EDITORIAL

Complexity theory in the management of patients with pain

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Abstract

Nonlinear systems are not susceptible to being investigated with reductionist methods. In this sense, complexity theory offers an alternative approach to quantify the importance of contextual factors (CFs) in the patient with pain. The result of the positive (placebo) or negative (nocebo) use of CFs in the therapeutic setting could be responsible for a large part of a non-specific component of the efficacy of the treatment, directly affecting the quality of the results related to the patient's health (for example, pain, disability, or satisfaction). In recent years, understanding of the value of these effects has increased. Despite growing interest, knowledge, and awareness of them is currently limited and heterogeneous among health professionals, reducing their translational value in the field of health.

Keywords: complexity, contextual factors, pain, health professionals, placebo, nocebo.

Medicine is ever-changing and this conceptual and material dynamism of diseases should not be regarded merely as a bio-scientific process, but also involves a broad range of human and social experiences[1]. Recent studies have shown that complexity originates from the interaction between the patient's own factors and other contextual factors (CFs)[2]. However, like many other scientific fields, medicine is founded upon the classical Cartesian method of reductionism, where a problem is broken down into its smallest components, examined, and then the information gleaned used to draw conclusions about the nature of the larger reality[3]. Fundamental to this approach is the requirement that the problem being examined is a linear system[3,4]. When this is the case, the reductionist approach is highly successful, and the health professional can rightly feel confident in predicting the outcome of an intervention. However, frustrations arise when the problem we wish to examine is not a simple linear system but exhibits nonlinear behavior. This problem of our inability to predict the outcome in these situations gave birth to the science of complexity theory[3].

Pain is a subjective experience modulated by a variety of cognitive and emotional factors, as well as by a series of sensory signals, which arise from the context surrounding the painful experience[5,6]. Capturing the complexity of the pain patient is one of the most challenging yet largely underexplored issues, as current health systems still focus on individual diseases and are not equipped to handle complexity[7].

A complex system (CS) can be defined as a network of individual factors whose dynamic interaction emerges from new properties of the system itself, and where the observable results are different from the sum of their individual parts[2,8]. In other words, it is a collection of agents free to act in a way that is not always predictable, and whose actions are interconnected so that the actions of an agent change the context for other agents[8]. In this sense, the patient with pain and his/her interaction with the therapeutic environment during the professional consultation can also be considered as a CS, characterized by a high degree of biological variability, negative entropy, and emergent order. In a complex system, agents

respond to their environment using a set of internalized rules that drive action. In a biochemical system, the "rules" are a series of chemical reactions. At the human level, rules can be expressed as instincts, constructions, and mental models. "Exploring the patient's previous experiences, expectations and preferences" is an example of an internalized rule that could drive the actions of a professional (Box 1)[8].

> One afternoon, a patient returns, consulting for the same illness he had consulted the previous year. He wanted to repeat the same treatment that we had previously and that, according to the previous experience, there had been a positive result. However, this treatment did not seem to have scientific support of effectiveness. The patient, not entirely in agreement, accepts a new treatment proposal recommended by the literature. After some sessions, the symptoms did not resolve, and the patient requested to resume the treatment that had previously been successful. During the following sessions, and having resumed the treatment applied previously, the patient's symptoms began to improve. Based on this case, it would seem that the treatment that opposes the available evidence has triumphed. Is this patient a particular clinical case? Are there other factors that could influence the evolution of the clinical picture of the individual?

Box 1: Complexity in a common day in a consulting room

Many times, we find ourselves challenged by complex situations during the approach to the pain of our patients. With the objective of solving these scenarios, we pursue and apply the recommendations of the scientific literature. However, many times the clinical evolution has outcomes that are difficult to understand. Symptoms can improve or worsen for many reasons not related to treatment[9]. The understanding of the characteristics of this CS can contribute to the approach of the patient from another perspective, more satisfactory for both the patient and the professional who assists him. These CSs can be better understood by analyzing their characteristics[2,3,8].

The determinants of clinical evolution are a phenomenon of emerging interest among professionals and researchers. The complexity approach recognizes patients as a whole, their social, cultural and environmental context, which shapes the individual response to the disease; in essence, a patient-centered health system[10]. On the other hand, the CS understands health and illness as subjective and disease as objective; emergent states of top-down and bottom-up interactions between the restrictive environmental, socio-cultural, and economic-political context and the recursive physiological and psychological interactions of networks of cellular and organ functions[11].

Pain is a subjective experience that cannot be solely attributed to incoming nociceptive information. In fact, pain is modulated by a variety of cognitive and emotional factors, and also by a series of sensory signals[6,12]. That is, the cognitive, emotional and sensory processes that affect pain arise from the context surrounding the painful experience. Contextual factors (CF) are physical, psychological and social elements involved in the clinical encounter between the patient and the professional (figure 1)[13,14].
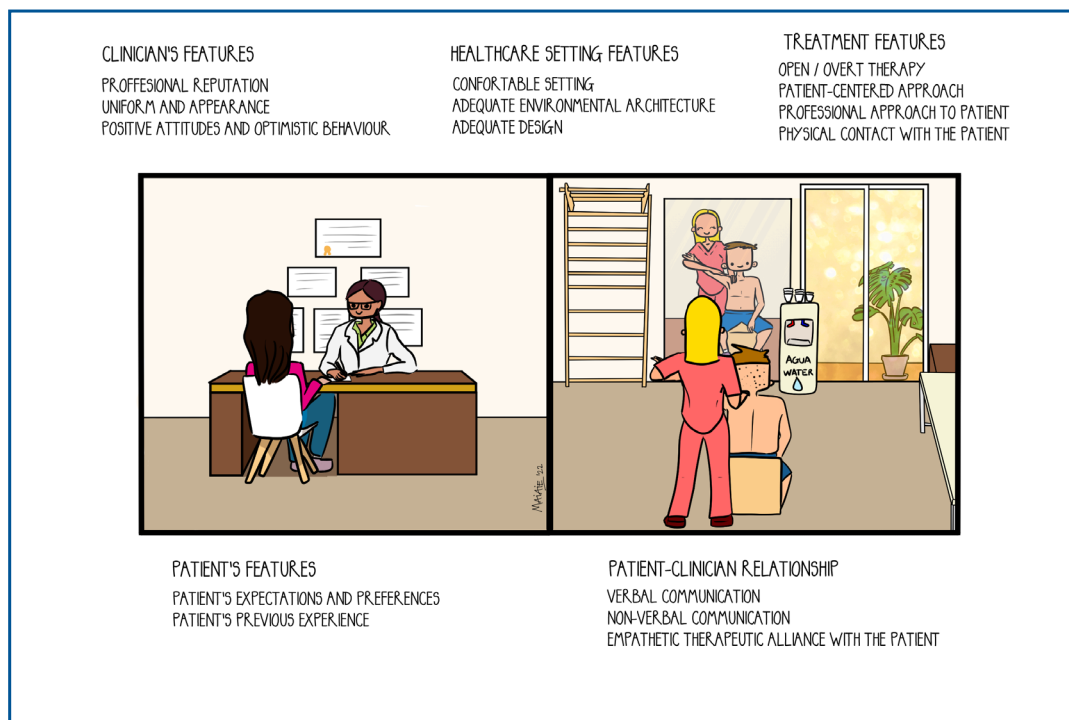

Figure 1: Complexity in a common day in a consulting room

In the clinical context, the interaction between the specific component of a treatment and the surrounding CF influence the subjective therapeutic experience (for example, pain) triggering effects related to placebo or nocebo[15]; specifically, positive CF can improve clinical outcomes, while negative CF can amplify the patient's symptoms, preventing their recovery[16]. The placebo and nocebo effects incorporate complex and different phenomena in which behavioral, neurophysiological, perceptual, and cognitive changes occur during the therapeutic encounter between the professional and the patient. For example, comfortable environment (low noise, music, fragrances, temperature), proper architecture (private cabinets, modern equipment, spacious, windows), carefully planned environmental design (decorations, trims, and colors) are aspects that can affect the therapeutic result. These effects can also occur when an active and therapeutically effective treatment is administered: in fact, any treatment (active or inert) that is administered in any context of care can trigger effects related to this context. CF can be identified related to the characteristics of the professional and the patient, with the patient-professional interaction, with the characteristics of the treatment and with the treatment environment[13].

Evidence-based medicine has traditionally focused on the effect of pharmacological agents, underestimating those psychological and environmental factors that contribute significantly to improving the therapeutic outcome with our patients[17]. For this reason, it is important to consider the approach to the patient with pain as a CS since it will offer additional therapeutic opportunities to manage pain and could be essential to improve the therapeutic efficacy of different interventions. In this approach, the Journal of Human Growth and Development (JHGD) brings to each edition discussions[18-35], which can be enriched with this debate about CF and CS in different health conditions and epidemiological contexts.

It is important to reflect on the importance of CS in the therapeutic result, instead of minimizing them or labeling them exclusively as confounding factors[1]. From an educational perspective, complexity is still underestimated in most undergraduate and postgraduate health courses. To ensure adequate competence, knowledge, and ethical use, it should be included in the study programs.

CONCLUSION

The determinants of clinical evolution are a phenomenon of emerging interest among professionals and researchers. Interest in CFs has grown and is widely identified in the literature. To deal with complexity in pain patient care, we must abandon linear models, accept unpredictability, respect (and use) autonomy and creativity, and respond flexibly to emerging patterns and opportunities.

As long ago as 400 BC, Hippocrates wrote of how "the patient, though conscious that his condition is perilous, may recover his health simply through his contentment with the goodness of the physician". Balint added that what mattered was "not only the medicine . . . or the pills . . . but the way the doctor gave them to the patient—in fact the whole atmosphere in which the drug was given". (Di Blasi Z, et al.).

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Resumen

Los sistemas no lineales no son susceptibles de ser investigados con métodos reduccionistas. En este sentido, la teoría de la complejidad ofrece un enfoque alternativo para cuantificar la importancia de los factores contextuales (FCs) en el paciente con dolor. El resultado del uso positivo (placebo) o negativo (nocebo) de FCs en el tratamiento podría ser responsable de gran parte de un componente no específico de la eficacia del tratamiento, afectando directamente la calidad de los resultados relacionados con la salud del paciente (por ejemplo, dolor, funcionalidad o satisfacción).

En los últimos años se ha incrementado la comprensión del valor de estos efectos. A pesar del creciente interés, el conocimiento y la conciencia de ellos es actualmente limitado y heterogéneo entre profesionales de la salud, lo que reduce su valor traslacional en el campo de la salud.

Palabras clave: complejidad, factores contextuales, profesionales de la salud, dolor, placebo, nocebo.