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Exploring Practices and Effectiveness of Bedside Teaching in Residency Training: Protocol for a Scoping Review

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ABSTRACT

Bedside teaching (BST) is an indispensable practice in clinical education. To stay ahead of the curve in the rapidly evolving field of clinical education, embracing innovative and effective learning approaches like BST is essential. The first step is to understand the current approaches and practices of BST in the clinical training of the residents by utilising the highly effective Joanna Briggs Institute scoping review guidelines, which will systematically map the approaches and practices in BST over the last 10 years. Primary data will be searched from relevant studies, review articles, and grey literature from January 2013 to July 2023; a three-step search strategy will be employed, consisting of review search, study selection, and evidence charting by involving electronic databases (PubMed, Scopus, EBSCOhost, Google Scholar) and two independent reviewers. A third reviewer is provided in case of disagreements between the two reviewers. After conducting a thorough screening of the eligible studies and importing them into our electronic source, the charting and presentation of the results of the included studies will be done. As a secondary search, ethical approval is not required. This review will probe into the demographic aspects, study designs, various approaches and practices utilised, and their learning attainments in outcomes and better patient care and safety. Traditional and innovative methods are appraised, examining their respective impact on the clinical outcomes, with all efforts to restore this declining art of medicine. Once this review is complete, the findings will be disseminated through articles and publications nationally and globally, ensuring that the broader community can benefit from our insights regarding approaches and practices of BST and their impact on anticipated outcomes.

Keywords: *Bedside teaching, Postgraduate training, Clinical education, Scoping review, Clinical competency*

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BACKGROUND

Bedside teaching (BST) has a rich history and remains an essential form of medical education (1–3). This active learning process, which takes place in the presence of patients, has been enhanced by implementing structured approaches that enable students to develop problem-solving and decision-making skills while modeling professional behaviour and humanism (4, 5–8). The complexity of BST has been recognised, and it is often considered a stepwise process that starts with preparation and ends with delivery (9). Janicik and Fletcher's (10) role in evaluating the advantages and impediments of BST has shed further light on the benefits of this instructional method. The significant instructional value of the BST has been confirmed by extensive evidence in the literature (1, 5, 11), making it an indispensable tool for medical education.

Adequate organisational support is crucial to residents' learning in clinical settings, as evidenced by studies (12–14). Studies suggest that BST may have variable teaching qualities and a lack of creativity (15, 16). This highlights the need for innovation to address the latest challenges and transform the teaching paradigm to improve learning outcomes, educational quality, and trainer self-sufficiency (15). In response, institutions worldwide are adopting new technologies and approaches to revolutionise their educational systems and achieve predetermined objectives (17). Innovative BST requires creativity and transformation of teaching styles and methods. By implementing new ideas and technologies, we can generate new insights, motivations, creativity, and thought processes that enhance residents' engagement and motivation (15, 18).

The integration of new technologies has revolutionised modern pedagogy, greatly enhancing the impact of education and training in ways previously (19). These innovations encompass a range of approaches, including the Learning Management System (LMS), blended learning, embedded learning, learning by doing, computational thinking, and crossover learning. These cutting-edge techniques foster curiosity, interest, motivation, attention, and collaboration among residents, leading to optimal learning outcomes and ensuring patient safety (20). Studies have demonstrated that smartphones and smartphone-based applications have become essential tools for healthcare workers, with 100% utilisation by students and in the ever-evolving hospital clinical environment (21–24). Additionally, many have implemented skill labs that provide residents with a safe and supportive training environment that does not compromise patient care (25, 26). Innovative training modalities such as virtual reality, box training, and live animal training are also utilised in many minimally invasive procedures (27, 28).

This scoping review aimed to investigate BST's current approaches and practices in the clinical training of residents and delve into their impact on residents' learning outcomes.

SCOPING REVIEW QUESTION(S)

Our search strategies will be expertly crafted to encompass the crucial components of our research question: population, control, and outcome. This was accomplished by guiding our investigation with precision and focus. We aimed to answer two key research questions. First, we sought to understand the current approaches and practices of BST in the clinical training of residents. Second, we strive to determine the impacts of these approaches and practices on learning attainment. These research questions serve as the foundation of our study, and they will be reviewed and refined iteratively, allowing us to optimise our selection of relevant studies after piloting and pursuing this rigorous approach and to uncover valuable insights that will advance our understanding of clinical training practice and ultimately enhance residents' learning experiences.

METHODOLOGY

Every stage of the study will be conducted rigorously and transparently, as this is paramount to ensure the reliability of the findings. It will be thoroughly documented with sufficient details to enable other researchers to replicate the results, thereby contributing to its credibility and allowing for future additions to enhance the rigour of our study (29). To achieve this, we will follow the Joana Briggs Institute (JBI) guidelines for scoping reviews (30, 31). The review process will be conducted from January 2013 to July 2023, ensuring each stage is approached systematically and comprehensively. Waveform transparency and rigour will lead to sound and meaningful research/impact, and any alterations to the approach will be clearly articulated and documented in the final scoping review paper.

Review Team

The primary reviewer (SH) will use this tool with the second reviewer (NSR, MSBY). A citation manager will be employed to establish a library for this review, and the primary investigator will search using the key fields in the databases created. Eligible studies will be exported to the citation manager, and duplicates will be removed prior to abstract screening by two reviewers. Any disagreement was resolved through consultation with a third reviewer (MZMN). The review team will conduct a thorough article screening in accordance with the eligibility criteria and ensure independent transparency at every step. The timelines will be decided by consensus within the team, and each stage will be completed within three months.

Inclusion Criteria

To ensure the highest level of accuracy in our research, we carefully developed eligibility criteria for all search articles, strictly adhering to our research question. The eligibility criteria for our scoping review framework will be meticulously developed based on population, concept, and context (32), ensuring that all pertinent factors are considered. Through this meticulous process, we will ensure that only the most relevant studies are included in our research, with congruence between the title, question/objectives, and inclusion criteria of all included studies, as shown in Table 1.

Table 1: Eligibility criteria for relevant studies

Inclusion criteria	Exclusion criteria
This must include postgraduate residents in their first to fourth year.	Not available in English.
Must focus on current approaches and practices of BST from 2013 to 2023 in full text.	Unpublished, blog posts, websites.
Must reveal full information on impact, outcomes, and competencies.	
It must be accessible in full text.	
Relevant grey literature will also be considered, including theses, dissertations, conference proceedings, working papers, study protocols, and preprints.	

Types of Participants

Population

The review will encompass peer and gray literature on the BST's current approaches and practices and their learning achievements and outcomes among postgraduate residents. We detail the important characteristics of the participants to make them appropriate for the objectives of the review question and scoping review. The resources excluded from the review will describe approaches and practices among other professionals and clinical staff.

Concept

The core concept will be clearly articulated to direct the scope and breadth of the inquiry, ensuring all approaches and practices are being used and that they impact better patient care. The outcomes will be a component of our scoping review, as they will be closely linked to the objectives and serve the scoping review's purpose.

Context

Although the study's context will focus on current approaches and practices of BST in medical education and training within residency programmes, the review will draw on studies and grey literature from various geographical locations worldwide to provide a comprehensive appraisal of BST practices and outcomes among postgraduate students in clinical practice. By conducting an extensive search, the review broadens its scope. It meaningfully categorises the nature of BST's current approaches, practices, and outcomes in medical education and training, as well as in global clinical settings, by objectives and questionnaires.

Types of Evidence Sources

This review will encompass existing literature, including primary research, both qualitative and quantitative, as well as various types of secondary reviews. It will not be limited to narrative reviews, scoping reviews, meta-analyses, systematic reviews, and published grey literature. However, it will be limited to conferences, dissertations, theses, working papers, preprints, and protocols related to the approaches and practices of BST, as well as their impact. This review will include articles published in English from January 2013 to July 2023, spanning over 10 years. Unpublished literature, blog posts, and websites will be excluded to ensure the reliability and authenticity of the reference data.

Search Strategy

This review will be conducted using a three-phase search strategy based on the recommendations of the JBI scoping review guidelines. The initial words will be identified based on keywords in the title and index terms for the description of relevant responses. The keywords will be identified using Medical Subject Headings (MeSH) and Education Resources Information Centre (ERIC) databases. Our search terms will be specific and include relevant terms such as "bedside teaching" AND "postgraduate clinical training" OR "postgraduate medical education" AND "learning attainments" OR "learning outcomes" OR "competency." By employing this meticulous approach, we aimed to extract high-quality information to support our research goals.

A comprehensive search will be conducted for potential related keywords and index terms across PubMed, EBSCOhost, ScienceDirect, and Google Scholar databases. We will also include relevant grey literature, such as theses, dissertations, conference proceedings, working papers, study protocols, and preprints. We will identify additional resources using the Grey Literature Report (www.greylit.org), tailored Google search engines, and consultation with subject matter experts according to standard procedures.

In addition, the reference lists of all included studies will be hand-searched for additional sources. Key study authors may be contacted for additional data or clarification if required. To maintain transparency and reproducibility, a full search strategy for at least one main database will be provided in the appendix. The Peer Review of Electronic Search Strategies (PRESS) guideline, developed by McGowan et al. (33), will be considered in the development of the search protocol. Well-defined and justified eligibility criteria will ensure the inclusion of studies published in the English language and within the specified time frame. Due to the broad nature of our two research questions, we will also aim to capture a wide range of evidence sources relevant to our study objectives, thereby achieving maximum sensitivity in our review process.

The search for a scoping review may be iterative as reviewers become more familiar with evidence-based approaches, additional keywords, and potentially helpful search terms, which can be incorporated into the search strategy. If this is the case, it will be of utmost importance that the entire search strategy and results are transparent and auditable. The input of a research librarian or information scientist is valuable in designing and refining the search.

Source of Evidence Selection

All identified sources, including grey literature, will be exported into Microsoft Excel, and duplicate articles will be removed. The selection will be performed using the predefined inclusion criteria. Before the selection process, a pilot test will be conducted in which two researchers will independently review the titles and abstracts of the included studies. If there is any disagreement among the researchers, it will be resolved through discussion first. After familiarisation with the selection process, the titles, abstracts, and full-text articles of included studies will be screened using the inclusion criteria. This screening will be conducted independently by two researchers, and a third reviewer will be present to resolve any disagreements between the two researchers. Articles that did not fulfill the inclusion criteria were excluded from this study, and the reason for exclusion will also be mentioned.

This framework stage involved an iterative process to refine the selection of additional articles. All selected articles will be presented in a PRISMA-ScR statement, and Figure 1 illustrates a review process flow chart.

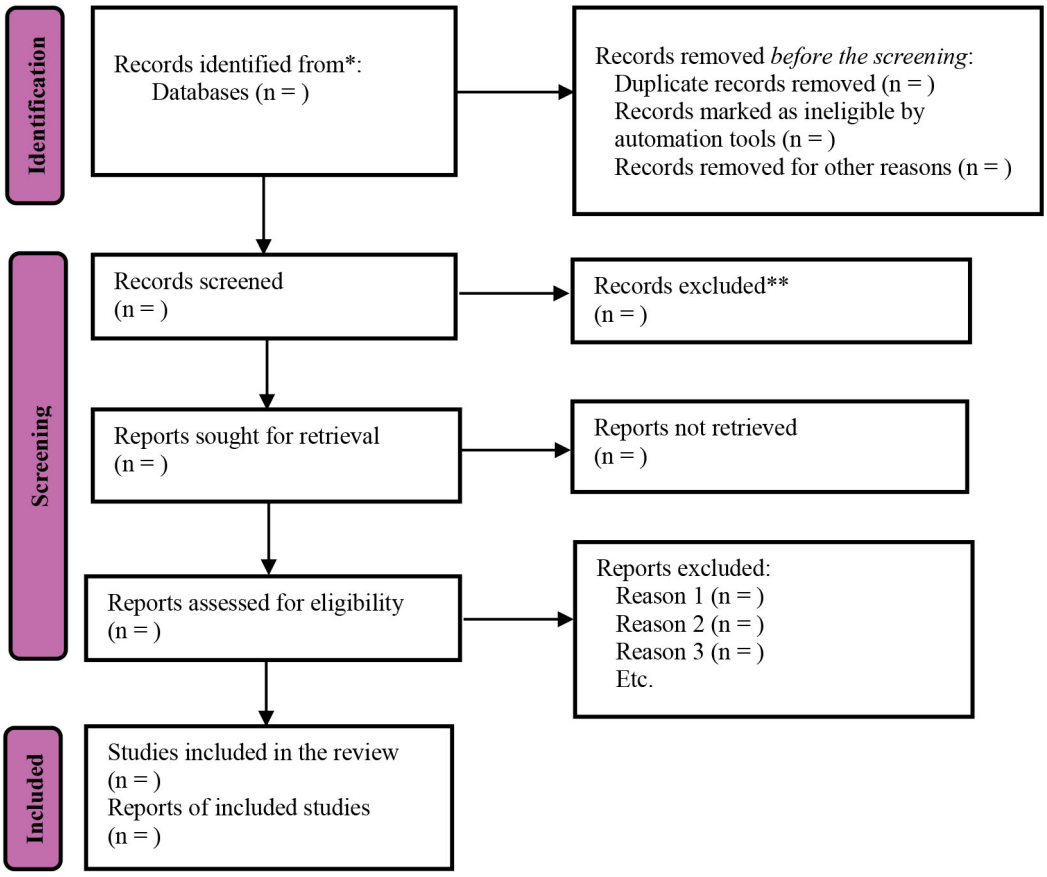

Figure 1: Flow diagram of study selection based on preferred reporting items for systematic reviews and meta-analysis (PRISMA) guidelines by Moher et al. (34).

The source selection, duplication, full-text recovery, third search additions, data extractions, and management of the results will be made through EndNote; the details of the full-text articles will be given of included articles, and a brief description of the excluded articles with reasons will also be undertaken; we will also ensure some pilot testing of the source selectors as mentioned prior to boarding on source selection for the whole team, which will facilitate refinement in the source selection tool; we will ensure the pilot testing of source selection based on a framework in which 25 titles/abstract will be chosen, and all eligibility criteria will be screened as predefined; all discrepancies will be addressed before obtaining 75% (or more) agreement.

Data Extraction

This data extraction process, or data charting, gives the reader a descriptive and logical summary of the results aligned with the review questions and objectives. A draft or charting table will be piloted, initially elaborated on, and refined in later stages of scoping reviews. Our data charting will include the author's name, year of publication, country, study design, approaches, practices, impacts, study setting, and data used, as shown in Table 2.

Table 2: Data charting (extraction) table

Author's name	Year	Country	Study design	Approaches	Practices	Impacts	Clinical settings	Databases used

The two reviewers will conduct data extraction independently to reduce the risk of error. There will be a discussion among the reviewers regarding their extraction strategy and the data extraction process to ensure the reliability and consistency of this extraction process. This will be an iterative process; the reviewers will be transparent and clear in their methods, and any additional unforeseen data will also be recorded by each reviewer separately and will keep on updating it continuously; initial piloting in the extraction process has also been supported by Arksey and O'Malley (35), Armstrong et al. (36) and Valaitis et al. (37). The ultimate purpose of charting the data will be to identify, characterise, and summarise research evidence on a topic, including identification of research gaps (38), any disagreement if arise, will be resolved by third reviewer after discussion. If any missing data from relevant articles is missing, the author will also be approached; this data charting will be refined throughout the review, and any modification report will be entered in the scoping review report.

Analysis of Evidence

There are many ways in which data are analysed and presented in scoping reviews; the data analysed in scoping reviews will largely depend on the review and the author's judgement. The most important consideration is that all the authors will be transparent and explicit in the approach they have taken, including justifying their approach, as scoping reviews will not synthesise the results/outcomes of included sources of evidence as done in systematic reviews, as scoping reviews will only extract the results from the included data sources and map these but never attempt to assess or synthesise the results like in systematic reviews.

The characteristics, population, concepts, and other field data were expressed as a simple frequency count. We will also perform in-depth analysis such as descriptive content analysis, including the basic coding of the data, which will be summarised into a particular category (coding and classifying the approaches and their impact); qualitative content analysis is generally descriptive, and our reviewers will not undertake thematic analysis/synthesis beyond the scoping review scope and would be more appropriate in systematic review of qualitative evidence; for quantitative data, simple frequency counts cannot be used; they will need more advanced analysis, which will be decided mutually with consensus at that stage in the view of guidelines if required.

Presentation of Results

All the data will be presented in tabular form with frequency and percentage, which will be decided initially by the reviewers for the presentation of the results draft chart, figure, or table, as predicted by Lockwood et al. (39). This will largely depend on the nature of the data identified in light of scoping review objectives and questions, which may be further refined

as reviewers will get more considerations and familiarity regarding the extracted data. The scoping review results will be presented in a map of the data extracted from the included studies, in diagrammatic or tabular form, and in descriptive form, based on the objectives of the study review, supported by the elements of participant, concept, and context eligibility criteria. This will help map the data appropriately. A narrative summary of the charted or tabulated results and the objectives/review questions will also be attached.

DISCUSSION

Other approaches are replacing traditional BST, as the culture of innovation has replaced pen-and-paper methods with technology. While innovative technologies have highlighted the areas where residents need to address their deficiencies, both traditional and innovative methods have been carefully appraised, examining their respective impact on the clinical outcomes of postgraduate clinical training. Both traditional and innovative methods can complement each other, even in the era of ICT. The COVID-19 pandemic underscores the importance of innovative teaching methods. Therefore, there is a need to develop a protocol to review the current approaches and practices and their impact on residents' outcomes and learning attainments to develop clinical competencies. Long-term planning is necessary to formulate recommendations to enhance the approaches and practices of BST, learning attainments, and expected competencies to meet future challenges nationally and globally. Once the review is complete, the findings will be disseminated through journals, conferences, publications, and worldwide, ensuring that a broadened community can benefit from our insights into BST.

CONCLUSION

For the restoration and addressing all impediments in BST, it is necessary to develop a protocol to review current practices and approaches with their impact on residents' competencies to meet all future challenges in medical education.

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