RESEARCH PAPER

Use of SNAPPS Model for Pediatric Outpatient Education

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Objective: To assess and compare the educational effectiveness of SNAPPS model with traditional method in developing reasoning skills of Pediatric residents in Out-patient department.

Methods: 40 case presentations with 4 residents (20 each with traditional and SNAPPS methods) were audiotaped and compared with respect to making differentials, reasoning for analyzing differentials, raising uncertainties by probing preceptor, and selecting case-related issues for self study. Residents feedback was collected using a self-designed proforma.

Results: Residents made more differentials (median 3.0 *vs* 1.5; *P*<0.001), exhibited more clinical reasoning for analyzing differentials (*P*<0.001), raised uncertainties more often by probing preceptors (15/20 *vs* 1/20; *P*<0.001) and selected case related issues for self-study (12/20 *vs* 0/20; *P*<0.001) with SNAPPS compared to traditional case presentations. Residents found SNAPPS relevant to ambulatory teaching.

Conclusion: SNAPPS promotes clinical reasoning and self-directed learning.

Keywords: *Clinical decision-making, Educational model, Graduate medical education.*

Teaching medical students and residents in ambulatory settings/Out-patient Department (OPD) is an integral part of medical education. However, it has been found to be unsatisfactory and characterized by variability, unpredictability, immediacy, and lack of continuity [1,2]. Passive role of learners, and exchange of factual information without much clinical reasoning have also been identified [3,4]. SNAPPS (Summarize history and findings; Narrow differentials; Analyze differentials; Probe preceptor about uncertainties; Plan management; Select case-related issues for self-study), a learner-centered model, modifies the learning encounter by condensing the reporting of facts while encouraging clinical reasoning [5].

The purpose of the present study was to assess the educational effectiveness of SNAPPS model in comparison to traditional method for training pediatric residents in the OPD-setting at a teaching hospital.

Methods

We conducted this comparative study after Institutional Ethics Committee's approval and recruited all second - and third-year pediatric residents (annual intake, 2 postgraduates), after informed written consent. Informed consent was also taken from parents of patients involved in the study.

We audiotaped 20 case presentations by residents in the Pediatric OPD of our institute, using traditional method with faculty being unaware of SNAPPS model. Subsequently, we conducted a mini-workshop to sensitize faculty and residents to the SNAPPS model with video demonstration, role-play, and discussion to clarify queries. We subsequently audiotaped 20 case presentations using SNAPPS by the same residents. All residents made equal presentations, and with apparently similar difficulty level of patients in both sessions (difficulty levels decided as per expert faculty consensus).

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We allotted identification numbers to all presentations and sequenced them randomly. Two investigators analyzed and coded the recordings independently using a predesigned checklist. Subsequently, they tallied the coding and in case of any discrepancy they listened it together to reach to a consensus.

We took residents' feedback using a structured proforma with closed ended questions answered on a 5-point Likert scale, and open-ended questions.

Number of encounters (20 with each method) were taken as units for analysis. We calculated median and inter-quartile range (IQR). We applied Mann Whitney U Test to

compare medians and z test for two sample proportion, with P=0.05 as the level of significance. We used SPSS 19.0 for analysis.

RESULTS

Four residents (2nd and 3rd year) and three faculty members participated in case discussions. Each resident had five encounters in both the groups. Data were analyzed on six outcome categories, further subdivided into 11 variables (***Table* I**). Though total case discussion time was more in SNAPPS as compared to traditional method, time taken for case summarization was almost equal in both; extra time was spent in active discussion with SNAPPS. Evaluations regarding completeness of history and completeness of relevant physical examination revealed better results with SNAPPS method (P=0.008 and 0.025, respectively).

Residents initiated making differentials in all (20/20) SNAPPS presentations compared to only two (2/20) in traditional method. Of the remaining 18 traditional case presentations, preceptor elicited the differentials in 17 and no diagnosis was made in one case. In addition, the preceptors also raised more uncertainties in traditional than SNAPPS presentations (11 *vs* 8), supporting preceptor's dominance in traditional case presentations. Topics for self-study were selected only with SNAPPS model, though only in 60% cases.

Residents perceived that SNAPPS model was more structured, stimulating, relevant to teaching in the OPD, and easy to follow. They felt confident in making differentials with clinical reasoning, and motivated for self-directed learning. They read most, though not all, selected topics for self-study. One resident found the encounters to be stressful initially.

DISCUSSION

In this comparative study of SNAPPS model and traditional teaching of four residents in the OPD setting, we observed that SNAPPS model motivated pediatric residents to think actively, reason out more differentials, raise their uncertainties, and select case-related issues for self-study. Our study found case presentations to be more complete with SNAPPS.

Limitations of present study include small number of residents and few training sessions. We did not check how much learning occurred on topics selected for self-study, which can be an area of future research.

The results in present study are in accordance with the original study by Wolpaw, *et al*. [6]. In their follow-up study, they demonstrated that students in SNAPPS group raised more uncertainties about diagnostic reasoning and received more preceptors' feedback [7]. Our residents agreed that the corrective feedback from faculty improved their reasoning skills; similar result has been reported

TABLE I COMPARISON OF CASE PRESENTATIONS WITH TRADITIONAL AND SNAPPS METHODS

Outcomes	*Traditional method (n = 20)*	*SNAPPS method (n = 20)*	*P value*
Summarize the case			
*Total case-discussion time (min)	3.44 (3.14-4.61)	5.17 (4.31-5.69)	0.002
*Case-presentation time (min)	1.21 (1.06-2.05)	1.34 (1.24-1.64)	0.542
Completeness of history	9 (45)	17 (85)	0.008
Completeness of physical examination	8 (40)	15 (75)	0.025
Narrow down the differentials			
*Diagnosis made by learner for each case	1.5 (1.0-2.0)	3.0 (3.0-4.0)	<0.001
Analyze the differentials			
*Justifications made for first diagnosis	0 (0.0-1.0)	2.5 (1.0-4.0)	<0.001
*Justifications made for differentials	0 (0.0-1.0)	4.0 (2.75-5.25)	<0.001
Probe the preceptor			
Learner raised the uncertainties	1 (5)	15 (75)	<0.001
Plan the management			
Learner initiated plan for investigation	0 (0)	13 (65)	<0.001
Learner initiated plan for treatment	2 (10)	18 (90)	<0.001
Selection of issues for self-study			
Learner selected issues for self-study	0 (0)	12 (60)	<0.001

**Values in median (IQR), rest in No. (%).*

WHAT THIS STUDY ADDS?

- SNAPPS is an efficient teaching/learning tool that promotes clinical reasoning and self-directed learning amongst pediatric postgraduates in OPD setting.

previously [8]. Stress among residents during SNAPPS presentations was also reported in a previous study [9]. SNAPPS has also been adapted for indoor-teaching as a whole or in components [10], and in different cultural settings [9]. SNAPPS, ensures explicit analysis of the differentials, and adds two more steps to traditional teaching – probing the preceptor for uncertainties and selecting case related topics for self-study. These experiences provide experiential learning to be applied in future [11]. When preceptors seek their students' thought process, learners increase their own expression of clinical thinking and reasoning [4].

To conclude, the present study suggests that SNAPPS model is an efficient teaching-learning tool to promote clinical reasoning. It can be used effectively in a busy OPD where preceptor gets multiple, short-duration teaching-opportunities between patient care. It allows a paradigm shift of teacher-centered precepting to learner-centered learning.

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