

Investigating the Role of Geriatrics Pharmacies in the Health care Supply Chain

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Abstract

The health care system in Egypt is witnessing a complete reform with the aim of streamlining its supply chain to better serve the public. One of the challenging issues in the health care supply chain in Egypt is the demographic transition which shifted the age distribution in favor of an aging population. The percentage of adults over 60 in Egypt is increasing faster than that of any other age group. This consequently resulted in higher medical service demand in public hospitals. It was found that the absence of specialized pharmacies for the elderly patients in hospitals known as ‘geriatrics’ pharmacies, resulted in prescription errors and drug interactions. Therefore, this study aims to investigate the current status of the general pharmacies in public hospitals in Beni Swif governorate in Egypt, and exploring the opinions of pharmacists, doctors and patients in establishing specialized geriatrics pharmacies in public hospitals. This study follows an exploratory approach with the use of questionnaires for data collection. The results showed that establishing geriatrics pharmacies in public hospitals in Egypt would ensure the provision of a better medical service for the elderly and reduce prescription errors and drug interactions.

Keywords

Healthcare supply chain, geriatrics, Egypt, pharmacies, and logistics

1. Introduction

In the year 2016, Egypt launched its ‘Egypt vision 2030’ for development which adopted the sustainable development concept as a general framework to improve the quality of life of the present and future generations. Egypt vision 2030 includes ten main pillars whereas the 6th pillar focuses on health. The vision for the ‘health’ pillar as stated in Egypt Vision 2030: “All Egyptians enjoy a healthy, safe, and secure life through an integrated, accessible, high quality, and universal healthcare system capable of improving health conditions through early intervention, and preventive coverage...this will lead to prosperity, welfare, happiness, as well as social and economic development, which will qualify Egypt to become a leader in the field of healthcare services and research in the Arab world and Africa”. Different successful health reform programs were executed in Egypt over the past few years which positively impacted the social and economic development and resulted in longer life expectancy and higher productivity (The center for global health and development 2023). Currently, Egypt’s population is 108,900,792 persons with an average annual growth rate of 1.5% (CAPMAS 2023). The percentage of adults over 60 in Egypt is increasing faster than that of any other age group. According to the latest statistics, the 65+ population is around 4,875,305 persons representing 5% of the total Egyptian population (CAPMAS 2023). This consequently resulted in higher medical service demand in public hospitals which suffer from limited resources. It was found that the absence of specialized pharmacies for the elderly patients in hospitals known as ‘geriatrics’ pharmacies, resulted in prescription errors and drug interactions, which affects the patient’s health and deplete the already limited resources. Therefore, this research attempts to investigate the role of geriatrics pharmacies in the health care supply chain and the impact it might have on the involved stakeholders.

1.1 Objectives

This research paper attempts to fulfill three main objectives: (1) to emphasize the role and importance of geriatrics pharmacies in Egypt’s healthcare supply chain (2) to investigate the stakeholders’ perspectives on establishing geriatrics pharmacies i.e. doctors, pharmacists and patients (3) to provide recommendations for establishing geriatrics pharmacies in public hospitals in Egypt.

2. Literature Review

Health care supply chain management is a sophisticated network of processes that aim at connecting medications, supplies and health care providers to efficiently and effectively use resources to achieve the overall quality in the health care system (Ledlow et al. 2016; Gupta and Ramesh 2015). The foundation of the healthcare system is supply chain management since patient care is heavily dependent on the timely and appropriate availability of pharmaceuticals and other medical supplies (Singh et al. 2017; Mathew et al. 2013). Every supply chain practice in healthcare institutions aims to guarantee commodity security for every customer (Singh et al. 2017; Kumurya 2015). However, the dynamic, intricate, and uncertain health care supply chain is frequently seen as fragmented and inefficient (Mathur et al. 2018; Schneller et al. 2006). This might be because the traditional healthcare supply chain cannot function as a system because each phase functions independently. The performance of the supply chain can be enhanced by effective communication and integration among all stakeholders (Lenin 2014). The healthcare business has struggled to adopt and implement system-wide supply chain management practices due to the mismatched incentives and competing goals of the various stages and divisions (Buttigieg et al. 2020). The primary objective of the healthcare supply chain should be focused on satisfying the expectations of stakeholders by providing timely delivery of items of the highest quality in the appropriate amounts and cutting-edge services (Buttigieg et al. 2020). As stated by Mathew et al. (2013), stakeholders in the health care supply chain consist of eight groups: producers/suppliers of medical and surgical supplies, medical devices, pharmaceuticals; purchasers (wholesalers, distributors, group purchasing organizations); providers (hospitals, integrated delivery networks, physicians, clinics, pharmacies, nursing homes); customers/clients/patients; relatives/carers; governmental institutions; regulatory agencies and insurance companies.

Hospital supply chains, which are pertinent to this study, are complicated structures that depend on the movement of goods and services to meet the requirements of both patients and those who care for them (Schneller et al., 2006). To deliver healthcare services effectively and efficiently, patient logistics, clinical routes, data exchange, and integrated supply chains have all become essential (Buttigieg et al. 2020). The main variables that affect hospital supply chain performance are trust, knowledge sharing, IT integration, and supply integration. Reorganizing hospital services, which are characterized by linked supply chains, is thus an example of a decisive strategy to reduce resource consumption and improve the standard of healthcare (de Vries and Huijsman 2011).

According to the Geriatric Medical Center in New Jersey (2023), geriatrics is “a branch of medicine focused on the health care of the elderly”. Geriatric patients may suffer from different diseases such as dementia, delirium, fall and coronary heart disease (Geriatric Medical Center 2023; Elliott 2016). Illnesses and medications may affect older people differently than younger adults and older patients may have overlapping health problems that require multiple medications (Elliott 2016). Therefore, the role of geriatricians is to manage and prevent illnesses for the elderly in addition to developing care plans that address the special health problems (Elliott 2016). A common problem that is often found with geriatrics is ‘polypharmacy’. Polypharmacy refers to the use of more medications than is clinically indicated or warranted (Cantlay et al. 2016; Duerden et al. 2013). Elderlies have an average of 2 to 6 prescription drugs in addition to up to 4 over the counter medicine (Geriatric Medical Center 2023). Consequently, with the increasing number of drugs being taken, the risk of drug interaction increases significantly leading to the patients’ poor quality of life, high rate of symptomatology and drug expenses (Abdulraheem 2013; Qato et al. 2012). It is worth noting that a very important reason that is contributing to polypharmacy is the incomplete drug history and prescriptions of the patients at the time of hospital admission (Abdulraheem 2013). Thus, geriatric pharmacy practice has grown in popularity as a field of specialty for pharmacists as a result of the complexity of drug management for elderly patients. It is also worth noting that research has shown that the need for geriatric medicine and pharmacy practice will grow as the world's population of seniors ages, and the majority of doctors and chemists practicing adult medicine will need some knowledge of geriatric assessment and care (Elliott 2016).

Research on geriatric pharmacy mainly focused on two specific themes: (1) the role of pharmacists in geriatric such as in Petrovic et al. (2016), Riordan et al. (2016), Lee et al. (2015), Marengoni et al. (2015) (2) geriatric pharmacy education such as in Hope et al. (2023), Woodall et al. (2022), Odegard et al. (2007). The review of literature revealed the scarcity of geriatric pharmacy research in the Middle East, and only two research studies were found; Awad et al. (2020) and Awad and Hanna (2019) and both were conducted in Kuwait.

Therefore, the literature review confirms the lack of research on geriatrics pharmacies and its role in the health care supply chain and this presents a research gap that this research paper will attempt to fill.

3. Methods

This research follows the exploratory approach to investigate the status of the general pharmacies in public hospitals in Beni Swif governorate in Egypt, through exploring the opinions of three groups: doctors, pharmacists and elderly patients over the age of 65 in establishing specialized geriatrics pharmacies in public hospitals. These three groups were selected for the study to have a comprehensive view from the involved stakeholders. ‘Doctors and geriatrics specialists’ are experienced in medical care for elderly patients; ‘pharmacists’ are responsible about drug prescriptions, drug interactions, doses and side effects; and ‘elderly patients’ are the recipient of the service.

4. Data Collection

The data was collected through three different questionnaires that addressed the three selected groups: doctors, pharmacists and elderly patients over the age of 65. The questionnaires aim at exploring the stakeholders’ views on the public hospitals’ pharmacies’ performance on the services provided to geriatrics and on the necessity of establishing specialized geriatrics pharmacies. The questionnaires were developed from the literature, and it was reviewed by a group of 10 experts that included doctors specialized in elderly medicine and faculty members at the Faculty of Pharmacy Beni Swif University. The study used stratified sampling, whereas the response rate for the doctors’ sample was 46% (questionnaire was sent to 82 doctors and responses were received from 38 doctors), the response rate for pharmacists’ sample was 74% (questionnaire was sent to 132 pharmacists and responses were received from 98 pharmacists) and the response rate for patients was 41% (questionnaire was sent to 100 patients and responses were received from 41 patients). The data collected was reviewed and analyzed using descriptive statistics as it is presented in the following section.

5. Results and Discussion

The first questionnaire that addressed doctors was divided into two sections. Section one focused on investigating the doctors’ assessment on the performance of the current pharmacies regarding elder patients using a four-point Likert scale (1 poor, 2 good, 3 very good, 4 excellent). Section two focused on examining the frequency of occurrence of selected geriatric issues. Table 1 shows the results of section one and Table 2 presents the mean score of the doctors’ responses.

Table 1. Doctors Questionnaire Results

| No | Questions | Poor | Good | Very Good | Excellent |
|----|---|------|------|-----------|-----------|
| 1 | What is your assessment of the permanent availability of the drug in the main pharmacy? | 3% | 37% | 24% | 37% |
| 2 | What is your assessment for separating the elder patients’ medications in a special geriatric pharmacy? | 0% | 58% | 18% | 24% |
| 3 | What is your assessment on the pharmacists’ role in terms of dealing with drug interaction with patients? | 0% | 0% | 68% | 32% |
| 4 | What is your assessment on the pharmacists’ role in providing drug information and education for the medication prescribed to the patient? | 0% | 26% | 24% | 50% |
| 5 | What is your assessment of on the pharmacy’s role in terms of reminding the patient to take his treatment at the specified and appropriate times? | 0% | 24% | 39% | 37% |
| 6 | What is your assessment on the review of treatment and doses by the clinical pharmacists? | 0% | 0% | 34% | 66% |

Table 2. Mean Score of Doctors' Response

| Rank | Questions | Mean Score |
|------|---|------------|
| 1 | What is your assessment on the review of treatment and doses by the clinical pharmacists? | 3.7 |
| 2 | What is your assessment on the pharmacists' role in terms of dealing with drug interaction with patients? | 3.3 |
| 3 | What is your assessment on the pharmacists' role in providing drug information and education for the medication prescribed to the patient? | 3.2 |
| 4 | What is your assessment of on the pharmacy's role in terms of reminding the patient to take his treatment at the specified and appropriate times? | 3.1 |
| 5 | What is your assessment of the permanent availability of the drug in the main pharmacy? | 2.9 |
| 6 | What is your assessment for separating the elder patient medications in a special geriatric pharmacy? | 2.7 |

As it is shown in Table 1 and 2, the doctors' assessment on the performance of current pharmacies can be considered as very good since four dimensions out six had a mean score of above 3. The results indicate that the pharmacists' performance regarding elderly patients is very satisfactory. Table 3 shows the results of the doctors' responses on the frequency of occurrence of selected geriatric issues.

Table 3. Doctors' responses on Geriatric Patients Issues

| No. | Questions | From 1 – 3 times | From 4- 6 times | From 7 – 9 times | More than 10 time |
|-----|--|------------------|-----------------|------------------|-------------------|
| 1 | How often do you need a pharmacist's consultation about drug contradictions for geriatric patients? | 32% | 11% | 37% | 21% |
| 2 | How many times geriatric patients come with miss dosing of drugs? | 24% | 13% | 24% | 39% |
| 3 | How many times did you see geriatric patients with medication errors (wrong dose, wrong medication)? | 24% | 13% | 13% | 50% |

The results shown in Table 3 highlight some of the problems doctors encounter when dealing with geriatric patients. As it is shown, 37% of doctors stated that from 7 to 9 times they often need pharmacists' consultation about drug contradictions for geriatric patients. This is primarily due to the lack of information on the patients' medical history. In addition, 39% of doctors stated that more than 10 time they found geriatric patients miss dosing the prescribed drugs i.e., not taking their medications at the right timings as prescribed which consequently impact the efficacy of the treatment. And it was also found that 50% of doctors have seen more than 10-time geriatric patients with medication errors that include taking the wrong doses or even sometimes the wrong medications.

The second questionnaire was addressed to pharmacists to evaluate the potential need for establishing geriatrics pharmacies in public hospitals. The results of the pharmacists' questionnaire are presented in Table 4.

Table 4. Pharmacists Responses on the Establishing of Geriatrics Pharmacies in Hospitals

| No. | | Yes | No | Maybe | I don't know |
|-----|---|-----|----|-------|--------------|
| 1 | Is there a need to establish a sub specialized pharmacy to dispense, educate and follow up on geriatric patients? | 73% | 5% | 0% | 19% |
| 2 | Will this new pharmacy add value to the hospital? | 68% | 9% | 20% | 0% |
| 3 | Will this pharmacy provide the right products/drugs to the patients? | 84% | 5% | 9% | 0% |
| 4 | Will this pharmacy provide the right quantity of drugs to the patients? | 79% | 9% | 0% | 10% |
| 5 | Will this pharmacy provide the right drugs in the right condition to the patients? | 84% | 9% | 5% | 0% |
| 6 | Will this pharmacy deliver the drugs to patients in the right time? | 89% | 5% | 0% | 4% |
| 7 | Will this pharmacy store drugs in the right conditions? | 73% | 9% | 15% | 0% |

As it is shown from Table 4, most responses indicate the need for establishing geriatrics pharmacies. The pharmacists agreed that the establishment of such pharmacies will add value to the hospitals and logistically support the process of service provision. Such pharmacies will achieve the logistics goals of providing the right drugs in the right quantities and conditions at the right time to geriatric patients. Achieving such goals will significantly reduce the occurrence of geriatric related problems that doctors have experienced in Table 3.

The third questionnaire investigated the elderly patients' opinions on the performance of current pharmacies in public hospitals and their views on establishing specialized geriatric pharmacies. Table 5 presents the findings of the elderly patients' responses.

Table 5. Elderly Patients Responses

| No. | Questions | yes | no | maybe | I don't know |
|-----|--|-----|-----|-------|--------------|
| 1 | Will the presence of a special pharmacy for the elderly improve the service for elderly patients? | 85% | 15% | 0% | 0% |
| 2 | Can the method of treatment be prescribed in an easy and simplified way by the pharmacist in the elderly pharmacy? | 85% | 0% | 15% | 0% |
| 3 | Does the presence of a specialized pharmacy for the elderly make the patient feel comfortable and safe with medicines? | 85% | 15% | 0% | 0% |
| 4 | Does the current pharmacy provide medical consultations for elderly patients to take care and improve the level of their health? | 85% | 0% | 0% | 15% |
| 5 | Are the pharmacists in the current pharmacy distinguished by cooperating and providing services to the elderly? | 71% | 0% | 24% | 5% |
| 6 | Is the treatment dispensed in sufficient quantities? | 56% | 15% | 29% | 0% |
| 7 | Do you think we need a specialized pharmacy to serve and care for elderly patients? | 85% | 0% | 0% | 15% |
| 8 | Is the patient's committed to take the correct medication with the correct doses and at the correct times during the previous periods, through the pharmacist? | 71% | 0% | 27% | 2% |

As it is shown in Table 5, most responses show that the presence of specialized geriatric pharmacies would allow for better follow-ups and consultations and improve the service provided to elderly patients. The specialized geriatric pharmacies would improve efficiency in terms of inventory management as patients will receive the right medications in the right quantities thus reducing waste that might result from prescribing conflicting medication.

6. Conclusion

This research investigated the status of the general pharmacies in public hospitals in Beni Swif governorate in Egypt as pharmacies being a significant link in the healthcare supply chain. Through exploring the perspectives of pharmacists, doctors and patients to establish specialized geriatrics pharmacies in public hospitals, the results showed

that establishing such pharmacies would ensure the provision of a better medical service for the elderly and reduce prescription errors and drug interactions. This consequently would contribute to reducing waste and inventory costs in the health care supply chain. It can be concluded from this research that providing pharmacy services to geriatric patients requires a specialized approach in the health care supply chain that takes into consideration their unique needs and challenges. For instance, personalized care to geriatric patients is needed to understand their individual needs and medication regimens. This include providing medication counseling and education, monitoring for potential drug interactions and side effects, and developing medication management plans that are tailored to each patient's specific needs. Also, in terms of logistics, accessibility is very important. Geriatric pharmacies should ensure that their facilities are accessible to geriatric patients, including those with mobility issues or visual impairments. This can include installing wheelchair ramps, providing large-print labels and medication instructions, and offering home delivery services for patients who are unable to leave their homes. Moreover, pharmacies should prioritize effective communication with geriatric patients by providing clear and concise medication instructions, answering questions in a patient-friendly manner, and using plain language to explain potential side effects and drug interactions. Additionally, pharmacies should ensure that their staff members are trained to communicate effectively with geriatric patients, who may have hearing or cognitive impairments.

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Biography

Sara Elzarka is a professor of supply chain management, and she is currently the dean of the International Transport and Logistics Institute for postgraduate studies at the Arab Academy for Science, Technology and Maritime Transport in Egypt. Professor Elzarka received her PhD in supply chain management from the University of Huddersfield in the United Kingdom and won several research awards. Professor Elzarka is a member of the International Supply Chain Education Alliance (ISCEA) Europe/Middle East/Africa (EMEA) advisory board. She served as the education chairperson for the Council of Supply Chain Management Professional (CSCMP) Egypt roundtable. Her research work focuses on the applications of supply chain management in Egypt and the Middle East. Professor Elzarka worked in several international research projects funded by the European Union and the International Association of Maritime Universities (IAMU).

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Marwan Mustafa El-Gamal is a clinical pharmacist; Dr. Marwan holds a bachelor's degree in pharmacy in the clinical department from Bani Suef University. He worked as a clinical pharmacist in Nasser General Hospitals in Bani Suef for fever, the Ihnasia Center. He worked in the Bani Suef Health Directorate in the management of therapeutic medicine and hospital management. He was assigned to manage blood banks and as a liaison officer. The directorate's politician 2017-2020 was the referral officer in Bani Suef hospitals in 100 million health units. A campaign sponsored by the President of Egypt, and he was honored for his efforts in that initiative in 2017. He was assigned as an infection control officer at the Fever Hospital in Bani Suef from 2015-2016. And he was assigned as Deputy Director of Chest Hospital in Bani Suef from 2021 to date.