Jurnal Aisyah: Jurnal Ilmu Kesehatan

Volume 10, Issue 1, 03 2025, p. 128-140
ISSN 2502-4825 (print), ISSN 2502-9495 (online)

THE INFLUENCE OF TEAM BASED LEARNING ON STUDENTS UNDERSTANDING PATIENT SAFETY: LITERATURE REVIEW

Author:

Ludovikus Duhu[1], Wiwik Kusumawati[2*]

Master of Nursing, Universitas Muhammadiyah Yogyakarta, Yogyakarta, Indonesia[1]
Master of Nursing, Universitas Muhammadiyah Yogyakarta, Yogyakarta, Indonesia[2]
Co Responden : wiwik@umy.ac.id

About the Author

1st Author	: Ludovikus Duhu, S.Kep.,Ns
Affilition	: Master of Nursing, Universitas Muhammadiyah Yogyakarta
Mailing address	: Jl.Brawijaya, Tamantirto, Kasihan, Bantul, Yogyakarta, 55183
Email of author	: ludovikus.duhu.psc22@mail.umy.ac.id
ID Orcid	: https://orcid.org/0009-0002-5230-0614
URL Google Cendekia	: https://bit.ly/3BTdENE
Phone number	: +6281251971051
2st Author	: Dr. dr. Wiwik Kusumawati, M.Kes
Affilition	: Master of Nursing, Universitas Muhammadiyah Yogyakarta
Mailing address	: Watu, nomor 74 RT 04 Argomulyo Sedayu Bantul Yogyakarta
Email of author	: *wiwik@umy.ac.id*
ID Orcid	: https://orcid.org/0000-0003-2266-8661
URL Google Cendekia	: http://surl.li/lbvic
Phone number	: +628164224386

ABSTRACT

A kind of health care that is offered to the public and is patient-safe is known as patient safety. To improve students' understanding of patient safety, teachers need to use student-centered teaching methods. Small-group instruction built on cooperation, thorough reasoning, and critical thinking is known as team-based learning. The goal of this study is to determine how team-based learning influences students' understanding patient safety through a review of the literature. The research method uses literature review from 4 databases: Scopus, PubMed, Science Direct, and Google Scholar, with the keywords "team-based learning," "patient safety," and "students." It obtained 10,843 articles. The Joanna Briggs Institute (JBI) helped collect and extract the results of the study. The final results showed that seven articles were eligible for review. According to the findings, team-based learning can help students gain a better comprehension of the idea of patient safety, as well as enhance their critical thinking, communication, and collaboration abilities. Conclusion: Team-based learning can impact improving understanding of the concept patient safety, improving teamwork, improving critical thinking skills of patient safety students, and improving students' communication skills.

Keywords: team based learning, patient safety, students.

ABSTRACT

Patient safety merupakan sebuah bentuk pelayanan kesehatan yang aman bagi pasien. Untuk meningkatkan pemahaman patient safety mahasiswa, pengajar perlu menggunakan metode pengajaran berpusat pada mahaiswa. Team Based

Learning merupakan model pembelajaran dalam bentuk tim kecil didasarkan pada kerja sama tim, penalaran mendalam, dan pemikiran kritis. Studi ini **bertujuan** untuk mengetahui pengaruh team based learning terhadap pemahaman patient safety mahasiswa melalui tinjauan pustaka. **Metode penelitian** menggunakan literatur review dari 4 database scopus, pubmed dan science direct dan google scolar, dengan kata kunci “team based learning” "patient safety" "mahasiswa" didapatkan 10,843 artikel. Institut Joanna Briggs (JBI) membantu mengumpulkan dan mengekstrak hasil studi. Hasil akhir menunjukkan bahwa tujuh artikel memenuhi syarat untuk review. Hasil menunjukkan bahwa pembelajaran berbasis tim dapat membantu mahasiswa memperoleh pemahaman yang lebih baik tentang konsep keselamatan pasien, serta meningkatkan kemampuan berpikir kritis, komunikasi, dan kolaborasi. **Kesimpulan**: Team based learning dapat berpengaruh meningkatkan pemahaman pengetahuan patient safety, meningkatkan kerjasama tim, meningkatkan kemampuan berpikir kritis patient safety mahasiswa, serta peningkatan kemampuan komunikasi mahasiswa.

Kata kunci : team based learning, patient safety, mahasiswa.

INTRODUCTION

Patient safety is becoming an increasingly important issue in the health sector, especially in the increasingly complex modern era. One fundamental tenet of health services that helps to improve quality is patient safety (Wulandari et al., 2021). One way to ensure patient safety is to improve the understanding and skills of medical personnel in patient safety. To reduce medical errors, health workers, including nurses, are responsible for maintaining patient safety (Kobayashi et al., 2021). In hospitals, patient safety is a critical concern for all healthcare providers, including physicians, nurses, and other health teams. Health services that are safe and do not harm patients are known as patient safety (Dinius et al., 2019).

The World Health Organization (WHO) states that patient safety is a major global health concern. Medical errors can arise from both individual and systemic sources. Adverse patient safety outcomes are primarily caused by surgical operations (27%) pharmaceutical errors (18%) and health care-associated infections (Al Rahmi et al., 2021). Hong Kong (31%), Australia (25%), India (23%), the United States (12%), and Canada (10%) are the five nations worldwide where patient safety problems have been reported (Kusniati et al., 2024). In Indonesia, in 2013 there were 132 reports, in 2016 there were 688 reports, and in 2019 there were 7,465 reports (Sutejo et al., 2021). In 2023, based on data on the Patient Safety Incident Report website, hospital patient safety incident reports by incidents resulted in 117 deaths, 43 cases of irreversible/serious injuries, 350 cases of reversible/moderate injuries, and 808 cases of minor injuries. Meanwhile, based on the incident report, data on Near Miss Incidents/KNC (Near Miss) were obtained: 1,721 cases of KTC (Non-Injury Incidents) and 1,789 cases of adverse events/sentinel incidents (Patient Safety incident report, 2023). On the other hand, hospitals do not report all information about patient safety, which shows that patient safety is still lacking (Rizany et al., 2021). Patient safety incident reports are needed to support service quality and as a reference for educators to teach students (Wijaya et al., 2022).

Health education contributes to patient safety culture. Education in medicine, nursing, and pharmacy must include patient safety (Gill et al., 2017). It is emphasized that patient safety should be included as a key element in health education. In health education, patient safety is not specifically defined as an educational goal, but as its importance increases, studies on patient safety and nursing education are reported to be increasing (Ahn et al., 2018). Students' awareness of the importance of patient safety is high, while students have low understanding of patient safety competencies and instructors have low confidence in patient safety education. These results support the need for quantitative improvement of learning models in nursing education that are effective for improving students' patient safety competencies. For students to become more competent, they must be taught using strategies like problem-centered learning, action learning, and team-based learning (Lee & Park, 2021). Currently employed in education, team-based learning, or TBL, is an active learning technique that helps students improve their knowledge and abilities related to clinical reasoning (Carrasco et al., 2019). This method focuses on applying ideas in complex real-world situations. In Indonesia, team

learning is still not widely used in health education. The TBL method can be used well to deliver learning materials, especially in classes with many students (Burton et al., 2021).

The strength of TBL lies in its efforts to foster students' desire to learn independently and in a group work environment, which allows students to learn materials or topics effectively, interestingly, and not boringly. They can also understand concepts and how they are applied. Recent research indicates that TBL can enhance students' understanding, capacity for addressing problems, and capacity for autonomous learning (Lee & Park, 2021). TBL is an excellent learning method to improve students' understanding and skills in patient safetyThrough the use of an active and collaborative learning strategy, TBL can boost student engagement and participation in the classroom(Sumiyoshi et al., 2020). To effectively apply TBL, there are still a lot of elements to take into account, such choosing authentic and pertinent instances and diverse, well-balanced teams.

Increasing teamwork, student involvement, and a deeper comprehension of patient safety can all be accomplished with the help of the TBL method. By engaging students in group discussions and team-based assignments, this method can help improve students' social skills, conceptual understanding, and cognitive skills. In addition, other benefits of using TBL are encouraging collaboration between team members and developing effective teamwork skills, increasing active, participatory learning and strengthening students' critical skills, honing problem-solving skills (Kim et al., 2016), decision-making, and logical reasoning of students, helping students to develop independence, manage time well, and appreciate the importance of individual responsibility for team success (Wu et al., 2022). Based on the description above, the author wants to conduct a literature review to find out the results of research on how TBL affects students' understanding of patient safety. We expect this study to enhance students' comprehension and proficiency in patient safety by utilizing a team-based learning model.

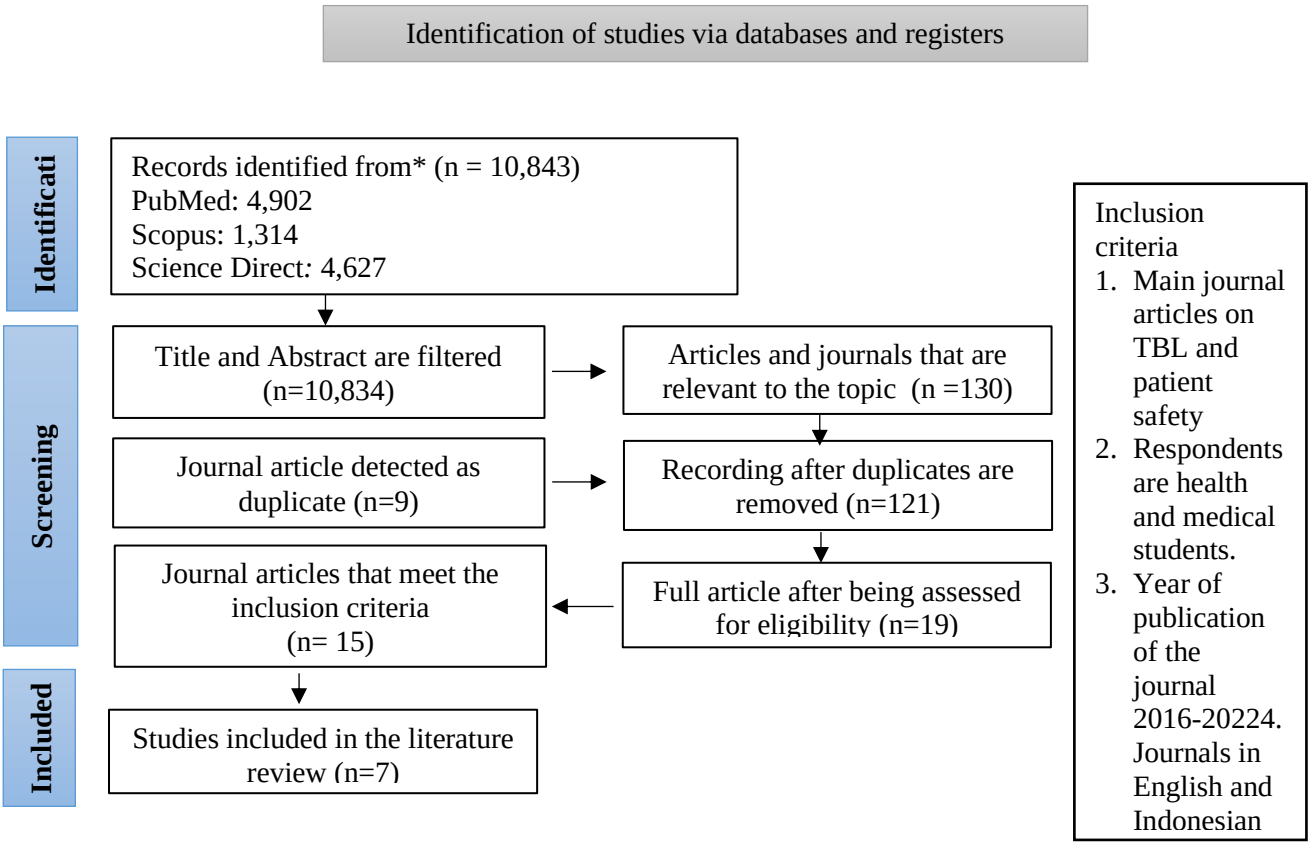

Figure 1: PRISMA flow diagram

METHOD

The study used a systematic and selective literature review of relevant articles. To search for literature with the keywords team-based learning, patient safety, and students, electronic databases such as PubMed, Science Direct, and Scopus were used. Inclusion criteria included primary journal articles on team-based learning, patient safety, and health and medical student respondents from the publication years 2016–2022. PRISMA (The Preferred Reporting Items for Systematic Reviews and Meta-Analysis) criteria were followed during the article selection and full text search process, which restricted the search to just English-language publications (Liberati et al., 2009).

Journal articles with unclear or unstructured research techniques, abstract-only publications, systematic review journal articles, and scoping reviews were among the exclusion criteria. The chosen literature consisted of journal papers discussing how team-based learning affects students' comprehension of patient safety. There were 10,834 articles found from three databases, which showed that the articles were relevant to the topic being reviewed. After publishing the articles and conducting title and abstract screening, there were 10,834 that were not appropriate and the remaining 130 that were appropriate to the topic. Additionally, out of the 19 journal articles that were selected for further consideration after filtering and duplicating those that satisfied the inclusion criteria, 7 were thoroughly discussed and deemed practical. These data were then analyzed and discussed systematically to produce research conclusions. Following the literature analysis, the data and material were arranged and presented as a literature review, which comprised an introduction, methodology, results, and conclusions.

RESULTS AND DISCUSSIONS

Researchers first sorted and extracted data for the papers they had collected by carefully detailing the author's name, title, research design, aims, interventions, and findings. This was done after conducting article selection based on inclusion and exclusion criteria. This table provides an overview of the study.

Table 1. Previous Research

NO	AUTHOR/ YEAR/ TITLE	METHOD	COUNTRY	OBJECTIVE	RESEARCH RESULT
		Design and Sample			
1	Applying interprofessional Team-Based Learning in patient safety (Lochner et al., 2018)	This study used a quasi-experimental pre-test study design. Respondents use instruments like the West England Interprofessional Questionnaire and the TBL Mennenga Student Assessment Instrument to complete self-assessment. To determine whether students learn from one another during group discussions, individual readiness test scores are compared with group readiness test scores. The methods employed in the data analysis included non-parametric, parametric, and descriptive methods including the paired t-test and mean and standard deviation.	Italia	The aim of this research is to understand how TBL impacts pre-med and non-medical healthcare students. The effects of TBL include students' reactions to educational methods such as TBL, changes in how students perceive interprofessional learning (such as teamwork and communication, changes in their perspectives on patient safety as well as interprofessional learning, exchanges, and relationships.	IN CONTRAST TO THE DIDACTIC LECTURES THEY HAD PREVIOUSLY EXPERIENCED, STUDENTS WERE ASKED WHICH METHOD THEY PREFERRED—THE RECENTLY ADOPTED TBL APPROACH OR THE OTHER. THE FINDINGS INDICATE THAT ELEMENTS PERTAINING TO "SELF-DIRECTED LEARNING" AND "RETENTION" HAD HIGHER TBL RATINGS (84.6 PERCENT AND 64.1%, RESPECTIVELY), WITH A SIGNIFICANT DIFFERENCE ($P < 0.05$). TEAM-BASED LEARNING IS A

					SUCCESSFUL TEACHING TECHNIQUE THAT GREATLY IMPROVES INTERPROFESSIONAL LEARNING, COMMUNICATION, AND TEAMWORK, ACCORDING TO THE RESEARCH FINDINGS. IN THE MEANTIME, ATTITUDES DIFFERED WHEN COMPARED BETWEEN THE PRE- AND POST-TESTS; SEVEN ATTITUDES AND SAFETY BEHAVIORS WERE SHOWN TO DIFFER BETWEEN THE TWO PERIODS PRIOR TO AND FOLLOWING THE INTRODUCTION OF TEAM-BASED LEARNING.
2	Effectiveness of an interprofessio al patient safety team-based learning simulation experience on healthcare professional trainees (Goolsarran et al., 2018a)	Deskriptif Statistik Uji is used to calculate rata-rata, standard deviation, and persentase. To find out whether there are any variations between solo and team work, the overall IRAT score and the overall TRAT score are compared using the independent sample test (Uji t sampel). To contrast IRAT with TRAT in terms of the quantity of accurate answers for every question, uji chi-kuadrat is used. Response total before and after analysis using the independent sample. Samples of 50 undergraduate nursing students enrolled in the expedited one-year bachelor nursing program and 26 internists in their first year of practice.	USA	This research seeks to apply, evaluate, and measure the efficacy of simulation and TBL models for teaching discipline-specific concepts related to patient behavior.	FINDINGS FROM THE TEAM READINESS GUARANTEE EXAMINATION (TRAT) REVEALED THAT THE TEAM-BASED LEARNING APPROACH INCREASED KNOWLEDGE OF THE BASIC CONCEPT OF PATIENT SAFETY WHEN RELATED TO THE INDIVIDUAL READINESS GUARANTEE ASSESSMENT (IRAT) (P= 0.001). THE CHECKLIST FOR THE SIMULATION APPLICATION EXERCISE HAS BEEN REALLY WELL ACCOMPLISHED. REGARDING THE INTERPROFESSIONAL LEARNING SUBSCALE PREPAREDNESS RATINGS (RIPLS) FOR TEAMWORK AND COLLABORATION, AS WELL AS HIGHER PROFESSIONAL IDENTITIES, THE ONLY VARIATIONS BETWEEN PRE- AND POST-WORKSHOP SURVEYS WERE IN POSITIVE PROFESSIONAL IDENTITY SUBSCALES (P = 0.03). NINETY PERCENT OF THOSE SURVEYED THOUGHT THAT THE KNOWLEDGE THEY GAINED ABOUT SAFETY WILL PROBABLY ENHANCE THE CARE THEY GIVE

					PATIENTS GOING FORWARD.
3	Team-Based Learning: a randomized clinical trial in undergraduate nursing (Sakamoto et al., 2020)	The research design has a parallel, controlled, and academic klinis uji. The aforementioned groups consist of 11 students for a kelas based on kuliah and 14 students for tim-based instruction.	Brazil	to evaluate learning satisfaction with the Team-Based Learning methodology and to compare the comprehension of surgical safety knowledge using the Team-Based Learning technique.	THE STUDY'S CONCLUSIONS INDICATE THAT THERE WAS A SIGNIFICANT DIFFERENCE (P = 0.002) IN THE POST-TEST SCORES OF THE LECTURE CLASS AND TBL GROUPS WITH REGARD TO THE CORRECT RESPONSES. ON THE OTHER HAND, THE CONTROL GROUP DID NOT SHOW A STATISTICALLY SIGNIFICANT DIFFERENCE IN THE NUMBER OF CORRECT ANSWERS IN THE TBL GROUP. IT CAN BE CONCLUDED THAT TBL HAS A SIGNIFICANT IMPACT ON THE UNDERSTANDING OF KNOWLEDGE AMONG UNDERGRADUATE NURSING STUDENTS AFTER THE LECTURE CLASS COMPARED TO THE CONTROL GROUP.
4	Teaching Patient Safety Using an Interprofessional Team-Based Learning Simulation Model in Residency Training (Lu et al., 2016).	A chi-square test is used in this study to compare the number of responses with the correct answers for each item in the IRAT/GRAT questions, and a t-test is used to compare the IRAT and GRAT scores. The sample consists of 76 participants, including 26 nursing students and 50 pharmacy interns.	USA	The aim of this study is to investigate the effects of the TBL simulation experience on the knowledge, attitudes, and abilities of the respondents with respect to patient safety and high-quality healthcare.	IN ORDER TO COMPARE THE IRAT AND GRAT SCORES, AN INDEPENDENT SAMPLES T-TEST WAS EMPLOYED. THE GRAT SCORE (M = 7.7, SD = 1.8; T(94) = −4.9, P = 0.001) WAS SIGNIFICANTLY HIGHER THAN THE IRAT SCORE (M = 5.6, SD = 1.7). THIS SHOWS THAT TBL SIMULATION IS AN EFFECTIVE WAY TO TEACH THE FUNDAMENTALS OF PATIENT SAFETY. REALISTIC AND USEFUL PATIENT SAFETY CONCEPTS CAN BE TAUGHT USING THIS MODEL, WHICH IS A VALUABLE TEACHING TOOL.
5	Using team-based learning in a large interprofessional health science education experience (Black et al., 2016)	Quantitative study employing two-way modeling An ANOVA test was used to look at the IRAT scores of the students throughout time as well as their careers. The number of samples used was divided into 3 sessions, namely 639, 626, and 631 respondents each participating in three sessions.	USA	To ascertain the experience in putting the team-based learning model into practice by assessing the knowledge of participants through three sessions of discussion questions and clinical-based scenarios for each of the following topics: patient safety, ethical behavior in the workplace, and	WITH AN AVERAGE SCORE OF 83.01, 80.2, AND 83.73% CORRECT IN THE THREE TEAM EVALUATIONS, THE ANOVA TEST RESULTS DEMONSTRATED THAT THE RESPONDENTS' KNOWLEDGE OF THE TRAT SCORE WAS CONSIDERABLY HIGHER THAN EACH OF THE THREE SESSIONS'

				variations in health systems.	IRAT SCORES (P <.01). THIS INDICATES THAT THE EFFECTIVENESS OF TBL IN ASSISTING INDIVIDUAL LEARNERS IN BETTER UNDERSTANDING PATIENT SAFETY, PROFESSIONAL ETHICS, AND THE DIFFERENCES BETWEEN HEALTH SYSTEMS HAS BEEN ESTABLISHED.
6	A comparison of team-based learning and lecture based learning on clinical reasoning and classroom engagement (Ulfa et al., 2021).	This study is quantitative in nature and analyzes demographic data using descriptive statistics. The standard deviation is used to evaluate the basic comparison between the two groups, and Cohen's d test is used to determine the effect size. 62 kids were in the intervention group and 53 students were in the control group out of the 115 total respondents.	Jepang	Assessing and comparing the effects of TBL and LBL on clinical reasoning and classroom engagement about postpartum hemorrhage among Indonesian students pursuing midwifery.	THE STUDY'S CONCLUSIONS DEMONSTRATE THAT TBL STUDENTS OUTPERFORM LBL STUDENTS IN TERMS OF AVERAGE CLINICAL REASONING SCORES ON POSTPARTUM HEMORRHAGE IN BOTH POST-TESTS (P <.001; COHEN D = 1.41) AND TWO WEEKS POST-TEST (P <.001; COHEN D = 1.50). THIS INDICATES THAT THE INTERVENTION GROUP OUTPERFORMS THE CONTROL GROUP IN TERMS OF POSTPARTUM HEMORRHAGE SCORES. TBL IS AN EFFICIENT WAY TO STRENGTHEN KNOWLEDGE AND CAN HELP STUDENTS DEVELOP THEIR CLINICAL REASONING SKILLS. SPEAKING WITH PEERS ABOUT THE SUBJECT IN DETAIL MIGHT ALSO BE BENEFICIAL.
7	IMPROVING PATIENT SAFETY: ENGAGING STUDENTS IN INTERPROFESSIONAL TEAM-BASED LEARNING (TBL) (CLARKE ET AL., 2023)	THE INTERPROFESSIONAL PATIENT SAFETY TBL SESSION WAS VOLUNTARY FOR 11 PHARMACY STUDENTS, 8 NURSING STUDENTS, AND 8 MEDICAL STUDENTS WHO MADE UP THE 27 RESPONDENTS IN THE QUANTITATIVE RESEARCH DESIGN. ANOVA, OR ONE-WAY ANALYSIS OF VARIANCE, WAS USED TO COMPARE THE AVERAGE IRAT SCORES AMONG FIELDS. TO ANALYZE THE DATA, IBM SPSS STATISTICAL VERSION 27 WAS UTILIZED.	AUSTRALIA	AN ASSESSMENT OF TBL'S USE IN AN INTERPROFESSIONAL SETTING WITH THE GOAL OF IDENTIFYING STUDENTS' LEARNING OBJECTIVES WITH REFERENCE TO PATIENT SAFETY WAS CONDUCTED.	ACCORDING TO THE STUDY'S FINDINGS, THE AVERAGE IRAT SCORE FOR NURSING IS 60%, FOR PHARMACY IT IS 60%, AND FOR MEDICAL IT IS 70%. ACCORDING TO A ONE-WAY ANOVA, THERE WAS NO PROOF THAT THE AVERAGE SCORES ACROSS FIELDS DIFFERED SIGNIFICANTLY (F = 0.865, DF = 2, P = 0.43). THIS SUGGESTS THAT EACH PARTICIPANT HAS A SAME AMOUNT OF KNOWLEDGE BASE. WITHIN THE RANGE OF 31 TO 35 OUT OF 40, THE INTERDISCIPLINARY TEAM'S TRAT SCORE FALLS.

A method of teaching called team-based learning (TBL) uses collaboration to solve problems and accomplish learning goals. TBL is often implemented as an active learning method that encourages team interaction, discussion, and problem-solving related to patient safety. TBL has been applied in various educational contexts, including understanding patient safety among students. Several research look at how TBL affects students' comprehension of patient safety in this overview of the literature. The impact of implementing TBL on students can be categorized into four themes: increasing patient safety concept understanding, developing critical thinking abilities in clinical reasoning, encouraging active student participation in the learning process, and fostering cooperation and communication. These themes are derived from the theme's mapping findings about how team-based learning affects students' comprehension of patient safety.

1. Improvement of knowledge about patient safety concepts

A person's ability to understand or comprehend something after recalling and grasping it is called conceptual understanding. When students can explain something using their own words or provide a more detailed explanation about it, it indicates that they have understood something. (Suryani Ela, 2019). Understanding the concepts and principles of patient safety and quality care is very important. One way an educator can teach the concept of patient safety is through interactive and student-centered learning.

Active participation and cooperation from trainees and students are required for team-based learning, a multi-phase educational approach. This teaching technique is the best approach to encouraging teamwork in the workplace in order to enable safe patient care. The consistent use of TBL is associated with an improvement in the understanding of the concept of patient safety among students. Through self-directed learning in the pre-class phase, team discussions, and case-based problem-solving, students can delve deeper into the understanding of the concept of patient safety as applied in real-world contexts (Walton et al., 2014). This is consistent with the study by (Lu et al., 2016), which discovered that teaching the principles of patient safety through team-based learning is an efficient method. The study by (Buhse & Della Ratta, 2017)emphasizes that team-based learning enhances knowledge about chronic care management and patient safety. Additionally, the motivation for cross-disciplinary collaboration and knowledge sharing can be enhanced through team-based learning. TBL is more suited for the workplace since it can change people's beliefs and knowledge to become more conscious of patient safety issues (Clarke et al., 2023).

2. Critical thinking in clinical reasoning

Critical thinking is very important for a student in assessing the information they receive and serves as a foundation for evaluating the ideas, opinions, and beliefs presented by academics and the general public. Through critical thinking, students can showcase their creativity and strive to enhance their ability to argue about the ideas and issues being discussed (Sihotang Kasdin, 2019). In the world of health education, critical thinking skills will grow and develop through classroom learning activities. Students who are consistently engaged in interactive learning activities will cultivate the ability to think critically.

TBL is an adult learning model that can encourage students to think critically, including on issues of patient safety. This is due to the fact that this approach compels students to employ what they have learned in difficult circumstances, like debating clinical case studies in class (Espey, 2018). This condition forces students to develop analytical skills and clinical reasoning that are essential in

understanding and addressing patient safety challenges (Hosny et al., 2019). Preparation before to class, group formation during the first lesson, reiterating the learning objectives, applying the material, and cooperating as a team are all part of team-based learning. Patient safety and treatment both depend on efficient teamwork. In today's complicated healthcare system, medical errors resulting from a lack of team communication are common. This can lead to tragic consequences for patients. In the application of content, students are expected to think critically through clinical reasoning based on patient safety cases in healthcare (Ulfa et al., 2021), and working effectively in teams is crucial for healthcare and patient safety (Branson et al., 2015).

TBL equips medical staff with the skills necessary to collaborate in groups, synthesize data, and interact with patients. Research evaluating student engagement and attitudes (Lochner et al., 2018a) towards TBL learning skills, compared to students' experiences in a traditional lecture format, shows that the TBL format promotes communication skills, knowledge application, and peer-to-peer learning. Students also believe that the TBL format encourages independent learning (Wu et al., 2022) and ability to think critically (Silberman et al., 2021) compared to learning in a lecture format (Kek et al., 2019). This may be due to the characteristics of the TBL methodology, where students are engaged in an active learning process, enhancing their critical thinking skills, and taking responsibility for their learning before class (Branson et al., 2015). Students use their pooled knowledge and critical thinking abilities to solve complicated occupational health and safety concerns through genuine cooperation (Kek et al., 2019).

3. Active Student Engagement in Learning

In TBL learning, students are actively involved in team discussions and collaborate with other team members. This enhances student engagement and desire to learn about patient safety because they feel involved in the learning process and have a responsibility to achieve the team's goals. The research results of Currey et al., (2020) shown that, when comparing the TBL learning model to the traditional learning model, the average student engagement scores were noticeably higher. This is due to the fact that TBL allows students to collaborate in teams to solve the same problems or questions, as well as to combine the overall performance of the class group. In this way, in each team there are students who are able to achieve very good and convincing individual performance and positively guide their group towards better scores as well (Vannini et al., 2022).

According to research by Burgess et al. (2020) co-teaching improves students' engagement, interest, performance, and retention of information. The TBL group's problem-solving skill ratings significantly increased in this study when compared to the control group. TBL is very important for encouraging students to participate in team discussions and listen to peer feedback. By doing that, they can get clearer answers, and their memories last longer. The research by Sakamoto et al., (2020) highlights that following lecture lessons as opposed to TBL classes, students' comprehension of the material is higher in the TBL group, and every student expressed satisfaction with the TBL approach. They were all interested in the process and found the approach enjoyable, which helped them comprehend the material and apply it to their challenges more skillfully. Interprofessional collaborative TBL simulation is a useful method for teaching the fundamentals of patient safety. In order to teach healthcare personnel realistic and useful patient principles, team-based learning models might be a valuable training tool.

4. Communication and Teamwork

Through team-based learning, students get the chance to routinely communicate with other team members. During this process, they learn to communicate effectively, listen to others' opinions, and collaborate to achieve common goals (Li et al., 2023). In terms of patient safety, these communication and collaboration skills are crucial because effective team collaboration is necessary to avoid errors and ensure patient safety (Goolsarran et al., 2018). This is consistent with the findings of the study carried out by (Branney & Priego-Hernández, 2018), research discovered most participants felt team-based learning increased their sense of accountability and satisfaction. Team-based learning looks to be an approach that offers considerable educational benefits through contextualization and collaboration (Epstein, 2016).

Furthermore, TBL highlights that, as an active learning technique, TBL may develop teamwork abilities and help apply them in the context of interprofessional learning (Park & Park, 2022). The individual team members' contributions, which are related to improving team performance, are among the distinctive components of collaboration. This is consistent with studies that highlight the value of leadership in collaborative efforts. Moreover, team-based learning (TBL) can be a useful tool for training interprofessional learner groups in certain subject areas and encouraging the use of collaboration abilities (Black et al., 2016). This is further reinforced by research conducted by (Lochner et al., 2018), where all teams beat the average scores of their individual members during the readiness assurance process, demonstrating notable gains in communication and teamwork, and TBL favorably affected teaching techniques.

RESEARCH LIMITATIONS

The quantitative approach to the analysis of research findings is the only area in which this study has limitations. Consequently, qualitative research is still required to determine how team-based learning affects students' comprehension of patient safety.

CONCLUSIONS AND SUGGESTIONS

The research findings can be concluded that the team-based learning model can enhance students' understanding of patient safety knowledge, critical thinking skills in clinical reasoning, active student engagement in learning, as well as communication and teamwork. Many studies have examined the impact of team-based learning in education, but research related to TBL and student patient safety is still lacking. Therefore, the researcher suggests that future researchers delve deeper into the impact of team-based learning on student patient safety in the context of quality healthcare services.

CONFLICT OF INTEREST STATEMENT

The researchers state that there are no conflicts of interest in the writing of this research.

REFERENCES

Ahn, S., Lee, N.-J., & Jang, H. (2018). Patient Safety Teaching Competency of Nursing Faculty. *Journal of Korean Academy of Nursing*, *48*(6), 720. https://doi.org/10.4040/jkan.2018.48.6.720

Black, E. W., Blue, A. V., Davidson, R., & McCormack, W. T. (2016). Using team-based learning in a large interprofessional health science education experience. *Journal of Interprofessional Education & Practice*, *5*, 19–22. https://doi.org/10.1016/j.xjep.2016.09.002

Branney, J., & Priego-Hernández, J. (2018). A mixed methods evaluation of team-based learning for applied pathophysiology in undergraduate nursing education. *Nurse Education Today*, *61*, 127–133. https://doi.org/10.1016/j.nedt.2017.11.014

Branson, S., Boss, L., & Fowler, D. L. (2015). Team-based learning: Application in undergraduate baccalaureate nursing education. *Journal of Nursing Education and Practice*, *6*(4), p59. https://doi.org/10.5430/jnep.v6n4p59

Buhse, M., & Della Ratta, C. (2017). Enhancing Interprofessional Education With Team-Based Learning. *Nurse Educator*, *42*(5), 240–244. https://doi.org/10.1097/NNE.0000000000000370

Burgess, A., Van Diggele, C., Roberts, C., & Mellis, C. (2020). Team-based learning: Design, facilitation and participation. *BMC Medical Education*, *20*(S2), 461. https://doi.org/10.1186/s12909-020-02287-y

Burton, R., Van De Mortel, T., & Kain, V. (2021). Applying team-based learning in a transnational post registration bachelor of nursing program in Singapore. *BMC Nursing*, *20*(1), 82. https://doi.org/10.1186/s12912-021-00593-4

Carrasco, G. A., Behling, K. C., & Lopez, O. J. (2019). Implementation of Team-Based Learning: A Tale of Two New Medical Schools. *Medical Science Educator*, *29*(4), 1201–1210. https://doi.org/10.1007/s40670-019-00815-0

Clarke, A., Burgess, A., Van Diggele, C., Bloomfield, J., Schneider, C., Kalman, E., & Walton, M. (2023). Improving Patient Safety: Engaging Students in Interprofessional Team-Based Learning (TBL). *Journal of University Teaching and Learning Practice*, *20*(5). https://doi.org/10.53761/1.20.5.11

Currey, J., Sprogis, S. K., Burdeu, G., Story, I., Considine, J., O'Donnell, M., Gentle, A., Backhouse, S., & Oldland, E. (2020). Stakeholder acceptance of digital team-based learning. *Nurse Education in Practice*, *46*, 102833. https://doi.org/10.1016/j.nepr.2020.102833

Dinius, J., Hammer, A., Manser, T., Bergelt, C., Kriston, L., & Körner, M. (2019). Piloting and evaluating feasibility of a training program to improve patient safety for inter-professional inpatient care teams – study protocol of a cluster randomized controlled trial. *Trials*, *20*(1), 386. https://doi.org/10.1186/s13063-019-3448-7

Epstein, B. (2016). Five heads are better than one: Preliminary results of team-based learning in a communication disorders graduate course: Team-based learning in graduate education. *International Journal of Language & Communication Disorders*, *51*(1), 44–60. https://doi.org/10.1111/1460-6984.12184

Espey, M. (2018). Enhancing critical thinking using team-based learning. *Higher Education Research & Development*, *37*(1), 15–29. https://doi.org/10.1080/07294360.2017.1344196

Gill, A. C., Cowart, J. B., Hatfield, C. L., Dello Stritto, R. A., Landrum, P., Ismail, N., Nelson, E. A., & Teal, C. R. (2017). Patient Safety Interprofessional Training for Medical, Nursing, and Pharmacy Students. *MedEdPORTAL*, 10595. https://doi.org/10.15766/mep_2374-8265.10595

Goolsarran, N., Hamo, C. E., Lane, S., Frawley, S., & Lu, W.-H. (2018a). Effectiveness of an interprofessional patient safety team-based learning simulation experience on healthcare professional trainees. *BMC Medical Education*, *18*(1), 192. https://doi.org/10.1186/s12909-018-1301-4

Goolsarran, N., Hamo, C. E., Lane, S., Frawley, S., & Lu, W.-H. (2018b). Effectiveness of an interprofessional patient safety team-based learning simulation experience on healthcare professional trainees. *BMC Medical Education*, *18*(1), 192. https://doi.org/10.1186/s12909-018-1301-4

Hosny, S., Ghaly, M., Eldesouki, R., & Hegazy, G. (2019). Application of Modified Team-Based Learning Approach for Enhancing Undergraduate Medical Educational Seminars. *Medical Science Educator*, *29*(4), 1163–1170. https://doi.org/10.1007/s40670-019-00776-4

Kek, B., Buchanan, J., & Adisesh, A. (2019). An Introduction to Occupational Medicine Using a Team-Based Learning Methodology. *Journal of Occupational & Environmental Medicine*, *61*(2), 132–135. https://doi.org/10.1097/JOM.0000000000001499

Kementerian Kesehatan RI Direktorat Jenderal Pelayanan Kesehatan (2023). Laporan Insiden Keselamatan Pasien Rumah Sakit: Patient Safety incident report http://sirs.yankes.kemkes.go.id/sp2rs/home.php.

Kim, H.-R., Song, Y., Lindquist, R., & Kang, H.-Y. (2016). Effects of team-based learning on problem-solving, knowledge and clinical performance of Korean nursing students. *Nurse Education Today*, *38*, 115–118. https://doi.org/10.1016/j.nedt.2015.12.003

Kobayashi, K., Ando, K., Nakashima, H., Machino, M., Kanbara, S., Ito, S., Inoue, T., Yamaguchi, H., Ishiguro, N., & Imagama, S. (2021). *Challenges for Joint Commission International accreditation: Performance of orthopedic surgeons based on International Patient Safety Goals* (No. 1). Nagoya University Graduate School of Medicine, School of Medicine. https://doi.org/10.18999/nagjms.83.1.87

Kusniati, R., Arti, D. W. K., & Harniati, E. D. (2024). *PATIENT SAFETY CULTURE ASSESSMENT AMONG THE STAF OF THE ORAL DENTAL HOSPITAL*. *9*(1), 200–208.

Lee, S. H., & Park, H. J. (2021). The effects of team-based learning on nursing students' learning performance with a focus on high-risk pregnancy: A quasi-experimental study. *Korean Journal of Women Health Nursing*, *27*(4), 388–397. https://doi.org/10.4069/kjwhn.2021.11.16

Li, Z., Cai, X., Zhou, K., Qin, J., Zhang, J., Yang, Q., & Yan, F. (2023). Effects of BOPPPS combined with TBL in surgical nursing for nursing undergraduates: A mixed-method study. *BMC Nursing*, *22*(1), 133. https://doi.org/10.1186/s12912-023-01281-1

Liberati, A., Altman, D. G., Tetzlaff, J., Mulrow, C., Gøtzsche, P. C., Ioannidis, J. P. A., Clarke, M., Devereaux, P. J., Kleijnen, J., & Moher, D. (2009). *The PRISMA Statement for Reporting Systematic Reviews and Meta-Analyses of Studies That Evaluate Health Care Interventions: Explanation and Elaboration*.

Lochner, L., Girardi, S., Pavcovich, A., Meier, H., Mantovan, F., & Ausserhofer, D. (2018a). Applying interprofessional Team-Based Learning in patient safety: A pilot evaluation study. *BMC Medical Education*, *18*(1), 48. https://doi.org/10.1186/s12909-018-1164-8

Lochner, L., Girardi, S., Pavcovich, A., Meier, H., Mantovan, F., & Ausserhofer, D. (2018b). Applying interprofessional Team-Based Learning in patient safety: A pilot evaluation study. *BMC Medical Education*, *18*(1), 48. https://doi.org/10.1186/s12909-018-1164-8

Lu, W.-H., Goolsarran, N., Hamo, C. E., Frawley, S. M., Rowe, C., & Lane, S. (2016). Teaching Patient Safety Using an Interprofessional Team-Based Learning Simulation Model in Residency Training. *MedEdPORTAL*, 10409. https://doi.org/10.15766/mep_2374-8265.10409

Park, H.-R., & Park, E. (2022). Team-Based Learning Experiences of Nursing Students in a Health Assessment Subject: A Qualitative Study. *Healthcare*, *10*(5), 817. https://doi.org/10.3390/healthcare10050817

Rizany, I., Pertiwiwati, E., Setiawan, H., Jumbri, M., Rahmaniah, L., & Rahman, M. R. (2021). Kompetensi perawat terhadap Keselamatan Pasien di Beberapa Rumah Sakit Pinggiran Sungai Aliran Barito. *Dunia Keperawatan: Jurnal Keperawatan dan Kesehatan*, *9*(2), 319. https://doi.org/10.20527/dk.v9i2.11946

Sakamoto, S. R., Dell'Acqua, M. C. Q., Abbade, L. P. F., Caldeira, S. M., Fusco, S. D. F. B., & Avila, M. A. G. D. (2020). Team-Based Learning: A randomized clinical trial in undergraduate nursing. *Revista Brasileira de Enfermagem*, *73*(2), e20180621. https://doi.org/10.1590/0034-7167-2018-0621

Silberman, D., Carpenter, R., Takemoto, J. K., & Coyne, L. (2021). The impact of team-based learning on the critical thinking skills of pharmacy students. *Currents in Pharmacy Teaching and Learning*, *13*(2), 116–121. https://doi.org/10.1016/j.cptl.2020.09.008

Sumiyoshi, T., Yokono, T., Kawachi, I., & Suzuki, T. (2020). Learning outcomes of interprofessional collaboration among medical and nursing students in Japan. *Journal of Interprofessional Education & Practice*, *21*, 100377. https://doi.org/10.1016/j.xjep.2020.100377

Sutejo, S., Prasetijo, A. B., & Agushybana, F. (2021). Designing Integrated Patient Safety Incident Reporting with Hospital Information System. *Jurnal Aisyah : Jurnal Ilmu Kesehatan*, *6*(3), 661–666. https://doi.org/10.30604/jika.v6i3.968

Ulfa, Y., Igarashi, Y., Takahata, K., Shishido, E., & Horiuchi, S. (2021). A comparison of team-based learning and lecture-based learning on clinical reasoning and classroom engagement: A cluster randomized controlled trial. *BMC Medical Education*, *21*(1), 444. https://doi.org/10.1186/s12909-021-02881-8

Vannini, V., Alberti, S., Epifani, C., Valentini, O., & Ferri, P. (2022). The effects of online Team-Based Learning on undergraduate nursing students' performance, attitudes and accountability during COVID-19 pandemic. *Acta Biomedica Atenei Parmensis*, *93*(6), e2022346. https://doi.org/10.23750/abm.v93i6.13769

Walton, M., Ardolino, T., Cheung, R., Zheng, H., Leotsakos, A., & Barraclough, B. (2014). Educating future leaders in patient safety. *Journal of Multidisciplinary Healthcare*, 381. https://doi.org/10.2147/JMDH.S53792

Wijaya, T., Rahmah, F., & Chalidyanto, D. (2022). The Relationship Between Group and Organizational Factors on Misbehavior Performance in the Implementation of Patient Safety Incident Reporting. *Jurnal Aisyah : Jurnal Ilmu Kesehatan*, *8*(1), 107–110. https://doi.org/10.30604/jika.v8i1.1486

Wu, W., Pu, L., Zhang, E., Xiong, S., Zhou, X., Xia, X., & Wen, D. (2022). Application of team-based learning to ophthalmology in China. *Frontiers in Public Health*, *10*, 922325. https://doi.org/10.3389/fpubh.2022.922325

Wulandari, R. Y., Nugroho, T. A., & Febrianti, C. D. (2021). Hubungan Pengetahuan dan Sikap Perawat Terhadap Pelaksanaan Identifikasi Patient Safety di Ruang Rawat Inap Rumah Sakit. *Jurnal Aisyah : Jurnal Ilmu Kesehatan*, *6*. https://doi.org/10.30604/jika.v6iS1.789