Knowledge Economy: Prospects for Medicine and Medical Education in Sri Lanka

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Abstract

The overall aim of medical education is to develop the hearts, minds and hands of the doctors, to enable them to provide good-quality promotive, preventive, curative and rehabilitative healthcare. As medical education programs compete for scarce resources, evaluation of costs of those resources will become important.

The potential contribution of medical education to the knowledge economy in Sri Lanka would be both direct and indirect. Directly, medical education can contribute through the production of skilled human resources that are needed for technological innovations, promoting "medical tourism", and for organised "export" of skilled doctors to other countries. The direct contribution also results from the production of new knowledge and the adoption and utilisation of available knowledge to solve the health problems in the community. However, the indirect impacts are even more crucial for the country's economy. The argument is that, for building a knowledge economy in our country, a healthy population is the most important resource, and to achieve this goal, doctors need to make a distinct contribution. The paper concludes with some of the basic reforms needed in medical education to contribute better to the advancement of a knowledge economy in Sri Lanka.

Introduction

The World Development Report 1999 concluded that, "for countries in the vanguard of the world economy, the balance between knowledge and resources has shifted so far towards the former that knowledge has become perhaps the most important factor determining the standard of living - more than land, labour, tools, etc. Today's most technologically advanced economies are truly knowledge-based.

For the last nearly two hundred years, neo-classical economics has recognised only two factors of production, labour and capital. Knowledge, productivity, education, and intellectual capital were all regarded as exogenous factors. New Growth Theory, based on work by Stanford economist, Paul Romer and others who have attempted to deal with the causes of long-term growth, proposed a change to the neo-classical model by seeing knowledge and technology as an intrinsic part of the economic system. Knowledge has become the third and possibly the most important factor of production in leading economies." (Romer, 1986; Romer, 1990).

This paper will examine how medical education contributes, and can contribute, to the country's economy and identify some newer areas which hold a great deal of potential for medicine and medical education to create economic opportunities. It also suggests some of the reforms that medical sector needs to consider to position itself to avail of these opportunities.

Medical Education and the Knowledge Economy

Physicians educated to care for the sick, promote the health of patients and populations, advance biomedical science through research, educate future health professionals, and thereby serve the profession and society. For this, we develop the hearts, minds and hands of the doctors so that they would be in a position to provide good-quality promotive, preventive, curative and rehabilitative healthcare to the people. For a doctor, there is no other meaningful professional life, except contribution to the health of the population and the advancement of medicine. However, today, medical education and healthcare worldwide are backed by a massive knowledge-based techno-commercial enterprise, that is, researching and developing new medicines, diagnostics and techniques.

The old view was that health is basically a welfare activity and hence of not much use as an economic investment. Now the reality is otherwise. Healthy people are an economic asset, essential for the economic development of the country. By this simple yardstick alone, medical education makes an enormous contribution to Sri Lanka's economy. Certainly, it may be less obvious to the public than some of the other professions and disciplines, but the contribution of medicine and medical education might even supersede most other professions.

Figure 1 shows the issues that healthcare has to address—the

main objective of healthcare is to constantly keep moving the individuals and groups in the lower (more ill) slabs upwards.

Medical education can contribute to the knowledge economy in Sri Lanka both directly and indirectly. Directly, medical education can contribute through the production of skilled human resources needed for technological innovations and for the production of new knowledge and the adoption of the existing knowledge, and thereby generating income. There are a number of other potential areas such as "medical tourism", and for organised "export" of skills, referred to later. However, the indirect relationships and contributions are more critical for the country's economy. Therefore, the argument here is that, for building a knowledge economy in our country, a healthy population is the most important resource and, it could be said without any fear of contradiction that for the achievement of this goal, medicine and medical education need to make a major contribution.

Relationship between Health and Wealth

Hardly anyone will deny in any enlightened discussion or debate that our health service is an economic asset. Or to generalise, the outlay on care and treatment of the sick helps increase the country's wealth. In other words, economy gains returns to investment in health services.Of course, the relationship between outlay on healthcare and economic gain can only go up to an optimum point and cannot go on increasing limitlessly, to say until 50%, because then the economic returns would not be commensurate with the outlay. But the point is that, while its economic value is crucially important, the value of health in economic development is not simply a linear one. There are very important non-economic values that we live by, and one of the most important, if not the most important of them, is taking care of our parents and the elderly, to the best of our ability. The return cannot be and should not be measured in economic terms alone.

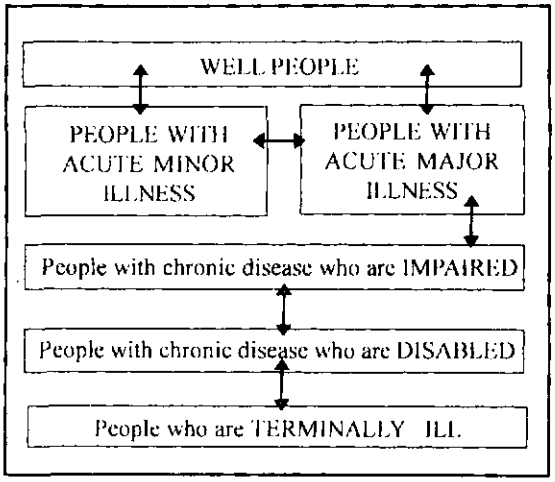

Figure 1: The wellness–illness continuum

Otherwise it would be possible to put together a specific package of health services that limits it to a range of treatments and patients, that it would, in fact, maximise the gross domestic product immensely. For example, medical care could be concentrated on those who had a substantial period of productive life still before them, and whose prognosis indicated that the outlay on their care and treatment would be less than the economic output to be expected from them in the future. The weakling, the old, the subnormal, and especially the severely subnormal, would be left to die with the minimum of care, unless some indirect economic benefit could be expected from providing more care in any individual case.

But such a health service would be scarcely conceivable even in a nightmare dictator state. It will defy all that we value in social justice or in human rights, with no resemblance to any known health service, yesterday, today or tomorrow. In fact, it is not really a health service at all, but a veterinary service, treating men as economic chattels, and logically leads to the substitution of the euthanasiast for the geriatrician.

It is possible to isolate theoretically from our own health service, elements which certainly or probably produce a net return in economic terms. The public health services would largely qualify under this head: vaccination and immunisation, for instance, are certainly 'money-spinners'. Similarly, it is perfectly possible to select treatments and patients where the cost of restoration to health is amply repaid in production. But a society always spends more on its health services than can be justified only in economic terms. With Sri Lanka having one of the fastest ageing populations in Asia, we face the prospect of seeing more and more technology being procured and used in ever expanding ways. The costs are bound to go up. But one also needs to look at the impressive benefits as we balance the needs and demands.

Medical Care and Health – Does Medical Technology Make a Difference?

The health achievements of Sri Lanka are correctly ascribed to how well we have addressed the social determinants of health, which have now become very important currency in global health debates following Prof. Michael Marmot's report to the World Health Organisation (WHO).

Sri Lanka, in fact, is a living demonstration of the critical importance of medical technology on health. Caldwell published a classic paper in 1986 on "Routes to Low Mortality in Poor Countries",

which stresses that many of the other social determinants, *especially, education* and female autonomy, work ultimately through medical services. Educated, rich Americans with good sanitation in the 1890s still had far worse Infant Mortality Rates (IMRs) than Sri Lankans in the 1970s - the difference being medical technology. Rich women in Nigerian villages only achieved lower IMRs when their villages had access to medical services. Caldwell has a more specific study of Sri Lanka published in Social Science and Medicine in1989, which shows this using Sri Lankan survey data.[1]

A recent review by Cutler and Deaton, and the concluding paragraph mentions, "there was no health gradient between English aristocrats and ordinary people prior to the Enlightenment, but one developed soon thereafter, so that average life expectancy and the gap between rich and poor rose together. There was no gradient in infant mortality between the children of physicians and non-physicians prior to an understanding of the germ theory of disease. More educated people quit smoking faster after the health consequences were understood. Our hypothesis is that greater speed of introduction of new health-related knowledge and technology will tend to raise the health gradient, a hypothesis that is consistent with rising gradients in rich countries in the recent past.

Costs of Medical Education: Is Medical Education Worth the Cost?

Consider the case of an individual who either dies or leaves the workforce at age 40 because he is not properly diagnosed or treated for a disease. This results in lost earnings for the household. Considering per capita monthly income (as recorded by the Department of Census and Statistics Survey) annual lost earnings can be calculated as follows:

- Assume his income would grow at 3.6% per annum right through the 20 years
- Build in probability of survival
- Build in probability of remaining employed until 60 (the age of retirement)
- Discounting annual earnings by 5% to gain the present value

Lost earnings over the period 40 to 60 years would be 1,348,353 (apart from all the heartbreak he and the family would suffer due to death or disability). This is more than the cost of educating one doctor. This is for one patient. Multiply by 500! The benefit: cost ratio is astounding. I checked this with a reputed health economist who re confirmed the argument.

Just compare this against the annual cost of medical education for one doctor, i.e., Rs.1,326,550 (UGC,2008).(Table 1)

Medical education is clearly cost effective – particularly since one doctor in his career could cure and save many lives! In fact, it can be argued that Sri Lanka is not spending enough on medical education, even in relation to other Asian countries. If we are to take advantage of the knowledge-based economy around the world, we will need to invest much more than we do now.

Table 1: Cost of producing a graduate in 2008

Subject / Specialisation	Cost (Rs)
Medicine	1,326,550
Science	662,229
Engineering	658,532
Architecture	435,382
Arts	407,676
Business Studies	288,361
Law	202,558

Source: University Grants Commission, 2008.

Potential Opportunities in the Knowledge Economy

What then are the potential areas for medicine and medical education to contribute *directly* to the knowledge economy in Sri Lanka?

Although the most important contribution of medical education is maintaining and improving the health of the people who will contribute to our economy, there are a number of potential areas for medical education to contribute more directly to the knowledge economy of Sri Lanka. The following is a sample of these possibilities:

i. Skilled labour export: The global trend is for planned skilled labour export, at least in part, to replace the earlier unskilled labour export. Although Sri Lanka's 2nd largest foreign exchange-generating avenue is foreign employment, the main source has been unskilled labour. While appreciating the immense contribution to the economy, we also need to take note of the social and familial consequences of this. Although rich in skilled labour, Sri Lanka has not taken advantage of the global opportunities to provide skilled labour to the international market as a part of her development strategy. Sri Lankan medical professionals, often some of the best skilled of in the country, are making a very significant contribution to the economies of other developed countries but Sri Lanka derives no benefit from this.

A few years ago, I was amazed to meet over 150 psychiatrists of Sri Lankan origin, trained in Sri Lanka, in one room at the American Psychiatric Association Annual Sessions. This was at a time that Sri Lanka had less than 30 fully-qualified consultant psychiatrists. The migration of skilled medical professionals (and now qualified nurses) from developing countries has created such a problem world wide, and become a massive net transfer of billions of dollars from the developing countries to the developed countries, often exceeding the aid that is being granted by these receiving countries to the developing source countries, that the WHO, at the World Health Assembly in 2010, is introducing a code of practice that the recruiting countries are urged to follow.

As a remedial measure, recently, in 2008, the Ministry of Health, the Treasury, Postgraduate Institute of Medicine (PGIM) and the Government Medical Officers' Association (GMOA) formulated a national plan to put this concept of planned export of medical professionals into operation. In addition to the financial benefits which could be substantial, it will help the continuous professional development of the doctors as they will be able to gain employment in international centres of excellence in healthcare, education and in research.

ii. Medical tourism: Our Asian neighbours, Singapore, Thailand, Malaysia and India are riding the medical tourism boom right now, but unfortunately, Sri Lanka has missed out thus far.

Services typically sought by travelers include elective procedures as well as complex specialised surgeries, such as, transplants, stem cell therapy, replacement, cardiac, dental surgery, and cosmetic surgeries. However, virtually every type of healthcare, including psychiatry, alternative treatments, convalescent care are available.

Singapore, until recently a popular a honeymoon destination, has very quickly positioned itself as a regional medical tourism hub. Attracting about 200,000 overseas patients every year, Singapore Medicine, a multi-agency government initiative, is strategising to increase the number and hope to serve one million foreign patients annually by 2012 and generate at least USD 3 billion revenue.

What did it take them? Mainly it was through developing a few true centres of excellence for providing world-class treatment and having the best possible medical expertise and state-of-the-art infrastructure. The quality of the medical professionals, similar to the ones we possess here, is what gives Singapore the edge.

Countries like Malaysia, Thailand and India are also riding the health industry boom. These emerging markets prove that there is immense potential in the Asian healthcare business, and it will see a stupendous growth. Sri Lanka today possesses all of the key ingredients - highly skilled health personnel, widespread use of English for communication, geographic location and an all year climate- to take full advantage of the expanding medical tourism boom. The end of the conflict has offered tremendous potential for us to join our neighbours to be a centre of excellence in the health care industry.

The General Agreement on Trade and Services, commonly called GATS, provides the institutional and legal framework to make sure that we safeguard the rights and the privileges of our own doctors while we open up our services to the rest of the world. We need to seize the opportunity now or we will probably miss it for ever.

iii. Medical Education for Local and Foreign Students: Off-shore medical education is now a multi-billion dollar industry. Each year, nearly 300 Sri Lankan students return after studying Medicine in nearby foreign countries, predominantly in Russia, China, Bangladesh, Nepal and India. The clearly evident wide variability in the quality of the education, in comparison to that imparted in our own medical schools, has been a matter of serious concern for a long time. The results at the licensing examination conducted by the Universities and the Medical Council reflect this vividly with the recent pass rates being less than 20%.

In fact, medical education for foreign students (not to mention the hundreds of Sri Lankan students) could be a very successful knowledge industry in Sri Lanka, apart from the substantial savings of foreign exchange each year. The reputation that Sri Lankan doctors enjoy around the world is definite comparative advantage over many other countries which are current leaders in off-shore medical education. The dubious quality of some of the off-shore schools is now evident by the fact that President Obama has instituted an investigation to examine the quality of the off-shore medical schools that have been approved by the U.S, and for which American students are eligible to obtain grants and loans from the US government.

iv. Nanotechnology: The Ministry of Science and Technology has recently established a nanotechnology park as a public-private partnership. Use of Nanotechnology in medicine offers some exciting possibilities and holds vast potential as a contributor to the knowledge economy. Medical education can make an important direct contribution in this. One application of nanotechnology is in drug delivery; to deliver drugs, or heat or light, or even other substances to specific types of cells, particularly cancer cells. This reduces the damage to the healthy cells. Another way is to orally administer drugs that are now injected by encapsulating the drug in a nanoparticle that can pass to the bloodstream through the stomach mucosa. There are many other possibilities such as blocking inflammation due to allergic reactions, reduce bleeding in trauma patients and stimulation of immune responses to fight respiratory diseases. Nanomedicine can also be applied widely in diagnostic and imaging techniques, to locate cancer tumours and many others. There are so many other possibilities that can be exploited.

Of course, to take full advantage of these possibilities in nanomedicine applications, we need to carefully plan and train the medical graduates and the basic scientists who would be required.

v. Information and Communication Technology (ICT) and E-health: Another exciting area that is expanding very fast is related to the ICT revolution. The information age has heralded the death of distance. Medical educationists in Sri Lanka now understand the importance of ICT as a key enabler of change. The stirrings of change are visible everywhere, in the medical schools, in the PGIM, the Specialist Colleges and the Open University, as evidenced by some of the new innovations in teaching and learning and examinations. Our doctors are a rich source of competitive advantage and there are a number of possibilities to use this to build knowledge-based enterprises.

Then, there is an expanding market in the development of clinical guidelines/decision support systems which can be shared across the region/globally to assist in delivery of care that will result in better patient outcomes. Our big neighbour, India, has already started taking vast strides in this work. How this works is that the information could be customised to meet the specific disease conditions and population demographics and could better target the delivery of information at the point of care. Computer systems can be programmed to provide disease specific (context specific) information to a clinician when they are treating a patient.

For example, there are opportunities for better integrating information from General Practitioners (GP) and making that available to hospitals and vice versa via some form of a summary health record which would be implemented in more rural areas (where most of the value would be realised). The technology can support both provision of summary clinical data and also information from more complex inpatient/acute settings where patient admissions and discharge information is captured.

The main premise of the use of information technology (as an enabler for providing medical education information) is to minimise the cost of healthcare by better streamlining the delivery of care (making it more efficient) and minimising medical errors (which is where the medical education in a knowledge economy would be relevant). With the quality of medical education that we provide we could easily become a market leader in this region, and in fact globally. We could, indeed we must, seize this initiative too.

vi. Biomedical research: Another potential area with promise for deriving benefits from the knowledge economy in medicine is biomedical research, especially, clinical trials. Our medical schools could all be excellent clinical sites. A clinical site is ideally a medical facility staffed with clinical investigators qualified for clinical research. They need to be qualified by education, training and experience to assume responsibility for the conduct of the clinical trials, a requirement that most of the medical faculties in Sri Lanka could meet, with appropriate preparation.

While it might be somewhat premature for our faculties to think of regular phase one studies, but even here they could participate in some phase two trials which study dosing requirements and efficacy and toxicity. They are ideally placed to undertake phase 3 trials. These are randomised controlled multi-centre trials on large patient groups that are aimed at the definitive assessment of how effective the drug is, in comparison with the current gold standard treatment. These can take long periods of time but once we enter the system, they could contribute substantially to the knowledge economy.

What Changes are Needed in Medical Education?

What does all of this spell for medical education, in terms of change and innovation?

General criticisms of current medical education around the world include the divergence between physician training and patient needs; focus on research and patient care at the expense of teaching; poor interaction between the basic sciences and clinical aspects of medical school training; lack of opportunity for students to monitor patients throughout the entire course of illness; and lack of emphasis on problem-solving skills, continued learning, and development of faculty role models. Reform of medical education has been particularly slow in most medical schools. For contributing to the knowledge economy, a few modifications may be required, principally in the way basic and clinical sciences are taught. But such education must start before students enter medical school. Better science, not more science, is needed in schools.

Harvard which has often been a forerunner in innovations in medical education in the world has introduced a new programme called the New Pathway– to increase the rigour of the teaching of science (basic biological, social, and population sciences) and truly integrate the teaching of science and clinical medicine throughout the entire student experience, to gear its graduates for, inter alia, benefit from the knowledge economy.

Education directed at these aims cannot resemble an assembly line. Instead, it needs to draw out the distinctive interests, abilities, and experiences of each learner. The ultimate goal of medical education should be to prepare each learner to perform at his or her best ability as a physician.

2010 is the centenary of the revolutionary Flexnerian reforms in Medical Education, and 100 years after Flexner, *balance* is the pervasive theme in medical education today -balance in the education of physicians, from curriculum content to the length of medical training and to broader educational goals.

There is the need to balance the medical curriculum between a "focus on disease management" and an "emphasis on population-based health improvement," and "the integration of formal knowledge of the basic, clinical, and social sciences with clinical experience."

Conclusion

Medicine and medical education can contribute to and benefit from the emerging knowledge economy in numerous productive ways, both directly through the development and adoption of science and technology; and in a much larger sense, and indirectly, by taking care of the health of the population. The benefits of discovering a new vaccine, or a drug, or substituting a modern operating technique for an obsolete one (take cataract operations for instance!), or a changed approach to mental health, or of active geriatric techniques are not things measurable in themselves, nor are they, still less, measurable one against another. The impulse and driving force to do them does not arise from calculation of output or product alone, even in non-economic terms: it arises from an inner compulsion which we try, but often fail, to describe by such epithets as 'humanitarian', or 'altruistic' or 'progressive', a compulsion as basic as the urge to acquire knowledge itself. If the activities of medical education and health services are thus neither justifiable directly by economic calculation, nor assessable in comparative statistical terms, these are features which they share with all the highest activities of man.

Therefore, the permanent human questions at the core of the science and art of healing—questions about what it means to be human and to care for another person should not be overlooked. These answers will define the medical profession as doctors and as human beings.

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Footnote:

[1] Caldwell, John, Indra Gajanayake, Pat Caldwell, and Indrani Peiris. 1989. Sensitization to illness and the risk of death: An explanation for Sri Lanka's approach to good health for all.
Social Science and Medicine 28 (4):365-79.
De Silva et al also had a recent paper which is a reconfirmation of the same points. ■

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accepted the private sector involvement. As pointed out earlier there are already such institutions functioning. At the same time, it becomes the function of the State and its responsibility to ensure that best quality is maintained by higher education providers in all institutions.

It need not be said that quality assurance is not a concept maintained by separate institutions within their own standards. HEIs may achieve quality separately by themselves. While respecting those identities in each of the centres of excellence, it is desirable that there exist uniformity in quality. It is possible to dwell on this topic at length but there is unanimity as regards maintaining uniformity in quality within a few prestigious Institutions and among the State universities within the country. It is expected that this requirement should cover all HEIs, State, affiliated, private and all other categories. It is in this sprit that the National Education Commission has proposed the establishment of the above mentioned NQAAC.

The NEC has not disregarded the long cherished concept of 'Autonomy' in the HEIs. Maintaining Quality in HEIs is even more important. It would be possible to work out an equation between Autonomy and Quality.

Functions of the NQAAC

The main functions of the proposed NQAAC would include the following:

(a) Enhance the quality of education in all HEIs, public and private, through regular reviews of all academic activities in the institutions.

(b) Ensure academic standards by setting national goals and guidelines by establishing a common Credit and Qualifications framework for all HEIs, a quality assessment system as well as external assessments.

(c) Keep abreast with developments in the world of knowledge and the world of work without prejudice to social relevance.

For the successful implementation of the above recommendations the following proposals are mandatory:

(i) Establishment of a Common Credit and Qualifications framework for all HEIs.

(ii) Establishment of a Quality Assessment system for all HEIs which includes internal as well as external assessment.

It is evident that certain universities and faculties are not quite familiar with the credit based modular structure operative in other parts of the world. Hence it is desirable that our faculty members be given some in depth understanding of the system. A common Credit and Qualifications framework at the national level would contribute to the maintenance of uniformity of standards among the respective courses offered by the different HEIs. It would enable students to accumulate meaningful credits from other HEIs so as to complete a degree. Such a system would also facilitate uniformity of the levels of achievement and standards of the qualification. Further, from the point of view the employer too, it would help better assessment of the employee.

The proposed National Quality Assurance and Accreditation Council will be an umbrella organization with authority to oversee the maintenance of quality in all areas of Higher Education, a statutory body under HE the President set up by an Act of Parliament. Of course, some of the functions of the present UGC will have to be transferred to the Council. It has been unanimously agreed throughout the world that quality assurance agencies should be fully autonomous bodies which operate independently without any possible influence or interference from outside. ■