

## ***Presidential Address 1990***

# **Research and the Physician – Some Perspectives**

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The fight to understand and combat disease has produced some of the greatest achievements in the history of man. These became possible because, the study of medicine has always attracted the ablest minds of every period. Consequently, medical history inevitably, features scientists whose individual or collective efforts over the centuries have provided landmarks in this vital field of study. Medical inventions and research remain inseparable where the study of disease and the development of knowledge are concerned. The story begins from the magic rites of prehistoric sorcerers to the modern researchers of the present era. These include the times of Charaka and Susruta of about 1500 B.C., the era of Chinese and Egyptian medicine to Hippocrates, the father of medicine in the 5th century B.C. Then came Galen in 130 A.D. and through the dark ages and the renaissance to the golden age of science, the 17th century where William Harvey discovered the circulation of blood. Born in Folkestone, England, in 1578 his discovery and his writing 'de mortu cordis' become the start of modern research.

The quest for modern research necessitated the discovery of new instruments. The man who worked out

basic microscopical techniques and discovered many new facts was, Marcello Malpighi (1628 – 1694) who worked on capillary circulation and saw the red blood corpuscle. Medicine was advancing. The discipline of the exact sciences, hand in hand with experiments and research, became more complex. Thomas Sydenham, the English Hippocrates, born in Dorset in 1624 could not have come at a more opportune time. In 1761 Giovanni Morgagni of Padua laid the foundation of modern pathology. This was followed by Edward Jenner and the discovery of vaccination in 1796 and later, Louis Pasteur in 1855 with his victory over infections by immunisation and by Robert Koch 1878 in his studies on bacteria. There was no end to the frontiers of knowledge, by describing and discovering hitherto unrecognised forms of disease. Hughlings Jackson (1835-1911) described many neurological conditions and spoke of syndromes. Furthermore, there was, during this period a remarkable resurgence of research from the continents of North America and Europe which added to the increasing dimensions of medical advancement.

Lord Brain (1895-1967) renowned neurologist and a past President of the Royal College of Physicians, London, remarked that the 'discoverer of a substantial thing, such as a bacillus, an extract or disease, achieves more

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certain immortality than one who discovers a principle, for permanently valid principles soon become part of current thought and in time appear so obvious, to have no discovery<sup>1</sup>. He thus emphasises the importance of medical discoveries and research as opposed to scientific hypothesis. However, it is true to say that experimental and clinical research and hypotheses are often intergrated as in the discoveries in immunology by the 'two greats', Sir MacFarlane Burnette and Sir Peter Medawar who laid the foundations of modern transplant immunology. Then came the era of genetic engineering.

I have briefly reviewed some discoveries and landmarks in medical history which I presume would be a satisfactory prelude to the title of this Presidential Address, namely 'Research and the Physician — some perspectives'.

Too often the new doctor leaves medical school in total ignorance of the evolution of his art and science, which form the cornerstones of modern research. The inescapable truth is that medical research reminds us of something built over the centuries, succeeding eras seeing more or less important additions by way of modern discoveries. Sir James Gowans in his Harveian Oration of 1987 delivered before the Royal College of Physicians, London said 'those who are involved in medical research could not be living at a more exciting time<sup>2</sup>'. However, the prospects of medical research depend not only on scientific opportunity and talent but also on the resources available to exploit it. The excitement of research and its appli-

cation to clinical practice not only employs methods of advanced technology, but also those of accurate clinical observations and good record keeping in simple surroundings. The breath-taking advances in the basic sciences has in the last few decades left most clinicians somewhat bewildered and sometimes with something of a feeling of hopelessness in their inability to catch up with, and understand current physiology, biochemistry, immunology, molecular biology and applied physics. Nevertheless, whatever his field of practice, the clinician should make every effort to keep abreast with these advances in its applied form pertaining to his field of work.

It now becomes necessary to consider in some detail, perspectives regarding modern clinical research. This would include the following considerations.

1. The tremendous surge in research during this century.
2. The types of research available to the physician.
3. The presentation of data, and the critical appraisal of medical reports.
4. Statistics and computers in medical research, their vital role.
5. Is research necessary in developing nations.
6. What type of research is relevant to these countries including Sri Lanka.
7. Some features of Sri Lankan research.
8. Other problems, funding, lack of enthusiasm and lethargy in research.

The above considerations certainly apply not only to the physician but also to all the varied disciplines of

medical science, including the basic sciences, and is hence relevant to all medical scientific men.

1. The tremendous surge in research during this century needs some comment. Harvey's exhortation to 'search and study the secrets of nature by way of experiment' has inevitably led to the dissemination of new knowledge, what has been called the 'sharing the secrets'<sup>3</sup>. This is an increasing problem to the scientific, technical and medical communities at large, with a flow of new information. This is indicated by the growth in numbers of medical and professional journals estimated at about 10 per cent per year. With the increase in recognised specialities which will presumably continue the quality of research required would reach higher standards. Consequently, this flow of new information should not be swamped by a torrent of irrelevant research. M.F. Oliver's definition of clinical research could be relevant to this problem. Oliver (1968) then President of the Royal College of Physicians of Edinburgh defined it as a pursuit of new ideas by clinical and scientific investigators, with the object of advancing knowledge which might be applied to the lessening of disease or amelioration of its progress, and hence to the benefit of society<sup>4</sup>.

2. Regarding the types of medical research, it could be varied. They broadly fall into one of two types:- (i) research in basic sciences — usually experimental, and (ii) what concerns the clinician — clinical research. The differing types of research fall into many a category, these include:-

a. case reports and clinical observations.

b. vital statistics.

c. cross sectional surveys.

d. retrospective studies — case control studies.

e. prospective studies — cohort studies.

f. clinical trials.

g. prospective experiments.

A brief discussion on these studies would not be out of context. Case reports and clinical observations popularised by Sydenham way back in the 17th century are usually known to be off the framework of statistical evaluation. While they are devoid of numerical material, they do however, serve an excellent sources of ideas and hypotheses, that may lead to a chain of events and firm establishment of relationships and hence deserve credit.

Cross sectional surveys on the other hand, usually apply to the association of diseases, indicating a snapshot view of a relationship at an instant of time as with community surveys. In retrospective studies, accuracy of data collection becomes vital. These studies are generally weak, although such simply collected data could certainly lead to more thorough study of a problem with additional statistical evaluation of a prospective and planned nature. Prospective studies, a study going forward in time have the distinct advantage of permitting uniformity in observation, personal record keeping, establishing rigorous criteria and careful follow-up. Classical example of such studies would be the Framingham Heart Study and the publications of Doll and Hill on the association between cigarette smoking and lung cancer<sup>5 6</sup>.

and more recently — studies on aspirin and coronary heart disease.

Clinical trials, specially controlled trials with random allocation by chance, which could be either single or double blind, form an important aspect of drug evaluation. Lastly, prospective experiments as for example, in lipid lowering agents in hyperlipidaemic states and coronary artery disease becomes a modified form of a clinical trial.

3. The critical appraisal of the results of all studies, whatever its type, and its value thereof depends on many features, namely:

(i) object of hypothesis (ii) design of the investigation (iii) the accuracy of observations (iv) presentation of the findings (v) the analysis of data (vi) conclusion and (vii) the outlining of constructive suggestions<sup>7</sup>.

Research could be a driving force, what type of research could be pursued under what circumstances, and how far one can pursue such research with humans alive or dead, are matters of wide ethical concern. Adequate precautions must be taken to maintain human dignity and this has led to ethical concerns to avoid harm or distress to any individual or his family. Confidentiality in handling personal medical information must be maintained and precautions paid to the doctor-patient relationship. Thus ethical considerations in clinical research needs no over-emphasis. Indeed there has been in recent times a flood of reports on the ethics of medical research by the Medical Research Council, and the Royal Colleges of Physicians of U.K.<sup>8</sup>.

4. I shall say a few words on statistics and computers in medical research. This usually appeals to the physician who primarily engaged in clinical research has to implement the proclaimed advances in knowledge of his researcher peers. The dire need to understand basic statistics revolves around the requirements; firstly, to analyse the large volume of quantitative data studied, secondly, in the interpretation of data which is increasingly becoming reliant on statistical methodology, and thirdly, due to the fact that statistics pervades the medical literature.

Computers provide provision for the safe keeping of records, mass storage of data, preservation of data and the ability to obtain information instantly at any required time. Although such information processing is a great breakthrough in research, safeguards that no harm, distress or embarrassment to patient confidentiality has to be ensured

5. The question, is research necessary in developing countries needs some discussion. The answer is obviously yes<sup>9</sup>. Well organised research to distinguish fact from myth through well organised scientific studies from the affluent countries worldwide may not reveal information necessary for the needs of a particular population under consideration. Socio-economic, nutritional, immunological and host factors, and the spectrum of occult and overt infections would certainly affect disease patterns in different locations. This emphasises the importance of the triad of diseases, namely environmental, host and agent factors which differ widely from location to location.

6. Thus research must be done in every country. What type of research while depending on the calibre of the researcher, must be carefully planned. Clinical research, the less costly option when compared to research in the basic sciences, gains priority in the developing world. Any attempt to reproduce basic research in developing nations could lead to cost intensiveness, frustrations, and research setbacks. We in developing nations should make use of the data from basic research from the developed world and plan applied clinical research to suit our needs. This could help and assist in the planning of health programmes for our society with great benefit.

7. This brings me to some aspects of Sri Lankan medical research. A researcher of the highest quality during the period 1940 to 1960 was P. B. Fernando, and it is no exaggeration to say that he was the first physician in this country to document his experiences in a systematized manner. He was known to many in our generation and his publications on aspects of liver disease, nutrition, diabetes and arterial diseases have their relevance even today. His demise in 1965 was indeed a setback for Sri Lankan research. Research publications in peer reviewed journals became a feature in the last twenty years. I make special reference to the many publications by C. G. Uragoda, N. Nagaratnam, S. Ramachandran and N. Senanayake. They wrote extensively on many topics relevant to medicine in this country and hence deserve credit. Uragoda emphasized the occurrence of, and the hazards of occupational lung diseases which was a breakthrough in indus-

trial and community medicine. His paper on histamine reaction produced by the ingestion of blood fish in tuberculous patients on isoniazid therapy has been mentioned in the Oxford Textbook of Medicine. Nagaratnam was the pioneer in studies in haematology and liver diseases and emphasized that the haemoglobinopathies was not uncommon in the country. Ramachandran's extensive publications on the amoebic liver abscess are complimented by Kapoor in his excellent monograph on the liver abscess<sup>10</sup>. Several research publications by him on leptospirosis, alcoholic liver disease, aspects of nephrology, and acute renal failure are also very relevant to the disease problems of Sri Lanka. Senanayake is well known for his studies on the epilepsies and organophosphorous insecticide poisoning. I shall be failing in my duty if I do not mention the extensive research done by the children's physicians, C. C. de Silva and Priyani Soysa in paediatric practice.

I refer to some of us by name because it could be an incentive to the younger generation of physicians especially when it is realized that many of these studies were done without ample funding and were carried out in nonteaching hospitals.

8. Lastly I shall consider some features relevant to research in a somewhat critical manner. These features include:-

- a) lack of encouragement of research.
- b) financing and funding of research.
- c) research in non-university institutions.
- d) future of academic medicine<sup>11</sup>.

The lack of enthusiasm and encouragement for research could arise from the low esteem, indeed disconcert, with which research may be held by administrators and clinicians alike. Lethargy may also ensue from the inability to publish results due to the higher quality of research papers. Furthermore, there may be a conflict between clinical practice and academic research amongst the medical profession, notwithstanding the fact that both should go hand in hand.

Research must be encouraged, initiated and perpetuated by funding authorities. This would involve the Ministry of Health, National Science Council, The Postgraduate Institute of Medicine, international organisations and the various colleges of Sri Lanka.

In Sri Lanka, clinical research useful to the community could be relentlessly carried out in every possible medical institution, however small.

One should not be carried away by the thought that clinical research could only be done in the teaching hospitals in Sri Lanka.

The future of academic medicine befalls all practicing physicians. Although patient care must come first, a right balance between patient care, teaching, training and research must be struck.

In this Presidential address I have highlighted many aspects of research for all disciplines of medical sciences with special emphasis on the physician. There is only one urgent and fundamental priority needed in the training of medical researchers, this is a career structure. Improving the

structure in a developing country like Sri Lanka would be to promote and motivate every medical graduate, post-graduate trainee and young physician in the art and science of clinical research, however basic it may be, so that he or she could contribute something, however small, to the progress of medical research in this country and to this end the Ceylon College of Physicians has its responsibility.

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