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Perception of medical students towards teaching basic clinical skills in otorhinolaryngology through peer physical examination (PPE)

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Abstract:

BACKGROUND: Medical education is now largely learner centered with self-directed learning. The best method for teaching physical examination skills is difficult to determine. The process by which students examine each other as part of their learning process in anatomy and clinical skills is known as peer physical examination (PPE). The aim of this study was to demonstrate the perceptions of students toward PPE in ear, nose, throat, head, and neck.

MATERIALS AND METHODS: This cross-sectional study was conducted in 2018 among 100 medical students after obtaining ethical approval. In the PPE programme, students participated in a small group of 2–3 students. A self-administered questionnaire was also filled out by students before and after the program, which gathered demographic details and responses to the modified Peer Physical Examination Questionnaire (PPEQ). Significant associations ($P < 0.05$) were examined using ANOVA analysis.

RESULTS: In the present study, 81.5% of students have previously conducted examinations on fellow students. Prior to the program, the willingness to be examined (for throat) by a peer was 71.7%, which rose to 95.7% after the program. Most students replied that “I am concerned about being a possible object of sexual interest during PPE.” A univariate analysis showed that age, gender, and residence of students were significantly associated with PPEQ scores ($P < 0.05$).

CONCLUSION: In the present study, it was observed that there was a change in the willingness for PPE before and after the programme and also that there was a change in the perception towards PPE following the program.

Keywords:

Attitude, group, medical education, peer, posttest, undergraduate

Introduction

Medical education is now largely learner centered with self-directed learning. The best method for teaching physical examination skills is difficult to determine. It is probably a combination of more than one modality.^[1] Various digital learning platforms use text, graphics, animations, audio, and video to support and enhance learning. They can be accessed online by many different users and may be

used in self-directed learning. Also, there are educational aids in modern medical education comprising 3D animations in virtual environments of multimedia, which give a near-reality feel.^[2]

However, essential tactile sensory and stereo gnostic memory are not developed. But it is the touch and feel that gives the much-needed memory to be retained and extrapolated to future clinical experiences. For early training of clinical skills, the use of students as examination models, is now

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accepted in many medical schools.^[3] However, as this involves ethical, practical, and personal issues, consent for participation is mandatory.

The process by which students examine each other as part of their learning process in anatomy and clinical skills is known as peer physical examination (PPE).^[4] Examination of fellow students (EFS) is another term for this valuable tool in the teaching armamentarium in the undergraduate curriculum. PPE is cheaper than simulators and simulated patients. Sensitivity towards any student for whom PPE is not acceptable is also necessary.^[5] Also, examination of peers has been described as a hidden curriculum by Wearn *et al.*^[6]

The ear, nose, throat (ENT), head, and neck examination have a cognitive load due to its complexity. Also, it is important because numerous patients with disorders of the ENT and head and neck, present to primary care physicians.^[7] PPE has previously been used informally in our department with same-gender student partners. Apart from the repetitive practice of clinical skills, being examined as a patient provides the student with an experience that fosters empathy toward a patient. The present study was conducted with the aim of demonstrating the perceptions of students toward those who have conducted as well as undergone informal PPE activities (for the ENT, head, and neck) in same-gender students as a preparation for the real-patient examination. This will also impart clinical skills in ENT to medical students for real-life practice through the initial steps of PPE.

Materials and Methods

Study design and setting

The present study was cross-sectional in design and conducted at a Medical College of North India from May 2018 to September 2018. The college started in 2013 with getting its first batch of MBBS students, and since then there has been an average of 100 MBBS students each year, so currently there are 600 MBBS students including interns.

Study participants and sampling

MBBS undergraduate students (100 eligible students) admitted to Medical College (semesters 4 and 6) were invited via email to participate in the study (4-month duration). After understanding the study objectives, the participants provided their written consent and were asked to complete a survey before and after completing the clinical rotation (May 2018 to September 2018). Taking up the role of the “examination model” for practicing examination skills was voluntary, and possible attempts were made to keep the information pertaining to participants anonymous and confidential.

Data collection tool and technique

The study questionnaire was self-administered by students, which gathered demographic details such as age, gender, religion, residence, and previous awareness of such courses involving physical examination; and responses to the modified EFS Questionnaire (EFSQ), the modified PPE Questionnaire (PPEQ), and the feedback questionnaire. Both the EFS questionnaire and the PPE questionnaire captured pre and post intervention details, whereas demographic details were captured during preintervention only and the feedback questionnaire was captured during the postintervention session only. The language of the questionnaire was English, and all the questions were objective and multiple-choice types.

The modified EFSQ included items with a response such as willingness or unwillingness to examine a peer or to be examined by a peer for head and neck.^[8]

The modified PPEQ focused on the acceptability of the practice of PPE (9 items) and the students’ opinion of the educational value of PPE (5 items). The scores on the items were assigned equivalent points on the five-point Likert scale (0 = completely disagree, 1 = disagree, 2 = neutral, 3 = agree, 4 = completely agree), except for items 3 to 7 and 10, which were assigned points in a reverse way. The maximum possible score was 56 points. In the modified PPEQ, the items of the opposite gender examination were not included.^[9]

The students’ feedback questionnaire included seven items such as: overall this teaching practice of physical examination was a good learning activity; I feel confident in my ability to perform this physical examination; adequate time was allowed for me to practice this examination; my skill in performing the physical examination has improved as a result of this activity; this kind of learning activity should be conducted while teaching other clinical examination skills (e.g., eye examination, respiratory system, cardiovascular system); will you practice your examination skills on fellow students in the future; and will you permit fellow students to practice their physical examination skills on you in the future. The scores on the items were assigned equivalent points on a five-point Likert scale (0 = strongly disagree, 1 = disagree, 2 = not sure, 3 = agree, 4 = strongly agree).^[10]

The activity of study was divided into three parts.

Pretest: During the first part of the activity, the participants took part in a group of 8 counts per session, and a pretest questionnaire for participants was self-administered by students. The questionnaire required 20–25 min per participant to be completed. Also, the filled questionnaires were then checked for completeness.

Intervention

After the pretest session, students were guided to break into smaller groups of two or three for PPE. Students taking up the “examination model” role were treated with sensitivity and dignity, and they were given the opportunity to take the examining role as well. Specifically, students were not expected to undress for the examination. A high acceptability among medical students was expected as clinical examination of the ENT, head, and neck does not involve removal of clothes, and thus there was no invasion of privacy. Also, only same-gender pairs of students were permitted to examine each other. Finally, it was ensured that students with abnormal clinical findings were dealt with appropriately. During the learning phase, students were supervised by faculty and residents, and they were then advanced to refine their skills in clinical practice with patients.

Posttest: During third part of the activity, the intervention was evaluated by the investigator at an interval of 12 weeks posttraining session. A posttest questionnaire for participants was self-administered by students to evaluate the change in the baseline attitude and perception towards accepting PPE.

Statistical analysis

Collected data was entered into the MS Excel spreadsheet, coded appropriately and later cleaned for any possible errors. Analysis was carried out using IBM SPSS Statistics for Windows, Version 22.0 (IBM Corp., Armonk, NY, USA). During data cleaning, more variables were created so as to facilitate the association of variables. Clear values for various outcomes were determined before running frequency tests. Continuous data was represented as percentages (%), while categorical data was represented as mean and standard deviation. An ANOVA test was performed to examine the association between each dependent variable at pretest and posttest for PPEQ. All tests were performed at a 5% level of significance; thus, an association was significant if the *P* value was less than 0.05.

Ethical consideration

Ethical approval was obtained from the Institutional Ethical Committee (approval letter number: SMC/IEC/03, Dated: 18/04/2018).

Results

The present study enrolled 100 students, and 92 students (50 males and 42 females) continued to be part of the study till its completion, as 8 students were declared nonresponders and were removed from pretest and posttest analysis. Nearly two-thirds of students (66.3%) lived in rural areas, and more than four-fifths (84.8%)

believed in religion. Prior to participating in this program, more than four-fifths of students (81.5%) conducted examinations on fellow students or were examined by fellow students (84.8%) [Table 1].

Table 2. shows that prior to the program, willingness to examine a peer throat was as 84.8%, but eventually after the programme it rose to a hundred percent. Similarly, prior to the program, willingness to be examined by a peer for ear was 70.7%, which rose to 100.0% after the program.

Table 3. shows that there was an overall impressive improvement in the PPEQ mean score, as prior to the programme it was 42.35 ± 4.59 and after the programme it was 47.78 ± 4.21 and this difference was statistically significant. Most students replied that “I am concerned about being a possible object of sexual interest during PPE,” as prior to the programme the mean score was 2.35 ± 0.24 and after the programme it was 2.87 ± 0.98 .

Table 4. shows the students’ feedback towards the program; more than two thirds of students (66.7%) agreed with the fact that “I feel confident in my ability to perform this physical examination;” but only half of the students (52.9%) responded that “Adequate time was allowed for me to practise this examination.”

A univariate analysis performed to compare pretest and posttest variables for participant characteristics is shown in Table 5. which demonstrates that age, gender, and residence of students had significant associations with PPEQ scores ($P < 0.05$).

Table 1: Sociodemographic characteristics of study participants (n=92)

Variables	Number (%) or Mean±S.D.
Age (in years)	21.54±1.66
Gender	
Male	50 (54.3%)
Female	42 (45.7%)
Religious belief	
Yes	78 (84.8%)
No	14 (15.2%)
Residence	
Urban	31 (33.7%)
Rural	61 (66.3%)
Have you ever conducted physical examinations on fellow students before this program	
Yes	75 (81.5%)
No	17 (18.5%)
Have you ever been examined by fellow students before this program	
Yes	78 (84.8%)
No	14 (15.2%)

Discussion

The present study showed that students' willingness to get oral and throat examinations by peers was less frequent before and after the program, and such a difference in willingness to get examined was also observed in studies by Reid *et al.*, and Burggraf *et al.*^[11,12] The present study showed that acceptance to the programme was higher among male students compared to females, and it was in contrast to the study done by Vnuk *et al.*, where male students felt more uncomfortable with the PPE programme as compared to females, but Reid *et al.*, showed that there were no differences in perceptions of PPE for students by gender.^[11,13]

The present study observed that the PPEQ mean score prior to the programme was 42.35 ± 4.59 and after the programme it was 47.78 ± 4.21 and this difference was statistically significant. Such a difference was also reflected in the study done by Vaughan *et al.*^[14]

Table 2: Modified Examining Fellow Students Questionnaire (EFSQ) response among study participants

Variables	Number (%)	
	Willingness Pretest (n=92)	Willingness Posttest (n=92)
Examine a peer		
Nose	81 (88.0%)	92 (100.0%)
Ear	80 (87.0%)	92 (100.0%)
Throat	78 (84.8%)	92 (100.0%)
Oral	81 (88.0%)	92 (100.0%)
Be examined by a peer		
Nose	69 (75.0%)	92 (100.0%)
Ear	65 (70.7%)	92 (100.0%)
Throat	66 (71.7%)	88 (95.7%)
Oral	71 (77.2%)	88 (95.7%)

Table 3: Modified Examining Fellow Students Questionnaire (EFSQ) response among study participants

Variables	Mean±S.D.	
	Pretest (n=92)	Posttest (n=92)
1. In general, I (will) feel comfortable when performing PPE on a colleague of mine*	3.11±0.97	3.52±0.62
2. In general, I (will) feel comfortable when a colleague performs PPE on me**	3.13±0.11	3.41±0.54
3. I (will) feel embarrassed if I am undressed for PPE in front of my group of colleagues*	2.92±0.44	3.12±0.75
4. I (will) feel embarrassed if I am undressed for PPE in front of my teacher or tutor*	2.94±0.34	3.17±0.66
5. I am concerned of being a possible object of sexual interest during PPE**	2.35±0.24	2.87±0.98
6. I am concerned of experiencing possible sexual interest for my colleagues during PPE**	3.17±0.82	3.70±0.28
7. I am concerned of experiencing possible sexual interest for my teacher or tutor during PPE**	3.26±0.21	3.64±0.31
8. I (will) feel comfortable when performing PPE on a colleague of my same sex*	3.19±0.91	3.62±0.51
9. I (will) feel comfortable when PPE is performed on me by a colleague of my same sex*	3.04±0.97	3.41±0.53
10. It is inappropriate to perform PPE on persons that will be my future colleagues**	3.20±0.43	3.54±0.43
11. To perform PPE is an appropriate practice for the education of a medical doctor**	3.01±0.60	3.45±0.20
12. To undergo PPE is an appropriate practice for the education of a medical doctor	2.89±1.71	3.16±0.31
13. In performing PPE I (will) get useful feedback from my colleagues about my skill**	3.13±0.61	3.62±0.18
14. It is a sign of professionalism as a student to accept to perform and undergo PPE**	3.01±0.83	3.55±0.16
Overall score**	42.35±4.59	47.78±4.21

*Statistically significant at $P < 0.05$, **Statistically significant at $P < 0.0001$

The study by Consorti *et al.*,^[15] showed that the mean PPEQ score among medical students was 43.4 ± 8.9 . The study also made an attempt to find the barriers to the PPE and it was revealed that most of students agreed with the fact that "I am concerned about being a possible object of sexual interest during PPE," as prior to the programme the mean score was 2.35 ± 0.24 and after the programme it was 2.87 ± 0.98 . Similarly, most students expressed that "I (will) feel embarrassed if I am undressed for PPE in front of my group of colleagues/tutors" and barriers such as embarrassment and feeling of coercion among students were also mentioned by Hendry *et al.*^[16] Such barriers were captured on PPEQ as it subscales "comfort," "concern," and "professionalism and education" as identified in a Mokken scale analysis by Vaughan *et al.*^[17]

In the feedback for the programme obtained from the students, more than half of the students prompted that "Overall, this teaching practise of physical examination was a good learning activity" and "I feel confident in my ability to perform this physical examination." Similar feedback was noted by Hattingh *et al.*,^[18] where students responded positively to the PPE programme as it provides students with a safe environment to practice and enhance their skills. Apart from this, it also enhances theoretical knowledge of basic clinical principles, as shown in studies by Chen *et al.*, Yamauchi *et al.*, and Struk *et al.*^[19,21]

The Medical Council of India (MCI) has declared that the IMG (Indian Medical Graduate) must be able to function appropriately and effectively in various capacities such as "Clinician" who understands and provides preventive, promotive, curative, palliative and holistic care with compassion; "Leader and member of the health care team and system" with capabilities to collect, analyze,

Table 4: Postprogram feedback questionnaire responses among the study participants (n=92)

Variables	Number (%)				
	Strongly agree	Agree	Not sure	Disagree	Totally disagree
Overall, this teaching practice of physical examination was a good learning activity	26 (28.1%)	55 (59.4%)	5 (5.4%)	2 (2.1%)	4 (4.3%)
I feel confident in my ability to perform this physical examination	6 (6.5%)	62 (66.7%)	20 (21.6%)	3 (3.2%)	1 (1.1%)
Adequate time was allowed for me to practice this examination	16 (17.3%)	49 (52.9%)	21 (22.7%)	3 (3.2%)	3 (3.2%)
My skill in performing the physical examination has improved as a result of this activity	12 (12.9%)	51 (55.1%)	22 (23.8%)	3 (3.2%)	4 (4.3%)
This kind of learning activity should be conducted while teaching other clinical examination skills (e.g., eye examination, respiratory system, cardiovascular system)	38 (41.0%)	36 (28.9%)	9 (9.7%)	6 (6.5%)	3 (3.2%)

Table 5: Univariate analysis of pretest and posttest PPEQ score with sociodemographic characteristics of study participants (n=92)

Variables	Mean±S.D.		Test of significance*
	Pretest (n=92)	Posttest (n=92)	
Age (in years)			
<20 years (n=27)	42.16±4.16	49.22±3.98	F=7.102, df=1, P=0.009
>20 years (n=65)	42.46±4.72	47.18±4.18	
Gender			
Male (n=50)	42.39±4.88	48.29±4.33	F=4.818, df=1, P=0.031
Female (n=42)	42.33±4.12	47.13±4.01	
Religious belief			
Yes (n=78)	42.27±4.61	47.68±4.08	F=0.135, df=1, P=0.714
No (n=14)	42.85±4.63	48.38±5.04	
Residence			
Urban (n=31)	41.65±4.34	48.29±4.18	F=8.570, df=1, P=0.004
Rural (n=61)	42.73±4.61	47.52±4.23	
Have you ever conducted physical examinations on fellow students before this program			
Yes (n=75)	42.10±4.68	47.52±4.19	F=0.587, df=1, P=0.446
No (n=17)	43.62±4.01	49.13±4.15	
Have you ever been examined by fellow students before this program			
Yes (n=78)	42.16±4.67	47.63±4.27	F=0.094, df=1, P=0.759
No (n=14)	43.73±3.87	48.91±3.67	

*Univariate analysis (ANOVA) for pretest and posttest scores

synthesize and communicate health data appropriately; “Communicator” with patients, families, colleagues and community, “Lifelong learner” committed to continuous improvement of skills and knowledge; and “Professional” who is committed to excellence, is ethical, responsive and accountable to patients, community and profession and MCI has mandated that a competency-based medical education model needs to be adopted by medical colleges. Competency-based learning includes designing and implementing a medical education curriculum that focuses on the desired and observable ability in real-life situations.^[22]

In order to achieve this, an ENT rotation is limited to 8 weeks in the medical school curriculum. Students have to acquire expertise to examine patients with ENT disorders during their clinical rotations, which are limited to two sessions of 4 weeks each. In Indian settings, medical college resources are limited and there

is a lack of standardized patients and mannequins. During this rigid time frame, in order to achieve this competency, it is recommended that students first conduct examinations of peer students before they examine patients. Here, students get direct, hands-on experience to learn and practice the components of complex clinical skills. This is a primer to prepare them to perform clinical examinations on real patients.^[7]

It is proposed that this practice of prior peer examination is an effective way to develop specific individual clinical skills. Deliberate practice is necessary to develop any skill, including medical skills. There are constraints on manpower and man-hours to provide much needed clinical teaching. The number of students may grow (as and when the Medical Council of India permits an increase in the intake of students) while the number of faculty to support them does not increase in direct proportion.^[23] Thus, it may reduce the faculty time

burden while allowing real-life practice. Also, in recent times, patients are often not ready to be examined by many students, as was earlier. This also serves to protect patients from early learners.^[24]

Limitation and recommendation

Even after a thorough search of Google Scholar and PubMed, no similar study conducted in India was found, so this study is unique in determining medical students' perceptions and acceptability of PPE and extending such a programme to other clinical subjects. In the present study, the examination by peer was done among only same-gender individuals, which can be considered a limitation of the study. But a study by Taylor *et al.*, has shown that there were fewer opportunities to examine the peer of the opposite gender, and around one-fourth of the male peers missed an opportunity to examine a female peer.^[25] The study was single-centered, so generalization to other medical colleges within the state or other states is limited, so the upcoming study must be multicentric for better generalization. Furthermore, because the current study is quantitative in nature, the inclusion of qualitative methods would allow us to capture issues that students face prior to or during the program.

Conclusion

The study made an attempt to reveal the acceptability and perception of medical students towards the PPE and it was observed that there was an observed change in willingness for PPE before and after the program and also there was change in the perception toward PPE following program. The study also evaluated barriers which inhibits students from practicing PPE in clinical postings. The program conducted by ENT department shall be also adopted by other clinical subjects, so to make it universal practice of PPE to enhance the competency and skills of medical student for the benefits for patients in future.

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Conflicts of interest

There are no conflicts of interest.

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