REVIEW

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Effectiveness of Tabletop Exercise Training in Triage for Medical Personnel: A Systematic Review

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Abstract

Mass casualty incidents require a rapid and coordinated response from medical personnel, where triage is a critical skill. Tabletop exercise training has emerged as an innovative method to enhance triage skills by providing a safe, risk-free environment for scenario-based practice. This systematic review aims to evaluate the effectiveness of tabletop exercise training in improving triage skills among medical personnel. A comprehensive literature search was conducted in March 2024 across the following databases: ScienceDirect, PubMed, Wiley Online Library, and Cochrane. The search strategy included combinations of the following terms:

- "Tabletop exercise" AND "triage"
- "Tabletop simulation" AND "emergency preparedness"
- "Triage training" OR "disaster drill"
- "Medical personnel" AND and "simulation-based learning"

Boolean operators and or were used to refine the search results. Inclusion criteria covered studies published between 2014 and 2024 involving medical personnel trained in triage. The primary outcomes measured included improvements in triage accuracy, response time, decision-making, and teamwork. Out of 178 articles identified, 10 studies met the inclusion criteria. Findings indicate that tabletop exercises (TTX) significantly improve triage accuracy, reduce response times, and foster better teamwork and communication among healthcare providers. TTX are an effective training method for enhancing triage skills in medical personnel and should be integrated into regular training programs to improve preparedness for real-world emergencies.

Keywords: Tabletop exercise, triage training, medical personnel, systematic review, emergency preparedness

Introduction

Mass casualty incidents (MCIs), such as major accidents, terrorist attacks, or natural disasters, can result in a high number of casualties, necessitating a rapid and coordinated response from medical personnel. Triage, the process of classifying patients based on the severity of their injuries and their need for care, is one of the most crucial skills in emergency situations [1]. Without adequate triage skills, medical personnel risk making decisions that could have fatal consequences for both patients and the healthcare system as a whole. Therefore, effective training in triage is essential to ensure that medical personnel can provide appropriate and efficient care in stressful environments [2].

Tabletop exercise training has emerged as an innovative and effective method for improving triage skills. These exercises allow participants to engage in realistic simulation scenarios,

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where they can develop strategies, collaborate with teams, and refine their decision-making skills without real risk [3]. Research indicates that tabletop exercises (TTX) not only enhance triage knowledge and skills but also strengthen teamwork and communication among medical personnel. By employing a simulation-based approach, TTX can better prepare medical personnel for complex and dynamic emergency situations [4].

This systematic review aims to evaluate the effectiveness of TTX in triage training for medical personnel by collecting and analyzing data from relevant studies. By assessing the results of various studies, we hope to gain a deeper understanding of the impact of TTX on improving triage skills, response time, and accuracy in patient management. The findings of this review are expected to provide valuable insights for the development of more effective triage training programs, ultimately enhancing the preparedness and response of medical personnel in dealing with mass disaster incidents in the future.

Materials and Methods

This systematic review follows the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. The study population includes medical personnel who participated in triage training using TTX. The effectiveness of tabletop exercise training in improving triage skills was examined, with comparisons made to other triage training approaches. The primary outcomes measured include improvements in triage skills, decision-making accuracy, response times, and teamwork among medical personnel. A comprehensive literature search was conducted in March 2024 across four major databases: ScienceDirect, PubMed, Wiley Library Online, and Cochrane. The search used a combination of keywords, including “tabletop exercise”, “triage training”, “medical personnel”, and “effectiveness”. Boolean operators such as “AND”, “OR”, and “NOT” were applied to refine search results and maximize relevant article retrieval. Inclusion and exclusion criteria were defined using the framework patient/population, concept, and context. Inclusion criteria required studies involving medical personnel undergoing tabletop exercise-based triage training, published between 2014 and 2024, in English, and classified as research articles. Exclusion criteria included: studies not using TTX, articles published more than 10 years ago, non-English publications, and non-research materials (e.g., books, videos, conference proceedings). The initial search yielded 178 articles. After removing duplicates (76 articles), the remaining 102 articles were screened by title and abstract, resulting in 34 articles (Figure 1).

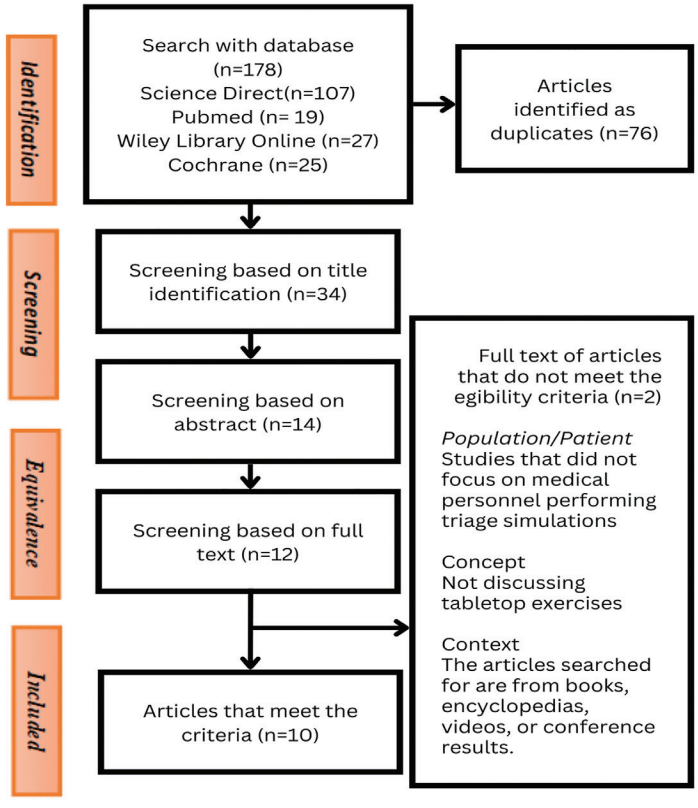

Figure 1. Flowchart of systematic review with process using PRISMA statistical analysis

PRISMA: Preferred Reporting Items for Systematic Reviews and Meta-Analyses

Data extracted from the included studies were synthesized and analyzed in a descriptive manner. A narrative synthesis approach was used to summarize improvements in triage accuracy, response times, decision-making, and teamwork. When applicable, percentage improvements and confidence intervals were reported. The quality of included studies was assessed using the Joanna Briggs Institute (JBI) critical appraisal tool. Statistical pooling or meta-analysis was not performed due to heterogeneity in study designs, interventions, and outcome measures. Full-text reviews narrowed the selection to 10 eligible studies that met all inclusion criteria. The PRISMA flowchart outlines this selection process; article eligibility was assessed based on study design, sample size, intervention details, and outcome measures (Table 1).

Results

Data extraction was performed using a standardized form to collect information on study characteristics (author, year, location, sample size, and design), intervention details, key findings, and conclusions. The results were synthesized to provide a comprehensive evaluation of the impact of TTX on triage training outcomes, highlighting both qualitative and quantitative evidence from the selected studies (Table 2).

Triage is a fundamental component of emergency response, particularly in MCIs where patient needs must be rapidly prioritized. Effective triage can significantly impact patient outcomes, reducing mortality rates and optimizing resource allocation. Research over the past decade has demonstrated that training methods directly influence the accuracy and speed of triage decision-making, with TTX emerging as a highly effective approach to skill development.

TTX provide a safe, controlled environment where medical personnel can simulate emergency scenarios without real-world consequences. Studies show that this training method enhances decision-making skills, improves knowledge retention, and boosts confidence in triage situations. For example, a 2021 study by Sena et al. [5] found that TTX improved both response times and triage accuracy among emergency medicine residents, with participants reporting greater preparedness for real-life emergencies.

Research indicates that TTX enhance cognitive processing under pressure, allowing participants to practice prioritizing patients based on injury severity. A study revealed a 20% improvement in triage accuracy after just one hour of tabletop training. Furthermore, these exercises reinforce the simple triage and rapid treatment and sort, assess, lifesaving interventions, treatment/transport methodologies, ensuring participants can swiftly apply evidence-based practices (Table 3).

Effective triage is a team effort, requiring clear communication and collaboration among healthcare providers. Several studies emphasize the role of TTX in fostering teamwork. The study demonstrated that healthcare teams participating in collaborative TTX showed improved coordination, with reduced errors during triage simulations. While immediate post-training improvements are well-documented, research also suggests long-term benefits. Medical students who participated in TTX retained triage knowledge and skills six months post-training. However, ongoing refresher exercises may be necessary to maintain competency over time.

The quality appraisal of the included studies was conducted using the JBI checklist, which comprises nine critical appraisal questions addressing the methodological soundness of the research. These include clarity of objectives, appropriateness of inclusion criteria, methodological validity, study design adequacy, data collection methods, rigor in data analysis, ethical consideration, and alignment between results and conclusions.

As summarized in Table 4, all ten studies included in this review demonstrated high methodological quality, with total scores ranging from 8/9 to 9/9. Three studies—Nabi et al. [6], Sena et al. [5], and Lee and Franc. [7]—achieved a perfect score (9/9), indicating exceptional rigor. Most studies showed strong alignment in research objectives, methodology, and results, although a few lacked explicit ethical statements or coherence in their conclusions.

This uniform quality across studies supports the credibility of findings and strengthens the evidence for recommending TTX in improving triage accuracy, response efficiency, and interprofessional collaboration in emergency settings.

Table 1. Population, concept, context of article effectiveness of tabletop exercise training in triage for medical personnel: a systematic review

Patient/population	Medical officer conducting triage training	Medical personnel who do not undergo training and do not use tabletop exercises
Concept	Tabletop exercises	Does not explain tabletop exercise
Context	1. Triage Training 2. Research publications less than the last 10 years (2014-2024) 3. Publication using English language 4. The article type is a research article	The articles searched for are from books, encyclopedias, videos, or conference results.

Discussion

The findings from this systematic review highlight the significant impact of TTX on improving triage skills, response times, and teamwork among medical personnel [8]. However, while the benefits are clear, several factors must be considered to ensure the long-term effectiveness of this training method [9].

Triage Skills Enhancement: Long-Term Retention and Sustainability

TTX has been shown to improve triage accuracy and decision-making under pressure. Participants consistently demonstrated better patient prioritization and faster classification during simulated MCIs [10]. However, some studies suggest that these skills may degrade over time without regular refresher training [7]. To address this, incorporating periodic TTX sessions into ongoing education programs could help sustain these improvements [11].

Balancing Speed and Accuracy in Triage

One of the standout benefits of TTX is its ability to accelerate response times. In emergency situations, faster triage can save lives- but speed should not come at the cost of accuracy [12]. Some studies reported that instances where participants, focusing on rapid assessment, made more frequent errors in patient classification [13]. This highlights the need for exercises that emphasize both speed and precision, along with strategies for mitigating cognitive overload [5].

Teamwork and Communication: The Double-Edged Sword

TTX strengthens teamwork by promoting communication and collaboration in a low-stakes environment [6]. Better coordination leads to more efficient triage and patient management [14]. However, poor team dynamics or conflicts, even during training, can hinder learning outcomes. Addressing this, requires structured debriefing sessions, where teams reflect on their performance and work through interpersonal challenges [15].

Accessibility and Resource Limitations

While TTX is a cost-effective training option, access to this method may still be limited in certain healthcare settings, especially in resource-constrained regions [16]. Some facilities might lack trained facilitators or appropriate materials to run the exercises effectively [17]. Policymakers and healthcare institutions should explore ways to standardize and distribute TTX materials, possibly through digital platforms, to bridge this gap [18].

Training Policy and Institutional Support

The review also suggests that integrating TTX into institutional training policies can enhance disaster preparedness at a systemic level [19]. However, policy changes can face resistance from stakeholders due to logistical challenges, staffing constraints, or financial limitations [20]. Demonstrating the long-term benefits of TTX, including potential cost savings from better disaster management, could help garner support for widespread implementation [21].

Table 2. Resume article effectiveness of tabletop exercise training in triage for medical personnel: a systematic review

Author	Country	Time	Place	Design	Retrieval data
Aslan et al. [3] 2021	Türkiye	2021	Gümüşhane province	Observational study	Survey and questionnaire
Chiang et al. [17] 2020	Taiwan	2020	Military hospital	Cross-sectional design	Pre-post test and observation
Castro Delgado et al. [9] 2023	Spain	2023	Oviedo University	Pre-post test design	Survey and test results
Davis et al. [22]	USA	2016-2017	Gulf-Coast region	Quantitative pre-post test design	Evaluation form
Farhadloo et al. [8] 2018	Iran	2018	Qom	Semi-experimental study	Test and simulation outcomes
Nabi et al. [6] 2022	Iran	2022	Isfahan province	Prospective pre-post intervention	Performance assessment
Sena et al. [5] 2021	USA	2021	New York	Pre-post test design	Likert Scale Questionnaire
Sultan et al. [4] 2023	Saudi Arabia	2023	Various healthcare facilities	Mixed-method (observation & interview)	CSCATTT instrument results
Khan [19] 2018	Qatar	2018	Hamad General Hospital	Randomized control trial	Accuracy and time-to-triage data
Lee and Franc [7] 2015	Canada	2015	University of Alberta, Royal Alexandra Hospital	Prospective observational cohort	Computer-based simulation

CSCATTT: Cardiac surgery competency assessment tool for the theatre team

Conclusion

The findings of this review show that TTX can significantly enhance triage skills, reduce response times, and improve accuracy in MCIs. Integrating TTX into clinical practice can better prepare medical personnel for real-world emergencies, minimizing triage errors and optimizing resource allocation during crises. Regularly incorporating TTX into training programs, facilitating post-exercise team debriefings, and leveraging digital platforms for wider access can sustain skill development and preparedness. On a policy level, adopting TTX as a mandatory component of emergency training, with national guidelines on training frequency, facilitator qualifications, and evaluation metrics, could standardize

Table 3. Characteristics of subjects in 10 articles included in the systematic review

Author	Sample	Age range	Men	Woman	Improved knowledge/skills (%)
Aslan et al. [3]	140 PH-staff (EMTs, paramedics)	22-50 years	70	70	75%
Chiang et al. [17]	161 nurses	25-55 years	40	121	80%
Castro Delgado et al. [9]	135 medical students	21-25 years	60	75	85%
Davis et al. [22] 2020	391 nursing students	20-30 years	100	291	78%
Farhadloo et al. [8]	70 nursing students	18-30 years	35	35	88%
Nabi et al. [6]	70 emergency personnel	25-45 years	45	25	82%
Sena et al. [5]	18 emergency medicine residents	26-35 years	12	6	90%
Sultan et al. [4]	100 healthcare workers	23-50 years	55	45	87%
Khan [19]	106 ED staff (doctors, nurses)	24-55 years	52	54	90%
Lee and Franc [7]	108 physicians and nurses	28-60 years	60	48	70%

Table 4. Quality assessment of included articles (Joanna Briggs Institute)

No	Author(s), Year	Clarity of objectives	Inclusion criteria	Validity of method	Study design	Data collection	Analysis	Ethics	Conclusion alignment	Total score	Quality category
1	Aslan et al. [3] 2021	✔	✔	✔	✔	✔	✔	✗	✔	8/9	Good quality
2	Chiang et al. [17] 2020	✔	✔	✔	✔	✔	✔	✗	✔	8/9	Good quality
3	Castro Delgado et al. [9] 2023	✔	✔	✔	✔	✔	✔	✔	✔	9/9	Good quality
4	Davis et al. [22] 2020	✔	✔	✔	✔	✔	✔	✗	✔	8/9	Good quality
5	Farhadloo et al. [8] 2018	✔	✔	✔	✔	✔	✔	✗	✔	8/9	Good quality
6	Nabi et al. [6] 2022	✔	✔	✔	✔	✔	✔	✔	✔	9/9	Good quality
7	Sena et al. [5] 2021	✔	✔	✔	✔	✔	✔	✔	✔	9/9	Good quality
8	Sultan et al. [4] 2023	✔	✔	✔	✔	✔	✔	✔	✗	8/9	Good quality
9	Khan [19] 2018	✔	✔	✔	✔	✔	✔	✔	✗	8/9	Good quality
10	Lee and Franc [7] 2015	✔	✔	✔	✔	✔	✔	✔	✔	9/9	Good quality

and strengthen disaster readiness. Despite strong evidence supporting TTX, gaps remain in understanding long-term skill retention, emphasizing the need for longitudinal studies to assess how well triage competency is maintained over time. Future research should explore comparisons between TTX and other training methods, investigate cost-effectiveness, and develop hybrid models that combine TTX with hands-on simulations for more immersive learning. Additionally, studying psychological factors like stress management and cognitive resilience could further refine training approaches, ensuring medical personnel are not only technically skilled but also mentally prepared to make critical decisions in high-pressure situations.

Footnotes

Authorship Contributions

Surgical and Medical Practices: J.A.D., S.S., Concept: J.A.D., S.S., Design: T.A.W., Data Collection or Processing: J.A.D., Analysis or Interpretation: T.A.W., S.S., Literature Search: J.A.D., Writing: J.A.D.

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References

1. Silvestri S, Field A, Mangalat N, Weatherford T, Hunter C, McGowan Z, et al. Comparison of START and SALT triage methodologies to reference standard definitions and to a field mass casualty simulation. Am J Disaster Med. 2017;12:27-33.
2. Gilboy N, Tanabe P, Travers D, Rosenau A. Emergency Severity Index (ESI) implementation handbook. 2020. Available from: https://media.emscimprovement.center/documents/Emergency_Severity_Index_Handbook.pdf
3. Aslan R, Şahinöz S, Şahinöz T. Determination of START triage skill and knowledge levels of prehospital emergency medical staff: a cross sectional study. Int Emerg Nurs. 2021;56:101004.
4. Sultan MAS, Khorram-Manesh A, Sørensen JL, Berlin J, Carlström E. Disaster collaborative exercises for healthcare teamwork in a Saudi context. Int J Disaster Risk Sci. 2023;14:183-93.
5. Sena A, Forde F, Yu C, Sule H, Masters MM. Disaster preparedness training for emergency medicine residents using a tabletop exercise. MedEdPORTAL. 2021;17:11119.
6. Nabi M, Zakerimoghadam M, Bahrampouri S, Dolatabadi A. Drill; A solution to reduce mistriage in prehospital emergency setting. Iran Red Crescent Med J. 2022;24:2272
7. Lee JS, Franc JM. Impact of a two-step emergency department triage model with START, then CTAS, on patient flow during a simulated mass-casualty incident. Prehosp Disaster Med. 2015;30(4):390-6.
8. Farhadloo R, Kashani Nejad M, Haji Mohammad Hoseini M, Vahedian M, Parvaresh Masoud M. Investigating the effect of training with the method of simulation on the knowledge and performance of nursing students in the pre-hospital triage. Heal Emergencies Disasters Q. 2018;3:123-30.
9. Castro Delgado R, Fernández García L, Cernuda Martínez JA, Cuartas Álvarez T, Arcos González P. Training of medical students for mass casualty incidents using table-top gamification. Disaster Med Public Health Prep. 2022;17:255.
10. Masci MD Jr, Bass E. Bioterrorism: a guide for hospital preparedness. Published online 2004:335-338. Available from: https://doi.org/10.1201/9780203491379
11. Suleman I, Pomalango ZB, Slamet H. Media tabletop disaster exercise meningkatkan pengetahuan tenaga kesehatan tentang manajemen penanggulangan bencana. Jambura J Heal Sci Res. 2023;5:90-9. Available from: https://ejurnal.ung.ac.id/index.php/jjhsr/index
12. Yuliano A, Kartika K, Alfandi M. The relationship between disaster volunteers' knowledge and attitudes and their skills in performing START triage in Bukittinggi City. Proc Perintis Health Seminar. 2019;2:52-5. https://jurnal.stikesperintis.ac.id/index.php/PSKP/article/view/374
13. Laksono BB. Triage as an instrument for handling victims in disaster settings: a review article. Nurs Inf J. 2024;3:69-78.
14. Killeen JP, Chan TC, Buono C, Griswold WG, Lenert LA. A wireless first responder handheld device for rapid triage, patient assessment and documentation during mass casualty incidents. AMIA Annu Symp Proc. 2006;2006:429-33.
15. Galenso N, Yuwono DK. Nurses' obligations in emergency care services. Poltekita J Community Engagement. 2022;3:888-97.
16. Prahmawati P, Rahmawati A, Kholina K. The relationship between nurses' response time and emergency care services in the emergency department of Demang Sepulau Raya Hospital, Central Lampung. J Wacana Kesehat. 2021;6:69.
17. Chiang HH, Ting CW, Chao E, Chen KJ. Using tabletop exercises to evaluate nurses' clinical performance of hazardous materials disaster management: a cross-sectional study. Nurse Educ Today. 2020;87:104358.
18. Aziz MH. Komunikasi kebencanaan: peran dan manfaat pada mitigasi. Communications [Internet]. 2023 Jan 31 [cited 2025 Dec 18];5(1):301-16. Available from: https://journal.unj.ac.id/unj/index.php/communications/article/view/31851
19. Khan K. Tabletop exercise on mass casualty incident triage, does it work? Heal Sci J. 2018;12.
20. Tofani I, Silitonga T, Afrianita Y, Tesiherdawati. Penerapan manajemen strategis untuk memitigasi dampak bencana. Jurnal Pelita Kota. 3:189-206.
21. Syafwani M, Winiarty Y, Yani S, Hamid A. Triage training in improving nurses' knowledge, speed, and accuracy of assessment in patients with chest pain in the emergency department of Hospital X. J Keperawatan Suaka Insa. 2024;9:22-9.
22. Davis A, Manning J, Germain D, Hayes S, Pigg C. Implementing disaster simulations for baccalaureate nursing students in the Gulf-Coast region. Clinical Simulation in Nursing. 2020;43:1-7.