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Editorial

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Ecological Implications of Decisions in the Individual Patient: Concentric Health Circles

Jose Luis Turabian*

Health Center Santa Maria de Benquerencia, Regional Health Service of Castilla la Mancha (SESCAM), Toledo, Spain

***Corresponding Author:** Jose Luis Turabian, Health Center Santa Maria de Benquerencia, Regional Health Service of Castilla la Mancha (SESCAM), Toledo, Spain.

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Abstract

The objective of this article is to present, for reflection, from examples of medical ecology, where decisions at the micro level, in the prescription of a drug to individual patients, involve systemic changes in a broader system, which we are not always aware. For example, "micro" decisions of the daily practice of the family doctor, such as the advice about powdered detergent for a family when a child comes with eczema, the inappropriate use of antibiotics that alters the entire ecosystem, the prescription of drugs composed of Prunus africana or Saw palmetto as treatment -not well founded- of the symptoms of prostatism that leads to the desertification of areas of Africa, the contamination of rivers and sea by drugs prescribed by doctors, in relation to the over-diagnosis and over-treatment, where thousands of marine species end up consuming the rest of these medicines that human discard, etc. The usual biomedical, psychosocial and public health frameworks that form the conceptual basis of medicine today are insufficient to understand the health/disease challenges, and to address the needs of medically complex patient populations and environmental problems. Physicians must be aware not only of the deep physiological effects of the psycho-social in the patients and of the psychosocial in the biological, but also of the repercussions in the global ecological system of our (apparently) small decisions " micro" at the individual level with the patient.

Keywords: *General practitioner; Family Medicine; Theoretical Models; Personalized Medicine; Complexity Science; Complex Biological System; System Medicine; Ecology; Ecosystem; Humans*

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Introduction

Human ecology studies the exchange of energy and materials within and between human societies and the biophysical environment. Human ecology is a global concept that encompasses various social, physical and cultural elements that exist in the external environment of the individual. One of the ways to approach ecology is as the study of interactions between humans and the environment, between humans and living beings, among all living beings. Some selected elements of the ecological approach have been included and adapted to medicine, as well as the promotion of health, health education, prevention and public health [1-3].

This approach integrates data from molecules, cells, organs, individuals, families, communities and the natural and man-made environment. Both extrinsic and intrinsic influences constantly challenge the biological networks associated with well-being [4].

As in cybernetics, "fields" open hierarchical systems with complicated feedback mechanisms: thinking about circles, spirals and systems instead of linear relationships. So, ecological thinking reminds us the mutual relations between two or more systems, for example between an organism and its external and internal environment, or between the interpersonal areas, as in the doctor-patient relationship. The individual sees himself in relation to his bio-psycho-socio-cultural background, as well as in the present and past in the light of his personal biographical narrative.

Some examples of human ecology could be observed in the promotion of physical activity, the greater consumption of fruits and vegetables and human nutrition in general, obesity, the dynamics of food consumption with socialization practices and with the influences of the means and contextual factors such as poverty and culture, the history of life, the use of physical space, the structure of the population, the ecology of the disease, the cultural and linguistic diversity patterns, and the industrial and urban systems [5,6].

In this scenario, it is presented, with the objective of favouring reflection, an example of medical ecology, where decisions at the micro level, in the prescription of a drug to individual patients, in the consultation of a developed country, have macro effects on the global health of large masses of people at another point away from the place of prescription.

Two Clinical-Ecological Cases [7-9]

Case 1

Mount Kenya, the highest mountain in Kenya, and the second highest in Africa (after Kilimanjaro), is the sacred mountain of the Kikuyu (the largest ethnic group in Kenya, comprising a population of more than 5 million people, 20% of the total population of Kenya) and declared a World Heritage Site by UNESCO in 1997, is being destroyed by the illegal exploitation of its forests, the cultivation of marijuana and abrasive agricultural practices.

More than 15,000 native trees have been felled, mainly camphor, cedar and tropical olive trees, and 90% of the forest mass has been destroyed in an area of 13,000 hectares. In this area without trees, more than 3,000 hectares have been used for cultivating miraá (marijuana).

Among the set of felled trees, it should also be noted the massive felling of a native species of the plum family, Prunus africana. From the bark of this tree is extracted a substance that serves to treat diseases of the prostate (benign prostatic hypertrophy, prostatism), so the pharmaceutical companies cut and take the trees. Although it is an internationally protected species, Prunus africana is now in danger of extinction, favouring the loss of soil fertility and the consequent food insecurity of its population.

Case 2

Serenoa repens or Sabal serrulata, commonly known as saw palmetto or dwarf palm heart, is the only species currently classified in the genus Serenoa. It is a small palm that grows to a maximum height of about 2-3 m. The wild palmito is native to the south Eastern Europe and northern Africa, and is endemic to the subtropical south eastern United States, most commonly along sand plains and hills of the South Atlantic and the Gulf. It grows in bushes or dense thickets in sandy coastal areas, and as understory in pine forests or hardwood shrubs. It is a resistant plant; of extremely slow growth and long life, with some plants, especially in Florida, which may be 500-700 years old. The dwarf palm heart is a perennial plant that belongs to the Arecaceae palm family. Although it has been claimed that the extract of saw palmetto is an herbal remedy for benign prostatic hyperplasia, it is an ineffective treatment.

Palm trees are the most important group of plants in the Amazonian forests, where they have a great importance in their composition, dynamics and structure, and therefore in maintaining their ecological balance, with a very important role for the local communities that live in these forests, which are the source of the resources used in the construction of their homes, in the manufacture of utensils,

and even in many cases are used for medicinal purposes. The populations of palms have diminished in a remarkable way, due to its overexploitation and to the deforestation of the forests where they grow.

Discussion

The usual biomedical, psychosocial and public health frameworks that form the conceptual basis of medicine today are insufficient to understand the health/disease challenges, and to address the needs of medically complex patient populations and environmental problems. Conventional medicine does not consider the power of the organism to self-regulate, and consequently decreases its ability to learn so it could be considered that acts against evolution. An expanded bio-psycho-social-ecological model is necessary for a more complete understanding of the concepts of health, illness, injury and disability [10].

The bio-psycho-social-ecological model is firmly rooted in the science of conventional medicine and recognizes the key importance of external influences (such as nutrition, the environment, for example, exposure to toxins and lifestyle) and internal influences (such as intestinal bacteria, disposition, allergy, nutritional deficiencies, and biochemical alterations) in the disease. But it is capable of going further to allow us to appreciate the points of influence and the links between socioeconomic status, family, work and school, for health. In addition, the inextricable interconnection of humans, pets, livestock and wildlife and their social and ecological environment is evident in this ecological system. Therefore, this model must consider the cultural and economic relationships that affect the interactions of people with domesticated and wild animal species and ecosystems, and the exploration of the cognitive and behavioural aspects of these interactions [11,12].

Based on complex ecological thinking that goes beyond humans and animals, this approach considers the inextricable links between ecosystems and health, which we can call "ecosystem health". This "eco-health" can identify emerging properties and determinants of health that can arise from a systemic vision that ranges from molecules to the ecological and socio-cultural context, as well as the comparison with different endemicities of diseases and structures of health systems [13], in addition to the maintenance of biodiversity and ecosystem services, and the capacity to act as an agency for both conservation and environmental justice [14].

On the other hand, it is also necessary to take into account the relationship between the economy and the ecological and social processes, such as the social metabolism and the metabolic social profile, interrelating the economic, material and energy flows, and producing indicators and indices of (dis) sustainability, the development models, and the distributive and socio-environmental conflicts generated by them [15].

In literature and art we can see examples of the ecological impact of decisions on the individual patient, so that they help us to reflect and know the ecological implications of the "micro" decisions (in the individual patient). For example, we can reflect on these concepts by watching the film "Dersu Uzala" (1975), which describes the relationship with nature as an equal without attempting to impose itself as Western civilization does, or in the film "The faithful gardener" (2005), based on the homonymous novel by John Le Carré, which in turn is based on illegal clinical trials conducted against Nigerian children in 1996 [16].

The practice that includes any element of ecology is based on an implicit acceptance of the importance of the social systems, in which the patient is immersed, for the health of that patient, and they involve systemic changes in a broader system, which we are not always aware of Thus, for example, "micro" decisions of the daily practice of the family doctor, such as:

1. The advice of the general practitioner about powdered detergent for a family when a child comes with eczema.
2. The inappropriate use of antibiotics that alters the entire ecosystem.
3. The contamination of rivers by drugs prescribed by doctors. After taking most of the drugs, the patient will eliminate between 50 and 90% of the pill he took through the urine. This waste travels down the drain and goes to wastewater. In the absence of 100% effective purification mechanisms, the waste returns to the waters of the rivers and the sea, where fish, crustaceans and thousands of marine species end up consuming the rest of that medicine that human discard. This situation multiplies exponentially in relation to the over-diagnosis and over-treatment that the doctor does. NSAIDs, psychotropic drugs, analgesics, antihypertensives, etc., can be detected in the rivers of major European cities such as Paris, London or Madrid, as well as in the USA [17,18].

4. The prescription of drugs composed of Prunus africana as treatment -not well founded- of the symptoms of prostatism that leads to the desertification of areas of Africa. Market demand of the African cherry (Prunus africana) has caused resource depletion and an erosion of traditional resource protection practices. Preservation of the species will depend on sustainable harvesting methods and on cultivation [19-22].
5. Other treatment of phototherapy for diseases of the prostate, Saw plametto (Seronoa repens), for which it has not been able to demonstrate its usefulness, follows a similar line to the problem of Prunus africana. Saw palmetto products are one of the most rapidly growing sectors of the American herbal market. This market is closely tied to present and future sales of Prunus africana products. Most Prunus africana-based herbals are sold within the European Union. However, as benign prostatic hypertrophy becomes more prevalent in aging American men, and as the theoretical efficacy of the product becomes more widely accepted without scientific base, the demand for Prunus africana products, in the lucrative American market, is expected to grow as well. The market for Prunus africana is closely tied to that of Seronoa repens. While saw palmetto may act to inhibit 5-reductase and as an anti-androgenic and anti-estrogenic, Prunus africana appears to interfere in the associated inflammatory response in the prostate, thus, some herbal formulations contain both products [20], and there are interrelations between the two markets -Saw palmetto and Prunus africana-, and both products are entirely wild collected. The ecological result by harvest of saw palmetto fruits are more unknown than the effects of the Prunus africana harvest which are known [8,9, 19-23].
6. The prescription and use of sunscreen against the importance and support for the preservation of forests and the planting of trees.
7. The support for new housing in relation to children with asthma living in damp houses... Etc.

The world is composed of nested systems. Each individual human being can be considered as a unique system. However, human beings do not exist in isolation. They are embedded or nested in other systems:

1. The family/home system
2. The neighbourhood system
3. The workplace system
4. The system of the locality
5. The system of the region
6. The nation/state system
7. The system of supranational agreements (for example, the European Union)
8. The global social systems
9. The system formed by all organic life ("Gaia" - "The goddess Earth" of the Greeks, from which the theory of the global system of life takes its name).

Therefore, several actors can influence and be influenced by the patient, patient's family and context. When a panoramic vision is adopted before a clinical problem, it is like unravelling facts and concepts that imply conflicts; this outcome often leads to rethinking the problem in a way that leaves it open to perceive ecological influences and facilitates its solution, educational intervention, or clinical treatment [24,25].

By gathering more information about the system you get to have a broader, more complete "panoramic view" of it. Normally we see the data from a single perspective - ours. But there is a "panoramic" or "ecological" vision. By tracking that broad vision, we can maintain the importance of our point of view, without ignoring or repressing it, but we realize that it is always possible to expand it, including the perspectives of others -other actors, other contexts-, and to perceive the ecological effects - local and global- clinical decisions that seem to have only personal effects, with which we can gain synergy (join energies) in the clinical decisions that are made.

Conclusion

Nature gives us the example of biodiversity as a survival strategy [26]. Physicians must be aware not only of the deep physiological effects of the psycho-social in the biological [27], but also of the repercussions in the global ecological system of our (apparently) small decisions " micro "at the individual level with the patient.

Of all the illusions, the most dangerous consists in thinking that there is only one reality: the one we see in front of the patient in the consultation. But, what exist are only different versions of a greater reality; our "micro" visions are sometimes contradictory versions, which are never the reflection of objective and eternal truths [28]. The nineteenth-century German Rudolf Virchow already expressed the idea that medicine is not merely the study of human disease but it is a general metaphor for understanding society, and defended the idea of "Medicine on a grand scale" [29]. We remember here that the "little medicine" is a medicine on a grand scale, whether or nor we want it. It is necessary, from the small consultation with the individual patient, to achieve a vision of "eco-health" that can identify the emerging properties and determinants of health that arise from a systemic vision that goes from the molecules to the ecological context and socio-cultural.

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