

Risk Perception and Environmental Risks Management in Environment and Health Protection Context

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Abstract

Risk Assessment: The qualified expert assessment of potential ecological/environmental and health risks rising from the planned industrial, transport and waste treatment facilities and other construction activities becomes indispensable. Whereas the initial phase of risk assessment, its identification or potential human exposure are of pure scientific character, the actual risk assessment increasingly assumes the arbitrary aspects (e.g. safety coefficients), risk communication, its control and management by way of psychological aspects; collective decision making then becomes a hotly debated political issue.

Risk Perception: When evaluating perception of environmental risks, psychosocial and psychosomatic factors may be of fundamental importance. This is the case in particular where our knowledge of the true health consequences of exposure to given factor is incomplete or its action is within the range of values where we do not anticipate the measurable biological effect. This applies not only in the case of the indoor environment related complains but also e.g. to that of non-ionizing electromagnetic radiation and electro-ionic microclimate.

A serious consequence found in the syndrome of mass hysteria is the fact that due to differently motivated disinformation, part of the population can suffer from some psychosomatic symptoms. Those imply objective suffering and deterioration quality of life for those affected.

Challenges for Prevention: The prevention of such conditions can either be systematic: early educational or popularisation campaigns, specific health education orientated to the development of industrial, transportation, or other types of constructions, and integration of the local civic activities in the program. The purpose of this should not be a cheap belittling of the risk but reasonable explaining of its acceptable rate, and also the likely advantage to benefit from the realization of the structures. Any later efforts to inform the public about the true state of affairs is usually accepted with distrust and disbelief, in belief this information had been well-paid by the government, industry and market forces, the military or some other institution trying to camouflage the actual condition.

Keywords

risk perception, environmental risks assessment, psychosomatic aspects, psychosocial aspects of risk, health an illness, scientific and social models, public health

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1 Introduction

1.1 Scientific and Social Models of Health and Illness

When contemplating the problem of a healthy environment in relation to a sick one, it is necessary to define the relationship of health and illness in general. Currently, health is conceived as a condition of physical, psychic, and socioeconomic wellbeing. Contrarily, illness involves an extensive set of different experiences or behaviours of

the affected person. Different experience in the negative sense against the generally accepted standard is implying the deteriorated or endangered subjective condition or social function, feeling of undesirability, of being unwelcome and/or unexpected. The illness induces some activities which aim is an improvement of the condition [4].

Every society responds to such impaired function by charging a number of individuals or institutions with duties to evaluate and interpret the actual condition and provide the necessary measures. Public health key stakeholders (owing to public health being both an institution and scientific discipline) whose representatives include physi-

cians are expected to react to these social requirements and provide best practices and outcomes. Medicine tries to build up a scientific model of illness, its diagnostics, treatment and prevention, yet this model often is neither identical nor congruent with the social one. There is a difference between illness and disease; the same as the difference of views concerning the therapeutic and preventive approach [6].

The priority of the scientific approach is the attempted objectivity and criticism in collecting data and interpreting it. On the contrary, the social model is mostly based on subjective and strongly emotional attitudes. Both, the expert and lay community are not immune against the harmful influence of myths. Science, however, is closer to truth, but not exceptionally, the science-based, as well as lay models, tend to misinterpret the situation, and provide altered or skewed approaches [7]. Using objective methods rooted in the scientific process, it becomes clear to be able to reflect upon failures, where the subjective approach often resists logical argumentation and organized methodology.

Nevertheless, even the scientific process operates with some traditional elements. Max Planck has lamented, "the new scientific truth would not win by convincing the opponents, but rather by letting the opponents die, and the new generation then adopts a new, and own truth." If rationally removing harmful effects and providing for a healthy living environment we have to consider both the scientific and social aspects, i.e. the views and needs of people living in particular environment.

2 Assessment of Ecological and Health Risk Factors and Settings

The assessment of potential ecological and health risk rising from the planned industrial transport and waste treatment facilities and other construction activities becomes indispensable [10]. Of course, the public health aspects of such waste management activities is no novelty as such cited projects have legally been controlled and approved by the district or regional public health authorities, within the scope of preventive supervision and best practices.

Whereas the initial phase of risk assessment, its identification or potential human exposure are of pure scientific character, the actual risk assessment increasingly assumes the arbitrary aspects (e.g. safety coefficients), risk communication, its control and management by way of psychological aspects; collective decision making then becomes a hotly debated political issue [5]. As illustrating examples we can use problems related to conflicting views concerning the health risk and associated effects of electromagnetic field and electronic microclimate [11].

The present approach to quantitative risk assessment artificially separating physiologically based pharmacokinetic (PBPK) model and biologically based dose response (BBDR) model needs to be substantially improved. The

modelling procedure must go beyond the current organ-tissue based PBPK model as well as the hard-to-modify two-stage BBDR model. It is clear that a model must be flexible and capable of incorporating information about pharmacokinetics and cell signalling response, among other transparent metrics that help to elucidate the situation [5, 18].

A limitation of the present approach to risk assessment is low dose extrapolation of cancer incidence data from both animal (experimental) and human (epidemiology) studies that are most frequently based on models that assume linearity at low doses and low exposures [18]. There are situations in which this assumption could be considered unreasonable. However, because of the lack of data and no alternative methodology for risk extrapolation at present, the model of low - dose linearity continues being used despite existence of qualitative evidence evidencing the contrary. This is specifically relevant in the case of many non-genotoxic carcinogens modulating mitogenic stimulation or suppression of apoptosis - processes regulated by signalling through its impact on gene expression [12]. Dioxins (TCDD) can serve as example of non-genotoxic carcinogen, endocrine disrupter acting through the Ah receptor. It is a general consensus that to resolve this problem, we need to develop a methodology incorporating biological data on mechanisms operating at the cellular or molecular level.

3 Psychic Infection and Mass Hysteria

As every expert knows dealing with clients may sometimes bring about a number of both material and psychological problems. Besides, addressing a group of individuals, who, moreover, feel endangered is more complicated still, especially when these groups previously organized in harmony and through a certain hierarchy start to change into disintegrated ones where behaviour suggest the behaviour of masses or of the mob. The mass psychology may appear whenever a sufficient number of persons are gathering around one point of common interest.

The psychology of the group never makes a mere sum of the member's psychology but it has its own individual characteristics. The group as a whole shows better quality than the most inferior members, but the worse judgement and lower IQ compared to the best individuals of the group, and it is prone to getting influenced by emotion rather than so by reality. Another characteristic is behaviour of the group as a mob (aggressive, panicking, etc.) whose activities are more often worse than those of an individual [2, 3, 17, 7].

The basic characteristic of mass dynamics is the "psychic infection" due to increased suggestibility responsible for the sensation of symptoms and subsequent chain reactions. A person in the mob then is capable of acts they would otherwise never have committed as an individual on their own. The cases of mass psychoses are well known

from many literary descriptions of "mass hysteria" in real or supposed exposure to toxic substances, or in health problems and symptoms connected with the indoor environment (sick building syndrome) found in air conditioned structures [16, 15, 19, 14, 13, 8].

In such cases, it can be considered "objective", (i.e. the patient really suffers from them). They are reminded of such symptoms of acute distress but they are less intense and last for a longer period of time, (e.g. for many days, weeks, or months). The affected are aware of the overall stress and tension, fright, shyness, of sensations of oppressiveness and worries, when addressing other people, and vague stressing uncertainty for the future. All these symptoms are accompanied by chronic fatigue, headache, insomnia and other sub-acute vegetative disorders. As the syndrome is not fully debilitating, the patient feels chronically unwell in both his daily duties and his reaction towards other people. Often their capacity of cognition and making sense of daily activities becomes reduced as the result of chronic fatigue and impaired concentration.

The symptomatology fully corresponds to the term "somatization" introduced in the ICD-10 international classification. The point is that emotion - here a very strong one - finds its vegetative correlate occurring in the somatic sphere. An important role in further development plays the "interpretative model" of the patient being xenochthonous in our case (the cause of all trouble comes from outside) and the patient is aware of it (sick building, nearby radar station, TV tower, waste incineration plant etc.). This mass reaction can manifest by two syndrome levels: one prevails the state of anxiety and the other prevails motoric symptoms (e.g. the medieval processions of flagellants praying for aversion of a pest).

The symptoms may appear separately or combined, or occur in turn in the patient. Mass hysteria afflicts men less frequently than women, especially those living in poorer socioeconomic conditions. Mass hysteria is closely connected with the problems of "sick indoor environment" illness. Important here is the firm conviction of outside noxia responsible for any kind of symptom, further tendency to hypochondria and stress and also hostile attitudes of the patient to anybody to blame for these conditions; in practice materialized by endless weary court trials. In a sense, also collective insistence on Unidentified flying Objects (UFOs) and other paranormal encounters belong to this category.

Yet, not all mass-occurring pathological symptoms are mass-hysteria-related. For example, the mass poisoning of school children in the school canteen in London can be mentioned, manifested by gastrointestinal troubles shortly after lunch. The complex microbiological, hygienic, and toxicological examination included a questionnaire for children, which showed a significant link between the symptoms and consumption of raw cucumber (relative risk 6.1). Microbiologically the cucumbers were safe but pesticide contaminated, as proved by toxicology tests. In the discussion, the authors warn against any overhasty diagnosis of mass hysteria.

Another example can be found with vaccination and concerns of a disproportionate amount of adverse side effects, including cognitive and development impairment. This new version of vaccine denialism has caused some eradicated disease such as measles, mumps and rubella to be once again found in the developed world due to significantly reduced herd immunity due to parents opting out of such otherwise required vaccines. Vaccine-preventable diseases have been a major cause of illness, death, and disability throughout human history. The advent of the modern vaccine era has changed this significantly. In more recent times, there has been much debate in the lay press regarding vaccine safety — namely what possible side-effects vaccines cause and whether these outweigh the risks of leaving a population without a vaccination program. Despite most of the hysteria, some key literature relating vaccines and childhood development have been completely rebuked and withdrawn from the literature. Present use vaccines provide disease coverage to populations, prevent illness and save lives.

Even when the concentration of toxicants fails to reach the risk values, other factors may be involved, e.g. ambient temperature, air humidity, etc., which have up to now not been included in our models but which are able to objectively influence the clinical course, morbidity and mortality rate [1]. There even may occur combination of the actual infection and mass hysteria. In some people evident hypersensitivity to some substances exists: their pathophysiological reaction then is capable of psychogenic effects on the environment.

Nevertheless, we presume the psychosocial aspects may be of basic importance in understanding the potential health risks.

Furthermore, we can expect such problems when our knowledge of actual health effects of human exposure is incomplete or the intensity of exposure oscillates in levels raising doubts as to possible biological effects [9, 5]. Very serious problems, mostly in psychologically unstable patients, are neuro-psyche and psychosomatic symptoms resisting to treatment. Despite the difficulty in objectification, they represent suffering that should not be underrated considering the quality of patient's life.

4 Challenges for Prevention

The prevention of such conditions can either be systematic: early educational or popularisation campaigns, specific health education orientated to the development of industrial, transportation, or other types of constructions, and integration of the local civic activities in the program. The purpose of this should not be a cheap belittling of the risk but reasonable explaining of its acceptable rate, and also the likely advantage to benefit from the realization of the structures. Any later efforts to inform the public about the true state of affairs is normally accepted with distrust and disbelief, in belief this information had been well-paid by the government, industry and market forces,

the military or some other institution trying to camouflage the actual condition.

5 Conclusion

The cases of mass psychoses are well known from many literary descriptions of “mass hysteria” in real or supposed exposure to toxic substances, or in health problems and symptoms connected with the indoor environment (sick building syndrome) found in air conditioned structures [16, 15, 19, 14, 13].

It is therefore recommended to carry out a relevant, competent epidemiological pilot study on potential incidence of some health problems (tumours, congenital malformations, etc.) still before starting the structures, to compare - using a set of reliable data, when the building had already been approved for use - the incident phenomenon with the previous conditions. Such a study, of course, is no alibi. In cases of positive findings the study could serve as basis for rational measures to minimize the health risk due to the operation of the particular facility. The concept of health risk minimization must be included as a theme in all stages of the design and realization, covering all potential risks for the environment and human health. In medicine, the Hippocrates' statement still holds: Life is short, and Art is long; the occasion is fleeting, experience fallacious, and judgment difficult. The physician must not only be prepared to do what is right himself, but must also make the patient, the attendants, and externals to co-operate. If we honour this in therapy, we should do so in prevention of environment related health risks twice as much [6].

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