# Clinical Research In The International Medical University

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**Abstract:** Clinical research refers to any field of research involving human subjects. Clinicians as researchers are well placed in contributing to research as they have access to human subjects and are able to apply research results for better patient outcome. The need for clinician-scientists as a dedicated breed is hence implied. Clinical research has low priority in the agenda of academic clinicians for various reasons. Strategies to overcome such a malady include training in research methodology and creating a permissive environment for the conduct of research. The IMU has introduced several measures to enhance clinical research and has a vibrant postgraduate program. The BMedSc programme has seen an increase in MBBS students taking this degree. Research is part of the curriculum before the Semester 7 examinations. Clinicians have been increasingly seen to be involved in research. The enhancement of clinical research through encouraging formal clinical research training and development of the MBBS-PhD programs could further enhance clinical research at the IMU. Attention to logistic constraints, improvement in collaboration with the CRC-MOH and other agencies and the close working relationship with scientists will propel clinical research to higher levels.

**IeJSME 2008: 2 (Suppl 1): S25-S34**

*Key Words: Clinical research, clinical methodology training, clinician-scientist, collaboration with scientists*

## Introduction

Clinical research in any university is an integral component of the education and scientific environment and good research attitudes contribute to a learning culture promoting the status of the institute in the academic field. The 3rd Industrial Master Plan (IMP3) of 2006 – 2020 (Malaysia) clearly paves the way to drive industrialization to higher levels of global competition through various channels including transformation and innovation of both manufacturing and service sector. The Prime Minister Dato Ahmad Badawi Abdulah reiterated that this critical Endeavour will move towards the nation achieving a developed nation status.

Under the IMP 3 targeted industries identified for upliftment and exploitation were in the manufacturing sector (pharmaceutical and biotechnological science and medical devices). In the service sector, healthcare (including health tourism), contract manufacturing and contract research have been identified.

Against such ideologies and visions clinical research would be a vital and yet useful activity to be improved, encouraged and exploited.

## Defining Clinical Research

The National Institute of Health (NIH) – United States has proposed a three part definition for clinical research viz.

i. Patient orientated research conducted with human subjects (or material of human origin such as tissues, specimens and cognitive phenomenon) for which an investigator or colleague directly interacts with human subjects. This includes mechanism of human disease, therapeutic intervention, clinical trials and development of new technology.
ii. Epidemiological and behavioral studies
iii. Outcome research and health services research.

The definition excludes in-vitro studies using human tissue where no direct contact or dealing with human subjects takes place. In clinical research it is necessary to identify the patient from whom tissue or cells are derived and the purpose such clinical material is to be used and methods of destruction of such material.

A more pragmatic yet narrower version for clinical research would imply patient oriented research in which there is interaction between the patient and physician. More close to home, the Centre for Clinical Research (Ministry of Health) has included 'studies involving living human subjects.' These include epidemiological and behavioral studies, mechanisms and pathology of disease, laboratory based development of new technology, evaluation of therapeutic intervention (clinical trials) and prognostic research (outcome studies). Perhaps it will be relevant for the IMU to adopt a similar definition for uniformity and to collaborate with local agencies.

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**Clinical Research in the International Medical University**

Although the IMU doctrine is to facilitate research, clinical research as defined above, has been rather poorly focused and has been allowed to develop along the lines of personal enthusiasm and individual pride when compared to scientific research.

Clinicians have been encouraged to conduct clinical trials as part of personal and professional development with little recourse to approach and targets. Clinical epidemiology, clinical audits and therapeutic research are well within the purview of academics in the IMU. Medical economics of cost-benefit of healthcare have been an area to be researched for bringing health cost down using evidence based medicine.

Cluster based clinical research with collaboration between clinicians and scientists have been seen at the IMU to have been developing rather slowly. This is largely related to postgraduate work for Bachelor of Medical Science (BMedSc) and MSc projects. Such endeavours have been limited in drawing large samples in population drawn by both funding and allowable time as completion of the degree of study dictates the project size. This has stifled longitudinal studies with reasonably sized samples for robust data collection and drawing clinical applicable conclusions.

The impetus for clinical research could be enhanced with further directions and improved facilitation. Whilst the NIH (US) guidelines are fairly broad and appropriate for our setting the strengths seen in the basic sciences research done by IMU and local scientists could be exploited by clinicians to relate to relevant fields in clinical medicine. Taking cognizance of the increased number of stakeholders in the IMU viz Medical Sciences, Health Sciences, Dental Sciences, Pharmacy, Clinical Trial Centers and several new disciplines, enhancement of existing channels of collaboration among researchers could propel clinical research to higher level. The close liaison clinical schools of the IMU have with MOH hospitals provides excellent channels for communication for research proposals to be conducted in collaboration with MOH clinicians. This would effectively promote both excellent research attitudes and improved clinical care.

**Clinicians As Researchers**

It is a worldwide phenomenon that clinicians are rather reluctant to be involved in clinical research. The NIH (US) reports that many clinicians are dispirited largely because they feel that they were trained to treat rather than do research. Time for research, lack of motivation, poor rewards and barriers to conduct of research are commonly quoted as reasons for such an attitude. Clinicians in IMU may suffer a similar fate if some of these issues are not addressed.

Phillipson EA referred to the clinician – scientist as the 'endangered species' quoting that between 1986 – 1996 the proportion of MDs among grantees of medical research council (MRC) funding decreased from 40% to 30%. MRC fellowship dropped form 400 to 100 per year. In the US in 1996 only 38% of research fell under the categorization of Clinical Research. In the National Institute of Health in US MD/PhD programs represent 2.5% of medical graduates. Attempts to reverse the trend required the introduction of innovative strategies.[1,2]

A lack of training in research methodology, beauracracy, funding and dedicated time may be factors contributing to a lack of interest among clinicians. Clinicians are complaining of being drained from too much service work, little time to reflect on their practice and are clamoring for clinical excellence in their fields of interest. Sub specialization in medicine coupled with increase in technology requiring need to learn new techniques to be effective service providers keeps them busy the whole day. A typical clinician spends a 5 day week completely in treating and managing patients and finds little time for research. Available time is prioritized to attend curriculum and managerial meetings, documentation of events in clinical practice, supervising trainees and medical students and writing medical reports.[3]

Academic clinicians spin their time among several activities apart from being service providers including involvement in teaching-learning activities for both undergraduate and postgraduate students, evaluation and assessment of students preparing for student examinations and other academic activities. The more prudent academic clinician also finds time to learn and partake in medical education and audit activities.

Attendance at conferences and participating in professional and expert groups relevant to their fields and some co-curricular activities literally wraps up the academic clinician in knots. At the International Medical University, academic clinicians also perform private practice to supplement their income and time has to be allocated for this more vital component of their career. These commitments leave little time for clinical research or are retained as 'low priority'.

The few academic clinicians in want of doing clinical research are those who have a passion for the field and wish to maintain a place among other 'greater men' of similar caliber.

Literature alludes to the clinician being a better person to do research when compared to scientists. Although this evokes adverse comments from pure bench work scientists; the comment needs to be explored from the humane aspect and to distinguish the good impact it will have on good clinical practice. The clinician researcher has much to contribute for the betterment of medicine for several reasons. Some of this have been pointed out by the National Institute of Health (NIH), US. The clinician understands both emotional and physical aspects of disease. From his immense contact time with both managing patients and providing care to the patient with a purpose to return the latter to the community in either good health or reasonably good health, he is aware of the need for research that would be required for further improvement of health and cure. The clinician is in a unique position to understand the impact his research has or will do to clinical care. He is able to apply, extrapolate and utilize information from clinical research for the betterment of health care. Furthermore, he can position himself to explain to pure scientists the limitation of research on human subjects and prevent the exploitation of human subjects drawn for clinical studies especially clinical trials involving the introduction of new drugs.

The clinician or physician researcher is better positioned to play a bridging role in interfacing bench work laboratory based research and clinical medicine. Synchronization and harmonization of scientific research and clinical medicine is inevitable and indeed this approach is desirous. The physician would also be in a useful position in advocating an approach of tying up the complex relationship between scientific research, pharmaceutical application and the community at large.

The International Medical University, with an active research environment has the necessary tools for further improvement to support the arguments for forging more effective relationship between academic clinicians, PhD scientists and behavioral sciences. An ever expanding school of pharmacy, high standard scientists, the MBBS programme, BDS, Nursing and biotechnology programmes coupled with a supportive and vibrant postgraduate school provide a fertile ground for clinical research to be nurtured to greater heights. The ad-hoc development and lack of interest (but by a few clinicians) is realized and needs to be addressed through new strategies to show academic clinicians the value of clinical research. Strengths exhibited by good clinical researchers should be harnessed and weaknesses need to be addressed so as to encourage new and younger clinicians to contribute through training and rewarding them without incurring personal financial losses and earned income.

**Strategies to Improve Clinical Research at the IMU**

***i. Current Status***

The current status in the clinical school needs further enhancement to support higher level of clinical research and sustain the interest of enthusiastic clinicians who have been contributing to research. Two rooms in the third floor of the clinical school have been dedicated for storage of

information /data and a fridge. The area had been identified by Professor Mustafa Embong for the 'Navigator Clinical Trial' and this clinical trial has been on-going. There is no dedicated auxiliary staff to assist clinicians to help, manage or provide support to run a clinical research unit in the clinical school. The senior nurse in charge of the clinical skills unit has been tasked to keep a record of projects (contract) in this area. The area is limited in space and support for any further storage of data or conduct of newer studies is lacking.

Research projects in the IMU Clinical School (including that done by clinicians in Batu Pahat campus) fall into four categories[4]:

i. Investigator-initiated research
ii. Contract research (clinical trials sponsored by pharmaceutical companies)
iii. Medical Education and Quality Assurance Research
iv. Student research projects (Semester 6 – 7)

The Research and Ethics Committee regulates and approves clinical research (mandatory for investigator-initiated and contract research) and any technical support has to be derived through the enthusiasm of the clinician and his ability to persevere to meet the needs and objectives of the project. Funding is largely though existing resources in both IMU and elsewhere, apart from Pharmaceutical Drug trials (where funding is implicit). Most clinical research is being done using Ministry of Health patients in collaboration with clinicians largely in Hospital Tuanku Jaafar. More recently clinicians in the O & G departments of Klang Hospital and Kuala Lumpur Hospitals have assisted us in conduct of at least three studies involving O & G patients.

Statistical support and supervision is left to the researchers to contend with, if the research proposal is not a multi-centre clinical trial. The usual approach is to innovate and write a research proposal and submit it to the Research and Ethics Committee for both approval and funding (if sought from the IMU). Clinicians do not have a dedicated support staff for secretarial help and will have to maintain their own research records and to be responsible for data management and data archiving. This has untold inconveniences and has been seen as a barrier to good progress. Sourcing clinical data from MOH hospitals has been the bane of contention because of inherent difficulties in clinical documentation and data mining from hospital records. Follow-up of patients (if not a clinical trial sponsored through a multi-centre pharmaceutical trial) by dedicated clinicians have problems both in terms of being seen by the researcher and failure to turn up for further care by patients (fall-out). MOH now has clear guidelines for utilization of patients for research and approval methods and further synchronization between clinical research centre (CRC – (Ministry of Health) and the IMU Research & Ethics Committee has to be enhanced.

Clinician investigators have from time to time expressed unhappiness in not being able to obtain approval from IMU Research and Ethics Committee because of unrealistic expectation. Case series and restricted samples used for observational studies have value in clinical medicine and may pave the way for more robust clinical study. However, this may not pass the approval process. Perhaps a broader approach with familiarity to research methodology, grantmanship, Good Clinical Practice requirement and National Medical Research Registry process (NMRR) with continued training of clinical faculty would overcome some of the issues raised by clinicians. CGP and research training is now in vogue and faculty will need to seize the opportunity for professional development.

Medical Education Projects has been increasing over the years with clinical faculty getting more involved in several workshops and research.

This has been due to the commitment of management to promote medical education in the IMU. It is gratifying that the International Medical Education Conferences (IMEC) has become an annual event and has encouraged clinicians to participate actively. Several medical education workshops have contributed to improved knowledge and teaching skills among clinicians. This needs to be continued with the same vigor. Apart from the IMEC, the close collaboration with University of Queensland (Australia) and direct transfer of technology in this area has made positive strides in the right direction. Plans for medical education certification courses will enhance clinician involvement in medical research.

Quality assurance projects are done as part of the teaching – learning activities for medical students and clinicians. Much more needs to be done in this area to make an impact.

Medical student research projects are mandatory contributing 3% of the End-of Semester 7 Examinations. The project (often involving 4 – 5 students in each group) is to be completed one month before the Semester 7 examinations. There are many weaknesses in the present system as 'approval of the project' and scientific methodology adopted is not often scrutinized by regulatory bodies. The lack of dedicated time, little formal instructions on research methodology and statistical support are common reasons cited for suboptimal results. On the positive side, many of the projects have been presented in both local and international conferences through the encouragement of enthusiastic clinical supervisors. Suggestions for improvement have been tabled for further discussion and dedicated time for student research has been suggested.

***ii. Logistic support***

Distributed learning has been the norm and the location of the Postgraduate School in Bukit Jalil (the nerve centre for all research in IMU) and separation of the clinical school from the mainstream laboratory researchers present obstacles to conduct of research. Locating research workers away from the clinical site and reluctance of young researchers (BMedSc students, Pharmacy students and Nursing students) to be present both in MOH Hospitals and to do bench work research back in Bukit Jalil has been seen as a barrier.

Infrastructural support in terms of physical work area, expert advice on research methodology, statistical support and data management would be required to facilitate clinical research, considering the clinician is multi-tasking with both academic and clinical service work.

***iii. Training the clinician***

Clinical researchers in the IMU are largely those who have a passion for the field. Of the 60 or so clinicians in the Clinical School, less than half have contributed to clinical research at some point in their career. Those who have not actively been engaged in research involving human subjects may have been contributing to other research modalities especially journal writing of reviews, metanalaysis or oral presentations based on observation studies, invited lectures by professional bodies and medical education research. Much of such work would not appear under 'clinical research' but lends to the fact that clinicians in IMU have been contributing to the medical field but may not have been captured as 'research'.

Formal training of clinicians in research methodology often stems from experiences in the course of their work as clinicians. Many have published their research based on 'observation studies' without having gone through the stringent and 'often considered laborious' research approval channel.

The senior clinician who is employed by the IMU may or may not have been involved in clinical research before entry into the university. Many have not had formal training in clinical

research but have learnt the trade over the years. The certificate for Good Clinical Practice has been mandated to be eligible for research and this has encouraged many in the clinical school to attend this course which has been conducted by the Postgraduate School of the IMU for several years.

Few clinicians in the IMU have been exposed to bench work but have worked in collaboration with scientists in relevant areas of interest. Experience and exposure to research methodology has been the 'plus factor' seen in many of our clinicians, especially among the senior colleagues and some new faculty. Those who are in their twilight of their years could play a facilitator role to nurture young clinicians to be involved in research. However, the mentor – mentee approach may not be the most ideal approach in a private university with the demands of work mentioned above prevailing making research a low priority. Those who have a passion for research will continue to contribute irrespective of the barriers to research mentioned but the quality of research may not be wanting.

New and novel approaches need to be in place. These include training to be clinician-scientist so as create a new breed of scientist-clinician for research. The postgraduate school at the IMU will need to re-look at the needs and grievances of enthusiastic clinicians so as to improve the working environment making it suitable for clinical research. Re-organization of the existing framework taking cognizance of the wants and needs for clinical research by clinicians working in partnership with MOH hospitals would facilitate involvement by clinician-researchers. Infrastructural support would make it less painful for furtherance of clinical research.

Attempting to emulate existing research models in research universities would perhaps not be the best approach apart from duplicating the model and incurring further costs. Collaborating with the well established centers (both national and international) would be pragmatic and acceptable to all.

***iv. Collaborating with MOH and other institutes and agencies (Research Universities)***

The Centre for Clinical Research in the Ministry of Health was established in 1997 under the National Institute of Health Malaysia. It became operational in 2000.5 Three main areas are covered i.e. Clinical Trials, Clinical Epidemiology and Clinical Economics Research. It has regional centers in all Ministry of Health Hospitals to assist in Good Study Design and to assist in carrying the research. The comprehensive coverage provided including clinical data management, clinical IT, monitoring and regulatory roles makes the CRC a useful centre for IMU to utilize through a formal memorandum of understanding (instead of establishing a centre of its own) through smart partnership.

Such a proposed partnership is inevitable as the IMU utilizes public hospitals (MOH) for clinical teaching and clinical materials are derived from these institutes at the present time (till it has its own hospital and consenting patients). The extension of this partnership to research would meet our objectives of working closely with the MOH colleagues and uplifting the standard of research in Malaysia.

***v. Translational Research***

The IMU has been well placed to carry out both basic science research and clinical research. Much of the former is often left to the research proposer without the establishment of priority areas in clinical medicine which will benefit the IMU in attempts towards achieving excellence status. The development of new vaccines, drug development, new drug delivery system and improving cancer treatment could be areas of focus through an integrative interdisciplinary initiative. Recently interest in stem cell research has been infused. Translating basic science knowledge from basic and pre-clinical research setting to the

patient, community and health practices through both inter-disciplinary research and partnership programme would pave the way to better research output and optimum utilization of research funds in the IMU. Clinicians would need training to play a better role in development of translational research. This approach becomes more relevant now with molecular biology becoming the pivot in clinical illness and stem cell research surging forward to be utilized in illness and well-ness (restorative medicine).

***vi. Clinical Research Co-ordination Centre***

As eluded above, utilization of CRC of the MOH would be a workable solution for IMU through a memorandum of understanding paving the way for better collaboration between MOH clinicians and IMU faculty. This would overcome many of the issues related to bureaucracy and research methodology. A 'help desk' in the clinical school for support of the research proposal for data storage, data management, grant office, conflict of interest site and statistical support would be vital in coordination and relation.

The IMU clearly has a policy on utilization of clinical material from the public hospitals and hence the existing research organization within the School of Postgraduate Studies could be re-engineered to incorporate the above proposals.

A positive step forward, in-line with the introduction of several new areas of medicine and healthcare in the IMU viz. traditional medicine, dental sciences, nutrition and dietetics, clinical research will go beyond the realms of traditional bench to bedside care. Behavioral sciences are developing rapidly and have great potential for more extensive work in epidemiology and health system methodology.

It appears inevitable that clinical research will now need further coordination beyond traditional lines so as be able to harmonize research and make translational research possible as IMU is now working towards providing comprehensive and integrated medical education involving both conventional western medicine and eastern medicine.

***vii. Contract Research (Clinical trials)***

The following research trials have been conducted at the IMU:

i. NAVIGATOR study (Novartis)
ii. DYNAMIC Study (Diamicron 30 mg)
iii. RAMADAN study (AMARYL-Aventis)
iv. MEDIAXIL study (Benflorex-Servier)
v. STAY study (AstraZeneca)
vi. COMPASS study (AstraZeneca)
vii. AHEAD study (AstraZenaca)
viii. ALANTA study (JADE study)

Although a few clinical trials have been conducted through IMU using patients from the MOH the benefits of this will be limited with permissive effect but will contribute little to research excellence. Concerns have been expressed about using human subjects from a small population (Seremban has a population of about 400,000) for several clinical trials of different nature.

Non-contractual research without utilizing the assigned area but involving clinical patients from the Hospital Tuanku Jaafar has been on-going in spite of the difficulties mentioned. These are cited in the Annual President's Report (of the IMU).

One local research conducted in the existing site is included below:

IMU Grant 084/2005: 'A comparison between sodium homeostasis in salt sensitive hypertensive and age' – 01/06/2006 - 01/06/2007

The Ministry of Health and the three research universities have evolved into centers for clinical trials. Considering the difficulties in drawing patients from the MOH for such studies and that

MOH has established CRC centers in most hospitals in the state, we may be competing with MOH clinicians as far as clinical resource is concerned. Clinical trials would require dedicated space and this appears to be scarce in the present setting in the clinical school.

Considering these factors, the IMU should perhaps not make the conduct of clinical trials as the main thrust for clinical research but divert attention to doing bench-to bedside research. Further discussion would be warranted on this issue.

***viii. Protected time***

Protected time for research under the IMU regulations is available but with the limited faculty strength in clinical school, it becomes difficult for clinical managers to allow for optimum use of protected time. Few clinicians have used protected time for research.

Dedicated time (scheduled in the daily time table) for student – initiated research is reiterated.

**Recommendations for Development of Clinical Research**

The designation of International Medical College as a University (IMU) in 2003 paved the way for seeking funding from the Ministry of Science and Technology IRPA and the commissioning of IMU Animal Holding facility in the same year are important milestones for research. Research vibrancy has been alluded to in the President's Report and the State of the university addresses since 2002. Approved projects have increased by leaps and bounds over the years. In 2003 there were 28 projects approved with 7 obtaining external funding. Scientific journal publications totaled 68 with 62 conference reports.

In 2005 forty five projects were approved with 6 obtaining external funding. Active collaboration with University Malaya, Ministry of Health, private sector and other research institutes were apparent and contributed to the vigor of researchers. Over the years clinical research has increased with 11 projects in 2005 being initiated by clinicians. There were 47 publications authored by clinicians in the same year with 3 books listed in the President's report. There was an increase in enthusiasm over the years with 46 research projects being approved by the IMU Research and Ethics Committee, internal funding for 43 of them amounting to RM 711,200/=. The ScienceFund (Malaysian Government) was yet another source for funding in December 2006. In the same year a total of 172 scientific presentations and 83 scientific papers were presented with a third of them involving clinicians. Clinicians were lead researcher in 6 approved projects with another 5 involving clinicians as co-researchers. Two medical education research projects by clinicians derived funding from the IMU.

The Strategic Plan for Research, yet another milestone mapped the strategy from 2005 – 2009. Special emphasis was to be on Medical Education, Bioactive molecules and Building related illness with research being spelt out as contributing to teaching - learning activities.[6]

It becomes mandatory for clinical institutes to perpetuate the clinical environment for research. Several approaches have been recommended world-wide and IMU needs to re-look at the need to develop the research attitude for both short and long term gains for both the university and the nation. Recommendations to address the issues raised above would be to inculcate the research environment better. However, some long term approaches would be mandated. It is imperative on IMU management to re-look at the curriculum to allow for the development of the research culture. Included in these suggestions are inclusion of research methodology and the values of doing research among clinical students in the medical curriculum. Evidence based medicine and elements of research are included in semester 6 – 7. However the effect and impact has been minimal as students have found this not rewarding and a strain on their existing learning curriculum.

**Four strategies are suggested to further enhance the attempts at improving the quality of clinical research in the IMU.**

i. Identify priority areas for translational research based on national needs, commercial viability and clinical excellence

ii. Provide training for clinical research for a selected group of clinicians recruited on the basis of wanting to become clinician -scientist. Three groups could be included under this category:

   a. Young clinicians who wish to pursue a PhD after MBBS/BDS

   b. Enthusiastic clinicians who would be providing at least 60 per cent of their clinical expertise for clinical teaching for maintaining their clinical skills but would want to pursue the MD/PhD on part time basis.

   c. Facilitating serving clinicians to continue their academic duties but permitting them to do their MD thesis through research (by providing protected time) but without financial loss would be rewarding.

   On a broader front, IMU could encourage MOH specialists and subspecialties working in collaboration with the clinical school to pursue both MD and PhD courses to enhance the partnership with MOH through an MOU. Other postgraduate's degrees like MPH and certificate programs on research would improve the learning climate among clinicians. These could include:

   - *Clinical Trials Certificate Program*
     – Good clinical practice
   - *Clinical Research Training Program*
     – Learning to translate biological and technical discoveries to improve patient care
     – Mentored research that could lead to a Masters degree
   - *Clinical-investigator program*
     – Training in clinical and basic research
     – Combines clinical and research needs
     – Tailored for clinicians to dedicate time for research as they continue as clinicians
   - *Certificate in Clinical Epidemiology*
     – A vital diploma program of perhaps 3 months duration designed for clinicians
   - *Clinical Research Education Diploma*
     – Complete certificate for clinicians who could be teachers for the above programs.

   Enables them to be effective supervisor for young clinician-scientists

iii. Enhance the undergraduate medical program further by encouraging pursing the BMedSc for local 5 year program (in addition to those going to partner schools) through incentives.

iv. Broaden the existing medical student research and improve the quality of research by dedicating time for research with the supervisor playing a more active role so as to carry the research to greater heights

All these strategies require commitment, dedicated time and enthusiasm. Funding is often a constraint apart from the other factors mentioned. IMU could develop partnership with national and international agencies in drawing research proposal where funding could be obtained especially for those not too familiar with the processes of procurement.6 Although these are not new suggestions and it is prevailing, extension of such to IMU clinicians during orientation would be vital and useful.

**Conclusion**

Clinical research is an integral part of university teaching-learning activities and has seen some degree of vibrancy since 2001 in the IMU. Continued cajoling of clinical faculty, encouraging collaboration with

scientists and other research institutes will contribute to further enhancement of clinical research. Strategies to improve clinical research include the training if medical students and clinicians in research methodology and approval methods. The inclusion of formal training of scientific research in the medical curriculum is relevant in teaching-learning activities. The IMU has taken the right approach in encouraging medical students to take a year off the MBBS program to do the BMedSc. Degree. It remains for the IMU to move to training doctors to be scientists through a combined MBBS-PhD program for a selected few who could contribute to value of clinical research in the long run.

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