



# Investigation of the Group Purchasing Structure in the Field of Pharmaceuticals and Medical Devices: The Case of Public Pharmacies

Mohammadreza Rahim<sup>1</sup>, Sajjad Esmaili<sup>2</sup> and Mohammad Peikanpour<sup>2,\*</sup>

<sup>1</sup>Pharm.D, School of Pharmacy, Shahid Beheshti University of Medical Sciences, Tehran, Iran

<sup>2</sup>Department of Pharmacoeconomics and Pharma Management, School of Pharmacy, Shahid Beheshti University of Medical Sciences, Tehran, Iran

\*Corresponding author: Department of Pharmacoeconomics and Pharma Management, School of Pharmacy, Shahid Beheshti University of Medical Sciences, Tehran, Iran. Email: m\_peikanpour@yahoo.com

Received 2022 August 03; Revised 2022 November 02; Accepted 2022 December 05.

## Abstract

**Background:** The supply chain of pharmaceuticals and medical devices takes on critical importance regarding group purchasing, given its contribution to a country's healthcare system. One of the primary loops in this chain is the pharmacy as a supplier of goods to consumers and a buyer of goods from distributors.

**Objectives:** Given the importance of proper and productive preparation, this study examined the structure of aggregated procurement of drugs and medical supplies in public pharmacies.

**Methods:** This study used a qualitative method and interviews to collect the necessary data. Fourteen experts and specialists in the public pharmacy field were interviewed and selected using the purposive sampling method. Finally, the textual data were analyzed using efficient thematic analysis.

**Results:** According to experts, the organizational structure for aggregated procurement of medicines and medical supplies in Iran's public pharmacies can take the form of a headquarters structure, a virtual structure, and a semi-centralized virtual structure. The main requirements for these structures are software infrastructure, a productive workforce, and improved storage methods.

**Conclusions:** According to the majority of experts, the most desirable structure for implementing aggregated procurement in hospital pharmacies is the headquarters structure. The aggregated procurement process can reduce pharmacy costs and increase financial reserves and profitability if adequately implemented and equipped with the necessary infrastructure.

**Keywords:** Group Purchasing, Public Pharmacies, Supply Chain

## 1. Background

Supply chain management (SCM) is a strategy that integrates chain members to reduce costs and improve customer service. One of the main concerns of supply chain stakeholders is the timely provision of items needed by chain members. Accordingly, various models have been proposed as supply chain purchasing strategies. One of the SCM methods is group purchasing, which is used in many areas, especially in retail chains, to reduce the cost of purchasing goods.

In recent years, 'group procurement' has attracted much attention in all industries (1). This concept is an effective tool for healthcare providers, schools, government agencies, and other associations to keep prices low and help these organizations achieve their goals (2, 3). Nowadays, organizations aggregate their purchases by procurement groups to achieve economic benefits on a large scale. In the literature, the terms 'horizontal participatory

procurement,' 'reciprocal procurement,' 'procurement alliances,' and 'procurement groups' are used interchangeably (4). In commercial organizations and for manufacturers, costs of goods purchase account for 60 - 90% of total turnover (5), and for service providers, it is typically 35% (6). In government organizations, such as municipalities, the average of goods purchase accounts for about 60% of costs (7). In addition, the transactions for purchasing the required products and services involve many organizational costs, and reducing the transaction costs is more complicated than reducing the costs resulting from the purchase price (8).

In recent decades, this method has been used in some countries for purchasing healthcare goods, including medical supplies and drugs, in hospitals and chain pharmacies. In the group procurement system, a group of buyers' participation and cooperation help reduce costs, including ordering, shipping, and purchasing (9).

The supply chain of medicines and medical supplies is

one of the most critical parts of aggregated procurement in any country's health system. It is the most important condition for implementing a strategic purchasing policy in this area. In this chain, aggregated purchasing reduces costs and increases productivity in each loop when it is carried out to improve efficiency. According to Hendrik's study on aggregated procurement groups, two types of structures can be considered for aggregated procurement (10). One is a cooperative structure where the purchases are made by this group and distributed among the members. The other is a third-party structure in which another organization negotiates and enters into a contract at the request of the members (10).

The procurement literature distinguishes between two different structural forms of participatory procurement: informal virtual organizations and third-party organizations. The members own virtual networks, and many operate without formal rules. Typically, new collaborators are not hired into these networks and are not specifically assigned to the partnership. The collaboration is often part of their other job in one of the sourcing group's member organizations. Third-party organizations are separate organizations explicitly created to manage and coordinate collaborations. They have formal rules and dedicated staff responsible for the aggregated procurement process (11-14). In both boundary structures, the degree of collaboration between collections and subsets must be organized to ultimately select and design a form of organization (13, 15, 16).

Virtual organizations tend to be minor, with direct and immediate interaction between the participants. Third-party organizations tend to be larger and more regional or national, working with a more extensive membership base because they need to support their infrastructure. Professional networks can be national, regional, or local. The second structure may be more collaborative because of the ease of contact between neighboring hospitals. Third-party takeovers outsource to the private sector, and the public sector relinquishes control (17). Walker et al. pointed out that by relying on the evolutionary models of participatory procurement, one could start collaborating with virtual professional networks where individuals get to know each other and purchase together (15). This can lead in some way to procurement management, shared services, or backups (15).

According to Schneller's study, disciplined models proposed for group purchasing organization (GPO) contract compliance do not achieve effective performance unless the following are addressed: (1) Ensuring executive commitment to procurement excellence; (2) recognizing the legitimacy of suppliers and physicians; (3) creating an integrated business-clinical organizational focus; (4) ensur-

ing the application of advanced skills in SCM and information technology; and (5) fostering an organizational focus where everyone works "smarter" to optimize resources and get the job done (16). Such a compliance model maintains price fidelity as a critical objective for GPO and ensures that GPO activities are aligned with affected organizations (16).

Maltz and Ellram have noted the dual function of procurement in complex organizations (17). On the one hand, procurement involves identifying and screening suppliers, purchasing the necessary structures and obtaining opinions, negotiating final agreements, and monitoring ongoing relationships (17).

By providing an organizational focus, GPOs can create an environment in which members are accountable for the optimal use of resources by achieving departmental integration, creating and implementing performance measures, and incentivizing system-level performance (18).

As Huber et al. mentioned, electronic purchasing groups (EPGs) provide information and communication technology-based infrastructures and electronically perform the tasks required to manage the aggregated demand of two or more organizations (18).

One of the most important links in this chain is pharmacies as suppliers of goods to consumers and buyers of goods from distributors. Since the efficiency of aggregated procurement is highly dependent on the structure of the purchasing organization and is also influenced by the local conditions of a country and its upstream policies, the study of the structure of aggregated procurement organizations in this area is of great importance. The importance of the aggregated procurement structure lies in the fact that the optimal procurement approach may vary depending on the economic status of a country and differences in factors affecting the performance of economic activities. Accordingly, it is paramount to study aggregated procurement in the healthcare system.

## 2. Objectives

Given the importance of creating an appropriate and efficient structure for implementing aggregated procurement policy, this study identified factors contributing to the structure of aggregated procurement of drugs and medical supplies in public pharmacies. This study provided a suitable model for policymakers and activists in this field by extracting various dimensions of the structure of an aggregated procurement organization.

### 3. Methods

In this study, the phenomenological method was used to identify the structures of aggregated procurement and the factors contributing to this issue based on the opinions of different experts. The experts interviewed were selected using the purposive sampling method. An attempt was made to choose managers and activists involved in aggregated procurement, policymaking, and monitoring in public pharmacies. Community and hospital pharmacies in three universities of medical sciences, including Tehran, Shahid Beheshti, and Iran, were considered public pharmacies. Then, 14 experts and specialists in the pharmacy sector were interviewed in person who had held various senior positions in the food and drug ministries and public pharmacies in the past or were still working in those positions during the study period. Eight experts interviewed held senior pharmacy positions at the Faculty of Pharmacy, Tehran University of Medical Sciences. Four of the interviewees had managerial experience in running pharmacies at the Faculty of Pharmacy affiliated with Shahid Beheshti University of Medical Sciences and as vice chancellor for the Department of Food and Drugs at Shahid Beheshti University of Medical Sciences; however, the mentioned group had no position at the time of the interview. Two interviewees held senior positions in hospital pharmacies at the Iran University of Medical Sciences. [Table 1](#) provides further information on the participants.

After the interviews, the audio files were transcribed and edited, and the collected data were analyzed using the efficient thematic analysis method. To achieve this goal, independent coders are of utmost importance in identifying the themes. In the present study, two research team members performed coding using MAXQDA version 20 software. Codes were grouped and then reviewed and modified by a third researcher. Then, the categories related to the research objectives were extracted by coding each section. Finally, the data were analyzed, and a report was prepared.

### 4. Results

Qualitative analysis of the interviews revealed six themes and 94 primary codes, the details of which are shown in [Table 2](#). These themes and relevant codes illustrated requirements for developing structures for the creation of aggregated procurement organizations.

Of the 94 codes in the structure of the aggregated procurement organization, 34 codes were associated with software infrastructure requirements, representing the most significant number of codes on this theme. In addition, 24 codes were associated with the aggregated procurement

structure of headquarters, indicating the importance and priority of this structure, and 13 codes were associated with the desired management requirements and the importance of appropriate staff. Finally, five codes were associated with adopting a sustainable strategy for aggregated procurement.

### 5. Discussion

In this study, data were extracted from articles and scientific texts, as well as from the qualitative analysis of the materials mentioned by the experts in the interviews, to identify the structure of aggregated procurement organization. Among them, three issues (namely, headquarters structure, software infrastructure requirements, and the importance of qualified staff) were mentioned most frequently by the experts from all three universities of medical sciences (Shahid Beheshti University, Tehran University, and Iran University).

#### 5.1. Headquarters Structure

According to most experts, one of the most important ways to implement an aggregated procurement strategy is to create a “headquarters structure.” This centralized structure creates sub-groups in regulatory discussions, information monitoring, negotiations with manufacturers and distributors, purchasing, warehousing, and shipping goods to sub-sectors.

A vital feature of the headquarters structure is that it does not typically rely on the staff of its subsidiary pharmacies to perform its functions and hires new staff to specialize in each integrated task at headquarters. Some experts believe that “this structure has a physical environment and warehouse independent of the subsidiary pharmacies and is considered a kind of third-party organization.”

As the experts noted, other requirements for implementing the headquarters structure are “creating strategic reserves to reduce the risk of shortages” and damage to the organization so that the trade sector can “use negotiation techniques and obtain information from distributors” to buy stock of the risky product.

Some experts believe that in the headquarters structure, there is a “need for an appropriate central warehouse for the targeted management of the supply network,” which should have characteristics such as “adequate access and geographic centrality” to the location of pharmacies. Johnson looked at third-party purchasing groups where the CPA has an independent subcenter structure, and the subcontractors outsource the purchasing task to these organizations and do not actively participate. They assumed that it was a third-party structure (14). The study

**Table 1.** Interviewees' Characteristics

No.	Gender	Age	Level of Education	Position and Affiliation
1	Male	39	Pharm.D.	Director of the Supply Center for Urban Pharmacies, Tehran University of Medical Sciences
2	Male	49	Pharm.D.	Superspecialist Pharmacy Manager, Tehran University of Medical Sciences
3	Male	48	DBA	Deputy Planning for Pharmacies, Tehran University of Medical Sciences
4	Male	36	Pharm.D.	Head of Urban Pharmacy, Shahid Beheshti University of Medical Sciences
5	Female	48	Ph.D.	Associated Professor, Former Deputy of Food and Drug at Tehran University of Medical Sciences
6	Male	56	Ph.D.	Former General Manager of pharmacies, Tehran University of Medical Sciences
7	Male	51	Pharm.D.	Director of the Supply Center for Hospital Pharmacies, Tehran University of Medical Sciences
8	Male	47	Pharm.D.	Manager of the Purchasing Committee for Pharmacies, Tehran University of Medical Sciences
9	Male	30	Pharm.D.	Manager of Pharmaceutical and Supplies Warehouse, Iran University of Medical Sciences
10	Male	35	Pharm.D.	Head of the Commercial Department, Iran University of Medical Sciences
11	Male	34	Ph.D.	Assistant Professor, Former head of pharmacies in Shahid Beheshti University of Medical Sciences
12	Male	47	Ph.D.	Associated Professor, Former Deputy of Food and Drug in Shahid Beheshti University of Medical Sciences
13	Male	37	Pharm.D.	Deputy of Hospital Pharmacies, Tehran University of Medical Sciences
14	Male	36	Ph.D.	Assistant Professor, Former Deputy of Pharmacies in Shahid Beheshti University of Medical Sciences

also refers to virtual aggregated procurement structures that are almost informal, small-scale, and directly interact with stakeholders. However, the difference between these virtual structures and the headquarters structure is that no new forces are used, and human resources from subdivisions and pharmacies are used for aggregated procurement tasks. In this structure, costs are reduced due to the simplicity of bureaucracy and the reduced need for liquidity (14).

### 5.2. Software Infrastructure Requirements

Most experts believe that in all structures of aggregated procurement, the "software infrastructure" is of paramount importance and should have the capability to rely on this data. Before implementing an aggregated procurement strategy, the most crucial task is to synchronize and build an integrated software infrastructure. Appropriate software should allow headquarters to monitor the network online and identify the location of resources wasted in the company.

Another feature of the software is the ability to conduct transparent online bidding among vendors, which results in full consideration of bids submitted by companies and increased competition among companies to lower prices. In addition, the transparency of the tenders reduces the possibility of rent formation in the companies' purchases, ensuring fair competition. According to Huber et al., the size of a company's purchases and the maturity level are the most important factors for group e-procurement, and EPGs are positively related to buyer-supplier relationships (18). They also pointed out that the pressure caused by the

business context does not significantly affect the importance of EPGs in the procurement strategy of enterprises (18). In a study by Yuan and Lin, the researchers state that group bargaining is essential in e-commerce and that the internet makes it easier for buyers to participate in such bargaining (19). The researchers offer a group-building approach called credit-based group negotiation, which facilitates grouping buyers and sellers and achieving favorable prices for both buyers and sellers (19).

### 5.3. The Importance of Qualified Personnel

One of the problems of governmental organizations, which is also associated with low productivity, is the concentration of forces in one place. The proper personnel management should prevent this problem, and personnel performance for reward and punishment should be monitored to increase their productivity. In addition, due to the importance and sensitivity of warehouse tasks and the high volume of goods in central warehouses, experienced and trustworthy personnel should be assigned to warehouses. Nollet and Beaulieu also noted the importance of staff training and learning working principles in aggregated procurement (11). This point is similar to the one above and indicates the critical role of staff in the quality of executive work in the aggregated procurement structure (11).

### 5.4. Optimal Management Requirements

In order to establish the structure for aggregated procurement organization, a solid and efficient management

**Table 2.** Qualitative Analysis of the interviews

<b>Themes</b>	<b>Primary Codes</b>
<b>Adopting a sustainable strategy for collective purchasing</b>	Specifying the shopping cart
	Identifying profitable items
	Performing an ABC analysis for shopping
	Targeting purchases of high-turnover items
	Incremental purchasing of critical items with high financial value
<b>Headquarters structure</b>	The need to provide the necessary hardware requirements for the central warehouse
	The need for strategic warehousing for the goods depot
	Pyramidal structure in organizations
	The need for a decision-making body for procurement and distribution planning
	The need for oversight of subsidiaries
	The distinction between purchasing and warehousing in the central office
	The design of a central warehouse suitable for focused management
	Implementation of the necessary support for the delivery of goods to supply centers
<b>Software infrastructure requirements</b>	Potentials to predict consumption
	Potentials to create a transparent online tender among suppliers
	Monitoring inventory, consumption, and waste of resources
	Leveraging electronic records of the health system
	Leveraging the infrastructure of the health information system (HIS)
	Leveraging hospital intelligence management (HIM) infrastructure
	Potentials to control the expiration date
	Online monitoring of supply, distribution, and supply network
	Centralization of invoices issued in the virtual system
	Differentiation of the consumption patterns of medicines by hospital departments
	Unification of product codes
	The need for an integrated software infrastructure
<b>Favorable management requirements</b>	The need for an efficient management team
	The need for a monitoring and performance monitoring unit
	The need for organizational charts and corresponding instructions
	The existence of a pyramidal structure and corresponding management units
<b>Significance of having qualified staff</b>	The need to review employee performance for rewards and punishments
	The prevention of employees becoming inflamed with low efficiency
	The need for continuous staff training
	The need to assign experienced and trustworthy staff to warehouses
<b>Improved storage methods</b>	The need for strategic storage of sensitive medications
	The implementation of good distribution practice and good storage practice guidelines
	Expansion of the physical environment of the central warehouse
	Reducing the amount of storage space in pharmacies

team is required from the beginning, which is highly willing to achieve the organizational goals and set the organizational chart of the organization and the corresponding instructions. Another important factor for the organization's management is establishing a monitoring body that would observe the performance of the sub-sectors and thus prevent violations in these sectors. Based on Huber et al., GPOs can create an environment in which members are held accountable for the optimal use of resources by achieving integration across departments, establishing and implementing performance measures, and ensuring that incentives exist to achieve system-level efficiencies (18).

### 5.5. Improved Storage Methods

Implementing good distribution practice (GDP) and good storage practice (GSP) guidelines should be a priority for pharmacies so that the inventory is not damaged. It is also necessary to establish a strategic warehouse to store sensitive goods. To reduce the inventory of urban pharmacies, to decrease the need for pharmacy warehouses, and to promote the management of the expiration date in the headquarters, it is necessary to expand the central warehouses and reduce pharmacy storage space.

### 5.6. Adoption of a Sustainable Strategy for Aggregated Procurement

Some experts in the interviews believed that the aggregated procurement of all goods was a wrong strategy. They assumed that the ABC analysis should be performed for purchases and that items with high turnover should be purchased selectively. Accordingly, purchases should gradually start with items with higher financial value and then include items with lower turnover in the aggregated shopping cart. Rego et al. emphasized that standardization and integrating purchasing volume increase economy of scale (20).

### 5.7. Conclusions

If properly implemented and with the necessary infrastructure, the aggregated procurement process can reduce pharmacy costs, increase financial reserves and profitability, and reduce corruption in government organizations. Moreover, the function and efficiency of aggregated procurement mainly depend on the appropriate executive structure and software infrastructure.

### Footnotes

**Authors' Contribution:** Study concept and design: R. M., E. S., and P. M.; analysis and interpretation of data: R. M.,

and E. S.; drafting of the manuscript: R. M.; critical revision of the manuscript for important intellectual content: R. M., E. S., and P. M.

**Conflict of Interests:** The authors declare no conflict of interests.

**Ethical Approval:** IR.SBMU.PHARMACY.REC.1398.322

**Funding/Support:** This research does not have any funding/support.

### References

1. Burns LR, Lee JA. Hospital purchasing alliances: utilization, services, and performance. *Health Care Manage Rev.* 2008;**33**(3):203-15. [PubMed ID: 18580300]. <https://doi.org/10.1097/01.HMR.0000324906.04025.33>.
2. Essig M. Purchasing consortia as symbiotic relationships: developing the concept of "consortium sourcing". *J Purch Supply Manag.* 2000;**6**(1):13-22. [https://doi.org/10.1016/S0969-7012\(99\)00031-3](https://doi.org/10.1016/S0969-7012(99)00031-3).
3. Nollet J, Beaulieu M. The development of group purchasing: an empirical study in the healthcare sector. *J Purch Supply Manag.* 2003;**9**(1):3-10. [https://doi.org/10.1016/S0969-7012\(02\)00034-5](https://doi.org/10.1016/S0969-7012(02)00034-5).
4. Stefan JP, Santiago RE. The benefits of group purchase. *J Prop Manag.* 1989;**54**(5):50-3.
5. Schotanus F, Telgen J, Deboer L. Unraveling quantity discounts. *Omega.* 2009;**37**(3):510-21. <https://doi.org/10.1016/j.omega.2007.09.002>.
6. Telgen J, de Boer L. Experience with the EC directives on public procurement: A survey of Dutch municipalities. *Public Procure law Rev.* 1997;**6**(3):121-7.
7. Degraeve Z, Roodhooft F. A smarter way to buy. *Harv Bus Rev.* 2001;**79**(6):22-3. 145. [PubMed ID: 11408975].
8. Ahmadi A, Pishvae MS, Heydari M. How group purchasing Organisations influence healthcare-product supply chains? An analytical approach. *J Oper Res Soc.* 2018;**70**(2):280-93. <https://doi.org/10.1080/01605682.2018.1434403>.
9. Harink J, Telgen J, Streefkerk P. *[Purchasing management in municipalities]*. Alphen aan den Rijn, Netherlands: Wolters Kluwer Netherlands; 1999. Dutch.
10. Hendrick TE. *Purchasing consortiums: Horizontal alliances among firms buying common goods and services: What? who? why? how?* Tempe, USA: Center for Advanced Purchasing Studies; 1996.
11. Nollet J, Beaulieu M. Should an organisation join a purchasing group? *Int J Supply Chain Manag.* 2005;**10**(1):11-7. <https://doi.org/10.1108/13598540510578333>.
12. Aylesworth M. Purchasing consortia in the public sector, models and methods for success. *International Supply Management Conference and Educational Exhibit*. Huntsville, USA. 2003.
13. Bakker E, Walker H, Harland C. Organizing for collaborative procurement: An initial conceptual framework. *Adv public Procure Pract Innov knowledge-sharing.* 2006:14-44.
14. Johnson PF. The Pattern of Evolution in Public Sector Purchasing Consortia. *Int J Logist Res Appl.* 2007;**2**(1):57-73. <https://doi.org/10.1080/13675569908901572>.
15. Walker H, Bakker E, Schotanus F, Harland C. Choosing an organisational form: the case of collaborative procurement initiatives. *Int J Procure Manag.* 2008;**1**(3). <https://doi.org/10.1504/ijpm.2008.017527>.
16. Schneller ES. The value of group purchasing-2009: meeting the needs for strategic savings. *Health Care Sector Advances, Inc.* 2009;**6**.
17. Maltz A, Ellram L. Outsourcing Supply Management. *J Supply Chain Manag.* 1999;**35**(2):4-17. <https://doi.org/10.1111/j.1745-493X.1999.tb00232.x>.

18. Huber B, Sweeney E, Smyth A. Purchasing Consortia and Electronic Markets - A Procurement Direction in Integrated Supply Chain Management. *Electron Mark.* 2004;**14**(4):284-94. <https://doi.org/10.1080/10196780412331311739>.
19. Yuan ST, Lin YH. Credit Based Group Negotiation for aggregate sell/buy in e-markets. *Electron Commer Res Appl.* 2004;**3**(1):74-94. <https://doi.org/10.1016/j.elerap.2003.09.002>.
20. Rego N, Claro J, Pinho de Sousa J. A hybrid approach for integrated healthcare cooperative purchasing and supply chain configuration. *Health Care Manag Sci.* 2014;**17**(4):303-20. [PubMed ID: 24370921]. <https://doi.org/10.1007/s10729-013-9262-y>.