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Medical interventions and their poor scientific backup: A threat to Evidence-Based Medicine

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Abstract

In order to support Evidence-Based Medicine, critically evaluating the scientific basis of contemporary medical interventions is crucial. The significant scarcity of scientific backup for most medical interventions, however, poses a marked threat to Evidence-Based Medicine. This article explores the extent of this issue and its effects on healthcare. This article suggests that most contemporary medical interventions lack a scientific backup. Although there is counterevidence suggesting that most medical interventions are backed with solid evidence, the results of this counterevidence (study) can only be inferred in the settings where this study was conducted, questioning its generalisability.

Furthermore, this article delves into the information-seeking behaviours of doctors. Over journal articles, which are the cornerstone of Evidence-Based Medicine, doctors favour textbooks and personal contacts. Relying on textbooks may not be the best choice as they may not necessarily be updated with the latest research, leading to outdated recommendations. Personal opinions obtained through personal contacts are also unreliable sources of information. When doctors search for health information inefficiently and choose treatments unsupported by evidence, it can have severe consequences for public health and put patients at risk. Therefore, to encourage doctors to root their interventions in the best available evidence, urgent measures are required to enhance the research paper reading literacy skills of doctors. This article suggests that encouraging research-related training and education in the medical syllabus and continuing education activities is vital. Improving doctors' skills in reading and evaluating research papers can lead to increased interest in medical literature and more reliable decision-making based on the most trustworthy evidence.

Moreover, this article suggests that, even for experienced researchers, reading a research paper can be difficult due to the complex language and terminologies. Therefore, journal article authors should consider using more straightforward language, providing plain language summaries, visual aids like graphs and videos, and graphical abstracts. This way, doctors can understand research findings and easily incorporate them into practice. At last, this article provides an important note that collaboration among interdisciplinary professionals (researchers, doctors, allied health professionals, and educators) and other relevant stakeholders (policymakers, syllabus designers, and decision-makers) is crucial for promoting Evidence-Based Medicine.

Keywords: Evidence-based medicine, Medical interventions, Evidence-based practice, Scientific backup.

1. Introduction

1.1) The poor scientific foundation of medical interventions: A threat to Evidence-Based Medicine

Throughout history, it has become clear that many medical interventions lack sufficient scientific evidence to support their effectiveness. Despite this, they continue to be widely used. As Smith (1992) ^[22] highlighted, many experts and commentators have lamented the lack of a solid scientific basis for medical care. In 1991, Richard Smith, editor of the prestigious British Medical Journal (BMJ), stated in an editorial that just 15% of medical procedures had strong scientific evidence to support them (Smith, 1991) ^[21]. This information was shared by David Eddy, a health policy and management professor at Duke University, during a healthcare conference in Manchester, UK, as quoted by Smith (1991) ^[21] in his editorial. Moreover, such laments, as depicted by the following quote by Oliver Wendell Holmes in 1861, were present even in the mid-nineteenth century:

"I firmly believe that if the whole materia medica, as used now, could be sunk to the bottom of the sea, it would be all the better for mankind—and all the worse for the fishes" (Ellis,

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Mulligan, Rowe, & Sackett, 1995, p. 407)^[8].

1.2) Counterevidence and its flaws

There is a plethora of evidence in the literature suggesting that no more than 10-20% of medical interventions and procedures have any scientific foundation (Dubinsky & Ferguson, 1990; Office of Technology Assessment Congress of the United States [OTA CUS], 1978; Williamson, Goldschmidt, & Jillson, 1979, as cited in Ellis *et al.*, 1995)^[6] ^[17] ^[25]. However, counterevidence is also present in the existing literature. For example, Ellis *et al.* (1995)^[8] conducted a study investigating the treatments given to a series of patients. According to this study, 60-90% of therapeutic decisions were evidence-based, depending on the specialisation. This study, however, has methodological limitations. This study, for instance, was carried out in a highly specialised division examining the physicians who are international experts in the field of Evidence-Based Medicine. Therefore, the results of this study can hardly be extrapolated to other clinical settings. This, therefore, suggests that, despite in light of the counterevidence, it is likely that most of the medical interventions lack a proper scientific backup. In order to understand this problem in more significant detail, it would be helpful to explore the information-seeking behaviour of doctors and health professionals; this is because the information-seeking behaviour might shape the doctors' decision to choose a medical intervention (Gorman, 1999; Kostagiolas, Kourouthanassis, Martzoukou, Korfiatis, & Niakas, 2018)^[9] ^[13].

2) Information-seeking behaviours of doctors: A threat to Evidence-Based Medicine

Davis (2007)^[5] reviewed the evidence regarding doctors' information-seeking behaviour. This extensive review—which included studies from 1996 to 2006—assessed the preferred/favoured sources opted by doctors for comprehending the clinical information. Davis (2007)^[5] found that the most preferred source was a "textbook", followed by "Personal and face-to-face contacts, personal communication, and telephonic calls". Unfortunately, the "journal articles"—one of the strongest pillars of Evidence-Based Medicine—were the third source of preference. The results of this review are more likely to be broadly generalisable, as it has reviewed studies through a range of countries, i.e., the USA, the UK, Australia, New Zealand, Canada, Hong Kong, Greece, Denmark, and Singapore. One of the problems with relying on textbooks is that the medical textbooks—even if they are evidence-based—may not necessarily be updated in light of the most recent research evidence and, therefore, may endorse outdated treatments and recommendations (Jeffery *et al.*, 2012)^[12]. Moreover, one of the problems associated with "Personal and face-to-face contacts, personal communication, and telephonic calls" is that, unfortunately, the information sought through such mediums is most likely to be someone's opinion or expert opinion, which, at the hierarchy of evidence, is ranked at the bottom (University of Canberra Library [UCL], 2023)^[24]. Therefore, medical students are always encouraged to keep learning on their own (Pathare, 2022)^[19], and one of the well-accepted reliable ways to do this is by perusing and critically evaluating the journal articles published in the medical literature (Greenhalgh, 2014)^[10].

Therefore, this section implies that shifting doctors' information-seeking behaviour towards published medical articles is imperative. In order to achieve this, it is essential to explore why doctors are unlikely to prefer journal articles as their direct source of information. This article, therefore, will move towards this exploration.

3) Enhancing research paper reading literacy skills among doctors: An urgent need

During a meeting of around two hundred physicians, Dr Milton Packer, a distinguished scholar in cardiovascular science at Baylor University Medical Center in Dallas, Texas, posed a question to the group. He asked how many physicians actually read any journal issues that were delivered to them, either electronically or physically. The surprising answer he received was zero. Dr Packer then asked if the physicians at least read the titles of lead papers in the *New England Journal of Medicine* every week, but no one did. He then asked if they [the physicians] picked one journal in their field of interest and attempted to keep up with it, but again the answer was zero. Finally, Dr Packer asked when was the last time any of them [the physicians] read a paper on any topic from start to finish, but he received no response, only silence. Dr Packer was profoundly shaken by this; therefore, he asked why no physician was reading any papers; in response, the physicians explained that they did not know how to read the research papers (Packer, 2018)^[18].

Moreover, a general practitioner, Kevin Barraclough, expressed frustration towards reading research papers, especially in medicine (Barraclough, 2004)^[1]. According to Barraclough (2004)^[1], most doctors experience difficulties understanding the statistical arguments and probability concepts presented in medical papers. The collective implication of Packer (2018)^[18] and Barraclough (2004)^[1] suggests that one of the profound reasons why doctors do not read research papers is that their reading skills for medical journals are not improving as quickly as the pace at which new research papers—incorporating diverse methodologies—are being published. Another equally important implication is that research paper authors must use straightforward language so doctors can understand it easily.

4) Alarming consequences

This article, so far, suggests that most doctors likely tend not to refer to the published medical literature adequately—either because of doctors' lack of research paper reading skills or due to complicated language used by research paper authors. Reading and critically evaluating the published medical literature is one of the cornerstones of Evidence-Based Medicine (Greenhalgh, 2014)^[10], and the inability of doctors to do so may have significantly alarming consequences on patient safety and public health. For example, Ebell, Sokol, Lee, Simons, and Early (2017)^[7]—a review published in *BMJ Evidence-Based Medicine*—revealed that only 18%—out of 3251—of decisions and recommendations provided by doctors could be categorised as "patient-oriented good-quality evidence". Therefore, in light of improving patient safety and public health, it is crucial to enhance doctors' research paper reading skills and encourage research paper authors to put the scientific arguments in the simplest way possible.

5) Potential solutions

Firstly, it is essential to acknowledge that reading and critically evaluating a research paper is a specialised skill and, therefore, needs specialised training and education (Castillo-Martínez & Ramírez-Montoya, 2021) ^[3]. Therefore, to help doctors engage more in reading medical articles, it is vital to encourage proper training and education in their syllabus and continuing education activities. Enhanced skills in reading and critically evaluating a research paper may increase doctors' appeal towards pursuing medical literature. In effect, they may shift their information-seeking behaviour towards journal articles, helping doctors make more informed decisions in light of the best evidence.

Secondly, it is also essential to acknowledge that reading a research paper, even for an experienced researcher (Kroemer, 2023) ^[14], can be a challenging experience due to some inherent complexities involved in methodologies and terminologies used while conducting and writing research. Therefore, journal article authors should be encouraged to convey their findings and implications through more understandable methods such as—but not limited to—the following: using less complicated language (Hubbard & Dunbar, 2017; Snow, 2010) ^[11, 23], providing plain language summaries (Martínez Silvagnoli, Shepherd, Pritchett, & Gardner, 2022) ^[15], infographics (Crick & Hartling, 2015) ^[4], visual abstracts (Millar & Lim, 2022) ^[16], and video abstracts (Bredbenner & Simon, 2019) ^[2]. This can help improve doctors' understanding of research findings and facilitate their application in daily clinical practice.

6) Collaborative approach: A critical note

To support and promote Evidence-Based Medicine, doctors, allied medical professionals, educators, and researchers must collaborate. Furthermore, there needs to be more synergy between these professionals: policymakers, syllabus designers, decision-makers, and many other relevant stakeholders must also work together. This collaborative effort is necessary to embrace the solutions presented in this article and achieve a shared goal. Establishing this type of synergy is always encouraged in public health (Pathare, 2021) ^[20].

7) Conclusion

Medical interventions need solid scientific backup to encourage Evidence-Based Medicine. However, most medical interventions lack evidence, which threatens Evidence-Based Medicine. Doctors often seek information from textbooks and personal contacts instead of journal articles critical to Evidence-Based Medicine. Relying primarily on medical textbooks can lead to outdated treatments. Personal interactions or phone calls may be unreliable since they rely on opinion rather than evidence. This inefficient behaviour can harm patients and public health. Doctors need training and education to improve research paper reading skills. Research paper authors should use more straightforward language, plain summaries, and visual aids to make research findings understandable. Collaboration among interdisciplinary professionals (researchers, doctors, allied health professionals, and educators) and other relevant stakeholders (policymakers, syllabus designers, and decision-makers) is crucial to promote Evidence-Based Medicine.

8) About the author

Abhinav is a public health and community medicine researcher from India. He obtained a Master of Science in Applied Public Health from the University of Central Lancashire (UCLan), England, in 2020 with a merit classification. Currently, Abhinav works as the Principal Investigator at Public Health India (PHI), an Indian research organisation.

Abhinav has written numerous scientific articles on various topics related to public health and community medicine. These include revisiting public health dietary guidelines, exploring the low-carbohydrate high-fat approach, addressing issues of obesity and Non-Alcoholic Fatty Liver Disease (NAFLD), promoting health through the healthy setting approach, encouraging health-promoting universities, and discussing sports nutrition.

Abhinav is dedicated to advancing Evidence-Based Medicine in the field of public health. His goal is to help create well-informed programs, interventions, policies, and strategies that have a positive impact on the health of the public.

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11) Conflict of interest

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