

**TECHNOLOGIES FOR DEVELOPING COGNITIVE THINKING OF STUDENTS
IN MEDICAL EDUCATION BASED ON THE SNAPPS MODEL (IN THE
EXAMPLE OF TEACHING INTERNAL MEDICINE)**

Supichakov Khondamir Khamidovich

Andijan State Medical Institute

Abstract: Residential postgraduate teaching suffers from problems such as long and unstructured presentations containing much historical information and time constraints due to increasing workload. The learner-centered SNAPPS six-step mnemonic model modifies the teaching process by reducing factual presentation while encouraging clinical reasoning. This study was designed to evaluate the effectiveness of SNAPPS compared to traditional case presentation in facilitating clinical reasoning in a residential setting.

Keywords: SNAPPS, method, clinics, presentation, treatment.

INTRODUCTION

Medical educators face a number of challenges in developing clinical acumen in medical residents. Facilitating the development of clinical acumen in residents is a complex process, with challenges including complex patients, documentation demands, increasing workload, time constraints, and productivity goals competing with teaching time. Two clinical acumen development frameworks, the one-minute briefing (OMP) and SNAPPS (Summarize history and findings; NDifferentials with arrows; AAnalyze differentials; PInstruct about uncertainties; PMaintain local network; SSelect case-related questions for self-study), have been well studied in the community setting. These models may provide hospitalist educators with the opportunity to better assess trainees, integrate regular feedback, and encourage self-directed learning. These teaching systems may also allow faculty to provide more targeted teaching to trainees without taking up additional valuable time [1, 2].

MATERIALS AND METHODS

This open, randomized, controlled trial was conducted among 18 residents of the Faculty of Medicine at MGIMS. SNAPPS faculty and residents were introduced to the SNAPPS technique using videos, role-plays, and handouts over 2 sessions of 30 minutes each. Twenty-seven case presentations (3 per resident) were given in each group (54 case presentations in total). Data were recorded on a validated data sheet after each presentation, and feedback was obtained from the faculty as well as the residents regarding their perceptions.

RESULTS AND DISCUSSION

The SNAPPS model foreshadows a change in preceptor training by combining error development and learner development as co-factors in education. Guided by the SNAPPS methodology, students summarized patient data concisely (7 vs. 2.7 vs. 5.22 vs. 2.33, $p = 0.0057$), maintaining the same degree of thoroughness as in traditional case presentations. Students in the SNAPPS group were more articulate about their diagnostic hypothesis and

compared their multiple diagnoses well (2.56 vs. 1.74, $p = 0.002$). Students in the SNAPPS group initiated patient management discussions nearly 20% more often compared to the control group.

The SNAPPS model [3] foreshadows a change in preceptor training by combining error development and learner development as an adjunct to education. The learner-centered, six-step mnemonic SNAPPS model modifies the learning process by reducing factual exposition while encouraging clinical reasoning. It was developed based on cognitive learning (Bordage) and reflective practice theory (Osterman and Kottkamp) [3].

Developing clinical reasoning in a resident is a very complex process. The literature explains strategies to help develop this clinical reasoning and also explains the clinical reasoning process of a novice compared to an experienced resident. All clinicians know that the clinical reasoning of an experienced person is a well-balanced approach between pattern recognition and hypothetico-deductive approach, while a novice uses a hypothetico-deductive approach. Both approaches have their own importance but hypothetico-deductive approach is more important especially in cases of undifferentiated disease. SNAPPS is a case presentation technique that provides a process of hypothetico-deductive approach as well as self-directed learning. The ability to develop a differential diagnosis, justify the features of the differential; it is a process of further expanding clinical thinking. SNAPPS provides clear guidance to the postgraduate students and sharpens their clinical thinking skills and hence after a thorough literature review, this method was considered for our study.

The steps of SNAPPS technique are based on the cognitive assessment scale developed by Connell [4]. SNAPPS is widely used for teaching in the outpatient or office setting. A small study conducted in pediatric outpatient setting demonstrated the effectiveness of SNAPPS as a case presentation technique that improves clinical thinking. Residents in the study found the SNAPPS model to be more structured, stimulating, and relevant for teaching in the outpatient department (OPD), easy to follow, and motivating for self-study [5]. Only a small, cursory study has been conducted using SNAPPS for inpatient teaching, which provides an excellent teaching opportunity [2]. However, a long, unstructured presentation to fellows that includes a lot of historical information is quite time-consuming. The increased presentation time also results in the faculty member passively offering a diagnosis due to time constraints and increased patient load. In addition, the increased time involves both faculty and fellow patient care. Furthermore, it does not demonstrate the analytical skills and deductive logic of a fellow student needed to arrive at a diagnosis after including or excluding many differential diagnoses. Thus, the teaching opportunity in the inpatient setting is lost or is very haphazard. A review and critical analysis of different teaching models to optimize learner-centered methodology in busy clinical settings concluded that, compared to OMP, the use of SNAPPS allows learners to be more active in their learning, including questioning preceptors and identifying topics for asynchronous learning [2]. Furthermore, learners can determine the content of the learning they receive based on the uncertainties they raise with preceptors during case presentations [3]. Therefore, this study was designed to evaluate the effectiveness of SNAPPS compared to traditional case presentation in facilitating clinical reasoning in the hospital setting. We also wanted to understand the perceptions of graduate students and faculty of this new case presentation method.

CONCLUSION

We conclude that SNAPPS, a student-centered method of case presentation, facilitated the expression of clinical diagnostic reasoning and case-based uncertainty in the hospital setting without increasing the unusual length of student case presentations. It also paved the way for enhanced self-directed learning.

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