MODERN METHODS OF TEACHING THE TOPIC OF SOLUTIONS IN MEDICAL CHEMISTRY

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Annotation: This article discusses the modern pedagogical approaches applied in teaching the topic of solutions within medical chemistry. The emphasis is placed on interactive learning, problem-based learning (PBL), virtual simulations, and the use of digital tools. Through comparative analysis of traditional and modern approaches, the paper highlights the higher effectiveness of innovative methods in improving both knowledge retention and student satisfaction in medical education.

Keywords: Medical chemistry, solutions, modern teaching methods, interactive learning, problem-based learning, digital education.

Introduction

Medical chemistry is a cornerstone of medical education, providing essential knowledge about chemical principles relevant to physiological processes and pharmacology. Solutions, as a core topic, play an important role in understanding body fluid balance, preparation of intravenous infusions, and drug formulations. Teaching this topic requires modern educational methods that foster both theoretical knowledge and practical application.

Theoretical Background of Solutions

A solution is a homogeneous mixture of two or more substances. Key parameters in medical chemistry include concentration, molarity, osmolarity, osmotic pressure, and pH. These properties directly influence drug stability, safety of infusion solutions, and diagnostic reagents. For instance, isotonic saline and glucose solutions are essential in clinical practice to maintain homeostasis. Understanding the preparation and analysis of solutions is therefore fundamental for medical students.

Modern Methods of Teaching Solutions in Medical Chemistry

1. Interactive Lectures: Use of clicker systems, Q&A sessions, and student polls.
2. Problem-Based Learning (PBL): Applying clinical scenarios, such as intravenous fluid preparation, to foster analytical skills.
3. Technology-Enhanced Learning: Incorporation of e-learning platforms, AR/VR labs, and simulation software.
4. Case Studies and Research Projects: Encouraging students to analyze real-world data and conduct mini-projects.
5. Competency-Based Approach: Training students to prepare and calculate solution concentrations for clinical use.

Comparative Analysis of Teaching Methods

Traditional Methods	Modern Methods
Lecture-based, theoretical, memorization-focused	Interactive, practical, student-centered
Low student engagement	High student engagement and motivation
Limited use of technology	Integration of AR/VR, e-learning, and

	simulations
Minimal real-life problem solving	Clinical case-based and problem-oriented

Graphical Representation

The following graphs compare traditional and modern teaching methods in terms of knowledge retention and student satisfaction.
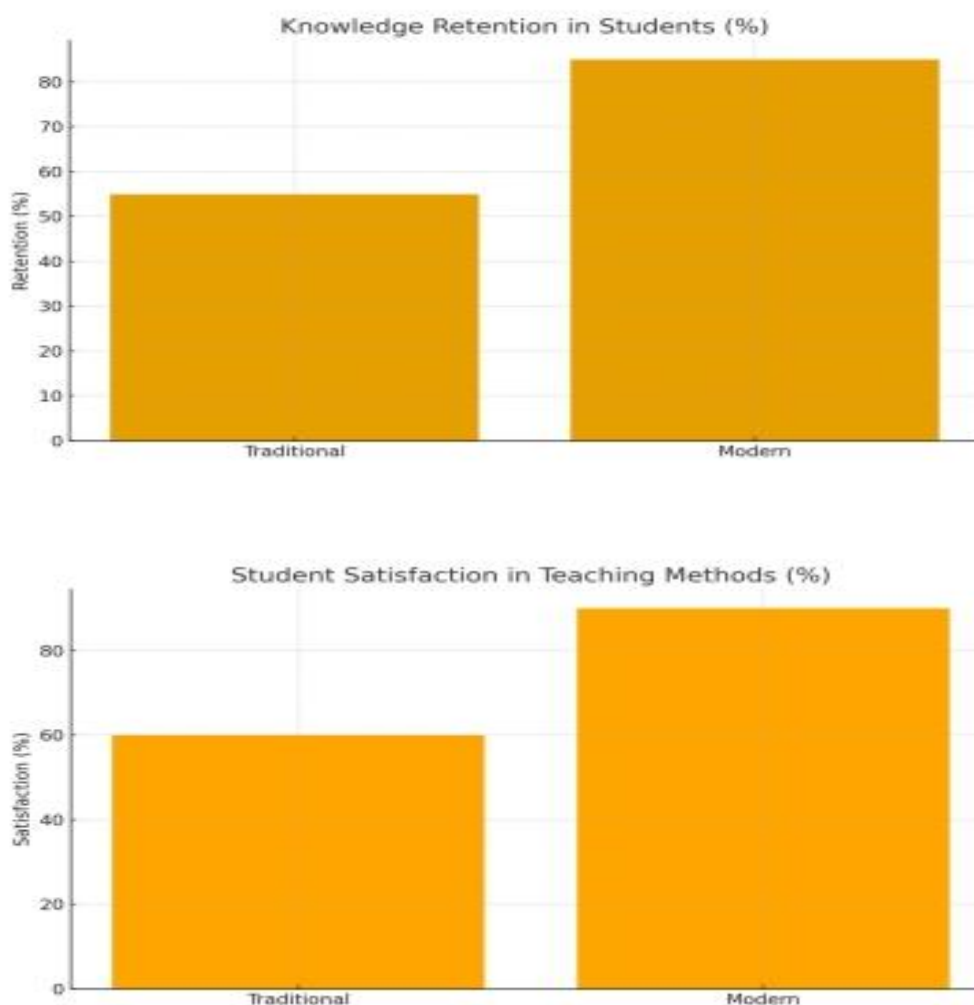
The comparative results demonstrate that students taught with modern methods retain approximately 85% of core concepts, compared to only 55% retention in traditional methods. Similarly, student satisfaction was significantly higher, reaching 90% under modern teaching practices versus 60% in traditional ones. These results confirm that interactive and technology-enhanced approaches not only improve cognitive learning outcomes but also enhance student motivation and engagement.

Conclusion The teaching of solutions in medical chemistry should incorporate modern pedagogical strategies to address the demands of contemporary medical education. By combining interactive, problem-based, and technology-enhanced approaches, educators can

ensure higher retention, satisfaction, and practical skills among students. These methods effectively bridge the gap between theory and clinical application, preparing future healthcare professionals more efficiently.

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