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## Introduction of Clinical, Simulation-Based Software for Medical Sciences Teachings

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### Abstract

*Introduction* - Simulation is the gold standard for training in aviation and trauma medicine. Now it is available for diseases diagnosis and treatment. With simulation, clinicians can practice their art in a realistic, consequence free environment, combining both theory and practice in a comprehensive program. *Method and materials* - In the virtual clinical environment of “VPsoft mentor” software, the practitioner reviews a patient’s history, orders laboratory tests and procedures, interprets findings, renders diagnoses, and prescribes medication. Every diagnostic or treatment decision the clinician makes for the patient is analyzed by E-mentor, providing instant feedback. *Results* - This software have been used in our academic centre in Arak, as part of residency evidence based learning in a schedule of the small group teaching which, by comparing two groups of case and control, we detected meaningful differences in the *Objective Structured Clinical Examination (OSCE)* evaluation scores between them. *Discussion / Conclusion* – Expert systems-based virtual patient simulation shows promise as a mechanism for assessing practitioner skill, detecting skill gaps and for electronic mentoring. Using CD- based clinical simulations it is possible to augment clinical sciences training globally at low cost with high clinician acceptance, in order to track improvement over time.

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*Keywords:* E-mentor; Simulation; Virtual Patient; VPsoft mentor

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### 1-Introduction

Novel artificial intelligence-based software systems are becoming available to improve the quality of patient care by measuring clinician behavior and targeting interventions to improve performance and reduce medical errors.

We designed an interactive computer-based simulation and data analysis program in which practitioners can manage virtual patient with vast arrays of medical conditions. The aim of this approach is better education by implementing self-directed learning opportunities using clinical case simulations installed on computers in university sites, libraries or at home. This software has been designed in two languages of persian and english.

## 2-Method and materials

Using an interactive virtual medical records interface, clinicians receive electronic mentoring and testing (dual mode) by reviewing histories, ordering tests, making diagnoses among hundreds of choices, and choosing treatments from more than hundreds medications and other therapies [Fig1,2,3]. The simulations can allow or hide in-session diagnostic and therapeutic information, which is produced by an expert system-based artificial intelligence engine (A.I.). The A.I. provides guidelines and evidence-based feedback on the appropriateness of choices. Finally, the simulation shows an explanation of reasonable choices for the case, a mini-review of the general topic, and the user's errors, warnings and deviations from guideline, evidence and expert consensus-driven recommendations. All choices are recorded for analysis.

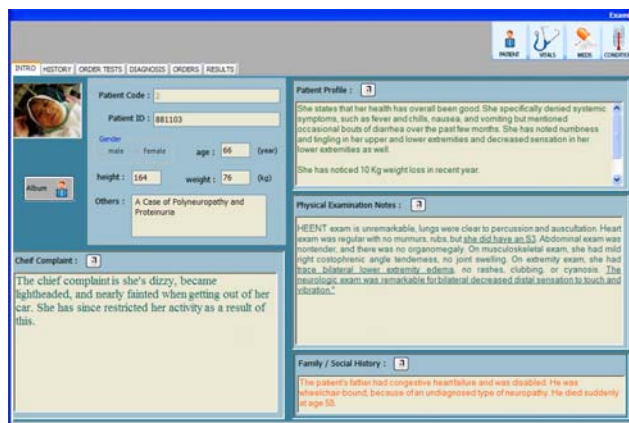


Fig. 1. Reviewing History

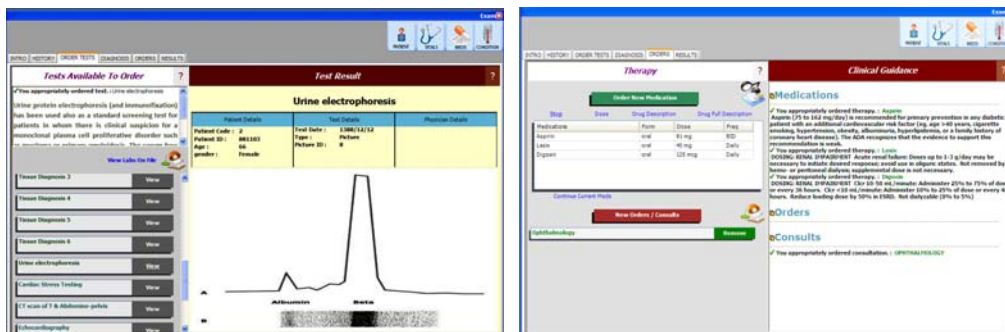


Fig. 2. (a) Ordering Tests; (b) Making Diagnoses and Choosing Treatments

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