

## **MEDICAL TECHNOLOGY IN DEVELOPING COUNTRIES**

by:  
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### **ABSTRACT**

#### **Medical technology in developing countries**

Many developing countries today are confronted with a dilemma with regard to medical technology. Based on Indonesia's perspective, this paper elaborates the problems and challenges encountered by the health sector development programmes to select the appropriate medical technology.

To cope with the dilemma, an authoritative national body for technology and economic assessment should be instituted, to function as a screening and controlling mechanism. Also, the World Health Organization (WHO) should issue guidelines and criteria for safe and appropriate medical technology.

*Key words:* Medical technology, healthcare, dilemma, developing countries.

### **ABSTRAK**

#### **Teknologi kedokteran di negara-negara berkembang**

Dewasa ini banyak negara-negara berkembang menghadapi dilema yang berkaitan dengan teknologi kedokteran. Berdasarkan sudut pandang Indonesia artikel ini mengupas permasalahan dan tantangan yang dihadapi oleh pelayanan kedokteran yang pantas.

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Untuk mengatasi dilema tersebut, patut dibentuk suatu badan nasional pengkajian teknologi dan ekonomi yang berfungsi untuk melakukan penapisan dan pengendalian. Juga, Badan Kesehatan Dunia (WHO) harus menerbitkan ketentuan yang berisikan petunjuk dan kriteria untuk memilih teknologi kedokteran yang aman dan pantas.

*Kata-kata kunci* : Teknologi kedokteran, pelayanan kedokteran, dilema, negara-negara berkembang

## **BACK GROUNDS**



Medical technology may be defined as the accumulation of knowledge, skills, means and procedures to develop and to apply medical activities that are beneficial for the individual and the community. So, contrary to popular belief, medical technology does not simply refer to medical equipment.

In this century we have witnessed three major revolutions in medical technology. The first started in the 1920s with the invention of effective drugs as products of applied biochemistry, the second was the mass development of high-tech medical equipment since the 1950s, and the third started with the application of biotechnology in medicine in the late 1970s.

Many of these technologies have played an important role in improving quality of health care, and ultimately quality of life and the state of health of whole nations. We only have to mention as an example the use of vaccines to prevent, and ultimately eradicate, certain infectious and communicable diseases. More recently, advances in imaging, laparoscopic and other diagnostic and therapeutic technologies have improved safety and outcomes compared with conventional procedures.

On the other hand, a number of new technologies have been proven useless, or even harmful. A popular example is the promotion of bottle-feeding instead of breast-feeding for infants. Some technologies even seem contradictory to national policies: we want to reduce the birth rate, but at the same time we also invest in expensive technology for human reproduction for the benefit of childless couples. Recent developments in medical biotechnology (for example, human cloning) have unleashed strong criticism based on bioethical and religious grounds.

## **A TECHNOLOGICAL DILEMMA**

Many developing countries today are confronted with a dilemma with regard to medical technology, in particular with high-tech medical equipment and biotechnology in medicine. On the one hand, modern medicine can no longer do without them; on the other, they may have unwanted clinical, economic, social, ethical and dehumanising effects. In the first place they are expensive, especially for countries such as Indonesia

where resource allocation for health care is a mere 2 per cent of the GNP, or US\$ 12 per head per annum.

Technology is one of the causes of cost escalation in health care. It is one of the contributing factors that sharpen the division between cost, quality and equity in health care delivery. The investment cost for one CT-scanner may be equivalent to the cost of providing three or more community health centres. Members of the upper and middle classes, however, usually do not make use of these primary health care centres. They sometimes choose to go abroad for treatment of even trivial cases, if they are told that quality of care in their country is not supported by the latest technology. Because of this attitude, the money that is saved by not investing in technology is lost again as foreign exchange expended on treatments of individuals abroad.

Heart surgery is another example. Open heart surgery is one of the most important developments in medical technology, and is generally considered a yardstick to measure the level of achievement of surgery and of medical technology adaptation in a developing country. However, for the cost of performing one open heart surgery on one patient, hundreds of children may be immunised against Hepatitis B. Taking into account the future social and economic costs saved by not having to treat so many cases of hepatitis, the choice seems obvious.

### **PRIMARY VERSUS TERTIARY CARE**

Many other examples of opportunity cost of hightech medicine for tertiary care that compare unfavourably with the cost of primary care may be cited. No wonder one foreign consultant was once heard offering the opinion: "Why bother to do bypass surgery? Let those who can afford it go abroad for treatment. You concentrate on eradicating infectious diseases." This was, of course, the most simple solution to our dilemma. It sounded very similar to the advice given by a visiting high ranking American dignitary to the Japanese after the Second World War: "Don't try to start an automotive industry, you will never catch up with our technology. But you people make very beautiful silk handkerchiefs, concentrate on that for export to the US". Had the Japanese followed that advice, the world economy and politics today would perhaps have been quite different: GATT, EEC, NAFTA, APEC and the like would probably not have been necessary. But the Japanese did not follow that advice. Or rather, they only followed part of that advice. They did export silk handkerchiefs, but at the same time they manufactured automobiles. We know the result: 20 years later America and Europe were compelled to protect themselves against invading high-quality Japanese cars.

In health care, Indonesia too, could not just do one thing and leave the other alone. We had to address both extremes of the health care spectrum at the same time.

In the 1960s our priority in health care was indeed quantity, so we started to build thousands of primary health care centres to reach the population even in remote and isolated areas. The outcome of this health policy was remarkable. Supported by improvements in other related factors out-side the health sector, the health status of the nation has improved considerably within a relatively short period of time. Consequently we are experiencing a rapid epidemiologic and demographic transition. Although we still have to cope with so-called diseases of the poor, the pattern of diseases is shifting toward cardio-vascular diseases, cancers, traffic accidents and other similar perils of the industrialised world.

The Indonesian population has also started to age. Life expectancy at birth has increased considerably within the past two decades, and it is projected to increase even more. This means more economic, social, and health care problems for the future, the solutions of which we have to start preparing for today. Thus, simultaneously we also have to take care of the other extreme of the health care spectrum. That means quality and, at least to a certain extent, technology.

We have in effect already decided "yes" to technology some time ago, bringing with it the trade-offs of the dilemma. Had we not started to invest some 20 years ago in human and technology development, today we would still have been at the very beginning of a learning curve in trying to master the knowledge and skills of more advanced medicine. Perhaps another 20 years will be needed before we ourselves can look after our own patients who need tertiary care. In the meantime we would be doomed to lag further and further behind other nations. Because of an improved ability to pay, we would only play the role of a desirable market for technologies provided by others.

### **DRAWBACKS AND PITFALLS**

Medical technology may have both positive and negative effects. Negative ethical impacts are universal: supplier-induced demands, indiscriminate use, duplication, overuse, appliance without the right indications, lack of awareness of contraindications, inadequate training and experience, and so on. These undesirable aspects happen on an individual or institutional level, because of the unethical behaviour of some doctors or hospitals to the disadvantage of usually ignorant patients. The objectives are financial gain. It is up to the government and professional associations to discipline hospitals and professionals.

There are also pitfalls on a national scale to be aware of. In the past 20 years a strong private sector has emerged, with a considerable number of profit-oriented hospitals being built in large cities. High-tech medical equipment is one of their strong

selling points. This will certainly lead to increased cost of medical care and the emergence of a two-tiered health care system-such hospitals will serve exclusively those who can afford it.

Economic growth in Indonesia has been quite strong over the past 15 years. Prosperity has increased, and Indonesia is a good market for transnational corporations. With the removal of trade and tariff barriers since the global acceptance of GATT in December 1993, there are practically no more obstacles for foreign medical services to invest and operate here. They will bring with them their own human resources and technology and because of their stronger competitive advantage, the domestic sector will suffer considerably.

Another pitfall to watch is the importation of second hand medical equipment. It is known that a large supply of this used equipment is in store in the USA and elsewhere. Some of it may still be good, some may have been discarded in the home country because of flaws or because it has proved to be useless, or even harmful. Developing countries may become a dumping ground for dangerous technological waste and out of date equipment.

If expensive technology is purchased for a government hospital, and the hospital applies users' charge for the use of that technology on patients, this may mean excluding the poor. In that case the government's health budget (that is, the people's money) is actually subsidising only the better-off section of the community. In other words the excluded poor are subsidising the rich — a negative cross-subsidy. This might be one of the causes of the finding, as stated in the 1993 World Bank Report, that in Indonesia in 1990 subsidies for health for the richest 10 per cent of households were nearly three times that of subsidies going to the poorest 10 per cent.

Developing countries may also be used as testing grounds for technologies and drugs that have not yet met with approval by authoritative bodies in the producing country (such as the FDA in the USA). In this example the agent responsible for the potential pitfall does not have to be one of the developed countries-beware also of other developing countries.

## **CONCLUSIONS**

Selected medical technology is a must, we still have a long way to go to catch up with others. But technology may cause a dilemma. To adopt or not to adopt may have consequences of its own. There are drawbacks and pitfalls to watch for and to take care of, on national and institutional levels. For that purpose an authoritative national body for technology and economic assessment should be instituted, to function as a

screening and controlling mechanism. The World Health Organisation (WHO) should issue guidelines and criteria for safe and appropriate medical technology, in particular for developing countries.

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