HEALTH, CULTURE and SOCIETY

From Physiology to Prevention:

Further remarks on the physiological imperative

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Abstract

Physiology, is the fundamental and functional expression of life. It is the study of all the representative functions of Man in all his capacities, and in particular, his capacity to work. It is very possible to establish a link between a physiological and physiopathological state, the capacity of work and the economy, which can be understood as the articulation between the physiological capacities of Man and the production of work.

If these functions are innately acquired by Man they are likewise maintained by regulatory functions throughout life. The stability of these regulatory mechanisms represent the state of good health. The management of this state, constitutes Primary Prevention where both chronic and acute physiopathology defines an alteration in these regulatory mechanisms.

We deduce from this reasoning that a tripartite management adapted to the physiological situation is viable and that by choosing parameters specific to individual and collective behavior, it is possible to inject, and combine, at each level and to each demand in order to budget a healthcare system in a more balanced and equitable way.

Keywords: Physiology; prevention; health systems; health economics; India; Europe

From Physiology to Prevention:

Further remarks on the physiological imperative[1]

B. Jouanjean

I. Primary Remarks

The stability of our human organism remains an astonishing feat, a permanent miracle almost. Since the 19th C. we have carried a physiological identity, namely one which is regulated through the function of equilibrium. Our morphology and weight, furnish an apt example of this stability. And thus, Claude Bernard in his *Introduction to the Study of Experimental Medicine*, pinpointed the Liver's glycoregulation, whilst Louis Pasteur, in studying the mechanisms of immuno-defense against viral attack, struck upon the source of physiological equilibrium itself.

The philosophy of determinism was thus born with such feverish pursuits of great medical minds, and today, our energies are still solicited by the depth and possibilities of physiological laws. But these deterministic laws of which we speak are far more than the tallying of results and determined outcomes.

Let us also keep in mind that we have not been the only ones to observe these regulatory laws with conceptual precision. Several thousand years ago, in a more social and metaphorical context, the Indian civilization established a social system known as the Varna, which evidenced a *functional complementarity* between all individuals composing society. An awareness of the need to regulate resulting behavior for the benefits of social cohesion, meant that social groups known as the Vaisya, Brahmin, Ksatriya and Sudra, came to be judicially governed by the socio-cosmological system of Dharma – this, the social and cosmological architectonic hallmarking the zenith of the Indian civilization.

It is important to note that social divisions were an expression of *principal functions* and their correspondences, these equally at work in the human organism just as in society. Indeed, in looking back at the history of great traditions, a system of correspondences and analogical reasoning were important pillars to social, medical and cosmological philosophies. In the Indian context of the Varna, an idea of homeostasis emerges, lest a metaphor, through which the rationale of social castes is borne. The influence of karma, understood as retributive action, likewise featured as the ethical mechanism working the ancient social system of the Varna which propagated, albeit rather rigidly.

Uniquely, in the Varna there was a classification of what we could call "dispositions for...", or "strong tendencies towards..." the *functional potential* of individuals. For example, those who were gifted and beheld a certain tendency towards military life entered the Ksatriya social group to fulfil a destiny of leadership, strategy, politics etc.

[1] This invited contribution to HCS has been called for on the basis of the readership demand for clarification and indeed, extension and further explanation of my previously published work in the inaugural issue of HCS, Vol.1, no.1 (2011).

To date, our scientific research has progressively revealed the autonomous, regulatory mechanisms of the organism and its functions. Physiology, which studies these functions, can be understood as an innate expression of autonomous prevention at work within the organism whose laws are the blueprint to regulation, maintenance and governance.

At work within the organism, for example, is a *complimentary homogeneity of functions*. These enable the *autonomous prevention of the organism* and ensure that ever so important *global state of equilibrium*. Precisely here, is where physiology finds its sense, intention and value, and us, as human beings, our identity. All functions composing this majestic system of the organism (in the same way as the great social system of the Indian civilization), are both different and interactive: to think; to move; to defend; to eliminate waste, are complimentary functions for example. When, then, we see the word "Physio(-)pathology" we should understand that it is but one expression of physiological disequilibrium provoked by an alteration in the organism's regulating mechanisms, and that this alteration is brought about internally or externally (environmentally).

The word "prevention" is often vulgarized and the true meaning somewhat obscured. It seems to immediately resonate with the principle of "precaution" or "precautionary measure" which is a reflex action in face of an accepted situation. But prevention is sooner the *anticipation* of a situation in order to avoid accident. "Prevention" is also used in other contexts – we have forecast management for employment and for medicine, the epidemiological prevention of the W.H.O. The latter is a definition of public health creating a tripartite health system which in fact opposes the preventive and curative. With this latter scenario, what we call "primary prevention" is not integrated, and the management of therapeutic factors of risk adopts more of a sociological character which we find in work medicine as measure for pathological and professional accident. Likewise, "prevention" has its remit of meanings in the disciplines of genetics and biology, which endow the word with their own specific reading and ethos.

Yet is there a definition of prevention which can help us better understand, conceptualize and indeed propose a health system? It is possibly through a physiological definition of prevention that a more functional health system can be put into place by considering that:

- Physiology is a functional expression of life, that is, it studies all the functions which are expressed through the human body
- The ensemble of these functions represents Man and in particular, his capacities for work
- All these functions are extensible through extra-organic prostheses (the artificial extension of a function)
- The metabolic function, for example can be extended by the common car, which augments the function of mobility.
- The neuro-psychical function, can be potentialized through the common computer
- The neuro-sensory function, by the mobile phone, the television, the internet

Each function is specific. Thus, the metabolic function transforms foodstuffs into energy which in turn nourishes all organs of the body, especially the muscles. There is specificity for each function, that of metabolism certainly, but the neurological; neuro-sensory; defense function and eliminative function are likewise indispensible for the regulation of the system. These are, moreover, interactive, that is to say, a complimentarity exists between each function, where one cannot survive without the other. Thus, physical activity requires an intellectual choice (neuropsychical system), a muscular action (metabolic activity), thermic and neuro-vegetative protection, and

metabolic regulation with the elimination of waste (catabolism). If these functions are innately acquired by humans, then likewise throughout life they are maintained by regulatory mechanisms.

The stability of these regulatory mechanisms was evidenced by Claude Bernard and Louis Pasteur in the 19th Century, by Walter Cannon in the 20th, and by all the modern schools of biology. This is where the understanding of the state of well-being and good health arises and finds true definition. Regulatory mechanisms are managed naturally by Man and in a therapeutic context generate recovery or an improvement in the health state. There is, therefore, no dualism between health and disease, but sooner a concerted alteration of regulatory mechanisms susceptible to influence the state of health and the capacity for action. It is here that the management of prevention and the maintenance of health and well-being imply the *integrity* of our functions.

Short and long-term functional impairment provoke an alteration in our health state. Through this alteration generates acute or chronic disease, including disability. What we call *functional variation* therefore reflects acute or chronic pathologies. Such an analysis brings us to considering three physiological and physiopathological situations: (1) primary physiological prevention; (2) secondary physiological prevention and, (3) tertiary prevention. We must also bear in mind that the space of primary physiological prevention is variable and must be defined by experts who specify the move from primary to secondary prevention. This aleatory zone, this *space*, is difficult to analyze and must be reviewed on a yearly basis because such a system of prevention cannot be established merely for reasons of medicine and national budget.

All specific and interactive functional activity conditions the capacity to work, which can only be effectuated when the integrity of functions and the realization of an objective are combined. This, logically, depends on the individual's state of health and in this sense there are differing situations in relation to the physiological capacities of each and every one of us. And let us also remember a fundamental point, namely that the national economy depends on active, living forces. There is, therefore, a link between physiology and economy.

There is also the link between physiological function and social representation we have to consider. If physiology has evolved increasingly towards sociology, the social plane has also *a priori* a degree of detachment from physiology. Just as there is a link between the individual and the society within which he/she lives, so too is there a degree of liberty between physiological capacities and sociological actions. There is no social obligation for prevention, for all is in the knowledge of risks and in the education of populations facing these risks. Prevention integrates, totally, a social vision, the essence of which is physiological.

Here we have certain questions which are both individual and collective. Above all, it must be underlined that prevention cannot exist without respecting one's self and others. This ethical dimension to the architectonic is played out in the individual and collective interactivity defining the physiology-sociology relation. Sociology, in the collective sense, imposes a choice upon the individual: before all else, we have to want to prevent, help and protect others in the scenario of illness – both the individual and the collective need to be encouraged to take responsibility for different states of illness. Solidarity thus constitutes an awareness of the physical and psychical effects of health. In a more prospective sense, the anticipation of our health variations must be integrated into the elaboration of a health system where physiological prevention establishes a link between the individual and the collective. This self-regulating, functional system which we possess is therefore a blueprint for an ethical health system meeting the needs and demands of every living being composing the social architectonic and seeking to find and assert quality of life therein.

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II. Secondary Remarks

In a physiological and physiopathological context, our state of health can vary through three stages:

- The primary health state, said of well-being, is the result of a synergy of the organism's functional, regulatory mechanisms. This includes risk factors which have no functional effects. This is the stage / capacity where work is at its maximum.
- The secondary health state is an acute disequilibrium in physiological regulation of limited duration. This is the management of an emergency or an acute illness. Here, the capacity to work is provisionally reduced.
- The tertiary health state is a chronic disequilibrium in physiological regulation, either predictable or unpredictable. Work capacity is thus conditioned by the concerned affection.

These three levels correspond to three different functional expressions. Through these, we can choose representative behavioral parameters, both individual and collective.

Primary physiological prevention

Should a person who visits for being overweight be regarded as suffering from an acute illness? Or is it sooner a question of risk factors? It is during consultations on nutrition that the essential role of physiological education appears in the management of patients, for it is education that teaches us to know, anticipate and foretell. Physiological education is, moreover, fundamental in that it allows us to speak the "truth" by way of logical and clear explanations. Yet we must also remember that it gives strength to certain pseudo-medical claims churned by the media machine of our epoch, knowing that each spring, fashion magazines among others bombard the population with dietary advice of all kinds. The result is a confusion borne in the minds of those who pin their hopes on the media and its counsel.

So what can we do in the face of the excess of mixed information in which the patient fails to find orientation and resolve for his/her despair? What is the mass of information on obesity and what are the expectations of the patient? Should we use an authoritarian language prohibiting certain foods and advising others? Before all else, the causes which condition a new behavior need to be understood, and it is necessary to explain in the simplest and most accessible manner, *why* and *how* certain things have happened, and *what* can be done. It is not by blame or guilt that the best results are obtained. There is now an urgency to *convince* in a world of information excess, where memory has long since failed. Consultation has shown that a physiological explanation is required in order to change perception and behavior, in the long-term[2].

[2] This said, a consultation has a time-limit and basic explanations need to find their place within such a framework. It is why, in order to translate the homogeneity of the organism, we represented a sphere divided into four quadrants representing physiological functions (HCS, Vol.1: Issue 1). The image provided in our previous study,

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The global management of the organism calls for the equilibrium of functions which are exposed to internal and external (environmental) stimulation. Here it is a question of the four great functions of the organism: the metabolic (that which transforms foodstuffs into energy permitting the elimination of waste through the skin, kidneys, intestines, lungs); the neurological and neuro-sensory functions, and the functions of protection integrating immunological defence.

For example, by encouraging exchanges between all functional compartments of the body, physical activity constitutes an act of primary prevention to which the neurological (decision making) and metabolic (nourishment of muscles and the elimination of waste) contribute. By acting through all functional compartments, physical activity can regulate acute stimulation – particularly stress. Moreover, physical activity helps maintain the balance in the neurological and neuro-sensory struggle against psycho-social risks. We can distinguish several types of stress: stress related to the metabolic stimulation of energy production and disposal systems; neurological and neuro-sensory stress; immunological stress. Specifically, we must also learn to manage stress through educational initiatives focusing on metabolic nutrition and physical activity. The management of our environment is also crucial because it affects our autonomic balance, our own immune defence, and our protection (on a genetic level, gene expression can also be affected).

There are medical risk factors that can be detected in primary prevention, with the support of those involved. These factors consist of laboratory abnormalities (hypercholesterolemia, hyperuricemia...) that are variables impacting on the functional abilities of the individual. Moreover, it is here that we encounter the complexities of care because of the possible move towards an acute and/or chronic stage. What this means is that *nothing is static* and that a random area exists where the management of certain risk factors depend upon the very knowledge of risks. Thus, in France it is estimated that the decrease in LDL-c (low-density-lipoprotein cholesterol) is the best indicator for measuring the effectiveness of cardiovascular prevention (this is the therapeutic goal). If the therapeutic goal is not attained, within three months, Stating therapy is the preferred strategy.

In terms of AIDS, there is the idea of screening and treating systematically all HIV patients including those not eligible for conventional treatment, this, in order to reduce the risk of transmission. This is at the level of primary prevention because physiological functional capabilities are preserved. Only an expert committee could establish a protocol of evolutionary transition from primary to secondary prevention then, after a period of time, tertiary prevention. What is interesting is that these different supported players evolve and change according to the level of prevention to effectuate. As we have said, *nothing is static*. This would also help balance the budgeting system.

It should be encouraged that a policy of primary prevention is followed and those involved encouraged to act. Indeed, we must be forward looking to encourage certain behaviors – solidarity and prevention go hand in hand and there is no prevention without solidarity.The fact that the avowed objective of the health system is prevention, regardless of health status, changes the thinking and behavior of patients and responsible actors.

was to quickly and simply show the stability of the whole (drawn as a circle) defined as homeostasis, and the dependence on regulatory mechanisms as well as environmental interactions.

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But what form of organization can collectively support primary prevention? In primary prevention, patients are functionally healthy and have a maximum working capacity. Companies must have every incentive to protect their employees and help them maintain this state of equilibrium, by promoting a policy that allows primary prevention and the management of risk factors, in particular through the education of staff. – this in order to decrease the prevalence of acute and chronic diseases. Hence there is the interest to pursue a policy of primary prevention by implementing a policy of wellness, both in and out of the workplace. Companies could be encouraged by policy to create and channel financial capacity for the investment *in* health, synonymous with efficiency *at* work.

Secondary physiological prevention

Every acute disease and every emergency has two features: they are time-limited conditions regardless of their severity, and their effect creates a temporary dependence in the individual. When work capacity is destroyed, voluntarism; encouragement, solidarity and anticipation come mainly from the community. The individual is essentially dependent (temporarily so) on the community who must take charge. The subject whose capacity to work has been temporarily destroyed can thus heal through the care provided to him by the community. Therefore it seems that the tax system is the most suitable and most financially just mechanism to manage such a situation. Since the disease is statistically determined, budgeting of limited duration can be appreciated by the organizations responsible.

Tertiary physiological prevention

Tertiary physiological prevention highlights the consequences of addiction. In this case, it is the anticipation to grasp the future. We must anticipate a disease, especially one that will require a collective, sustainable and possibly expensive support. Awareness of the forms of addiction can lead to acts of solidarity. Thus, the consequences of a disabling injury will require a different treatment than that of Alzheimer's disease. The reasons for this are simple: Alzheimer's disease may be epidemiologically expected because of aging populations while a crash, for example, on the public highway involving a young person, is often unpredictable. We could envisage both a collective and individual anticipation, two additional forms of insurance systems whose variability could be related to the type of dependence (foreseeable or unforeseeable), and depending on the financial ability of the individual to take charge. It should be remembered that end-of-life costs increase considerably and require sharing of individual and collective participation.

Each of us can see the terrible impact of Alzheimer's upon a couple, family and society in general. The management is complex and expensive. Family involvement is essential in this case and could facilitate the management. We believe it is necessary to anticipate this situation by establishing a life insurance dependency, which is solely dedicated to the final era of life. This final-term care insurance would be family-transferable without tax impingement. Such insurance would be compulsory from the age of 50, for example.

III. Conclusive Remarks

In conclusion health, work and economy are interdependent. Health determines our ability to take charge. The individual and the community must learn to complete their actions for the welfare of society. This can be understood as a collective responsibility, built up through individual awareness. Only in this way, can healthcare achieve the equity and demand it so seeks to address and harmonize.

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What is therefore necessary for an individual or collective to invest in a health system? Choices have to be just and equitable, and above all it is necessary that the population are educated and aware of the different medical situations possible. There are four parameters that we have to work with in the management of prevention, and which are representative of individual and collective capacities. These are (1) voluntarianism; (2) incitation; (3) solidarity; (4) anticipation. The study of these parameters, in both a collective and individual context highlights states of health and an appreciation of functional capacities. Work, through such a strategy, gains new allure, sense, intention and value. In my previously published studies, I proposed the systematic application of these parameters (called V.I.S.A.) in the management of the health system with the hope of promoting equity, and as a medic, ensuring the well being of both individual and society.

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