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Overdiagnosis in Modern Clinical Practice: Causes, Consequences, and Research Gaps

Abstract:

Overdiagnosis is a well-known issue in modern healthcare, where conditions are correctly diagnosed, but their findings are irrelevant to the patient's health. This review explores the main factors contributing to overdiagnosis, its impact on the patients and the healthcare system, and the gaps that still exist. In addition, it focuses on studies related to medical imaging and clinical decision-making. These findings suggest that overdiagnosis is influenced by the advancement in technology, broader diagnostic criteria, patient expectations, and systemic pressures within healthcare systems. These factors have led to unnecessary treatments, emotional distress, and increased healthcare costs. Furthermore, it diverts the resources and attention from patients with more urgent needs. Despite the awareness of the issue, research remains limited to noncancer conditions and low-middle-income countries. Addressing these gaps, along with improving clinical guidelines and patient communication, is essential to ensure that early detection benefits more than unnecessary harm.

Introduction:

Modern medicine has made a remarkable impact in detecting diseases early on before any complications can develop. Many believe that finding any abnormalities early automatically saves lives. However, the push to find the illnesses early on has led to misjudgment and inaccurate decision-making, inflicting more burden than relief. Overdiagnosis is when a condition is correctly identified but receives unnecessary treatment, unlike misdiagnosis, which confuses symptoms altogether. “Misdiagnosis and false positives are related but distinctly different concepts. Misdiagnosis is an incorrect diagnosis of a condition, often owing to a lack of diagnostic specificity. Misdiagnosis and false positives can also lead to harm due to subsequent investigations and unnecessary

treatment" (Can Fam Physician, 2018). Overdiagnosis has caused unnecessary worry, treatment, and surgery, as well as exposure to side effects from medication and procedures. "Overdiagnosis was well recognized in the second half of the 20th century from the advent of widespread screening for cancers" (Harminder Singh, James A Dickinson, 2018).

One major issue is the lack of a standardized definition of the problem. Overdiagnosis is defined and used differently across studies and disciplines, making it difficult to compare results across studies. Another challenge to overcome is the limited data on diseases and settings. In modern clinical practice, research has focused on cancer screenings, with fewer studies on overdiagnosis in mental health, infectious diseases, and pediatrics. Lastly, most of the evidence comes from the high-income class, but countries that rank part of the low-middle income classes are unable to conduct research. This creates a gap in understanding the impact of overdiagnosis across different healthcare systems. A key barrier is communication; even when overdiagnosis is identified, translating these findings into clear guidance for clinics and patients remains a challenge.

This paper aims to explore the causes, consequences, and challenges of overdiagnosis in modern clinical practice. It will look at how overdiagnosis differs from misdiagnosis, examine its impact on patients and healthcare systems, and highlight key barriers and gaps in research, especially in non-cancer conditions and low- and middle-income countries.

Method:

The objective of this research was to conduct a systematic narrative review of overdiagnosis within contemporary healthcare practice. A structured review process was adopted to enhance objectivity while limiting bias.

To accomplish this, a comprehensive database search was performed through PubMed, Scopus, and Google Scholar, using the following terms: "overdiagnosis," "medical screening," and "clinical decision-making." Only studies published in English and

focused on relevant clinical areas were considered for inclusion in this review. Studies that were deemed low quality, not clinically focused, or unrelated to the identified objectives were excluded.

Once appropriate data had been identified within the reviewed studies, the following information was extracted: definitions, aetiologies (e.g., increased screening), outcomes, and variations in definitions across healthcare systems. A qualitative analysis was conducted to identify common themes and differences in definitions, outcomes, and types of studies conducted. Additionally, the review highlighted the limited body of scientific evidence across populations.

The review followed a systematic methodology, ensuring methodological rigor and transparency throughout the research process.

Overdiagnosis is a disease that is correctly identified, but treating it won't make a difference. This issue has become more common throughout the years with the advancement of medical technology and widespread screening programs. Which can detect very small or slow-growing abnormalities. "Overdiagnosis could include, for instance, the detection of indolent tumors that typically grow so slowly that the individual dies of old age without ever knowing about the presence of the tumor" (Thomas, 2022). Alternatively, misdiagnosis refers to an incorrect diagnosis, whereas overdiagnosis involves correctly identifying a disease that would resolve on its own without treatment. For example, some cancers detected through routine screening may grow slowly through a patient's lifetime or resolve themselves, requiring no medical attention. Despite this, once a condition is diagnosed, it is then treated as a serious disease. "Once the tumor is detected, however, both the patient and the physician face a dilemma. Patients typically feel distressed at doing nothing about the tumor, even if they are reassured that it will most probably never be aggressive. An Australian study showed that one in five common cancers was detected by overdiagnosis, using over three decades of data" (Thomas, 2022). As a result, patients may undergo unnecessary treatments, medications, and surgeries. This can lead to physical side effects, emotional stress, and increased healthcare costs.

Overdiagnosis is led by the technological, clinical, and systemic factors in modern healthcare. While advances in medical technology have made a tremendous impact in detecting abnormalities, it also initiates unnecessary attention toward a problem. Beyond technology, clinical practices also contribute to overdiagnosis. The guidelines every physician must follow provide recommendations for diagnosing, treating, and preventing medical conditions. However, these guidelines can broaden diagnostic criteria; they can also lead to unnecessary screenings and additional testing. Some patients expect through testing and treatments, often requesting medications or interventions when they might need them. “Current medical practice in many countries, characterized by intolerance to uncertainty, the need to label every problem with a diagnosis, pervasive risk aversion, fear of malpractice and litigation are also important drivers of overdiagnosis and overuse” (Bandovas et al., 2022). Furthermore, systemic factors also contribute to the increasing rates of overdiagnosis. For instance, financial incentives within healthcare systems may promote increased testing and treatment, prioritizing early detection. “On the other hand, financial incentives from ordering tests and performing medical and surgical procedures may result in increasing demand” (Bandovas et al., 2022). Collectively, cultural beliefs emphasize proactive healthcare and encourage unnecessary diagnoses and interventions. Together, these factors create a context in which overdiagnosis has become more common.

The consequences of overdiagnosis affect both patients and healthcare systems. Patients may undergo interventions that provide little or no benefit, causing physical side effects, complications, and long-term health risks. “Overtreatment following overdiagnosis can lead to clinically important consequences, including death from the side effects of treatment—for example, sepsis in a patient undergoing chemotherapy for treatment of an overdiagnosed cancer. (Singh et al., 2018). Besides the physical effects, a patient may also suffer emotional and psychological pain. At the same time, healthcare systems face financial burden due to unnecessary tests, procedures, and follow-up care. Additionally, resources and medical attention may be diverted to critical, life-threatening patients. As a whole, these consequences show a significant impact of overdiagnosis for both patients and healthcare systems.

However, there are key research gaps regarding overdiagnosis. While cancer screenings have dominated research, very little work has been done on the topic in conditions such as mental health disorders, infectious diseases, and pediatric illnesses. “ Key areas where evidence is lacking include non-cancer conditions, the effectiveness of mitigation strategies, and methods for communicating these risks to patients.” (Gram et al., 2025). Moreover, the lack of standardized or consistent definitions and methodologies across studies hinders both the comparison of results and their generalizability. “Research shows patients struggle to understand that 'finding more' is not always better, and many healthcare professionals also have differing levels of awareness of the issue.” (Karentius et al., 2026). These gaps collectively indicate a substantial impact of overdiagnosis for patients and health care systems alike. Much of the existing evidence comes from high-income countries, while low- and middle-income countries have limited capacity to conduct research, leading to a knowledge gap globally. Furthermore, even when overdiagnosis is recognised, it can still be difficult to translate research into actionable clinical guidelines and a patient-friendly communication strategy. Filling these gaps will undoubtedly enhance healthcare decision-making and reduce avoidable interventions.

Conclusion:

Overdiagnosis is a growing concern in modern healthcare systems. Although advances in medical technology and early detection have improved the identification of many abnormalities, they have also led to the detection of unnecessary conditions that may never harm the patient. This can result in unnecessary treatments, emotional distress, and increased healthcare costs, impacting both patients and healthcare systems. Despite the growing awareness, the research gaps remain, particularly in non-cancer patients and low to middle-income countries. While tackling these gaps, guidelines that physicians follow also need improving, as do patient communication. This is essential to ensure that the benefits of early detection outweigh the risks of overdiagnosis.

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