Chapter 1

Research and Postgraduation

You might be a scientist.....

If your wrist watch has more computing power than an Intel Core i5.

If your ideal evening consists of fast-forwarding through the latest sci-fi movie looking for technical inaccuracies.

If you carry on a one-hour debate over the expected results of a test that actually takes five minutes to run.

If you have never backed-up your hard drive.

If you can remember 7 computer passwords but not your wedding anniversary.

If you can type 70 words a minute but can't read your own handwriting.

If you have more friends on the internet than in real life.

If you think that when people around you yawn, it's because they didn't get enough sleep.

If your three year old son asks why the sky is blue and you try to explain atmospheric absorption theory.

From http://www.xs4all.nl/~jcdverha/scijokes/8.html#might.be_6

1. Research and Postgraduation

Research

Research is a systematic and organised scientific process to find answers to questions. For example *a question is raised : Can prazosin prevent deaths in children stung by scorpion?* Assuming the question is not answered already in the whole of medical literature, it can be answered by conducting a scientific study. Such a study, if conducted is systematic because there is a definite set of procedures and steps to be followed in a specified order. It is organized in the sense it is a planned process and not an impulsive one. The above question is the basis and a starting point of research. If there is no question there is no research. Answer(s) to question(s) is the endpoint of research. The answer may be negative (*"Prazosin cannot prevent deaths"*) but it is still an answer.

Research generates new knowledge that can be used to solve a problem or improve the existing status of a process. A sociologist questioning villagers about their food habits, a statistician doing a meta analysis of clinical trials, a geneticist encoding a protein sequence - are all doing research though using different instruments to attain their objectives i.e., *a pencil and paper by the sociologist, a computer by the statistician and molecular probes by the geneticist*. Research uses the scientific method to discover facts and their interrelationships and the new knowledge obtained is applied in practical settings. Research may provide a fresh understanding of a disease process, or mechanism of action of a drug or it may provide new tools for disease management such as vaccines or it may generate information on the health problems of a community to plan health care strategies.

Importance of research

Knowledge is power and research is essential for generating information and understanding problems that can enable the community to achieve a better quality of life. In the context of medicine, research is undertaken to promote health. There are four important reasons why research should be undertaken:

(a) Promotes basic knowledge: This is the infrastructure upon which drug treatment, disease management, or health care reforms depend.

(b) Development of new tools: These may be drugs, vaccines, a diagnostic aid, pesticides, an operative technique, an instrument or rating scales. These are all weapons in the war against disease.

(c) Informs public: In the industrialized countries substantial improvements in health have resulted from changes in life style, diet and activity - all of which are due to health promotion on the basis of the outcomes of research.

(d) Effective planning: Research provides the data for better management of scarce resources and can guide health policies and actions.

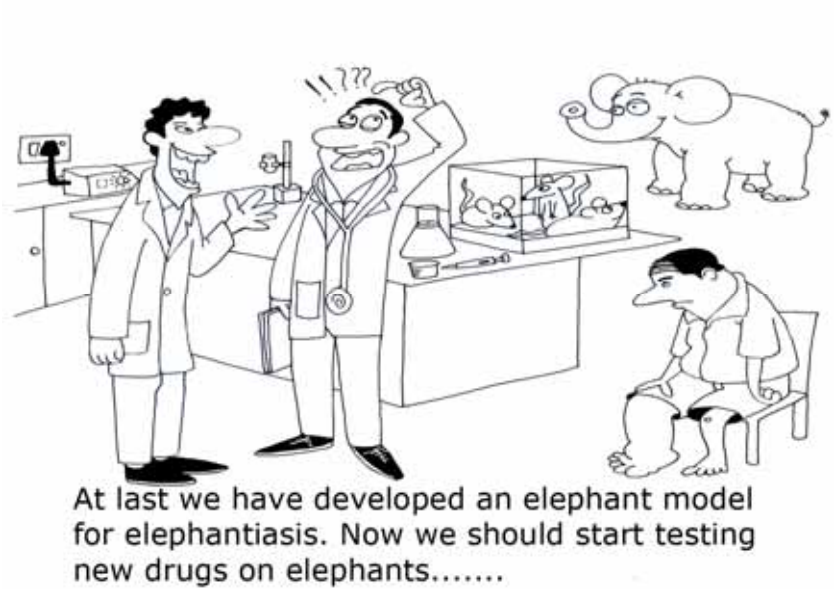
The pursuit of research depends on systematic analyses, creativity, exploration and commitment to truth. The benefits of research, both social and monetary stimulate a demand for it and result in faster progress for the mutual benefit of society.

Box 1.1 **Why do research?**

If we	
Do research	**Don't do research**
1. We ourselves can solve our problems.	We have to depend on others to solve our problems.
2. We can attain intellectual independence and stay in front	We will be depending on others for information and knowledge.
3. We can commercially exploit the fruits of research leading to economic growth.	We will be buying technology and equipment and become poorer.

Having read the importance of research, it is natural that a question arises in our minds; where do we, the Indian researchers, stand in the international arena of medical research? How many new drugs have we developed and introduced in the market? How many new medical devices have we designed and marketed? How many diseases, syndromes and treatment regimens were described by Indian doctors? How many scientists in India got Nobel Prize for medicine? Sadly we are not in a position to proudly answer these questions holding our head high. We are far behind our Western counterparts. Many of us like to believe that the Westerners do research because they have better facilities. The reverse is, in fact true. They create facilities because they want to do research and not that they do research because the facilities are already existing. The facilities were/are developed/created by them and were/are not gifted to them by their Gods from heaven. We do not show adequate interest in research and hence we have not established better facilities either. We have miserably failed to create a favorable environment for research. There is a misguided belief that our doctors and scientists are no inferior to those in the West. When most of the original work and scientific inventions emanate from the West and our contribution is very little so far or nothing to speak of, we wonder how we can call ourselves equals. At the most we are good photocopies. Even though a photocopy looks better than the original, still it is a photocopy i.e., *the value attached to it is much less than that of the original*. This is one reason why we should make adequate original contributions if we really want to be considered equals. This is not something impossible and we can do it, if we desire.

Research has become the last priority for many medical teachers whose dictum is patient first, teaching next and research last (or no research). Many clinicians are happy publishing case reports as a way of increasing the number of publications in their respective curriculum vitae. We have reached a stage where we expect our Western counterparts to solve most if not all our problems including some which are exclusive to our country. Why would a Western scientist be interested in finding an effective treatment for leprosy which is not a problem of the West? Many believe that meaningful research can only be done in the West and we need not or cannot do good research. Nothing could be more unfortunate for medical science in India.



The most deplorable state is lack or non-availability or inaccessibility of medical data even on a common disease or some important aspect of medicine. We have come across many theses and dissertations done in India which typically quote statistics of USA or Europe; not that of India. The stock answer for this malady is “the Indian data are not available or accessible”. When one of us was examining a PhD thesis from an institute in India, the candidate was asked why he quoted statistics of USA instead of India. The answer was “the data were not available”. When it was suggested that he could have mentioned at least the data from his hospital, his answer was the same. The thesis was on schizophrenia and the institute was exclusively for mental disorders.

This situation is not irreversible. Though there are many reasons for the pitiable state of medical research in our country – lack of training and lackadaisical attitude towards research among the medical fraternity are the major ones. Proper training of postgraduate students (PGs) on research methodology and changing their attitude by generating interest in research will go a long way in tilting the scales favorably even though this process may take decades.

Aims and objectives of a postgraduate (PG) dissertation

Many universities in India have made dissertation work a part of PG curriculum. The aim is to teach a PG student the fundamentals of research methodology and stimulate an interest in research. A PG student, at the end of his course, should be capable of planning and

carrying out an independent research project. It also helps him develop the necessary skills required to do research. Such skills will also assist him to critically analyze medical literature. He may not be able to assess the relative merits and demerits of new drugs and new treatment modalities, unless he is familiar with the basics of research.

Dissertation and thesis

Dissertation is not very different from thesis. A thesis as The Oxford English dictionary (Oxford University Press, London, 1933 & 1961) says is `a proposition laid down or stated especially as a theme to be discussed and proved or to be maintained against attack'. It is an 'in depth' study of a particular topic which contributes new information/knowledge in the field. In contrast, a dissertation is `a spoken or written discourse upon or treatment of a subject in which it is discussed at length'. At the postgraduate level one is expected to do a dissertation and what research scholars (Ph.D.) produce is called thesis. The length of a thesis is usually much longer than that of a dissertation. There is no specific length prescribed, though a dissertation should be at least 50 typed pages. It is also generally expected that original work is done as a part of a thesis (as mentioned in the definition). The same is true for the dissertation too but the volume of work is smaller than that of a thesis. Ph.D. is a full time research course extending for at least three years whereas dissertation work is only part-time for medical PG students and the duration of work does not normally extend beyond two years. Hence the rigors of a thesis are not usually expected of a dissertation.

Advantages of PG dissertation

The reasons for doing a PG dissertation are many :

1. Learning research methodology: PGs learn and get trained in research methodology.
2. Development of scientific attitude: A doctor must think scientifically and develop scientific attitude towards patient management (evidence based medicine) and research. Such attitude is useful in assessing new approaches to management of patients/community health.
3. Chance for in depth study: Dissertation work offers the PGs an opportunity to study a topic in depth and earn experience in a particular field.
4. Critical reading: The PGs learn how to collect literature on a topic and analyze it critically instead of blindly accepting whatever is

published. They get to know how to use the library and the internet for literature search.

5. Special skills: In the course of a dissertation, PGs may develop special skills and interests which they could put to good use in future.
6. Imparting new information: Contributing new knowledge, however small it may be, is exciting and satisfying.
7. Curricular requirement: In many universities/institutes, dissertation is a part of the curriculum to earn a postgraduate degree.
8. Publication: Dissertation work can be published in journals and publications are very important for a successful academic career.

The role of universities

Universities insist on PG dissertation. What they do not insist on are the minimum standards for a dissertation. When a dissertation is submitted to the university it is sent to the examiners who are appointed for that particular session. The examiner is expected to evaluate the dissertation and either approve or not approve it. If the dissertation is not approved, the candidate is asked to revise the dissertation along the lines suggested by the examiners. The candidate is, however, allowed to sit for the examination but his results will be withheld until the dissertation is revised and resubmitted (Some universities do not allow students to take the examination till the dissertation is approved). During the oral examination the candidate is asked to defend his dissertation. The time devoted to the dissertation in an examination is very little and examiners tend to point out very obvious errors and do not discuss it in detail. There can be no better way of diminishing the importance of research.

Many times the universities send the copies of the dissertation to the examiners at the last moment. The examiner has no time to even read the summary of the dissertation. At some centers there are 10-15 candidates appearing for the examination. It is not humanely possible for any examiner to critically go through all the dissertations in one or two weeks (sometimes they are given only one or two days time). Indeed, there have been examiners who have come for the examination without even opening the parcel containing the dissertations sent from the university.

What can universities do to improve this current scenario? If research is to be given importance then universities should insist on dissertation being given due weightage during the final examination. A specific

number of marks for the dissertation will certainly ensure that more effort will be spent on it. At the end of one and a half years (if the course is of three years) an assessment of the progress of the work should be done. The university could recruit a team of people (two or three) to conduct an open viva-voce on the progress made. The candidate will then be forced to carry out some work before this evaluation and hence one can expect the dissertation to be planned and understood better by the candidate and assessed better by the examiners. Universities should also insist on orientation/training courses in research methodology and statistics for the first year PGs before they choose the topics and submit their protocols. An examination on research methodology and statistics will at least force the PGs to learn these subjects. Currently the PGs in dental and allied medical courses undergo these courses and examinations. It is a mystery why the medical PG courses have been left out.

The role of guides

*Many of us are (were) not lucky enough to have erudite, research-*oriented, enthusiastic guides. Some guides take on the mentoring of PGs as a cross to bear which comes with the job. Some take it as an opportunity to have one more paper and as a statistic to be added to their biodata. Some simply do not bother at all. They leave it up to the PGs to do everything and simply sit back and sign the certificate at the end of the whole thing. Between these extremes, there are varying shades of interest shown by guides.

But do we always have only the guides to blame? The same attitude is prevalent (and at times endemic) among PGs too. There are those who meet the guides and co-guides for the first time with the draft of their dissertation, not having taken the trouble to contact them before this stage leading to an inevitable stand-off between the two.

The guide is expected to supervise the candidate at all stages of the dissertation. From defining a problem to finally approving and signing the dissertation he should be involved in all stages. This does not mean that the guide should sit with the candidate and do the experiments or finally write the dissertation (though there are many instances where guides have done so). The guide is expected to teach the PGs the basics of research methodology, cut through the red tape, smoothen administrative problems and help the candidate procure the necessary drugs or instruments and offer general help in the conduct of the study. During this process one hopes that some of the guide's enthusiasm (or disinterest) for research will rub off on the student.

The guide should also take it as a challenge to identify relevant areas of research, define challenging problems and ask the PGs to seek answers to problems facing our health care. This is easier said than done. Some guides have problems selecting a topic and ask students to "look" at dissertations from other colleges and quickly plagiarize the topic with a regional feel. Of course the justification is easy. We do not have data from our population. While there is nothing wrong with this line of thinking, it stifles imagination and does not permit the students to think out of the box.

Box 1.2 **Guides**

Qualities of an ideal guide	**Problems with the guides**
Available and approachable	Too busy and no/little time for the student
Knowledgeable, competent and encouraging	Unethical
Considerable interest in research	Lack of interest in research
Expertise in the field of interest	Poor knowledge about research methodology and statistics
Good communication and feedback	Poor communication skills
Solves administrative problems	Lack of problem solving skills
Critical but flexible and listens to student	Lack of confidence and commitment
Courteous and respectful	Selfish and rude

There is no universally accepted norm to be nominated as a guide. It appears any faculty member with three years experience after a PG degree can become a guide. Senior faculty members are allotted students not because they are proficient in research but because of their seniority. One wonders why universities cannot scrutinize the research background of a faculty member before declaring him a qualified guide. Guideship must be earned and not conferred. Universities should ask the individual institutes to conduct a course on research methodology for their faculty and conduct examinations (written and viva) for those aspiring to become guides. In some departments the staff student ratio is very low. In such instances it is very difficult for a guide to think of 3-4 topics per year and guide his PGs. There have been instances of dissertations being copied verbatim from other universities (or sometimes the same university) and being submitted with the approval of the guide.

These "misguides" and the mass production of dissertations have led to waning enthusiasm among faculty members and the apathy is transmitted to the PGs.

The role of PGs

Most PGs think that research is a waste of time and they try to finish their dissertation as quickly as possible so as to have more time to devote to their books. This has led to a lot of malpractice, with data being cooked up, statistics being manipulated and large portions of the text being copied verbatim from other sources. One of the reasons for this state of affairs is that PGs are unable to relate the need for a dissertation with their clinical goals. They believe that research can be carried out only in teaching institutions and since most PGs do not opt for academics (after getting the degree) they believe it to be a waste of time. Research enriches one's understanding of medicine and gives him the knowledge to critically assess scientific literature. It allows one to form his own opinion of drugs and treatments and grants the freedom to be able to scientifically assess the true worth of new discoveries. It is also possible to do research in private practice or in a primary health center (PHC). Certainly there will be some/many constraints and limitations in such settings. But these obstacles can be overcome by choosing a viable research project with careful planning.

It is time that PGs realized the importance of research and became truly involved in their dissertation projects working sincerely to make the best use of the opportunity to learn research methodology, gain the practical knowledge and skills of organizing and conducting the work and have a firsthand experience of learning scientific writing – a skill which is required more and more in today’s world. They should also insist on more involvement from their guides. Since it is customary for the postgraduate student to be the first author of publications which evolve from the dissertation work, he has to accept responsibility for the same. It is probably the first time he will be held accountable for their actions. Unless PGs take pride in presenting a good dissertation and guides are challenged to select better topics for their students, mediocrity will be the norm.

Therefore, a dissertation is like a well choreographed dance. Unless the guide asks the student to come and dance with him it is bound to be full of wrong moves. It is time both the guides and PGs look upon the dissertation as an opportunity to learn and add to knowledge.