



Review Article

Long-Acting Injectable Neuroleptic Medications: Challenges to Optimization and Strategies for Enhanced Utilization

Cliff N. Ntenga

Department of Health Sciences, Walden University, Minneapolis, MN, USA.

*Corresponding author: Cliff N. Ntenga, Department of Health Sciences, Walden University, Minneapolis, MN, USA.

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Abstract

Long-acting injectable (LAI) formulations of psychotropic medications represent a significant advancement in the management of serious mental illnesses. Designed to ensure sustained drug delivery, long acting injectables may improve medication adherence, reduce relapse rates, and promote functional recovery. In the realms of psychiatry, long acting injectables are mostly indicated for patients whose nonadherence may lead to aggression, self-harm, or recurrent hospitalization. Additionally, these formulations may be used in patients with poor oral agents' absorption profiles, or those who have the inclination for long-acting formulation use. Despite robust evidence supporting efficacy and safety, global utilization of LAIs remains a challenge. This article examines the major barriers to optimal LAI adoption and proposes strategies to enhance their integration into routine psychiatric practice.

Introduction

Medication nonadherence remains one of the foremost challenges in mental health care. Non-adherence may lead to relapses, repeated hospitalization leading to impaired quality of life. To navigate the challenges associated with non-adherence, LAI formulations were developed. Through long-acting injectables, the need for daily dosing is reduced while maintaining stable plasma concentration. Despite the well-informed benefits, there is still limited use of LAIs, and this can be attributed to multiple factors. This article explores clinician-, patient-, and system-level challenges that may limit the utilization of LAIs. Additionally, this article will outline some evidence-based strategies to promote LAIs optimization.

Challenges to LAI optimization

A nuanced understanding of the multifactorial barriers to LAI utilization is essential for optimizing their use and realizing their therapeutic potential. These factors can be classified into, clinician, patient and systemic factors.

1. Clinician factors

Clinician-related factors-particularly attitudes, knowledge, and practice pattern may significantly influence LAI utilization. Clinician decisions to embrace LAI as a treatment modality may be influenced by clinician attitude, knowledge and training and clinical guidelines

a. Clinician attitude

The attitude harbored by clinicians may exert significant influence on prescribing patterns for long-acting injectable [1]. Attitudes such as observing LAIs as corrective, forced, or primarily reserved for patients who are "noncompliant"-can foster reluctance to initiate [1]. Besides clinician attitude, clinician age may contribute to the reluctance to embrace LAIs. Older practitioners may be less inclined to adopt LAIs due to historical concerns about side effects, limited efficacy data from earlier formulations, or familiarity with oral antipsychotics as the standard of care [2]. Moreover, prior experiences, in which LAIs were predominantly prescribed in

high-risk or acute settings, perpetuating the association of these medications with unembellished illness or behavioral management rather than preventive care may contribute to hesitancy in prescribing by clinicians [1].

b. Knowledge and training deficit

The other factor that may serve as a barrier to LAI optimization is gaps in clinician knowledge and practical training. Many prescribers lack comprehensive understanding of LAI pharmacokinetics, side effects, dose equivalencies between oral and injectable formulations, and evidence-based strategies for transitioning patients from oral medications to LAIs [3]. This knowledge gap can result in uncertainty regarding appropriate dosing, timing of initiation, and management of overlapping therapies, which in turn may reduce prescriber confidence and contribute to reluctance in optimal use [3]. Moreover, deficits in skill set needed for LAI administration such as proper needle selection, administration site identification, aseptic technique, and monitoring for injection-site reactions or systemic side effects may lead to reluctance to adopt LAI [3].

C. Guideline ambiguity and clinical practice variability

The lack of clarity and inconsistencies in clinical guidelines may contribute to hesitancy in adopting long-acting injectable therapies [3]. Generally, treatment protocols have recommended LAIs primarily for patients with documented repeated nonadherence, treatment resistance, or frequent relapse, which may inadvertently reinforce perceptions that LAIs are reserved for “last resort” cases leading to underutilization [3]. Furthermore, the lack of standardized protocols for LAI initiation, loading strategies, and maintenance dosing may contribute to hesitancy in adopting LAIs [3]. Finally, variability in recommended administration schedules, titration strategies, and monitoring requirements may contribute to reluctance in prescribing LAIs [3].

2. Patient factors

Patient related factors particularly stigma, discomfort, limited insight, and socioeconomic challenge may also hinder the optimization of long acting injectables.

a. Stigma

Stigma represents a pervasive barrier to the acceptance and utilization of long-acting injectable (LAI) therapies [4]. Reluctance to embrace long acting injectable may emanate from the perception

by some patients that injections are meant for the seriously ill [4]. Such perceptions may evoke emotions such as shame, or fear of social marginalization, ultimately fostering reluctance to consider LAIs as a therapeutic option. Moreover, such perceptions may be reinforced by historical patterns in psychiatric care, where LAIs were frequently prescribed to patients perceived as aggressive, non-adherent, or challenging to manage [4]. This legacy contributes to the view that LAIs are punitive or coercive interventions rather than standard, patient-centered treatment modalities hence leading to hesitancy from patients to accept LAIs as a treatment modality [4].

b. Fear of needles

The other patient factor that may lead to LAIs utilization is the fear of needles. Notably, patients may be reluctant to initiate or continue long-acting injectable (LAI) therapy due to concerns related to discomfort and needle-related anxiety [4]. Anticipated pain or fear of injection-site reactions can act as significant psychological barriers, particularly among individuals who are sensitive to somatic discomfort or have previous negative experiences with injections [4]. Beyond physical discomfort, needle use can elicit trauma-related responses in certain populations. Individuals with history of medical trauma, needle phobia, or adverse experiences in healthcare settings may experience heightened anxiety, avoidance behaviors, or physiological stress responses when confronted with injectable medications [4].

c. Limited insight and illness awareness

The other patient factor that may contribute to reluctance by patients to accept long acting injectables is limited insight as to illness, long-acting formulations or both. Limited insight into one's illness and insufficient knowledge of long-acting injectable (LAI) formulations has been attributed to the hesitancy in embracing LAI [5].

d. Patient-level economic and access barriers

For many patients, hesitancy to initiate long-acting injectable (LAI) therapies may also be compounded by practical and financial barriers, including transportation challenges, inconsistent insurance coverage, and substantial out-of-pocket (OOP) costs [1]. Accessing regular LAI appointments may require repeated travel to healthcare facilities, which is particularly burdensome for individuals living in rural or underserved areas, those with mobility

limitations, or those reliant on public transportation [1]. Also, the logistical demands of attending regular clinic appointments for injections, particularly for individuals with mobility limitations, transportation challenges, or competing life responsibilities, can act as a barrier to LAI optimization [5].

3. Systemic factors

Systemic and structural factors such as reimbursement models, infrastructure and workforce capacity and barriers to continuity of care may also lead to suboptimization of the long acting injectables.

a. Reimbursement and funding models

Despite growing evidence supporting the clinical and economic benefits of long-acting injectable (LAI) therapies, fragmented reimbursement systems and high upfront costs continue to impede their widespread adoption [6]. In many healthcare settings, inconsistent coverage policies and administrative complexities in reimbursement processes create significant disincentives for both prescribers and patients [6]. Furthermore, clinicians may be reluctant to recommend LAIs when reimbursement mechanisms do not adequately compensate for the time and resources required for administration, follow-up, and coordination of care [6]. Moreover, many payers remain hesitant to invest in LAIs despite robust evidence demonstrating their potential to reduce long-term healthcare expenditures through decreased relapse rates, fewer hospitalizations, and improved adherence [6].

b. Infrastructure and workforce capacity

The other factor that may hinder optimization of long acting injectable is the limited infrastructure facilities and workforce capacity. Optimization of long-acting injectable (LAI) therapies is contingent upon the availability of adequately trained healthcare personnel, reliable storage infrastructure, and consistent monitoring systems [7]. Each of these components forms a critical pillar in ensuring the safety, efficacy, and sustainability of LAI implementation. Trained clinicians and nursing staff are essential not only for proper administration technique and adverse event management but also for patient education, counseling, and the maintenance of therapeutic engagement. [7]. Furthermore, lack of competence in handling injection procedures, cold-chain management, and documentation practices directly influence both clinical outcomes and patient trust in treatment [7]. Last, high professional workload, limited consultation time, and competing

clinical responsibilities may discourage clinicians from engaging in additional patient education, shared decision-making, and monitoring required for LAI therapy [2].

C. Continuity of care

The other factor that may contribute to reluctance in optimizing LAI use is lapses in continuity of care. Continuity of care is a critical determinant of successful long-acting injectable (LAI) therapy outcomes, particularly during transitions between inpatient and outpatient settings [8]. However, disruptions in care coordination at these confluences often result in treatment discontinuity, delayed administration, and relapses, undermining the therapeutic advantages of LAIs [8]. Moreover, poor documentation practices and limited interoperability between electronic health records (EHRs) across facilities may further exacerbate lapses in continuity of care leading to the barriers in LAI optimization [8].

Strategies to enhance LAI optimization

1. Clinician education, training, and shared decision making

One of the strategies to promoting the use of long acting injectables is through enhanced clinical education and training. Integrating comprehensive long-acting injectable (LAI) education into psychiatric training programs is essential for cultivating prescriber confidence, enhancing clinical competence, and promoting evidence-based practice [3]. Early exposure to LAI pharmacology, administration techniques, and communication strategies within medical and psychiatric residency curricula ensures that emerging clinicians view these treatments as integral components of modern psychiatric care rather than interventions reserved for non-adherence or last-resort scenarios [3].

Additionally, embedding LAI-focused modules into formal training can also demystify concerns about side effects, patient resistance, and logistical challenges, thereby normalizing their use within clinical decision-making processes. Beyond initial education, ongoing professional development plays a vital role in sustaining and expanding provider proficiency [3]. Continuing education initiatives, including workshops, simulation-based training, and case-based learning, have demonstrated effectiveness in improving clinicians' technical skills and comfort with LAI administration [3]. Equally important is the cultivation of patient-centered communication frameworks grounded in shared decision-making [9]. Shared decision-making has been shown to improve

satisfaction and adherence by aligning treatment plans with individual preferences, values, and lifestyle considerations [9]. Taken together, comprehensive education, continued professional development, and participatory care models create a synergistic foundation for optimizing LAI use.

2. Guideline and policy development

The other strategy that can help foster the adoption of the long-acting injectable use is the formulation of new clinical guidelines and the establishment of progressive health policies. Integrating evidence-based recommendations for LAI use into national and international treatment protocols can standardize clinical practice and mitigate variability in prescribing patterns [10]. Furthermore, the inclusion of LAIs in essential medicines lists and clinical quality indicators would provide formal institutional endorsement, signal their recognized therapeutic value and encourage procurement within public health systems [10].

Additionally, working on policy reforms to address systemic barriers that limit timely access to LAIs can help in fostering using long acting injectables leading to optimized clinical outcomes and reduced long-term burden on healthcare systems [11].

Additionally, as policy regulatory frameworks that incentivize local manufacturing and streamline approval processes may further enhance availability and affordability, particularly in low- and middle-income countries shedding off an additional layer to accessibility while increasing optimization [11].

3. Financing and Health System Integration

The other strategy that may be instrumental in fostering long-acting injectable use is through close evaluation of the financial and health systems for efficiency. When financial systems are strong then the higher upfront costs associated with long-acting injectable (LAI) therapies may be offset through subsidies leading to wider access [12]. Moreover, strategic investment from governments, global health agencies, and private sector stakeholders can reduce procurement costs, enhance supply chain efficiency, and promote equitable access, particularly in resource-limited settings [11]. Lastly, public-private collaboration can also foster innovation in financing models, such as outcome-based reimbursement or tiered pricing schemes, which align incentives for manufacturers, payers, and healthcare providers [11]. Moreover, streamlining reimbursement processes between pharmacy and clinical services

is essential to reduce administrative barriers and facilitate integrated care delivery.

4. Infrastructure and service delivery innovations

The other strategy that may lead to enhanced access of LAI neuroleptic therapy is through infrastructure and service delivery innovations. Innovative models of infrastructure and service delivery are pivotal for expanding access to long-acting injectable (LAI) neuroleptic therapy and subsequent adoption and integration into routine care [13]. Dedicated LAI clinics, which provide streamlined and specialized services, can facilitate efficient administration, follow-up, and patient education within supportive and stigma-free environments [13]. Additionally, leveraging on the existing nursing workforce through targeted training and empowerment, health systems can enhance both the efficiency and scalability of LAI delivery while maintaining high standards of safety and patient-centered care [13]. Workforce capacity remains a cornerstone of effective LAI service delivery and in that regard education, clinical experience, and specialized psychiatric training are directly associated with higher proficiency in LAI administration and improved patient outcomes [7]. More importantly, the integration of telepsychiatry and digital health platforms offers additional opportunities to overcome geographic and logistical barriers to LAI optimization [13]. When combined with community-based outreach initiatives, these technologies facilitate proactive follow-up and reduce the risk of treatment discontinuation [13].

5. Research and implementation of science

Robust real-world studies are critical for advancing the understanding of long-acting injectable (LAI) therapies beyond the controlled environments of clinical trials [12]. While randomized controlled trials establish efficacy, real-world evidence is indispensable for assessing effectiveness, feasibility, and long-term outcomes across heterogeneous patient populations and diverse healthcare systems [12]. Such studies can elucidate factors influencing initiation, adherence, and continuity of LAI treatment, including socio-economic determinants, health system infrastructure, and cultural perceptions of injectable medications [12]. Moreover, the application of implementation science frameworks provides a structured approach to understanding and addressing the multilevel barriers that may influence LAI adoption [3]. Furthermore,

collaborative research partnerships between academic institutions, health ministries, and community stakeholders can ensure that evidence generated is both contextually relevant and actionable to the optimization of LAIs

6. Public education, communication, and patient-centered engagement

The other forerunner factor to improving LAI optimization is through public education, communication and patient centered engagement. Public education campaigns are essential to escalate the optimization of the use of long-acting injectable (LAI) therapies and to counter persistent misconceptions surrounding their purpose and acceptability. Public awareness initiatives that emphasize the safety, efficacy, and convenience of LAIs can reshape societal attitudes and reduce stigma [9]. More importantly, educating patients that innovations in the pharmaceutical industry have led to newer LAI preparations that employ lower injection volumes, extended dosing intervals, and subcutaneous administration routes have been associated with reduced pain, greater comfort, and improved satisfaction [9]. Lastly, engaging patients and providing timely education about individualized options, including preferred injection sites such as deltoid versus gluteal administration may empower them to participate actively in treatment planning and mitigate procedural anxiety [8].

Discussion

The rationale for expanding LAI use is compelling: by improving adherence, these formulations mitigate relapse risk and hospitalization rates, ultimately enhancing long-term outcomes in SMIs. However, realizing their full potential requires a multifaceted approach that integrates education, infrastructure, and policy reform. Special attention must be paid to equity in access, particularly in LMICs, where resource and workforce limitations persist. The emergence of next-generation LAIs with extended dosing intervals further strengthens the case for early and broader adoption.

Conclusion

Long-acting injectable antipsychotics represent a cornerstone in modern psychiatric therapeutics. Yet, their utilization remains constrained by complex clinician, patient, and system-level barriers. Optimizing LAI use requires comprehensive strategies

encompassing education, policy alignment, infrastructure investment, and stigma reduction. Ensuring equitable access—particularly within resource-limited settings—is not only a clinical imperative but also a moral responsibility toward advancing patient-centered, sustainable mental health care.

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