IJBMC
International Journal of Body, Mind and Culture

Volume 12, Issue 4, pp 235-246
DOI: 10.61838/ijbmc.v12i4.1087

Article type:
Review Article

# The Engineering of Health: A Model for Critiquing and Assessing Medicalization

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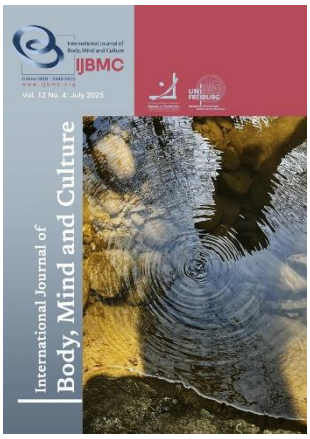



Article history:

Received 11 Jan 2025
Revised 14 Feb 2025
Accepted 24 Feb 2024
Published online 21 May 2025

How to cite this article:
Monajemi, A. (2025). The Engineering of Health: A Model for Critiquing and Assessing Medicalization. International Journal of Body, Mind and Culture, 12(4), 235–246.



## ABSTRACT

Medicalization refers to the process by which human conditions are transformed into medical problems. While conceptualized initially as a critical tool in sociology, medicalization has since evolved, leading to its application beyond disease to enhancement-oriented practices. This paper proposes a new model for evaluating medicalization through the lens of technology, drawing on the philosophy of medicine and the intersection of medicine and technology. It argues that current sociological approaches, particularly Conrad's framework, often neglect foundational concepts such as disease ontology and the epistemology of medicine. The author introduces the idea of medicalization as a socio-technical system, governed by instrumental rationality akin to engineering sciences, as opposed to the practical wisdom (phronesis) that governs medical practice. Central to the proposed model is a hybrid concept of disease, combining descriptive (biological dysfunction) and normative (harm) criteria, inspired by Wakefield's "harmful dysfunction" model. This distinction allows for a more precise differentiation between legitimate medical practice and over-medicalization. The paper categorizes medicalization into disease-oriented and health-oriented types, each with distinct evaluation criteria. Disease-oriented medicalization is assessed based on the presence of real pathology, justification of demand, appropriateness of medical intervention, and safety. Health-oriented medicalization—e.g., cosmetic interventions—is judged through technology assessment rather than traditional clinical frameworks. Ultimately, the model aims to protect the integrity of medicine while acknowledging the role of biomedical technology and commercial interests. It calls for a transdisciplinary and contextualized approach to evaluating medicalization that includes public engagement, social sciences, and critical oversight to prevent the commodification of health.

**Keywords:** Medicalization, Technology Assessment, Biomedical Engineering, Health Policy, Harmful Dysfunction.

## Introduction

The core concept of medicalization involves expanding the domain of medicine to encompass new aspects of human existence, often through the redefinition or reconstruction of these areas as medical conditions. (Ballard & Elston, 2005; Conrad, 1992, 2005, 2007) Consequently, medicalization is a fundamentally critical concept, referring to the inappropriate or excessive medicalization, i.e., over-medicalization, of various aspects of life (Sholl, 2017).

Medicalization has been defined as the "transformation of human condition into a treatable problem". (Conrad, 2005; Davis, 2010). This process transforms the concept of abnormality or deviation into illness. The devaluation of medicalization marked a significant shift, such that it was no longer considered undesirable or reprehensible. Medicalization was framed as a process, meaning that sociologists should

not judge medicalization but rather describe the transformation of human conditions into treatable problems. In subsequent decades, Conrad emphasized that medical definitions of deviance and abnormality are a key mechanism in the process of medicalization. This analytical strategy enabled him to demonstrate that medicalization is not a unitary and integrated process, but rather a multidimensional, fluctuating, and reversible one. This process, which progresses unevenly in different cases, involves medical professionals and the public to varying degrees (Bodea, 2016).

Addressing the phenomenon of medicalization is essential, as it can undermine public trust in the medical community, weaken individual coping mechanisms, obfuscate lines of responsibility, promote individualism, and depoliticize social issues. The concept of medicalization offers a twofold benefit. First, it allows us to identify and prevent the misuse of medicine, as medicalization often justifies itself by mimicking legitimate medical practices. Second, it helps safeguard various aspects of our lives from being transformed into commodities solely for commercial gain.

Despite the justified and severe criticisms of medicalization, a coherent theoretical framework for understanding and interacting with this phenomenon has yet to be developed. Both the sociological and bioethical approaches have neglected two fundamental aspects: one, the epistemological foundations of medicine, and the ontological aspects of health and disease. A framework is needed to differentiate between medical practice and medicalization, and to establish criteria for evaluating the legitimacy of medicalization. This article aims to provide a framework for this purpose.

The idea of 'medicalization as technology' has emerged from the intersection of philosophy of technology and philosophy of medicine. The initial concept was developed nearly a decade ago. Since then, I have refined and expanded upon it. By combining insights from both fields, I have sought to gain a deeper understanding of the nature and purpose of medicine, distinguishing between medical practice and over-medicalization. Additionally, this model enables us to distinguish between medicalization and over-medicalization, i.e., invalid medicalization. This interdisciplinary approach provides a framework for utilizing medicalization beneficially without equating it with medical practice, ensuring that such interventions are both safe and effective (Monajemi, 2016, 2018, 2023; Monajemi et al., 2014; Monajemi & Moghadam-Heidari, 2022; Monajemi & Moghadam, 2019; Monajemi & Mousavi, 2022; Monajemi & Shabani, 2023). My primary goal is to formulate a model of medicalization that safeguards the medical profession's status and prestige while ensuring the continued use of safe and effective medical interventions within a reasonable framework. This model enables the utilization of medical interventions in society, adhering to regulations and standards, without solely relying on physicians.

In this paper, I will first address criticisms of the sociological interpretation of medicalization, with a particular focus on the influential work of Conrad, which has significantly shaped the field of medicalization studies. Next, I will elaborate on the concept of medicalization as a technology, outlining its key components. Finally, I will discuss its practical implications.

## Critique of Conrad's work

One of the most significant criticisms leveled at sociological analyses of medicalization is the neglect of the concept of disease. In other words, the transformation of human problems into treatable conditions has been conceptualized without adequately considering the notion of "disease." Are the issues we have medicalized truly diseases, or are they merely defined as such by convention? If the issues that have been medicalized are indeed diseases, do we then justify the medicalization of these issues? Moreover, if they are not genuine diseases, is medicalization inappropriate? How do different conceptions of disease intersect with medicalization? What conception of disease can best help us to engage with medicalization?

Hoffmann (2016) critiques the sociological perspective on medicalization, arguing that the expansion of the medical field and the increase in patient numbers are not always due to the transformation of non-medical issues into medical ones (as sociologists often suggest). Instead, he proposes that in many cases, this expansion is facilitated by changes in diagnostic criteria, a phenomenon that occurs within the medical profession itself. He terms this phenomenon "overdiagnosis" and demonstrates that other

approaches to medicalization have overlooked it (Hofmann, 2016). Scholl (2017) offers a critique of Conrad's concept of medicalization, arguing that it oversimplifies the complexities of medical practice and assumes that the medical community, by consensus, determines that something is a disease. Schull argues that when discussing medicalization, there is no precise definition of "the medical." Upon closer examination, he finds confusion between clinical practice and pathology within the medical field. Instead of focusing on the sociological aspects of medical discourse, Schull aims to differentiate between these two practices. He believes the solution lies in understanding the distinction between medicalization and Pathologization (Sholl, 2017).

The starting point of this critique of the sociological approach is that without understanding the interaction between biomedical sciences and medical practice, we cannot fully comprehend the process of medicalization. Clinical physicians cannot define diseases on their own; rather, it is the basic (biomedical) sciences that provide this possibility. Therefore, successful and justifiable examples of medicalization are always based on the results of research in these sciences (Clarke & Shim, 2011).

## Medicalization as technology

The formulation of medicalization as a technology has three components: first, the nature of medicine; second, the nature of disease; and third, the distinction between medical sciences and engineering sciences.

It is important to clarify that by 'technology', we refer not to physical tools and devices, but to a specific form of rationality that underlies engineering, often termed 'instrumental rationality'. Medicine holds a unique position within the academic landscape. While medicine relies on knowledge from natural sciences and employs technological tools, it is distinct from both.

Critically reflecting on its nature, medicine is a goal-oriented practice dedicated to treating and caring for patients. Unlike disciplines like physics and engineering, medicine is not solely concerned with understanding the natural world or applying technical principles. Instead, it is a human-centered endeavor that blends scientific knowledge with practical considerations.

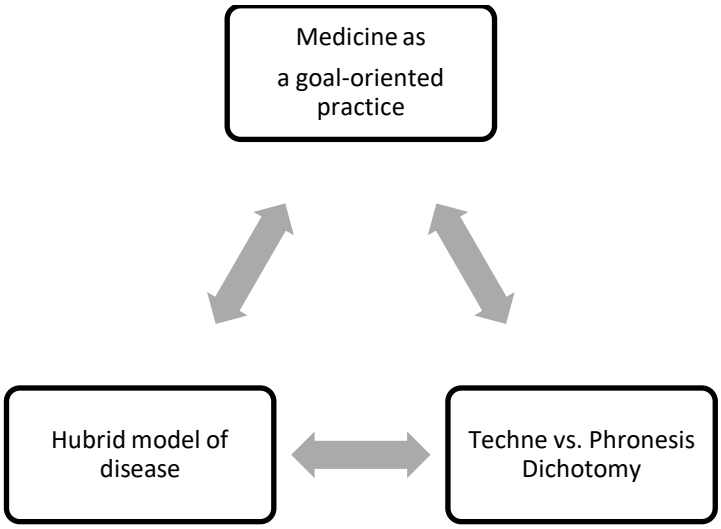
When examining the nature of disease, a hybrid model that incorporates both biological and social factors is most appropriate. Neither a purely biological nor a purely social perspective provides a comprehensive framework for understanding medicalization.

To differentiate between medical practice and medicalization, we must delve deeper into the fundamental differences between medical and engineering sciences. While both fields involve practical applications, medicine is guided by deontic principles and a commitment to patient well-being. Engineering, on the other hand, is often driven by efficiency and optimization. Drawing on the Aristotelian distinction between techne and phronesis, we can discern fundamental differences in the rationalities governing medicine and engineering. While engineering primarily employs technical skills and knowledge (techne), medicine requires a blend of technical expertise and practical wisdom (phronesis). By understanding the distinct rationalities underlying medicine and engineering, we can better appreciate the unique role of medicine in society and critically evaluate the process of medicalization.

I believe that to understand medicalization and its relationship to clinical practice correctly, we must understand it as a technology. The way medicalization has managed to frame itself using the language of clinical practice is the result of two events: the first is the "transformation of health into a product" (such as a beautiful nose, a happy life, a better memory, a small stomach), and the second is the "transformation of medicine from a healing art into a kind of engineering science."

**Figure 1**

*Components of medicalization as a technology model*




*The nature of medicine*

Unlike physics or chemistry, medicine does not rely on universal laws and axioms. While physical sciences, such as Newtonian mechanics and electromagnetism, are built on a foundation of precise mathematical principles, medical theories are more nuanced and context-dependent. They often rely on experiential reasoning and specific examples, rather than axiomatic structures.

The nature of knowledge in medicine also differs from that of natural sciences. Scientific knowledge is typically descriptive, providing objective observations about the world. In contrast, medical knowledge is often normative-deontic, guiding clinical decisions and interventions. For instance, while a biologist might describe the structure of a cell, a physician prescribes drugs for a specific patient's condition (Wieland, 2002).

Moreover, the fundamental goals of medicine and science diverge. Science aims to understand the natural world, while medicine seeks to improve human health. This health-centered focus permeates all aspects of medical practice and research. Medical research, though grounded in scientific methods, is ultimately directed towards the practical goal of diagnosing, treating, and preventing diseases (Sadegh-Zadeh, 2013).

It is essential to acknowledge that while scientific principles inform medical knowledge, they are not reducible to them. Diseases and treatments are not merely objective facts but are shaped by human values, cultural contexts, and ethical considerations. This highlights the unique character of medicine as a discipline that bridges the gap between science and the humanities."

Medicine encompasses three primary areas: clinical practice, clinical research, and biomedical research. In this context, clinical practice takes precedence over the other two areas, and both clinical research and basic sciences revolve around it. Clinical practice is a goal-oriented activity aimed at maintaining health and restoring it in times of illness. If this purposeful activity is removed from medicine, it loses its meaning.

One of the major criticisms leveled at the World Health Organization's definition of health is that it provides a suitable basis for medicalization. Since the WHO defines health as "a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity," and no one enjoys complete well-being in all three aspects, it follows that everyone is sick and needs medical intervention. For this reason, this definition of health can be considered the primary driver of medicalization.

## Medical practice is a goal-oriented activity.

Medical practice is a goal-oriented activity aimed at maintaining health and restoring it when an individual is ill. If this purposeful activity is removed from medicine, it loses its meaning. The idea of consulting a doctor who, instead of treating you, merely explains the scientific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causes of your illness is so counterintuitive that it sounds more like a joke. Medical practice takes priority because it is where the goal of medicine is achieved. The other two parts, namely clinical research and basic sciences, revolve around it. Gadamer, in his exploration of health, shows that, unlike many other fields, theory and practice in medicine are not separate and distinct but are wholly intertwined. Medical knowledge is acquired from and for practice, and what is called science in medicine (theoretical and practical) is a guide for medical practice." (Gadamer, 1996, pp 20-30) Here, practice refers to a complex and embodied form of activity based on human cooperation, socially established, through which the internal goods implicit in that activity are realized in the pursuit of excellence. These standards are suitable for this type of activity and, to some extent, shape it (Frawley, 2015).

## The Theoretical-Practical Distinction in Medicine"

According to Wieland, to understand the nature of medicine, neither the science/art dichotomy nor the natural sciences/humanities dichotomy is sufficient. A more suitable framework for understanding the nature of medicine is the distinction between theoretical and practical knowledge.

Theoretical knowledge encompasses descriptive and expressible propositions, such as quantum theory, pathology theory, evolutionary theory, and immunology theory. According to Sadegh-Zadeh, examples of theoretical knowledge include natural sciences, biomedical sciences, mathematics, sociology, history, and linguistics. Theoretical knowledge can explain and predict. In medicine, theoretical knowledge is closely tied to biomedical science, which provides physicians with the necessary understanding of the body's structure and function.

In contrast, practical knowledge consists of imperatives for performing an action or intervention. This means that under condition "A," if the goal is "B," then action "C" must be performed. Engineering sciences, clinical sciences, and educational sciences fall into this category (Sadegh-Zadeh, 2013).

The second component is a hybrid perspective on disease. This perspective emerged as an attempt to overcome the shortcomings of other perspectives, and as we shall see, it not only provides a more comprehensive view of the concept of disease but is also less susceptible to many of the criticisms leveled against other views. Moreover, this perspective can be understood as a criterion for limiting the scope of medicine.

### *Nature of Disease*

These debates seek to define the boundaries of medical intervention and distinguish medical care from other societal activities. The concept of disease is fundamental. In response to the question of what constitutes a disease, there are three main perspectives or interpretations. According to the biostatistical view, a condition is considered a disease when it deviates from what is statistically normal in terms of psychological and physical functions, and this deviation impacts the survival or reproduction of the living organism (Sadler et al., 2009). This perspective attempts to understand disease in naturalistic terms, avoiding resort to normative components (Hofmann, 2016). The most significant criticism of descriptive perspectives is that they overlook the fact that value judgments are inherent in the concept of disease. In contrast, disease is always a deontic construct and a society-relative category (Sadegh-Zadeh, 2013).

Medicalization reflects the growth of biomedical sciences, accelerating health innovations. It has also shifted our focus towards addressing psychological issues. What sociologists termed "non-medical issues" were not inherently so. Instead, a lack of scientific understanding and research hindered their initial recognition as medical conditions. As science advances, we have realized conditions like addiction, obesity, and depression are indeed medical. From a philosophical perspective, these conditions have been *discovered*, not *constructed*.

In contrast, normativist perspectives argue that disease is a social construct and involves cultural judgments. What determines whether a condition is a disease is human norms, and not merely abnormal biological states. According to this view, "disease is the judgment that a person is harmed in a way that can be explained in terms of psychological or physical conditions or processes".

Normativist perspectives have been criticized for being unable to distinguish between diseases and non-disease conditions. In other words, some conditions cause suffering and impair a person's ability to pursue


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their life goals, but cannot be considered diseases because they are not caused by dysfunction. Therefore, it seems that the distinction between disease and non-disease requires other criteria.

A normative approach to disease can lead us to mistakenly view illnesses as social constructs fabricated by doctors, society, or a combination of both. Consequently, this perspective is insufficient for providing a robust framework to evaluate medicalization.

Hybrid perspectives on disease attempt to offer a new view of disease by combining elements of both normativist and descriptive perspectives, addressing the shortcomings of these two views. Wakefield provides an example of such a hybrid perspective. According to Wakefield, any theory of disease must answer the question of whether disease is a normative concept based on value judgments or a "scientific" concept independent of values. (Wakefield, 1992,373) Wakefield defines disease as "harmful dysfunction." Harmfulness is a value-laden concept, determined according to socio-cultural criteria, whereas dysfunction is a scientific concept that refers to a failure in a function that is biologically designed. For example, although illiteracy is harmful and is negatively evaluated, an illiterate person is not considered sick; however, if illiteracy is caused by a neurological flaw that impairs learning, it can be considered a disease (Wieland, 2002).

According to Wakefield's perspective, a condition must meet two criteria simultaneously to be considered a disease. Firstly, it must be deemed undesirable and harmful according to social standards, and it must at least potentially be a subject of medical attention. Therefore, medicine is inevitably a value-based profession (Wieland, 2002). Additionally, there must be a second component that Wakefield refers to as 'dysfunction.' This component refers to an unrealized function and a flaw in some of the organism's mechanisms that prevents it from fulfilling its purpose. Dysfunction occurs when a mechanism cannot perform its assumed natural function, which is independent of human interests and concerns. For example, the natural function of the perceptual system is to transmit relatively accurate information from the environment; therefore, hallucinations indicate the presence of a dysfunction because one of the internal mechanisms is unable to perform its natural function (Wieland, 2002).

The hybrid perspective aims to determine the necessary and sufficient conditions for a condition to be considered a disease. This perspective aims to be free from the problems associated with normative and descriptive perspectives. The second component of the hybrid perspective prevents undesirable conditions that are not caused by internal mechanism flaws from being considered diseases. Additionally, the hybrid perspective does not consider deviation from the statistical norm sufficient to label a particular condition as a disease. By adding the condition of harmfulness, conditions that deviate from the statistical norm but are not harmful are excluded from the category of disease, thus defining a broader range for the normal state.

This paper has demonstrated that medicine is a goal-driven practice that leverages both the natural sciences and technology. A hybrid model that encompasses both descriptive and normative disease concepts has proven most effective in understanding medicalization. Building on these findings, the final section will delineate between medical practice and medicalization."

*Differentiating medical practice from medicalization*

Medicalization signals a rapid shift in medicine from a healing art to a science of engineering. Engineering practice involves designing a material or tool to achieve a specific goal. Engineering science, on the other hand, is a field where methods for designing materials and tools to achieve specific goals are researched. In this research, the crucial aspect is demonstrating the greater effectiveness of the proposed method compared to other methods. Therefore, the rationality governing engineering science is based on tool-goal relationships. In other words, engineering research involves examining the efficiency of tools, yielding practical knowledge. The way these sciences propose to achieve a specific goal is through the application of materials and tools. (Sadegh-Zadeh (2013) p. 847-851)

We consider medicine a practical science because, through biomedical and clinical research, and based on tool-goal relationships, effective clinical practical knowledge is obtained. Therefore, diagnostic or clinical applications, which are an important part of the practical knowledge of medicine, only research the effectiveness of various medical interventions.

Medicine as an engineering science is a kind of Aristotelian interpretation of poetic science. Poetic


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science in medicine encompasses the development and implementation of diagnostic, therapeutic, and preventive methods. Many of these methods utilize complex tools and algorithms, including automated machines, that require human intervention to function. For example, consider the human-machine complex in the ICU, cardiology laboratories, or neurosurgery. Methods and measurements are created, designed, and engineered. For example, insulin is produced by a genetically engineered bacterium and works with a fuzzy controller. Biomedical engineering represents the poiesis of medicine, the main branch of which is biotechnology, without which health care is neither deliverable nor possible. Therefore, it is no exaggeration to say that biomedical engineering has made healthcare possible, which can be considered a combination of engineering, health science, and health practice (Sadegh-Zadeh, 2013).

This model aims to demonstrate that medicalization and medical practice have different goals and are governed by different rationalities. This can help us to understand medicalization better and distinguish it from medical practice.

As mentioned, sociological perspectives study medicalization as a social phenomenon alongside other phenomena, and this approach makes it prone to neglecting medical practice or medicine itself. In the previous section, medical practice was considered through the discussion of disease. In this section, another aspect of medical practice is examined through a discussion of the purpose and rationality of medicine. Moreover, these two criteria are used to differentiate medicine from medicalization.

The purpose of medicine is to care for human beings. This may be achieved through complete cure or by creating the best possible condition under specific disease conditions (Bodea, 2016).

The distinction between medicine and medicalization can be explained based on the rationality governing each of these actions. Medicalization is a sign that medicine is evolving into an engineering science. In engineering sciences, means-ends rationality prevails. At the center of engineering sciences and actions is a form of instrumental rationality aimed at achieving a known goal. Whereas, what is important for medicine is to answer the question of what should be done for this particular patient? In other words, what is the right and appropriate healing action at this moment for this individual? Moreover, this is a practical question, not a scientific or technical one. Although a suitable and correct healing action requires mastery of scientific knowledge and technical skills, medicine cannot be reduced to these knowledge and skills alone.

The goals and rationality governing medicalization differ from those of the medical profession. By transforming health into a product and medicalizing medicine from a healing art into a form of engineering science, medicalization can be considered a form of technology. In other words, medicalization is a technology based on biomedical engineering that produces products. To better understand, medicalization must be viewed as a socio-technical system whose various components, including doctors, designers, users, theories, device users, and social institutions, are involved.

More fundamentally, the distinction between medicine and medicalization is based on the distinction between techne and phronesis in the Nicomachean Ethics, specifically in the discussion of intellectual virtues related to the changeable world, or, more leniently, practical matters. According to this view, techne or craft is involved in producing a product based on a pre-existing plan. The product produced by the craftsman is separate from him and can be evaluated independently of the craftsman. The rationality governing techne is instrumental-goal. In contrast, phronesis is a practical situation that has no specific product. The distinction between means and ends is meaningless in it, and the goal is realized during the action. Aristotle places ethics and politics in the category of phronesis. The goal of ethics is realized during ethical action, and ethical action does not pursue an external goal; if it does, it is no longer an ethical action but falls under instrumental rationality. For example, respecting a teacher is an ethical act; however, if this respect is given solely to obtain a grade or reward from the teacher, it becomes an unethical act. Medicalization is of the nature of techne, and medicine is of the nature of phronesis (Aristotle, 2009; Gadamer, 1996).

## Practical Implications of the Model

One significant implication of this theory is its ability to differentiate between disease-based and health-based

medicalization. While disease-based medicalization deifies a human condition as a disease, health-based medicalization prioritizes health over disease, aiming to enhance overall well-being. Influenced by healthism, this type of medicalization focuses on goals like beauty, youthfulness, and other personal aspirations, rather than treating illness.

Disease-based medicalization aligns with clinical medicine. Legitimate disease-based medicalizations become part of medical science, rendering the term 'medicalization' inapplicable. Conversely, illegitimate disease-based medicalizations, which mimic clinical medicine to gain legitimacy, must be prevented by medical institutions to avoid the misuse of medicine.

Health-based medicalizations, such as cosmetic interventions, do not require a disease concept and can exist outside of traditional medical practice. These practices can be legitimate or illegitimate, with legitimacy determined by the assessment of technology. Safe, effective, and scientifically sound health-based medicalizations are considered legitimate by using technology assessment methods. The legitimacy of these medicalizations does not imply that medical institutions must be responsible for them; instead, medical institutions should merely oversee them, similar to health inspectors who visit restaurants and issue health cards to staff. This challenges the misconception that medical institutions must control all health-related interventions.

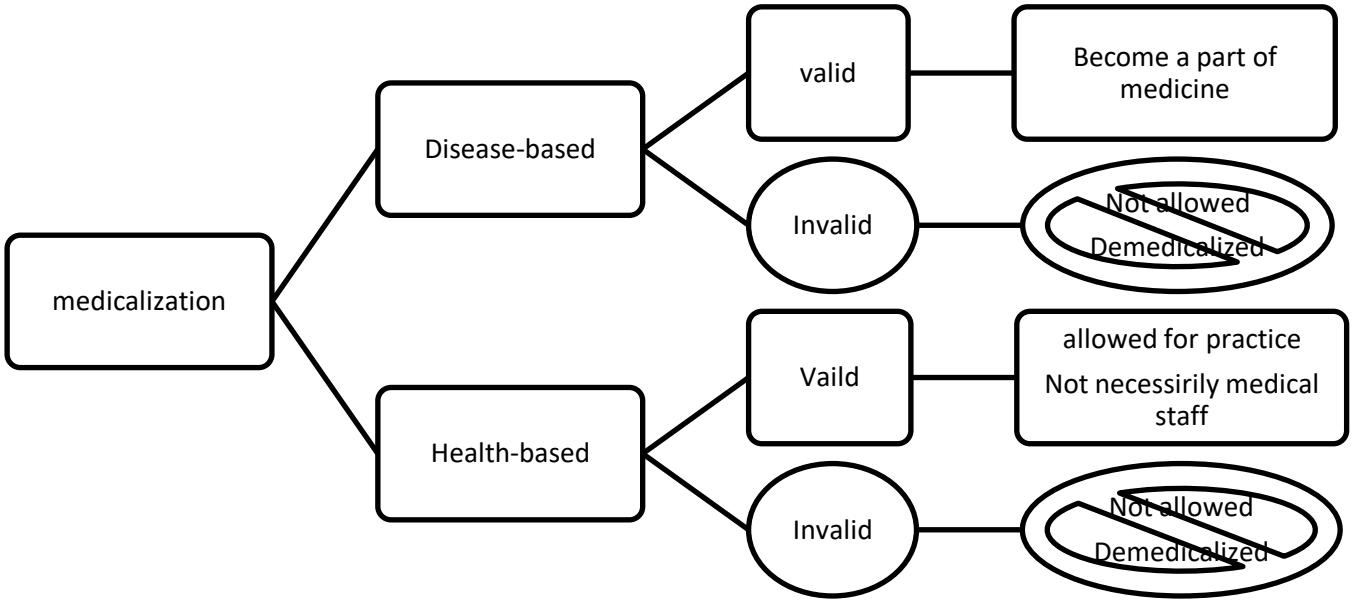
Unlike disease-oriented medicalization, health-oriented medicalization does not align with traditional medical practice. It is better understood as a form of health engineering. To assess its implications, we must employ technology assessment methods and consider critical perspectives, such as those articulated by Feinberg.

## Criteria for evaluation of medicalization

To distinguish medicalization from traditional medical practice, it is essential to differentiate between the two types: disease-oriented and health-oriented medicalization. As medical practice is primarily focused on treating diseases, disease-oriented medicalization should be separated from it. To determine the legitimacy of disease-oriented medicalization, four specific criteria are applied. If a condition meets these criteria, it is integrated into the realm of medical practice, and the label of 'medicalization' is no longer applied. Conversely, medicalizations that fail to meet these criteria are deemed inappropriate and excluded from the domain of medicine. Picture 1 illustrates the evaluation process.

**Figure 2**

*The process of medicalization evaluation*



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Disease-based medicalization criteria

1- **Is the condition truly a disease?** Does defining it as such significantly reduce the risk of physical, psychological, or mortal harm? For instance, when medicalizing obesity, we must ask: Does classifying it as a disease reduce health risks?
2- **Who demands medicalization?** Is the demand justified or exaggerated? Could it be a way to reduce social diversity or impose norms? Who benefits from this medicalization?
3- **Is medicalization the best approach?** Can the condition be better understood and addressed through non-medical means? Consider everyday emotions like sadness and grief. Medicalizing these can pathologize everyday human experiences.
4- **Is medicalization safe and effective?** Should it be compared to non-medical alternatives? For example, is medication always the best solution for sadness, or could social activities be just as practical?

If a medicalized condition meets the first two criteria, it may warrant further evaluation using the third and fourth criteria. If it fails to meet the first two criteria, it may be considered an illegitimate form of medicalization.

**Health-based medicalization criteria**

1- **Is the medicalization of this condition rooted in a legitimate need or driven by exaggerated expectations?** Could it be a means of reducing societal diversity or imposing normative standards? Which social group is advocating for this medicalization, based on what rationale, and who stands to benefit?
2- **Does the proposed medical intervention align with the principles of biomedical science?** Miller's framework provides valuable insights. He distinguishes between science and technology, emphasizing that technology is not merely applied science. Demonstrating a technology's effectiveness does not inherently validate its scientific underpinnings. However, science can guide technological development by predicting limitations based on scientific theories, preventing fruitless endeavors. For instance, the laws of thermodynamics preclude the creation of a 100% efficient machine. Similarly, biomedical sciences can delineate the boundaries of permissible and impossible bodily interventions.
3- **Is the proposed intervention both safe and effective?** For example, if using prosthetics to alter body shape, they must be both functional and harmless. Here, the fields of biomedical science and engineering play crucial roles. Beyond safety and efficacy, additional criteria should be considered for evaluating health-based technologies.
4- **Are there non-medical alternatives?** How do they compare to medical interventions? Does the technology necessitate a medical context? Finberg introduces the concept of a "Parliament of Things," suggesting that we can freely choose between various technologies, including medical and non-medical options.

This comparison considers both safety and efficacy. Given the potential harms of over-medicalization, in situations where non-medical alternatives are equally effective and safe, it is preferable to avoid medicalization. Consider the debate between dermatologists and beauticians regarding cosmetic procedures. The concern is often about potential harm due to insufficient expertise. However, if trained and skilled beauticians perform these procedures, might they not be as qualified as dermatologists? We do not expect cooks to be medical experts, even though unhealthy food can be detrimental to one's health. Why then do we expect medical expertise for beauty treatments? Cosmetic surgeries performed for non-therapeutic reasons are a clear example of medicalization. This criterion suggests that medical institutions can oversee health-based technologies to ensure safety and efficacy, but they do not necessarily require medical practitioners to administer them.

Suppose healthcare providers, whose primary role is to provide patient care, shift their focus towards health-based medicalization. In that case, there is a significant risk of harming society due to the limited human and financial resources in the healthcare sector. This is particularly concerning because health-based

medicalizations often generate higher incomes and impose less psychological stress on medical staff.

Health-oriented medicalization is primarily concerned with public health, making it a matter of significant policy interest for institutions like the Ministry of Health. Consequently, understanding the complex interplay between biological life and political power, as outlined by biopolitics, can provide valuable insights into the processes and implications of medicalization. One of the major criticisms of the World Health Organization (WHO) definition of health is that it provides a suitable basis for medicalization. Since the WHO defines health as complete physical, mental, and social well-being, and no one enjoys complete well-being in all three aspects, it follows that everyone is ill and needs medical intervention. For this reason, this definition of health can be considered the primary driver of medicalization. The growing prevalence of medicalization has fueled increasing concerns that things have gotten out of hand and that medicine has taken over all aspects of human life. Criticism of medicalization implicitly understands it as a Frankenstein that its creator cannot control and becomes subjugated to.

The proposed criteria do not suggest that medical institutions should have exclusive authority over the evaluation of medicalization. Assessing medicalization requires the involvement of social sciences, humanities, and broader society. Given the origins of many overdiagnosis protests in civil society, solely entrusting medical institutions with this task could lead to biased outcomes.

On the other hand, the assumption that medical institutions solely drive medicalization is a limiting perspective that can impede a comprehensive evaluation. The factors driving the emergence, growth, and expansion of medicalization are multifaceted, encompassing societal, professional, and political influences. When social deviance or crime is medicalized, the associated stigma is often reduced. By framing these behaviors as medical issues, individuals are encouraged to seek treatment, leading to more humane and empathetic responses.

Historically, conditions like epilepsy were stigmatized and misunderstood. However, medicalization has helped to dispel negative perceptions, allowing individuals with epilepsy to live more fulfilling lives. Similarly, the diagnosis of ADHD can be beneficial for individuals who struggle with attention and hyperactivity, as it provides a framework for understanding and managing their condition (Sholl, 2017).

Medicalization can also empower individuals by granting them greater control over their lives. For example, birth control pills have given women more autonomy over their reproductive health. Moreover, medicalizing social problems can legitimize suffering and stimulate research, leading to improved treatments and prevention strategies.

While medicalization can have positive consequences, it can also be used as a tool of social control. By framing social issues as medical problems, governments and other institutions can avoid taking responsibility for systemic problems and shift the burden onto individuals. Additionally, the pharmaceutical industry and other commercial interests play a significant role in driving medicalization, often promoting treatments for conditions that may not require medical intervention.

The rapid advancements in biotechnology, genetics, and information technology, coupled with the influence of neoliberal economic policies, have further accelerated the process of medicalization. This has led to the development of increasingly sophisticated medical treatments, but it has also resulted in the commodification of health and well-being (Maturo, 2010).

The study of medicalization necessitates an interdisciplinary research design and a transdisciplinary evaluation process. This approach will ensure that academic research findings are effectively translated into practical applications, influencing both societal and policy outcomes.

## Conclusion

This paper proposes a model to delineate the boundaries of medical practice and provide a framework for assessing medicalization. The model incorporates three key elements: medicine as a goal-driven practice, disease as a hybrid construct, and medicalization as a technological system or a sort of engineering of health. This model facilitates the distinction between health-oriented and disease-oriented medicalization, providing criteria for evaluating both.

Given that societal issues evolve, medicalization is a value-laden concept that is both time-bound and context-specific. A medicalization that is considered valid and effective in one context may be deemed unjustified in another. Therefore, the continuous evaluation of medicalization is essential.

The rapid evolution of medicalization over the past half-century necessitates a fundamental shift in how we approach the study of medicalization. The democratization of medical knowledge through digital platforms has challenged traditional medical authority, empowering patients to take a more active role in their healthcare decisions. This shift from a paternalistic model to a more collaborative approach is reflected in the transition from "patient" to "consumer."

To adequately capture the complexities of this evolving landscape, medicalization studies must adopt innovative methodologies. Top-down, institutionally driven research must be complemented by bottom-up approaches that prioritize the perspectives of individuals and communities. By incorporating anthropological and ethnographic methods, researchers can gain a deeper understanding of the social and cultural factors that shape medicalization processes. The absence of such bottom-up studies may explain why we have yet to comprehend the societal dimensions of medicalization fully.

In conclusion, a few points regarding the evaluation of medicalization are noteworthy. Firstly, the evaluation of medicalization appears to be post hoc. In other words, it can be assessed only after it has occurred. When confronted with a medicalized condition, one must first determine whether it is disease-oriented or health-oriented. Only then can its validity be evaluated, as the criteria for evaluating these two types of medicalization differ. As mentioned earlier, valid medicalization does not necessarily equate to medical practice. The evaluation of medicalization is essential for preserving the medical institution, purifying it from improper practices, and protecting society from harmful demands and interventions. Medicalization is dependent on cultural, economic, social, and political contexts, and therefore, its evaluation will be incomplete without considering these factors. This evaluation requires continuous monitoring and oversight, which necessitates educating the public, physicians, and healthcare providers, as well as institutionalization and open discourse.

Like any other concept, medicalization requires constant monitoring and refinement to maintain its critical power and its connection to the field of health. To achieve this goal, a dynamic critical dialogue, continuous monitoring and evaluation, accountability among relevant institutions, the activism of various social groups, and the sensitivity and responsibility of medical institutions are necessary.

The drivers of medicalization evolve over time and therefore require constant monitoring and evaluation. While the transformation of deviance into illness, such as addiction, was once a mainstream trend in medicalization, today the focus is on enhancing the capabilities of healthy individuals, i.e., health-based medicalization. What has gained significant importance in the field of medicalization is the role of biomedical sciences. The biopolitical economy has created dense and complex fields where biomedical knowledge and technology, including drugs, devices, services, and biological capital, increasingly reinforce each other. On the other hand, the growing focus on health (and not merely on disease, illness, and harm) and the optimization and enhancement of the body with scientific and technological tools, along with an increasing number of controllable risk factors at individual, group, and population levels, has made everyday life increasingly susceptible to medicalization. Precision medicine, which enables the diagnosis and treatment of individuals based on their unique genetic makeup, will further facilitate targeted interventions and personalized treatments. The trend towards enhancing technologies is replacing lower and less expensive technologies, such as glasses, with surgeries like LASIK. Therefore, the role of sciences such as biomedical engineering must be scrutinized more closely. The production of biomedical knowledge, the management of information, its distribution, and consumption — primarily through the application of computer and information sciences —and increased media coverage should be given more serious attention. Biomedical knowledge is becoming accessible to everyone through information technology and cyberspace, which itself is one of the drivers of medicalization. The transformation of bodies and the production of new scientific-technological identities at individual, group, or


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E-ISSN: 2345-5802

population levels, which potentially form the basis for the emergence of social movements, will introduce medicalization into new political-economic dimensions that have been less considered in the past. Therefore, the link between biopolitics and medicalization will become a significant topic of discussion.

## Acknowledgments

None.

## Declaration of Interest

The authors of this article declared no conflict of interest.

## Ethical Considerations

Not applicable.

## Transparency of Data

By the principles of transparency and open research, we declare that all data and materials used in this study are available upon request.

## Funding

This research was conducted independently, with personal funding, and without the financial support of any governmental or private institution or organization.

## Authors' Contributions

All authors equally contribute to this study.

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