

## Skills training of junior medical students: Can peer teaching be the solution?

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**Background.** The system-based curriculum of the Medical College of Alzaiem Alazhari University, Sudan, entails skills training for pre-clerkship students. The increased demands on full-time trained clinical teachers cannot be solved by employing part-time staff owing to the poor financial incentives that are offered.

**Objectives.** To verify the feasibility of implementing a peer tutor model for skills training of junior students and to establish whether this model can overcome the shortage of clinical teachers.

**Methods.** Eight selected and trained peer tutors participated in teaching certain aspects related to the basic skills module to 2nd-year students (N=144). Three sessions were prepared, conducted and implemented by peer tutors. The effectiveness of the experience was evaluated by an objective structured clinical examination (OSCE) and two questionnaires.

**Results.** Junior students received the peer teaching sessions favourably and requested a continuation of the process. The performance of the tutees was good. Peer tutors enjoyed and benefited from this teaching method without it negatively affecting their own learning.

**Discussion.** Our study demonstrated that a peer teaching educational model is feasible and can contribute to solving the problem of skills training of junior medical students. The peer teaching model is effective, provided the tutors are well trained and the educational experience is supervised.

**Conclusion.** Peer-assisted learning is effective and beneficial for both tutors and tutees in resource-limited environments. It can contribute towards addressing the problem of skills training of junior medical students where there is a shortage of trained clinical teachers.

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Peer-assisted learning 'is the act or process of gaining knowledge, understanding or skill from students that are either at a different or equivalent academic level.<sup>[1]</sup> Informal peer teaching usually takes place in the clinical skills laboratory (CSL) as mutual teaching, where students alternate between the roles of teachers and learners.<sup>[1]</sup> Peer teaching for undergraduate skills training is widely accepted by tutees, provided that peer tutors receive good training and the teaching sessions are supervised by experienced staff members.<sup>[2]</sup>

The skills training of undergraduate medical students during preclinical and clinical rotations typically entails small-group teaching sessions, thereby increasing the load on clinical teachers. These increased demands on the limited number of trained clinical teachers in a developing country – in this case, Sudan – created a need for other resources. There were two possibilities: (i) to recruit part-time clinical educators, which proved to be difficult because of the unattractive financial incentives; or (ii) peer teaching.

Various studies highlight the benefits of peer teaching, demonstrating that it improves the examination performance of the tutees,<sup>[3,4]</sup> and establishes reciprocal social, psychological and cognitive support.<sup>[5]</sup> Both peer tutors and learners benefit from peer teaching, as the former can improve their learning habits, acquire new advanced perceptions towards the subject matter, and increase their skill competence. Peer learners can acquire new skills and knowledge and feel relaxed in the presence of their peer teachers.<sup>[6,7]</sup> This cognitive and social congruence promotes a more

relaxed teaching environment.<sup>[8,9]</sup> The increased number of medical students and hence the increased demands on the limited number of trained staff encourage the adoption of the peer teaching method.<sup>[10]</sup>

The limited resources at the Faculty of Medicine of Alzaiem Alazhari University (AAU), Sudan, the shortage of trained clinical educators and the increasing numbers of medical students created a need for a teaching strategy that is effective, feasible and contributes towards solving the problem of skills training for preclinical medical students.

### Objectives

The aims of our study were to investigate the feasibility of implementing a peer teaching model for skills training of junior medical students, to establish its effectiveness and to verify whether peer teaching can help to solve the problem of skills training of junior students in developing countries with limited resources.

### Methods

A mixed observational study was conducted. A near-peer teaching model was selected, bearing in mind that senior students have enough clinical experience for effective skills teaching. The criteria for selection of peer tutors included: senior students (clerkship students), voluntary participation, cumulative grade point average  $\geq 3.3$ , personal motivation, and former experience of informal peer teaching. All 2nd-year students (N=144) in their basic clinical course were involved in the study as learners. They were

informed about the educational experience and that they were to be trained by peers under supervision of the staff.

## Training of peer tutors

Peer tutors ( $N=16$ ) were selected and received 8 weeks of training sessions on the principles, concepts and theories of adult learning and skills teaching in the CSL. They practised how to assess the students formatively and give feedback, demonstrate the five steps of skills teaching in the CSL, set the objectives of the skills training sessions and prepare handouts and checklists for their teaching sessions. Eventually, only 8 peer tutors participated in the study; the other 8 graduated and left the faculty.

Peer learners were divided into groups ( $n=11$  or  $12$ ) per peer tutor. Every group attended three 2-hour sessions, which were prepared and presented by peer tutors. The staff were present during some of the sessions to help solve administrative problems and to observe the training. The training for learners was done on models, manikins and simulated patients, and thereafter in teaching hospitals. Each peer tutor supervised one or two groups. Nine skills were selected for practice, including intramuscular and intravenous injections; intravenous line insertion; measurement of blood pressure, pulse rate, respiratory rate, and body temperature; insertion of a nasogastric tube; and urethral catheterisation.

## Data collection

Data regarding tutors' and peer learners' perceptions and benefits of peer teaching were collected by means of two separate questionnaires using the 5-point Likert scale (from strongly disagree = 1 to strongly agree = 5). Both questionnaires included an open-ended question about the opinion of the tutors and learners on peer teaching. The questionnaires were handed out to tutors and learners at completion of the educational experience. In addition, learners' performance was assessed by an objective structured clinical examination (OSCE) at the end of the training course. The OSCE, composed of 6 stations (each of 5 minutes' duration) in the CSL, using models, manikins and simulated patients, was used to verify that the learners had acquired all the required skills taught by peers. It was organised by the peer tutors and supervised by trained clinicians who did not participate in teaching.

This study was approved by the Research Committee of the Faculty of Medicine of AAU.

## Data analysis

Version 16 SPSS software was used to analyse the data. All values of the descriptive statistical analyses were expressed as percentages (mean $\pm$ SD). The scores of the 5-point Likert scale were calculated and similarly expressed as percentages to indicate agreement or disagreement of tutors and tutees with regard to the statements in the questionnaires.

## Results

Out of the total number ( $N=144$ ) of 2nd-year students, 100 (69.4%) responded to the questionnaire of the tutees' perceptions. Forty-six volunteer peer tutors wished to participate in peer teaching; however, only 16 were eligible and selected for training, but eventually only 8 participated in the study. All 8 peer tutors who participated in the study responded to the post-intervention questionnaire.

The peer teaching programme was successfully implemented, all scheduled sessions were conducted, there was no absenteeism among the peer learners, and both tutors and learners were very enthusiastic.

Peer learners who participated in the programme accepted the usefulness and benefits of peer teaching (Table 1). About half of the peer learners (48%) thought that there was not enough time for practising the newly acquired skills. Overall, the peer learners rated peer teaching as good or excellent (89%), with a mean Likert scale of 4.25/5. The OSCE held at the end of the training course for assessing students' competence showed a success rate of 100% (Table 2).

In the open-ended question, most of the peer tutees were of the opinion that peer teaching is a good learning experience and an excellent way to learn skills. Participants also mentioned that peer teaching increased their confidence levels, making it easy for them to ask the tutors questions. The only negative aspect mentioned was that they did not have enough time to practise. They concluded that they support the continuation of this model of education. Some of the learners' comments are given below:

'It is a good experience to be taught by our peers, but I think three sessions are not enough.'

'The only negative aspect is that we did not have enough time to practise.'

'Peer teaching is a great way of learning.'

'Tutoring by peers was fun and full of knowledge.'

'The experience makes me more confident.'

'It is a good experience because we feel at ease when asking the peer tutors.'

**Table 1. Peer learners' agreement on the usefulness of peer teaching at Alzaiem Alazhari University, Sudan, 2011**

Question	Participants ( $N=100$ )	
	Agreement (%) <sup>*</sup>	Mean (/5) $\pm$ SD
1. Learning objectives were clearly defined by tutors	96	4.37 $\pm$ 0.63
2. Peer tutors were well prepared for each session	85	4.06 $\pm$ 0.99
3. Peer tutors enthusiastic for teaching	82	4.14 $\pm$ 0.83
4. Peer tutors were skilful	89	4.15 $\pm$ 0.87
5. Peer tutors demonstrated the skills satisfactorily	85	3.99 $\pm$ 0.67
6. I acquired new skills	87	4.08 $\pm$ 0.79
7. I gained new information	91	4.22 $\pm$ 0.66
8. We allowed enough time to practise skills	52	3.27 $\pm$ 1.29
9. Peer tutors provided constructive feedback	68	3.67 $\pm$ 0.99
10. Peer teaching should continue for skills training	79	4.02 $\pm$ 1.06

<sup>\*</sup>Note: agreement is defined as a score of 4 or 5 on a 5-point Likert scale.

Peer tutors demonstrated that participating in teaching junior students did not affect their learning programme as senior students and that it was an enjoyable experience. The responses of peer tutors regarding their perception of peer teaching are given in Table 3.

These comments emphasised the need for more and continuous training of tutors, the necessity for continuation of the programme, and the improvement of the teaching environment in the CSL.

## Discussion

A mixed qualitative/quantitative observational study was conducted to determine: (i) the attitude of our junior medical students towards peer teaching; (ii) whether they accepted it and found it a useful tool for acquiring skills; (iii) its effectiveness; and (iv) the students' skills competence. Our study demonstrated that a peer-teaching educational model is feasible in a resource-limited context, provided it is well organised, the peer tutors are trained, and there is supervision. Our selected peer tutors were all well trained for a period of 8 weeks before commencement of teaching. They all demonstrated the steps and methods of teaching skills, and prepared a written model of handouts and checklists for their training sessions.

This finding is consistent with the conclusion that peer teaching in undergraduate clinical skills training is a feasible and an accepted method if tutors receive enough training and the process is supervised.<sup>[2]</sup> Many studies in medical education during the last decades have documented peer teaching and demonstrated its value in clinical education.<sup>[1,6,10]</sup> Our results add further proof of its suitability as a training tool in a developing country.

The study demonstrated that junior medical students received peer teaching favourably. They gained new knowledge and acquired skills, and both peer tutors and peer learners benefited from the educational experience. Peer tutors benefited by improving their knowledge and acquiring the skill of teaching, without affecting their own learning programmes as senior medical students.<sup>[12,13]</sup> The peer learners were at ease when communicating with peer tutors, an aspect which can be related to the cognitive and social congruence highlighted by many studies.<sup>[5,8,9]</sup> The results of our study are in agreement with those of previous studies documenting the benefits of peer teaching in medical education.<sup>[4,6,7-9,11]</sup>

The peer teaching experience was successful, demonstrating its effectiveness and benefits. It also showed that peer teaching can help to solve the problem of skills teaching to junior medical students in a resource-limited environment. Peer learners and peer tutors agreed on the importance of continuation of this programme, and some of the participants requested the inclusion of this model as a formal method in the curriculum. An increasing number of medical students and time constraints on clinical teaching staff (due to increased demands) are leading to the adoption of this method of teaching.<sup>[10]</sup> Formal adoption of peer teaching into curricula can develop medical students' knowledge, skills and attitude.<sup>[3]</sup> The criteria that we used for selection of tutors did not differ from those in the literature.<sup>[13]</sup> Tutees commented that there was not enough time to practise the skills taught, which could be related to the limited number of peer tutors and the relatively large number of learners for each tutor. However, this issue can be solved by allocating 5 - 6 learners per tutor.

To the best of our knowledge, this is the first educational experience using formal peer teaching for skills training in Sudan. The results and tutees' acceptance should encourage other medical colleges in Sudan to formally employ peer teaching to overcome the shortage of trained clinical teachers.

By adoption of peer teaching as a formal method of skills training, the increased involvement and demands on trained clinical teachers will decrease, so that they can spend more time with senior students and on patient care. Formal adoption of peer teaching does not rule out the role of trained clinical teachers in the teaching of junior students. They also have an important role in training peer tutors, watching their performance and giving them advice for improvement.

To increase the benefits of our peer-teaching experience, the number of skills and tutors should be increased. There should be a follow-up

**Table 2. The OSCE scores of peer learners' competence at Alzaiem Alazhari University, Sudan, 2011**

Grade and (score)	Students (N=144)
	n (%)
A (≥80)	69 (47.5)
B+ (75<80)	51 (36.7)
B (65<75)	24 (15.8)
C+ (60<65)	
C (50<60)	
F (<50)	

OSCE = objective structured clinical examination.

**Table 3. Peer tutors' responses regarding peer teaching at Alzaiem Alazhari University, Sudan, 2011**

Question	Peer tutors (n=8)	
	Agree/disagree (%)*	Mean±SD
1. Peer teaching interfered with my learning as a senior student*	100	4.75±0.46
2. Participating in peer teaching improved my skills	100	4.75±0.46
3. Peer teaching helped me to gain more knowledge	100	4.75±0.46
4. I was well informed and trained for peer teaching	100	4.62±0.51
5. I felt comfortable participating in teaching and evaluating peers	100	4.62±0.51
6. Trained peer tutors can participate effectively in skills teaching	100	4.87±0.35
7. Participating in peer teaching encouraged me to teach mates	75	4.00±0.75
8. My overall rating for peer teaching	100	4.62±0.51

\*Note: Agreement is defined as a response of 4 or 5 on a 5-point Likert scale for questions 2 - 8, and disagreement as a response of 1 or 2 for question 1.

evaluation of the students' performance to establish whether they can retain what they have acquired with regard to the next clinical rotation. Randomisation of learners is an important issue as well as inclusion of controls.

## Conclusion

Our study demonstrated that a near-peer teaching model for teaching skills to junior medical students, that entails a limited financial cost and a moderate administrative effort, can be an effective tool for teaching and can contribute towards solving the problem of skills training of junior medical students in a resource-limited country. The results of our study suggest that peer teaching can be adopted as a mode of teaching clinical skills and can be incorporated into the curriculum to improve skills training and to participate in solving the shortage of the trained staff.

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