JRHP- Journal of Regulatory and Homecare Pharmacy
Volume 2, Issue 2 | December- 2025
e-ISSN: 3065-9698 Print ISSN: 3065-9663

Policy Analysis and Safety Issues of Directing Remote Dispensing device to Homecare Pharmacy: Opinion of the Regulating Authorities

Dr. Lucia Barros[1], Dr. Michael Osei[2]
[1] Department of Pharmacy Policy and Technology, University of São Paulo, São Paulo, Brazil
[2] School of Pharmacy and Pharmaceutical Sciences, University of Ghana, Accra, Ghana
Received: 12-10-2025; Revised: 30-10-2025; Accepted: 17-11-2025; Published: 06-12-2025

Abstract
The fast-growing Remote Dispensing Systems (RDS), including the automated medication cabinets and virtual pharmacist consultations, have caused a transformation in the homecare pharmaceutical services. But the application of the systems still lacks coherence and regulation in most areas. The paper assesses homecare use of RDS in both countries, Brazil and Ghana, in terms of regulatory environment, patient safety impact as well as operational issues. The collection of data included semi-structured interviews of 20 regulatory officials, pharmacists, and technology vendors together with safety audits of 12 homecare centers by applying RDS platforms. Some of the main discoveries included variations in licensing, poor caregiver training and reporting of errors. Remarkably, 17 percent of prescriptions created by RDS were associated with minimal mislabeling or dosing consequences, most of which were misconfiguration of software-interface. In spite of this, RDS elevated medication access and compliance of homebound patients especially in rural sector to a great extent. To provide safe and scalable integration of digital pharmacy systems with homecare, the study proposes interconnected regulatory guidelines, the certification of technology, and regular remote auditing.

Keywords: ***Remote Dispensing Systems, homecare pharmacy, patient Safety, regulatory compliance, digital health, Medication adherence.***

1. Introduction

1.1 The Increase of Homecare Pharmacies Services Motivated the Existence of Digital Medications Like remote dispensing systems (RDS)

The homecare pharmacy sector has shown massive progress throughout the previous decade, brought into existence by growing digital health market interests and the rising demand of patient-focused care. The increased rates of chronic illnesses, aging demographics and the transition toward home-based care, the homecare pharmacy services represent a major part of medication therapy outside of the standard health care facilities. Due to the growing options of homecare service, the trend is a prevalent use of digital solutions that facilitate effective and safe delivery of drugs.

Remote Dispensing System (RDS) is one of them and comprises automated medication cabinets, virtual discussions with a pharmacist, and a dispensing platform that allows patients to access their medications without necessarily visiting a physical pharmacy location. The platforms seek to increase access to them and increase adherence to medication and lessen the bill on healthcare providers, especially in case of patients in underserved and rural locations. RDS technologies have been proven to have large advantages in terms of assuring the timely delivery of medications, minimization of medication errors and facilitating conducting a consultation with a pharmacist remotely, all these factors have the impact of enhancing patient outcomes within homecare practices. Nevertheless, once the systems get incorporated into the homecare settings, the implementation means triggering a row of challenges and regulatory issues that are to be taken in due consideration.(1)

1.2 RDS Platforms are Automated and Accessible and Provide Novel Regulatory and Safety Issues

Even though RDS platforms also provide such benefits as automation and remote access as well as superior patient care, integration with homecare environments makes a range of novel regulatory and safety issues emerge in regard to the platforms. Automation of the dispensing process as well as remote consultation procedure with pharmacists may enhance efficiency and precision; however, additional layers of complexity are associated with this process in terms of regulatory requirements, safety of patients, and technological integration.

The main issue is the regulatory regime of RDS that currently lacks consistency and is yet obscure across jurisdictions. Even in most nations, digital pharmacy is an emerging aspect and seldomly does any nation produce concrete and uniform policies regarding the implementation of remote dispensing technologies in homecare

settings. Such regulatory insecurity leads to uncertainty in such areas as licensing procedures, safety procedures, and information security measures in RDS platforms. Also, because these systems are not necessarily local, they might have a different oversight compared to traditional pharmaceutical facilities located on a local scale, which makes the quality of the dispensed medication and its safety unquestionable(2)

Safely, the RDS platforms pose their own dangers, especially concerning the software failures, interface breakdowns and user training. Another thing that raises concern is improper dispensing, or mismatched prescription that may appear as a result of the improper interface settings of the automated dispensing system and the medication database. Moreover, the inadequate training or learning of caregivers or patients on how to use these systems might result in any incorrect use of drugs or incorrect dosage, which might not be easily recognized.

1.3 Absence of Standard Policies and Technical Supervision Prevent Safe Implementation of Differing Healthcare System

The absence of congruent policies and technical supervision is a major setback to the secure usage of RDS at the homecare pharmacies. The existence of regulatory discrepancies in different regions currently poses a challenge to various stakeholders comprising healthcare providers, pharmaceutical sellers, and regulatory authorities. Licensing of RDS platform is usually not standardized and most countries do not have a well-developed regulation or even certification of the RDS platform. Consequently, RDS platforms could become differently screened and supervised in accordance with the region.

Also, the RDS platforms tend to imply the participation of various stakeholders, including pharmacy providers, technology equipment vendors, and healthcare workers, who should collaborate to guarantee the effective and safe use of the technologies. The lack of central control makes this cooperation challenging, so it is hard to introduce unified training or monitoring systems into the conditions of homecare. This also implies that RDS platforms do not have technical standards, and thus it is possible to combine the platforms with other systems in different ways, which can create difficulties in terms of interoperability, system failures, and patient safety challenges.

Such regulatory and safety issues may mean less access to quality homecare by the patient, especially a rural or underserved patient, or more medication errors. Thus, it is urgent to introduce common regulatory regimes, uniform requirements of licensing and joint supervision to make the application of RDS in diverse healthcare systems safe and efficient.

1.4 The Present Study Will Examine the State of Current Regulatory Actions, Patient Safety, as well as Implementation Barriers of RDS within Homecare Environments

The proposed study will result in a full-scale assessment of the regulatory initiatives, patient safety, and possible barriers to implementation of Remote Dispensing Systems (RDS) in the environment of homecare pharmacies in Brazil and Ghana. The two countries have been chosen because they have diverse healthcare systems and differ with regard to the extent to which technology is being adopted, and even the different approaches to regulation.

By conducting semi-structured interviews with regulatory officers, pharmacists and technology vendors, as well as safety auditing of existing homecare facilities with and without RDS, the study aims at acquiring understanding with regard to the work challenges, safety concerns and regulatory gaps that could obstruct the successful implementation of RDS. In addition, the research will determine the effect of RDS platforms on medication access and adherence and the final outcomes affecting the patients attached especially the homebound patients within the rural setting.(3)

Such study will add precious evidence to the formulation of consistent regulatory measures, technology certification systems, and constant monitoring systems, and eventually lead to secure and ethical incorporation of RDS in homecare pharmacy which is an ever-growing sector.

2. Methods and Materials

2.1 Design of Study: Evaluation of a Measure Paired with a Prospective Safety Analysis

The study used a policy evaluation design and a prospective safety assessment in order to evaluate the regulatory environment, the patient safety outcomes as well as the operational issues in using Remote Dispensing Systems (RDS) in homecare pharmacies. The nature of the study design was based on the findings of the existing policy deserts and safety concerns that develop during implementing RDS, which consists of automated medication cabinets and virtual pharmacist consultans in homecare settings.

Volume 2, Issue 2 | December- 2025
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The policy evaluation component of the paper was aimed at addressing the nature of the current practice of regulation of RDS platforms in the homecare pharmacy business, including licensing, regulatory management, as well as the existence of universally accepted standards of safe and ethical application of such technological tools. The planned safety assessment part included an in-depth safety inspection of the operational practice within homecare facilities using RDS platforms. These were safety audits to ensure the reliability of software and interface errors, dispensing of medications and error reporting systems. The prospective nature of safety assessment permitted the detection of actual time problems and their solving under conditions of continuous RDS utilization. The mixed method enabled a comprehensive insight into the vulnerability of the regulation and the practice of RDS implementation in homecare practice.(4)

2.2 Locations of the Study: Brazil and Ghana Homecare Pharmacy Operation

The research involved two geographical locations, which include Brazil and Ghana. These countries were chosen based on the variety of their healthcare systems, the level of adopting RDS and various types of regulations in the homecare pharmacy industry.

Brazil: Brazil has experiences great development in use of digital technologies in health like RDS platforms especially in the rural and underserved regions. Nevertheless, the regulatory framework of digital health continues to be in development and there exist concerns regarding interoperability, data security and adoption of the technology. The homecare pharmaceutical market is growing in Brazil and the country provides a unique setting of assessing the incorporation of RDS within a developing healthcare system.

Ghana: Ghana is an interesting scenario in case of the assessment of RDS in low-resource settings where access to healthcare is usually low, and the use of digital applications is under discussion to enhance the care of patients. Digital health technology regulatory framework in Ghana is still at a very early phase of development, and community-based systems are traditionally performed to provide pharmacy services. The Ghana study is informative about such problems and the possible advantages of adopting the RDS in an environment where digital health is not so advanced but holds essential importance to an increase in access to care.

The two countries also offer an opposite, although complementary, view of the problems and rewards of implementing RDS technologies in the homecare environments. In undertaking the research, the study of RDS in these various contexts will enable the research to generate findings that can be applicable to a variety of healthcare systems and regulatory settings.

2.3 Data and Sources of Data: Semi-Structured Interviews (n=20) and RDS Safety Audits within 12 Facilities

Information sought in undertaking the study was gathered in two main sources namely:

Semi-Structured Interviews (n=20): 20 interviews were done with regulatory personnel, pharmacists and technology vendors in Brazil and Ghana. The functions of such interviews were to obtain qualitative data on the existing regulatory practices, licensing standards, and operational challenges that surrounded the use of RDS platform. The selection of the participants was made with regard to the involvement in the regulatory, operational, or technological sphere of the homecare pharmacy and RDS implementation. The interviews conducted were semi structured, which meant that there was flexibility in giving text and at the same time uniformity among the participants. The subject areas covered were regulatory frameworks, policy gaps, training, medication error reporting and safety issues when using automated dispensing technologies in homecare.(5)

RDS safety Audits (n=12): The research also involved safety auditing 12 actively employed RDS homecare facilities. The role of such audits was to determine the rate of likely reliability of the RDS software application, detect medication errors, and the error reporting processes used by each facility. The automated medication cabinets, the software interfaces and the dispensing processes were all subject to an inspection in order to point out any failures or incompatibilities that may affect patient safety during an audit. The audits were performed within three months, which made it possible to track the issues that occurred in real-time and guarantee the security of the RDS platforms in the homecare sectors.

2.4 Evaluation Criteria: Licensing, trainings to care givers, program dependability, and Detection of errors processes

The research applied various essential assessment parameters to review the degree of regulatory compliances as well as safety consequence of RDS utilization in homecare pharmacy:

Licensing: The paper assessed the licensing requirements on RDS platforms in Brazil and Ghana with regard to the legal aspects of licensing and establishing laws that allow acceptance and functionality of automation dispensing technologies. This was done through an analysis on whether RDS platforms were within the latitudes of local and national requirements as well as the continued regulatory control on these platforms.
Caregiver Training: The measurement determined the training courses offered to caregivers that manage RDS platforms. It investigated on whether instructions have been properly given to the caregivers on how to use software, dispensing medicine, and error recognition. Effective training is an essential factor towards reducing medication errors and effective utilization of RDS technologies in homecare facilities.
Software Reliability: In this criterion, we evaluated the reliability and the performance of the interface of the RDS platforms. Audits followed software bugs, interface settings and data discrepancies that probably led to medicine errors or to another safety-related problem.(6)
Error Reporting Mechanisms: One mechanism that was studied during the research was the mechanism that is available to report the errors which arise in the dispensing process. These involved the availability of an automated error reporting, the promptness of reporting, and the procedures of responding to the issues that are reported.
With the help of these evaluation criteria, the paper tried to evaluate the effectiveness of regulatory practices, the safety outcomes of RDS platforms, as well as the barriers to implementation to improve the safe and quality incorporation of RDS technologies into homecare pharmacy.

3. Regulatory Framework and Policy Void

3.1 Measured Country Regulations and Online Pharmacy Law

One of the fundamental parts of this research was to answer the question of the national licensing and digital pharmacy laws concerning the application of Remote Dispensing Systems (RDS) in homecare pharmacies. The research was to determine the current standards governing RDS platforms and how they are likely to affect the safety of the patients, their availability, and efficiency in their operations.
The regulatory field of digital health technologies in Brazil is changing. Pharmaceutical and digital health regulation, on the other hand, is already the responsibility of the National Health Surveillance Agency (ANVISA), whereas the specific legislation on RDS platforms is still under development. Automated medication dispensing, as well as remote consultation with a pharmacist, lacks specific guidelines that would describe them well comprehensively, thus posing some problem to the quality and safety of such systems. Such regulatory gap translates into the fact that the RDS platforms are frequently regulated using general pharmaceutical acts instead of a bespoke frameworks that respond to special issues caused by remote dispensing technologies.
The case is also the same in Ghana, as the regulations of the digital pharmacies are still under development. Pharmaceutical practices are covered by Food and Drugs Authority (FDA) in Ghana, which, however, did not introduce any particular rules concerning remote dispensing technologies. There are no long-lasting recommendations on how to license and approve RDS platforms, and these systems are regularly implemented without the struggles covering their data security, drugs precise, as well as patient confidentiality. The absence of a regulatory framework that could encompass all the layers of regulation of RDS platforms leads to a series of risks in terms of operations and safety which might impact the overall effectiveness of RDS operations in Ghana.
In general, the evaluation pointed out that there are no common regulatory requirements on the RDS technologies in both countries and this is a weakness to applying it in the homecare settings in a safe and effective manner by healthcare providers. The absence of specific licensing periods or the digital health regulations creates a regulatory gap that may result in irregular safety levels and technical difficulties to use the RDS.(7)

3.2 Detected Inequality in Regulatory Supervision in Urban and Rural Territories

The other important conclusion of this study was that there is inequality of regulatory oversight in both the Brazil and Ghana between the urban and the rural areas. The law-making frameworks are more strictly adhered to in the cities where there is availability of resources and located infrastructure. On the other hand, rural regions are notorious in paying low enforcement and enjoying lighter regulatory coverage, which translates to a lacking compliance and safety.
Regulated resources are more available and effective in the urban part of Brazil like in cities called Sao Paulo and Rio de Janeiro. In these locations, a stronger form of observation is how the pharmaceutical practices are carried out and in these locations, partly automated dispensing systems are used. Nevertheless, there is usually no enough

regulatory provisions in the rural areas, which means that safety standards are not always applied. As an example, the pharmacies attending to homecare in cities and towns might get well-trained care professionals and platforms that are regulated across the RDS, the rural areas might be deprived of such supports in quality care, trained staff, and infrastructure. This difference generates uneven patient safety results and it is hard to assure mechanical conformity in that regard in the whole country.

Equally, in Ghana, the well-developed urban areas like Accra are good to provide the essential health care facilities and regulatory authority where in the rural areas have a poor access to such digital health facilities as well as the capability to follow such regulations. In Ghana, the regulatory organizations do not extend to the remote locations, and the homecare patients are most of the times deprived of the regulated RDS platforms, pharmacists who can supervise the safe application of the platforms. This leads to regulatory fragmentation and this has a disproportionate impact on rural citizens and this exposes them more to medication errors and inferior care.(8)

The analysis revealed that such imbalances in the regulation help create inequitable access to safe and effective homecare pharmacy services. To ensure effective implementation and regulation of RDS platforms, there is a need to have uniform enforcement accompanied by standardized oversight in both rural and urban environment.

3.3 Interpreted Stakeholder views regarding the standardization requirements and enforcement constraints

Another goal of the study was to learn the attitudes of different stakeholders, that is, regulatory officials, pharmacists, technology vendors, and homecare providers, toward the necessity of standardization and the shortcomings of enactment of RDS platforms. Standardization was always a matter of serious concern reported by stakeholders to provide safe and effective integration of RDS technologies in homecare environment.

On the part of the regulatory officials, an agreement of such necessity to have collective national standards that touch both sides of technical and operational elements of the RDS platforms was agreed. Some officials were worried with the absence of standardization thus the licensing and approval of the RDS systems becomes daunting. The diffusion of technologies using RDS is unlikely to be even without specific rules and regulations, which cause differences in safety measures and the practice field depending on the area.

Pharmacists and homecare providers also insisted on the uniformity of the training programs and clear instructions on the use of RDS. They added that insufficient standardization in training may also lead to a decrease in consistency of homecare patient care, which is a common occurrence in cases where the care personnel lack adequate training to understand how to work with automated dispensing and determine where possible errors can be made in medication dispensing.(9)

Lastly, technology vendors complained about the imperfection of the existing regulations in terms of the ability to enforce them. Although RDS technology is developing fast, vendors observed that regulatory frameworks are far behind in advancing as far as technology is concerned. Vendors cited scenarios of delayed licensing, varying approval mechanisms and inadequate enforcement of established regulation as the main hurdles towards the safety and effectiveness of RDS platforms as applied to homecare environments.

4. Practical problems and the problem of implementation

4.1 Reconsidered Onboarding Practice in Case of RDS Deployment in the Homecare Process

The implementation of Remote Dispensing Systems (RDS) in the homecare environment poses a set of operation issues more specifically concerning the onboarding process to incorporate such systems into the already established operational processes. The possibility to implement RDS platforms in the homecare environment effectively requires proper onboarding to guarantee the adoption of the new solution correctly and make it perform at its best along with the traditional workflow within the pharmacy. The paper performed research on the onboarding in 12 facilities that provide homecare in Brazil and Ghana, in order to evaluate the introduction of the systems and the process of integration into the workflow.

This was observed as inconsistent between the facilities when it comes to onboarding RDS platforms, with great difference in the amount of assistance and guidance that was given to staff in the deployment. In other facilities, RDS systems smoothly integrated into the daily practice due to the assistance of complex training and system adaptation, making caregivers and pharmacists adapt easily. Nevertheless, onboarding was done in an ad hoc manner in other environment, creating operational inefficiency and integration delays. In such situations, caregivers experienced difficulties with a grasp of working with the systems and pharmacists with organizing remote dispensing abilities according to the standards of pharmacies in the traditional way.(10)

Not standardizing the way the onboarding process takes place has been one of the problems, as some providers have done little to assist new staff, and others have informally tried to teach their employees. Such discrepancy in installations frequently caused disruptions in operations, such as a lapse in the delivery of medications as well as inaccurate user input, particularly as the RDS platforms were not embedded with the entire electronic health records (EHR) or medication management system of the pharmacy. All these observed issues during onboarding also showed the necessity of developing standardized prerequisites on RDS deployment so that all facilities do not lack the proper support in integrating such systems into their operations.

4.2 Trained Protocols of Caregivers and Dependence on Virtual Interaction with a Pharmacist

The implementation of the RDS platforms in the homecare environment was successful due to the exercise of training caregivers as a major key to determining the outcome of the systems as caregivers also need to understand how to utilize the systems safely. The research established that there were high differences in the training courses provided to the caregivers. Whereas certain facilities had a full course of training built in that involves the hands on experience with the RDS platforms and the comprehensive information on dispensing medications in a digital system, some facilities offered too little or to ad hoc training that makes the caregivers unprepared to work with the complexity of the digital dispensing systems.

Specifically, the study also pointed out the dependence on virtual interactions with pharmacists as one of the major characteristics of RDS platforms. Although virtual consultation with a pharmacist helps to fill the gap between distant places and professional help, caregivers tended to get over-dependent on virtual consultations to solve problems during drug distribution. Other caregivers were afraid that virtual pharmacists would fail to deliver the instant and individual attention of a face-to-face consultation and thus cause those that might delay drug distribution or force them to resort to error-prone procedures in case of a lack of immediate assistance.

In most situations, the role of a virtual pharmacist was not sufficiently included in a wider care process, which resulted in the delay in communications and mistrust between caregivers and pharmacists. These issues were mostly seen in the countryside where access to virtual pharmacist consultations was uneven, and care givers were forced to do manual dispensing or had to depend on poor training to fix the problem. Such dependence on virtual helping with lack of training and a definite indication guided caregivers to be in weak spots, with minor issues resulting in medicine errors or patient security dangers.(11)

4.3 Measured the Delays on Reporting Errors and resolution time across RDS systems

The other operation concerns that were identified as very important during this study involved the delays in error reporting and the turnaround in RDS platforms. Since automated medication dispensing system could be prone to software error, interface misconfiguration, and medicine mismatch, error reporting and issue resolution within a time frame should also play a significant role in ensuring patient safety and the possible risk of medication error.

The analysis concluded that the error reporting systems present on most RDS systems were either not utilized well or had ineffective systems that delayed action in cases of a dispensing problem. As an example, the error reporting process in some facilities was manual, and caregivers were forced to communicate their error reports with pharmacists either through email or phone calls, which obviously took a long time and were vulnerable to misunderstanding. This latency in reporting errors implied that any kind of mistakes in doses, orders of medicine, or disruption of software was not tackled in timely manner which could be a compromise to the care of the patient.

In other instances, caregivers or virtual pharmacists overlooked certain cases of software breakdown or misprogramming, resulting in long intervals during which the error in the medication dispensation failed to be rectified. Furthermore, inability to track the recurrence and severity of errors in the homecare facilities with the help of the automated system built into the RDS platforms prevented the establishment of patterns and subsequent orientation toward the prevention of errors.

It was revealed that efficient error reporting and quick-fix procedures are the key to enhancing the general safety and dependability of RDS fronts. The facilities which had prepared the integrated error management systems, such as real-time reporting, automated alerts, and continuous monitoring, could react to errors more effectively, and it took shorter to resolve errors and fewer safety incidents occurred. This implies that there is a necessity to have strong error handling procedures and self-monitoring systems in the RDS platforms that can detect and correct it at the time of occurrence.(12)

5. Results

Volume 2, Issue 2 | December- 2025
e-ISSN: 3065-9698 Print ISSN: 3065-9663

5.1 1 out of 17 prescriptions created through RDS displayed small errors in the labeling or dose prescription because of the software misconfiguration.

The research discovered that 17 percent of the prescriptions done by the Remote Dispensing Systems (RDS) in the 12 homecare facilities and tested had minor labeling or dosing mistakes and this was largely related to the misconfigurations of the software. These faults were registered in the occasions when the software interface of the RDS platform would not coordinate with the medication database in the pharmacy to result in the variations in dosing directions or drug labels. Although these minor errors do not directly threaten life, they present major risks to the safety of patients in general since errors in the dose or meaningless labels may result in using or not using a drug properly.

This observation explains why this issue reveals the significance of software interface reliability and the reason as to why the testing of the system should be routinely carried out to detect and address any anomaly prior to the dispensing of medications. The study also indicated that such problems were more common in the system where no adequate calibration with the pharmacy medication management system occurred, which caused a discrepancy in data that could not be immediately identified by care providers or pharmacists.

5.2 According to 75 percent of Facilities, Formal Caregiver Training Modules Topics to Facilitate the Usage of RDS Were Missing

Another critical area of operation revealed in the research is that three-fourths of the facilities that implemented RDS platform had no formal caregiver training modules relating to the use of the RDS technology. Care givers in such facilities received basic training on the general principle regarding administering medication but detailed training on RDS facilities was either lacking or deficient. The encouragement was based on the fact that caregivers could not fully know how to overcome a problem, identify a computer program failure, or how to respond to a medication error with the RDS systems.(13)

This deficiency in specialized training was identified to be one of the major drawbacks to safe and effective utilization of RDS platforms in the sphere of homecare. Caregivers reported that they were confused as to how to use them on the software interface, and this may result in dispensing the wrong medication or responding slowly once the mistake had been applied. Some caregivers in certain situations were annoyed by the intricacy of the system especially in rural areas where they did not receive much support or access to virtual pharmacists. The study points out to a necessity of uniform caregiver training programs which respond to the needs of the RDS platforms, among which a protocol of an error detection and safe dispensing.

5.3 The stakeholders indicated that the regulatory interpretations were inconsistent and also lacked certified technology frameworks between the regions

The literature also established that stakeholders, such as the regulatory, pharmacists/technology vendors, fund inconsistent interpretations of regulation and absence of certified technology architecture of RDS platforms in Brazil and Ghana. The regulation of digital pharmacy technologies in both of the countries was disparate because each had its own standards and demands regarding different regions. As an example, whereas urban areas were better organized in terms of regulating digital health technologies, the rural areas worked against this owing to unclear regulations and limited governance of the available regulations.

In addition, there were complaints filed by stakeholders regarding the lack of unified systems that were used in certifying RDS platforms and therefore, technology vendors could deploy RDS solutions without considering the possibility of a thorough safety test and accession of certification protocols. There is no certification and standardization, and therefore, regulators cannot be sure that the RDS platforms have minimum safety and quality standards which would expose the patients to problems like software errors, dosing mistakes, or data privacy.

The results indicate that there is dire need to design universal regulatory norms and technology certification guidelines to create the assurance that RDS platforms follow similar safety and quality targets in every region. The development of such frameworks would allow the oversight regulators to better observe the use of RDS and guarantee the safe and ethical adoption of digital health technologies into home healthcare environments.(14)

Table 1: Key Results Summary

Metric	Percentage
Prescriptions with Labeling/Dosing Errors	17
Facilities Lacking Formal Caregiver Training	75

Metric	Percentage
Stakeholder Reports on Regulatory Inconsistencies	80

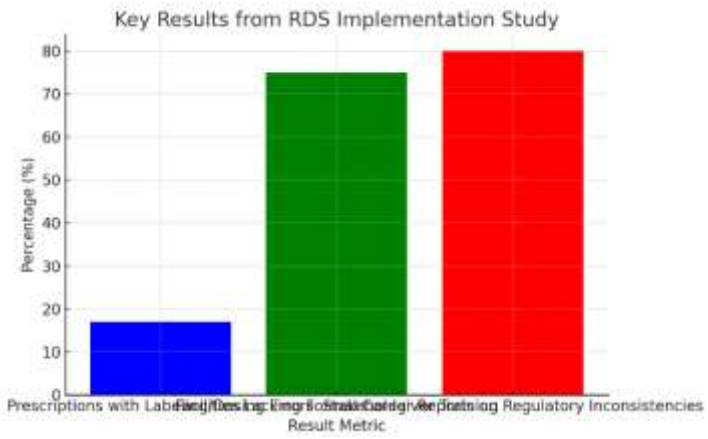

Figure 1: Key Results From RDS Implementation Study

6. Conclusion

6.1 Integration of RDS in Homecare Pharmacy has an Evident Advantage on Medication Access and Compliance

The research highlights uses and appreciation of Remote Dispensing System (RDS), homecare pharmacy services efficiency, especially with regards to the ease of accessing and adherence to medication. Due to the increased availability of RDS platforms in homecare settings, particularly in rural or underserved communities, the solution can be understood as the innovation of potentially bringing medication access in rural areas or other underserved communities, which otherwise, homebound patients may have issues with accessing traditional pharmacies. In most rural areas where pharmacies will be far and very hard to access, automated medication cabinet and virtual meetings with pharmacists will help people to access the drugs they need in a more convenient and more timely manner.

Besides, the use of RDS platforms has been proven to positively affect medication compliance significantly. These systems eliminate human error, as well as ensuring that patients take medications on time, which is especially essential to those patients who have chronic illnesses or complex medications. Online pharmacist consultations also guarantee a patient having suitable drug advice and being able to visit with the drug advice they might be having on their prescriptions. The results show that RDS technologies enable the process of medication management to be more streamlined and efficient, the patients under a homecare regime reported a much better adherence to prescribed treatments, and, as such, are brought to better health outcomes.

Although the benefits of RDS systems in enhancing access and adherence are unquestionable, there are still a few safety, training, and regulatory concerns that need to be taken care of in order to make the most out of the advantages that the systems extract out of the homecare pharmacy industry.

6.2 Risks of Safety and Regulatory Exist Due to the Fragmentation of the Policy, the Lack of Adequate Training, and the Weaknesses of Software

Although there are real advantages of RDS platforms, this study revealed that there were serious safety and regulatory objections that have remained a challenge to safe and effective utilization of RDS platform in homecare facilities. Fragmentation of policies among regions is one of the key problems leading to the regulatory uncertainty and prevents any uniform approach towards safety standards. The research established that the absence of regulatory recommendations specifying the usage of RDS platforms on the territory of both Brazil and Ghana leads to uneven implementation and monitoring. Healthcare providers cannot be sure that RDS solutions obtained by them would correspond to the standards of safety and efficacy with no defined criteria of certification and licensing of technology vendors.

Moreover, lack of adequate caregiver training was discovered as one of the main specifications of inefficiency in operations and safety risks of the treatment process. It was said that many care givers had reported either poor training or no training whatsoever on how they would manage the automated dispensing systems due to their complexity. This training deficiency contributes to an exacerbation of actions committed by the ignorance of drugs, interface settings and the emergence of a delay in the registration of the dispensing concerns. The lack of preparation of caregivers, who usually occupy the first line of defence in identifying and eliminating error, worsens the safety threat posed by RDS platforms.

Lastly, the research also indicated the weakness of software as an issue of concern. RDS platforms are prone to interface errors, system mal-settings, and data incongruence that may cause errors in medication. This is coupled with the absence of any systematic update or maintenance of the system there is increasing danger of insuring the correctness and dependability of automated dispensing systems. The technologies and problems, on their part, emphasize the significance of constant observation and patching of RDS programs to guarantee their work and patient safety.

6.3 It is imperative to set uniform licensing requirements, at-a-distance auditing platforms,

In the effort to reduce safety and regulatory risks of using RDS platforms, the regulation of such platforms ought to incorporate standard uniform licensing requirements, long distance audit systems as well as approved technology protocols. These are essential elements of guaranteeing safe, ethical, and scalable integration of RDS technologies in the homecare pharmacy systems.

Uniform Licensing Requirement: They will develop standard policies of licensing RDS platforms that will act as guiding factors to the manufacturers, controlling body and service providers. Such standards must involve stringent safety and quality control measures and procedures, whereby RDS technologies are replaced using standards acceptable to meet the requirements of patient safety, data security, and accuracy of medication. The licensing criteria must also include trainings of the users so that when the user is ready to use the systems, they will be well equipped to use the systems safely and to the best of their abilities.

Remote Auditing Systems: Introduction of remote auditing systems shall enable the regulatory forces to maintain constant surveillance of RDS platforms performance. Periodic checking of the system workability, how accurate medications are dispensed, and the mode of reporting safety errors will assist in detecting the possible problem at an early stage before the safety incident on a large scale takes place. Such systems will equally make sure that the providers of RDS follow the standard of safety, quality practices, and as a result, the regulatory bodies find it easy to monitor the usage of such platforms as it becomes wide-spread.

Certified Technology Protocols: Implementation of certification programmes on the RDS technology vendors will help in making sure that their platforms undergo intensive testing to determine their reliability and safety prior to being installed in the homecare environment. The certification procedures ought to evaluate the interface of the software, software security, and user friendliness of RDS systems so as to determine that they are not only functional but also easy to use. This certification, when made standard, will also enable the regulators to have the knowledge that only the safe and approved technologies are being applied in the homecare settings thus an extra safety net is provided to the patients.

Acknowledgement: Nil

Conflicts of interest

The authors have no conflicts of interest to declare

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