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A systemic view of the pandemic

>> The coronavirus pandemic is travelling in waves and there are local hotspots. These characteristics of flows, their variation and identity, are the subject of physics, which apparently makes them suitable for pandemic research. However, systems science is better suited to analysing heterogeneous systems.

Systems science and cybernetics

Systems science emerged from the dialectic between applications and theories in the natural sciences, humanities, engineering and social sciences, from ‚chaos‘ in meteorology (Edward Lorenz) to ‚self-reference‘ in social systems (Niklas Luhmann). Today‘s canonised knowledge can be characterised by several features: there is a specific language or terminology (system, structure, function, complexity, dynamics, equilibrium, etc.) and an explicit methodology of modelling and simulation. The depth and contexts of the system are considered in an integrated manner (multi-level models). Interdisciplinary fruitful paradigms, such as self-organisation or resilience, are developed. The foundations of systemic thinking are based on specific theories such as control and communication theory (cybernetics) or chaos theory. In this context, constructivist systems philosophy (Heinz von Foerster) should also be considered as 2nd order cybernetics: The observation itself influences the behaviour of the observed system observing the observation. The inherent dynamics of bio-psycho-social systems were thus emphasised. One-dimensional input-output models are therefore inadequate. Rather, the systemic integration of heterogeneous methods and evidence is necessary. Corona science therefore appears inadequate in several respects.

Corona science and theoretical deficits

Alongside virology, coronavirus science was characterised by physics as a form of social physics, although clinical medicine is responsible for health/disease. Thus, people and their contact relationships were modelled by algorithms of agents and/or as a flow of particles between compartments. Compartmental models are based on the structure of the SEIR model: once a large part of the population is infected - according to one of the insights - herd immunity can be achieved. From a medical point of view, this concept already reveals theoretical weaknesses, as the infectiousness of the infected persons towards the susceptibles depends not only on viral properties themselves and on physical contact parameters such as proximity and duration of exposure and the air conditions of the encounter area, but also on the intra- or expiratory activity of the susceptibles or infected persons (collective singing at festivals). At the biological level, which is the focus of medicine, an organism-related ‚systemic pathology‘ should also be used, which takes into account the multi-layered resistance biology of susceptibles and integrates it with the prevailing molecular view. Although people were differentiated according to demographic variables such as age, gender, ethnicity, etc., there was a lack of consideration of basic social science concepts of the stratification of actions or expectations or the understanding of rules. Little attention was also paid to cultural orientations as determinants of behaviour. Even socio-spatial - i.e. urban sociological - comparisons would have yielded relevant evidence and hypotheses. Ultimately, from a psychological perspective, people - even if they are conceptualised as a ‚population‘ - are not objects, but ‚situated subjects‘, bio-psychosocio-ecological beings with interests and their own will, striving for autonomy. Obviously, the prevailing research strategy was shaped by the molecular biology big data programme, which assumes that large amounts of data and their computer analysis reveal the truth per se, and that no behavioural or social science knowledge or theories are necessary for this, according to the implicit epistemology.

Pandemic as a system

The aforementioned SEIR models and their derivatives see the population as a tiered black box, consisting of billiard balls so to speak, with inputs (SARS-CoV2 virus) and outputs (Covid-19 disease). However, this fundamentally systemic perspective does not adequately depict the population in its complexity and as a network of bio-psycho-socio-ecological beings with their own dynamics. Such crude modelling was therefore suboptimal in the context of pandemic management. This becomes clear when the corona problem is modelled in terms of systemic management as a large control loop for society as a whole: politics as a ‚controller‘, which receives the state of the population as an ‚actual value‘ from science as a ‚sensor‘ and which, in relation to cultural ‚target values‘ (ensuring population health), has regulations implemented via the administration as an ‚effector‘, ensures that people protect themselves better as ‚control objects‘, etc. This control loop model shows that latencies of resonances and inherent dynamics of the individual system components generate an additional variation in incidence figures in addition to virus mutations. This insufficiency of unidirectional top-down - and thus undemocratic - problem management, which can also be experienced, exacerbated the polarisation of the population that can be seen today as a paradox of ‚benevolent parentalism‘ (Richard Münch).

Conclusion

A systemic, holistic analysis and reflection of pandemics (and other crises) would enable more humane and democratic problem management in the future, without overemphasising individual components. This view would also facilitate the still lacking reappraisal.htern. <<

Literature:
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