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Evaluation of views regarding pharmacy information management systems implementation and systemic issues in community pharmacies

Ay Gungor*, Department of Health Management, Faculty of Health Sciences, Marmara University, 34722 Istanbul, Turkey https://orcid.org/0000-0002-3292-4932

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Abstract

Pharmacy information management systems have become an indispensable element in order to provide safe, effective and efficient health services in community pharmacies, which is one of the fundamental building blocks of the health sector. Despite the advancement in pharmacy information management systems, many problems can be encountered in optimum use, interoperability and data sharing. The problems encountered can be caused by technology as well as the end-user, legislation and organisational factors. The aim of this research is to examine opinions and suggestions of pharmacists and pharmacy staff on systematic issues encountered in the use of pharmacy information management systems and their effects and solution in community pharmacies. A total of 289 people, working in community pharmacies of Kadikoy, Istanbul, 119 of whom were pharmacists and 170 of whom were pharmacy staff, participated in this study. The data were obtained by a structured questionnaire which was completed by a face-to-face interview method. The analysis of the obtained data was carried out using descriptive analysis.62.5% (*n*=40) of the pharmacists and 64.6% (*n* = 64) of the pharmacy staff who participated in the study stated that there were problems with 'stock updates'; 59.7% (*n*=71) of pharmacists and 52.4% (*n*=89) of pharmacy staff stated that in-service training should be conducted and novelties should be informed. The pharmacists and pharmacy employees who participated in the research believe in the importance of pharmacy information management systems, despite the negative experiences related to the use of the system and see it as an indispensable element in pharmacy services.

Keywords: Community pharmacy, pharmacist, pharmacy staff.

* ADDRESS FOR CORRESPONDENCE: **Gungor Ay,** Department of Health Management, Faculty of Health Sciences, Marmara University, 34722 Istanbul, Turkey. *E-mail address*: gungor.aydn@gmail.com

1. Introduction

In the world of technological developments that advances rapidly, the health sector is not indifferent to developing and providing better service to patients for an optimal quality of life. Pharmacy information management systems are indispensable for pharmacies in order to provide safe and effective healthcare services (Alanazi, Rabiah, Gadi, Househ & Dosari, 2018). Basic functions that are present in the system are inpatient and outpatient treatment order entry, inventory and purchasing management, reporting, clinical observations, response management, treatment management, connecting with other systems and discharge and billing processes (Troiano, 2001). As a functional and useful system, well integrated into business processes, it reduces drug errors, improves patient safety and service quality, provides cost control, lightens the workload and saves time (Hadji & Degoulet, 2016). Systems that are not designed according to the needs and that do not meet the expectations are not accepted by the user and become idle (Tarcan & Celik, 2016). Therefore, it is very important to include the end user in the development of a system (ElMahalli, El-Khafif & Yamani, 2016). On the other hand, despite the advancement in pharmacy information management systems, many problems can be encountered in optimum use, interoperability and data sharing (Nardi, Lentz, Winckworth-Prejsnar, Abernethy & Carlson, 2016). The problems encountered can be caused by technology as well as the end user, legal regulations and organisational factors (Kim, Coiera & Magrabi, 2017; Nyella, 2011).

Legal regulations may prohibit interoperability with other systems, make it complex, costly and time-consuming (Auschra, 2018). Organisational factors such as inadequate strategic planning for technology implementation, lack of information technology support training and inadequate cooperation between healthcare providers can also cause e-prescription problems (Odukoya, Stone & Chui, 2015). Faults affect user satisfaction negatively and decreases efficiency and efficiency (Farrahi, Jeddi, Nabovati, Jabali & Khajoue, 2019). In ensuring the success and sustainability of the system, a safe infrastructure compatible with other systems provides uninterrupted energy, internet and network connection. An effective and comprehensive software and technical support and training services, provided by the supplier company with functions and features appropriate to business processes, provides system security, data security and privacy, which plays an important role (Jawhari et al., 2016).

In the implementation of the system, the biggest concern for free pharmacies is cost (Zadeh & Tremblay, 2016). Procurement, development and periodic maintenance of a new system requires a large investment (Serrano, Guzman, Xydopoulos & Tarhini, 2018).

The purpose of this study is to examine the opinions and suggestions of pharmacists and pharmacy employees in free pharmacies regarding the systemic problems experienced in the use of pharmacy information management systems, their effects and solutions.

2. Material and method

The sample of the study consisted of free pharmacies in Kadikoy district of Istanbul. A total of 289 people, 119 pharmacists and 170 pharmacy employees, participated in the study. The data were obtained through a structured questionnaire filled out by a face-to-face interview method. In the survey form, questions regarding socio-demographic characteristics and working status; technology questions, including computer use and the use of a pharmacy information management system; and questions to evaluate the pharmacy information management system were used. There were open-ended questions about systemic problems, their impact and solution. The data obtained were analysed descriptively.

2.1. Ethical dimension of the research

The research was carried out in accordance with the principles of the Helsinki Declaration. Written permission was obtained from the Marmara University Health Sciences Ethics Committee (protocol no: 05.06.2017/144) and the Istanbul Chamber of Pharmacists (protocol no: 28.04.2017/2312) to evaluate the ethical suitability of the research. In addition, verbal consent was obtained from the participants.

3. Results

In this cross-sectional descriptive study, a total of 289 people participated, out of which 119 were pharmacists (32 male and 87 female; Mean age: 37.94 ± 8.54 years) and170 were pharmacy workers (58 male and 112 female; Mean age: 28.35 ± 6.23 years). While 48.7% (*n* = 58) of pharmacists were in the 28–37 age range, 55.3% (*n* = 94) of the pharmacy employee were in the 18–27 age range. About 73.1% (*n* = 87) of pharmacists and 65.9% (*n* = 112) of pharmacy employees were female (Table 1).

Table 1. Distribution of socio-demographic features of participants (*n* = 289)

Variables	Pharmacist		Pharmacy employee	
	n	**%**	***n***	**%**
Gender				
Female	87	73.1	112	65.9
Male	32	26.9	58	34.1
Total	119	100.0	170	100.0
Age				
18–27 years	10	8.4	94	55.3
28–37 years	58	48.7	59	34.7
38 and above	51	42.9	17	10.0
Total	119	100.0	170	100.0

When the opinions of the research group regarding the processes associated with the pharmacy information management system were evaluated, 60.5% (*n* = 72) of pharmacists and 30% of pharmacy employees (*n* = 51) stated 'follow-up', 47.1% (*n* = 56) of pharmacists and 17.6% of pharmacy employees (*n* = 30) stated 'conducting financial follow-up' and 23.5% (*n* = 28) of pharmacists and 32.9% (*n* = 56) of pharmacy employees stated 'provide faster and error-free processing'(Table 2).

Table 2. Processes associated with the use of pharmacy information management system (*n* = 289)

Processes associated with the use of EDMS[a]	Pharmacist		Pharmacy employee	
	n	**%**	***n***	**%**
Follows the stock	72	60.5	51	30.0
Monitors finance	56	47.1	30	17.6
Follows the prescription	14	11.8	25	14.7
Prevents paper waste	13	10.9	40	23.5
Enables faster and error-free processing	28	23.5	56	32.9
Provides connection to Medulla and Medication Tracking System	15	12.6	20	11.8
Increases patient safety	24	20.2	25	14.7
Total	119		170	

[a] The questions were open-ended and the participants gave more than one answer.

When the opinions of the research group regarding the problems encountered during the purchase of drug provision on the SGK Medulla screen were evaluated, 74.8% (*n* = 89) of pharmacists and 71.2% (*n* = 121) of pharmacy employees stated that the 'system disconnects frequently', 52.1% (*n* = 62) of pharmacists and pharmacy employees 41.8% (*n* = 71) stated that the 'system screen freezes

frequently' and 18.5% of pharmacists (*n* = 22) and 22.4% (*n* = 38) of pharmacy workers stated that the 'system often it runs slowly' (Table 3).

Table 3. Distribution of problems during medulla screen drug procurement intake (*n* = 289)

Problems during taking SSI medulla screen drug provision [a]	Pharmacist		Pharmacy employee	
	n	%	*n*	%
System screen freezes frequently	62	52.1	71	41.8
System disconnects frequently	89	74.8	121	71.2
The system runs slowly	22	18.5	38	22.4
Total	119		170	

[a] The questions were open-ended and the participants answered more than one.

When the opinions of the research group regarding the 'systematic problems they encountered in the use of pharmacy information management system' were evaluated, 62.5% (*n* = 40) of pharmacists and 64.6% (*n* = 64) of pharmacy employees mentioned 'stock update', 32.8% (*n* = 21) of pharmacists and 15.2% (*n* = 15) of pharmacy employees mentioned about 'programme updates', 28.1% (*n* = 18) of pharmacists and 29.3% (*n* = 29) of pharmacy employees mentioned about 'invoice/prescription correction', 20.3% (*n* = 13) of pharmacists and 18.2% (*n* = 18) of pharmacy staff mentioned about 'drug return' and 15.6% (*n* = 10) of pharmacists and 24.2% of pharmacy staff (*n* = 24) stated that the supplier company was contacted about the 'programme not responding' (Table 4).

Table 4. Distribution of systematic problems faced by participants in the use of pharmacy information management system (*n* = 289)

EBYS systematic problem [a] (subject)	Pharmacist		Pharmacy employee	
	n	%	*n*	%
Stock update	40	62.5	64	64.6
Drug return	13	20.3	18	18.2
Invoice/receipt correction	18	28.1	29	29.3
Programme updates	21	32.8	15	15.2
Programme not responding	10	15.6	24	24.2
Total	64		99	

[a] The questions were open-ended and the participants gave more than one answer.

According to the working position of the research group, when the opinions regarding the 'technical support-related problems' provided for the pharmacy information management system were evaluated, 41.2% (*n* = 49) of pharmacists and 28.8% (*n* = 49) of pharmacy employees did not have sufficient technical staff, 53.8% (*n* = 64) of pharmacists and pharmacy employees 42.4 (*n* = 72) stated that more technical staff should be available, 15.1% (*n* = 18) of pharmacists and 25.3% (*n* = 43) of pharmacy employees stated that updates should be made outside office hours and 21.8% (*n* = 26) of pharmacists and 14.1% (*n* = 24) of pharmacy workers stated that they did not experience any problems (Table 5).

Table 5. Distribution of participants' views on technical support provided for pharmacy information management system (*n* = 289)

Problems and solution suggestions regarding EBYS technical support[a]	Pharmacist		Pharmacy employee	
	n	%	n	%
There are not enough technical staff	49	41.2	49	28.8
More technical staff should be available	64	53.8	72	42.4
Updates should be made out of working hours	18	15.1	43	25.3
Faster remote connection to the system should be provided	15	12.6	63	37.1
There is no problem	26	21.8	24	14.1
Total	119		170	

[a] The questions were open-ended and the participants answered more than one.

When the opinions of the research group about the effect of the relationship between the patient and the pharmacy staff in the failures arising from the pharmacy information management system were evaluated, 33.6% (*n* = 40) of pharmacists and 34.7% (*n* = 59) of pharmacy employees stated that they did not want to wait, 57.1% (*n* = 68) of pharmacists and 56.5% of pharmacy employees (*n* = 96) stated that they try not to reflect the issues to patients and 39.5% (*n* = 47) of pharmacists and 49.4% (*n* = 84) of pharmacy workers stated that system outages should be avoided (Table 6).

Table 6. Distribution of opinions on the effect of system-related faults on patient relationships (*n* = 289)

EBYS kaynakli arizalarda hastalarla iliskiler nasil etkileniyor ve cozum onerileri[a]	Eczaci		Eczane calisani	
	n	%	*n*	%
Zaman zaman gerginlik yasaniyor	28	23.5	16	9.4
Hastalar beklemek istemiyor	40	33.6	59	34.7
Aksakliklar hastalara yansitilmamaya calisiliyor	68	57.1	96	56.5
Sistem kesintilerinin onune gecilmeli	47	39.5	84	49.4
Toplam	119		170	

[a] Sorular acik uclu olup katilimcilar birden fazla yanit vermistir.

When the opinions of the research group about the 'more efficient use of the pharmacy information management system' were evaluated, 59.7% (*n* = 71) of pharmacists and 52.4% (*n* = 89) of pharmacy employees stated that they should be provided with in-service training and changes should be reported, 48.7% (*n* = 58) of pharmacists and 12.9% (*n* = 22) pharmacy employees stated that the systems should be made faster, 18.5% (*n* = 22) of pharmacists and 41.2% (*n* = 70) of pharmacy employees wanted to make the system more useful and understandable and 37.8% (*n* = 45) of pharmacists and 34.7% (*n* = 59) of pharmacy employees stated that updates should be made more frequently (Table 7).

Tablo 7. Katilimcilarin eczane bilgi yonetim sistemi verimliliginin artirilmasi ile ilgili goruslerinin dagilimi (*n*=289)

EBYS nasil daha verimli olarak kullanilir?[a]	Eczaci		Eczane calisani	
	n	%	*n*	%
Hizmet ici egitim ve degisiklikleri bildirme	71	59.7	89	52.4
Sistem daha kullanisli ve anlasilir olmali	22	18.5	70	41.2
Sistem daha hizli hale getirilmeli	58	48.7	22	12.9
Guncellemeler daha sik yapilmali	45	37.8	59	34.7
Sistem kesintilerinin onune gecilmeli	29	24.4	45	26.5
Toplam	119		170	

[a] Sorular acik uclu olup katilimcilar birden fazla yanit vermistir.

4. Discussion

Pharmacy services and technology are closely related (Baines, Bates, Bader, Hale & Schneider, 2018). Continuation of service depends on ensuring the optimal operation of the system is carried out. Therefore, integration with technical support, system infrastructure and other systems is of great importance (Sezgin & Yildirim, 2016). For the success of the system, stakeholders should address problems and make improvements in cooperation (Darby, Su, Reynolds & Madlock, 2019).

In this study, the systematic problems experienced in the use of pharmacy information management systems in free pharmacies and the opinions and suggestions of pharmacists and pharmacy employees regarding their effects and solutions were examined.

According to the research findings, with regard to pharmacists, 'stock tracking', 'financial tracking' were in the first and second place, respectively, and 'faster and error-free transactions' were in the third place regarding the areas where the use of the pharmacy information management system benefits. With regard to the pharmacy employees, 'faster and error-free processing' was in the first

place, 'stock tracking' was in the second place and 'prevents paper waste' was in the third place (Table 2). In similar studies in the literature, in parallel with our findings, different occupational groups have been reported to rank differently for the areas in which the use of health information systems have benefited because they have different expectations, duties and responsibilities and use different functions (Isik & Akbolat, 2010; Karimi, Poo & Tan, 2015; Westerling, 2011).

Regarding the problems experienced by the participants during the drug provisioning on the Medulla screen, there is the problem of 'disconnection' in the first place, 'screen freezing' in the second place and 'slow operation of the system' in the third place (Table 3). Medula is an integrated system created between the Social Security Institution and the health service providers to perform billing and repayment transactions (Expense, January & Top, 2015). Most of the services offered by free pharmacies are carried out through Medulla. Therefore, Medulla connection has a vital importance (Gulpinar, Uzun & Yalim, 2015). The reason for the living problems; This may be due to system renewal and development efforts, updates and hardware problems, as well as many users trying to connect to the Medulla system at the same time. The most important factor in addressing these problems is the lack of technical infrastructure. Similarly, in the studies conducted by Kocabacak (2011) and Kiran, Karaca and Ulkar (2017), it has been reported that the Medulla provision system remained very frequently unconnected and the system was working slowly. The infrastructure required for problem-free, quality and fast service delivery must be established (Sebetci & Aksel, 2016).

According to pharmacists, 'stock update' came first, 'programme updates' came second and 'invoice/receipt correction' came third. According to the pharmacy staff, 'stock update' was in the first place, 'invoice/receipt correction' was in the second place and 'programme not responding' was in the third place (Table 4). Garfield, Hibberd and Barber (2013) study, which is similar to our finding, reported and stated that problems related to the pharmacy information system inventory control and reimbursement module should be improved. In addition, in Kim et al.'s (2017) study, it was stated that the error of 'programme not responding' is a problem related to updates, and update problems are among the common problems.

When the participants were asked about the 'problems and solution suggestions about providing technical support related to pharmacy information management system', the vast majority of pharmacists and pharmacy employees stated that the technical support provided by the supplier company was not sufficient (Table 5). Technical support is one of the key elements in the integration of technology (Islahi & Nasrin, 2019). Among the subjects that need technical support are infrastructure support related to the purchase, installation, maintenance and repair of hardware, auxiliary devices, server and network connections; software support, such as software installation, updating, virus removal and fixing programme errors; functional support on how to use the various features of the system; data backup, recovery and archiving, data support and training support to ensure integrity, accuracy and consistency in data entry (Shachak, Barnsley, Tu, Jadad & Lemieux, 2011). Small businesses need more technical support than large enterprises because they do not employ a sufficient number of technical support staff (Baron, Fabens, Schiffman & Wolf, 2005). Therefore, the quality of technical support is one of the determining factors in system preference (Holden, Brown, Scanlon & Karsh, 2012; Khalifa, 2013; Omune & Kandiri, 2018).

The pharmacists and pharmacy employees who participated in this study stated that the patient relationships were adversely affected and the patients did not want to wait in case of malfunctions caused by the pharmacy information management system (Table 6). It is seen that pharmacists and pharmacy employees have sufficient experience in overcoming problems and communicate effectively in order to not lose customers and increase patient satisfaction. Garfield et al. (2013), similarly, stated that pharmacists sometimes experience tension with patients due to systemic problems and try to persuade them by explaining the problem. In pharmaceutical services, one of the most effective methods used to increase patient satisfaction is communication. Mehralian, Rangchian and Rasekh (2014) stated that the quality of communication between the pharmacist and the patient directly

affected the level of satisfaction. Other factors that affected patient satisfaction were the demographic characteristics of the patient, the variety of drugs in the pharmacy, waiting time, the pharmacy layout, the location and service quality of the pharmacy (Ayalew et al., 2017).

When the participants were asked what to do for more efficient use of pharmacy information management systems, the vast majority of pharmacists and pharmacy employees stated that in-service training is very important and should be carried out regularly (Table 7). Similarly, in the study conducted by White and Hohmeier (2015), it was stated that training in the use of information technologies is required in free pharmacies to increase efficiency. In-service training programmes are of great importance in order to follow developments in the professional field, keep up with technological innovations, increase efficiency and minimise errors (Eraslan & Sar, 2005). Pharmacists and pharmacy employees use pharmacy information management systems very intensely in their daily activities. The ability to use electronic health information systems and other e-health applications varies depending on personal experiences, education level, courses and in-service trainings. Effective use of health information systems plays an important role in improving patient safety and service quality, and acts as an effective barrier against personal data and privacy threats. Awareness of possible risks is also increased, thanks to the trainings on the use of information systems (Jouini, Rabai & Aissa, 2014). In a study by Mac Lure and Stewart (2016), it was stated that pharmacy employees did not receive adequate training on the use of pharmacy information management systems. Therefore, courses and in-service training should be made compulsory to improve the ability to use health information systems and other e-health applications to protect data security and privacy, and improve patient safety and service quality (Mac Lure & Stewart, 2015).

5. Results and recommendations

Pharmacy information management systems play an important role in reducing errors and increasing working speed in prescribing medicines, drug delivery and treatment management processes. Therefore, during the supply and implementation of the system, it is necessary to pay attention to the necessary information, processes and procedures for the end user. A well-developed pharmacy information management system, established in accordance with current standards, provides an increase in quality in pharmaceutical services. However, based on our findings, the underlying systematic problems are the lack of infrastructure, technical support and lack of training on system use. As a result, pharmacists and pharmacy employees participating in the research believe in the importance of Pharmacy Information Management Systems and regard it as an indispensable element in pharmacy services, despite the problems regarding the use of the system.

Based on the results of this research, the following can be suggested:

- The quality of technical support provided by the supplier company should be increased.

- System infrastructure should be improved.

- In-service training programmes should be planned to ensure effective use of the system.

- Efforts should be made to reduce the supply and development costs of the system and free pharmacies should be supported with incentive funds.

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