

## EFFECTIVENESS OF PEER-ASSISTED LEARNING IN NURSING STUDENT KNOWLEDGE AND COMPLIANCE IN THE APPLICATION OF STANDARD PRECAUTIONS

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### Abstract

The learning process in higher nursing education develops student competences, such as applying standard precautions, in providing professional nursing care. To improve student knowledge and compliance related to standard precautions requires innovation from lecturers in providing appropriate learning methods. Peer-assisted learning (PAL) can enhance the active role of students and improve achievement. The PAL method involves senior students as peer teachers who help junior students. Using a questionnaire as an assessment instrument, this study aimed to determine the effectiveness of PAL on knowledge and compliance in the application of standard precautions in student nurses. This study design was quasi experimental with pre and post assessment and a control group design approach. This research was conducted at the D Hospital in Padang, Indonesia, a hospital where students practice. This study was conducted in June–September 2017 with a sample size of 45. Data analysis using paired t-test showed that the average values of the level of knowledge and skills of students in the application of standard precautions before and after PAL methods differed significantly in the intervention group ( $p= 0.001$ ). In conclusion, PAL can be applied in the learning process of nursing students to increase student achievement.

**Keywords:** nursing student, peer-assisted learning, standard precaution

### Abstrak

*Efektifitas Metode Peer-Assisted Learning terhadap Tingkat Pengetahuan dan Kepatuhan Mahasiswa dalam Penerapan Kewaspadaan Standar. Proses pembelajaran dalam pendidikan tinggi keperawatan mengembangkan kompetensi siswa, seperti menerapkan tindakan pencegahan standar, dalam memberikan asuhan keperawatan profesional. Untuk meningkatkan pengetahuan dan kepatuhan mahasiswa terkait kewaspadaan standar, dibutuhkan inovasi dari dosen dalam memberikan metode pembelajaran yang tepat. Peer-assisted learning (PAL) dapat meningkatkan peran aktif siswa dan meningkatkan prestasi. Metode PAL melibatkan mahasiswa senior sebagai peer-teacher yang membantu mahasiswa junior. Menggunakan kuesioner sebagai instrumen penilaian, penelitian ini bertujuan untuk menentukan efektivitas PAL pada pengetahuan dan kepatuhan dalam penerapan kewaspadaan standar pada mahasiswa keperawatan. Desain penelitian ini adalah quasi experiment dengan penilaian pre dan post dan pendekatan control group design. Penelitian ini dilakukan di Rumah Sakit D di Padang, Indonesia, sebuah rumah sakit tempat praktik mahasiswa. Penelitian ini dilakukan pada Juni–September 2017 dengan sampel 45. Analisis data menggunakan paired t-test menunjukkan bahwa nilai rerata tingkat pengetahuan dan keterampilan mahasiswa dalam penerapan kewaspadaan standar sebelum dan sesudah metode PAL berbeda secara signifikan pada kelompok intervensi ( $p= 0,001$ ). Kesimpulannya, PAL dapat diterapkan dalam proses belajar siswa keperawatan untuk meningkatkan prestasi siswa.*

**Kata kunci:** kewaspadaan standar, mahasiswa keperawatan, peer-assisted learning

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### Introduction

Nursing education supports the development of competence university campuses and in hospitals or other practical settings (Scheckel, 2016). The hospital exposes students to real

situations and the demands of nursing practice to achieve the expected clinical competence (Sheahan, While, & Bloomfield, 2015).

A basic clinical competence encountered in the hospital is the application of standard precau-

tions (Al-Rawajfah & Tubaishat, 2015), to prevent, protect, and minimize the occurrence of cross-infections among health care workers, including nurses, in direct contact with the body fluids of infected patients (Cheung et al., 2015; Berman, Snyder, Kozier, & Erb, 2016).

According to Williams, Olausson, and Peterson (2015), peer-assisted learning (PAL) is a learning method that can be applied in the hospital setting. PAL encourages active student participation in learning by assigning senior students as peer teachers of junior students. At the time of hospital practice, students are always in contact with fellow students and peers, which enhances their confidence, commitment, concern for others, and sense of familiarity to facilitate the learning process. Cheung et al. (2015) found that senior students have a superior level of knowledge to junior students with regard the application of standard precautions.

Preliminary studies observed 10 students who practice at the D Hospital in Padang, Indonesia and found that six students still had poor adherence to while five students lacked knowledge about the standard precautions. The observations and interviews revealed that senior students had the knowledge and the ability to apply standard precautions better than junior students. During preclinical observations, students often ask professionals how to carry out the practice. Furthermore, the results of interviews with six lecturers in three nursing educational institutions in Padang City showed that PAL had never been applied. Four lecturers mentioned that students are equipped with materials on standard precautions before entering hospital practice. These studies indicate that research is required to determine the effectiveness of PAL on increasing the knowledge and compliance levels of nursing students in the application of standard precautions.

## Methods

The research design was *quasi experimental* with a pre and post control group design. The

total sample included 45 nursing students divided into an intervention group (22) and a control group (23). Non-probability sampling with consecutive sampling was used. The sample inclusion criteria were a willingness to participate junior status or those undergoing clinical practice. Peer-teacher senior students who had academic ability and good practices as indicated in their prior assessment results were included in this study.

Student knowledge and compliance assessment was carried out using the questionnaire developed by Chan et al. (2002). The level of knowledge instrument consisted of 18 yes/no items. The compliance level instrument consisted of 16 items with “always,” “often,” “sometimes,” “rarely,” and “never” being the answer choices.

This study was conducted after obtaining an administrative license, passing an ethics review and applying the principles of research ethics.

The intervention was performed in the clinical setting for 3 weeks. We designed the PAL sessions as student-led case-based discussions about standard precautions in the clinical setting. We anchored the sessions to their clinical experiences and aimed to support great self-direction among our students because case-based discussion is a successful format for PAL by incorporating the identification of learning objectives linked to cases. Students were allocated to groups of four or five peers for PAL sessions, which occurred once per week. Each group consisted of one senior student acting as a peer teacher. The peer teacher presented the case about compliance in the application of standard precautions. The group provided feedback to the peer teacher on their presentation. The peer teacher then taught a topic related to the case. Students selected the topic for the session themselves as an important learning objective linked to the case. They were also guided in their choice of topic by curricular documents. Students had already received teaching in core clinical topics. Therefore, the

PAL sessions focused on the review and application of prior learning to real cases. These sessions occurred at the bedside and in other locations within the clinical sites in the hospital. Each student attended three PAL sessions.

Quantitative data were analyzed using Statistical Package SPSS. The mean, standard deviations, and minimum and maximum knowledge and compliance student scores about standard precautions were investigated using univariate analysis. A dependent sample t-test was also performed to examine whether or not the knowledge and compliance student scores about standard precautions differed before and after PAL. All tests were two tailed unless other-

wise stated. Statistical significance was considered at  $p < 0.05$ .

## Results

The knowledge scores of the participants about standard precautions before and after PAL in the intervention and control groups are listed in Table 1. Compliance scores on standard precautions before and after PAL in the intervention and control groups are shown in Table 2. The effectiveness of PAL on increasing the knowledge and compliance of students in applying standard precautions was indicated by the results of analysis before and after PAL in the intervention and control groups (Table 3).

Table 1. Score of Nursing Student Knowledge about Standard Precautions before and after PAL in the Intervention and Control Groups at the D Hospital in Padang, Indonesia (n= 45)

Group	n	Measurement Knowledge Scores	Mean ± SD	Min–Max
Intervention	22	Before	12.05 + 1.96	8–15
		After	15.27 + 1.49	12–18
Control	23	Before	11.43 + 1,83	8–15
		after	11.65 + 1.58	10–15

Table 2. Compliance Score on Standard Precautions before and after PAL in the Intervention and Control Groups at the D Hospital in Padang, Indonesia (n= 45)

Group	n	Measurement Compliance Score	Mean ± SD	Min–Max
Intervention	22	Before	65.77 + 5.77	55–77
		After	69.73 + 5.01	60–78
Control	23	Before	63.74 + 7.39	50–76
		After	64.39 + 7.28	50–76

Table 3. Differences in Compliance Knowledge and Application of Standard Precautions before and after PAL on the Intervention and Control Groups at the D Hospital in Padang, Indonesia (n = 45)

Variable	Intervention (n= 22)			P	Controls (n= 23)			P
	Mean	SD	Min - Max		Mean	SD	Min - max	
Knowledge								
Prior	12.05	1.96	8–15	0.001*	11.44	1.83	8–15	0.096
After	15.27	1.49	12–18		11.65	1.58	10–15	
Compliance								
Before	65.77	5.77	55–77	0.001*	63.74	7.39	50–76	0.074
After	69.73	5.01	60–78		64.39	7.28	50–76	

\* significant at  $\alpha = 5\%$

As shown in Table 3, the mean scores of knowledge before and after PAL in the intervention group were 12.05 and 15.27, respectively. Further analysis in the intervention group showed a significant difference in the knowledge scores before and after PAL ( $p= 0.001$ ;  $\alpha= 0.05$ ), whereas further analysis in the control group showed no significant difference in the knowledge scores before and after PAL ( $p= 0.090$ ;  $\alpha= 0.05$ ).

The compliance score before PAL in the intervention group was 65.77, and the average score given therapy adherence after PAL was 69.73. Further analysis in the intervention group showed a significant difference in the compliance scores before and after PAL ( $p= 0.001$ ;  $\alpha= 0.05$ ), whereas further analysis in the control group revealed no significant difference in the adherence scores before and after PAL. The unknown mean scores of compliance before and after PAL in the control group were 63.74 and 64.39, respectively. Further analysis showed no significant differences in the scores of compliances before and after PAL in the control group ( $p= 0.074$ ;  $\alpha= 0.05$ ).

## **Discussion**

The results of this study demonstrate the effectiveness of PAL in improving the knowledge and compliance scores of nursing students in applying standard precautions. The results are consistent with those of several previous studies that demonstrated the effectiveness of PAL in clinical learning. Pelloux et al. (2017) compared the effect of PAL with lecturer-guided learning on 86 students and found that PAL is effective in improving students' ability to insert a peripheral venous catheter ( $p= 0.026$ ). Williams et al. (2015) studied 38 student paramedics and demonstrated the effectiveness of PAL in increasing the confidence ( $p= 0.02$ ) and enhancing the activity and motivation of the students ( $p= 0.009$ ). Pelloux et al. (2017) and Williams et al. (2015) also applied PAL in the learning process in the classroom.

PAL allows people from similar social groupings, despite not being professional teachers, to help each other to learn by teaching (Williams, Fellows, Eastwood & Wallis, 2014). PAL is used to teach clinical procedures in specific programs for students who are currently doing clerkships and learning in a skills laboratory. PAL is a common teaching and learning method in medical and health education (Hanso, Ramsdell, Balmer, & Boquin, 2012). In the setting of skills laboratories (skills labs), student tutors are often employed as an equivalent alternative to teachers (Williams et al., 2014).

Burke et al. (2007) stated that PAL can be used as an additional method in the learning process of students in a practical environment, especially to practice clinical skills. PAL is effective in raising objective structured clinical examination test scores, self-confidence, communication skills, and collaboration among students or seniors. Burke et al. (2007) concluded that PAL is effective in improving the clinical skills of students.

PAL is mutually beneficial for student tutors and student learners (Yu et al., 2011). On the one hand, PAL supports the cognitive, psychomotor, and affective development of student learners, thereby increasing their self-confidence, autonomy, clinical reasoning, self-evaluation, and peer collaboration (Secomb, 2008). On the other hand, student tutors also benefit from this program and are able to improve their individual knowledge, skills, and attitudes while practicing interaction and leadership competencies. This program can enable student tutors to become better learners themselves, which in turn helps their undergraduate education, future residency, and faculty membership. Some studies have shown that the so-called "social and cognitive congruence" between student tutors and student learners plays an important role in PAL. Given their similar social roles, student tutors and learners are assumed to be socially congruent (Bugaj et al., 2019).

Feedback from our respondents in this research indicated that they felt that structure was needed during times when they were expected to direct their own learning. The introduction of PAL sessions to clinical attachments about standard precautions offered an opportunity to address this need, provide organizational support by scheduling a structured activity, and to provide pedagogic support by encouraging students to take responsibility for their own learning. PAL was implemented to support student development as a community of learners by providing a framework within which students could work together, encourage mutual engagement among students, and to promote the development of domain-independent skills, such as teamwork, organization, and communication. The peer teacher in this research showed that self-confidence and professionalism are needed for teaching peer learners in the clinical setting. The peer learners also described the importance of a clear structure and efficient time management in the application of standard precautions.

The success of PAL in the educational process of medical students and health professionals has been widely reported and is considered a learning method that involves active collaboration and cooperation between senior and junior students (Yu et al., 2011). With the PAL method, senior students explain the concepts in a simple language in accordance with the ability of junior students as peer learners (Ten Cate & Durning, 2007), resulting in cognitive congruence. Thus, junior students are more open to discussion with senior students than with lecturers. Equality also resulted in a common understanding between senior and junior students to the expected competence and achievement in the learning process.

In real situations, most of the learning that takes place between nursing students in practice has been addressed as informal. Nursing students learn the clinical skill in hospitals through the nurses. The recognition of potential gaps in time spent with mentors or clinical

preceptors and the missed opportunity to learn alongside them cause problems in practice. Nursing education must prepare students to competently conduct appropriate and safe practices to patients. This procedure is an obligation for students to become professional nurses. Student competency must be achieved to meet all health needs, especially in solving patient health problems. Strategies and learning methods applied are expected to improve the achievement of student competencies in the learning process (McKenna & French, 2011).

Peer support has emerged as an influential factor influencing student learning. Peer support is most beneficial in providing emotional support, sharing experience to facilitate learning, and performing physical tasks. Much of the research regarding PAL programs investigated the validity of the claim that PAL benefits all students participating. Diverse literature supports the notion that PAL promotes teaching skills, improves professional skills, such as communication, time management, responsibility, and self-confidence, and increases the knowledge base of peer teachers (Beard, O'Sullivan, Palmer, Qiu, & Kim, 2012; Ross & Cameron, 2007; Secomb, 2008). The reported benefits of students being taught by their peers are observed through an increased openness in classes, with improved access, involvement, interest in learning, and confidence in class participation. Despite the absence of expertise from peer teachers, several studies have also reported improved cognitive and psychomotor abilities compared with non-peer led programs. Nonetheless, lack of expertise is the greatest cause of concern for PAL programs in terms of the quality of student learning. Other issues include high levels of time and resources required to implement PAL programs and students reporting incompatibility with senior students as peer teachers (Hammond, Bithell, Jones, & Bidgood, 2010; Secomb, 2008).

This research provided evidence that PAL enhances the competence of student learning and self-efficacy in the clinical settings, especially

the knowledge and compliance of students in applying standard precautions. Student nurses should also be encouraged to become peer teachers. Owen and Ward-Smith (2014) evaluated the interactions during simulated learning between third-year students playing the role of patients and mentors alongside first-year students providing care and receiving guidance from senior students. This near-peer teaching approach provides a positive learning opportunity for all students and encourages knowledge and skills attainment (Owen & Ward-Smith, 2014). Evidence was also provided in the area of peer mentoring between second-year nursing student mentors and first-year mentees within the academic environment (Gilmour, Kopeikin, & Douche, 2007). Benefits of these partnerships support the transition from university to nursing practice by preparing students to be mentored in the clinical settings and reducing the anxiety of students (Li, Wang, Lin, & Lee, 2010).

The peer teachers in the present research thought that their own enthusiasm and high motivation as well as their similar role and level of expertise are substantial factors influencing the positive and productive atmosphere in PAL. The peer teachers found that the peer learners they taught were generally less anxious and felt fewer inhibitions in asking questions, talking about difficulties, and making mistakes. Carr et al. (2016) showed that PAL provides a comfortable learning environment where the students feel safe to ask questions or make mistakes. Consequently, the relaxed learning environment provided by PAL may enhance the academic performance of health and medical students. Authoritarian lecturers, overly lecturer-centered teaching, and angry lecturers could potentially counteract a relaxed educational environment (Patil & Chaudari, 2016).

Another factor that contributes to the ineffectiveness of PAL is role congruence. Senior students as peer teachers and junior students as peer learners share the role of students. This condition made the junior students comfortab-

le, relaxed, and open in discussions with senior students. It also provided them the courage to think, ask questions, discuss, or practice their clinical skills. Moreover, motivation and confidence increased in the senior and junior students. Lockspeiser, O'Sullivan, Teherani, and Muller (2006) stated that cognitive congruence and role congruence support the effectiveness of PAL.

PAL provides many benefits to the learning process, including increasing social interaction between students and independence in learning (Simorangkir, 2015). PAL allows students to participate actively and think critically (McKenna & French, 2011).

## Conclusion

PAL increases the knowledge and skills of nursing students in applying standard precautions. PAL can be used as a learning method for nursing students to improve their competencies in the cognitive and psychomotor terms to provide effective nursing care to clients. Students are expected to utilize PAL to improve the achievement of competencies in nursing practice. Nursing lecturers can apply PAL as a learning method in practical environments, such as hospitals. The role of lecturers in modifying learning methods is important to improve student competency and thus produce quality nursing graduates.

## References

- Al-Rawajfah, O.M., & Tubaishat, A. (2015). Nursing students knowledge and practices of standard precautions: A Jordanian web-based survey. *Nurse Education Today*, 35 (12), 1175–1180. doi: 10.1016/j.nedt.2015.05.011.
- Beard, J.H., O'Sullivan, P., Palmer, B.J.A., Qiu, M., & Kim, E.H. (2012). Peer assisted learning in surgical skills laboratory training: A pilot study. *Medical Teacher*, 34 (11), 957–959. doi: 10.3109/0142159X.2012.706340.

- Berman, A.J., Snyder, S., Kozier, B., & Erb, G. (2016). *Kozier & Erb's fundamentals of nursing: Concepts, process, and practice* (10th Ed.). USA: Pearson Prentice Hall.
- Bugaj, T.J., Blohm, M., Schmid, C., ..., Nikendei, C. (2019). Peer-assisted learning (PAL): Skills lab tutors' experiences and motivation. *BMC Medical Education, 19* (353), 1–14. doi: 10.1186/s12909-019-1760-2.
- Carr, S.E., Brand, G., Wei, L., Nicol, P., Metcalfe, H., ..., Foley, L. (2016). Helping someone with a skill sharpen it in your own mind: A mixed method study exploring health professions student experiences of peer assisted learning (PAL). *BMC Medical Education, 16* (48), 1–10. doi: 10.1186/s12909-016-0566-8.
- Chan, R., Molassiotis, A., Chan, E., Chan, V., Ho, B., Lia, C., Lamp, C., Shift, F., & Yiu, L. (2002). Nurses knowledge of and compliance with universal precautions in an acute care hospital. *International Journal Nurses Student, 39* (2), 157–163. doi: 10.1016/s0020-7489(01)00021-9.
- Cheung, K., Chan, C.K., Chang, M.Y., Chu, P.H., Fung, W.F., .... Mak, H.M. (2015). Predictors for compliance of standard precautions among nursing students. *American Journal of Infection Control, 43* (7), 729–734. doi: 10.1016/j.ajic.2015.03.007.
- Gilmour, J., Kopeikin, A., & Douche, J. (2007). Student nurses as peer-mentors: Congeniality in practice. *Nurse Education Practice, 7* (1), 36–43. doi: 10.1016/j.nepr.2006.04.004.
- Hammond, J.A., Bithell, C.P., Jones, L., & Bidgood, P. (2010). A first year experience of student-directed peer-assisted learning. *Active Learning in Higher Education, 11* (3), 201–212. doi: 10.1177/1469787410379683.
- Hanso, M., Ramsdell, A., Balmer, D., & Boquin, C. (2012). Medical students as teachers at CoSMO, Columbia University's student-run clinic: A pilot study and literature review. *Medical Teacher, 34* (3), 189–197. doi: 10.3109/0142159X.2012.642832.
- Li, H.C., Wang, L.S., Lin, Y.H., & Lee, I. (2010). The effect of a peer-mentoring strategy on student nurse stress reduction in clinical practice. *International Nursing Review, 58* (2), 203–210. doi: 10.1111/j.1466-7657.2010.00839.x.
- Lockspeiser, T.M., O'Sullivan, P., Teherani, A., & Muller, J. (2008). Understanding the experience of being taught by peers: The value of social and cognitive congruence. *Advances in Health Sciences Education: Theory and Practice, 13* (3), 361–372. doi: 10.1007/s10459-006-9049-8.
- McKenna, L., & French, J. (2011). A step ahead: Teaching undergraduate students to be peer teachers. *Nurse Education in Practice, 11* (2), 141–145. doi: 10.1016/j.nepr.2010.10.003.
- Owen, A., & Ward-Smith, P. (2014). Collaborative learning in nursing simulation: Near-peer teaching using standardized patients. *Journal of Nurse Education, 53* (3), 170–173. doi: 10.3928/01484834-20140219-04.
- Patil, A.A., & Chaudhari, V.L. (2016). Students' perception of the educational environment in medical college: A study based on DREEM questionnaire. *Korean Journal of Medical Education, 28* (3), 281–288. doi: 10.3946/kjme.2016.32.
- Pelloux, S., Gregoire, A., Kirmizigul, P., Maillot, S., ... Rimmele, T. (2017). Peripheral venous catheter insertion simulation training: A randomized controlled trial comparing performance after instructor-led teaching versus peer-assisted learning. *Anaesthesie Critical Care Pain Medication, 36* (6), 397–402. doi: 10.1016/j.accpm.2016.11.007.
- Ross, M.T., & Cameron, H.S. (2007). Peer assisted learning: A planning and implementation framework: AMEE Guide no 30. *Medical Teacher, 29* (6), 527–545. doi: 10.1080/01421590701665886.
- Scheckel, M. (2016). *Nursing education: Past, present, future*. Retrieved from <http://www.>



jblearning.com/samples/0763752258/52258\_CH02\_Roux.pdf.

Secomb, J. (2008). A systematic review of peer teaching and learning in clinical education. *Journal of Clinical Nursing*, 17 (6), 703–716. doi: 10.1111/j.1365-2701.2007.01954.x.

Sheahan, L., While, E., & Bloomfield, J. (2015). An exploratory trial exploring the use of a multiple intelligences teaching approach (MITA) for teaching clinical skills to first year undergraduate nursing students. *Nurse Education Today*, 35 (12), 1148–1154. doi: 10.1016/j.nedt.2015.05.002.

Simorangkir, S.J.V. (2015). Metode pembelajaran peer assisted learning pada praktikum anatomi. *Jurnal Pendidikan Kedokteran Indonesia*, 4 (2), 58–64. <https://jurnal.ugm.ac.id/jpki/article/view/25282>

Ten Cate, O., Van de Vorst, I., & Van den Broek, S. (2012). Academic achievement of students tutored by near-peers. *International Journal of Medical Education*, 3 (6), 6–13. doi: 10.5116/ijme.4f0c.9ed2.

Williams, B., Fellow, H., Eastwood, K., & Wallis, J. (2014). Peer teaching experience of final year paramedic students: 2011–2012. *Journal of Peer Learning*, 7 (1), 81–91. <https://files.eric.ed.gov/fulltext/EJ1059989.pdf>.

Williams, B., Olausson, A., & Peterson, E.L. (2015). Peer-assisted teaching: An interventional study. *Nurse Education in Practice*, 15 (4), 293–298. doi: 10.1016/j.nep.2015.03.008.

Yu, T.C., Wilson, N.C, Singh, P.P., Lemanu, D.P., Hawken, S.J., & Hill, A.G. (2011). Medical students-as-teachers: A systematic review of peer-assisted teaching during medical school. *Advances in Medical Education and Practice*, 23 (2), 157–172. doi: 10.2147/AMEP.S14383.