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REVIEW ARTICLE

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Artificial Intelligence in Pharmacy Education: A Transformative Approach

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ABSTRACT

Background: Artificial intelligence (AI) is increasingly being integrated into pharmacy education, offering innovative approaches to teaching, learning, and assessment. AI-driven technologies have the potential to enhance student engagement, personalize learning experiences, and support research and professional development, thereby addressing the evolving needs of modern pharmacy practice.

Objective: This review aims to evaluate the impact of AI applications in pharmacy education and to propose an outcome-based AI-integrated curriculum framework suitable for implementation in pharmacy institutions.

Methods: A structured literature review was conducted using databases including PubMed, Scopus, Web of Science, and Google Scholar. English-language studies focusing on AI applications in pharmacy or health professions education were included, while non-educational and opinion-based articles were excluded. Relevant data were analysed to assess AI-enabled teaching methodologies, assessment strategies, and curriculum models.

Results: The findings indicate that AI-driven tools such as adaptive learning platforms, virtual simulations, automated assessment systems, and data analytics significantly improve personalized learning, clinical decision-making, research competency, and student engagement. Based on the synthesized evidence, a comprehensive AI-integrated pharmacy curriculum was developed, encompassing modules on AI fundamentals, drug discovery, clinical pharmacy, hospital and community practice, pharmaceutical industry applications, and regulatory and ethical considerations. The proposed framework aligns with key program outcomes, including digital literacy, clinical excellence, research proficiency, ethical responsibility, and industry readiness.

Conclusion: AI integration in pharmacy education enhances learning efficiency and outcomes while complementing the role of educators. A structured, outcome-based curriculum provides a sustainable pathway for preparing future-ready pharmacy professionals.

KEYWORDS: Artificial Intelligence; Pharmacy Education; Teaching; Virtual Learning; AI labs.

REVIEW ARTICLE

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A Comprehensive Perspective on Transdermal Drug Delivery System: A Systematic Review

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ABSTRACT

Transdermal drug delivery systems (TDDS) are noninvasive, wearable platforms that deliver drugs through the skin into systemic circulation, offering an alternative to oral and injectable routes. By bypassing first-pass metabolism, TDDS improve bioavailability, enable self-administration, and enhance patient compliance. Advancements in materials such as hydrogels and fabrics have supported the evolution of TDDS through four generations, enabling controlled and efficient drug delivery. Various drugs, including NSAIDs, steroidal agents, and insulin, have been successfully formulated, with nitroglycerin patches introduced in 1985 representing an early milestone in transdermal therapy.

KEYWORDS: Transdermal Patch, Matrix Patches, Reservoir Type, Microneedles, Drug-In-Adhesive Patches, Micro Reservoir Patches, 3D printed patches

RESEARCH ARTICLE

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Assessment of Smartphone Addiction and its Determinants among College Students of Anand

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ABSTRACT:

Introduction: Smartphone addiction has emerged as a growing behavioural concern, particularly among young adults. Excessive smartphone use may adversely affect physical health, sleep and psychological well-being. Thus, this study aimed to determine prevalence of smartphone addiction among college students and to assess associated usage patterns, risk factors and related consequences. **Methodology:** A cross-sectional, questionnaire-based survey was conducted among college students in Anand from January to March 2023. Data were collected using a predesigned Google Form that included the Short Smartphone Addiction Scale along with questions related to usage duration, purpose of use, and associated symptoms. **Results:** A total of 404 students participated in the study. Smartphone addiction was observed in 83.7% of participants. Among those identified as addicted, more than half reported smartphone usage exceeding 3 hours per day (54.43%). Social media use (87.27%), e-commerce activities (37.57%), gaming (29.58%), and academic purposes (6.8%) were common usage patterns. Reported consequences included eye strain (35.5%), neck pain (68.8%), and sleep disturbances (70%). Additionally, 33.9% of participants experienced phantom vibration syndrome, while 35.6% exhibited nomophobia. **Conclusion:** Smartphone addiction was highly prevalent among college students in the study population. The findings highlight the need for targeted awareness programs and early interventions to reduce excessive smartphone use and prevent associated health consequences.

KEYWORDS: Smartphone Addiction, Risk Factors, sleep disturbance, Phantom vibration syndrome, NoMoPhobia

RESEARCH ARTICLE

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Formulation and Evaluation of Tadalafil orally Disintegrating Tablets Prepared By Complexation With B-Cyclodextrin By Kneading Method

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ABSTRACT

The present work was aimed to formulate and evaluate Oral Disintegrating Tablets (ODTs) of Tadalafil (TDF) prepared by complexation with β -Cyclodextrin by direct compression method. Four formulations, F- I(control) and (F-II to F-IV) of Tadalafil oral disintegrating tablets were prepared and evaluated for various post compression parameters. FT-IR results showed that there was no interaction between API and the excipients used in the formulations. From the overall results, formulation F-IV prepared using crospovidone as superdisintegrant and 15% β -Cyclodextrin showed the least wetting time (7.33 seconds), the highest water absorption ratio of 99.27 ± 1.58 , the fastest disintegration time (6 seconds) and maximum drug release (99.15%) at the end of 20 minutes and selected as the best formulation and subjected to DSC analysis and stability studies. DSC thermogram of TDF- β -Cyclodextrin mixture indicated that TDF got complexed with β -Cyclodextrin. Stability study of best formulation revealed that the formulation F-IV was stable even after stored at $40^\circ \text{C} \pm 2^\circ \text{C} / 75\% \pm 5\% \text{RH}$ for 3 months. Hence, it can be concluded that oral disintegrating tablet formulation (F-IV) prepared with 15% β -Cyclodextrin by kneading method for complex formation and 8% crospovidone as superdisintegrant by direct compression method may be an effective strategy to increase the solubility and dissolution rate of Tadalafil.

KEYWORDS: Direct compression, Solubility, Superdisintegrant and Tadalafil.

RESEARCH ARTICLE

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Lamarckian Genetic Algorithm-Guided Targeting on The Phytoconstituents of *Ailanthus Excelsa* against Adenosine A2A Receptor For The Management of Parkinson's Disease

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ABSTRACT

Parkinson's disease (PD) is a progressive neurodegenerative disorder characterized by the degeneration of dopaminergic neurons in the *substantia nigra*. Adenosine A2A receptor is responsible for the activation of Parkinson's disease. *Ailanthus excelsa* Roxb is commonly known as tree of heaven is a medicinal plant traditionally used for anti-inflammatory, antioxidant, and neuroprotective properties. The aim of the present study is to identify and evaluate the inhibitory activity of Adenosine A2A receptor using the phytoconstituents presents in the *Ailanthus excelsa* through *in silico* approach against Parkinson's disease. The twenty-six phytoconstituents reported from the *Ailanthus excelsa* were identified from various literatures and screened for its drug-likeness properties through Molinspiration software. Molecular docking analysis was carried out against Adenosine A2A receptor using an automated docking tool AutoDock 4.2. The various docking parameters such as binding energy, inhibition constant and intermolecular energy of the phytoconstituents were determined to know its anti-Parkinsonism potentials. The phytoconstituents of *Ailanthus excelsa* contribute a beneficial interaction towards Adenosine A2A receptor and exhibited promising docking parameters profile. In the twenty-six selected phytoconstituents especially quercetin and kaempferol exhibited the binding energy values of -7.61 kcal/mol and -7.43 kcal/mol when compared to the standard drug levodopa showed -3.76 kcal/mol. From these results, quercetin and kaempferol provide a possible antagonist effect that may mitigate the symptoms of Parkinson's disease. From this computational study, it can be concluded that the phytoconstituents of *Ailanthus excelsa* especially Quercetin and Kaempferol has potency to inhibit Adenosine A2A receptor and thereby it could be serve as a potential agent for the management of Parkinson's disease. Further *in-vivo* and translational research need to perform to prove its vital role in the management of Parkinson's disease.

KEYWORDS : Adenosine A2A receptor, Docking analysis, Kaempferol, Parkinson's disease, Quercetin.

CASE REPORT

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Abducens Nerve Palsy: A Case Report

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ABSTRACT

The most prevalent ocular motor nerve palsy, abducens nerve palsy, is frequently associated with microvascular reasons in diabetics. We describe a 52-year-old man who developed hazy vision, binocular horizontal diplopia, with worsening on right gaze one week prior. The patient had a known history of diabetes mellitus but no hypertension or recent infection. Ocular examination revealed restricted right lateral gaze and correctable refractive errors. Fundoscopy showed bilateral drusens and dull foveal reflexes, indicating early macular changes. MRI revealed a calcified granuloma in the left frontal lobe, an incidental finding. The patient was managed with neuroprotective agents, antiplatelets, statins, and medications to improve microcirculation. Clinical signs resolved over four months, consistent with microvascular aetiology. This case highlights the need for thorough systemic and ocular evaluation in cranial nerve palsies and supports the potential for full recovery with appropriate medical management in diabetic patients.

KEYWORDS: Abducens nerve palsy, Drusens, Diplopia, Sixth cranial nerve, Granuloma, Motoneurons