

# Reductionism and Nursing Clinical Reality

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## Introduction

Biomedicine has been a significant force in medical and nursing research and understanding, and described by some as the cornerstone of laboratory-based diagnosis and care within modern health [1]. Biomedicine's in-vitro research has significantly advanced diagnosis and treatment, evident particularly in the area of carcinogenesis [2]. Historically, from a perspective of vitalism (the idea of life forces engaging and animating the universe and living things), Western science moved progressively towards a position of positivism, reflecting similarity of elements, and subject to the same laws and dynamic principles [3]. This could be examined and understood substantially through a biological, chemical and physiological lens [4]

Until quite recently (and in the view of many still) the biomedical sciences and research focus had been characterized by reductionism [3]. Reductionism has perhaps a range of definitions, but could be properly defined as describing and interpreting systems at the lower level (reduced), thereby enabling the properties of an element or substance or living entity to be understood and interpreted through studying their constituent elements and interaction [5], in a sense living entities understood as the sum of their parts. In addition, transference enables understanding gained from one area of biomedical sciences to be transferred to understanding in another area of biomedical science [5].

Some cases combining an understanding of parts of the system can be arguably translated to a more complete understanding of the whole phenomena. The system can therefore be treated as closed or semi closed and somewhat shielded from the impacts of environment [5]. Reductionist methods are sometimes referred to as decomposition, with a significant focus on in vitro isolation and factors internal to the organism or system [4,5]. Significant questions then started to emerge as to whether there were other dynamic forces engaging, animating and vitalizing living organisms, factors or elements that a reductionist model didn't incorporate. For example was the human mind, merely a function of the organ of the human brain, or something more; where does consciousness and free will arise [3,4].

By way of some contrast to reductionism the concept of holism has become significantly more present within the literature [3,4]. Again, a term open to a range of interpretations, some of which

strayed to the higher end of the esoteric, but for the purposes of this discussion and opinion paper, holism will be defined as the complex interaction of a living system with the matrix in which that system lives and functions and producing often unpredictable and unique characteristics of the living whole, through dynamic interaction. Biomedicine had tended to ignore the vital energy of living entities [3,4]. Holistic arguments would suggest that living systems are inherently complex, irreducible and incapable of understanding without applying a more whole system interpretation; that reduction or deconstruction limits our understanding of their systemic complexity [3-5]. Emergent properties or phenomena could then be more fully explored or evaluated in their own right rather than marginalized or ignored [5].

Certainly holistic theory would be critical of reductionist approaches in sometimes significantly oversimplifying complex phenomena and possibly therefore misinterpreting cause and effect [6,7]. Complex systems cannot therefore perhaps be properly investigated or understood by exploring the constituent parts in isolation [8,9], with need for an approach more reflective of the dynamic interaction between parts of the system and the impacting environmental influences [4,5,8]. Reductionism would acknowledge 'epiphenomenon', and probably distance itself from research 'elimination' in which a phenomenon is denied or ignored. Epiphenomenon or emergent phenomena might elicit a reductionist explanation in terms of another medically understood constituent, rather than considering epiphenomenon or emergent phenomena as important in their own right [4,5]. For example in a near death 'out of the body experience' reported in a number of accounts, whilst not necessarily dismissed, might be interpreted through the prism of cardio pulmonary hypoxia, biochemical reactions and known psychological pathways [6,7]. The reductionist model might over focus internally and either ignore or oversimplify environmental factors [5] providing perhaps sometimes rather a limited insight to complex systems [1,3,5]. Certainly within the area of human health care, in seeking to understand the complexities of certain disease processes research methods substantially focused within a reductive paradigms can have a limited or misleading value [10,11].

The chaotic and turbulent nature of some systems over and above simple weather patterns do not lend themselves easily

to biomedical reductionism. Reductionist models struggle somewhat when it comes to an understanding of consciousness and free will [3,4] perhaps better understood within a systems theory. Systems theory has potentially significant value when considering environmental, global economic and emergent political phenomena [4,8,12]. To use a simple but for many tragic example of carcinogenesis, much of the biomedical research approach had focused genetically, at a cellular level and in an exploration of mutations and the progression of tumors [5,8,13]. The cancer might be a product of biochemical imbalance or primarily caused by a carcinogen. However the reductionist approach can over focus on internal factors, an approach that tends to ignore what might be termed higher level factors, including an individual's sense of resilience, the environmental context in which the individual is living, and the negative stressors (distress) experienced by the individual (as in immunosuppressant) [14]. Reductionist models within both the life and social sciences would tend to ignore or marginalized the impacts of social class, poverty, isolation and the potential for vital force or energy field theory to apply itself in avoidance of or treatment of disease [14-16].

## Conclusion

Reductionist medical research has had and continues to have a significant value to nursing practice when its decomposing approach is applied properly. In addressing a more holistic model or seeking to interpret phenomena through a systems approach, it is still important in many situations, to understand the constituent parts. Reductionist methods when properly applied can significantly contribute to nursing and medical understanding and practice. However, reductionist methods perhaps struggle when seeking to incorporate or perhaps ignore high level factors or the emergent phenomena from complex interactions. Where reductionist methods tend to ignore or marginalize emergent phenomena, this presents a limitation. Within nursing there exists the professional obligation to address the physiological, the psychological, the social and the spiritual dimensions of patient care. Certainly with the latter spiritual domain, a reductionist model of biomedicine tends to struggle. Reductionism in biomedicine can help provide part of that answer, but it is only part. Dynamic integrated systems cannot be properly understood and properly treated and cared for

in isolation. They exist in vivo rather than in vitro and that is the dimension in which professional nursing care is delivered.

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