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Development and Evaluation of Inventory Management Software for Community Pharmacies in India

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ABSTRACT
Inventory control is the process of maintaining optimum of stock levels, whether in a single warehouse or across multiple sites. of your purchase orders and keep a functional supply chain. It includes the management of products from the time they are in stock until they are sent to their final destination or disposed of. An inventory management system also keeps track of their movement, use, and storage. Inventory control refers to maintaining track of inventory levels to ensure that each product on hand, have the right amount. It comprises management of items from the time you have them in stock to their final destination or disposal. An inventory control system also monitors their movement, usage, and storage. Inventory control means managing your inventory levels to ensure that you are keeping the optimal amount of each product. Proper inventory control can keep track. for inventory management of a pharmacy, computer software plays a vital role. The goal of the study was to develop an inventory control management software that would help community pharmacies run more efficiently. The researcher conducts a pre study survey to understand the problems of existing software in the field. The problems were analyzed. Practical and theoretical solution to resolve the problems were implemented on the development of a new software. After the investigator provided certain formulas, settings, ideas and solutions for existing problems to a team of software developers, a software was developed and executed named "Farmasoftech" using the programing language visual basic 6.0. The inventory management software 'Farmaoftech' was installed in a community pharmacy for the study. The software managed the budget of all items in the pharmacy by integrating various inventory control techniques such as ABC analysis, VED analysis, ABC-VED matrix analysis, and the EOQ approach. After a year of application, the programme was found to be effective. It was observed that around 87% of the products were properly predicted, 4% of the things were forecasted in excess, and 9% of the items were predicted in less quantity than the actual consumption. Over the term of a year, all of the items in the pharmacy were reordered at the appropriate times, and none of the items reached the level of "No stock." The innovative software 'Farmasoftech' benefited in the improved ordering and forecasting of all items in a community pharmacy.

Key words: Farmasoftech, ABC, VED, ABC-VED matrix, EOQ.

I. INTRODUCTION

A pharmacy also called drug store is a retail shop which dispense prescription drugs and also over the counter drugs. Pharmacist supervises the supply of medicines, advice the patient about safe and effective medicinal use. It is also helped in analyzing the revenues, expenses, measuring return on investment and to ensure profitable operation. In the case of hospital, one-third of the annual budget is spent on buying materials and supplies, including medicines. pharmacy is one of the most heavily used therapeutic facilities, as well as one of the few places where a significant amount of money is spent on recurring purchases. This highlights the importance of planning, developing, and organizing the pharmacy in a very method that clinical and administrative services are efficient. Community pharmacies have more complex business and customer relation issues. Community pharmacy have to collect different types of drugs and other cosmetics depends up on the population and the area.

A Pharmacy software is essential for keeping and recording the data. A comprehensive inventory control management software can be purchased online, or the software can be constructed by information technology developers to meet the needs of the pharmacy. The process of

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planning, arranging, and controlling inventory" is how inventory management is defined. The goal is to "minimize inventory investment while balancing supply and demand. In addition to being a large portion of many businesses overall current resources, the stock item handles an essential option variable at all phases of assembling, dissemination, and deals. It is essential that great stock administration be polished to guarantee growth and productivity. There are so many inventory softwares are available like spreadsheet. An inventory spreadsheet is useful tool for collecting data and storing the appropriate information. Spread sheets are typically not inventory software. the typical captions used in the spreadsheets are Reorder, Item no, manufacturer etc. small business may be able to stick with an inventory spreadsheet. The spreadsheet needs continuous and diligent manual intervention. Pharmacy software is utilized to provide medication to customers in the supervision of pharmacist also ensuring the safe and effective use of drugs in the prescribed manner. The primary function of a pharmacy software is to maintain optimum amount of stock in the pharmacy. Also the software is able to reduce the excess stock and also reduce the value of nonmoving drugs. It is a key highlight for a pharmacy software to reduce medication errors and also drug interactions. It is important to apply scientific inventory management tools like ABC analysis, VED analysis, ABC-VED analysis, EOQ etc.

To define the boundaries in an ideal manner, to make convenient decisions in the acquisition of clear drugs and to keep a close watch on the drug items with important classes. Stock management programming should have the option of working directly with mobile and retail chemists, assisting various stock accommodations, and electronic data interchange points of interaction to facilitate correspondence with providers. Stock reports should be comprehensive and adjustable to meet the particular needs and patient population of the drugstore. For developing an inventory control formula to be incorporated into the software, initially all the conventional inventory control techniques such as ABC analysis, VED analysis, ABC –VED Matrix analysis and EOQ method. The techniques are performed and the merits and demerits were identified. The objective of the study was to develop a novel inventory management software for Community Pharmacies.

II. METHODOLOGY

Step1: Evaluation of existing software.

The study was started by evaluating the existing software in the market. Most of the software in the market has number of problems. The main drawback of the software handled in the year end, which related with the accounting section. The trail balance, repeated orders, dead stocks, accurate expiry forecasting delay in the supply and fixing appropriate orders are the main problems in a pharmacy. That is minimized by the use of software in an extent.

Pre study survey

A pre study survey on existing software was started at November 2017. For the survey the pharmacies are randomly selected from Malappuram district. The three main cities of Malappuram were selected. The survey was conducted to 50 pharmacies. A survey was conducted to understand the merits and demerits of the existing pharmacy accounting software. For the survey a questionnaire was prepared. The questionnaire was directly hand over to the pharmacist or to pharmacy in charge.

Step2: Development of new software for pharmacy inventory control.

After the approval for the study the researcher began to develop software for inventory control management. The researcher decided to approach a software company on September 2019. Development of new software for the management of pharmacy inventory management was prepared to write in VB.NET. by “Tachyon Solutions”. After two months on December 2018 the Tachyon solutions developed new software for inventory control management as per the feature that was organized by the researcher. The Tachyon solutions developed the software within time. They have

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meet all the demands and suggestions that was referred by the researcher.

Step3. Trail of Farmasoftech in the Pharmacies

The pre study survey was conducted in 50 pharmacies. After the development of Farmasoftech, the trial version was introduced to all these 50 pharmacies. The researcher took appointments in all these pharmacies prior to the survey. The trail was performed in each pharmacy directly by the researcher.

Step4. Implementation of Farmasoftech

Farmasoftech was installed in a private pharmacy before April 2019. The duration of the study was 1st April 2019 to 31st March 2020. The pharmacy entitled as research lab for this research. The pharmacy already computerized and they are using software (software A). the software A is customized in visual basic 6 programing language.

ABC Analysis

Finding out from the consumption records of issued products from existing drug stores is the most usual and accurate approach of ABC analysis. Serial number and the name of the all the products was compiled using computer-generated consumption records. The data was then transcribed in a MS-Excel spreadsheet and arranged in the descending order based on annual consumption cost. The proportion of the total cost was then calculated for each item. Based on the theoretical concepts, the list of objects was divided into three groups: 'A,' 'B,' and 'C.'The categorization of objects into 'A', 'B', and 'C' was based on the number of items arranged; the first 10% of the items are categorized into 'A' items, the next 20% into 'B' items, and the remaining 70% into 'C' items. According to theoretical principles, "A" accounts for approximately 70% of total cost, "B " items for approximately 20% of total cost, and "C" items for approximately 10% of total cost.

VED Analysis

The list of all goods in the pharmacy was compiled and handed to pharmacists, experienced staffs and management reprehensive of the community pharmacy. who classified the drugs as vital (V), essential (E), or desired (D) (D). The group then discussed the VED status of each medicine with justification until an agreement was established. As a result, all commodities in the pharmacy were classified as vital (V), essential (E), or desired (D).

ABC-VED Matrix Analysis

By cross-tabulating the ABC and VED analyses, the ABC-VED matrix was created. Three categories were formed as a result of the combination (category i,ii and iii). Items from the AV, AE, AD, BV, and CV divisions were combined to form Category i. The BE, CE, and BD subcategories made up category ii, while the rest of the CD subcategory made up category iii. The first alphabet in these subcategories denotes its position in the ABC analysis, whereas the second alphabet denotes its position in the VED analysis.

EOQ

The EOQ is calculated based on an item's average demand and sale. The demand of an item for a specific period of time is computed using this EOQ approach by dividing the actual consumption of that item for a specific review period time. The result represents the average daily intake of an item over the review period. it is then multiplied by the number of days for which the item is needed.Normally the review of order was taken in research pharmacy was 30 days and the items were ordered for the next 20 days. Here a frequent ordering is necessary. The pharmacy has no warehouse or stocking facility. The limited area has to be covered all the items and should be taken in account of various hospitals nearby. The prescription cannot be expected within the limited area. The storage space for the pharmacy is minimal. The formula used to calculate the EOQ of the drugs mathematically represented as

$$EOQ = \left\{ \frac{\text{Actual consumption of an item for the last 30 days}}{30 \text{ days}} \right\} \times 20 \text{ days}$$

This method of resolve the economic order quantity works with good accuracy for most of the drugs in the pharmacy. The prediction and estimation about the drugs and other items can be predicted. But the estimation of the methods is not accurate in case of very specific drugs which need special or medium attention. The categorization of the drugs is depending up on the degree of attention needed for each product. Which is based on theoretically approved principle. Before the estimation of EOQ the researcher along with the

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pharmacy staff and management began to find out the suppliers who are intended to supply medicines with in short time.

Developing an EOQ for each ABC-VED Matrix category.

Category I: The category mainly deals with the drugs of annual expenditure 74.75%. They are the drugs with high value of inventory. A special attention is needed in this group. Also the order should be maintaining in optimum level. Review period for this category is 10 days and the order is for the next 15 days.

$$EOQ = \left\{ \frac{\text{Actual consumption of an item for the last 10 days}}{\text{10 days}} \right\} X\ 15\ \text{days}$$

This method leads to frequent order to the supplier. But in another manner inventory cost can be reduced because of holding minimum amount of drugs for limited period.

Category II: The category includes with the drugs of annual expenditure 19.55%. They are the drugs of medium value of inventory. A medium level attention is needed in this group. Review period for this category is 15 days and the order is for the next 20 days. The value of the category is average the drugs should be maintaining at medium level.

$$EOQ = \left\{ \frac{\text{Actual consumption of an item for the last 15 days}}{\text{15 days}} \right\} X15\text{days}$$

Category III: The category includes with the drugs of annual expenditure 5.70%. They are the drugs of minimum value of inventory. Minimum level attention is only needed in this group. Review period for this category is 45 days and the order is for the next 30 days. The value of the category is very minimum. The stock should is with little revenue. So it can be stored with minimum invest.

$$EOQ = \left\{ \frac{\text{Actual consumption of an item for the last 45 days}}{\text{45days}} \right\} X30\ \text{days}$$

III. RESULTS AND DISCUSSION

All of the pharmacists and the technicians in the pharmacy claims that the Farmasoftech was easy to use. The positive feedback was backed up by the fact that the average total time necessary to provide a prescription was reduced. Roughly 50 percent of the products were accurately anticipated before the programme was installed, 20 percent of the items were projected in excess, and 30 percent of the things were predicted in less quantity than the actual consumption. After a year of successful installation and operation, it was discovered that around 87% of the things were almost accurately anticipated, 4% of the items were forecasted in excess, and 9% of the items were predicted in less quantity than the actual consumption. Over the span of a year, all of the items in the pharmacy were reordered at the appropriate times, and none of the items reached the level of "No stock." With the help of the novel inventory management software farmasoftech, better inventory management was achieved, according to the findings.

IV. CONCLUSION

Farmasoftech, a novel inventory management software, developed implemented and executed in a community pharmacy is better in the management and economic forecasting of items.

REFERENCE

[1]. Subal Chandra Basak, DondetiSathyanarayana (2009). Community Pharmacy Practice in India: Past, Present and Future. Southern med review.Volume1,Issue2, www.researchgate.net /publication/232649468, PP: 11-14.

[2]. Toshio awaya, Ko-ichiOhtaki, Takehiro Yamada, Kuniko Yamamoto, Toshiyuki Miyoshi, Yu-ichiItagaki, Yoshikazu Tasaki,

NobumasaHayase and Kazuo Matsubara(2005). Automation in drug inventory management saves personal time and budget. The pharmaceutical society of Japan. YakugakuZasshi Volume 125 issue 5 PP: 427-432

[3]. YudiPadmadisastra (2007). Application of Pharmacy Management Software for Independent Pharmacy Retail System .Journal of Faculty of Economics Padjadjaran University. Economic journal, Volume 22, No. 1 PP: 1-18

[4]. Elisabeth J Berger, Darius Jazayeri , Marcel Sauveur , Jean Joel Manasse , InelPlancher , Marquise Fiefe , GuerlineLaurat , Samahel Joseph , Kathryn Kempton, Hamish Fraser (2007). Implementation and evaluation of a web based system for pharmacy stock management in rural Haiti. Article in AMIA. Annual Symposium proceedings. Research gate publication. PP: 46-50

I. Ele Sylvester, W. A. Adesola, A. O. Ofem and P. A. Ackley (2016). Design of an Integrated Computerized Pharmacy Inventory Monitoring System (ICPIMS): A Case of University of Calabar Teaching Hospital (UCTH) .British Journal of Mathematics & Computer Science Volume 15 issue 5, Article no.BJMCS.23954 ISSN: 2231-0851 Science domains international www.sciencedomain.org. PP: 1-13

[5]. Michelle Sweidan, James F Reeve, Jo-anne E Brien, PradeepJayasuriya, Jennifer H Martin and Graeme M Vernon(2009). Quality of drug interaction alerts in prescribing and dispensing software. The medical journal of Australia, Volume 190 Number 5 PP:251-254

[6]. ShivrajJadhav, KomalNikam, Anand Gandhi, NarendraShinde, KishorSalunkhe (2012). Applications of Computer Science in Pharmacy: An Overview. National Journal of Physiology, Pharmacy & Pharmacology, Volume 2 , Issue 1 PP: 1 – 9.

[7]. Onuiri Ernest E., OyebanjiInalegwu G., Fayehun Solomon A., Chukwujioke Sam-David (2016). Online Pharmaceutical Management System. European Scientific Journal April 2016 edition vol.12, No.12 ISSN: 1857 – 7881. PP: 139-156.

[8]. M. O Yinyeh, S. Alhassan (2013). Inventory Management System Software for Public Universities in Ghana (IMSSPUG). International Journal of Advanced Research in Computer Engineering & Technology (IJARCET) ISSN: 2278 – 1323, Volume 2, Issue 8. PP: 2461-2464.

[9]. Kim R Saverno, Lisa E Hines, Terri L Warholak, Amy J Grizzle, Lauren Babits, Courtney Clark, Ann M Taylor, Daniel C Malone(2018).Ability of pharmacy clinical decision-support software to alert users about clinically important drug-drug interactions. Journal of the American Medical Informatics Association, Volume 18, Issue 1.PP:32-37.

[10]. Levin Thomas, Jayakrishnan SS. (2014) Development and Evaluation of a novel inventory management software for community pharmacy practice. International journal of innovative pharmaceutical science and research. Volume 2, Issue 4. PP: 765-776

[11]. Vishavdeep Singh, Harwinder Singh, Sukhjeet Singh (2015). Drug Inventory Management of A Pharmacy Store by Combined ABC VED Analysis. International Journal on Mechanical Engineering and Robotics (IJMER), ISSN (Print): 2321-5747, Volume-3, Issue-5,201 PP: 19-22.

[12]. SurabhiDwivedi, Arunkumar, Preetikothiyal (2012) Inventory Management: A Tool of Identifying Items That Need Greater Attention for Control. www.thepharmajournal.com. ISSN: 2277-7695. Volume 1, number 7. PP: 125-129

[13]. Renuka K.P, SibyJoseph(2013).Study on working of community pharmacies in three major cities of Kerala, India. Asian Journal of Pharmaceutical and Health Sciences. Volume 2, Issue 1. PP: 719-725.

[14]. Levin Thomas, Jayakrishnan SS. (2014 (2015). Quality assurance auditing of community pharmacies across the state of Kerala. Asian Journal of Pharmaceutical and Health Sciences. Volume 5, Issue 2. PP: 1230-1236.

[15]. AnupamSaha, ArunChatterjee ,MadhurimaGhosh(2018). An overview on the utility of computer application in the pharmacy world and its significance. Indian Research Journal of Pharmacy and Science.Volume 5, Issue 3. PP:1628-1635.

[16]. FS Vaz1, AM Ferreira , I Pereira-Antao , MS Kulkarni and DD Motghare(2008). Application of inventory control techniques for drug management at a rural health centre.

Indian Journal of Preventive and Social Medicine. Volume 39 ,No3 and 4. PP: 120-123.

[17]. ManishaKetkar andOmkarprasad S. Vaidyab (2014). Developing ordering policy based on multiple inventory classification schemes. Procedia - Social and Behavioral Sciences 133. PP: 180-188

[18]. Edward A. Silver, Hussein Naseraldin and Diane P. Bischak (2009). Determining the Reorder Point and Order-Up-To-Level in a Periodic Review System So As to Achieve a Desired Fill Rate and a Desired Average Time Between Replenishments. ournal of the Operational Research Society • PP: 1-34.

[19]. Frederic r. curtiss, phd, rph, cebs, Richard n. fry, bspharm, rph and Steven g. avey (2004). Framework for Pharmacy Services Quality Improvement, A Bridge to Cross the Quality Chasm. Journal of Managed Care Pharmacy, Volume 10, No 1. PP: 60-78.