COMPARISON OF EFFECTIVENESS OF SNAPPS, ONE-MINUTE PRECEPTOR AND TRADITIONAL CLINICAL TEACHING IN DEVELOPING CLINICAL REASONING SKILLS IN UNDERGRADUATE MEDICAL STUDENTS

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Abstract

Introduction: Clinical reasoning is becoming a primary educational goal to be achieved by medical students so; more attention needs to be given for innovation of teaching methods for attaining clinical reasoning skills. For learning clinical reasoning skill, there are several teaching methodologies e.g. SNAPPS, One-minute Preceptor (OMP), illness script writing etc., that can be used in any busy clinical settings. However, there is lot of discrepancy in literature regarding the effectiveness of one particular method.

Research Question: Which clinical teaching method among SNAPPS, OMP and traditional method is effective for improving clinical reasoning skill in undergraduate medical student?

Methods: A randomized control trial, including 60 students of final year MBBS, was conducted at Pediatrics Department of Peshawar Medical College. Students were randomly distributed in three groups i.e. SNAPPS, OMP and traditional teaching with 20 students in each group. All 60 students were exposed to pretest including 4 Key Feature Problems (KFPs). Students were then taught on pre-identified 4 topics with one topic / week by respective teaching methodology. Each topic was followed by posttest using 4 KFPs.

Results: The total number of female students was 60. The mean marks in pretest were 12.57 ± 0.15. The variability among and between groups for pretest was statistically insignificant with *p*-value of 0.984. Mean marks of posttest for traditional method, OMP and SNAPPS were 16, 2[illegible]and 27 respectively. The variability among and betw[illegible]n groups for posttest was statistically significant with *p* value of .000. There was statistically significant difference with *p* value of .000 when we compared SNAPPS with traditional method.

Conclusion: SNAPPS is found significantly more effective in improving clinical reasoning than OMP and traditional teaching method.

Key words: Clinical reasoning, SNAPPS, one-minute preceptor, key feature Problems.

Introduction

With advances in science and technology in the past century, some attributes of becoming a doctor have changed. The traditional curriculum, where there was clear demarcation between two years of basic sciences and three years of clinical sciences, was not found in developed countries and this trend is also emerging in developing countries. Even Pakistan Medical and Dental Council PMDC recognized and favored the need of integration of basic with clinical sciences in their curriculum document 2010-2011. Pakistan Medical and dental council (PMDC) also considered "problem solver" as one of the essential component of "SEVEN STARS" doctor for undergraduate medical student in their compulsory integrated curriculum since 2011. Solving a problem or making correct diagnosis is called as clinical reasoning. Clinical reasoning involve integration and applying different types of knowledge, collecting relevant data, critical thinking over an argument and reflection on process of making diagnosis(1).

The time constraint is a major issue for clinical teachers in clinical setting as they are involved in multiple activities including patient care, solving administrative issue, research and teaching(2). So, there is always a need to develop time-efficient teaching methods in the clinical setting that can improve students' clinical reasoning skill while also allowing the clinician to remain fully engaged in the priorities of patient care(3) .

For learning clinical reasoning skill, there are several teaching methodologies e.g. SNAPPS(summarize, narrow, analyze, probing, management plan, select a topic) (4), One-minute Preceptor (OMP)(5), illness script writing, Aunt Minnie Model, thinking aloud exercises(1), highlighter exercises(6–8), reverse presentation, concept mapping(9)etc. that can be used in busy clinical settings in Out Patient Department

(OPD), inpatient setting and emergency. SNAPPS is an acronym used for learner - centered six steps model of case presentation while OMP is five steps technique including "Get a Commitment, Probe for Supporting Evidence, Reinforce What Was Done Well, Give Guidance About Errors and Omissions and Teach a General Principle".

There is lot of discrepancy in literature regarding the effectiveness of one single method. Lap Ki used OMP in anatomy laboratory and found it an active learner-centered teaching approach which was also endorsed by Lockspeiser when he applied OMP in pediatrics and gynecology(10) while Wolpaw considered SNAPPS as more learner-centered in ambulatory care(4).

Eva Aagaard considered OMP as more effective in developing clinical reasoning skill of 92% students versus 76% in traditional method(11) However, Wolpaw found SNAPPS as more effective than feedback and traditional method in expressing clinical reasoning skill(12) . Although Pascoe reported equal effectiveness of both the modalities in inpatient setting and in developing clinical reasoning skill of students but they also suggested additional studies(13).

The rationale of our research is based on the research question that which clinical teaching method among SNAPPS, OMP and traditional method is effective for improving clinical reasoning skill in undergraduate medical student as there is disparity in the existing literature regarding the effectiveness of SNAPPS and One-Minute Preceptor in developing clinical reasoning skill.

The objective of this study was to compare the effectiveness of SNAPPS, One-minute preceptor and traditional clinical teaching in developing clinical reasoning skills of final year undergraduate MBBS students in pediatrics clinical setting.

Method

This was a randomized control trial (Pretest-Posttest Control Group design) conducted in Pediatrics unit of Peshawar Medical College, Peshawar, Pakistan. A total of 60 female final year medical students were included in this study by stratified random sampling. The strata's developed as two groups, group I included those students who got 50-75% marks in last professional examination (i.e. Third Prof) while group II comprised students who got >75% marks. We excluded those Students who had not attended the pediatrics clinical rotation in 4^{th} year. The study was completed in six months ranging from February to July 2016. The purpose of this study was explained to the students and informed consent was taken in writing. After taking consent from the students, the total of 60 female students were allocated to three groups with 20 students in each group by randomization with stratification. Group A was taught by traditional clinical teaching. Group B's teaching modality was OMP. Group C was taught by SNAPPS. All the students were first subjected to pretest including four key Feature problems (KFPs). The KFPs were same for all three groups. On the first day of ward rotation, Students of SNAPP and OMP group were briefed according to their respective methodology and their questions about the method were answered. All three groups were taught by the same teacher with respective methodology; one topic per week. The pre-identified topics were 1) pallor in children 2) hematuria in children 3) pyrexia of unknown origin in children 4) diarrhea in children. At the end of teaching the identified topics, students of each group were exposed to post-test

comprising of four different KFPs on same pre-identified topics, one KFPs/theme. The posttest was different from pretest but with same difficulty level. Each key feature problem in pretest and posttest was assigned 10 marks with the total of 40 marks.

After the posttest, it was ensured that all the three groups were taught by three methods (SNAAPS, OMP, and Traditional) in special classes.

Traditional teaching methodology, we defined as "already in practice, at Pediatric wards of Peshawar Medical College, where teacher explains patient's condition to students, students and teacher examine the patient and then the teacher informs about diagnosis and management plan".

We used Levett-Johns definition of clinical reasoning as it was the recent one and more applicable in our situation. According to her, "clinical reasoning is When student is able to take relevant history, conduct physical examination, order required investigation, design effective management plan and counsel patient effectively" (7,14–16)(17).

The operational definition of effectiveness was "Increase in score in posttest as compared to pretest."

Choosing KFPs for assessing clinical reasoning in this study has multiple reasons. The leading cause is that KFPs are considered authentic, problem-based and with more interdisciplinary approach(18,19). In any real case, there is an essential element that is extremely important in decision making and KFPs is best for assessing this essential critical step in any clinical decision(20). The KFPs have longitudinal nature

that enables the student to perform, like dealing with patient in real life. So, these are the few reasons that we chose KFPs which is considered a more valid written examination method of clinical decision-making skill(18)

We followed a structured seven-steps process for KFPs proposed by AMEE Guide 87 (21) . Six KFPs on each topic with the total of 24 KFPs were formed. For content validation, 24 KFPs were then sent to 10 experts including eight pediatricians and two medical educationists. Content validity ratio was calculated for each KFP through the formula derived by Lawshe, (22) Formula of content validity ratio.

We selected only those KFPs whose content validity ratio is 0.8 or more. Same eight pediatricians using 4- point Likert scale did face validity of these KFPs.

For assessing the reliability of questionnaire (KFPs), the questionnaire was tested on previous final year. 25 students of previous final year MBBS students who were on preparation leave for pre-professional (Mock) exam were randomly selected by lottery method. After finishing their Pediatric paper on the specified day, they were also called upon for the pilot study. As the exam was in college and current final year was supposed to be in clinical wards so there was no direct mixing of previous and current final year. In addition, till that time, current final year had no idea about enrollment in this study.

21 KFPs were tested for measuring the difficulty index. After item analysis, 16 out of 21 were selected. These KFPs were then distributed for pretest and posttests (SNAPPS. OMP, traditional teaching). Two KFPS were selected from medium difficulty and one each was selected from high and low difficulty index for each group.

The data was entered and analyzed by SPSS 20. One Way Analysis of Variance (ANOVA) was used as a unit of analysis. ANOVA was used to analyze the differences among group means and their associated procedures like "variation" among and between groups (OMP, SNAPPS, traditional). Comparisons of means square and standard deviation among groups for pretest and posttest were also analyzed.

Results

All 60 female students of final year completed the study and none dropped out. The mean marks of pretest of three groups were 12.50 ± 0.15 with minimum number of 4±1 marks and maximum of 23± 1. The mean marks of students in posttest with minimum and maximum marks obtained were shown in Table 1.

Table 1: Mean Marks Obtained By Students In Posttest

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Traditional	20	16.60	6.261	1.400	13.67	19.53	7	26
OMP	20	20.05	7.294	1.631	16.64	23.46	8	33
SNAPPS	20	26.95	6.287	1.406	24.01	29.89	17	36
Total	60	21.20	7.830	1.011	19.18	23.22	7	36

The least variability of mean square between and among group for pretest is shown in Table 2

Table 2: Mean Square Between And Within Groups For Pretest.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1.233	2	.617	.016	.984
Within Groups	2169.500	57	38.061		
Total	2170.733	59			

The mean square between and within groups for posttest is shown in table 3.

Table 3: Mean square between and among groups of posttest

	Sum of Squares	df	Mean Square	Sig.
Between Groups	1110.900	2	555.450	.000
Within Groups	2506.700	57	43.977	
Total	3617.600	59		

There was statistically significant difference (p value= .000) of mean square between and within groups of posttest.

There was statistically significant difference (p value=0.000) when traditional teaching methodology was compared with SNAPPS. The difference was also statistically significant (p value=0.005) when OMP was compared with SNAPPS methodology (table 4).

Table 4: multiple comparison of posttest

(I) Group	(J) group	Sig.	95% Confidence Interval	
			Lower Bound	Upper Bound
Traditional	OMP	.235	-8.50	1.60
	SNAPPS	.000	-15.40	-5.30
OMP	Traditional	.235	-1.60	8.50
	SNAPPS	.005	-11.95	-1.85

SNAPPS	Traditional	.000	5.30	15.40
	OMP	.005	1.85	11.95

Discussion

Clinical reasoning is considered to be the core skill required for patient care but it was not taught explicitly in the past(23). The best method of teaching and assessing clinical reasoning is not yet unraveled and clarified (24).

The present study revealed that students in SNAPPS group scored higher when compared with OMP and traditional teaching group with marks of 26.97 as compared to 20.05 and 16.60 respectively. Scott Heinerichs also reported that students showed marked improved in their posttest score with SNAPPS from baseline with *p* value<0.001 when compared with traditional group (25) .

Wolpow et al in his randomized control trial-posttest only also found that students in SNAPPS training justified their differential diagnosis more than feedback training and traditional training groups i.e.(1.26 versus 0.22 and 0.23, *P*< .000). In another study by Wolpow concluded that students using SNAPPS technique justify patients' management plan more often than the comparison groups (84.84% versus 56.72% and 53.66%) with *p* value .003(12). The multiple comparisons of posttest in our study also showed statistically significant difference when we compare SNAPPS with OMP and traditional teaching with *p* value of 0.000, 0.005 and 0.235 respectively.

Kittisak Sawanyawisuth et al observed improvement in case presentation of fifth year medical students with *p value* = 0.003 when compared SNAPPS users with traditional teaching method users.

Masayasu Seki et al found that residents in SNAPPS group used significantly more meaning units related to questions and uncertainties compared with those of OMP group i.e. p value < 0.001.

One study by Eva Aagaard (11) found no significant difference in the 'ability of students to correctly diagnose a problem' with p value of 0.24 when she compared OMP with traditional teaching and we also found similar results in the present study i.e. p =0.235 when we did multiple comparisons of OMP with traditional teaching.

All these international studies are in accordance with our study.

To the best of my knowledge, the present study is first of its kind conducted in Pakistan that compared SNAPPS, OMP and traditional teaching methodologies. It is recommended that more research needs to be conducted in local setup before disseminating educational theories. My second recommendation is that present study took place in pediatrics inpatient settings. We cannot generalize it to other specialties or settings. So, the areas like other disciplines and settings need to be explored in near future by doing further research. Further research is desired to estimate the content coverage in comparison to traditional inpatient settings and how do they impact the efficiency of teaching rounds.

Limitation of study

The limitation of our study is that we conducted this study only with female medical students and we found that students learned by SNAPPS technique performed best in post-test when we compared it with OMP and traditional teaching. Although, it can be considered as a positive point in our study as the present study hold the gender

variable constant but the main reason for not including male students along with female students in each group is the policy of our medical college. The male and female are assigned to separate clinical batches by our medial education department. From present study, we cannot predict that male students will also perform better with SNAPPS technique. So the present study cannot be generalized to male students too.

Conclusion

Clinical reasoning is a complex cognitive process to collect and analyze patient's information for proper action. As it is a primary educational goal to be achieved by every medical student, more attention should be given for innovative teaching methodology to attain that skill. This randomized control study is conducted to determine the effectiveness of SNAPPS, One-Minute Preceptor and traditional teaching method in improving clinical reasoning skill of medical students. Study results show that SNAPPS is found significantly more effective in improving clinical reasoning than OMP and traditional teaching method.

Acknowledgment

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Conflict of interest: none declared

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