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Increase Supply Chain Management at 354 Military Hospital After COVID-19

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Abstract
Supply chain in hospitals include procuring materials, managing supplies, and transporting goods and services to medical staff and patients. The process of managing the flow of goods, information, and services in the industry often involves many independent parties, including manufacturers, insurers, hospitals, healthcare professionals, distributors, and organizations. Purchasing group organization and a number of authorities. The outbreak of Covid-19 has disrupted supply chains in hospitals. 354 Military Hospital is one of the Military Hospitals performing the national special task of providing medical examination and treatment for wounded soldiers, sick soldiers, active-duty soldiers, insured patients and all classes of people. To perform well this task requires the hospital to manage the supply chain well, especially after the Covid_19 epidemic has occurred. The article uses the data of 2022 with qualitative research methods and descriptive statistics to understand the impact of Covid-19 on the supply chain management at 354 Military Hospital. From the research results, the article proposes measures to strengthen supply chain management at 354 Military Hospital after the Covid-19.

Keywords: Supply Chain, Supply Chain Management

1. Introduction
The last period of 2020-2022 was heavily affected by the COVID-19, many bidding packages had to be purchased in the form of shortened appointment of contractors, selecting contractors in urgent cases to serve the needs of rooms, anti-epidemic. The supply of raw materials and goods is scarce, and prices fluctuate, making the procurement of drugs, medical supplies, chemicals, biological products for disease prevention and control, and medical examination and treatment even more difficult.
After the COVID-19, the number of people going for medical examination and treatment increased, exceeding the service capacity of medical facilities. The number of patients coming for examination and treatment at the units in the first 6 months of 2022 increased significantly compared to the previous period, affecting the identification of needs and the implementation of plans to purchase drugs, chemicals, and materials. Medical advice of medical facilities.
354 Military Hospital is a regional, strategic grade 1 general hospital under the General Department of Logistics. Over 70 years of construction and growth, along with the close attention of the hospital's leaders and commanders, the specific direction and guidance of the hospital's leadership, 354 Military Hospital has not stopped creatively and innovatively in terms of content as well as form of operation, actively contributing to the well implementation of the unit's political tasks; creating a dynamic emulation movement with strong spread.
After the Covid-19, 354 Military Hospital also encountered difficulties and disruptions in the supply chain. Therefore, this article studies the impact of the Covid-19 epidemic on the supply chain at 354 Military Hospital and proposes measures to strengthen supply chain management.

2. Literature Review
Anas Ziat *et al* (2019) have proposed a supply chain model in medical facilities. This article presents a common supply chain model for hospitals based on the theory synthesized by the authors. A three-level structured model is presented in this article, which identifies the most valuable link in the supply chain as from both patients and hospital staff. The article has also suggested some methods to overcome the most common bottlenecks in the supply chain to enhance supply chain management.
Anas Ziat *et al* (2022) [1] also studied the model of capacity assessment of supply chain management in hospitals. The authors have based on the traditional criteria to evaluate the performance of supply chain management capacity and proposed Delphi and SEM models. According to the article, this is an effective model that identifies the key factors that promote the sustainable operation of the supply chain at the hospital.

Nghiem Thanh Huy (2020) [5] with a doctoral thesis has researched the current situation of the supply chain and evaluated the supply chain management capacity at military hospitals in Hanoi. The research results also show the factors affecting the supply chain management capacity, thereby proposing solutions to improve the supply chain management capacity at the military hospital in Hanoi.
However, after the Covid_19 broke the supply chain at hospitals. Therefore, it is necessary to have solutions to strengthen supply chain management aftrer Covid_19.

3. Theoretical Basis

Supply Chain

There are many concepts of supply chain proposed by researchers and economists as follows:
According to David Blanchard: "Supply chain is defined as the most basic way; supply chain is the chain that links all activities and processes involved in the life cycle of a product from its inception to its end".
According to Lambert, Stock, and Ellram: "Supply chain is the arrangement or arrangement of companies to bring products and services to market."
According to Chopra and Meindle: "Supply chain includes all the stages that constitute, directly or indirectly, in fulfilling a customer request. The supply chain includes not only manufacturers and suppliers, but also transporters, warehouses, retailers, and the customers themselves."
According to Ganeshan and Harison: "Supply chain is a network of conditions and distribution options implemented as a function of procuring raw materials, transforming these materials into intermediate products or into finished goods. products, and the distribution of these finished products to customers".
Thus, supply chain consists of a journey linking elements in which there are 3 basic activities including:

- Supply: how to focus the activities of purchasing raw materials? Buy where and when raw materials are provided to effectively serve the production and business process.
- Manufacturing: is the process of converting raw materials into finished products and into the perfect final product.
- Distribution: is the process of ensuring products are delivered to end customers through distribution networks, warehousing, and retail in a timely and efficient manner.

On the basis of research on several supply chain definitions, it can be concluded that: supply chain includes activities of all related entities from purchasing raw materials, producing products to supplying customers and distributed to consumers to achieve two basic objects of creating a link between suppliers and customers because they have an impact on the results and efficiency of the supply chain, system-wide efficiency.

Supply Chain in Hospitals

The supply chain in hospitals is about procuring materials, managing supplies, and transporting goods and services to medical staff and patients. The process of managing the flow of goods, information and services in the industry often involves many independent parties, including manufacturers, insurers, hospitals, healthcare professionals, distributors, organizations purchasing group organization and a number of authorities.
The supply chain in hospitals begins where medical products are manufactured and then transported to distribution centers. Depending on the type of product, hospitals can purchase products directly without going through the manufacturer or through a distributor, or this transaction can be done through a purchasing group organization-the representatives hospital side to establish a purchase contract with the manufacturer.
Medical products are shipped to health medical institutions, where the goods are stored. These organizations will ensure healthcare workers will always have the necessary products and patients will always have access to lifesaving drug tools in a timely manner.

Supply Chain Management in Hospitals

Supply chain management in hospitals is a relatively complex and multi-stage process. Hospitals and related organizations have been taking specific actions to cut costs in the healthcare sector, while some focus on the distribution of bills and services in the revenue stream. to cut budgets, others focus on their healthcare supply chain.
Another aspect of healthcare supply chain management is the involvement of authorities, health payers including insurance companies. Authorities and payers often decide whether a medical resource is appropriate for consumers to use and whether healthcare providers are reimbursed for providing services to the most patients. determined.
Healthcare supply chain management has become so unique mainly because each stakeholder has unique interests to protect at different stages in the supply chain. Healthcare professionals may want to use certain products because they are trained in them, while hospitals aim to buy products they can afford.
Patients also have a say in the healthcare supply chain management. While healthcare organizations may regularly order their own standards such as medical gloves, some patients may need more customized medical products such as latex-free gloves, depending on their needs. on their state of health.
Similarly, healthcare professionals may prefer a particular brand or type of medical product, which can lead to cost concerns. For example, medical staff will put their preferences first for certain products, while financial managers will work to cut costs and limit expired products. Hospitals are sometimes faced with medical staff hoarding certain types of medical products.

Criteria for Evaluating Supply Chain Management Capacity in Hospitals

For an organization that is a hospital, the criteria for evaluating supply chain management capacity at the hospital are developed through each stage as follows:

1. Evaluation criteria at the stage of medical examination and treatment

According to HEA (Vietnam Health Economic Association), "The quality of medical examination and treatment includes two components: professional quality, technical quality and functional quality. Professional and technical quality is measured through the number of medical visits, the number of inpatient visits, the mortality rate, cured and untreated at the hospital, and the total number of surgeries. Functional quality of medical examination and treatment services is

reflected in the attitude of staff (doctors, nurses, technicians, receptionists, security guards, housekeepers).

2. Evaluation criteria at the stage of warehouse and stocking of goods

The assessment of supply chain management capacity in the stage of warehouse and goods storage is reflected in the situation of organizing the storage of medical equipment, medicines and the system of laboratories as well as drug stores. at the hospital.

Securing equipment storage and drug supply assesses a hospital's ability to manage inventory.

3. Evaluation criteria at the stage of transporting medicines and patients

Transporting patients as well as providing medicines to patients is one of the important stages in the supply chain for the hospital system. The assessment of supply chain management capacity at this stage is reflected in the quality, time to transport patients and timely medicines. At the same time, the quality of means of transport also assesses the capacity of supply chain management.

4. Evaluation criteria at the stage of site arrangement

The location arrangement is reflected in the arrangement of a reasonable medical clinic system that is convenient for the patient. Besides, the index of patients at the hospital with the capacity of using hospital beds shows the ability to meet medical examination and treatment services at the hospital.

5. Criteria for evaluating logistics in supply chain information

Supply chain information is an internal hospital information system and a patient management information system as well as providing necessary information to patients. Criteria for evaluating logistics in supply chain information is reflected in whether the information transmission to patients is timely, complete and scientific.

4. Implement Supply Chain Management at 354 Military Hospital

About 354 Military Hospital

354 Military Hospital, formerly known as Tran Quoc Toan Military, directly under the Ministry of Defency - Commander-in-Chief, was established on May 27, 1949 in Cao Chua hamlet - My Trang village - Yen My commune - Dai Tu district. - Thai Nguyen province. It was not until 1974 that the hospital received the Artillery Command and the Engineer Command and was moved to Ba Dinh - Hanoi until now.

With more than 70 years of establishment and operation, the hospital always tries, constantly strives to improve the quality of medical staff as well as medical examination and treatment services. With a system of modern and spacious facilities with 250 beds, the hospital receives hundreds of visits and inpatient treatment every day.

During the process of construction and development, 354 Military Hospital has always successfully completed all assigned tasks and received many noble rewards such as: Emulation flags of the Government, certificates of merit from the Prime Minister, Resistance war medal, the second Class, the third Class...

354 Military Hospital was born with many noble tasks and missions. Some of the duties and functions at the hospital can be mentioned as:

- Perform examination, emergency and treatment for more than 100 focal points including officers of the general level, the rank of colonel, agencies of the Ministry of Defency, the army service.
- Check-up services and health insurance for local people, most of which are retired military and government officials.
- Participate in directing the line with military units under the direction of the Military Department
- Participate in scientific research to innovate and improve the quality of treatment
- Always in a ready-to-battle position, performing all assigned tasks.

Actual situation of supply chain management at 354 Military Hospital after Covid-19

To study the current situation of supply chain management at 354 Military Hospital, the author collects primary and secondary data. With primary data, the author conducts in-depth interviews with experts to better define the supply chain at hospitals as well as the criteria for evaluating supply chain management capacity at hospitals. The author conducts in-depth interviews with structured and unstructured questions.

From the results of the interview, the author builds a survey and descriptive statistics of the variables using SPSS 20.0 software. The subjects of the survey are doctors and patients who come to the hospital for medical examination and treatment. The author builds 20 variables to assess supply chain management capacity on 5 stages (from theoretical and qualitative research results).

Based on the study of Hair, Anderson, Tatham and Black (1998) as a reference for the expected sample size. Accordingly, the minimum sample size is 5 times the total number of observed variables. This is a suitable sample size for research using factor analysis (Comrey, 1973).

Thus, the number of samples to be selected: n = 5*18 = 90 samples.

The author distributes 200 random votes. As a result, 186 valid votes were obtained.

1. The Current Situation of Supply Chain Management at the Stage of Medical Examination and Treatment

Due to the impact of the epidemic, the number of patients coming to the clinic has increased, especially those who have had Covid-19 with a history of respiratory problems. However, with the characteristics of the military hospital under the General Department of Logistics, there is always a stable force of doctors and nurses with high professional qualifications. Therefore, it still meets the medical needs.

Survey results for patients who come for medical examination and treatment at 354 Military Hospital, show that supply chain management at the medical examination and treatment stage is evaluated quite well, the level of medical examination and treatment is quite regular, the quality of medical examination and treatment services is quite good. Diseases and support services are rated as good. In particular, the waiting time and medical examination and treatment were quickly assessed as very fast with the service attitude of very enthusiastic doctors and nurses.

Table 1: The current situation of supply chain management at the stage of medical examination and treatment (Descriptive Statistics)

	N	Mean	Std. Deviation
MD.KB1. Frequency of regular use of medical examination and treatment services at the hospital.	186	3.7478	.63855
MD.KB2. Satisfaction with treatment time	186	2.6813	.51728
MD.KB3. Satisfaction with the quality of medical care	186	3.9159	.67921
MD.KB4. Satisfaction with doctors' attitudes	186	3.6295	.68429
MD.KB5. Satisfaction with support services	186	3.Ω6	.69426
Valid N (listwise)	186		

Source: Author's survey results

2. The Current Situation of Supply Chain Management at the Stage of Warehouse and Stocking of Goods

This content analyzes the storage and inventory stages of medical equipment, supplies and medicines in hospitals.

With medical equipment and supplies: managed at the Equipment Department located in the Paraclinical Division. The Faculty of Equipment organizes the reception and management of medical equipment, tools and supplies; minor repairs and deployment of new equipment, effectively exploiting and promoting equipment for diagnosis and treatment of patients.

With medicines: the management is done by the Pharmacy Department located in the Clinical Division at the Hospitals. Preservation of drugs, chemicals, consumable medical supplies. Stock up on drug bases to prevent natural disasters, catastrophes and wars. Managing the use of drugs and chemicals in the Departments of the Hospital.

However, after Covid_19, the bidding and procurement of equipment was also limited, so there was a shortage of medical equipment. On the other hand, stockpiled drugs are also used for a long time during the epidemic, while production is closed, and imported drugs are delayed due to border closures as well as slow shipping. Although difficult.

According to patients' assessment, the number of drugstores at the hospital is not enough to meet the needs of patients, although the quality of drugs is still highly appreciated. As for the density of the wards, it is still overloaded due to the high number of patients after the epidemic, although the equipment in the ward is considered to be modern.

Table 2: The current situation of supply chain management at the stage of warehouse and stocking of goods (Descriptive Statistics)

	N	Mean	Std. Deviation
MD.K1. Responsiveness of the pharmacy system at the hospital	186	2.6712	.58875
MD.K2. Diversity and abundance of drugs	186	3.0853	.59728
MD.K3. Satisfaction with the quality of drugs and medical devices.	186	3.6158	.67228
MD.K4. Satisfaction with hospital density	186	3.4275	.64823
MD.K5. Satisfaction with the quality of disease prevention	186	3.4352	.63416
Valid N (listwise)	186		

Source: Author's survey results

3. The Current Situation of Supply Chain Management at the Stage of Transporting Medicines and Patients

In the transportation stage, the supply chain management capacity at hospitals is reflected in the number of times and the efficiency of transportation to ensure smooth operation in the chain.

This is the task of the Logistics Department of 354 Military Hospital. At 354 Military Hospital, Logistics has organized the exploitation, receipt and distribution of petrol and oil fully and promptly in accordance with the regulations and approved limits. Strictly manage transportation plans as well as petroleum to ensure safety in use, no loss, fire and explosion. Well implemented the 50 campaign, exploiting technical equipment "well kept, durable, safe, economical and traffic safe". Currently, 354 Hospital has 15 vehicles, 11 drivers, and the vehicles are regularly maintained and repaired. Drivers strictly obey traffic laws, strictly observe professional duty as well as ready to fight, the vehicles run to ensure 100% safe kilometers.

According to the survey results, the convenience in transporting patients between clinics has not been assessed as convenient for patients.

Table 3: The current situation of supply chain management at the stage of transporting medicines and patients (Descriptive Statistics)

	N	Mean	Std. Deviation
MD.PT1. Satisfaction with the quality of means of transport for patients	186	3.2514	.68286
MD.PT2. Satisfaction with patient transport time	186	3.5678	.67690
Valid N (listwise)	186		

Source: Author's survey results

4. The Current Situation of Supply Chain Management at the Stage of Site Arrangement

At 354 Military Hospital, the Technical Logistics Department, the Equipment Department, the Pharmacy Department, the Examination Department and the departments related to the treatment of patients are arranged and arranged in the overall common space of the hospital. Hospital. For the smooth operation of the supply chain, the most important thing is to arrange space for the departments of Technical Logistics Department, Department of Equipment, Faculty of Pharmacy and Department of Medical Examination. Space and location of each department to ensure that the museum is stocked with medical equipment, supplies, medicines, means of transport and to ensure the arrangement of enough space and examination rooms for the number of patients to visit and treat. treat. Currently at the 354 Military Hospital, there are 28 examination rooms, 4 Near-Clinical areas, 1 Security Camera area, 1 insurance book distribution area, 6 patient guidance counters, 14 examination registration desks for all objects, 2 pharmacy supply counters, 20 finance and insurance payment desks, 1 entertainment area, coffee, reading newspapers, refreshments.

The survey results show that at present, the arrangement of clinics and administrative procedure rooms at 354 Military Hospital is quite reasonable.

Table 4: The current situation of supply chain management at the stage of site arrangement (Descriptive Statistics)

	N	Mean	Std. Deviation
MD.DD1. Reasonable level of the arrangement of clinics	186	3.8251	.67824
MD.DD2.Reasonable level of the arrangement of the wards	186	3.4823	.68425
MD.DD3.Reasonable level of arrangement of administrative procedures	186	3.6158	.68128
Valid N (listwise)	186		

Source: Author's survey results

5. The Current Situation of Supply Chain Management at Logistics Supply Chain Information

At 354 Military Hospital, the supply chain management is distributed, from the General Planning Department, the Finance Department, the Logistics and Technical Department, the Equipment Department, and the Pharmacy Department without being concentrated in a specific department. 354 Military Hospital has not built an enterprise resource planning system (ERP), which means there is no set of information technology solutions capable of integrating all production and business management applications into the hospital a single system for automating management processes.

The survey results showed that the management of information in the supply chain was not appreciated by patients, and the convenience of medical examination and treatment procedures was only evaluated.

Table 5: The current situation of supply chain management at logistics supply chain information (Descriptive Statistics)

	N	Mean	Std. Deviation
MD.TT1.Reasonable level of providing information to guide medical examination and treatment procedures	186	2.6215	.57629
MD.TT2.State of the art patient information systems are tracked and archived	186	2.9863	.62418
MD.TT3.Convenience of medical examination and treatment procedures	186	3.155	.68522
Valid N (listwise)	186		

Source: Author's survey results

5. Recommendations and Conclusions

Over many years of operation, 354 Military Hospital has always maintained the role and position of the upper-level hospital, providing many medical examination and treatment services, developing many specialties and expanding many new institutes and centers with new facilities. Modern and advanced technology meets all the needs of patients. Supply chain management fulfills the job requirements for technical expertise in diagnosis and treatment.

However, supply chain management is still in its infancy and has not yet been implemented according to the standards of a modern supply chain. Although the chain management mechanism follows all 5 basic steps of medical examination and treatment, transportation, storage, location and information, it is only spontaneous without developing specific and clear strategies and plans. Clear. Demand is assessed based on primitive guesses to build supply chain management without detailed, specific and realistic calculations in accordance with objective reality in professional work daily at 354 Military Hospital and in line with the development and innovation trend of the market mechanism. Supply chain management is only carried out according to the allocation mechanism, typical of the subsidy mechanism, and does not create autonomy for the unit. Hospitals passively receive budgets from their superiors without being flexible and proactive in exploiting and using funding sources in the most effective way. This shows an inadequacy in management and administration.

Through a survey and assessment of the current situation of supply chain management at 354 Military Hospital through 5 stages, it can be seen that there are currently shortcomings in medical examination and treatment time, qualifications of doctors, nurses and nursing staff; administrative procedures for medical examination and treatment; the number of drugstores is small; the state of medical equipment is not really modern; patient density is still high; patient transport and drug dispensing time; the arrangement of rooms for administrative procedures; inadequate information system...

Thus, in order to improve supply chain management capacity, the Hospital's Board of Directors is required to constantly improve and improve the quality of the five stages in the supply chain.

Specifics:

1. *Medical examination and treatment:* The hospital needs to shorten the waiting time for medical examination by setting up software on the Hospital's website for patients to register for online medical examination.
2. *The stage of warehouse and stocking of goods:* Every year, the hospital should review the quantity of each type of medicine and medical equipment. Develop a plan for stockpiling drugs and medical equipment. Regularly organize public and objective bidding for investment and procurement of medical equipment. Develop a plan and gradually expand the stockpile of drugs and medical equipment.
3. *The stage of transporting medicines and patients:* Invest in purchasing more modern facilities to increase both quantity and quality in patient transport.
4. *The stage of site arrangement:* Strengthening linkage, coordination and implementation among departments and specialized faculties.
5. *Logistics supply chain information:* The hospital applies information technology to the storage of patient information. Set up the hospital's app so that patients can easily log in to look up their medical information.

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