

Improving Clinical Competence and Leadership in Nigerian Pharmacy Interns Using the ADDIE Instructional Design Framework

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Abstract

This study determines the potential way in which the application of ADDIE instructional design model can enhance the leadership skills and clinical pharmacy competencies of the Nigerian pharmacy interns. More and more, pharmacists find themselves expected to take on leadership roles and concentrate on patient care, systematic training is essential. For the needs of local healthcare environments, this initiative adapts the ADDIE model, designing a systematic framework for the development of professional skills, integration of evidence-based policies in organizational practice, and leadership competencies in pharmacy practice. Results of this study demonstrate that introducing the ADDIE methodology into clinical learning prepares interns better for clinical endeavors and facilitates their leading role in cooperative healthcare bodies.

Keywords: Pharmacy Internship, ADDIE Model, Clinical Pharmacy, Leadership Development, Instructional Design, Nigerian Healthcare, Competency-Based Training, Professional Education.

1. Introduction

While there have been key recent developments in the world of pharmacy education and practice, there has been much emphasis placed on developing leadership skills and expanding clinical pharmacy activity. For instance, leadership competencies are now an integral part of pharmacy educational programs in the United States. It is acknowledged that these competencies are critical, not only for those pharmacists who have official leadership responsibilities but also for all the other members of the profession. These leadership programs are directed at creating people who will be able to spearhead change in the healthcare system and, therefore, in particular relevant in today's fast-paced healthcare environment. However, leadership instruction continues to be underrepresented in pharmacy educational systems in vast parts of the world, including the developing countries. In view of its myriad and unique healthcare difficulties, Nigeria follows this trend along with other countries. Despite receiving a prominent scientific education, Nigerian pharmacists' curriculum does not provide enough developing of skills to lead and manage, which restricts them in affect and development of clinical pharmacy practice(1).

In Nigeria, students are trained about the theoretical underpinnings of the pharmacy profession (i.e., pharmaceutical sciences, pharmacology, and medicinal chemistry), but rarely get a chance to learn about leadership and managerial competencies. Therefore, the role of pharmacists in clinical settings especially as it relates to patient care and clinical decision making, is not fully actualized. Such clinical pharmacy services as participation in interdisciplinary care teams, drug therapy review process and drug therapy monitoring have still not been implemented broadly, and pharmacists remain to be largely absent in the meaningful core clinical activities in most of the hospitals. Despite a few hospitals in Nigeria starting to initiate basic clinical pharmacy services, a wide scale implementation of the advanced clinical pharmacy practice is still yet to be achieved.

Further, pharmacy graduates often leave their training lacking the ability to lead clinical initiatives, develop new ways to care for patients, or drive improvement in health care delivery without leadership education being part of the curriculum. With the skyrocketing demand for better quality care and increased health results in Nigeria's healthcare sector, pharmacists should be a significant part of this process. Their role is also permit them to identify the short falls in the areas of patient management and medication protocols but leadership and management competencies are key to actual meaningful increase. Lacking this formal education, pharmacists cannot fully contribute to the leadership of clinical pharmacy improvement and initiatives(2).

A very effective way to achieving this deficiency is in the mandatory one year internship after academical studies for pharmacy graduates in Nigeria. The one year internship provides a necessary step to connect the gap between the practical work in the field of pharmacy and the informative education in academic institutions. Although it has training courses in important areas such as prescription validation, dispensing, and increasingly drug information

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management, the internship does not formally train its students on leadership and the advancement of clinical pharmacy practice. The lack of systematic leadership training component in the internship leaves room for pharmacy interns to contribute meaningfully on the development of the clinical pharmacy in Nigeria.

Integrating leadership training within the current models of the pharmacy internship can help play a role in the clinical pharmacy development process other than simply supporting internship. Therefore, the development of a clear and comprehensive training outline is needed in order the leadership development in clinical pharmacy does not only meet the needs of interns but also contribute in enhancing healthcare institutions. ADDIE model of instructional design is a comprehensive system for building effective educational programs. Using the ADDIE instructional design methodology of Analysis, Design, Development, Implementation, and Evaluation, has helped many organisations in healthcare and education develop in depth and responsive training courses. Due to the continuous loop of refinement in the ADDIE model, the program was redesigned to be more consistent with its mission, and more appropriate to distinguish the diverse learning needs of its participants.

The purpose of this paper is to describe a novel training program that is a unique initiative geared towards Nigerian pharmacy interns so as to support them to acquire critical leadership skills to improve clinical pharmacy practice. An online facility was used to hold the training program for interns scattered across different parts of Nigeria. Through the use of the ADDIE model, the training was divided to a series of online modules, which covered different aspects of leadership and clinical pharmacy(3). Learning pathways in the program delved into topics from the origins of clinical pharmacy in the U.S. to process improvement, project management, and the basics of leading people both personally and with others. Providing these interns with the needed knowledge and expertise to identify and address challenges in patient care or medication management, the program objective was to equip them with the skill to hold leadership posts at their respective practice sites.

There were multiple difficulties with implementing such a program. During the course of the program, its biggest challenge came in the middle of its execution when the global COVID-19 pandemic came. The effects of the pandemic included movements; control of mobility, limitations to direct patient care, and changes to the total healthcare culture. Despite the obstacles, the program succeeded in doing something and changed its methods and continued working to achieve its goals. The ADDIE model's flexibility most effectively enabled the program to adapt swiftly to changes while attempting not to lose its relevance and usefulness amongst continuous upheavals.

The success of the training program was evaluated using Kirkpatrick's four-level evaluation model. These four levels are the basis for assessing training programs (>>; reaction, learning, behavior, and results. Trainers determine whether participants liked the training at the reaction level; knowledge and abilities are established at the learning level; the behavior level evaluates the alteration of their practice due to the program; finally, the effects are seen at the results level. Using a multi-level evaluation framework, the authors obtained useful information about the effectiveness of the program, outlined areas of improvement, and measured its impact on the interns and the sites they were staying at.

By using its findings, this study highlights the fundamental role played by leadership training to clinical pharmacy practice as it continues to develop. The fact that this leadership training program has been successfully implemented in a resource limited setting like Nigeria, like other resource pressed settings demonstrates that it is possible to design, build and deliver a successful leadership training curriculum for pharmacy interns. Moreover, there is underscored emphasis on sustained efforts in offering leadership and clinical pharmacy training opportunities since these are important elements required in making healthcare systems of Nigeria and other resource-straining areas keep improving. With the current change in healthcare systems; pharmacists must not only receive instruction in scientific competence but also in leadership skills necessary to lead to innovation, increase the patient's outcomes and direct healthcare teams.

This work contributes to the literature gap in regards to pharmacist training and leadership programs in developing countries. It indicates why providing leadership training as part of pharmacy curricula should be made compulsory and shows how methodologies such as ADDIE can be used to develop practical training programs. The realization of this program gives evidence that similar programs could be embraced in other nations facing similar problems so as to spur a new generation of pharmacy leaders, who will facilitate development in clinical pharmacy and health globally.

2. Program Objectives and Scope

The major objective of the training initiative for Nigerian pharmacy interns was to help develop the skills for leadership and strengthen clinical pharmacy in an area where formal training had been few and far between. Leadership entails much more than supervising staff or managing as a top executive in a company. It is an approach which motivates people to lead with initiative, to promote progress, and oversee improvements in processes. In practice in pharmacy, leadership is key in raising the standards of patient care, improving medication practices as well as mandating the value of pharmacists in health care. The absence of leadership training in Nigerian pharmacy education programs has hampered advancements in clinical pharmacy that can significantly improve patient results through quality medication management and joint force with health care partners.

Therefore, the purpose of the program was to prepare pharmacy interns to take leadership responsibilities at their practice settings despite the absence of formal recognition. The program asked interns to identify inequities in patient care and medication use, develop, and implement strategies, which would resolve those problems. The overall goal was to improve their leadership skills along with promoting practical interests in improving clinical pharmacy services in Nigeria's health environment. Through the program the interns were given the platform to fashion their career advancement and drive pharmacy practice within their local health systems where applicable(4).

The program was organized as an intensive one-year experience supported both by online learning activities and actual managerial project implementation. The training was wide ranging including clinical pharmacy practices general and leadership skills. Theoretical material could be absorbed by participants prior to the application of what had been learned in practical world clinical settings. The training was to assist the varied needs of Nigerian pharmacy interns working in various hospitals spread across Nigeria. Where clinical pharmacy services were limited settings, interns were brought to interact with the healthcare staff to design and grow these services during their training.

Among the major components of the leadership part of the training program, a number of central elements of leadership were the main subjects of focus:

1. **Project Management:** Interns learned how to design, implement and review pharmacy-related projects during the course of their learning. Having these capabilities is necessary for identifying critical issues and delivering a solution in the healthcare industry. Armed with a strong background in project management, the pharmacists are well prepared to address difficult problems, launch the solutions, and assess their effects.
2. **Process Improvement:** Enhancement of prescribing, dispensing and supervising the medications systems is at the heart of the progression of clinical pharmacy practice. The interns during the course developed skills in analysis of prevailing workflows, identifying gaps, developing interventions to enhance the quality of patient care. Based on the peculiar problems of Nigerian healthcare including medication mistakes, mishandling of drugs, and lack of uniform guidelines, this training was of tremendous value.
3. **Personal and Interpersonal Leadership:** The training focused much on personal leadership including self awareness, emotional intelligence and motivating the team members. In return, the program therefore also improved interns' interpersonal skills, an area that includes fostering relations, resolving conflicts as well as channelling group efforts. It is imperative that pharmacists would develop these interpersonal skills; so they can work together and communicate effectively with patients.
4. **A major component of the training was to study the background and developments in clinical pharmacy.** One of the significant elements of the training was the lecture on how clinical pharmacy developed historically, especially in those countries that have accepted it on a large scale such as the U.S. Reviewing the history of clinical pharmacy in various countries made interns aware of the scope for growth and development of clinical pharmacy in Nigeria. By working on this module, interns would be able to appreciate the overall pharmacy work and its importance in patient's care as a whole.
5. **Leadership in Advancing Clinical Pharmacy:** The main goal of the program was to promote the development of leadership skills in pharmacy interns. Nigerian interns were supposed to learn how to proactively contribute to clinical pharmacy development in Nigeria from this module. The program sought to illustrate how true leadership entails rising to the challenge of dealing with challenges facing areas such

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as patient care and medication management, or championing change instead of one being an authority figure.

The program intended to train the pharmacy interns in the leadership skills that could help drive improvements in their clinical pharmacy practice in areas where they will be working. Interns were required to develop and implement a capstone project, which would promote clinical pharmacy services, i.e., introducing innovative pharmacy services, better patient education, or better efficacy of medication therapy management(5). The projects aimed at showcasing the interns' leadership skills and would considerably increase clinical pharmacy practice in the hospitals they worked at.

One of the major ways in which the program stood out was through the use of online delivery strategies. Through use of multimedia such as video lectures, live zoom and discussion board, as well as available assorted digital platforms, the program was designed to ensure that training could be reached to all interns in Nigeria, particularly the ones in remote areas. The flexible and digital approach provided access to training for interns in challenging areas where travel and infrastructure issues are a norm thus improving the effectiveness of the program.

Moreover, the program took note of the variety of conditions that interns experienced in Nigeria's hospitals, from those with existing clinical pharmacy programs to those with meager pharmacy presence. By encouraging interns to apply their learning in the real-world settings the program preserved its practical value and ensured that there was tangible change unveiled by the learning. Ultimately, this method helped interns work on projects that consolidate powerful theoretical concepts with contextually appropriate responses to the challenges in their practice sites(6).

To solve major challenges facing the clinical pharmacy case, the training program took into account systemic aspects. The major challenges that emerged included the absence of pharmacists on collaborative healthcare teams, absence of pharmacists in critical clinical decision making, as well as underrepresentation of pharmacists in research activities. In their work, the interns sought to demystify these systemic barriers, working towards improving roles of pharmacists in multidisciplinary health care teams and maximising, overall, clinical pharmacy services.

ADDIE model was utilized to direct program delivery which offers a blend between a systematic program and the capacity to be flexible during the training process. Over the course of the iterative structure of the model, instructors were able to gather on-going feedback and tweak the program to best serve the interests of the trainees. This flexibility was particularly important when confronted with the COVID-19 pandemic that paralyzed the healthcare training all over the world. Despite these inabilities, the program did not only survive it but also gained momentum thus demonstrating the effectiveness of the training framework and determination of the participants.

3. Methodology

This training program was designed using the structured ADDIE framework, which provided a framework for the development of each stage, from initial and continued to comprehensive evaluation. Owing to its being organized and flexible, the ADDIE model is commonly used in designing an educational program especially in designing customized leadership training for pharmacy interns in Nigeria. By following this model, the program was sure that every step would be carefully organized and executed in order to meet the singular needs of the interns and address the healthcare issues in Nigeria.

Analysis Phase: Evaluations of needs and identification of knowledge discrepancies.

The Analysis phase played a significant role during ADDIE process to reveal the level of leadership and clinical pharmacy knowledge, skills and attitudes among the pharmacy interns. Information was collected systematically during this period, through the use of surveys, interviews and review of existing pharmacy curricula in Nigeria. With this information, the developers of the program were able to personalize the instruction to plug the knowledge and skill shortcomings which the interns had.

The main finding of the analysis was that the pharmacy education in Nigeria did not systematically embed leadership development. Although interns were well clued on pharmacological science and patient care, their educational background left unnoticed a lot of important leadership competencies such as project management and process improvement, which are vital for clinical pharmacy advancement. Analytically, it was found that many interns lacked knowledge of the historical context and development of clinical pharmacy particularly in the United States where broader clinical practice has been adopted(7).

It is apparent from the analysis that considerable variation in the clinical pharmacy services rendered in Nigerian

healthcare facilities exist. Although some hospitals proclaimed to have existing pharmacy departments that are involved in medication therapy management, others had little or no clinical pharmacy presence. In order to address these discrepancies, the design of the curriculum needed to be flexible in meeting the diverse needs and conditions which interns found in practice. The curriculum needed to make the interns capable of identifying the deficiencies inherent in their practice areas and developing specific intervention strategies to target those deficiencies without regard to the level of clinical pharmacy experience of the given hospital.

Design Phase: Structuring the Curriculum

After the identification of needs and gaps, the construction of training curriculum took place. In the ADDIE process' design stage, specific training goals and objectives were created accompanied by a detailed plan for the implementation of the program. The overall goal was to enable pharmacy interns acquire skills necessary to assume leadership roles that would expedite the development of clinical pharmacy services in their practice sites. The curriculum was put in place to fill in the identified gaps and was developed with the aim of equipping interns with the necessary knowledge and skills and hands on experience to shine as future pharmacy leaders.

The program was laid out in six basic modules that compile each of the modules focusing on a specific element of leadership and clinical pharmacy. The topics included:

1. **A Background and Development of Clinical Pharmacy:**<< This module expounded on the evolution of clinical pharmacy with a view given on its great presence in healthcare teams particularly in the United States. Through this historical perspective, interns became aware of the importance of clinical pharmacy, which increased their prospects of understanding its role in improving patients results as well as the strategies for integrating pharmacy into multidisciplinary health teams in Nigeria(8).
2. **Process Improvement:** This module helped interns to become aware of how processes in healthcare organisations can be improved. Interns learned how to assess current pharmacy operations and identify bottlenecks and develop solutions to address these issues with the view to enhancing medication management and patient outcomes. Naturally, with the continuing progress of clinical pharmacy practice in the Nigerian hospitals, this module was particularly important in meeting the specific challenges that the hospitals experience.
3. **Project Management:** Interns were also made to learn how to skillfully manage projects while in the program. The curriculum also gave interns the necessary knowledge to oversee the process of project development, executing and evaluation. The interns were supplied with the power to create schedules, utilize resources, supervise progress, and study project results. Interns acquired the ability to implement these skills into real-world projects; which would have a real-world impact and have a positive outcome on the clinical pharmacy services at their practice sites.
4. **Leadership Fundamentals:** Interns learned basic leadership theories, such as how to make informed decisions, how to think about challenges, express thoughts, and operate their teams. Interns were encouraged to think about how their personal leadership approaches might be utilized to drive change within their practice environments. Interns were at the core of personal development of leadership learning how to set an example and inspire continuous growth among their colleagues(9).
5. **Personal and Interpersonal Leadership:** Besides the fundamental leadership abilities, this module focused on personal and interpersonal leadership competencies. Emotional intelligence, solving disagreements and communication were all major topics interns had in this module. Mastery of these soft skills helps interns develop strong professional networks, manage teams well, and have good patient interactions. As interns who work on multidisciplinary teams need to collaborate with a wide range of healthcare professionals, the interpersonal leadership skills provided in this module were very important.

Leadership in Advancing Clinical Pharmacy: The final module targeted guiding the pharmacy interns how they could use their leadership skills to drive the development of clinical pharmacy practice in Nigeria. Interns through this module earned knowledge in their support for the integration of pharmacists in the clinical care teams, demonstrating the benefits of clinical pharmacy and solutions to the promotion of medication management and enhanced patient outcomes. It was designed in a way that required interns to be self directed in career pursuit and take the lead in clinical pharmacy progress.

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In the design phase, the issue of the best methods of delivering the modules was a clear priority. Given the distribution of the interns and the resource limitations in Nigeria, the team preferred to use an online delivery method. >>The interns followed an asynchronous selfpaced program online through the use of an online education platform where they could study at their convenience. By adding multimedia components such as pre-taped lectures, interactive discussions and case studies, the learning environment was dynamic and stimulating. Also, tools like zoom or Skype were utilized in conducting live sessions and group interaction thus promoting the feeling of community among the far-off interns.

Development Phase: Creating the Materials and Tools

During the development phase, the main idea revolved around the creation and construction of the educational equipment and resources and content for the training program. The facilitators and instructors created detailed lesson plans, created course modules, provided relevant reading, made quizzes, and gave tasks. Guidelines regarding preceptors and facilitators were prepared to facilitate effective delivery and participation on the part of all stakeholders and involved in the program. In the testing phase, the learning materials were evaluated to ensure that they arouse interest and are applicable and easily understood by all the interns.

Additionally, assessment methodologies were created with the purpose to evaluate interns' learning outcomes and to provide them with feedback. Knowledge retention and application were measured in each module by means of quizzes, assignments and peer assessment. Interns were assessed using a capstone project which was a major component of the evaluation process, giving individuals the ability to demonstrate their leadership abilities as well as the practical importance of their activities in the field of clinical pharmacy.

Implementation Phase: Launching the Program

At the implementation phase, the training program was initiated as to be implemented. The first set of interns started the journey in October 2019, with the modules cascading each month after the first from a four-week orientation. Participants moved at their own rate through the modules, tracking their progression through interactive contact with facilitators and preceptors at intervals. The program delivery was fully online, assuring pharmacy interns in Nigeria to engage(10).

As the program was introduced, it was constantly monitored, and this enabled the introduction of modifications at any time when needed to control any problems. Adaptation to COVID-19 pandemic involved changing the program time-table to facilitate interns in terms of limited access to resources and their involvement in their projects. The flexibility in the ADDIE model allowed these changes to be incorporated without adversely affecting the standard of the training as a whole.

Evaluation Phase: Measuring Success

It was during the Evaluation phase in the ADDIE model that success was measured in terms of assessment of the training program. Evaluation used Kirkpatrick's four-level model, which addresses reactions of participants, what they learned, re-doing of their behavior, and achieved outcome. The in-depth evaluation allowed program leaders to do more than just assess how satisfied the interns found the program; they were in a position to calculate the program's impact on their skills and contribution to clinical pharmacy.

Overall, the program's methodology and curriculum took much thought and careful design and implementation to ensure that pharmacy interns obtained essential leadership and clinical pharmacy competencies. The ADDIE instructional design process guaranteed that the program would maintain a balanced approach to learning, adjusting to unique challenges that pharmacy interns faced in Nigeria. The fact that this program demonstrates the way in which leadership training can contribute to the virtue of the profession might stimulate the changes in education practices in the pharmacy field in Nigeria and other areas.

4.Results

The attempts to develop leadership competencies and promote clinical pharmacy within Nigeria aroused both promising results and prospects for further development of this training program. The results that are analyzed in this paper highlight the character of the participants, their progress during training, as well as the role of the program to heighten their skills and change the sites of practice. The four-level evaluation model amid Kirkpatrick was used to evaluate the program including reactions, learning gains, behavioral change, and end results of the training.

Characteristics of the Participants

All the twelve pharmacy interns involved in this training had already finished their pharmacy studies with profound root in pharmaceutical sciences. On average, the participants were 22 – 23 years old; all of them had a five-year background in pharmacy education before their internships. In the first place, the team implemented a learner analysis before the start of training in order to assess the interns' background knowledge and attitudes. From the analysis it became clear that a great number of interns had either little or no knowledge of leadership, project management and process improvement, and therefore, extensive training in these areas was critical.

According to the results of the first survey, 33% of the respondents had already taken leadership training, and 17% had completed a course in project management or process improvement. Although the interns had no prior exposure to the topic, a large group (92%) was quite convinced that pharmacy interns are competent to be leaders for advancing clinical pharmacy practice. Because the interns lacked any experience with the progress in clinical pharmacy in foreign countries or in the United States aside from Nigeria, incorporating such content in their training became an essential part of the curriculum.

Collection of Reactions from Participants, Concerning the Training Experience

The human evaluation portion of the work focused in the early stage of evaluating how participants reacted to the training, content, organization, and ways of presentation. Participants received positively to the training with many pleasantly commenting on the organization and sequencing of the modules in relation to their practical settings.

Towards the end of the training, interns were required to fill a 10-item survey to assess the relevance of content to their clinical practice. Individuals used a five-point Likert to rate the training. The mean score for reaction to modules was 3.77 (SD =0.119) to show most of respondents believed that the training was valuable and relevant to their careers.

It became clear from the participants' open-ended feedback, the content of the training was the most valued followed by modules for process improvement and leadership. The online platform was appreciated for ease of use, which enabled interns to manage the schedule of their course independently and interact with peers and facilitators using various discussions. On the contrary, some participants were interested in more interactive and practical case studies so that they could get more engaged in problem-solving.

The results of Level 1 evaluation were nurturing strong feedback from the participants, with the majority claiming that the training material was applicable and helpful for their future development as pharmacy leaders.

Evaluation of Learning Outcomes

The second level of evaluation sought to measure the improvement of knowledge and skills being achieved through the program. This level concentrated on the measurement of the extent the training affected the interns' learning and skill development. Such quizzes, assignments and capstone project became indices of the interns' advancement and learning.

In the twelve interns enrolled, eight (67%) passed the didactic program satisfactorily, while five (42%) proceeded with the mandatory capstone projects. The general average level of the academic performance of participants within the training period was 76% with individual scores ranging between 62% and 92%. This indicates that numerous interns managed to make sense of the material and apply it in their own settings.

The capstone projects undertaken by the interns were a worthwhile demonstration of the integration of leadership and clinical pharmacy . Participants had to analyze and implement solutions to deficiencies in patient care and medication use systems at the sites where the participants worked. It is good to note that 42% of the interns completed their capstone works, especially because the COVID-19 pandemic created huge impediments in getting access to practice settings as well as executing frontline patient duty.

Evaluation Level	Description	Key Findings	Suggestions for Improvement
Level 1 - Reaction	Evaluating participants' reactions to the content, structure, and delivery methods.	- Overall mean score for reaction to training modules was 3.77 (SD = 0.119).- Positive feedback on content relevance and online platform flexibility.	- Participants suggested more interactive activities and real-life case studies to engage more actively with the material.

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Evaluation Level	Description	Key Findings	Suggestions for Improvement
Level 2 - Learning	Assessing interns' knowledge and skills after completing the training.	- 67% of participants completed the didactic training.- Average performance of 76% across all assessments.- 42% of participants completed capstone projects.	- Additional resources and support needed for interns to implement projects successfully, including access to reliable internet and computers.
Level 3 - Behavior	Evaluating changes in the interns' behavior and application of the learned material.	- 42% of interns completed their capstone projects.- Positive feedback from department heads on interns' contributions to clinical pharmacy services.	- Incentives for completing the training and further professional development tools for interns could improve program engagement and completion rates.
Level 4 - Results	Assessing the impact of the training on clinical pharmacy practices at the practice sites.	- Interns' projects led to improved clinical pharmacy services in 3 out of 4 practice sites.- Increased pharmacist integration into healthcare teams.	- No significant additional suggestions from department heads other than improvements in training content and tools for better project success.

TABLE 1 Results

Change in Intern Behavior and Practice Application.

The last phase would have been the observation of whether the behavior of the interns changed into reflective of the skills obtained and knowledge gained from the program in their everyday work. This aspect was measured by counting the number of interns who completed their capstone projects and using qualitative information gathered through email interviews with pharmacist heads in the participating sites.

Of all the twelve interns involved in this work, five (42%) successfully completed their capstone project and prepared manuscripts based on those findings. That achievement was especially commendable in facing the challenges brought by the pandemic. The projects targeted actualizing improvement in clinical pharmacy in every practice site where the interns served. Interns created new patient resources, managed refining of medication management processes as well as introduced medication reconciliation systems through their capstone projects. Apart from highlighting the interns leadership skills, these projects also contributed to enhancing clinical pharmacy practices within the practice sites.

Responses from heads of pharmacy departments that were emailed indicated that the training improved the interns' participation in the clinical pharmacy initiatives considerably. Three of four heads of pharmacy departments who took part in the assessment reported that the training facilitated the development or continuation of clinical pharmacy services at their individual institutions. Departments reported speaker involvement from pharmacists in interdisciplinary care and more effort to achieve safe patient outcomes.

Results of the Training

In the end, it focused on ascertain how the training led to improvements in clinical pharmacy delivery at the interns' practice locations. Feedback obtained from the heads of pharmacy departments was used to identify intern projects that contributed to achieving the meaningful progress in clinical pharmacy services.

Three of the four department heads who accepted to take part in the exit interview reported positive results from the projects of the interns. The heads of the department emphasized establishing new clinical pharmacy services such as medication therapy management, as well as the growth in patient counseling due to the program. The department head highlighted the fact that the interns' efforts played a major role in gaining visibility and recognition of pharmacists among health professionals. Another department head also pointed out that the inclusion of research and writing aspects to the training could bring more productivity and well documented, evidence based training projects. While the program was rather effective, there were segments that are possible to improve. Several heads of department observed that more support, computer support, a steady internet connection, and the room for professional development could help interns succeed in completing their tasks. In addition, participants proposed to introduce rewards for completion that would increase participation and success of the program as a whole.

The results of the training program reflect how it has improved leadership capacities and clinical pharmacy in

Nigeria. Despite these ambiguities stemming from the pandemic, the program managed to achieve its mission of improving the leadership skills of interns and the enabling effective changes at their practice locations. The participants and key pharmacies department personnel said the program had led to meaningful development of the interns and the overall quality of clinical pharmacy in Nigeria.

In spite of surmounting logistical difficulties, the program's accomplishments validate the usefulness of online, organized training courses in overcoming education and practice deficiencies in resource-poor areas. However, the findings emphasize the need to intensify efforts for improving delivery of training, the allocation of resources, and supporting systems to maximize the potential in similar projects in future.

5. Conclusion and Future work

Through improved leadership competencies and the development of clinical pharmacy practice, this training programme for Nigerian pharmacy interns exceeded its objectives. While in the midst of broad problems, such as presented by the global pandemic COVID-19, the program actively served as an exemplary approach to improving leadership and clinical pharmacy skills in Nigeria's pharmacy interns. The use of ADDIE, an instructional design framework, allowed the program to provide a structured curriculum that can flex in supporting the particular needs of pharmacy interns operating within a variety of Nigerian healthcare settings.

This program was developed with leadership competencies for the pharmacy interns as the over-riding intention, to observe gaps in clinical pharmacy practices and develop initiatives that would strengthen patient care and medication provision. The evaluation demonstrated that the training greatly strengthened interns' knowledge and abilities which resulted in great improvements in their sites' clinical pharmacy practices. Pharmacy interns were able to complete projects that encouraged development of pharmacy services, including medication therapy management, patient education, as well as improved integration with multidisciplinary healthcare providers.

Purpose of the training modules as identified by feedback from attendants and mentors was emphasized with close attention given to those relating to project management, leadership, and process improvement. Proposed improvements to the program included enhancing interactivity, the availability of resources for intern participants in their projects, and the inclusion of motivational incentives to the program to bring about program participation as well as completion.

Use of the ADDIE instructional design model was instrumental in creating a systematic approach to the training program with the ability to consciously design and implement each stage. In view of the model's iterative approach, the program could quickly adjust and remain effective during the period of uncertainty, resulting from the pandemic. The flexibility of the online educational tools available to the program participants was one of the primary success factors of the program. These tools allowed participants to work at their pace while still having available essential support from facilitators and preceptors when needed.

The conduct of this training reflects a step in the right direction in correcting the deficit in leadership in pharmacy education and practice in all parts of Nigeria. By providing pharmacy interns with needed leadership skills to lead projects and improve clinical pharmacy practice this program becomes a key player in shaping professional development and improved patient care in Nigeria. This becomes a blueprint for the use of such initiatives in other countries that are developing their pharmacy education, demonstrating the need for leadership training for the spread of clinical pharmacy across the world.

Therefore, continued efforts in developing a leadership amongst pharmacy interns should focus on improving the development and fine-tuning of the training materials, the improvement of available resources and the level of participation in such programs. Drawing on the backdrop of the insights of this trial, subsequent cycles of the program should focus on deepening its influence and on sustaining growth. By making the next generation of pharmacists powerful, these initiatives will encourage innovations and raise the quality of delivery of healthcare not only in Nigeria but also for the rest of the world community.

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Conflicts of interest

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The authors have no conflicts of interest to declare

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