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INVOLVEMENT OF EVIDENCE-BASED MEDICINE IN STRENGTHENING THE QUALITY OF HEALTHCARE

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ABSTRACT

Medical knowledge grows every day, so that previously accepted facts rapidly become old, and it seems impossible to follow such an explosion of scientific information. Evidence-based medicine (EBM) is the standard for modern healthcare, emphasizing the use of the best, scientifically validated research alongside clinical judgment and patient values. Evidence-Based Practice (EBP) plays a pivotal role in enhancing patient safety and involves integrating the best available research evidence, clinical expertise, and patient preferences to guide clinical decision-making.EBM is yet to catch on as a widely applied method of treatment in local hospitals and among doctors. Evidence-based medicine (EBM) is an important aspect in medical education because it provides the opportunity to research deeply in the medical literature about a particular area of interest. It also gives an opportunity to the student to integrate basic and clinical sciences for developing skills as a future health professional. To practice quality health care, clinical decisions should be based on clinically relevant scientific evidence

INTRODUCTION

Evidence-based medicine is the conscientious, explicit, judicious, and reasonable use of current best evidence in making decisions about the care of individual patients.(1)

EBM application means relating individual clinical signs and individual clinical experience to the best scientific evidence obtained by clinical research (2)

The best scientific evidence is considered to be a randomized controlled clinical study conducted on a large number of respondents that can prove the effectiveness of many drugs, as well as the harm and the inefficacy of others in comparison with the best existing therapy (3)

Integration of fundamental biomedical knowledge, which is one of the core competencies of ACGME, is essential for understanding the pathophysiology of disease processes and making right decisions for the management of the patient. Integration helps to retain the knowledge and establishes interest in medical students (4).

Reflective practice, a model approach for EBM, reflects one's awareness of their own capability of visualizing the learning perception, directing the actions (5).

Most of the research articles interpret the findings in terms of statistics and whether the findings are statistically significant or not. Statistical knowledge and being literate in research methodology and interpretation are equally important in EBM (6).

Effective teaching techniques represent the first goal of successful EBM delivery and incorporation into the medical curriculum (7).

It is pertinent to address the specific interest to make EBM learning a more suitable experience for the target audience (8).

Blended techniques are also helpful in changing the positive attitude of medical students towards EBM techniques, clearly reflected in their practice (9). Group discussions, learning through case methods, and single, brief training sessions are some of the alternative approaches that enhance understanding of EBM in medical students and can be applied as effective EBM teaching tools (10).

The early introduction of EBM in medical schools has been effective in changing the thought process of the medical graduates. It also increases the ability for logical and critical appraisal, better suited for the understanding of the disease process and subsequent management (11).

Effective classroom teaching incorporated with hospital demonstration and real-time simulation will help students to better understand EBM (12).

An online module in EBM is very effective and enhances overall skills in medical students. Incorporation of EBM increases the knowledge, attitude, logical reasoning, and self-reported skills in medical students (13).

Medical students' sudden exposure to EBM in clinical years has minimal effect in critical appraisal ability. (14).

The practice of medicine is an artistic application of science (knowledge). More and more knowledge based on scientific research reduces the guesswork and results in good treatment outcomes (15)

In other words, it is the integration of clinical expertise and patient values (suitability in a given patient/infrastructure) with the best available research evidence (16)

The biggest challenge is the changing paradigm of healthcare, cost-effectiveness, and changing evidence, which has led to controversies and challenges in the rapid adaptation of the EBM (17)

In the words of William Osler,1 "medicine is a science of uncertainty and an art of probability", and training in EBM, to be sure, is a helpful way to take on its challenges (18,19)

Evidence-based medicine (EBM) emerges as a means to better address the challenges of modern medicine, including the existence of a vast and constantly evolving body of scientific information, the duty to offer the highest possible quality of care, and the limited amount of health care resources.(20)

History of EBM

The term "evidence-based medicine" (EBM) first appeared in the 1991 American College of Physicians (ACP) Journal Club editorial (21,22) Alvan Feinstein, while working on rheumatic fever in a hospital in New York during the mid-1950s, realized there were no clinical criteria to distinguish between benign and pathological murmurs.(23)

Dr. David Sackett expressed his vision as "the application, by a physician who provides direct patient care, of epidemiological and biometric methods to the study of the diagnostic and therapeutic process to effect a health improvement" (24)

In 1981, Dr. David Sackett and his colleagues introduced the term "critical appraisal," a method for understanding literature and its application at the bedside (25)

Guyatt et al. continued to expand upon their work and, a decade later, led to the formation of an international EBM working group (Evidence-Based Medicine Working Group, 1992) (26)

Suzanne and Robert Fletcher, scholars, described the absence of the translational application of biomedical science to clinical medicine. (27)
Anaesthesia and evidence-based medicine (EBM) are considered as two of the 15 most important medical milestones (28)

The birth of anaesthesia on 16th October 1846 and the subsequent publication of this discovery as a case study 33 days later in the high-impact Boston Medical and Surgical Journal (the current New England Journal of Medicine) resulted in its widespread use that dramatically changed surgical practice (29) Likewise, EBM, born at McMaster University in the early 90s, has had a considerable impact on modern-day health-care practice (30)

Importance of EBM

Evidence-based medicine (EBM) is integrated with clinical expertise and patient values to decide on individual patient care. Medical education is in a crisis. Curriculum and training need to be revamped. Good doctors are essential to society. However, the quality of doctors' training in India has been declining over the years for various reasons. Earlier, the strength of the medical profession rested on meritorious students who topped their batches and joined the profession. They were trained by dedicated and talented professionals who acted as role models for students. Evidence-based medicine (EBM) is the standard for modern healthcare, emphasizing the use of the best, scientifically validated research alongside clinical judgment and patient values. EBP enables healthcare professionals to stay consistently up-to-date about the latest developments and guidelines in their field. This ongoing knowledge update ensures that they are well informed about the most recent and effective approaches. By incorporating EBP, treatment choices rely on substantial evidence from research, ensuring that their decisions are rational, well-informed, and aligned with established best practices. EBP-driven care strategies can enhance the recovery process for patients. Healthcare practitioners are more likely to implement interventions that may yield positive outcomes, thus contributing to faster recovery times and improved patient well-being Healthcare providers gain insights into the probability and severity of adverse effects, enabling them to make well-balanced decisions that prioritise patient safety. Empowering patients to participate in their care planning: When healthcare providers involve patients in discussions about evidence-based treatment options, patients can make informed choices that align with their preferences and values, leading to more personalised and effective treatment.

Role of Evidence-Based Medicine in improving quality of healthcare

Evidence-Based Medicine (EBM) elevates healthcare quality by integrating rigorous scientific research, clinical expertise, and patient values. It standardizes care, minimizes medical errors, and ensures that medical decisions are driven by proven clinical data rather than intuition alone

Evidence-Based Medicine (EBM):

Evidence-Based Medicine (EBM) integrates high-quality research, clinical expertise, and patient values to guide healthcare, serving as a cornerstone of modern medicine. Evidence-based medicine (EBM) uses the scientific method to organize and apply current data to improve healthcare decisions.(31)

Thus, the best available science is combined with the healthcare professional's clinical experience and the patient's values to arrive at the best medical decision for the patient. There are 5 main steps for applying EBM to clinical practice: Defining a clinically relevant question, searching for the best evidence, critically appraising the evidence, applying the evidence, and evaluating the performance of EBM (32)

Advantages of EBM

EBM ensures interventions are scientifically proven to be safe and effective, directly enhancing patient recovery and health. It establishes standardized frameworks for medical procedures, ensuring consistent, high-quality care across different healthcare facilities and practitioners. EBM replaces purely anecdote-driven or intuition-based medicine with up-to-date, scientifically validated strategies, protecting patients from ineffective or harmful treatments.

Disadvantages

EBM is heavily based on randomized controlled trials (RCTs) involving large groups. The "average" outcome of a study may not accurately predict the response of a specific individual. Clinical trials frequently exclude elderly patients, pregnant women, or those with multiple co-morbidities. Consequently, the "best evidence" may not apply to complex, real-world patients.

Clinical Significance

Evidence-based medicine provides a framework for applying the relevant scientific evidence to the patient's condition based on the patient's values, using the clinician's clinical judgment to tailor the treatment for the patient. Evidence-based medicine aims to improve medical outcomes based on the highest quality evidence available. After the intervention is implemented, the outcome should be re-evaluated in the context of the clinical question to see what effect occurred; this can also be applied to a population to generate recommendations for the population based on current medical evidence. Population recommendations are typically graded based on the underlying science behind the guidelines. Various grading schemes exist. (33)

EVIDENCE-BASED MEDICINE IN THE 21st CENTURY

EBM, in the early 21st century, still needs clarification. The reason is that EBM has strong supporters but is not without its critics. As a matter of fact, supporters have traditionally envisioned EBM as a way to "close the gulf between good clinical research and clinical practice" (34)

Moreover, population-based studies are likely to fulfill the

goal of public health, but the application of the same knowledge to the individual is problematic. In addition, focusing primarily on the results of clinical trials minimizes the importance of intangible physical, emotional, and spiritual aspects of illness. Furthermore, all evidence is not equally good (e.g., studies' design, sample sizes, statistical significance) and evidence can be contradictory. Finally, EBM also has its ''internal'' enemies: the ''enthusiasts''. As pointed out by Dave Holmes, ''The evidence-based movement is outrageously exclusionary and dangerously normative…and constitutes a good example of micro-fascism at play in the contemporary arena" (35)

CONCLUSION

Evidence-based medicine (EBM) is the conscientious, prudent, and reasonable utilization of best evidence in reaching an assessment of the best care to be provided to patients. Evidence-based medicine (EBM) integrates clinical expertise, patient preferences, and rigorous research. Reports indicate that many Indian practitioners rely heavily on experience rather than EBM. Evidence-based medicine (EBM) is essential for integrating clinical research with patient care to ensure safety and prevent misinformation.In order to practice quality health care, clinical decisions should be based on clinically relevant scientific evidence. Introduction of EBM from early pre-clinical years enables students to appraise the current work in medicine and use it for skill enhancement. Future research is warranted to establish these findings and establish an integrative multidisciplinary approach to introduce EBM as an integral part of the curriculum, best suited for medical students.

REFERENCES

1. Maši I. Medicina bazirana na dokazima. U: Porodi na/ Obiteljska Medicina principi i praksa, Avicena Sarajevo, 2007: 115-23
2. Sackett DL, Richardson WS, Rosenberg W, Haynes RB. Evidence-based medicine: how to practice and teach. 2. ed. Edinburgh: Churchill-Livingstone, 2000
3. Sackett DL, Rosenberg W, Mc Gray JA, Haynes RB, Richardson WS. Evidence-based medicine: what it is and what it isn't. BMJ, 1996; 312: 71-2
4. Malau-Aduli BS, Lee AY, Cooling N, Catchpole M, Jose M, Turner R. Retention of knowledge and perceived relevance of basic sciences in an integrated case-based learning (CBL) curriculum. BMC Med Educ. 2013;13:139. doi: 10.1186/1472-6920-13-139.
5. Lewin LO, Robert NJ, Raczek J, Carraccio C, Hicks PJ. An online evidence-based medicine exercise prompts reflection in third-year medical students. BMC Med Educ. 2014;14:164. doi: 10.1186/1472-6920-14-164.
6. Ilic D, Bin Nordin R, Glasziou P, Tilson JK, Villanueva E. Implementation of a blended learning approach to teaching evidence-based practice: a protocol for a mixed methods study. BMC Med Educ. 2013;13:170. doi: 10.1186/1472-6920-13-170.
7. Ahmadi SF, Baradaran HR, Ahmadi E. Effectiveness of teaching evidence-based medicine to undergraduate medical students: a BEME systematic review. Med Teach. 2015;37(1):21–30. doi: 10.3109/0142159X.2014.971724.
8. Hadley JA, Davis J, Khan KS. Teaching and learning evidence-based medicine in complementary, allied, and alternative health care: an integrated tailor-made course. J Altern Complement Med. 2007;13(10):1151–5. doi: 10.1089/acm.2007.0512
9. Maloney S, Nicklen P, Rivers G, Foo J, Ooi YY, Reeves S, et al. A Cost-Effectiveness Analysis of Blended Versus Face-to-Face Delivery of Evidence-Based Medicine to Medical Students. J Med Internet Res. 2015;17(7):e182. doi: 10.2196/jmir.4346
10. Ilic D, Nordin RB, Glasziou P, Tilson JK, Villanueva E. A randomised controlled trial of a blended learning education intervention for teaching evidence-based medicine. BMC Med Educ. 2015;15:39. doi: 10.1186/s12909-015-0321-6.
11. Hatmi ZN, Tahvildari S, Dabiran S, Soheili S, Sabouri Kashani A, Raznahan M. Teaching evidence-based medicine more effectively. Acta Med Iran. 2010;48(5):332–6.
12. Vidyarthi AR, Kamei R, Chan K, Goh SH, Lek N. Factors associated with medical student clinical reasoning and evidence based medicine practice. Int J Med Educ. 2015;6:142–8. doi: 10.5116/ijme.563a.5dd0.
13. Puljak L. Using social media for knowledge translation, promotion of evidence-based medicine and high-quality information on health. J Evid Based Med. 2016;9(1):4–7. doi: 10.1111/jebm.12175.
14. Ilic D, Tepper K, Misso M. Teaching evidence-based medicine literature searching skills to medical students during the clinical years: a randomized controlled trial. J Med Libr Assoc. 2012;100(3):190–6. doi: 10.3163/1536-5050.100.3.009
15. **Jain AK**. Innovations in orthopaedics: Hypothesis to publication. *Indian J Orthop*. 2012;46:605-7.
16. Bhandari M, **Jain AK**. Evidence-based orthopedics: One step closer! *Indian J Orthop*. 2011;45:3.
17. Iqbal Ratnani ,Sahar Fatima 1, Muhammad Mohsin Abid 2, Zehra Surani 3, Salim Surani , Evidence-Based Medicine: History, Review, Criticisms, and Pitfalls, Cureus,2023 Feb 21;15(2):e35266.
18. P. Young, B.C. Finn, J.E. Bruetman, J.D.C. Emery, A. Buzzi,William Osler: el hombre y sus descripciones,Rev Med Chile., 140 (2012), pp. 1218-1227
19. L. Castilla Serna,El método científicoL. Castilla Serna (Ed.), Metodología de la investigación en ciencias de la salud, Editorial Manual Moderno, México, DF (2001), pp. 1-30
20. Rafael Martín-Masot, Carlos Ochoa Sangrador b, Jaime Javier Cuervo Valdés et al,Evidence-based medicine: 5 steps to navigate uncertaintyMedicina basada en la evidencia: 5 pasos para navegar en la incertidumbre,Anales de Pediatría (English Edition) Volume 103, Issue 2, August 2025, 503930
21. Evidence-based medicine. Guyatt GH. ACP Journal Club. 1991;114:0.
22. Evidence-based medicine: what it is and what it isn't. Sackett DL, Rosenberg WM, Gray JA, Haynes RB, Richardson WS. BMJ. 1996;312:71–72. doi: 10.1136/bmj.312.7023.71.[
23. Prognostic significance of valvular involvement in acute rheumatic fever. Feinstein AR, Di Massa R. http://10.1136/bmj.312.7023.71. N Engl J Med. 1959;260:1001–1007. doi: 10.1056/NEJM195905142602002.
24. Clinical epidemiology. Sackett DL. Am J Epidemiol. 1969;89:125–128. doi: 10.1093/oxfordjournals.aje.a120921.
25. How to read clinical journals: I. Why to read them and how to start reading them critically. 1981;124:555–558.
26. Guyatt G, Rennie D, Meade MO, Cook DJ. New York: McGraw-Hill Education; 2015. Users' guides to the medical literature: a manual for evidence-based clinical practice, 3rd ed.
27. Fletcher RH, Fletcher SW, Wagner EH. Philadelphia: Williams & Wilkins; 1982. Clinical Epidemiology: The Essentials
28. What is the most important medical advance since 1840? BMJ. 2007Last cited on 2016 Jul 19;334(Suppl 1) Available from: http://www.bmj.com/content/suppl/2007/01/18/334.suppl_1.DC3
29. Bigelow HJ. Insensibility during surgical operations produced by inhalation. Boston Med Surg J. 1846. Last cited on 2016 Jul 19;35:309–17. Available from: http://www.nejm.org/doi/abs/10.1056/NEJM184611180351601
30. Guyatt GH. Evidence-based medicine ACP J Club. 1991Last accessed on 2015 May 14;114:A16 Available from: http://www.acpjc.org/Content/114/2/issue/ACPJC-1991-114-2-A16.htm
31. Ashokan Bhaskaran1, Paul Bhaskar Jyoti2*, Saha Pijush3, Domnic Inbaraj Susai4, Bhaskaran Mohana5,**Simulation-Based Medical Education: A Boon for Medical Students? - An Integrative Review, Journal of Clinical and Biomedical Sciences,** 2023, **Volume**: 13, **Issue**: 3, **Pages**: 67-75
32. Sackett DL, Straus SE. Finding and applying evidence during clinical rounds: the "evidence cart". JAMA. 1998 Oct 21;280(15):1336-8.
33. Steven Tenny; Matthew A. Varacallo., Evidence-Based Medicine, NIN, National Library of Medicine, National Center for Biotechnology Information, 2024.
34. Rosenberg W, Donald A. Evidence-based medicine: an approach to clinical problem-solving. BMJ 1995; 310(6987):1122-6.
35. Holmes D, Murray SJ, Perron A, Rail G. Deconstructing the evidence-based discourse in health sciences: truth, power and fascism. Int J Evid Based Health 2006;4:180-6