ORIGINAL RESEARCH

Effect of peer teaching on the performance of undergraduate nursing students enrolled in nursing administration course

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Abstract

Background: Peer teaching is an effective educational approach for nursing students. This prepares the students for their future roles as educators, builds their self esteem, and enhances their psychomotor skills and their attitudes. The aim of this study was to assess the effect of peer teaching in a nursing administration course on undergraduate nursing students' performance.

Methods: The study was conducted at the Nursing Administration Department, Faculty of Nursing, Zagazig University using a quasi-experimental nonrandomized comparative design. All 338 nursing students enrolled in the 4th year were invited to participate, and 333 (266 females and 67 males) agreed. These were divided into two groups: study and control. Three tools were used for data collection: Student's Clinical Evaluation checklist, Clinical Teaching Preference Questionnaire, and Peer Teaching Experience Questionnaire.

Results: The study findings indicate that the performance score of the nursing students who learned by peer teaching will be significantly better than those trained by assistant teaching staff in traditional clinical sessions. The students in this group agreed upon many benefits of the peer teaching both as providers (teachers) and consumers (students).

Conclusion: The study findings add to the literature supporting the use of peer teaching approach in nursing education practical training. The approach is beneficial for enhancing students' acquisition of skills with better performance, in addition to building-up their teaching abilities, which are integral part of their future nursing role.

Key words

Peer teaching, Peer tutoring, Nursing students

1 Introduction

Professional nurses must be able to exercise their multiple roles of care providers, managers, teachers, as well as lifelong learners and researchers [1]. To do so, they should be able to solve clinical problems through analysis, synthesis, critical thinking, and effective communication. Such skills are not expected to be provided through traditional teaching, but need an active learning process with peer teaching opportunities [2-4].

The study aims to assess the effect of peer-teaching in a nursing administration course on undergraduate nursing students' performance at Zagazig Faculty of Nursing. The research hypothesis was that the performance score of the nursing students who learned by peer teaching will be significantly better than those trained by assistant teaching staff in traditional clinical sessions.

Background

Peer teaching or peer tutoring is an effective educational approach for nursing students [5], is based on Bandura's social learning theory, which postulates that individuals learn dramatically from observing the behaviors of others [6]. This increases learner's self-efficacy through more active participation in learning, lower anxiety, and greater feeling of ownership of learning [3]. At the same time it improves tutor's behavior and competence, with development of their teaching skills [7].

The process of peer-teaching may involve near peers as senior teaching freshmen, or co-peers who are at the same academic or experiential level [8] who help others to learn and acquire, retain and be able to use knowledge, understand, achieve skills, and develop attitudes [9]. Therefore, peer teaching is a way of communication of information between two parties of equal or different educational levels who are each engaged in learning the same subject [10], with someone acting as tutor and the other(s) as tutee(s) [7]. The process may be formal such as one-to-one tutoring and mentoring [11], or informal such as students helping each other outside the formal teaching environment [12]. It may involve short periods of lecturing with more emphasis on discussions and interactions [13].

In nursing schools, peer teaching is more used in laboratory settings where students alternatively play the roles of peer teachers and peer learners. As peer-teachers, students are asked to design teaching plans that include specific, concrete objectives related to a skill or topic, and identify relevant resources, and then apply this to small groups of students [14, 15]. This prepares the nursing students for their future roles as educators, builds their self esteem, and enhances their psychomotor skills and their attitudes [16-21]. As for nurse educators and faculty, peer teaching may reduce their workload in teaching, and provides them with more opportunities to observe and provide feedback to their students regarding their performance [22-27].

However, despite all its advantages, peer teaching may need more time to organize the matching of peers, and may need some changes in curriculum materials. Additionally, compared to teacher's approach, the quality of peer teaching may be inferior, and the content covered may be more variable [7]. To avoid these problems, the scope of the program and the peer roles should be clarified, with proper peer selection and positive motivational approached [28]. Also, making teaching aids available in a comfortable learning environment is more conducive to success of the process [29, 30].

The Faculty of Nursing, Zagazig University in Egypt operates an undergraduate program for four years following general secondary level. Fourth year students attend a nursing administration course aimed at enabling them to apply management theories and concepts in clinical settings. The course has formal lectures (theory) and clinical sessions (practical). The practical sessions are often taught by assistant teaching staff to a group of up to 21 students, a situation that makes guidance and supervision of the practical performance of each student not feasible. To overcome this and at the same time to motivate students' active learning, the Nursing Administration department started applying peer teaching in its course. The situation provides a kind of natural experiment to compare peer teaching with the traditional clinical session method.

2 Methods

2.1 Research design

The study used a quasi-experimental nonrandomized comparative design.

2.2 Ethical considerations

The researchers obtained the official permissions to conduct the study from the Dean of the Faculty and the head of the Nursing Administration Department, at the Faculty of Nursing, Zagazig University. And participation acceptance from nursing students. An individual informed consent was obtained from each student after full explanation of the study objectives and procedures. Students were reassured that participation is totally voluntary, that refusals or withdrawals have no consequences, and that the information would be strictly confidential and does not affect the assessment of their academic achievement.

2.3 Setting

The study was conducted at the Nursing Administration Department, Faculty of Nursing, Zagazig University. The Nursing Administration department is one of six departments of the Faculty. It is staffed by 1 assistant professor (head of department), 5 lecturers, 11 assistant teaching staff (6 assistant lecturers and 5 demonstrators). Over 1200 undergraduate students are currently enrolled in the four-year nursing program.

2.4 Sample

All 338 nursing students enrolled in the 4th year were invited to participate, and 333 (266 females and 67 males) agreed. These were divided into two groups. Group I (study group) consisted of 166 students and Group II (control group) included the other 167 students who were similarly assigned to the 10 skill labs in subgroups of around 17 students each.

2.5 Instruments

Three tools were used in this study: Student's Clinical Evaluation Checklist, Clinical Teaching Preference Questionnaire (CTPQ), and Peer Teaching Experience Questionnaire (PTEQ): Student's Clinical Evaluation Checklist developed by the researchers based on related literature [31-36] to evaluate the nursing student's performance toward applying steps of different skills taught in the practical part of the nursing administration course, and applied in the clinical setting. The tool asked about student's age and gender, and covered the following four areas: (1) Kardex: consists of 32 steps, (2) Time schedule (roster): consists of 29 steps, (3) Reporting and recording: consists of 67 steps grouped under shift report (18 steps), incident report (22 steps), statistical report (14 steps), and medication record (13 steps), and (4) Performance appraisal methods: consists of 93 steps grouped under: rating scale (32 steps), ranking method (12 steps), paired comparison method (14 steps), checklist method (12 steps), forced distribution method (11 steps), and anecdotal record (12 steps). Each step was to be checked as "done" or "not done," respectively scored 1 and 0 for some items and 0.5 and 0 for others to fit the grading system of the faculty. The score of total performance was 175 (kardex: 20; time schedule: 20; reporting and recording: 65; performance appraisal methods: 70). The point grade system of performance in the Faculty of Nursing, Zagazig University was applied to the total score as follows: Fail (<60%), Pass (60-65%), Good (65-75%), Very good (75-85%), and Excellent (>85%).

Clinical Teaching Preference Questionnaire (CTPQ): was developed [37] to assess nursing student's preference of peer teaching method. It consists of 11 statements (teaching is an important role for nurses, and I can communicate more freely with my peers than with my instructor examples of items) with a five-point Likert scale ranging from "strongly agree" to "strongly disagree." The responses were dichotomized into two categories: "strongly agree/agree" and "strongly disagree/ disagree/uncertain".

Peer Teaching Experience Questionnaire (PTEQ): was developed [37] to assess nursing student's experience gained from practice of peer teaching method. It consists of fourteen statements (I felt comfortable teaching the other students & I have developed skills for teaching basic clinical skills examples of items) with similar scoring as the Clinical Teaching Preference Questionnaire.

Before data collection, face and content validity of the tools through rigorous review by a panel of experts in nursing administration. The panel consisted of 9 Faculty members from the Faculties of Nursing at Zagazig, Mansoura, and Ain shams universities. Their comments served to finalize the tools. The researchers carried out a pilot study on a sample of 16 nursing students from the faculty, representing approximately 10% of the main study sample. The purpose was to ascertain the feasibility of the study and the clarity and applicability of the tools. It also helped to estimate the time needed for filling out the forms. Based on the results of the pilot no modifications were needed. The pilot served to assess the reliability of the scales used (CTPQ and PTEQ) through assessing their internal consistency. They proved to have good reliability with Cronbach alpha coefficients 0.65 and 0.86 respectively.

2.6 Procedure

After allocation of the students to the study (peer-teaching) and control (routine teaching) groups, the researchers conducted a one-day workshop starting the teaching sessions. The attendants were the assistant teaching staff assigned to the clinical sessions and the nursing students in the study group. It was for orientation of the participants concerning peer teaching benefits, techniques, and tutor role, with a briefing of the studies addressing this issue in the literature.

The researchers selected four core clinical skills that nursing students must learn in the clinical part of the nursing administration course. These are the types of reports and records, performance appraisal methods, kardex, and time schedule. This content was similar in both study and control groups. The 166 students in the study group were assigned to ten skill labs in subgroups of around17 students each. The subgroup in each lab was further subdivided into four small groups of four (one peer teacher& three students in each group) for implementation of the peer teaching process.

Each student was asked to select one clinical practical skill he/she can easily complete and was allowed to apply its steps in the Faculty skill lab under the supervision of researchers. This was repeated until the student mastered this skill. The student then designed a teaching plan that includes specific and concrete objectives, and identified the resources relevant to peer teaching. The researchers prepared a schedule for the trained students to act as peer teachers for others their colleagues. Each student was given two chances to act as a peer teacher. The clinical sessions started from 9 AM to 1 PM one day/week for 24 days.

The control group 167 students sub-grouped and distributed to 10 skill labs. These subgroups were trained by assistant teaching staff in traditional clinical sessions. The evaluation of the effect of the peer teaching was carried out through the use of the first tool – student's clinical evaluation checklist – and comparing its results among students in the study and control groups after the end of the clinical sessions. Additionally, the study group students' opinions regarding the peer teaching method were assessed using the second and third tools (CTPQ and PTEQ). The collection of data lasted four months starting from February to May 2012.

2.7 Data analysis

Data entry and statistical analysis were done using SPSS 16.0 statistical software package. Quantitative continuous data were compare using the non-parametric Mann-Whitney test. Qualitative categorical variables were compared using chi-square test. In order to identify the independent predictors of the performance scores, multiple linear regression analysis was used after testing for normal distribution and homoscedasticity, and analysis of variance for the full regression models were done. Statistical significance was considered at p-value <0.05.

3 Results

Table 1 demonstrates statistically significant differences in the performance scores between the students in the study and in the control groups ($p<0.001$). This is noticed in all the tested areas, and in all differences the study group students have higher scores.

Table 1. Comparison of performance scores of nursing students in the study and control groups

Clinical skills	Group (mean±SD)		Mann Whitney Test	*p*-value
	Study (n=166)	Control (n=167)		
Kardex	19.6±1.6	15.2±5.0	235.74	<0.001*
Time schedule (Roster)	19.5±0.8	14.8±1.4	251.91	<0.001*
Reporting/ recording:				
• Incident report	19.2±1.3	15.2±1.1	246.87	<0.001*
• Shift report	19.2±1.4	14.6±2.2	239.46	<0.001*
• Medication record	14.6±1.1	13.0±12.1	202.07	<0.001*
• Statistical report	9.9±0.4	6.9±0.6	282.93	<0.001*
• Total reporting/recording	62.9±3.1	49.7±12.2	227.44	<0.001*
Performance appraisal methods				
• Checklist	9.8±1.4	7.0±0.7	265.02	<0.001*
• Rating scale	19.5±1.5	14.9±1.0	243.42	<0.001*
• Ranking	9.7±1.2	7.0±0.6	258.17	<0.001*
• Anecdotal record	9.7±1.1	6.9±0.6	265.93	<0.001*
• Paired comparison	10.1±2.3	6.9±0.6	235.86	<0.001*
• Forced distribution	9.6±1.4	6.9±0.6	243.41	<0.001*
Total performance appraisal	68.3±6.2	49.1±2.5	238.87	<0.001*
Total score	170.0±9.2	128.6±13.8	225.92	<0.001*

*p<0.001

Table 2 demonstrates statistically significant differences in the performance grades between the students in the study and in the control groups (p<0.001). Overall, almost all students in the study group (98.2%) have "excellent" grade, compared to only 3.6% of those in the control group (p<0.001).

Table 2. Percentages of performance grades of nursing students in the study and control groups

Performance Grades	Group				X2 Test	P-value
	Study (n=166)		Control (n=167)			
	No	%	No	%		
Good	1	0.6%	143	85.6%		
Very good	2	1.2%	18	10.8%	298.07	<0.001*
Excellent	163	98.2%	6	3.6%		

*p<0.001

Multivariate analysis (see Table 3) confirms the independent effect of the study intervention (peer teaching method) on students' total performance scores, explaining 76% of the variance of this score. This effect is mainly on the performance appraisal component explaining 81% of its variance, and to a less extent on the reporting/recording component explaining 36% of its variance. Meanwhile, the intervention has no independent effect on the components of kardex or time schedule. The models indicate that student's gender does not affect the performance score.

Concerning study group students' feedback regarding their preferences of the peer teaching method, Table 4 shows that more than half of them agreed upon the issues related to better acquisition of problem solving skills and sense of responsibility, better learning and helping in general, However, at the other extreme, only a few of the students agreed that teaching is an important role for nurses.

As for the study group students' opinion about the experiences gained from their practice of peer-teaching. Table 5 illustrates that the highest agreement is upon feeling uncomfortable in assessing other students (41%), followed by feeling that the time and effort were well spent (25.9%). On the other hand, only 3.0% of the students believe that the teaching is

an important role for nurses after this experience, and 3.6% feel more confident teaching a clinical skill after this experience, and that what they have learnt in this experience will enhance their role as a nurse after graduation.

Table 3. Best fitting multiple linear regression model for nursing students' total performance scores

	Unstandardized Coefficients		Standardized Coefficients	*t*-test	*P*-value	95% Confidence Interval for B	
	B	Std. Error				Lower	Upper
Reporting/recording scores							
Constant	76.082	1.544		49.265	<0.001	73.044	79.120
Group (reference: control)	13.215	.976	.597	13.542	<0.001	15.134	11.295
r-square = 0.36							
Model ANOVA: F= 183.37, $p<0.001$							
Variables entered and excluded: gender							
Performance appraisal scores							
Constant	87.507	.823		106.389	<0.001	85.889	89.125
Group (reference: control)	19.205	.520	.897	36.952	<0.001	20.228	18.183
r-square = 0.81							
Model ANOVA: F= 1365.47, $p<0.001$							
Variables entered and excluded: gender							
Total performance scores							
Constant	120.705	1.158		104.191	<0.001	118.426	122.984
Group (reference: control)	23.679	.732	.872	32.347	<0.001	25.119	22.239
r-square = 0.76							
Model ANOVA: F= 1046.33, $p<0.001$							
Variables entered and excluded: gender							

Table 4. Agreement upon peer teaching preferences among nursing students in the study group (n=166)

Statements	Strongly agree/agree	
	No	%
My ability to problem solve improves less from instructor teaching than from my peers	87	52.4
Being taught clinical skills by my instructor decreases my sense of responsibility more than by being taught by my peers	87	52.4
I learn less from my instructor than my peers	86	51.8
I do not feel freer to approach my instructor for help than I do my peers	84	50.6
Being taught clinical skills by my peers increases my interaction and collaboration with other students more than when being taught by my instructor	28	16.9
The feedback I receive from my peers is from a student's viewpoint, therefore, more honest, reliable, helpful than from my instructor	26	15.7
I am more self-confident and able to perform independently because of being taught by my peers, more so than by my instructor	18	10.8
I am less anxious when performing a nursing skill in the presence of my peers than my instructor	17	10.2
I can communicate more freely with my peers than with my instructor	14	8.4
My peers are more supportive to me when I am performing a nursing skill than my instructor	11	6.6
Teaching is an important role for nurses	5	3.0

Table 5. Agreement upon the experience gained from peer teaching among students in the study group (n=166)

Statements	Strongly agree/agree	
	No	%
I felt uncomfortable assessing the other students' skills	68	41.0
The peer teaching experience was time and effort well spent	43	25.9
I now understand the principles underpinning teaching and learning	17	10.2
I have developed skills for teaching basic clinical skills	15	9.0
I felt comfortable teaching the other students	14	8.4
I was initially apprehensive about the peer teaching requirement in the clinical session	13	7.8
The peer teaching experience allowed me to reflect on my own previous learning	13	7.8
There should be more opportunities or peer teaching in the curriculum	13	7.8
I enjoyed working with the other students	12	7.2
The peer teaching experience was personally rewarding	11	6.6
Nurses have a professional responsibility to teach students and their peers	7	4.2
What I have learnt in this experience will help with my graduate nurse role	6	3.6
I would be more confident teaching a clinical skill after this experience	6	3.6
Teaching is an important role for nurses	5	3.0

4 Discussion

This study hypothesized that the performance score of the nursing students who learned by peer teaching will be significantly better than those trained by assistant teaching staff in traditional clinical sessions. The findings demonstrated significantly better performance scores in the peer-teaching group, which was confirmed through multivariate analysis.

The students in this group agreed upon many benefits of the peer teaching both as providers (teachers) and consumers (students).

The study was carried out using a quasi-experimental non-randomized comparative design since carrying out a completely randomized trial was not feasible given the educational system and regulations at the faculty. Although the level of evidence is lower compared with the fully randomized trials, this problem is often encountered in education research, and each design has its advantages and disadvantages [38]. Nonetheless, the two groups of the current study have similar age and gender distribution. Moreover, in the regression analysis gender has no effect on students' performance

The findings of the current study indicate significantly better performance scores among peer-teaching in all the tested areas. Moreover, almost all students in this group got a total "excellent" grade, compared to very few ones in the control group. The findings indicate success of the peer teaching approach. The improvement is certainly attributed to the new learning approach as shown by the multiple regression analysis where more than 75% of the score variance was explained by the teaching method. The findings go in line with a number of previous studies [5, 39-42]. On the same line [43, 44] found that peer teaching was more effective than traditional methods in improving the practices grades of students. Our findings add more support in favor of the peer-teaching approach against what has been reported in other previous studies [19, 45-47] that failed to show the supremacy of peers teaching compared with traditional approaches.

Nevertheless, the success of the peer-teaching approach in the present study is undoubtedly related to the process of the application of the intervention and the facilities and resources provided for achieving its goals. For instance, the researchers provided clear explanations for students to foster their peer teaching abilities, in addition to training them in mastering the selected practical skill until they became competent before starting the sessions, and teaching them how to prepare for teaching session. Moreover, they had better resources such as the small numbers of students in their groups, in addition to the availability and accessibility of the researchers as resources for peer teachers. In such environment, each

student had the opportunity to perform the practical skill more than once, which enhances his/her performance. The importance of such support in the success of peer teaching has been emphasized [48].

The present study demonstrates that magnitude of the effect of peer teaching on the performance scores varied by areas. It was highest in the area of performance appraisal, whereas the areas of kardex and time schedule were not independently influenced by the new approach. The findings might be explained by the nature of the difference between the peer-teaching and traditional teaching, which would be more influential on students' ability of performance appraisal. Actually, this area needs a higher feeling of freedom of expression, autonomy, and self-confidence among students. All these are better afforded by peer teaching. In fact, the students taught by peer teaching expressed their better acquisition of problem solving skills and sense of responsibility, better learning and helping in genera. These results are in congruence with the previously reported positive effects of peer teaching on students' abilities of interactions [49], transferable personal skills as communication, problem solving, and increased confidence in clinical practice [4, 21, 50].

The current study indicate only a few of nursing students taught by peer teaching were feel less anxious when performing a skill, more communicate& interaction with other students, and received honest feedback. Our findings against what has been reported in other previous studies [20, 51] found the majority of students taught by peer teaching expressed their less anxious, received honest feedback, and more interaction with other students.

On the other hand, the peer teaching showed a positive impact on the students' abilities to assume the role of teacher, which is in fact part of their future roles as educators [52]. The current study demonstrated that most students in the peer teaching were feeling uncomfortable in teaching and assessing other students. Only a few of them were gaining skills for teaching basic clinical skills, understanding the principles of teaching and learning, enjoying in working with other students, and more self confidence from their practice of peer teaching. In agreement with this, peer teachers were shown to gain support from their peers, and this increased their confidence and increased their enjoying this role [15, 51, 53, 54].

Nonetheless, many of the study group students were not feeling that their peer-teaching experience was worth the time and effort spent. Subsequently, only a few of them expressed their belief that the teaching is an important role for nurses. This might be explained by the workload students had in preparing for their role as teachers, and also for being prepared for active interactions during the sessions. Additionally, since this was the first time for students to act as teachers, they might have had the feeling of having a responsibility that is beyond their capabilities. Added to this is the concern that their peers may have the belief that they do not have the knowledge and clinical practice skills compared with the assistant teaching staff to play a role of the teacher. Added to this is the feeling of lack of real authority/power over students so that they might lose control. Many of such concerns were previously reported such as considering staff teachers more experienced than peer teachers [55], the need to be prepared and change the role from passive to active learner [56].

5 Conclusion and recommendations

The study findings add to the literature supporting the use of peer teaching approach in nursing education practical training. The approach is beneficial for enhancing students' acquisition of skills with better performance, in addition to building-up their teaching abilities, which are integral part of their future nursing role. Therefore, the study recommends more utilization of this approach in nursing schools, with training workshops aimed at changing the attitude of nurse educators toward the use of more innovative models of active learning such as peer teaching. This may start with a training program for peer teaching. Future studies should link peer teaching with student academic and clinical achievement.

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