

Family Medicine and the New Science

— J H Levenstein



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Curriculum vitae

Dr Joseph Levenstein graduated at UCT in 1965 with MBChB and obtained the MFGP(SA) in 1972. He is presently the Chairman of the Academy Council as well as the Faculty of General Practice of the College of Medicine of South Africa. He was Vice-President of WONCA from 1978 to 1980. He has many publications to his credit and has received both the Louis Leipold Medal and the Noristan Medal for two of his articles. He is Head of the Unit of General Practice, Department of Community Health at UCT and is the first recipient of the Lennon Boz Fehler Fellowship.

Scientific paradigms or models amount to a world view of reality. (Although they become belief systems, they differ from the latter in that their theoretical constructs and general laws can be verified or negated by independent observers in controlled experiments.) Natural science is the pursuit of testable truth in an attempt to understand our reality and our being. What distinguishes natural science from other systems of thought is whether its theories or statements can be refuted or not refuted¹. This does not mean that knowledge that is not able to be subjected to experiment for verification or falsification, is not valuable, but simply that it cannot be classified as being scientific^{2,3}.

Natural science involves making precise observations. Once we have these verified observations, we construct testable explanatory theories to explain them².

Summary

Family Medicine is a new discipline growing out of the old General Practitioner and the set of assumptions that govern conventional biomedical medicine. Conventional medicine derives its strength and phenomenal rise from the assumptions of Descartes and Newton, that the world and man function as a mere machine. This view of man and the world has however proven to be inadequate and has left medicine with many anomalies to face. These anomalies are being addressed through the developing principles of Family Medicine. Some of the insights gained from the new science of Einstein, Modern Physics and systems theory are helping to make medicine more human and holistic.

S Afr Fam Pract 1988; 9 (1): 11-17

KEYWORDS: Family Practice; Philosophy; Science; Physics

An example of scientific theory would be that certain bacteria are eradicated by the appropriate antibiotic. Experiments can be constructed to test the hypothesis to verify or refute it.

An example of a non-scientific theory would be Freud's explanatory theories on the unconscious mind^{1, 2}. While he fulfilled the first criterion of natural science, namely the collection of precise observations relating to the unconscious mind, his explanatory theories could not be verified or refuted. This resulted in competitive theories to the interpretation of this unconscious material by other analytical schools. Which theoretical system you then believed depended on your belief system and

not science. There is little doubt as to Freud's contribution, which may have had more impact than the discovery of antibiotics, but the fact remains that it is not science, as we understand it.

At any point in history there will be a prevailing system or scientific paradigm, which is made up of general laws, which attempts to explain existence⁴. Society usually consciously or unconsciously behaves in terms of this current wisdom. Knowledge, principles, and behaviour are ordered in terms of the existing paradigm. Medicine is no exception to

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this. Thus at any point in time, medicine, as with any other activity will be under the influence of the current scientific wisdom or be explainable in terms of its precepts. While all that takes place in medicine, for example, will not necessarily be scientific, other endeavours, including scholarly ones, technology, art and craft will follow the general laws of that paradigm.

The examples of antibiotics and bacteria and the existence of the unconscious mind, while not both being "scientific" are both products of a specific scientific paradigm.

Prior to the 16th century, the world view was organic⁵. People believed in the interdependence between material and spiritual phenomenon. The scientific framework of this organic view originated from Aristotle and the Church. In the thirteenth century Thomas Aquinas had combined Aristotle's view of nature with Christian theology and ethics and established a conceptual framework on the basis of reason and faith⁵. The main aim was to understand meaning and significance as opposed to prediction and control⁵.

The world as a machine

The concept of an organic living and spiritual universe changed dramatically from the sixteenth century to be replaced by the "world as a machine"⁵. Copernicus, Galileo and Bacon among others challenged the then current wisdom. Galileo believed that one should only study material bodies in areas which could be measured and quantified. Subjective mental projections such as taste, smell, should be excluded⁶. Bacon was responsible for the new scientific method of enquiry. This involved the inductive process where experiments were conducted from which conclusions were drawn. Bacon changed the ancient goal of science from understanding of the natural order to an instrument, "to turn nature into a slave"⁵. Inherent to the methodology of these early workers and those that

followed was an obsession with measurement and hence mathematics.

Descartes

The most influential figures in the change of the paradigm, model or world view were Rene Descartes and Isaac Newton. The former can be regarded as the father of modern philosophy and the latter the father of modern science⁵.

Descartes' aim was to construct a science about which there could be absolute certainty about nature⁷. "We reject all knowledge which is probable and believe only those things which are perfectly known"⁸. This belief is still widely held today with the belief that science is the only way of understanding nature. Descartes' methodology was that of deduction and analysis. Problems were broken up and then re-arranged in logical order and this analytic reasoning was his greatest contribution to science. Descartes' belief was that complex phenomena could only be understood by reducing them to ever decreasing smaller constituent parts. He was the founder of reductionism which lead to a never-ending fragmentation of all that is in the universe including our thinking and world view.

A cardinal hypothesis of his philosophy was the absolute division between mind and body - *res cogitans* and *res extensa*⁹. To Descartes, the material universe was a machine, nature was mechanical, including living organisms - "I do not recognise any difference between machines made by craftsmen and the various bodies that nature alone composes."¹⁰ Lest there be any doubt as to his philosophy of medicine he maintained "a sick man is an ill made clock and a healthy man, a well made clock".¹⁰

Newton

Descartes' vision of nature as a perfect machine governed by mathematical laws was to be realised by Isaac Newton, who completed a mathematical formulation of the mechanistic view of nature⁵. Newton formulated powerful, comprehensive mathematical explanatory laws explaining motion and

The shift was from objects to relationships

gravity - the universe was indeed a huge mechanical system operating to exact mathematical laws. He combined both inductive and deductive reasoning in his methodology. He emphasised that experiments had to be followed by reliable interpretation and deduction from first principles, and could not be considered reliable without subjecting them to explanation. Newton believed that there was absolute space, time and matter¹¹. Matter, like space and time, was indivisible and constant¹¹.

Significantly he was a rigorous determinist - all that happened had a definite cause. All could be predicted with absolute certainty, if details were known. In accordance with the Cartesian mind/body division the mechanical system could be described objectively without mentioning the human observer.

Newtonian mechanics has pervaded all fields of endeavour from chemistry to administration and became the dominant world view⁵. It has been responsible for putting a man on the moon and the elucidation of the double helix structure of DNA. It is the midwife of specialisation and super-specialisation - how better to understand an object than to reduce it further and further and further? Despite discoveries and observations that were not explicable by Newtonian laws such as electromagnetic waves which travelled through space and the Darwinian theory of evolution showing a continuum as opposed to absolutism, Cartesian/Newtonian thought remained the dominant paradigm as it does, to a certain extent, today. This in spite of the advent of the revolutionary theories, of relativity and quantum physics⁵.

The new physics

The theories of relativity and quantum physics were to shatter the fundamental bedrocks of Newtonian physics, and clash with our intuitive beliefs on reality⁵. There were no such things as absolute space, time and matter or a strictly physical causal explanation of physical nature. In fact there was no absolute anything including an "objective" view of nature. There was only probability. Newtonian physics could not fully explain the behaviour of the smallest possible particles, atoms, nor the largest systems, the cosmos, and their inter-relationships⁵.

Albert Einstein was to the new physics what Newton had been to reductionistic physics. He radically altered the traditional concepts of space and time. The exploration of the atomic and sub-atomic world were to lead further revelations and to the Quantum theory. These observations were so

The observer is necessary to bring about properties

shattering that Einstein himself would not believe them - "it was as if the ground had been pulled out from one ..."¹¹. The general conclusion was that the universe, as opposed to being made up of separate divisible parts, was one indivisible whole, whose parts were interrelated and could only be understood as patterns of the whole. Terminology such as organic, holistic, ecological, religious and even mystic were used to describe it.

Atomic theory was to show that atoms were far

from being solid particles, had vast quantities of space. Their so-called solid aspects, neutrons, protons and electrons could either be matter or waves. Whether it was one or the other depended on the experimental situation ie the observer influenced the experiment. Subatomic matter did not exist, it showed tendencies to exist and atomic events did not occur at definite times or definite ways, they merely showed tendencies to do so. Furthermore, subatomic particles could not be understood on their own but only in terms of their

There can be no value-free science

interrelationships and interconnections. The world cannot be reduced as it is basically one and interconnected. The shift was from objects to relationships. In quantum physics there are hidden variables and therefore one cannot make exact predictions only probable assumptions. In quantum theory events need not always have a well-defined single cause. These interrelationships are little understood.

Thus nothing is certain but only can be probable and the universe is definitely not mechanical.

Human consciousness too played a big role in the process of observation, the latter deciding, for example, how to observe a particle. The crucial feature of the quantum theory is that the observer is not only necessary to observe the atomic phenomenon but even necessary to bring about properties. If he determined an electron as a wave, it was a wave and if he determined it as a particle it was a particle. The electron thus did not have properties independent of the mind. Thus there can be no objective description of nature or value free science.

Two major themes of modern physics were that the universe is a web of relations and that the cosmos is dynamic.

The theory of relativity particularly showed us that matter cannot be separated from its activity. Matter was never dead at the subatomic level, it was restless. It also brought about a drastic revision of space and time - they were interrelated. In certain experiments space/time diagrams have no definite direction to them and thus no linear relation to cause and effect. Events are interconnected but not causal in the classical sense.

Modern physics changed the image of the universe as a machine to one indivisible dynamic whose parts are interrelated. The view of modern physics is a systems view.

Notwithstanding this, and the fact that the new physics is almost 100 years old, the world is still dominated by Newtonian Cartesian principles. While medicine has since the time of Hippocrates always wrestled with mind/body dualism, there is

little doubt as to which paradigm it ascribes today. Thus conventional medicine or the biomedical model or traditional medicine has functioned since the seventeenth century on Newtonian reductionistic principles. The momentum was started with Harvey's description of the blood circulation and then received its greatest impetus when Pasteur discovered the correlation between germs and disease.

Conventional biomedical medicine

If we examine "traditional" medicine, the biomedical or conventional model, and its principles, it will be seen how closely it approximates the Newtonian model¹². George Engel has written that the notion of the body as a machine is paramount¹². Disease is the breakdown of that machine and the doctor's job is to repair that machine¹².

Medicine is fragmented into separate disciplines on the basis of organs. It is further fragmented into areas of activity on the basis of age, sex, procedures and various technologies. It accepts the principle of reductionism seeking always to find the smallest possible unit and in the process creating further separate disciplines. Medicine has followed biology and the natural sciences with the division of body to organs to cells to molecules. Following the germ theory of disease, it has accepted a single causative factor of disease. This concept was entrenched further by Koch's postulates as to what scientifically could be proven to be the aetiology of a disease. It has as a basis for its classification Linnaeus's taxonomy of plants for its taxonomy of diseases.

The emphasis has been almost entirely on the physical, ie the body. The mind is examined in a separate discipline, psychiatry. To be accepted as a discipline, psychiatry has followed the Newtonian paradigm to the letter. It has classifications and deals similarly with gross manifested measurable disease. It makes no attempt to deal with the mind/body relationships of ordinary illness.

The clinical process biomedical medicine uses to diagnose or exclude disease is standardised and 'objective'. It is sometimes labelled as being the

Conventional medicine is a slave to the concept of the mechanistic man

doctor-centred model¹³. Furthermore, it is maintained that if the model is consistently applied it is irrelevant who the 'observer' or doctor is - the result will be the same¹⁴.

The patient is irrelevant to the process other than to be the respondent to the prescribed questions, examinations and investigations. If these yield

'nothing' then 'nothing' is wrong with the patient. It is non-flexible, precise and certain.

The objective is to label the patient with a well defined single disease, with a single aetiology. Down to organ replacement for broken parts, there is little doubt that conventional medicine is a slave to the concept of the mechanistic man.

There is no doubt too as to the spectacular success achieved with this model particularly in the latter half of this century. With the advent of 'magic

The "anomaly", most commonly acknowledged, is the placebo effect

bullets' in the form of vaccines, medicines, antibiotics, psychotropic drugs, endocrinological drugs, anti-inflammatories and vitamins, the "repairing of the machine" became seductively more logical. Blood transfusions, advances in anaesthesia and the most incredible technological equipment allowed an unimpeded explosion of reductionism to proceed. So entrenched is the model that most doctors working in terms of it are not even aware of its existence.

Few will fail to acknowledge the effectiveness of the treatments for clearly defined disease entities or conditions. Some however, have argued that the success of traditional medicine has been exaggerated and most of its achievements can be ascribed to factors such as improvement of nutrition, hygiene, sanitation and the environment^{5, 15}.

"Anomalies" to conventional medicine

Now no doctor would admit to being a passive neutral objective observer functioning on inanimate machine-like patients. To a lesser or greater extent they will all stress the importance of being 'nice' to their patients and recognise that the latter have feelings or at least pay lip service to the concept. However, while some might believe that what happens between them and their patients is important, few will examine this in a scientific way or incorporate it as part of their medical process. For the most part, what Kuhn describes as "anomalies"⁴ will be shrugged off and ignored. (Anomalies being defined as observations which does not fit into an accepted scientific paradigm)⁴.

And 'anomalies' there are!

Even when these anomalies are recognised their implications are never followed up and understood. There is no attempt made to integrate these into conventional medicine.

Examples of "anomalies" in everyday observations include:

- "If a patient makes up his mind to die you can do what you like, he dies!"

- "If you are 'run down' you are more likely to get disease", etc. etc.

Formalised studies, usually done by other disciplines, such as social science and psychology, are similarly ignored or at least not integrated into the "world view".

Examples of these include:

- Less post-operative analgesia is needed when the anaesthetist explains and discusses the operation with the patient¹⁶.
- Survival in an ICU or even in cancer is partially related to behavioural, psychological and social parameters¹⁴.
- The strongest predictive factors for chronic brucellosis as opposed to acute brucellosis are the concomitant presence of psycho-social problems¹⁸.
- Animal experimentation produces similar results^{4,5}.
- In a study on rabbits who were given an atherogenic diet there was a statistically lower incidence of atherosclerosis in those who were petted during the experiment as compared to those who were not⁴, etc, etc.

If this is not enough evidence of "anomalies" look at our day to day working activities where we fail to appreciate, the significance of "objective" ob-

Conventional medicine is riddled with "anomalies"

servers arguing about what they see on an X-Ray, what they hear in a chest, what agreed upon symptoms mean and which disease they represent, what antibiotic to use, and whether to operate or not operate, for example.

The "anomaly" that is the most commonly acknowledged is that of the placebo effect¹⁹. This cannot be ignored and studies are designed to eliminate it. Double blind studies are constructed to eliminate observer and patient bias. The scientific value of a study is measured to a large extent by the success attained in eliminating this "bias". It is acknowledged that this effect is tremendously powerful and can negate the value of the study. And so it can! However, no one stops to realise the implications of what they are doing. They are acknowledging the role played by the doctor and the patient in healing only to discard it as irrelevant in everything else they do! Factors acknowledged, by scientific design, to play at least as an important role as the causative agent of the disease or its treatment are not pursued, studied or integrated into the world view.

The principle scientific reason for ignoring these anomalies is that the Newtonian paradigm involves distinct mind/body separation and the

admixture of the two in a reductionistic approach cannot be countenanced.

In Kuhnian terms, conventional medicine is ripe for a paradigm change⁴. It is riddled with "anomalies". However, Kuhn is the first to acknowledge the power of the "establishment" and this is as much a political battle as it is a scientific one.

Family medicine as a discipline

At the outset, I would like to make it clear that I use the term Family Medicine synonymously with general practice and generalist primary care. Family Medicine is not a term I favour and it was designed for "political" purposes in the North American context. It has at least the advantage of being identified with a "new" discipline and not just being "old" general practice, which in the mind of many is misconstrued as the sum of all the specialist disciplines written small. Other terms, such as holistic medicine, embrace all and sundry including those who make no pretence to scientific endeavour, are inappropriate, while the term patient-centred medicine has not as yet gained universal acceptance.

The principles of Family Medicine leave little doubt as to which paradigm the discipline is governed by. These principles are universally accepted by academic subcommittees of the World Organisation of Academies and Colleges of Family Medicine/General Practice and the European Leewenhorst document.

These include:

- Illness as opposed to disease is the subject matter of family medicine. This is made up of physical, psychological and social components (this includes familial and environmental factors), ie illness has a multifactorial aetiology.
- Families affect illness and illness affects families.
- The management of patients and their families is a continuing evolving dynamic process.
- The doctor should exhibit self knowledge and awareness.
- The patient's perceptions, knowledge and feelings are of paramount importance in the therapeutic relationship.
- The family doctor should be able to tolerate uncertainty.
- The doctor is a therapeutic agent and the doctor/patient relationship is paramount in the management of illness.
- The practice of family medicine is committed to the patient rather than a disease.
- The family physician is committed to comprehensive and total management of his patients in the areas of preventive, immediate and chronic care - ie he is the manager of his patient's health.
- The family physician sees himself as a part of the community network of health care.
- Ideally, family physicians should share the same habitat as their patients, treating them in their

own environment and even in their own homes as far as possible.

- The process by which the family physician operates is *patient centred* exhibiting characteristics of flexibility and which places the highest value on the uniqueness of the patient's world²⁰.

Thus, there are relationships, of all orders, as opposed to fragmentation, and there is wholeness as opposed to division. There is uncertainty, probability, acknowledged subjectivity, observers being part of the experiment and the acceptance of their effect on outcome, and there is a dynamic

... thus there are relationships as opposed to fragmentation, wholeness as opposed to division

continuum. There is no value judgement on any one component (eg placing a higher priority on physical illness than psychological illness). It is all in the relative world perspectives of the doctor and patient and environment. There is recognition that certain events are not explicable.

All these are features of quantum physics and the theory of relativity. The obvious question is how on earth did all this come about? The doctors, who formulated these principles came from the same medical training as do their colleagues who continue to function in terms of the traditional paradigm. How could they articulate principles differing so much from the conventional ones?

The answer lies in their very activity. The discipline of family medicine can be described, as a body of knowledge about the problems encountered in Family Medicine, by family physicians²¹. While hospital doctors can ignore "anomalies", however important they may be, and get on with their job, family physicians cannot. Patients in hospital usually have clearly defined disease with which doctors can occupy themselves to the exclusion of everything else. In family practice this is not the case, patients have undifferentiated illness and in well over half of the encounters, not even one of their "complaints" can fit into conventional disease classifications²¹. Psychological problems, social problems, patient's personality, circumstances, stress situations all impinge on the consultation. If they are ignored the patient cannot be treated and managed. There cannot be a mind/body dualism.

Thus the patient appears "different" to the one in hospital. The teaching hospital population differs fundamentally from those with illness in the community. Only 1 out of 1000 illness incidents are referred to the teaching hospital²¹.

The hospital patient is totally dependent and is a part of a system where exhibitions of independence,

enquiry and participation in diagnosis, management, would not be tolerated. The community patient exhibits varying degrees of independence and involves himself in the process of diagnosis and management. The doctor centred process of the conventional model has a very low spinoff in this situation and is totally inappropriate and time consuming. "If", in every encounter, "you put your finger in it, you would really be putting your foot in it"! While common behaviour patterns are evident as with illness patterns, the patient's individual world is unique so the best place to learn it all from, is the patient!

Thus to function, the Family Physician has to accept the uncertainty, the individuality, the totality, the subjectivity, the relationships as part of his discipline - "anomalies" are no longer "anomalies", they are the rule.

Current status of Family Medicine as a scientific discipline

According to Ravetz's definition of disciplines, Family Medicine is an "immature" discipline²³. At this stage of its evolution, there are too few standardised materials which can be presented in standardised form and too many intuitive generalities dressed up as empirical laws²³. Thus, the scientific research base is thin^{2, 24}. While functioning in terms of the New Physics paradigm it has produced few generalised laws to consistently interpret the content of the discipline. The reasons for this are understandable²⁴. The midwife of the discipline was not the medical school where for a discipline to evolve, the research base has to come first. The major activities of Family Medicine leaders in ensuring the discipline's establishment have been political, administrative, organisational and more recently educational. It is inconceivable that without a secure academic base research can flourish. The priority was to establish the discipline as a legitimate area of learning and vocation - a priority far from completed, particularly in South Africa.

There is no doubt still that an urgent priority is to conduct appropriate research - research on clinical

The priority was to establish the discipline as a legitimate area of learning and vocation

processes, decision-making systems and of providing health care². Research is the source of the scientific content of a discipline. Without it no unifying accepted theories can emerge. No one has put it better than Spitzer - "The family physician has a distinctive perspective and obligation to

study, intact human beings in free living, non-institutionalised populations over long periods of time, observing transitions from health to disease and back to health, with a unique opportunity to observe on a firsthand basis, many of the commonest phenomena that affect health and disease, such as family, employment, housing and exposure to risk factors²⁵.

However, research cannot take place in a vacuum and the medical establishment will be extremely shortsighted if they do not support, nourish and encourage the principles of Family Medicine, both in their own endeavours and as a discipline in its own right²⁴. The medical problems of today, such as alcoholism, failure to obtain compliance in chronic illnesses, management of the elderly and terminal patients, drug addiction, breakdown in mental health of epidemic proportions, AIDS, overpopulation and malnutrition, cannot be conquered by a simplistic, reductionistic mechanistic model.

Society, particularly in the Northern Hemisphere is growing disillusioned with the medical establishment on a scale unimaginable to us. The rows of "anti-medicine" and alternative medicine books increase annually in bookshops. In North America, literally scores of hospitals, with sophisticated equipment, are closing down for lack of patients - this without any reported increase in mortality or morbidity. Society is particularly disillusioned with the increasing financial cost they have to bear. They have forgotten our successes and some have little faith in our future. Illich has gone as far as the claim that "The Medical Establishment has become a major threat to health!"¹⁵.

In some ways this has been because of the high expectations of medicine. Society too, believed in the mechanistic model of man, a belief we fostered and still propagate. The answers to all medical problems are just then a question of time. The cause must merely be isolated and a specific treatment found.

The medical establishment arrogantly proceeds, oblivious of the changes that are taking place around them. It is as if we believe we have been handed a Charter by God to control the care of the ill for all perpetuity. This control was given to us by society and our power, as we understand and know it, is not even a century old. In North America, it followed the Flexnerian revolution which exorcised the quacks, the sub-standard, the "unscientific" from our vocation and had medicine placed in our scientific hands²⁶. Those excluded are today's equivalent of the alternative medicine group who have no pretensions to science in any form. However, they also have no pretensions to curing everyone and everything and that is why their successes are met with such enthusiasm - much to our chagrin. They also talk and listen to their patients and could make claims, if they were so aware, to be functioning in terms of the New Physics.

In Family Medicine, I believe medicine has made the first move in terms of accepting the New Physics as the basis of reality. We cannot continue to function in terms of a model of physics that is no longer accepted by the physicians, the "anomalies" are too great. The decision as to whether medicine adapts or not will probably determine whether we, the upholders of the scientific method, will be society's principal providers of health care in the future.

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