results:** in this review, we found that the government in every country has different procurement systems, revealing that each has its strengths and weaknesses. However, centralized procurement systems have a distinct advantage.

**Keywords:** covid 19; hospital; logistic; management; procurement.

## INTRODUCTION

Due to the rise of the COVID-19 pandemic, medical health care plays a more crucial role in handling the increase. Countries worldwide accidentally collapsed because of unpreparedness in facing COVID-19, which caused a hospital panic phenomenon to stock medical equipment. This situation had degenerated since hospitals were vying for the availability. During the COVID-19 Pandemic, the hospitals' challenges and demands of the community are increasing, providing safe, fast, and adequate health services and maintaining good quality. Hospitals are also adapting in dealing with COVID-19 by complying with the medicine procurement, personal protective equipment (PPE), and diagnostic facilities according to regulations. In addition, hospital management needs to improve the habits and behavior of existing resources and implement new strategies to improve the quality and patient safety based on hospital service standards [1].

The COVID-19 pandemic impacts changes in consumer behavior that affect the operations of organizations, including health organizations. Non-COVID-19 referral hospitals were also affected by a decrease in non-COVID-19 patient visits. According to Persatuan Rumah Sakit Seluruh Indonesia (PERSI) reports, there was a decrease in patient visits in outpatient and inpatient, ranging by 40-60% [2]. It can reduce revenue and affect the hospital's cash flow. Meanwhile, hospital operating expenses tend to increase in line with new standard procedures in PPE use. If this condition continues, finances and hospital services can be disrupted. As a health service facility, hospitals must be ready and agile to adapt to changes in the number and type of patients. Health care facilities are expected to be able to provide patient care while maintaining good financial conditions so that hospital operations can continue to function optimally. Hence, this paper aims to analyze a systematic review of hospitals' health procurement systems and pharmaceutical supplies during the COVID-19 pandemic (2019-2022). The research question is how the hospital procurement system in the COVID-19 pandemic.

## METHOD

### Search strategy

Sources of research data were obtained by searching literature in journals related to procurement, supply chain, and hospitals during the pandemic. In the study, the researchers collected 92 articles according to the keywords: "procurement and hospital and COVID-19," "procurement system AND finance AND hospital," "Procurement OR direct-purchase AND hospital AND covid 19", "direct appointment AND hospital OR health care, "Auction AND covid 19 AND hospital financial system", "e-catalog AND COVID-19 AND hospital OR health service", "emergency procurement AND logistics AND COVID-19 AND hospital" which has many years of publicity in the last four years, namely between 2019-2022. First, it was reduced based on 92 articles to determine whether there were titles similar to the research topic. Then it was reduced to 29 articles. Then the 29 articles were reduced again to look for complete and relevant articles, thus getting 14 articles.

### Study selection

Systematic reviews would help synthesize a variety of relevant research results. Therefore, the search for research systematically followed the correct research stages or protocols using Preferred Reporting Items for Systematic Reviews and Meta-analyses, commonly called PRISMA.

### Data extraction

Literature accessed in the research process by having screenings based on the inclusion and exclusion criteria is suggested in Table 1. In the systematic review of data literacy, we first looked at the publication year and read the title and abstract so that it could be known on the topic. Then, we read the entire text by reviewing the methods used in procurement hospital system identification, results, and conclusions. At this stage, the criteria of the data found are defined, whether they are worthy of being used as data sources. Here is the seemingly worthy criterion.

Criteria	Description
Excluded	Editorials, letters, book, encyclopaedia, Non-English articles Double publication.
Included	Scientific articles published between 2020-2022 contain topics regarding hospital procurement during the covid period, journal articles with goals, research methods, research results, and clear conclusions.

Of the 92 articles extracted from ten databases (Figure 1), after screening had been made, the data extraction results could be known for further analysis. Therefore, based on screening and due diligence, the number of eligible articles found is fourteen articles published only in 2019–2022.

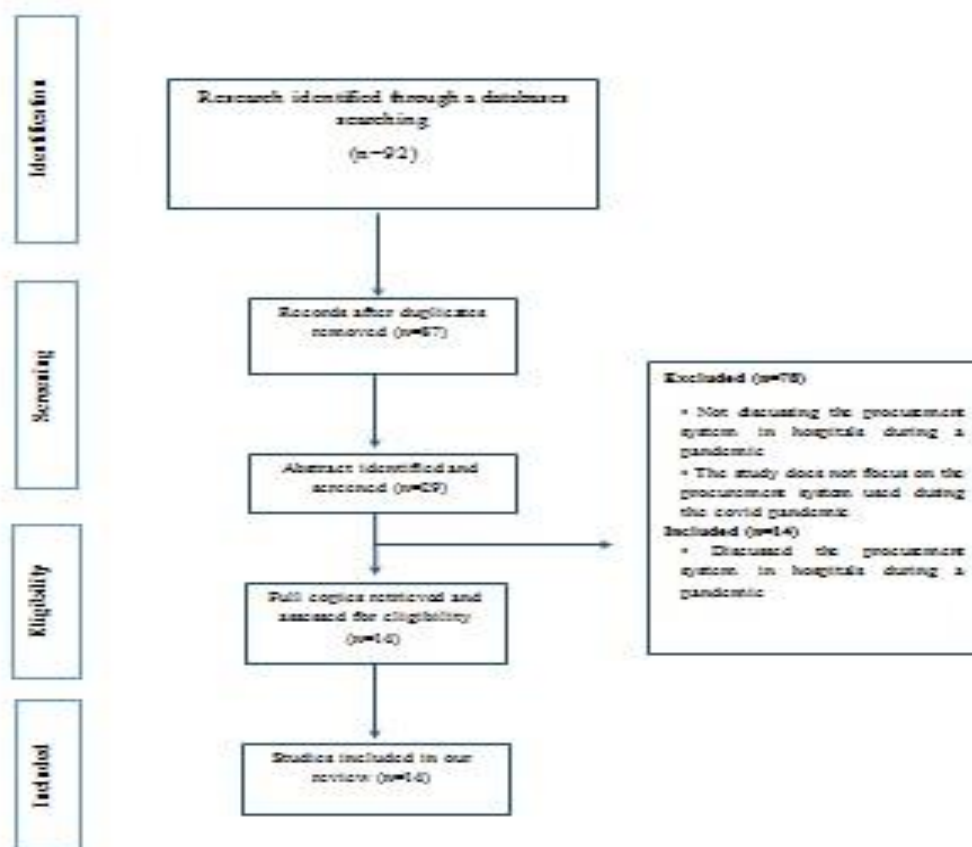


Figure 1. PRISMA Flow Diagram of Articles and Inclusion

**Data analysis**

Data analysis in this study used ATLAS.ti software with a manual coding model whose function was a reference to complement existing works. The coding manual is done by embedding words, phrases, or sentences representing aspects or essences of the data we capture (Saldaña, 2013). Several data coding results were obtained from the analysis activities, which were then linked and translated into writing.

**RESULTS AND DISCUSSION**

The selection found 14 articles that had met the requirements, and further studies were carried out. The findings and conclusions of this study can be seen in Table 1. All articles reviewed discussed research on systems for procurement for health and pharmaceuticals in hospitals during COVID-19 pandemic. Each article has information about procurement systems used as the basis for research and the dimensions of procurement for health and pharmaceuticals in hospital.

Table 1. Characteristic of Reviews Studies

Author(s), Year	Country	Method	Procurement System	Results
Septian Saraslina Ekawati, Helen Andriani, 2022	Indonesia	Qualitative	The quality of the procurement system in the hospital is maintained and running well.	hospital management needs to improve the habits and behavior of existing resources and implement new strategies to improve the quality and patient safety based on hospital service standards
Joseph Sarkis, 2020	USA	Qualitative	Not Reported	COVID-19 pandemic events and responses are unprecedented to modern operations and supply chains. Scholars
Alexander Spieske, Maximilian Gebhardt, Matthias Kopyto, Hendrik Birkel, 2022	Germany	Qualitative	We find that bridging measures within the healthcare supply base, such as offering procurement support for suppliers or leveraging long-term buyer-supplier relationships, are more effective for securing medical supplies than buffering measures	Both traditional and new buffering measures establish novel flows of medical supplies in the HCSC that can enable higher supply security in a pandemic

Author(s), Year	Country	Method	Procurement System	Results
Abdulmalek Aljafari, 2021	London	Qualitative	Procurement reveals that each has its own strengths and weaknesses, however, centralized procurement systems have a distinct advantage	While some governments have centralized the procurement of medical devices, developing a national scheme for tendering and purchase, other countries have deployed a decentralized approach where regions or even individual hospitals are responsible for all or some aspects of procurement.
Christopher L. Atkinson, Clifford McCue, Eric Prier, and Allison M. Atkinson, 2020	USA	Qualitative	Not Reported	concludes by discussing the centrality of public sector procurement professionals as a critical link for effective provision of government services, especially in times of crisis
Vincenzo Atella and Francesco Decarolis, 2021	Italy	Qualitative	Not Reported	The medical device industry has grown at an unprecedented rate over the last decade and an even sharper growth is forecast in the next years, mainly driven by demand factors such as population ageing and obesity pandemic
Bolaji S. Aregbeshola, Morenike O. Folayan, 2021	Nigeria	Qualitative	COVID-19-related commodity procurement was least responsive to the needs of those most in need of care and support.	Longstanding poor health care financing in Nigeria poses a major challenge to the COVID-19 pandemic response.
Yusi Anggriani, Hesty Utami Ramadaniati, Prih Sarnianto, Enny Pontoan, Sri Suryawati, 2020	Indonesia	Pre-post observational study	Not Reported	The pharmaceutical policy reforms under the JKN have had a profound impact on decreasing medicine procurement prices in Indonesia for both e-catalogue and non-e-catalogue medicines

Author(s), Year	Country	Method	Procurement System	Results
Ann Pulk, Rebecca; Leber, Molly; Tran, Lydia; Ammar, Mahmoud; Amin, Nilesh; Miller, LeeAnn; Yazdi, Marina (2020).	New England	reporting method	Yale New Haven Health deployed a system incident management command structure to effectively respond to the COVID-19 crisis	With medication shortages posing a threat to patient care, dynamic pharmacy leadership proved essential to providing patient care at the height of the COVID-19 pandemic.
I. C.-19 health service utilization forecasting Team, 2020	USA & Europe	Qualitative	The University of Washington Institute for Health Metrics and Evaluation model were assessed to the system using a fixed proportion generated.	Timing of the peak need for 35 hospital resource requirements varies considerably across states in the USA and across regions of 36 Europe
Cynthia Modisakeng, Moliehi Matlala, Brian Godman, and Johanna Catharina Meye, 2020	South Africa	Qualitative	The procurement process emerged from the data as the overarching theme, rooted in three main themes	Effective management of contracts of suppliers by the Provincial Department of Health is crucial to ensure accessibility and availability of essential medicines to all citizens of South Africa

### Sustainability and Resilience in Supply Chain

Open investigatory avenues will be conducted to maintain COVID-19 supply chain implementations to identify whether all supply chains need investigation, analysis, and orientation [3]. At the same moment, a fact showed that all medical supplies manufacturers encounter hardships in completing supplementary orders. This problem was aggravated because suppliers were not always competent to increase the product needs up to the demand stages. Therefore, the impotence to accomplish the hospital demands may affect the company's magnificence on SC partners that affect the company dependencies [4]

### Procurement systems in G20 Countries

An examination of the procurement systems of the G20 countries that are the basis of this study revealed that two approaches exist to uniform procurement of medical devices. Specifically, some countries have adopted a centralized model where a single body controls all decisions related to procurement, thus providing little or no autonomy to end-users (physicians and patients). Other countries take a more hands-off approach, providing a budget, and in some instances, a set of guidelines, to regional or local authorities that then make procurement decisions on their own, thereby following a decentralized model. A detailed explanation and evaluation of both of the models are presented below.[5]



## UK

The Medical Devices Management Group manages the selection and procurement of medical devices in the UK (MDMG), leading the NHS Trust's strategy by reviewing existing and new machines according to evidence-based practice and national standards.

In the COVID-19 pandemic response, the UK government sought whatever it could on the open market, using its buying power to outbid other countries and procurement authorities, but paying a considerable premium to secure the necessary supplies. Almost immediately, the UK struggled to provide its healthcare providers with the medical equipment they needed, which led to instances where doctors and nurses had to improvise, even wearing bin bags in place of proper PPE.

## Saudi Arabia

The Kingdom of Saudi Arabia established the NUPCO in 2008 as an independent company by Royal Order. NUPCO began procuring medical devices, medications, and other medical supplies in 2009. Since then, NUPCO has raised the quality of services in the healthcare market and has shown excellent cost efficiency in achieving better prices and discounts from vendors (Interview with Sharq Al-Aswat, 20 Dec. 2020). The government of Saudi Arabia formed a task force representing all ministries to take fast executive decisions to control COVID-19 infection. As a result, the exact process followed for medical devices and supplies between the Ministry of Health and NUPCO accelerated. NUPCO led the procurement and logistics as they were mandated.

## Italy

In the European Union (EU), procurement practices for medical devices are defined and regulated through a harmonized system laid down in EU procurement directives; however, the broad organization of the healthcare sector varies widely by country, with each member state adapting its procurement policies according to the structure of its healthcare system [6]. And in the COVID-19 pandemic, as one of the first western countries to be overwhelmed with COVID-19 infections, Italy was forced to act quickly and decisively to obtain the medical equipment necessary to treat the illness. Italy declared a state of emergency in late February 2020 that suspended the usual legislation. The emergency measures relieved purchasing authorities from specific approval requirements, giving regional authorities greater autonomy to make procurement decisions.

## Mexico

Mexico has a decentralized healthcare system at the federal and state levels and multiple sub-sectors within each local system. Various entities manage the procurement process, and patient outcomes vary between different states.[7] Procurement in covid 19 in Mexico issued an executive order in March 2020 that the Ministry of Health would take the lead in controlling COVID-19. This included purchasing all the services, medical devices, and other supplies, locally or internationally, needed to supply the healthcare providers' shortages[8]. They also collaborated with the Tax Administration Service to align with the executive order to facilitate customs and clearance processes in March. In addition, Mexico secured all the essential medical equipment and other supplies, such as vaccinations, by an agreement with the United Nations Office for Project Services (UNOPS) in July 2020 [8].

### **Governance and Financing**

The government offered a comprehensive health policy implementation to ensure hospital services, particularly for pharmaceutical terms [9]. There are at least four vital aspects to addressing healthcare supply chain management; the parties' designation, maintenance, distribution, and source funding identification are expected to minimize COVID-19 financial issues [10]. Identifying source funding as the Emergency Supply Chain (ESC) is crucial to establishing a clear budget. According to Best Practices in Supply Chain Preparedness for Public Health Emergencies in 2018 USAID reports, a preparedness fund and response reserve fund are two components suggested. The preparedness fund handles expenses ranging from emergency SC storage, inventory management (i.e., rotating out old stock), administrative costs for emergency staff, and routine preparedness training. The reserve fund is responsible for increasing the preparedness budget to avoid an emergency occurrence. Estimating the hospital needs is inherently challenging as supply and demand factors insight is restricted. Source funding identification will encompass endowment from government, non-profit associations, and donors [11]

The formulary governance structure at Yale New Haven Health (YNHH) has been in existence for almost a decade. It was essential to quickly organize an interdisciplinary COVID-19 healthcare professional, which operated as an internal panel of experts and concentrated on establishing evidence-driven practice guidelines using the extant Formulary Integration Committee (FIC) subcommittee architecture. This group was constantly reviewing new information and disseminating a COVID-19 treatment strategy to guide adult and paediatric patients' care [12]

### **Strategies for managing medication procurement during a COVID-19 pandemic crisis**

The University of Washington Institute for Health Metrics and Evaluation model were assessed to the system using a fixed proportion generated by comparing the weekly Centres for Disease Control and Prevention COVID-19 updates [13] for YNHH, which included an identification conversation with stakeholders and the intensive care unit (ICU) medical leadership, as well as a review of previous medical ICU order data. Within each necessary pharmaceutical used to purchase medical equipment, there are formulary and non-formulary pharmacological therapies. For example, the buying team secured a baseline supply of all critical agents equal to one month of historical use to provide a one-week operational capacity ahead of the COVID-19 caseload peak. As YNHH began treating COVID-19 patients, a rigorous revision of the COVID-19 necessary medicine list was carried out to capture internal expertise and emerging suggestions from consensus guidelines and critical care and infectious diseases organizations. For ventilated patients, this transformation comprised eliminating all antibacterial and antiviral medicines and the addition of anticoagulants and adjuvant therapy [12]. According to another study, there is an overall theme. The data revealed three primary elements in the procurement process: (i) buy-outs; (ii) supplier performance; and (iii) integrated computerized inventory management systems (resolution) [14].



## CONCLUSION

During COVID-19 Pandemic in hospitals, procurement had many challenges due to the large number of requests that must be supplied to hospitals during this pandemic. Therefore, every hospital in various countries must have a fast and effective procurement system to meet the hospital's needs adequately. The government in every country has a different procurement system, revealing that each has its strengths and weaknesses. However, centralized procurement systems have a distinct advantage.

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