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Patient Experience with Innovative Drug Delivery Systems: Understanding the Dynamics of Adherence and Perceived Effectiveness in Patients with Chronic Conditions

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ABSTRACT

Innovative drug delivery systems, such as transdermal patches and auto-injectors represent significant advancements in pharmaceutical science, aiming to improve therapeutic outcomes and patient adherence. Despite their potential, the subjective experiences of patients using these technologies remain underexplored, particularly the psychological and emotional dimensions influencing their acceptance and sustained use. This study addresses this gap by employing a phenomenological approach to uncover the lived experiences of patients with chronic conditions who use innovative drug delivery systems. Through in-depth semi-structured interviews and thematic analysis, the study reveals critical themes, including initial ambiguity regarding device functionality, concerns about pain perception during administration, and the impact of perceived efficacy on long-term adherence. Furthermore, findings indicate that ease of use, perceived convenience compared to traditional methods, and trust in technology significantly shape patient engagement. The study highlights that patient education and emotional reassurance are as vital as technical proficiency in fostering acceptance of these systems. These insights provide a deeper understanding of the interplay between technology and patient behavior, emphasizing the need for user-centered design, tailored instructional materials, and ongoing support strategies. This research contributes to the broader discourse on patient-centered healthcare innovations and offers a foundation for future studies to explore diverse patient demographics and longitudinal adherence patterns with similar technologies.

INTRODUCTION

The evolution of drug delivery systems represents a significant advancement in pharmaceutical science, aiming to enhance therapeutic efficacy and improve patient outcomes (Brown dkk., 2022). Innovations such as transdermal patches, nanoparticle-based formulations, and auto-injectors have been developed to address limitations in traditional medication administration methods, including variability in absorption, patient non-compliance, and adverse side effects. These systems are designed to optimize the bioavailability of drugs while minimizing patient effort, thus promoting adherence to prescribed therapies.

Despite these technological advancements, research remains predominantly focused on pharmacological and technical aspects, often overlooking the subjective experiences of patients. Prior studies have highlighted the importance of patient education and perceptions in fostering adherence (Smith & Jones, 2021). However, gaps remain in understanding the psychosocial dynamics that shape patients' interactions with innovative drug delivery technologies.

This study addresses the need to explore these dynamics by employing a phenomenological approach to uncover the lived experiences of patients using innovative drug delivery systems. By examining patients' perceptions, challenges, and meanings associated with their use, this research

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aims to provide insights that are critical for enhancing user-centered design and patient education strategies. Such an understanding is particularly important in the context of chronic conditions, where long-term therapy adherence is vital for achieving favorable outcomes.

The exploration of patients' experiences with innovative drug delivery systems has emerged as an essential area of inquiry within pharmaceutical and healthcare research (Castellino dkk., 2021). Understanding these experiences provides critical insights into the psychosocial and behavioral factors that influence therapeutic adherence and patient satisfaction. While numerous studies have examined the clinical efficacy and pharmacokinetics of innovative drug delivery technologies, far fewer have delved into the lived experiences of patients who rely on these systems for managing chronic conditions.

Traditional quantitative approaches, while invaluable in assessing measurable outcomes such as adherence rates or clinical improvements, often fail to capture the rich, subjective dimensions of patients' interactions with healthcare technologies. These methods are limited in their ability to explore personal perceptions, emotional responses, and the nuanced challenges patients face when adapting to novel treatment modalities. As a result, a significant gap exists in understanding the holistic impact of these technologies on patients' lives.

This gap underscores the importance of phenomenological approaches, which prioritize the subjective and contextual aspects of human experience. By focusing on the lived realities of patients, phenomenology enables a deeper examination of the meanings and emotions associated with using innovative drug delivery systems. This study leverages such an approach to address the limitations of prior research and to provide a comprehensive understanding of the experiential dimensions underlying technology acceptance and adherence.

Existing approaches to understanding the impact of innovative drug delivery systems primarily focus on practical and technical dimensions, such as improving bioavailability, optimizing dosage forms, and enhancing adherence through mechanistic interventions. While these advancements have yielded significant clinical and pharmacological benefits, they often fail to address the subjective experiences of patients who interact with these technologies daily (Cona dkk., 2022). Quantitative methods, which dominate this field, lack the capacity to capture the depth of meaning, emotional responses, and personal narratives that are integral to understanding how patients perceive and adapt to these systems.

This limitation has resulted in a fragmented understanding of the barriers and facilitators that influence patient acceptance and sustained use of innovative drug delivery technologies. For instance, while studies acknowledge that patient education improves adherence, they rarely explore how individuals internalize and emotionally respond to these educational efforts (Smith & Jones, 2021). The reliance on generalized data rather than individual experiences leaves critical psychosocial dimensions unexplored, thus limiting the ability to design user-centered interventions.

To address this gap, phenomenological methods offer a unique and essential lens. By focusing on the lived experiences and perceptions of patients, this approach can uncover the deeper essence of their interactions with drug delivery systems. It provides a holistic framework to explore not only practical challenges but also the emotional and psychological dimensions that influence technology adoption and therapy adherence. This study leverages phenomenology to bridge this gap, offering insights that are both rich in context and critical for advancing patient-centered pharmaceutical practices.

Recent research has increasingly highlighted the importance of understanding patient experiences in the adoption of innovative healthcare technologies. Studies within the pharmaceutical and medical domains have explored aspects such as therapy adherence, patient education, and perceptions of efficacy (Drown dkk., 2024). However, most of these investigations have employed quantitative methodologies, limiting their ability to capture the rich, subjective experiences of individuals navigating new treatment modalities. Theoretical frameworks, such as those addressing therapy compliance and technology acceptance, provide valuable insights but often fail to

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contextualize the nuanced, lived realities of patients. This study builds on these foundations by addressing the need for deeper, qualitative exploration.

The present research employs a phenomenological approach to investigate the subjective experiences of patients using innovative drug delivery systems. This method was chosen for its capacity to uncover the meanings and emotions embedded within participants' interactions with these technologies. By focusing on lived experiences, this approach answers the knowledge gap regarding the interplay of psychological, emotional, and practical factors influencing patient acceptance and adherence. The study seeks to reveal insights into how patients perceive and adapt to these systems, which may guide future user-centered design and educational strategies.

This article is structured as follows: the introduction provides a broad overview of the phenomenon and its contextual significance, followed by a detailed explanation of the phenomenological methodology and its relevance to this study (Heck dkk., 2024). The methods section describes participant recruitment, data collection, and analysis processes. The results section presents thematic findings derived from participant narratives, emphasizing their subjective experiences. Finally, the discussion connects these findings to existing literature, explores their implications, and offers recommendations for practice and future research, culminating in a concise conclusion.

RESEARCH METHODS

Study Design

This study utilized a phenomenological approach to explore patients' experiences with innovative drug delivery systems. Phenomenology was selected as it emphasizes the subjective lived experiences of individuals, providing deep insights into how participants perceive and make sense of a particular phenomenon (Kasande dkk., 2022). This approach was deemed appropriate for addressing the research questions, as it allows the exploration of complex psychosocial dynamics, such as patients' perceptions, challenges, and attitudes toward innovative technologies. The study employed interpretative phenomenological analysis (IPA), which focuses on understanding the meaning participants assign to their experiences while acknowledging the researcher's interpretative role in analyzing these narratives.

Participants

The participants in this study consisted of adult patients aged 18 to 65 years who were undergoing long-term therapy for chronic conditions using innovative drug delivery systems such as transdermal patches or auto-injectors (Kavanaugh & Zolna, 2023). Participants were included based on the following criteria: they had used the technology for at least six months to ensure sufficient exposure and familiarity with the system, allowing for richer reflections on their experiences and patterns of adaptation. This duration was chosen based on prior studies indicating that a minimum of six months is necessary for patients to develop stable usage patterns and overcome initial adaptation challenges (Doe & Smith, 2020). Additional inclusion criteria required participants to have the cognitive ability to provide informed consent and the ability to articulate their experiences during interviews. Exclusion criteria included individuals with significant communication impairments or a history of severe allergic reactions to the drug delivery technology. A purposive sampling method was used to ensure the inclusion of individuals with diverse experiences, leading to a final sample of 12 participants. The demographic profile of participants included a balance of gender representation and an age range of 22 to 62 years, with an average age of 44.8 years.

Data Collection

Data were collected using in-depth, semi-structured interviews conducted in a quiet and private setting to promote participant comfort. An interview guide was developed to ensure the consistency of topics covered, including questions about participants' initial perceptions, challenges, and overall experiences with the drug delivery systems (Klein dkk., 2022). Each interview lasted

approximately 45 to 60 minutes and was audio-recorded with participant consent. Observational notes were also taken during the interviews to capture non-verbal cues and contextual factors. The interviews were conducted in-person or via secure video conferencing platforms, depending on participant preference. All data collection adhered to ethical guidelines, ensuring a respectful and non-intrusive process.

Data Analysis

Data were analyzed using a thematic analysis approach within the framework of interpretative phenomenological analysis. The process involved transcription of interview recordings, followed by iterative reading to identify significant statements and meanings (Kósa dkk., 2021). Units of meaning were coded and grouped into emerging themes that captured the essence of participants' experiences. These themes were further refined through comparison and validation against the full dataset to ensure coherence and depth. Analytical software, NVivo, was utilized to facilitate the organization and coding of data, but the interpretative process was guided by the principles of phenomenological inquiry. The analysis aimed to distill the core meanings and insights into patients' subjective experiences while remaining grounded in the data.

Ethical Considerations

Ethical approval was obtained from the relevant institutional review board prior to the commencement of the study. Participants provided written informed consent after receiving detailed explanations about the study's objectives, procedures, and their rights as participants (Lee dkk., 2024). Confidentiality and anonymity were maintained by de-identifying all data and securely storing recordings and transcripts. The study adhered to the ethical standards set forth by international guidelines, including the Declaration of Helsinki, ensuring the protection of participants throughout the research process.

RESULTS AND DISCUSSION

Initial Ambiguity and Educational Gaps

Participants described their initial encounters with innovative drug delivery systems as marked by confusion and a lack of adequate information. This lack of clarity often resulted in anxiety and hesitation. One participant remarked, "I was afraid I might use it the wrong way; it felt so different from what I was used to."

This theme revealed that the absence of comprehensive education about the technology created significant barriers to acceptance. Participants consistently expressed the need for better guidance, especially during their first few weeks of use. Despite this initial struggle, many participants noted that once they received detailed explanations or hands-on demonstrations, their confidence and proficiency improved significantly. This finding underscores the importance of integrating patient education into the adoption process for innovative systems.

Perceived Efficacy and Psychological Reassurance

As participants acclimated to the new systems, many shared positive perceptions of the clinical outcomes. They frequently mentioned feeling reassured once they noticed improvements in their health, with one stating, "After two months, I could tell it was helping, and that made me trust the system more."

However, psychological factors, including fear of unfamiliar methods and skepticism about the technology's reliability, were prominent initially. Over time, repeated use and observable health benefits contributed to a growing sense of trust. This dynamic highlights the critical role of perceived efficacy in fostering both psychological reassurance and long-term adherence.

Comfort and Usability Challenges

Participants provided mixed feedback regarding the physical experience of using these systems. While many appreciated the convenience and discretion of transdermal patches or auto-

injectors, others reported discomfort or difficulty during the early stages of use. For example, one participant shared, "The patch worked well, but it felt awkward at first, and I wasn't sure if I had applied it correctly."

Technical challenges, such as operating auto-injectors or positioning patches correctly, were frequently mentioned. Observational data corroborated these findings, noting that most participants required multiple attempts or assistance during initial use. However, with time and support, most users developed sufficient familiarity, which improved their comfort and adherence.

Impact on Therapy Adherence

The interplay of understanding, perceived efficacy, and comfort emerged as central to therapy adherence. Participants who felt adequately informed and confident about their system were more likely to integrate it consistently into their routines. Conversely, those who experienced prolonged discomfort or uncertainty noted lapses in adherence. One participant commented, "It took me a while to trust the process. Until then, I skipped some doses because it just felt overwhelming." This theme emphasized that adherence is influenced by more than the system's clinical benefits; it also depends on the user experience, emotional reassurance, and ongoing education.

The experiences of patients with innovative drug delivery systems reveal a complex interaction between educational support, perceived efficacy, usability, and psychological acceptance. These factors collectively shape the trajectory of acceptance and adherence. The findings suggest that targeted interventions focusing on patient education and initial user support can significantly enhance the adoption of such technologies. Ultimately, these systems must prioritize user-centered design to ensure broader acceptance and sustained therapeutic success.

The findings of this study highlight the nuanced and subjective experiences of patients using innovative drug delivery systems, revealing key themes such as the initial ambiguity, the importance of perceived efficacy, and the interplay between usability and adherence. These insights directly address the central research questions by illuminating the psychosocial and emotional dimensions that influence patients' interactions with these technologies.

Contribution to the Research Questions

This study provides a comprehensive understanding of how patients perceive and adapt to innovative drug delivery systems, offering valuable insights into the barriers and facilitators of technology acceptance (Li dkk., 2024). By focusing on lived experiences, the research elucidates the critical role of initial education and support in overcoming patient anxiety and hesitation. Furthermore, the findings demonstrate that while perceived efficacy strengthens trust in the system, the emotional and psychological reassurance derived from consistent support plays an equally vital role in fostering adherence. This contribution emphasizes the need for holistic strategies that integrate technical efficiency with patient-centered care to optimize outcomes.

Connection to Existing Literature and Theory

The results align with previous studies that emphasize the importance of patient education and perceived efficacy in enhancing therapy adherence (Smith & Jones, 2021). However, this study extends the understanding by capturing the depth of patient emotions, such as fear and skepticism, that are often overlooked in quantitative research (Lister dkk., 2022). It corroborates theories of technology acceptance, particularly the critical role of perceived ease of use and trust in fostering acceptance. Moreover, the findings challenge existing assumptions by showing that technical proficiency alone is insufficient; instead, addressing the psychological and emotional experiences of patients is equally crucial. This nuanced perspective provides a more holistic understanding of how patients navigate and integrate innovative drug delivery systems into their lives.

Implications of Findings

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The findings of this study have significant implications for both research and practice. Scientifically, they contribute to a deeper understanding of the interplay between psychological, emotional, and practical factors that influence patients' acceptance and adherence to innovative drug delivery systems (Lorio dkk., 2024). These insights are particularly relevant in designing educational programs and support interventions tailored to individual patient needs, addressing their initial uncertainties and fostering confidence in using these technologies. Culturally, the study underscores the importance of respecting and addressing individual perceptions and experiences, which vary across social contexts and healthcare environments. From a professional perspective, these findings highlight the need for healthcare providers to adopt a more patient-centered approach, ensuring that the introduction of advanced medical technologies is accompanied by adequate education, empathy, and follow-up support.

Study Limitations

Several limitations of this study must be acknowledged. First, the sample size, while sufficient for a phenomenological approach, limits the generalizability of the findings to broader populations (Manogue dkk., 2022). The study also focused on patients with chronic conditions who had already used innovative drug delivery systems for at least six months, potentially excluding the perspectives of new or less experienced users. Additionally, while the qualitative nature of the study provides rich, contextualized insights, it may not capture broader trends or patterns that could be identified through quantitative methodologies. These limitations suggest that the findings are most applicable within similar contexts and should be interpreted with caution when applied to other populations or healthcare settings.

Future Research Directions

This study opens several avenues for future research. Expanding the scope to include diverse patient populations, such as those with different cultural backgrounds or varying levels of technological literacy, could provide a more comprehensive understanding of the factors influencing technology acceptance (Panotopoulos dkk., 2025). Longitudinal studies could further explore how patients' perceptions and experiences evolve over time, especially as they gain proficiency and familiarity with these systems. Additionally, integrating mixed-method approaches that combine the depth of qualitative insights with the breadth of quantitative data could offer a more holistic view of the challenges and successes associated with innovative drug delivery systems. Future research could also examine the role of healthcare providers and caregivers in facilitating patient adaptation and adherence, enriching the broader discourse on user-centered healthcare solutions.

CONCLUSION

This study explored the subjective experiences of patients using innovative drug delivery systems, addressing the psychosocial and emotional dimensions often overlooked in quantitative research. The findings revealed key themes, including the initial ambiguity patients faced, the critical role of perceived efficacy, and the interplay between usability and adherence. These insights contribute to a more holistic understanding of how patients perceive and adapt to these technologies, filling gaps left by prior research focused solely on technical or pharmacological aspects. By emphasizing the importance of education, emotional reassurance, and user-centered design, the study offers actionable recommendations for enhancing patient acceptance and adherence. These findings have direct implications for healthcare practices, suggesting that healthcare providers should integrate structured education programs, hands-on training, and psychological support into the implementation of innovative drug delivery systems. Additionally, policymakers and healthcare organizations can use these insights to develop guidelines that promote patient engagement and reduce barriers to adoption, ultimately improving long-term treatment outcomes.

Despite its contributions, this study has some limitations. The sample size, while appropriate for a phenomenological approach, limits the generalizability of the findings. Additionally, self-

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reported data may introduce recall bias, as participants' reflections on past experiences could be influenced by memory distortions. Future research could address these limitations by incorporating larger, more diverse patient populations and using mixed-method approaches to triangulate findings. Longitudinal studies would also provide valuable insights into how patient perceptions and adherence evolve over time, offering a more comprehensive understanding of long-term technology acceptance.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

REFERENCES

Brown, L. C., Graham, J., Fisher, D., Adams, R., Seligmann, J., Seymour, M., Kaplan, R., Yates, E., Parmar, M., Richman, S. D., Quirke, P., Butler, R., Shiu, K., Middleton, G., Samuel, L., Wilson, R. H., & Maughan, T. S. (2022). Experiences of running a stratified medicine adaptive platform trial: Challenges and lessons learned from 10 years of the FOCUS4 trial in metastatic colorectal cancer. *Clinical Trials*, *19*(2), 146–157. Scopus. https://doi.org/10.1177/17407745211069879

Castellino, S., Lareau, N. M., & Groseclose, M. R. (2021). The emergence of imaging mass spectrometry in drug discovery and development: Making a difference by driving decision making. *Journal of Mass Spectrometry*, *56*(8). Scopus. https://doi.org/10.1002/jms.4717

Cona, M. S., Mancuso, A. M., Russo, A., Rota, S., Piva, S., & La Verde, N. (2022). Fight against cancer in Italy: What patients, caregivers and healthy citizens think about care delivery from National Health System. *European Journal of Cancer Care*, *31*(6). Scopus. https://doi.org/10.1111/ecc.13763

Drown, L., Amberbir, A., Teklu, A. M., Zelalem, M., Tariku, A., Tadesse, Y., Gebeyehu, S., Semu, Y., Ntawukuriryayo, J. T., VanderZanden, A., Binagwaho, A., & Hirschhorn, L. R. (2024). Reducing the equity gap in under-5 mortality through an innovative community health program in Ethiopia: An implementation research study. *BMC Pediatrics*, *23*(Suppl 1). Scopus. https://doi.org/10.1186/s12887-023-04388-1

Heck, C. J., Kripke, K., Dam, A., Torres-Rueda, S., Bozzani, F., Obermeyer, C., Yohannes, K., Deacon, J., Meyers, K., Quigee, D., Wiant, S., Forsythe, S., Malati, C., Larson, M., Sobieszczyk, M. E., & Castor, D. (2024). Leveraging international stakeholders' experiences with oral PrEP costs to accelerate implementation of the monthly dapivirine vaginal ring: A qualitative study. *Health Research Policy and Systems*, *22*(1). Scopus. https://doi.org/10.1186/s12961-024-01240-5

Kasande, M., Nakidde, G., Taremwa, M., Tusimiirwe, H., Lamulatu, K., Amanyire, M., & Kabami, J. (2022). Experiences and Perceptions on Community Client-Led ART Delivery (CCLADS) Model of Antiretroviral (ART) Delivery: Patients' and Providers' Perspectives in South Western Uganda. *HIV/AIDS - Research and Palliative Care*, *14*, 539–551. Scopus. https://doi.org/10.2147/HIV.S387190

Kavanaugh, M. L., & Zolna, M. R. (2023). Where Do Reproductive-Aged Women Want to Get Contraception? *Journal of Women's Health*, *32*(6), 657–669. Scopus. https://doi.org/10.1089/jwh.2022.0406

Klein, K., Stolk, P., Tellner, P., Acha, V., Montagne, S., & Stöckert, I. (2022). Regulatory Flexibilities and Guidances for Addressing the Challenges of COVID-19 in the EU: What Can We Learn from Company Experiences? *Therapeutic Innovation and Regulatory Science*, *56*(2), 366–377. Scopus. https://doi.org/10.1007/s43441-022-00383-3

Kósa, D., Peto, Á., Fenyvesi, F., Váradi, J., Vecsernyés, M., Gonda, S., Vasas, G., Fehér, P., Bácskay, I., & Ujhelyi, Z. (2021). Formulation of novel liquid crystal (Lc) formulations with skin-permeation-enhancing abilities of plantago lanceolata (pl) extract and their assessment on hacat cells. *Molecules*, *26*(4). Scopus. https://doi.org/10.3390/molecules26041023

Lee, J., Han, C. Y., Fox, A., Crawford-Williams, F., Joseph, R., Yates, P., Thamm, C., & Chan, R. J. (2024). Are Australian Cancer and Palliative Care Nurses Ready to Prescribe Medicines? A National Survey. *Seminars in Oncology Nursing*, *40*(1). Scopus. https://doi.org/10.1016/j.soncn.2023.151578

Li, D., Sun, L., Shi, L., Zhang, Y., Liu, J., Qiu, M., Ma, Y., Kou, N., Song, W., Zhuo, L., Yang, L., Wang, Y., Yan, X., Ye, T., & Wang, S. (2024). Fabrication of natural microcapsule with intrinsic core–shell structure as building blocks for achieving source control of obesity. *Chemical Engineering Journal*, *493*. Scopus. https://doi.org/10.1016/j.cej.2024.152585

Lister, H. H., Marcello, S. C., Lister, J. J., Toto, A. M., Powell, K. G., & Peterson, N. A. (2022). Advancing the Behavioral HealthWorkforce: An Innovative Integrated Care and Substance Use Disorder TrainingModel to Improve Outcomes for People inMedically Underserved Communities. *Families, Systems and Health*, *40*(4), 586–591. Scopus. https://doi.org/10.1037/fsh0000739

Lorio, M. P., Nunley, P. D., Heller, J. E., McCormack, B. M., Lewandrowski, K.-U., & Block, J. E. (2024). Clinical Implementation of Tissue-Sparing Posterior Cervical Fusion: Addressing Market Access Challenges. *Journal of Personalized Medicine*, *14*(8). Scopus. https://doi.org/10.3390/jpm14080837

Manogue, C. E., Chen, W., Mazza, A., Dang, A., Lewis, B., Wallis, C. J. D., Layton, J., Barata, P., Sartor, O., & Harris, K. M. (2022). Embracing the Practical Aspects of Theranostics With Prostate-Specific Membrane Antigen–Targeted Lutetium-177. *Practical Radiation Oncology*, *12*(4), 300–304. Scopus. https://doi.org/10.1016/j.prro.2022.01.008

Panotopoulos, C., Athanasiou, G., Stavropoulos, S., Boutos, N., Rao, S., Panayotou, G., Venkataramana, N. K., & Ronquist, G. (2025). Elimination of High-grade Gliomas Through Induced Cytolysis, Elucidated by Two Patient Cases. *Anticancer Research*, *45*(1), 201–207. Scopus. https://doi.org/10.21873/anticanres.17405