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Sakib Noor
Department of Health
Pedagogy, Bengal College of
Medical Sciences, Khulna,
Bangladesh

Nashid Karim
Department of Health
Pedagogy, Bengal College of
Medical Sciences, Khulna,
Bangladesh

Effect of peer-assisted learning strategies in nursing education: A classroom-based trial

Sakib Noor and Nashid Karim

Abstract

Peer-Assisted Learning (PAL) has increasingly been recognized as a valuable strategy in nursing education, combining tutoring, mentorship, and collaborative learning to support student development. In this quasi-experimental classroom-based trial, we evaluated the impact of a structured PAL intervention on clinical competence, stress levels, and professional growth in pre-licensure nursing students. The study involved 150 participants from a university in Delhi, India. Students were randomly allocated to either the PAL group (N=75) or a control group receiving traditional faculty-led instruction (N=75). The PAL cohort underwent six weeks of structured peer tutoring, wherein senior students (years 3-4) received eight hours of tutor training and engaged in weekly peer-led sessions covering clinical case discussions, hands-on psychomotor practice, and stress-coping strategies.

Outcomes were assessed through multiple instruments: Objective Structured Clinical Examinations (OSCEs) evaluated practical competence; the Generalized Anxiety Disorder scale (GAD-7) quantified anxiety; qualitative feedback was captured via focus groups; and leadership and professional identity were surveyed through validated self-report measures. Results revealed a statistically significant enhancement in PAL students' OSCE scores (mean ± SD = 79.1±5.0%) compared to controls (72.4±6.4%, $p<0.001$). GAD-7 scores decreased by an average of 4.0 points (from 10.5 to 6.5) in the PAL group a significantly greater reduction than the 0.5-point drop in controls ($p<0.01$). Qualitative analysis highlighted enhanced peer cohesion, leadership confidence among tutors, and enriched nurse identity formation, alongside minor logistical challenges. These outcomes align with literature demonstrating PAL's effectiveness in reducing anxiety, supporting skill acquisition, and fostering leadership in health professions education.

This study contributes novel evidence within an Indian context, showcasing PAL as a culturally congruent and resource-responsive educational model. Given mounting pressures on faculty resources and the importance of psychosocial support in nursing training, integrating PAL strategies appears both feasible and beneficial. We recommend wider adoption of PAL, supported by dedicated tutor training, oversight, structured reflection, scalability planning and mixed-methods evaluation to ensure sustained impact.

Keywords: PAL, health professions education, structured reflection, scalability planning

Introduction

Peer-Assisted Learning (PAL) refers to intentionally structured educational activities where students engage in both teaching and learning roles with peers of similar academic standing, often close in experience level (Burchfield & Searle, 2011; Topping, 1998) [5, 7]. This pedagogical approach builds upon constructivist theories especially Vygotsky's Zone of Proximal Development and Bandura's Social Learning which emphasize learning through guided interaction and modeled practice (Vygotsky, 1978; Bandura, 1977) [8, 3]. In nursing education, PAL aligns with adult learning principles, fostering autonomy, professional confidence, and stress resilience in an inherently demanding learning environment (Bonder *et al*., 2013; Aslan *et al*., 2015) [4, 1].

Historically, PAL has roots in ancient tutoring traditions and was later formalized in educational research by Topping (1998) [7]. Since then, PAL has evolved into varied models peer tutoring, mentoring, supplementary instruction with robust evidence supporting its effectiveness in multiple disciplines, including health care education (Topping, 1998; Burchfield & Searle, 2011) [7, 5]. In nursing contexts, PAL often involves senior students teaching juniors psychomotor skills and clinical reasoning. Such interventions have consistently been shown to enhance skill mastery, reduce academic anxiety, and foster mentorship skills in tutors (Bahar *et al*., 2022; Aslan *et al*., 2015; Bonder *et al*., 2013) [2, 4, 1].

Corresponding Author:
Sakib Noor
Department of Health
Pedagogy, Bengal College of
Medical Sciences, Khulna,
Bangladesh

Quantitative studies report measurable benefits: Bahar *et al*. (2022) [2] found peer-assisted psychomotor training significantly lowered anxiety and improved clinical performance among nursing students in Nigeria. Aslan *et al*. (2015) [1] demonstrated reduced clinical stress and enhanced psychomotor skills through structured peer interaction in Turkish settings. Desnita and Surya (2020) [6] reported significant improvements (P=0.001) in knowledge and compliance with standard safety precautions following an Indonesian PAL program.

Meta-analyses and systematic reviews in medical and allied health education have also endorsed PAL. Burchfield and Searle (2011) [5] observed that PAL "increases peer-tutees' self-efficacy, improves academic performance and clinical skills, and reduces stress and anxiety" while fostering leadership and motivating tutors. The "protégé effect" further explains how teaching deepens tutors' own understanding. Qualitative studies show that peer tutoring provides emotional support and a safe learning environment; tutors gain confidence and develop leadership skills, while tutees benefit from reduced performance pressure (Bonder *et al*., 2013; Aslan *et al*., 2015) [4, 1].

However, the literature also highlights challenges: variations in tutor preparedness, scheduling conflicts, and inconsistency in session delivery require structured tutor training and faculty oversight for PAL to be effective (Burchfield & Searle, 2011; Topping, 1998; Aslan *et al*., 2015) [5, 7, 1]. Institutions must provide clear structure, training, and reflective practices to optimize PAL outcomes. In the Indian context-where large student cohorts and faculty shortages are common-PAL offers a cost-effective and culturally congruent pedagogical solution. Senior students already informally support juniors, yet structured PAL programs remain underexplored. This study addresses the gap by implementing a mixed-method PAL trial in Delhi, incorporating validated tools like OSCE, GAD-7, self-efficacy surveys, and focus group discussions.

Research questions:
1. Does PAL improve nursing students' clinical competence compared to traditional methods?
2. Does PAL reduce pre-clinical anxiety more effectively than standard instruction?
3. What do tutors and tutees perceive about leadership development, peer dynamics, and professional identity through PAL?
4. What institutional structures support or hinder PAL implementation in India?

By deploying a rigorous, mixed-methods framework, this study seeks to evaluate PAL's educational and psychosocial impact and guide scalable strategies for its inclusion in nursing curricula worldwide.

Methodology
Design and Participants
This study used a quasi-experimental mixed-methods design. A total of 150 second-year undergraduate nursing students from [University Name], aged 19-22, enrolled voluntarily and were randomized into either the PAL group (N=75) or control group (N=75). Ethical approval was secured, and participants provided informed consent.

PAL Intervention
Thirty senior students (years 3-4) were recruited as peer tutors and received eight hours of preparatory training. Training content included facilitation skills, case-based teaching techniques, supervision of psychomotor tasks, and mental-health support strategies. Following training, tutors were each paired with a junior mentee for a six-week program. Weekly 90-minute sessions were structured as follows:
1. 30 minutes of clinical case analysis and collaborative problem-solving.
2. 40 minutes of hands-on psychomotor training such as aseptic techniques and vital-sign measurement under tutor guidance.
3. 20 minutes of stress-management practice involving diaphragmatic breathing, guided relaxation, and reflective discussion.

The control group participated in faculty-led sessions of the same duration and content scope but without peer-led components.

Measurement
Clinical Competence: Blinded evaluators administered OSCEs pre- and post-intervention using standardized checklists.
- **Anxiety**: The GAD-7 questionnaire was administered pre- and post-intervention.
- **Leadership & Professional Identity**: Tutors completed validated self-efficacy and professional identity surveys at session end.
- **Qualitative Engagement**: Focus groups with 15 tutors and 15 tutees were facilitated post-intervention; sessions were transcribed verbatim.

Analysis
Quantitative data were processed using SPSS v.26. Paired t-tests determined within-group changes; independent t-tests compared post-intervention differences. A significance threshold of $p<0.05$ was applied. Qualitative transcripts were coded independently by two researchers using thematic analysis; coding reliability exceeded 80%. Triangulation of quantitative outcomes and qualitative insights provided a comprehensive evaluation.

Results
Participant Demographics
PAL and control groups were comparable regarding age (20.4±1.1 vs. 20.3±1.2 years), gender (72% vs. 70% female), and baseline GPA (3.2±0.3 vs. 3.1±0.3).

Clinical Competence
Baseline OSCE scores did not differ significantly. Post-intervention, PAL students achieved a mean OSCE score of 79.1±5.0, while the control group averaged 72.4±6.4. The 6.7-point difference (95% CI: 4.2-9.2) was highly significant ($p<0.001$), exceeding baseline change for controls (+11.3, $p<0.01$). The protégé effect likely contributed to tutors reinforcing their own skills by teaching peers.

Anxiety Reduction

Baseline GAD-7 scores were similar across groups. PAL participants' scores declined by 4.0 ± 2.0 to 6.5 (minimal anxiety), while controls reduced by 0.5 ± 1.8 to 9.7 (mild anxiety). The between-group reduction difference of 3.5 points (95% CI: -5.0 to -2.0) was significant ($p<0.01$).

Leadership & Professional Identity

Peer tutors reported high leadership self-efficacy (mean=4.3/5) and professional identity strengthening (4.1/5), indicating confidence gains aligned with prior PAL research (Bonder *et al*., 2013; Burchfield & Searle, 2011) [4, 5].

Qualitative Themes

Focus-group analysis revealed the following themes:

- **Skill Reinforcement & Reflection**: Tutors noted teaching classmates clarified their own understanding.
  "Teaching critical steps forced me to clarify my own understanding and correct misconceptions".
- **Safe Learning Environment**: Tutees felt more comfortable asking questions.
  "Learning from peers felt safe-it was okay to ask basic questions without fear".
- **Emotional Support & Stress Management**: Shared coping strategies normalized anxiety.
  "Doing relaxation drills together before OSCE calmed me; it felt shared".
- **Leadership Development**: Tutors described enhanced mentorship skills.
  "Coaching juniors helped me grow as a leader-something faculty feedback can't always foster".
- **Implementation Challenges**: Some faced scheduling conflicts and variability in teaching quality.
  "Finding time each week was tricky-some peers missed sessions due to clinical duties".

These concerns were mitigated by faculty coordination.

Table 1: Comparative Summary

Measure	PAL Group Change	Control Group Change	Between-Group Significance
OSCE Score (%)	+18.8 to 79.1	+11.3 to 72.4	$p<0.001$
GAD-7 Score	-4.0 to 6.5	-0.5 to 9.7	$p<0.01$
Leadership Self-Efficacy*	4.3/5 (tutors)	N/A	-

* Based on self-report.

Our outcomes align with findings from Bahar *et al*. (2022) [2], Aslan *et al*. (2015) [1] and Desnita & Surya (2020) [6], reinforcing that PAL supports psychomotor performance and anxiety reduction across cultural contexts.

Discussion

The PAL intervention led to substantial OSCE improvements (average + 18.8 points), compared to +11.3 points in the control group. This suggests dyadic, peer-led learning significantly enhances students' psychomotor skills and clinical reasoning, supporting findings from Bahar *et al*. (2022) [2] and Topping (1998) [7]. Tutor-led scaffolding enabled personalized feedback and iterative practice in a judgment-free space, which fosters skill mastery more effectively than passively receiving faculty instruction. Furthermore, the protégé effect likely strengthened both tutor and tutee learning. Teaching reinforces understanding- a cognitive effect that has been supported in various educational settings (Topping, 1998; Burchfield & Searle, 2011) [5, 4]. Our study confirms that preparing to teach, delivering content, and reflecting on interactions contribute to tutors' deeper skill acquisition and retention.

The 4-point reduction in GAD-7 scores among PAL participants marked a clinically meaningful drop, moving students into a 'minimal anxiety' range. By contrast, the control group's anxiety decreased only marginally, remaining at mild levels post-intervention.

Qualitative feedback emphasized the normalization of anxiety through shared experiences and guided stress-relief activities-a benefit echoed in Turkish and Nigerian PAL studies (Aslan *et al*., 2015; Bahar *et al*., 2022) [1, 2]. Since anxiety can impair clinical decision-making and testing performance, PAL's dual focus on skill and psychological readiness offers a holistic pathway to better student outcomes. The integration of specific coping protocols into sessions bolstered anxiety mitigation beyond what typical faculty-led instruction can provide.

Peer tutors reported enhanced leadership self-efficacy and maturity, noting their position as peer mentors reinforced their emerging professional identities. This aligns with Bandura's Social Learning Theory, which posits that modeling behaviors and observing positive outcomes increases self-efficacy (Bandura, 1977) [3]. PAL transfers responsibility, empowerment, and accountability to students-mirroring the supervisory roles nurses assume after graduation. The experience thus functions as a practical bridge between education and clinical practice.

These findings support assertions made by Bonder *et al*. (2013) and Burchfield & Searle (2011) [5], that PAL fosters intrinsic motivation, leadership, and mentoring aptitude in student teachers. These internal gains contribute to the professionalization process essential in nursing education.

Participants emphasized PAL's unique capacity for peer bonding and emotional safety. Tutees appreciated the non-hierarchical learning environment, which promoted open dialogue and encouraged clarification of doubts without fear. These findings align with research by Burchfield & Searle (2011) [5] and Bonder *et al*. (2013) [4], which document PAL's role in promoting supportive peer communities and reducing performance anxiety.

The emotional solidarity created in PAL sessions-through shared stress-coping practice routines-provided both psychological comfort and normalized emotional responses to clinical training stressors. This peer-driven emotional scaffolding adds a crucial psychosocial layer to technical skill acquisition.

Despite the successes, some challenges emerged: tutor availability, scheduling difficulties, and inconsistency in tutor quality were noted. These reflect similar limitations described in earlier research (Topping, 1998; Burchfield & Searle, 2011) [5, 7]. Examination of the underlying causes suggests that well-structured tutor training and robust faculty support are essential. For instance, establishing alternating tutor schedules and offering refreshers can reduce burnout and absences. Faculty coordination is crucial to enforce consistency, ensure adherence to pedagogical standards, and provide opportunities for timed substitution.

In India-where nursing schools contend with large cohorts, resource constraints, and faculty shortages-PAL offers a viable, low-resource strategy to augment both skill learning and psychosocial support. The cultural emphasis on collectivism and respect for senior mentors aligns well with PAL models, facilitating acceptance and institutionalization. Strategic implementation options include:

1. **Tutor Training Frameworks:** Intensive workshops in teaching methodology.
2. **Faculty Mentorship Support:** Pairing tutors with faculty supervisors to maintain quality.
3. **Curriculum Integration:** Scheduling structured PAL sessions within existing academic timetables.
4. **Reflection & Feedback Routines:** Including reflective logs, peer reviews, and formative evaluation.
5. **Scalable Policy Development:** Pilot PAL, evaluate outcomes, then scale.

By embedding PAL into curriculum design, Indian nursing schools can enhance learning outcomes while fostering leadership skills and emotional resiliency.

Conclusion

This study demonstrates that structured Peer-Assisted Learning (PAL) significantly enhances both clinical competence and psychological well-being among pre-licensure nursing students. PAL participants achieved markedly higher OSCE scores (+6.7 percentage points compared to controls) and experienced meaningful reductions in anxiety, moving from moderate to minimal levels. Equally important, peer tutors reported enhanced leadership self-efficacy and a stronger sense of professional identity.

Given the pressures on nursing education-such as faculty shortages, large class sizes, and the need for holistic skills-PAL emerges as a cost-effective, scalable, and culturally resonant pedagogical innovation. PAL's strengths lie in simultaneously fostering skill mastery, emotional resilience, leadership development, and supportive peer relationships. These outcomes align with prior international research (Bahar *et al.*, 2022; Aslan *et al.*, 2015; Bonder *et al.*, 2013) [1, 2, 4].

For broader implementation, institutions should consider: (1) formal tutor training workshops, (2) faculty-tutor pairing mechanisms, (3) curriculum-embedded PAL sessions, (4) structured reflection and peer evaluation processes, and (5) longitudinal evaluation frameworks. Future work should investigate PAL's long-term impacts on graduate performance and mental health, as well as its cost-effectiveness.

In sum, PAL is a comprehensive educational tool that not only strengthens clinical capabilities but also nurtures leadership, professional identity, and emotional well-being-attributes essential for the modern nursing workforce. By adopting PAL as a core educational strategy, nursing programs in India and globally can better prepare students for both practice excellence and professional fulfillment.

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