Original Article

Pharmacists' perception on the use of Accounting Information System for Pharmacy Management: A study in Muscat, Oman

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Abstract

Nowadays, pharmacies are playing an incredibly important role in human development by improving the quality of life and reducing the time spent in the hospital. The accounting information system will enable the pharmacies to obtain accurate information about the type of the drug, quality, price, sales and inventory level at their stores. The aim of this study is to understand the private pharmacists' perception on the use of Accounting Information system for inventory management and supply chain management and to know if AIS leads to improvement in operational efficiency of the pharmacies. Pharmacists perceive that AIS helps in maintaining safety stock levels, helps in monitoring the inventories, proper record is kept for damaged or problematic medical items, and helps in supply chain flexibility, responsibility, competency, and quickness in pharmacies. pharmacists think that inventory management and supply chain management using AIS is helping the improvement in the performance of pharmacies.

Keywords: Pharmacies, Pharmacist, Performance, Accounting Information System, Perception,Supply Chain, and Inventory Management.

Introduction

Nowadays, pharmacies are playing an incredibly important role in human development by improving the quality of life and reducing the time spent in the hospital. Pharmacies are a strategic element for the development of good health and productivity in a nation, due to direct connection with human wellbeing [1,2,3]. However, pharmacies are facing many challenges, especially after the COVID 19 pandemic. With the countries on lockdown, prescription volumes initially soared overnight as patients went into panic mode with social distancing, and pharmacy drive-through lanes became a common sight[4]. Pharmacy drive-through lanes were later recognized as an ideal access point for COVID-19 testing along with vaccinations for COVID-19[5]. Yet, these access points have been associated with the challenges of an inactive supply chain, mainly during the pandemic period.

The supply chain is one of the major problems in pharmacies due to its complex process of developing, manufacturing and delivering drugs and medicines[6,7].

A Pharmacy is a facility for storing and delivering medical supplies to customers. In order to keep the drugs available at all times, a pharmacy should monitor its supply chain, monitor its inventory level and have a good accounting system.

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The accounting information system will enable the pharmacies to obtain accurate information about the type of the drug, quality, price, sales and inventory level at their stores [8]. A report indicates that since the beginning of Covid-19, the daily sales of pharmacies have increased much when compared with the sales before Covid-19 [9]. The main reason for this is the increase in demand for hand sanitizers, masks and vitamins in society[10]. However, these items are always in shortage at the time there was high demand for them. This is due to the imbalance in the level of demand and supply of drugs and medical devices[7, 9,11] Such imbalances could cause negative effects on both the supply chain and the inventory management systems.

If a good accounting information system is used, it makes it possible to handle drug payments, payrolls, and inventory levels and it will also provide automated financial reports to get a clear financial outlook[12]. Many studies have highlighted the supply chain process and the challenges to provide access to medicines[13,14,15,16]. Other studies have focused more on inventory management challenges in pharmacies[17,18,19]. Yet, the existing studies have not examined the role of an information system that provided relevant information to support the decision-making process with respect to supply chain management decisions as well as inventory management decisions. Currently, competition has increased globally. The focus of any business, which strives to achieve a competitive advantage, should account for both efficient supply chain management and inventory management. Efficient management of supply chain and inventory level contribute to maximising the overall value of the firm by better utilization of resources of the firm[20].

A supply chain adds value by connecting the firm's suppliers and its customers, while inventory management will ensure the availability of the drug for customers. Both supply chain management and inventory management should be examined with consideration for information technology. The utilization of information technology assists pharmacists to manage the medication process and follow up on the progress [21,22]. It also facilitates better supply chain coordination and integration and better organisational performance [23,24]. This study will examine pharmacists' perception of the use of the Accounting Information System for pharmacy management for its inventory and supply chain. This paper is organized as follows: Section 1 discusses the importance of Pharmacists perception. Section 2 discusses the literature review. Section 3 discusses the study's objectives and research methodology. Section 4 includes data analysis and interpretation. Section 5, 6 and 7 discusses conclusion, recommendations and limitaions and scope for future research respectively.

1. Importance of Pharmacists' perception

Pharmacists revealed that the dispensing errors are increasing day by day. The major reasons identified for such errors were pharmacists fatigue and overwork, huge prescription volumes, confusing or similar medicine names. Pharmacists were of the opinion that having a good information system helps in detecting drug errors and mistakes, reduces pharmacists' unreasonable workload, and helps in numerous checks during the dispensing processes. [28].

There is an impact of Pharmacy accounting information system on the pharmacies' activities and communication also; it might influence the attitude and weakness of the tasks, However, Pharmacy accounting information system not only influence the pharmacies, it has an impact on medication results and management process as well [29].

In pharmacy, inventory is for the present and future demand of pharmaceutical products and the value of these assets continuously increase because of the growth of this industry that is necessary for the wellbeing of the people. Furthermore, accounting information system is used to have proper inventory control by recording any new medicine with all the important information. Financial management planning and preparation is complex in pharmacy. Accounting information system is used to solve many complex issues that works properly with inventory as the most important consideration [30].

In recent decades, the role of pharmacists have progressed from performing traditional activities like dispensing and supply of medications to the present day activities like ensuring coherent and cost-effective use of medications, promoting healthy lifestyle, and improving clinical results by actively engaging in direct patient care and working together with various healthcare disciplines. With such increasing scope of practice, pharmacists are being treasured as vital elements in offering personalized patient care as part of inter-professional healthcare groups.

An individual and groups' work demands, preferences, objectives, professional status, social networks and communication patterns influence the way a technology is designed, executed, and utilized [31]. Human resources play a significant role in managing and mitigating supply chain risk. Thus, how human resources are managed will have an impact on organizations.

Literature review

If an organization is able to maintain its stock levels at the lowest cost, it is called as inventory management. Inventory mismanagement has serious effects on patient safety. When examining a potential prescription error or other drug therapy issues, pharmacists should take into account the facts relevant to pharmacy inventory management (e.g. patient needs a medication but due to product unavailability, he is not able to receive the medicine; and loss of efficacy due to incorrect storage conditions[30].

An inventory control system facilitates a firm to maintain and decide on the optimum level of investment in inventory to accomplish the requisite operational efficiency. In order to

meet the customer demand, inventory control is required. The businesses should avoid out of stock situation without spending high inventory costs to meet the customer demands. It is found that the out of stock situations are due to the firms not using the inventory control systems.It is critical to keep track of inventory[30]. A firm cannot afford an out-of-stock situation. This out-of-stock situation will lead to losing customers and losing employees [22]. Hence, priority must be given to supply chain for faster delivery of quality products at lower costs, which helps the firm to generate more income, and minimize the defects. Business performance means set of skills and resources of a business and their application, transformed into strengths and weaknesses.

Technology has become an unavoidable part of businesses and human lives. It has brought about significant transformation in the business operations and everyday life [32].

Managing inventory using technology offers lot of benefits, which includes decrease in patient waiting time, decrease in loss due to inventory shortage and medication errors. It also helps the pharmacists with spare time to counsel patients along with increased medication availability, sales and improved pharmacists accountability. Inventory management in pharmacies has become a key challenge as the pharmacies try to reduce the costs at the same time. Accounting information system offers several benefits in terms of presenting and analyzing information. It also guides in reducing the expenses with an increase of performance of the work of pharmacy, projecting expected inventory cost and future revenues. In addition, it helps in making decisions regarding the orders and supplies, replacement of medical equipment, cost of inventories, costs of conversion, and costs of purchase [33].

While Supply chain management determines the efficient flow of goods from suppliers to consumers . Supply chain management emphasizes on the final customer. A customer creates the demand and the existence of supply chain provides the customer with the product. Pharmacy performance is the patients' intention to carry out various set of actions that bring out a stable, exclusive and positive relationship with the pharmacy.

[34] found that Pharmacists face challenges when implementing accounting information system and also without training it is difficult to use the system. In addition, there is a risk of losing the information due to hackers, and viruses. Moreover, errors in recording the availability of medical stock will make it difficult in finding out the inventory. Also lacks features such as warning for lack of available medical materials and tools.

According to [22], Accounting information system affects the pharmacists' assignments, principally in given service outcomes. In addition, it could influence the pharmacists' mentalities, and goals to utilize the Accounting information system for example, practicality, mistake rates, irretrievability. Adoption and execution of wellbeing of PC frameworks emphatically influence the everyday exercises of drug specialists. Digital technology offers lot of benefits such as increased prescription handling capacity, avoid delays in medication distribution systems and avoids medication errors which is associated with patient safety.

The Accounting information system has an accounting process for the supply of medicines to carry out the supply well [7]. Information systems can reduce medication errors. It helps in reducing the time the pharmacists spend in preparing, labeling, and packaging drugs. The time saved can be used for patient care activities. Apart from this, it is also more efficient in inventory control and thus helps in reducing the inventory costs. Information systems perform a variety of functions, which includes monitoring inventory and automatically reordering inventory when it is time for the pharmacy's inventory to be replenished . Accounting information system assists pharmacists with overseeing medicine administrations, work on monetary administration, and provide logical information about treatments and medicine uses. Additionally, like any innovative advancement, refreshing of Pharmacy information system is expected to satisfy the expanding needs of patients and help pharmacists in offering better assistance [22].

According to [35], Pharmacists usually have a positive attitude towards the use of pharmacy accounting system. They have mentioned that easy access to drug information, providing services on time, and reducing workforce problems as the main benefits of pharmacy accounting system.

OBJECTIVES AND METHODOLOGY

The aim of this study is to understand the private pharmacists' perception on the use of Accounting Information system for inventory management and supply chain management and to know if AIS leads to improvement in operational efficiency of the pharmacies. This study utilizes exploratory research to look into a problem that is not well defined. It is carried out in order to gain a better knowledge of the current problem, but the results are not conclusive.

Research respondents

Convenience sampling method is used for collecting data, which involves the use of "convenient" respondents for the researcher. The researchers collected the data from the private pharmacies where it is easily accessible and convenient to collect. Table1 below shows the number of private pharmacies in Muscat.

Table 1- Number of Private pharmacies in Muscat

Year	Number of pharmacies
2010	183
2011	200
2012	212

2013	228
2014	231
2015	236
2016	258
2017	270
2018	272
2019	279
2020	288

Source: NCSI, Oman

The number of private pharmacies for the year 2022 is not available. Therefore, based on the population size of 288 in 2020, the researchers were planning to collect data only from 200 pharmacists due to time limit, but were able to collect data only from 82 pharmacists. Out of which only 67 responses were useful as 15 pharmacists mentioned that their pharmacies are not using Accounting information system in their pharmacies.

This study gathered data from pharmacists by preparing a structured questionnaire that was distributed to the pharmacists working in private pharmacies. The questionnaire is divided into 3 parts, that are demographic consisting of age, gender and experience of the pharmacists. The second part covers questions related to the challenges and benefits of using AIS in pharmacies. The last part consists of questions on AIS or PIS in improving the operational efficiency. These questions were answered by choosing five point Likert scale of Strongly Agree, Agree, disagree, neutral and strongly disagree which are easy and fast to answer. The result of this questionnaire is helpful in accomplishing the aim and objectives of this research.

Treatment of Data

To assess the outcomes, SPSS software was utilized Multiple Regression and Correlation analysis is performed with the help of SPSS to fulfil the objectives of the study.

Data analysis and interpretation

Table 1- Demographic profile of Respondents

Demographic profile		Number	Percentage (%)
Gender	Female	47	57.3%
	Male	35	42.7%
Age	25-30	52	63.4%
	31-36	18	22.0%
	36-45	9	11.0%
	46-55	3	3.7%
Nationality	Omani	59	72.0%
	Indian	15	18.3%
	Filipino	5	6.1%
	Egyptian	2	2.4%
	Pakistani	1	1.2%
Educational level	Bachelor in pharmacy	57	69.5%
	Diploma	25	30.5%
Years of experience	2-3 years	41	50.0%
	> 5 years but less than 10 years	22	26.8%
	> 10 years	19	23.2%
Designation	Chief pharmacist	26	31.7%
	Junior pharmacist	24	29.3%
	Counselling pharmacist	9	11.0%
	Trainee pharmacist	23	28.0%

Source: Questionnaire

About 57.3% of total respondents are female and 42.7% of total respondents are male. Most of them were around 25-30 years, which is 63.4% of total respondents, while around 31-36 years are the second highest respondents, which is 22.0% of total. Between 36-45 years are only 11.0% of total respondents.

Most of respondents are Omani that are 59 of total respondents, which is 72.0%. As for Egyptian and Pakistani are lowest respondents of total that are 2.4% and 1.2% respectively. About 18.3% of total respondents are Indian respondents. All the respondents are having bachelor degree about 69.5% and only 30.5% of total respondents are having diploma degree.

The respondents working in pharmacies for 2-3years are 50% of total respondents. About 26.3% of total respondents are having work experience of more than 5 years. Around 23.3% are having experience of more than 10 years. The percentage of the positions of pharmacists are close for chief pharmacist, junior pharmacist and trainee pharmacist 31.7%, 29.3% and 28.0% respectively. Only few of respondents are from position of counselling pharmacist that is 11.0% of total respondents.

Table 2- Does the pharmacy apply accounting information system (AIS)?

Usage of AIS	N	%
Yes	73	89%
No	9	11%

Source: Questionnaire

From table 2, it is evident that 82 Pharmacists responded to the questionnaire. Out of 82 respondents, only 73 said that their pharmacy is using Accounting Information System, nine of them said that their pharmacy does not use the Accounting Information System. As our study focuses on Accounting Information System, only 73 questionnaires were used where Accounting Information system is applied.

Reliability of questionnaire

Cronbach Alpha is widely used to measure the reliability of an instrument (Bonett &Wright,2014). Nunnally (1978) notes that a Cronbach Alpha of 0.70 and above is considered reliable.

Table 3- Reliability Statistics

Cronbach's Alpha	No. of Items
0.978	20

Source: Researchers calculation using questionnaire

Table 3 shows the Cronbach's Alpha, which is 0.978 for 20 statements in the questionnaire. As the Cronbach's Alpha in this study is more than 0.90, the reliability of the questionnaire is excellent and further analysis can be carried out.

Multiple Regression

Multiple regression is a statistical tool used for analyzing and modeling different variables. The variables are analyzed if there is a positive or negative relationship between the dependent and the independent, showing if the variables affect each other. The data must also be properly analyzed to avoid erroneous conclusions. The benefits of using multiple regression are the ability to determine the relative impact of one or more variables and to predict the value of the criterion for the variables.

Table 4- Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.907	0.822	0.817	3.361

a. Predictors: (Constant), Supply chain management, Inventory Management

Source: Researchers calculation using questionnaire

The table 4 displays that R-value is above 0.7 that is 0.907 which indicates a strong linear relationship between the independent variables supply chain management, Inventory management and the dependent variable improvement in pharmacies operational efficiency.

The table 5 also shows R square value, which clarifies that total variance explained by Supply chain management and Inventory Management is 82.2% on pharmacies operational performance.

Table 5-ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3645.585	2	1822.793	161.384	.000[b]
	Residual	790.634	70	11.295		
	Total	4436.219	72			

a. Dependent Variable: Improvement in operational efficiency

b. Predictors: (Constant), Supply chain management, Inventory Management

Source: Researchers calculation using questionnaire

Table 5 shows the overall impact of Supply chain management and Inventory Management on Improvement in operational efficiency. As the significance value is less than 0.05 it indicates that Supply chain management and Inventory Management has an impact on Improvement in operational efficiency

Table 6- Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	5.301	1.479		3.583	<.001**
	Inventory Management	0.619	0.125	0.606	4.953	<0.001**
	Supply chain management	0.479	0.183	0.320	2.615	0.011**

a. Dependent Variable: Improvement in operational efficiency

**. Correlation is significant at the 0.01 level

Source: Researchers calculation using questionnaire

The table 6 demonstrates the co-efficient of two variables that is supply chain management and Inventory Management. Inventory management has 27.5% influence on improvement in operational efficiency. Whereas Supply chain management has 59.7% influence on improvement in operational efficiency.

As the significance value of inventory management is less than 0.01, it indicates that the pharmacists' perception on inventory management is related to improvement in operational efficiency of pharmacies. This clearly shows that the null hypothesis is rejected at 1 % significance level.

As the significance value of supply chain management is less than 0.01, it indicates that the pharmacists' perception on supply chain management is related to improvement in operational efficiency of pharmacies. This clearly displays that the null hypothesis is rejected at 1 % significance level.

Correlation

According to McLeod (2020), Correlation means association, and more specifically, a measure of how two variables are related to each other.

Table 7- Correlation analysis

	Inventory Management	**Supply Chain Management**	**Operational performance**
Inventory Management	1		
Supply Chain Management	.306**	1	
Operational performance	.897**	.871**	1

**. Correlation is significant at the 0.01 level (2-tailed).
Source: Researchers calculation using questionnaire

In correlation analysis, there is a relationship between inventory management and Operational performance of pharmacies as significance value is less than 0.01. This proves that there is a significant relationship between pharmacists' perception on proper inventory management and pharmacies operational performance and the null hypothesis(Ho1) is rejected at 1% significance level.

There is a relationship between Supply Chain Management and Operational performance of pharmacies as significance value is less than 0.01. This also proves that there is significant relationship between pharmacists' perception on supply chain management and pharmacies operational performance and the null hypothesis(Ho1) is rejected at 1% significance level.

Conclusion

Pharmacists perceive that AIS helps in maintaining safety stock levels, helps in monitoring the inventories, proper record is kept for damaged or problematic medical items, and helps in supply chain flexibility, responsibility, competency, and quickness in pharmacies. They are also of the perception that AIS reduce issues in the number of days for a supply chain to respond to plan, source, make and deliver unexpected demand variations, helps in proper transparency in the pricing of drugs as well as it helps in the frequent supply of emergency drugs. Thus, pharmacists think that inventory management and supply chain management using AIS is helping the improvement in the performance of pharmacies.

Recommendations

Based on

the findings, the researchers would like to give some recommendations to improve the usage of AIS.

- Conducting workshops to teach employees to use AIS in a professional manner and increase their experience and knowledge of it.
- Teaching pharmacy students and related disciplines about the AIS system and introduce them about the benefits, its functions, and its features.

Limitations and scope for further research

This study has limitations, which could become the basis for future research. Our study concentrates only on the perception of pharmacists about the use and challenges of accounting information system. However, it does not focus on the Patients perception towards the services provided by the pharmacies, which forms the basis for evaluating the operating efficiency of pharmacies. Hence, there is a need to confirm the study from various parties involved like patients,

doctors and nurses.

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