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"Future of Pharmacy: Integrating Automation and Telepharmacy for Improved Outcomes"

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ABSTRACT: This Article aims to explore the integration of technology and automation in healthcare, focusing on pharmacy automation and telepharmacy. The primary objectives include minimizing medication errors, enhancing patient care, and achieving desired therapeutic outcomes. The study highlights how pharmaceutical automation is revolutionising healthcare. It presents the idea of telepharmacy, which uses technology to provide chemist services remotely. This is especially helpful in remote or difficult areas. We talk about the integration of barcoding systems, the use of popular pharmacy management software, and the implementation of pharmacy management software. In order to improve productivity and lower errors in pharmacy and telepharmacy settings, the study explores the importance of automated packaging systems, robotic medicine dispensing systems, and automated pharmaceutical dispensing equipment.Highlighted findings include the potential to reduce dispensing errors by 95% and target potential adverse drug events (ADEs) by 97% through the implementation of barcoding technology. Pharmacy automation, including automated dispensing machines, significantly decreases the occurrence of prevented dispensing incidents. Robotic medication dispensing systems not only automate routine tasks but also offer scalability and seamless integration with telepharmacy platforms, contributing to faster prescription fulfilment and reduced waiting times.In conclusion, the integration of technology in pharmacy, particularly through automation and telepharmacy, transforms healthcare delivery. Pharmacy automation emerges as a superhero, offering accurate and efficient medication dispensing. The study concludes that these technologies not only minimize errors but also address various challenges in the healthcare system. The seamless integration of automation technologies with telepharmacy extends healthcare services to underserved areas, improves patient outcomes, and facilitates remote pharmacist-patient interactions. Overall, this integration sets the stage for a more efficient, accessible, and patient-centric future in healthcare.

KEYWORDS: Increased Accuracy, Reduced Medication Errors, Improved Patient Safety, Enhanced Efficiency and Time Savings.

I. INTRODUCTION:

This Review paper/article mainly aims to illustrate the increased use of technology and automation within the healthcare system for better patient care and desired therapeutic outcome from the patients without any medication errors. [1] one more thing human error is an inevitable it doesn't occur with an intent. Pharmacy is a place where you can get medicines and healthcare products, often with the guidance of a pharmacist. But in now a day some errors are occurring in the pharmacy through directly or indirectly by the pharmacist. [2] Pharmacies are like a bridge between doctors and patients, helping to ensure that everyone gets the right treatment and care. Because of these errors there is a chance that leads to break the bridge between doctors and patients by the pharmacy. [3] To overcome these issues in the society, we would like to introduce a new technology to this society i.e., pharmacy automation. [4] Pharmacy automation is like as the superhero of the healthcare world and it is immortal. The use of technology and automated systems to carry out various operations and procedures in a pharmacy is referred to as pharmacy automation. [5] The dispensing and delivery of pharmacy products will be more accurate, efficient, and safe with the help of these technologies. [6] Additionally, failing to consult a doctor at the appropriate moment during an emergency is another problem that may result in the death of multiple persons or patients. or at night. [7]

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Here some examples like stroke, renal calculi etc... To avoid this, we have to implement the telepharmacy. [8] This will help to the patients or persons to take the correct consultation by the doctor in the appropriate time. It will lead to decrease the mortality rate. [9] Telepharmacy is nothing but is a way for pharmacists to provide their services remotely through technology, like video calls and the internet. [10] It allows people to talk to a pharmacist and get information about their medications or health concerns without physically going to a pharmacy. [11] Telepharmacy can be especially useful in rural areas or when people have difficulty reaching a local pharmacy in the difficult conditions. [12] They have several advantages with this pharmacy automation and telepharmacy. [13] Coming to this pharmacy automation and telepharmacy it mainly focuses to the medication errors, Drug complications, Adverse drug reactions and Adverse events and increase the patient health accuracy, Improved patient safety, Enhanced efficiency and time savings to the pharmacists. [14] Here implementation of this system in to the pharmacy we can reduce the burden on the pharmacist i.e. robots handle the tasks like counting pills, dispensing medications, and packing. The pharmacist saves their time and mainly focus on their duties. [15] The pharmacist utilizes this saving time in the patient counselling, dosage regimen, and patient care services. [16] Pharmacy automation is the future of medicine and that future is now. It can act as high-tech pharmacy assistant to the pharmacist and its help to prevent the oops moments, ensuring the right dose gets to right person every time.[17] I strongly believe that in future telepharmacy can replace the clock in every house i.e. every house as a clock like that only telepharmacy is like as digital Docter to every house. [18] Telepharmacy is the bridge between patients and healthcare services especially in the rural areas. And also, when compared to normal disease conditions telepharmacy plays a significant role in management of chronic disease conditions. And also, telepharmacy is beneficial to the rural areas patients or people i.e. it can save the traveling charges and time to the patient or people. [19] Telepharmacy is like as game-changer for the disabled persons and paralysis patients i.e. disabled patients and paralysis patients are facing so many problems to go to hospitals or pharmacy they must need the help of caretakers to go to hospitals or pharmacy. [20] So, it acts as a game-changer for several people. [21]

II. METHODS:

1. SOFTWARE FOR PHARMACY MANAGEMENT: -

Pharmacy is a branch of medicine, which deals with the sale of much-needed medications. Pharmacotherapeutics, or compounds with physiological effects when eaten or injected into the body, are known as drugs. [22] Thus, in order to manage, track, and update patient data in computer systems that is, to employ software for pharmacy administration databases and operating systems must be used. [23] Consider all of these following a pharmaceutical drug management system that offers software for managing pharmaceuticals, including drug interactions, order creation, patient data matching, and medication specifics. [24] The system will detect the medicine whenever it is introduced to the patient, meaning that the dosage of the medication is correct to provide the intended therapeutic effect. [25] Additionally, it indicates whether the medication will result in any issues with drug interactions for the patient. Additionally, the system analyses and displays on the screen any drug interactions brought on by prescription drugs, dietary allergies, or the patient's medical condition. [26] Additionally, the programme effectively handles a variety of functions, including point-of-scale capabilities, reporting tools, and prescription monitoring. These are a few well-known pharmacy management programmes.

Table 1: SOFTWARE FOR PHARMACY MANAGEMENT

S.NO	SOFTWARE FOR PHARMACY MANAGEMENT
1.	PIONEER Rx
2.	ENTERPRISE Rx
3.	Rx30
4.	COMPUTER-Rx
5.	PRIME Rx
6.	CERNER POWERCHART

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FIGURE 1: METHODS USED IN THE PHARMACY AUTOMATION AND TELEPHARMACY

PIONEER Rx: - In the pharmacy software industry, pioneer Rx is the market leader with the most deployed systems and the happiest clients. [27] Pioneer Rx addresses everything, from inventory control to workflow management.

ENTERPRISE Rx: - Another popular system with capabilities like inventory management, workflow tools, and prescription processing is called Enterprise Rx.

Rx30: - Rx30 emphasises flexibility and scalability. Rx30 offers solutions for mail-order pharmacies, hospitals, and retail establishments. [28] Workflow management and prescription processing are among the other capabilities it provides.

COMPUTER-Rx: - Rx30 emphasises flexibility and scalability. Rx30 offers solutions for mail-order pharmacies, hospitals, and retail establishments. [29] Workflow management and prescription processing are among the other capabilities it provides.

PRIME Rx: - Medication services and E-prescribing are integrated with primer Rx at synchronisation. [30]

CERNER POWERCHART: - Power Chart offers capabilities including inventory tracking, drug utilisation review, and order entry, and Cerner offers a healthcare system. [31] Prior to selecting a

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software, you should ascertain that the programme satisfies the particular wants of your pharmacy. [31]

2. BARCODING SYSTEMS: -

Barcoding systems in pharmacies and telepharmacies can be used to increase productivity, decrease errors, and guarantee patient safety. [32] A barcoding system uses different-width bars and spaces to encode data in a way that is visible to computers and can be read by them. [33] It is frequently used to swiftly and precisely identify objects in retail, inventory management, transportation, and many other applications. [34] Every barcode has information about the product it represents, including the manufacturer, type of product, and unique identification number. [35] Alphanumeric characters are represented by parallel lines and gaps with varying widths in barcodes. By measuring the widths of the bars and spaces, a barcode scanner can read these patterns and convert them into the relevant data. [36] We can reduce dispensing errors by 95% and target possible ADEs by 94% by utilising barcode technology in pharmacy automation and telepharmacy. [41] These systems' integration of barcoding technology is in line with the overarching objectives of healthcare automation and the effective and high-quality patient care that telepharmacy offers.

Table 2: BARCODING SYSTEMS

S.NO	BARCODING SYSTEMS	FUNCTIONS
1.	**Medication Dispensing in Pharmacy Automation**	**Inventory management: -** Barcodes are used to monitor the stock levels of pharmaceuticals. The technology scans the barcode to automatically update the inventory when a drug is dispensed. **[37]**
		➢ **Automated dispensing cabinets (ADCs): -** Medication from ADCs can be dispensed automatically and securely with the use of barcoding. Pharmacists can scan barcodes to obtain specific medications. **[38]**
2.	**Medication Verification**	**Match With Prescription: -** Before giving out prescriptions, a chemist can scan the barcode on the prescription to make sure the drugs match. **[39]**
		Patient Medication Safety: - Barcodes on pharmaceutical packaging lower the chance of mistakes by ensuring that medications are used sensibly. **[40]**
3.	**Order Tracking and Workflow**	**Prescription Tracking: -** Prescriptions can be tracked using barcodes from form entry to the point of final dispensing.

3. AUTOMATED MEDICATION DISPENSING MACHINES: -

An essential element in the development of pharmacy automation and telepharmacy are automated medical dispensing machines. Modern technology, including sophisticated software and robots, is incorporated into these devices to improve productivity, accuracy, and patient safety. [42] The main result of the intervention—automated medical dispensing machines was a notable decrease in the total rate of drug errors during the dispensing procedure. [43] Advanced pharmacy technology systems called Automated Medication administering Machines (AMDMs) are made to make the process of administering pharmaceuticals in healthcare settings—like clinics, hospitals, and long-term care facilities—more efficient. [44] Numerous functions that were previously completed by chemists or nurses are now automated by these machines, including the storage, retrieval, dispensing, and documenting of medications. [45]

PHARMACY AUTOMATION

Prescription Dispensing: - Prescription medication can be dispensed with precision and efficiency thanks to these machines. [46] Pharmacists can stock the machines with a variety of drugs, and the system, which is linked with electronic health records (EHR), can use barcode or RFID scanning to determine which drug is appropriate for a given patient. [47]

TELEPHARMACY: -

Remote Medication Dispensing: - These devices allow distant chemists to deliver medication to patients in the context of telepharmacy. [48]

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Pharmacists may oversee prescriptions, start the dispensing process, and access the machine's interface remotely, guaranteeing that patients receive their medications on time and accurately. [49] The foundation of pharmacy automation and telepharmacy are automated medicine dispensing machines, which propel innovations that improve patient care, lower errors, and simplify pharmacy operations. [50] Despite this, the total mistake rate dropped. The frequency of avoided dispensing mishaps is reduced by 16–60% with automatic machines.[51]

4. ROBOTIC MEDICATION DISPENSING SYSTEMS: -

By automating the drug dispensing procedure and eliminating human error, robotic medication dispensing systems free up chemists to work on more difficult assignments. [52] The following are some salient features of the robotic drug dispensing system that are associated with telepharmacy and pharmacy automation By automating the delivery of prescription drugs, these robotic devices help to lower human error rates associated with labelling and counting. [53] Medication, including tablets, capsules, and liquids, can be precisely handled and dispensed by robots. Additionally, by keeping track of medicine usage and expiration dates, it facilitates more effective pharmacy inventory management. It also helps to maintain ideal stock levels and lowers the possibility of stockouts. Medication errors, such as giving the wrong drug or dosage, are greatly decreased by robotic dispensing systems. [54] Technologies for image recognition and barcoding are combined to validate pharmaceuticals and guarantee their accuracy. Because robotic systems handle regular dispensing duties, this technology primarily assists chemists in focusing on their specialty, such as clinical and patient care activities. Additionally, it shortens patient wait times, lowers filling errors, and expedites the fulfilling of prescriptions.

These systems can be expanded to accommodate the requirements of various pharmacy sizes, ranging from tiny neighbourhood pharmacies to major hospital pharmacies.

Robotic Medication Dispensing Systems in Pharmacy Automation:

The process of dispensing drugs at pharmacies is automated using robotic medication distribution devices, which improves patient safety, accuracy, and efficiency. Usually, these systems are made up of robotic arms, automated storage systems, and software interfaces that control duties related to inventory and dispensing of medications. [55]

Benefits of Robotic Medication Dispensing Systems:

Error Reduction: By precisely distributing medications in accordance with computerised prescriptions and patient profiles, robotic systems lower the risk of medication errors by decreasing the possibility of dosage errors or pharmaceutical mix-ups.

Workflow Optimization: Robotic systems simplify pharmacy workflow by automating dispensing procedures, freeing up pharmacists and pharmacy personnel to concentrate on patient care and clinical activities. [56]

Inventory Management: Real-time monitoring of medication inventory levels by robotic dispensing systems lowers the possibility of stockouts or overstocking by automatically replenishing medication supplies as needed.

Patient Safety: Robotic systems ensure accurate medicine delivery and reduce the likelihood of adverse drug-related events, which enhances patient safety. [57]

Robotic Medication Dispensing Systems in Telepharmacy:

Robotic medication distribution devices are essential to the telepharmacy industry because they allow remote pharmacies to offer patients in underserved or rural areas critical prescription treatments. [58] Pharmacists may oversee medicine dispensing procedures remotely thanks to these devices, which also make it easier to accurately dispense prescriptions based on electronic ones.

Benefits of Robotic Dispensing Systems in Telepharmacy:

Accessibility: Robotic dispensing technologies remove geographic obstacles to medicine access and enhance healthcare equity by extending pharmacy services to patients in underserved or remote areas. [59]

Medication Adherence: By guaranteeing that patients have timely access to their drugs, even in locations with restricted access to traditional

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pharmacies, telepharmacy with robotic dispensing systems encourages medication adherence.

Clinical Oversight: With robotic systems, chemists may remotely oversee the distribution of medications, guaranteeing adherence to regulations and offering clinical supervision to guarantee patient safety. [60]

Cost-Effectiveness: Telepharmacy, especially in underserved or rural areas, lowers healthcare expenses related to infrastructure and transportation by utilising robotic dispensing equipment.

Robotic systems are even more important in telepharmacy, where chemists can oversee prescription dispensing from a distance. Pharmacists can monitor dispensing activity remotely and take appropriate action if needed. Platforms for telepharmacy allow for remote tracking of the state and performance of the robotic system. [61] Pharmacists can minimise downtime by troubleshooting and doing maintenance remotely in the event of issues.

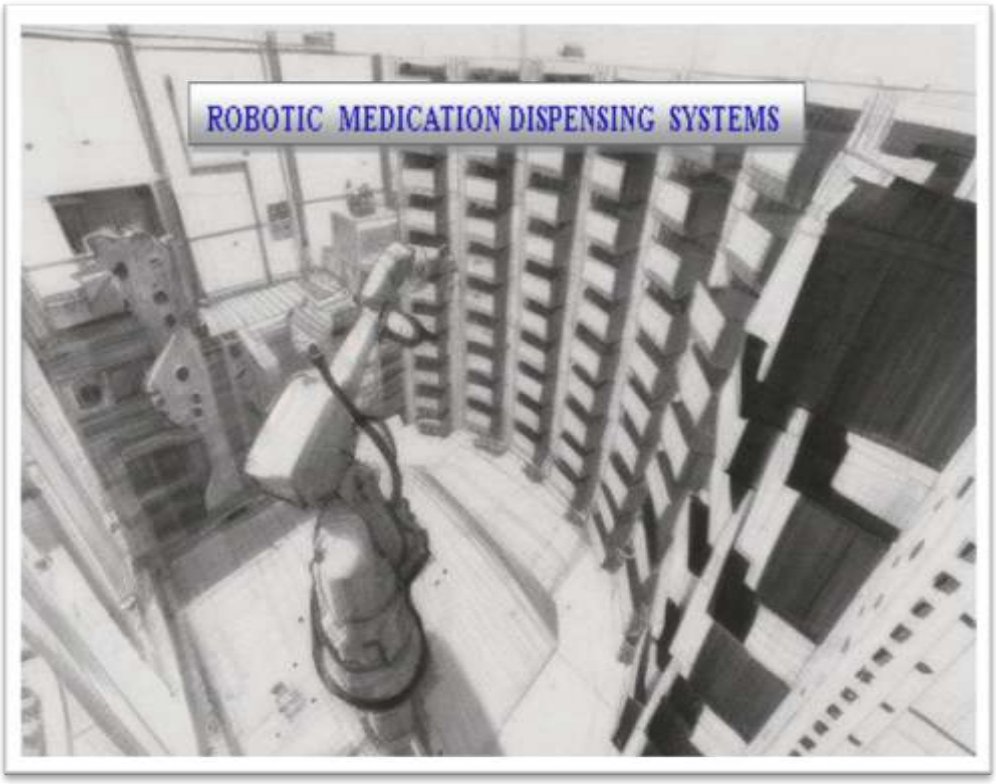

FIGURE 2: ROBOTIC MEDICATION DISPENSING SYSTEMS

5. AUTOMATED PACKAGING SYSTEMS: -

By automating the packaging of pharmaceuticals, automated packaging systems contribute significantly to telepharmacy and pharmacy automation. The packing of individual doses is automated by these methods, improving accuracy and efficiency. [62] Unit-dose packaging, which entails packaging individual dosages of pharmaceuticals for certain times or intervals, can be produced via Automated Packaging Systems. [63] Medication management is improved by unit dose packing, particularly for patients whose drug regimens are complex. These methods package pharmaceuticals in an easily comprehensible and organised manner, which helps to enhance medication adherence. Patients are less likely to forget doses because they can readily determine when to take each drug. [64] Measuring and packing prescription drugs by hand is less likely when automation is used in the process.Vision systems and barcode scanning are frequently combined to check the accuracy of the pharmaceutical packaging. Packaging can frequently be tailored using these automated packaging technologies to meet the requirements and preferences of the patient. [65] It is possible to

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package and categorise medications in a way that complements the patient's regimen and schedule. Moreover, automated packaging systems guarantee that drugs are safely packaged and sealed, lowering the possibility of contamination or tampering.

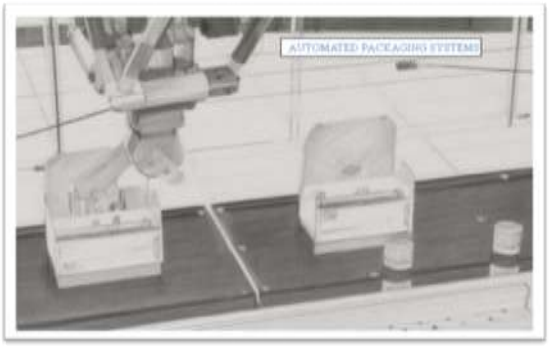

FIGURE 3: AUTOMATED PACKAGING SYSTEMS

Telepharmacy platforms can be linked with Automated packing Systems to enable smooth coordination between prescription dispensing and packing. [66] Integration makes it possible to oversee and monitor the complete pharmaceutical packaging and dispensing process in real time. Integration with systems for telepharmacy makes it possible to watch the packing process remotely. In the event of a problem, chemists can opt to receive alerts or notifications, which enables prompt intervention. [67] Packaging material inventory management functions are frequently included in automated packaging systems, guaranteeing a sufficient supply of packaging materials. Patient outcomes and satisfaction have increased as a result of these automated packing and dispensing processes.

Benefits of Automated Packaging Systems:

Accuracy: Medication errors are reduced by automated packaging systems, which precisely count and label pharmaceuticals in accordance with recommended dosages and patient instructions. [68]

Efficiency: Automated packaging solutions increase pharmacy workflow efficiency and lower labour costs by automating time-consuming packaging operations like pill counting and container labelling. [69]

Patient Safety: By guaranteeing that each packed drug contains the right medication, dosage, and administration instructions, the use of automated packaging technologies improves patient safety. [70]

Compliance: Pharmacies can better adhere to regulatory standards for medicine labelling and dispensing processes, such as those established by the Food and Drug Administration (FDA) and Drug Enforcement Administration (DEA), by implementing automated packaging systems. [71]

6. TELEPHARMACY: -

Telepharmacy is referred to as "the provision of pharmacist care by registered pharmacists and pharmacies through the use of telecommunications to patients located at a distance" Services offered by telepharmacy include clinical service provision, patient counselling and monitoring, medication selection, order review, and dispensing. [72] Telepharmacy, which includes remote dispensing, is a vital component of health systems that provides capillary access to healthcare services. [73] In developed nations, there is an uneven distribution of pharmaceutical services, with a regional scarcity in their distribution. [74] From an outlook on the future, it results in the anticipated decline in the number of chemists. [75] One essential aspect of telepharmacy is remote dispensing, which enables chemists to remotely dispense medications to patients without requiring face-to-face communication.

It results in less face-to-face interactions between medical staff and patients, issues with the assessment of medicine dispensing, and elevated security risks. [76] Telepharmacy platforms, which offer a safe and integrated setting for chemists to communicate with patients, take prescriptions, and dispense medication, are frequently used to enable remote dispensing. [77] Pharmacists and patients can communicate in real time via video conferences, chat rooms, or other secure messaging platforms provided by telepharmacy companies. [78] Pharmacists can conduct remote counselling, answer concerns from patients, and talk about information pertaining to medications. [79] Telepharmacy is utilised to teach patients with COPD, asthma, and pulmonary illnesses. [80]

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FIGURE 4: TELEPHARMACY

The telepharmacy platform may receive electronically sent prescriptions from healthcare professionals, which expedites the dispensing procedure. [81] Before distributing medication, chemists can remotely check and validate electronic prescriptions. [82] Automated dispensing systems, comprising robots and additional technologies, contribute to remote dispensing by precisely and quickly distributing pharmaceuticals in accordance with computerised prescriptions. [83] Pharmacists can oversee and control these systems remotely to guarantee accurate dispensing. [84]

PRESENT TRENDS / APPLICATIONS:

Access to Healthcare: Telepharmacy addresses the challenge of limited access to healthcare services, especially in rural or underserved areas where there is a shortage of pharmacies and healthcare professionals. [85]

Medication Management: With telepharmacy, pharmacists can remotely monitor medication adherence, provide counselling, and conduct medication therapy management (MTM) services, thereby improving patient outcomes and reducing medication errors. [86]

Chronic Disease Management: Telepharmacy enables continuous monitoring and support for patients with chronic diseases, such as diabetes, hypertension, and asthma, through remote consultations and medication adjustments. [87]

Medication Adherence: By offering convenient access to pharmacists through telecommunication channels, telepharmacy helps improve medication adherence rates by providing timely reminders, education, and support to patients. [88]

Emergency Response: In emergency situations or natural disasters where access to traditional pharmacies may be limited, telepharmacy can provide critical medication dispensing and counselling services, ensuring continuity of care. [89]

FUTURE TRENDS / APPLICATIONS:

Technology Integration: Advances in technology, including artificial intelligence (AI), machine learning, and robotics, will further enhance telepharmacy services, enabling automated medication dispensing, personalized medication recommendations, and predictive analytics for medication management. [90]

Expansion of Services: Telepharmacy is expected to expand beyond medication dispensing and counselling to include services such as genetic testing interpretation, pharmacogenomics consultations, and specialty medication management. [91]

Remote Monitoring Devices: Integration with remote monitoring devices and wearable sensors will enable pharmacists to track patient health metrics in real-time, allowing for proactive intervention and personalized medication adjustments. [92]

Virtual Reality (VR) and Augmented Reality (AR): VR and AR technologies may be incorporated into telepharmacy platforms to simulate in-person pharmacy experiences, such as medication counselling sessions or medication administration demonstrations. [83]

Global Healthcare Access: Telepharmacy has the potential to bridge healthcare gaps on a global scale by providing access to pharmacy services in remote regions and developing countries where healthcare infrastructure is limited. [84]

Pharmacists can offer patients remote drug consultation, answering any queries they may have and going over correct usage and possible side effects. [85] Platforms for telepharmacy frequently have tools for exchanging knowledge and resources regarding prescription drugs. [86] Before prescriptions are filled, chemists can remotely confirm and approve them, making sure that the drugs are appropriate for the patient's needs and medical background. [87] Reminders and alerts to patients to take their prescriptions on time are examples of services that telepharmacy systems may offer to monitor and encourage medication

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adherence. [88] When patients are unable to physically visit a pharmacy, remote dispensing enables pharmacists to provide prompt access to necessary medications in emergency situations. [89] In telepharmacy, remote dispensing broadens the scope of pharmacy services, improves accessibility, and helps improve patient outcomes—particularly in regions where access to healthcare is a barrier. [90] Additionally, it is in favour of using technology to enhance medicine administration and adherence. [91]

BENEFITS OF TELEPHARMACY:

Improved Access to Pharmacy Services: By bringing pharmacy services to underserved and rural places, [92] telepharmacy guarantees that patients have access to necessary prescription drugs, therapy, and assistance with medication management. [93]

Enhanced Medication Adherence: Telepharmacy lowers the chance of prescription errors and adverse drug events while promoting medication adherence by offering easy access to counselling and refill services. [94]

Cost Savings: Telepharmacy lowers total healthcare costs for patients and healthcare systems by lowering expenses related to transportation, [95] ER visits, and hospital readmissions. [96]

Increased Patient Engagement: By giving patients access to resources, [97] information, and support services related to healthcare, [98] telepharmacy promotes increased patient empowerment. [99]

Collaborative Care Coordination: Telepharmacy enables comprehensive and coordinated care delivery across numerous venues [100] and disciplines by facilitating collaboration among healthcare providers. [101]

III. DISCUSSION: -

This study emphasises the growing use of automation and technology in healthcare, with a particular emphasis on telepharmacy and pharmacy automation. The main objective is to reduce medication errors in order to improve patient care and get intended therapeutic outcomes. Since human mistake in the pharmacy is inevitable, sophisticated technology solutions are required. Pharmacy mistakes have the potential to damage the important relationship that exists between patients and doctors. The study presents pharmacy automation as a technical superhero in the healthcare industry, addressing these issues and guaranteeing safe, accurate, and efficient medicine delivery and dispensing.

Furthermore, the significance of prompt medical consultations is underscored, especially in emergency situations or at night, prompting the suggestion of telepharmacy as a potential remedy. In order to regulate, monitor, and update patient information, databases and operating systems are essential. This highlights the significance of software for pharmacy administration. It is noted that the incorporation of barcoding systems in telepharmacy and pharmacy has the ability to improve productivity, lower errors, and guarantee patient safety. The article explores the function of automated medicine dispensers, highlighting their capacity to correctly distribute prescription drugs and interface with electronic health information.

The automation of medicine dispensing, decrease in errors, and free up chemist time for more difficult jobs are the main reasons for the discussion of robotic medication dispensing systems. It has been determined that automated packaging systems play a major role in pharmacy automation and telepharmacy by optimising the packaging procedure, increasing productivity, and guaranteeing precise dispensing. The revolutionary potential of pharmacy automation and telepharmacy in enhancing healthcare delivery, decreasing errors, and ultimately helping patients—especially in underserved or rural areas—is highlighted in the paper's conclusion.

IV. CONCLUSION: -

This paper's examples of how technology and automation might be integrated into pharmacy offer a revolutionary way to deliver healthcare. The necessity for cutting-edge technical solutions is highlighted by the likelihood of human error in the administration of medications. In the field of healthcare, pharmacy automation shines like a superhero, providing safe, accurate, and efficient medication delivery and dispensing. Pharmacy automation and telepharmacy are being implemented to solve a number of issues within the healthcare system in addition to reducing drug mistakes. Pharmacy management software, such as Pioneer Rx, Enterprise Rx, Rx30, Computer-Rx, Primerx, and Cerner Power Chart, is used to ensure effective medication interaction analysis, order generation, and patient-specific prescription management. This software streamlines processes.

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Barcoding solutions are essential for improving productivity, cutting down on mistakes, and guaranteeing patient safety in telepharmacy and pharmacy environments. Modern technologies that greatly advance pharmacy automation and telepharmacy include robotic medicine dispensing systems, automated packaging systems, and automated medication dispensing equipment. These innovations improve patient care by cutting down on mistakes, optimising workflow, and freeing up chemists to work on more difficult assignments. Accuracy in drug distribution, verification, and inventory management is ensured by the combination of barcoding, image recognition, and RFID technology. In addition to automating repetitive operations, robotic drug distribution systems can be scaled to accommodate different pharmacy sizes, guaranteeing effective prescription fulfilment. The complete medicine dispensing and packaging process can be managed in real time by integrating these systems with telepharmacy platforms in a seamless manner. Through timely delivery of necessary prescriptions and improved patient outcomes, remote dispensing in telepharmacy expands access to healthcare services to underprivileged or remote communities.

Additionally, it makes remote interactions between chemists and patients possible, allowing for pharmaceutical advising, electronic prescription verification, and encouragement of drug adherence. Essentially, the combination of telepharmacy and pharmacy automation not only solves the problems facing the healthcare industry now, but it also opens the door to a future where patients come first, efficiency, and accessibility are prioritised. Particularly in remote or difficult settings, these technologies play a critical role in bridging the gap between patients and healthcare providers, thereby improving patient safety and overall healthcare results.

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