ORIGINAL RESEARCH ARTICLE

Pharmacist Perceptions of the use of IT within the Retail Pharmacy Sector in Two Regions in Trinidad: A Retrospective Study

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ABSTRACT
To assess the impacts of use of information technology for electronic dispensing, patient databases, inventories, ordering and purchasing processes, security, advertising and sales in pharmacies and how it affects the retail sector of business in Trinidad and Tobago.

Key words: Computer and Information technology, retail pharmacy, efficiency, business, patient database

INTRODUCTION

The performance in clinical pharmacy strives on the input of various types of information technology [1]. Before the verge of information technology smaller tasks such as writing prescriptions and pulling up records would have been very time consuming. In today's world Information Technology has made such tasks easy. Many pharmacies have peaked interest in the use of computer technology as a way to keep up with the other competing pharmacies and pharmaceutical corporations. Computers can be used as a business application such as computer terminals that allow pharmacists to enter orders directly, simultaneously improving customer service and increasing switching costs; the use of electronic labelling where computers are used to type up labels which saves time and effort; inventory management technologies including electronic data interchange with suppliers to increase operational efficiencies and improved services; and patient record systems for use in case management inputting data specifically and exclusively to monitor drug related problems. According to an article, Impact of information Technology on the Performance of Clinical Pharmacy Services, written by M. Tully from the School of Pharmacy of Manchester, information technology has become so important and useful that it can alert clinical pharmacists to possible drug interactions and adverse drug reactions. He also stated that it is useful when calculating drug dosages. [2] Also reported in an article Information Technology as Competitive Advantage written by Thomas Powell, it is stated that in pharmaceutical distribution, McKesson (a pharmaceutical distributor and health care information technology company) used computer terminals to improve customer service and increase switching costs simply by entering orders into the computer system[3].

Some pharmacists have been pushed into using Information Technology as a means to keep their business from falling short on profits. This is because of the advent of direct competition from the Internet which thus presents a further challenge, which may make it necessary for the retail pharmacy as a whole, as well as for each individual pharmacist, to re-evaluate their position with regard to strategic role of information technology in their business. Such competition includes the use of the Internet to market pharmaceuticals online where customers may be able to purchase or order their medications via the Internet. Also the use of advertisement via the Internet helps bring in more customers to a particular pharmacy. The use of the Internet also attracts the younger, new generation of today's world who are more computer and technology

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oriented. Pharmacies and pharmaceutical companies who market their products via the Internet can thus attract this ever-growing population. Pharmacists welcome the Internet as an excellent medium for information and communication. They see this new medium as a superb chance to further enhance their role as providers of information and advice on medicines. The use of Information Technology can also be used in the form of security. The use of cameras and item scanners at the exits of the pharmacy can ensure a safe environment for customers to shop and therefore attract more customers. Also the use of barcode readers can allow faster service and therefore greater customer compliance. In the article, Using Information Technology to reduce rates of medication errors by David W. Bates, it is stated that barcoding is used in many industries and results in error rates about a sixth of those due to keyboard entry and is less stressful to workers. [4] It ensures that the drug in hand is actually the intended one and can also be used to record who is giving and receiving it.

The objectives of this study are to discover how pharmacies in Trinidad encompass the use of information technology, how the use of information technology affects the business of the pharmacy and if the use of information technology gives an advantage over pharmacies that does not use this technology for electronic dispensing, patient databases, inventories, ordering and purchasing processes, security, advertising and sales.

MATERIALS AND METHODS

The study was carried out in the central and south region of Trinidad and study design was retrospective. Initially, 14-item questionnaire was developed and given for the evaluation to the experts (*n*=21) like clinical pharmacists, hospitals pharmacists and faculty members in pharmacy colleges in Trinidad and UAE. After 1 week their comments were obtained, as per comments, suitable corrections were made in the questionnaire and at last 21-item questionnaire was finalized.

The validated questionnaire was distributed to approximately 60 pharmacies in the central and south region of Trinidad. This was done over a period of 2 week. Each pharmacist employed at the pharmacies was asked to read the questionnaire completely and fill in properly.

The questionnaire consisted of 21 questions based on the various aspects of investigation. Information from the completed questionnaires was tabulated in Microsoft Excel and the respective percentages and proportions were calculated.

Questionnaire sheet to assess the impact of use of information technology on the retail pharmacy sector of business

This questionnaire is focused on gathering information about pharmacists' and pharmacy workers' perception of IT in the workplace, and its impact on health services provided in a pharmacy setting and the business. Data gathered from this questionnaire will be statistically analysed to draw relevant conclusions.

1. Sex
   o Male
   o Female
2. Age
   o 18 – 25
   o 26 – 40
   o 40 & above
3. Select the position that you currently hold in your place of work
   o Pharmacist
   o Pharmacy Technician
   o Other....Please specify_____
4. How long have you been working at your current place of employment?
   o Summer job
   o Less than 2 years
   o 2 – 10 years
   o More than 10 years
5. Do you use any form of computer technology in your pharmacy?
   o Yes
   o No
6. If yes, which of the following do you use?

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- o Electronic labels
- o Patient information database
- o Inventories
- o Other _____

7. If you do use IT, how much of a difference has it made in the safe and effective supply of drugs to your patients?
    - o Very good
    - o Good
    - o Fair
    - o Neutral
    - o No difference
    - o Bad

8. Do you believe it is more efficient and practical to keep patient records as electronic based rather that paper based?
    - o Yes
    - o No
    - o Neutral

9. Do you believe that errors such as prescription errors, possible adverse drug-drug reactions, drug-food interactions etc can be avoided using electronic records rather than papers based records?
    - o Yes
    - o No
    - o Neutral

10. Does the use of information technology in your pharmacy cause more errors?
    - o Yes
    - o No
    - o Neutral

11. If yes, which of the following errors are most applicable to you?
    - o Dispensing errors
    - o Errors in labeling (dosing, adverse effects, contra-indications etc)
    - o Other _____

12. Do you use computer-based electronic ordering process?
    - o Yes
    - o No

13. If yes, is it beneficial to the pharmacy?
    - o Yes
    - o No
    - o No change

14. Do you have a website whereby customers can purchase goods from your pharmacy online?
    - o Yes
    - o No

15. If yes, how did it affect sales?
    - o Increase
    - o Decrease
    - o No change

16. If not, do you think implementing an online mode of purchasing goods from your pharmacy will enhance customer value and attract new customers?
    - o Yes
    - o No
    - o Neutral

17. Do you believe that internet advertising of your pharmacy can help increase the amount of customers coming in and hence your sales?
    - o Yes
    - o No
    - o Neutral

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18. Does electronic prescribing leave the pharmacist with more time to do other activities such as patient counseling?
   o Yes
   o No
   o Neutral

19. Are you willing to invest more money into developing the electronic aspect of the pharmacy?
   o Yes
   o No

20. Do you have any form of electronic security in your pharmacy?
   o Yes
   o No

21. If yes, has it improved security in your pharmacy?
   o Yes
   o No
   o No change

RESULTS

A total of 60 questionnaires were distributed to various pharmacies in Trinidad. 54 of these questionnaires were returned, of which 42 were filled by females and 12 filled by males. 20 questionnaires were filled by pharmacists, 14 by pharmacy technicians and 20 by other personnel at the pharmacy (pharmacy clerks, assistants, sales clerks, pharmacy student, supervisor and assistant manager). The ages of the respondents varied equally (18 respondents each) amongst the categories; 18-25, 26-40 and 40 and above. The length of time each respondent has been working at their place of employment also varied from a summer job (2 respondents) to less than 2 years (22 respondents), 2-10 years (16 respondents) and more than 10 years (14 respondents).

A majority of 63% (34 respondents) use some form of computer technology in their pharmacy. However, 37% (20 respondents) did not use any form of computer technology and were completely paper based.

Inventories were the most common form of computer technology (24 respondents) followed by electronic labels (20 respondents) and patient information databases (18 respondents). 8 respondents used a combination of electronic labels, patient information databases and inventories while 8 used a combination of inventories and patient information databases. 2 respondents used a combination of electronic labels and patient information databases while another used a combination of electronic labels and inventories (**Table 1, Fig 1 & 2**).

A majority of 65% (22 respondents) thought that the use of computer technology made a very good difference in the safe and effective supply of drugs to their patients while 29% (10 respondents)

thought that it had a good impact. 6% (2 respondents) felt that computer technology made no difference in the safe and effective supply of drugs to their patients.

85% (46 respondents) found that it was more efficient and practical to keep patient records as electronic based rather than paper based. 7% (4 respondents) were neutral while 4% (2 respondents) believed that it was not more effective and practical to keep patient records as electronic based. 4% (2 respondents) did not answer the question.

78% (42 respondents) believed that errors such as prescription errors, possible adverse drug-drug interactions, drug-food interactions etc. can be avoided using electronic records as opposed to paper based records. However, 11% (6 respondents) found that this was not the case and 11% were neutral.

74% (40 respondents) believed that computer technology was not prone to cause more errors. However, 4% (2 respondents) found that this was not the case and 22% (12 respondents) were neutral.

46 pharmacies did not use a computer based electronic ordering process while only 8 pharmacies did. 75% (6 out of the 8 respondents who do have an electronic ordering process) believed that an electronic ordering process will be beneficial to the pharmacy. However, 25% (2 respondents) believed that the electronic ordering process did not have any impact on the pharmacy.

It can be seen that 55% (30 respondents) believe electronic prescribing will give pharmacists more time to do other activities such as patient counselling. However, 30% (16 respondents) felt that this would not make any difference while 15% (8 respondents) were neutral.

Vast majority of 85% (46 respondents) are willing to invest in developing the electronic aspect of their pharmacyas they felt it will improve their business at least by about 20%, while a minority of 11% (6 respondents) were unwilling. 4% (2 respondents) did not answer the question.

44 persons stated that they do have some form of electronic security in their pharmacy as opposed to 10 persons who did not have any form, out of the 44 persons who had some form of electronic security, 40 thought that it proved to be beneficial while only 4 stated that there was no change.

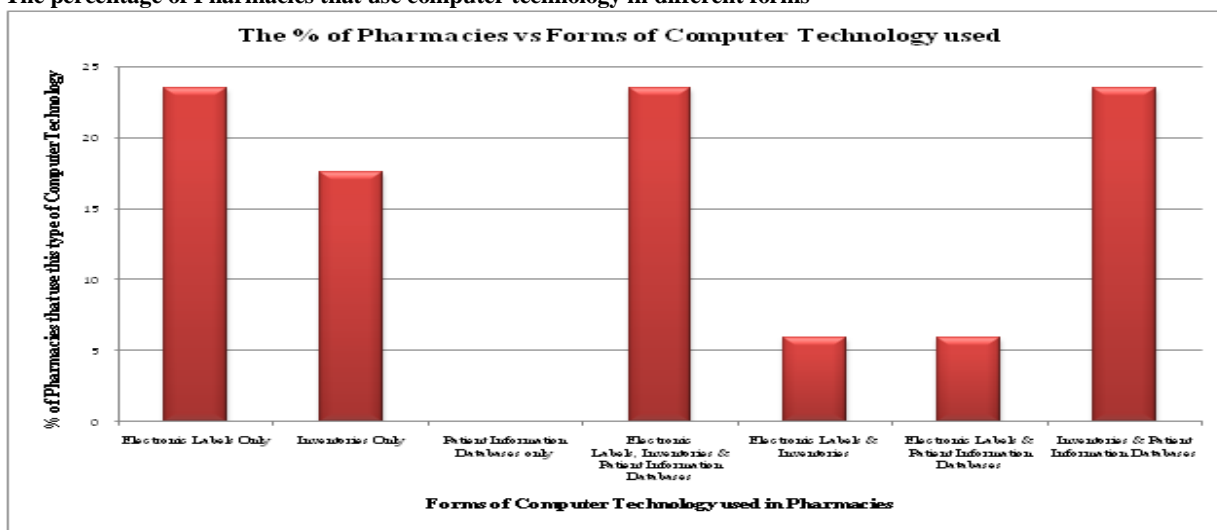**Fig 1: The percentage of Pharmacies that use computer technology in different forms**

Fig 2 : Showing the types of computer technology used in pharmacies
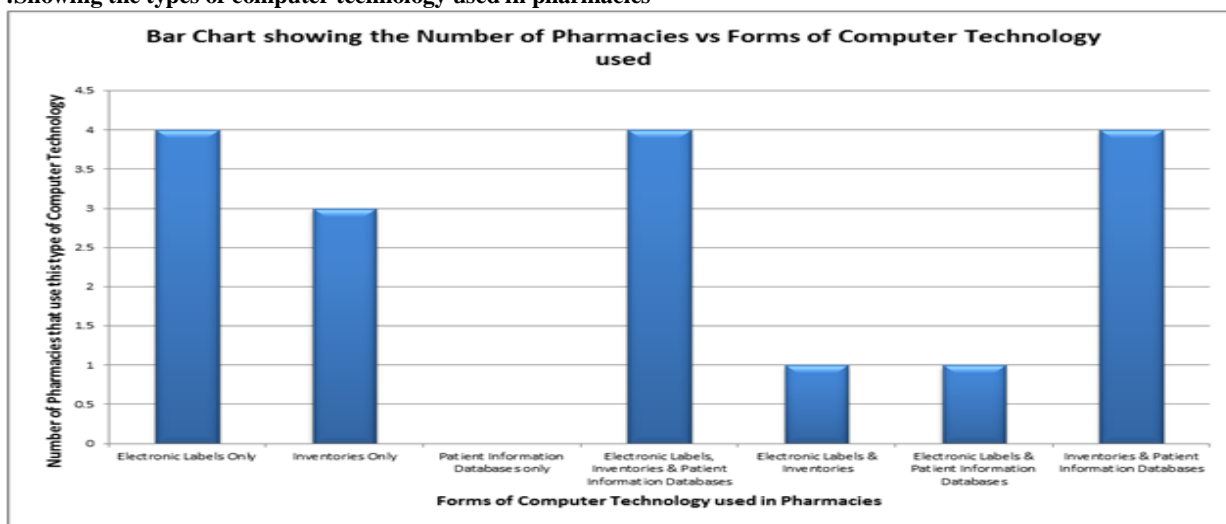

Table 1: Number and Percentage of Pharmacies that use different forms computer technology in their pharmacy

Forms of Computer Technology used in Pharmacies in Trinidad	Number of Pharmacies that use this form of Computer Technology	% of Pharmacies that use this form of Computer Technology
Electronic Labels only	8	23.5
Inventories only	6	17.6
Patient Information Databases only	0	0.0
Electronic Labels, Inventories & Patient Information Databases	8	23.5
Electronic Labels & Inventories	2	5.9
Electronic Labels & Patient Information Databases	2	5.9
Inventories & Patient Information Databases	8	23.5

DISCUSSION

In this study we have discussed the potential impact of Information Technology (IT) on the retail pharmacy sector. From the results we can observe the majority of pharmacies were participated in our study used some form of IT in their establishment because IT is a growing field which plays an important role in the pharmacy industry.

From the results, most of the participants used more than one form of information technology in their pharmacy. Inventory, electronic labels and patient information databases were used almost equally in the pharmacies used as information technology. This is because they are all important

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factors in the application of pharmacy practice. The majority of the pharmacies that utilized IT observed some improvement in the safe and effective supply of drugs to their patients. This result coincided with the findings presented by Tully in his article on the impact of IT on the performance of clinical pharmacy services. In his paper he wrote that IT provided opportunities for pharmacists to improve patient care [2].

Based on our findings, a large number of participants agreed that keeping electronic-based patient records were more effective and practical than paper-based ones. This was again supported by Tully who stated that electronic patient records are now being developed to assist in the clinical management of patients within secondary care and that such records are now becoming the norm for the successful management of a newly-developed business. The participants that supported keeping electronic records believed that these records can reduce prescription errors, adverse drug-drug interactions and drug-food interactions. There was one respondent who thought that electronic records were not necessary. This person has been working for more than ten years in the pharmacy industry and probably believes that he does not need IT to improve his effectiveness.

When the question of whether or not IT caused errors was asked, the majority of respondents believed it didn't and one respondent believed that it increased the possibility of dispensing errors occurring. This individual was elderly and probably set in the olden ways of performing tasks manually. Anderson et al. stated that, "IT has been shown to reduce medication errors and associated ADEs at every stage in medication administration," in their article on evaluating the impact of IT on medication errors. [5] This statement supported our findings.

According to Siska and Tribble, electronic ordering processes increases the efficiency of ordering pharmaceutical products because it decreases the likelihood of errors in ordering. [6] This coincided with our findings that the pharmacies that utilize electronic ordering processes believed that it was beneficial to their business.

55% of the respondents believed that electronic prescribing left the pharmacist with more time to do other activities such as patient counselling while 45% believed it didn't make a difference. Bates and Kaushal described the benefits of electronic prescribing in their article on 'Information Technology and medication safety –

what is the benefit?' They stated that, "electronic prescribing standardizes orders, ensures legibility and completeness, allows background checks to be performed, provide timely informacion, provide feedback about appropriateness and costs of medications.[7]," These benefits decrease the time the pharmacist usually spends on drug dispensing, and provides more time for the pharmacist to engage in patient counselling.

The majority of the respondents said that electronic security has been beneficial to their establishment. A small number believed that it had no effect on their level of security. In the article, Retail Pharmacy Growth Strengthens Security Needs, Finefrock stated, "Increased customer traffic introduces new risks into the store environment and raises the need for security solutions to protect what's on the shelves, behind the pharmacy counter and within the infrastructure. With today's sophisticated criminals, high-end security integration tools have become a necessity. [8]," This statement supported the result we gained in our study.

There were some limitations to our study. Firstly, our sample size was limited. Secondly, using questionnaires leads to results being biased because respondents may have answered questions to please interviewers. Also, no statistical analyses were done because of the scope of our questions presented in the questionnaire.

CONCLUSION

This study explored the impact of Information technology on the pharmacy sector. Pharmacists have been dependent on paper based recording and dispensing methods for decades but with the rapid growth of the technologic sector it became necessary to understand how this advancement has infiltrated this traditional profession and what impact it has had. Through the evaluation of previous studies it can be seen that information technology has affected pharmacy through electronic dispensing, patient databases, inventories, ordering and purchasing processes, security, advertising and sales. However, the status of Trinidad and Tobago as a developing country means that not all pharmacies may possess all of these technologies. Some pharmacies have not even accepted at least one form of technology. This may place them at a disadvantage in the provision of efficient services for their clients. The results of the study reflected that the advantages included an increase in efficiency in the supply of drugs, enhanced security and manageable inventories. These

advantages, however, are not quite as significant as those that are provided for the patients. Pharmacists in Trinidad have been able to more successfully aid their patients through the use of electronic patient databases where the detection of drug interactions and dispensing errors are being reduced. Hence, it can be seen that even though the implementation of these systems can be quite costly, the impact can result in improved patient care by the provision of more efficient services as well as increase of business.

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