

Free research proposal about the implementation of an automated dispensing system...

[Sociology](#), [Community](#)



- Introduction
- Pharmacy and technology

The use of up to date communication technology in relation to software and hardware components is gradually becoming a vital role in the evolution of the community pharmacy from a business perspective. This is because of its efficiency in pharmacy, profitability and professional reasons¹. The recurring manual dispensing process is quite labour intensive. Pharmacy dispensing roles in the United Kingdom comprise of inventory management, counting of tablets, record filling of patients' details in registers, manual dispensation of prescriptions and drug interaction detection².

Most of the medications being developed by manufacturers comprise of mainly tablets, capsules and syrup form usually packaged in little bottles. For a long time, pharmacists all over the world have usually dispensed drugs on a tray which is more labour intensive and time consuming due to the huge workload³. This has usually meant that safety and standard operations meant for quality Medicare have always been compromised. Hospitals have been forced to hire more casual labourers to meet the demands of the over flocking patients.

John and Frank Kirby in 1967 developed a portable tablet counting digital machine to count tablets and capsules. They are hence regarded to as the pioneers of small object counting machines and pharmacy automation. The machines were found to be consistent, accurate and much faster thus improving workflow. In 1980 tablet counters such as Electrocardiogram machines and Prestel Data terminals were invented and they proved to be fast, accurate and efficient in prescription dispensations⁴.

- Automated Dispensing System

Automated dispensing systems are designed to carry out the automatic storing and picking of drugs, correct labelling of the drugs and the constant supply of the drugs to facilitate the effective use of the machine⁶. These systems allow pharmacies to store and dispense drugs near the point of use. During storage of items in the Automated Dispensing System, the items are bar-code scanned using a barcode reader when placing the items in the storage cabinet. This process is important as it uniquely identifies the products which are stored in storage cabinets manually, semi-automatic or fully automatic process.

- The stock control system is linked to software through a computerized interface that allows the system to select an item during the medication supply process. When items are picked they are automatically sent to the end site using conveyer belts. Picking can also be done for drugs that would be picked later at a scheduled time. Presently there are two types of pharmacy-based automated dispensing systems that use different storage methods; randomised or channel storage. Other automated systems include ward-based storage and administration systems.

- Randomised storage systems

In this system, stocks are stored according to the dimensions of pack in most efficient space location. Drugs are placed anywhere on the rows of shelves inside the storage cabinet. The Automated Dispensing Systems scans each product allocating fittingly sized slot for each item. The randomised storage system uses a robot that is responsible for storage and retrieval of items⁷.

- Channel storage systems

- In channel storage systems, stock is usually loaded into predetermined locations. The storage is similar to that of a vending machine where complete channels are dedicated to a particular product. Items are manually stored at the back of the systems and are dispensed from the front. In this system, the storage and dispensing processes are independent from one another.

- Channel storages are increasingly being installed in community pharmacies but the random systems in hospital environments due to the high number of product lines. These automated dispensing systems have some features that enable them to store and dispense goods in a safe, secure and efficient manner. Some of these features include incorporation of pack labellers to ensure the automatic dispensing of items uniquely identified to each patient, availability of refrigerated units for the storage and dispensing of medication requiring refrigeration, automatic verification process to double check products to ensure correct dispensing of drugs among many other features.

- Pharmacist Roles in Community Pharmacy

- Community pharmacists are health professionals most accessible to the public. Most community pharmacists provide vital services for other health care providers and facilities in their communities. Pharmacists serve patients by taking their prescriptions and feeding them into automated machines. They are also responsible for the provision of clinical and educational services to community residents including glucose screening, blood pressure and diabetes counselling. Community pharmacists are also involved in the care of patients, the monitoring of drug utilization and health promotion among other roles.

- Processing steps of dispensing a prescription in community pharmacy

The ability to deliver an effective service should be verified by undertaking proper dispensing procedures as per the stipulated procedures and regulations to ensure correct dispensing⁹. A pharmacist should adhere to the following procedures;

- Receive properly prescriptions into the pharmacy.
- Encompass correct charging and exemption procedures and provision any additional information.
- Confirmation of whether the prescription is valid. They should be accurate, complete and conform to legal requirements.
- Check the prescription for safety and clinical correctness. This entails checking patient's medical history, side effects and conditions and appropriate dosage.
- Pinpointing any emerging problems and solving them appropriately.
- Perform correct dosage and prescription calculations.
- Assemble the prescriptions accurately which includes packaging and producing computer-generated labels. This is followed by supplying the correct drugs.
- Correctly issue dispensed drugs to patient with any additional information and advice and process necessary documentation.
- Application of automated dispensing system in community pharmacy

Automated dispensing devices systems have become increasingly universal in supplementing or replacing unit-dose distribution systems in an effort to improve medication availability enhance the efficiency of drug dispensing, billing and the trimming down of errors. The McLaughlin's dispensing system

is one of the ways in which automated dispensing can be applied in community pharmacy. The system comprises of a dispenser, a programmable magnetic card, and a pharmacy computer. It is a locked system which is loaded with a patients' prescription and at the required dosing time, the bedside dispenser drawer unlocks automatically for a dose to be administered.

The Baxter ATC-212 dispensing system⁶ installed at the pharmacy utilises a microcomputer to pack unit-dose tablets and capsules for oral administration¹⁰. Medications are stored in calibrated canisters that are designed specifically for each medication. Canisters have primary keys to reduce errors upon dispensing. A tablet or capsule is dispensed from a canister after the order is sent; a labelled drug then jets out.

- Benefits and Draw backs of robot dispensing system

The robotic dispensing system if utilized and employed correctly can have many benefits. There have been numerous reports on the impact of robotic dispensing systems on the number of error rates. The use of robotic systems has led to a significant reduction in error rates meaning that when used correctly they can facilitate savings and offer an opportunity for improvement of safety. Its implementation can be used to facilitate the quick dispensing of drugs and quicken the process of discharging patients. Some of the other benefits would include:

Stock control

An automated pharmacy dispensing system provides an automated inventory control and management. The iPharmacy and the robot provide automated inventory management that precisely records the drugs that

have been dispensed and their availability facilitating the ordering processes¹¹. IPharmacy provides roles in regard to stock control which include shelving techniques that reduce the chances of expired drugs and the streamlining on dispensing errors. Moreover in stock control, the system has also enhanced proper use of space, which brings with it significant improvements at the working environment.

The Automatic loader in the pharmacy dispensing systems does away with the use of store keepers, whose major work is stocking drugs on shelves, checking and sorting out drugs. This would save on time and improves efficiency¹².

Improved use of staff time

This automated dispensing system has fastens the dispensing process leading to better utilisation of the human resource. Operations have been made more efficient through saving on the amount of time spent to store and dispense these medications. This would further boost staff morale which later turns into job satisfaction¹³. Manual dispensing process is time consuming and often involves long working hours and stretched shifts. Staffs have ample time to focus on patients since they have adequate time at their disposal resulting from the automation of dispensing machine¹⁴. They also have a serene working environment as some of the labour intensive tasks have been made efficient.

Process efficiencies

Waiting times are the most quoted measures of patient experience. The number of items dispensed per hour can be increased with robotic

dispensing systems unlike in manual dispensing where a lot of time is usually used.

1. 7. Impact of an automated dispensing system on patient safety

Pharmacy management by large views technology as a way out of industry challenges such as stretched and hectic shifts, staffing shortages and the large volumes of prescriptions. Instead of acquiring more staff, pharmacies have invested in automated dispensing technology to handle the large volumes of prescriptions, while facilitating safer, precise and accurate dispensing process¹⁵. The robotic dispensing system has helped create staff efficiency by reducing the highly labour intensive task and the streamlining of the dispensing processes thus creating a serene working environment. The pharmacy staffs have ample time to adequately attend to patients making the system much safer.

An empirical study by Mandrack et al (2012),³ found out that the following errors are associated with the manual system of dispensing and hence there was need for an automated pharmacy dispensing machine: Staff shortage (29%), Telephone calls (64%), busy day (55%), many clients (43%), Lack of concentration (43%), Counterchecking (44%), and similar drug names (32%)

There are currently different suppliers of automated dispensing systems in the United Kingdom. The systems are able to pick a medication in 10 seconds and have dispensing capabilities of up to 1000 items an hour.

1. 8 Cost- effectiveness and time reducing by implementation of robot system

One of the major reasons for the implementation of the robot system has been cost saving through the cutting down of labour expenditures and

minimization of drug wastage and theft¹⁶. The system saves on personal time, enabling pharmacy staff to fully attend to all duties hence improving quality of service delivery. Although the installation costs of the robotic systems may be high, financial benefits accruing from better inventory management, saving and reallocation of pharmacy staff personal time, improved billing and revenue collection and quality service delivery will result in increased organization profits¹⁷.

1. 9. Examples of Implementation:

Macclesfield District General Hospital

Located in the United Kingdom the hospital uses technology to manage work flows and carry out medicine inventory management. The management has embraced automated dispensing system that has had positive benefits. The installation of iPharmacy was vital to Macclesfield District General Hospital's in automating process and functions which in the long run will steer up the growth of its processes and systems. The combined installation of the Robot and iPharmacy was a strategic decision in the achieving the goals and objectives of the hospital⁵. The system helped create staff efficiency by reducing the labour intensive task, streamlining the dispensing processes thus creating a serene working environment.

- Aims
- Objectives
- Methodology:

We sent the questionnaire to four pharmacists as a pilot so they could assist us with any possible improvements to the questionnaire. A final copy of the

questionnaire will be sent to approximately 1000 pharmacists. Data collection would be carried out using the questionnaire method and telephone. After filling of the questionnaires by the pharmacists, they would be contacted to follow up their response; this will be achieved via telephone or post. Data analysis would be carried out using graphs and pie charts.

- Project team:

Safiyah Ali, Eunice Leong, Soo Ling, Ciara Mooney, Rachel Nodwell

- Resources

Library books, journal, postage, questionnaire, excel.