HEALTH, TECHNOLOGY AND DEVELOPMENT[1]

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[1] This Workshop article relates to the author's Ph. D. work titled "Health Care in Urban Orissa: A Study on Access, Utilisation and Equity" which is yet to be submitted for examination to Ravenshaw University, Cuttack.

HEALTH, TECHNOLOGY AND DEVELOPMENT

Though traditional economic theory has always been emphasizing on the accumulation of physical capital as well as the use of technical progress to achieve economic growth, of late the need to prepare an efficient human workforce has long been recognized. The role of human capital (comprising health, education, and skill) is now almost universally regarded as being indispensable to sustain the economic growth of any nation. And the main determinants of an efficient workforce are the level of health and educational status as well as the level of skill attained in several spheres. This becomes all the more important for a country like India with a billion plus population. When health improves, the country can produce more output with any given combination of skills, physical capital and technological knowledge. Development in health sector is an inevitable ingredient of over all development of a country. Vital indicators like Infant Mortality Rate, Life Expectancy at Birth, Death Rate etc are the indicators of development.

Longer life expectancy encourages larger investments in human capital, which in turn accelerates per capita income. A healthier life increases the productive number of workdays thus enabling the poor to get out of poverty trap. Latest medical technologies are transforming health care making it more effective and portable to not only new regions but to altogether new population as well. For example, the advent of sophisticated equipments and instruments has simplified many complex surgical procedures which can now be performed with minimal incision such as endovascular surgery, interventional radiology or Laparoscopy. The issue is whether this scaling advancement in health technology will be able to address the problem of ensuring equity in health care accessibility and utilisation.

INTRODUCTION AND CONTEXT OF THE STUDY:

Health is a universal human aspiration and a basic human need. The development of society, rich or poor, can be judged by the quality of its population's health, how fairly health is distributed across the social spectrum, and the degree of protection provided from disadvantage as a result of ill-health (WHO).

The Human Capital Theory of Grossman states that individuals invest in themselves through education, training and health to increase their earnings. Thus health can be regarded both as consumption good as it makes people feel better as well as a productive or capital good as it increases the number of healthy days available to work and thus to earn income.

The Health Survey and Development, popularly called the Bhore Committee, set up by the British colonial authorities in 1943 had the guiding principles that:

i) no individual should be denied adequate medical care because of inability to pay for it (economic accessibility).
ii) the provision of health services should comprise all the necessary facilities for proper diagnosis and treatment without discrimination (equity), and
iii) health programme must from the beginning lay special emphasis on preventive work i.e., it should be located as close to the people as possible to ensure maximum benefits to the communities served (spatial accessibility and utilisation).

In Alma-Ata Declaration, following topics relating to public health have been incorporated.

i) to provide greater support and resources to facilitate health sector reforms in developing countries so as to ensure equity in health care for their populations, and
ii) to identify the obstructions to the policy of "health for all" and to support and uphold the self-reliance of these countries in charting their own path in health and human development (Alma-Ata declaration, 1995).

The preservation of health is certainly one of the most vital and ancient concerns of mankind. Yet it is precisely in this area that some of the greatest inequalities among nations, as well as between socio-economic groups within nations can be shown to exist. Paradoxically enough, while being an age –old problem, it was only in 1981 – with the adoption of Global Strategy for 'Health for All' by the year 2000- that the international community first focused its attention on the issue of health as a fundamental right of mankind and laid the foundation for worldwide action in this field. (Wartensleben, 1983).

According to the India Health Report, 2003, "It is increasingly being recognized that health is an important contributor to productivity and economic growth, but it is, first and foremost, an end in itself. In a poor country like India, where the only asset most people have is their bodies, health assumes even greater significance".

The prevalence of different health outcomes as reflected by uneven pattern of diseases and health behaviour across different socio-economic groups highlights the glaring inequalities prevalent in the health sector. 'Inequalities' are referred to as 'inequities', when distribution is deemed to be unfair and avoidable, thus representing needless human suffering and lost productivity (Wilkinson,1996).

The structure of the health care system in India is complex and includes various types of providers. These providers practise in different systems of medicines and facilities. The providers and facilities in India can be broadly classified by using three dimensions: ownership styles (public, private not-for-profit and private for-profit); systems of medicine (allopathic, homeopathic, and traditional); and types of organization (hospitals, dispensaries, and clinics). Of course, these dimensions are interdependent and overlapping (Bhat, 1993). Of the 15,393 hospitals in India in 2002, roughly two-thirds were public. Even after years of under-funding, most public health facilities provide only basic care and are in most cases inefficient in terms of adequately managed and staffed as well as equipped infrastructure including research facilities.As per a estimate, India needs 74,150 community health centres per million population but presently has less than half that number (PwC,2007). Identifying the resource constraint in the field of health care, the National Health Policy (1982) had recommended the states to encourage practice by private medical professionals as well as promote the NGOs to invest in the field. Along with these, the States were further advised to develop their own strategies to utilise the untapped resources so as to be able to meet the growing demand for health care.

Health is influenced by socio-economic factors like whole life-course, the neighbourhood in which one lives, past socio-economic factors, stress history, diet, income, education and many other factors. (Rout,2008).Thus, a multiple number of factors influence the patients' preference for a particular health care provider. The matter of concern is whether their choice is cost effective keeping in consideration the rising cost of accessing the health care facilities. The complete treatment of a disease is accompanied by a number of referrals involving the diagnosis of several related (also in some cases unrelated) issues. For example, a minor chest pain if referred to hospital or otherwise will involve the recommendations for blood test, ECG, Scanning etc., each of which involves a substantial amount of cost. Many a times even before the actual treatment starts, the patients already have to spend a lot on these referrals not to mention the indirect cost on stay, food and other accessories particularly for those who need to migrate for seeking the necessary treatment. And sometimes they are undertaken in futile. Thus, spending more on health services does not necessarily buy better health. It needs efficient management and use of resources. The following few studies highlights the related issues.

A survey of a few nursing homes in the Agra city was done focusing on the availability of infrastructural facilities as well as the qualifications of the practicing professionals in these nursing homes. (Ramkrishnan, 1993). The study showed that the average academic

qualifications of the service providers in the nursing homes were varied. Fifty percent of them were intermediates while forty percent were graduates and another ten percent were post graduates. The post graduate doctors were either BAMS or BHMS qualified and eighty percent of these practitioners practise allopathic medicine. A majority of them (90%) act as consultants to various nursing homes on a casual basis and the remaining 10% are employed temporarily in these nursing homes. Not a single pharmacist was found during the study in these nursing homes. A large number of nursing homes i.e. 90% refer their patients to other hospitals (both government and private) due to inadequate infrastructural facilities at these nursing homes. The findings were contrary to that observed in other private institutions in large cities where the practitioners at least had a MBBS degree. Again the findings also highlighted the fact that though these nursing homes earned a substantial amount yet the quality of services provided was questionable.

The cleanliness of hospitals was reported to be lowest in the government sector (40%), while it was 73% for mission hospitals and 81% for private hospitals. More than 70% of the patients from Mission hospitals felt that the nursing staff was helpful, while it was only 30% in government and corporation hospitals. (Balkrishna and Iyer, 1997)

Studies also provide insights into the social background and nature of practice of practitioners of indigenous systems of medicine. A similar study (Singh, 1993) conducted on the state of medicare facilities in Agra city with special reference on these indigenous practices finds that with regards to qualification of the practitioners about 50 % of them were just intermediates and only 25% of them had the needed Ayurved Ratna qualification. It was found that 75% of them had general practice and none of them provided any specialized practice. About 65% of them agreed that their profession was based on training, and for about 35% it was a family profession. It was also found that these practitioners also used allopathic methods of treatment along with their indigenous practices.

It is stated that Fifteen costly medical conditions, including diabetes, hypertension, trauma, back problems, heart disease, and cerebrovascular disease, accounted for more than half of that overall growth in health care cost. These conditions are, at least in part, preventable. A study in California showed that a 5% reduction in preventable Illnesses and injuries could lead to substantial savings. Though Individuals have a responsibility for their own health yet equally, the State has an interest in creating health-promoting environments that support individuals. This issue points to the trade–off between preventive and curative health care.

The use of technology in health care though has the potential to address the issues of equity and accessibility, yet its actual impact would depend upon its effective management.

Despite the multiple problems resulting from the growth of the private sector, there has been little effort to establish market or regulatory mechanism to ensure its appropriate growth. This is unfortunate, since it is well known that leaving health care to market forces does not necessarily lead to an effective and efficient health care system. The economic theory argues that market produce outcomes that are efficient but need not be socially just and fair. Joseph Stiglitz, the Nobel Laureate, relying on his work on information asymmetry argued that markets in general are not even efficient without government regulations. While it is necessary to nurture the innovative private health sector that has the potential to address the problem of skewed distribution in the concerned area, the state has to regulate, manage and motivate the 'non-state' part of the health sector.

This paper is divided into three sections. The first section introduces the concept of access, utilisation and equity and mentions the objectives and methodology of the current study. The second section provides a brief overview of the existing situation with respect to health care utilisation in India in general and Orissa in particular. It highlights the changes that is taking place in the health sector with the gradual penetration of technological development and its potential to address the problems of ensuring 'equity in access' of health care facilities. And lastly the conclusion summarises the important aspects the study has undertaken.

HEALTH CARE ACCESS, UTILISATION AND THEIR EQUITY ASPECTS:

The healthcare industry is faced with multifaceted complexities. While the problem of resource constraints like the Shortage of human capital (both skilled and unskilled), availability of adequate fund is to be resolved through public- private collaborations , on the other hand the high sensitivity of patients for health issues, high expectation for best quality treatment at lowest cost without inconvenience is to be addressed. Thus in a nutshell the solution has to oversee not only the access and utilisation of health care facilities but also ensure their equity aspects.

Access to health care covers three main facets, namely a) economic access, b) physical access or geographical access, and c) cultural access. These three constitutes a significant component of the determinants of utilisation of health care particularly the vulnerable sections of the society. Economic access includes not only the official and unofficial payments(often called the 'speed money') for utilising the health facilities but also the opportunity costs of attending the health facilities which is specifically very significant for the population belonging to the lower income stratum of the society although it also affects

almost all concerned to a varied extent. Again while geographical access has been interpreted in terms of the distance travelled to be able to access the facilities, cultural access is the cultural acceptability of health services, relating to the type of medicine and who the health care providers are. (Hutton, 2002).

There is little consensus on what is meant by 'equity' in health care. 'Equity in Health' is operationally defined as minimizing avoidable disparities in health and its determinants-including but not limited to health care between groups of people who have different levels of underlying social advantage or privilege, i.e., different levels of power, wealth or prestige due to their positions in society relative to other groups. Thus, the 'equity' aspect implies that the resources that affect health should be allocated based on need rather than on underlying social advantages (as reflected by socio-economic status, gender, ethnic and age differences or any other similar dimensions). (Braveman, 1997)

The concept of 'equity' in health care has thus been interpreted in terms of different aspects viz., equality of access, distribution according to need, equality of utilisation and ultimately the equality of health. (Culyer and Wagstaff, 1993). It is obvious that these various aspects of 'equity' are mutually incompatible .It has been suggested that equality of health should be the dominant principle and that equity in health care should entail distributing care in such a way as to get as close as is feasible to an equal distribution of health. More elaborately stated , ' Equity' in health is the absence of systematic and potentially remediable differences in one or more aspects of health across socially, demographically, or geographically defined populations or population subgroups (International Society for Equity in Health 2000).Thus conversely stated , inequity in health is the presence of such differences. Inequalities are termed inequities when these inequalities are deemed to be unfair and avoidable. They represent needless human suffering and lost productivity; they also have significant consequences for the economy and for social order and justice. (Wilkinson, 1996).

To make the health care availability more effective in terms of their actual utilisation, it is necessary to make them more responsive to people's needs and expectations, as it has been reflected from several studies that health care utilization is sensitive to user perceptions of quality. For these reasons, patient perceptions of health services are now an important part of quality assessment in health care. Some key factors which guide the pattern of utilisation are reputation of the provider, cost and physical accessibility of the health care facilities. (Peppers, 2005).

OBJECTIVES OF THE STUDY:

The objectives of the study are as follows:

1. To study the extent of the use of health technology in cross-section of health care providers.

2. To study the effects of the use of health technology in widening accessibility and utilisation of health facilities.

STUDY METHODOLOGY:

The study seeks to examine the pattern of service utilisation across the population of Cuttack district which has been taken as the sample space for the current study, with due reference to the perceptions of the availability and quality of the publicly provided health care services vis-à-vis the private health sector. The sample space has been aptly selected taking into consideration the scope of the research work. It provides an ideal field of comparison between the public vis-à-vis the private providers of health care due to the existence of the biggest Government medical college cum hospital i.e., the SCB Medical College and Hospital established in 1944, which caters to the health needs of not only within and periphery of Cuttack but also patients from the remote areas of Orissa and some parts of the neighbouring states. The study thus seeks to examine the pattern of health service utilisation across the population both for those who are the permanent residents of the district as well as those who migrates to access the required health services from outside the district.

The study will make use of data collected form primary sources and depending upon the necessity, it may also access several publications of governments and agencies/NGOs dealing with the health sector of the Orissa economy.

THE HEALTH SECTOR IN ORISSA: AN OVERVIEW:

Orissa's network of public and government-aided health facilities comprises 180 hospitals, 158 community health centres and 1,350 primary health centres, besides privately run hospital and healthcare centres. It has 4 medical colleges (including a dental college), 3 nursing colleges and 14 pharmacy institutes. Orissa has achieved significant progress in improving its social infrastructure. This is best reflected in the state's improving performance on the Human Development Index, where it has risen to the eleventh rank in 2001. Human Development Index value has increased from 0.345 in 1991 to 0.404 in 2001. Table 1 gives a brief review of the milestones in the development of health services in the state of Orissa.

Table 1

Milestones in the Development of Health Services in Orissa

Year	Event
1939	Orissa Service Code in force. Post of Director, Health Services and cadre of civil surgeons established.
1944	Cuttack Medical College established.
1959–60	Burla Medical College established.
1962–63	Berhampur Medical College established.
1964	State Family Planning Officer post created; basic health services scheme introduced.
1970	Registration of Birth and Death Rules. Birth and death registration was now the responsibility of the Health & Family Welfare Department.
1977	1/3 of PHCs converted to upgraded PHCs, Ayurvedic and Homoeopathic doctors attached to the UGPHCs.
1985	Dispensaries converted to single doctor PHCs.

Note: PHC: Primary Health Centre, UGPHC: Upgraded PHC

In fact while the country has achieved impressive demographic transition through the decline in Crude Birth Rate, Crude Death Rate, Total Fertility Rate and Infant Mortality Rate(reflected in Table-2) yet the existing inter-state variations with some better performing states co-existing with states lagging far behind in these indicators makes the overall achievements somewhat skewed.

TABLE-2

DIFFERENTIALS IN HEALTH STATUS AMONG STATES						
SECTOR	Population BPL(%)	IMR/1000 live birth(1999-SRS)	Mortality per 1000 (NFHS II)	MMR/lakh (Annual Report 2000)	Leprosy cases /10000 population	Malaria +ve cases in 1000s (2000)
INDIA	26.1	70	94.9	408	3.7	2200
RURAL	27.09	75	103.7	------	-----	-----
URBAN	23.62	44	63.1	------	-----	-----
BETTER PEEFORMING STATES						
KERALA	12.72	14	18.8	87	0.9	5.1
MAHARASTRA	25.02	48	58.1	135	3.1	138
TAMIL NADU	21.12	52	63.3	79	4.1	56
LOW PERFORMING STATES						
ORISSA	47.15	97	104.4	498	7.05	483
BIHAR	42.60	63	105.1	707	11.83	132
RAJASTHAN	15.28	81	114.9	607	0.8	53
UP	31.15	84	122.5	707	4.3	99
MP	37.43	90	137.6	498	3.83	528
SOURCE:- NATIONAL HEALTH POLICY, 2002						

Table-2 shows that while the average IMR for the country as a whole is 70 per 1000, and the Mortality rate is 94.9 per 1000, a high rate of inter-state variations in these indicators are seen among the states. For eg., while the IMR in Kerala is 14 per 1000 , 48 in Maharashtra which are better performing states , the corresponding figures for Orissa is 97 per 1000, in Rajasthan 81 per 1000 and in Madhya Pradesh 90 per 1000. Similar inequities are observed with respect to many other health indicators like the number of leprosy cases per ten thousand, number of malaria tested positive cases per 1000 etc.

Public sector expenditure on health in Orissa is about 1.2 per cent of the Gross State Domestic Product, and about 3 per cent of the annual budget. A large portion of the funds is spent in the tertiary sector. Allocation to health has remained low during the 1990s, and the sustained increase in the wage and salary component has made the non-salary portion shrink over the years. The disease burden is high. Communicable, pregnancy-related, and childhood ailments account for about 65 per cent of the diseases. The infant mortality rate in Orissa standing at 97 (Sample Registration System 1999), is the highest in the country.

(Gupta, 2002). Scheduled Tribes and Scheduled Castes, mostly living below the poverty line, constitute nearly 41 per cent of the population. Approximately half of the state's people live below the poverty line, with limited access to exploitable resources due to a complex interplay of social, economic, and cultural dynamics.

During 2006-07, Rs.590.51cr was earmarked for health and family welfare department and this has increased to 1004.79 cr. In 2008-09 Be the total allocation is less than 1% of the GSDP (0.97%). To achieve the target specified in Millennium Development Goals (MDGs) declaration towards health sector, the expenditure on health sector should be a minimum of 3% of the GSDP. What is worse is that the distribution of funds within the health department in 2007-08 is quite discriminating towards the rural health services. The share of rural health expenditure has decreased to 30.55 percent in 2007-08 from 41.29% in 2005-06.

Table-3 shows the distribution of health expenditure in Orissa. The Total Health Expenditure (THE) of Orissa was $534 million which is 4.45% of the SDP of Orissa. (Refer Table-3). The per capita health expenditure was less than $15 per annum. Government contribution is little more than 20% of the THE, while external resources constituted about 7% of THE .Out-of pocket expenditures of Households is more than $3/4^{th}$ of THE which is incurred largely for purchasing of medicines and other ancillary services. NGOs and firms constituted less than 1% of THE. Even this meager Government expenditure is found to be more for curative care than for preventive care. It is found to be more in favour of Tertiary level of health care which may not be appropriate for a less developed region with high incidence of poverty. The share of both private and public insurance was found to be negligible of about less than 2%) (Debi, 2007).

TABLE 3

TOTAL HEALTH EXPENDITURE IN ORISSA BY SOURCES OF FUNDS, 2004-05(IN MILLION $)

Expenditure	expenditure in million $	Per capita expenditure(in $)	Distribution of Total Health Expenditure(%)	Total Health Expenditure(as % of SDP)
Public Expenditure	110	3	20.55	0.91
Private Expenditure	389	10	72.92	3.24
External support	35	1	6.53	0.3
TOTAL	534	14	100	4.45

Source-paper presented in 5th Global National health Account Symposium, (Debi, 2007).

Ironically, health care service outlets are predominantly in the public sector in Orissa. Taking hospital beds as an indicator, private hospital beds account for less than 10 percent of the total bed strength in the state. This is in variance with the pattern elsewhere in India.

Similarly, for every 1000 patients seeking treatment, 906 rural patients and 810 urban patients get their services from government hospitals. Private medical institutions (PMIs) are, by and large, located in urban areas and are unevenly distributed among districts. Sixty four per cent of private hospitals, with 71 per cent of the total private hospital beds, are located in urban areas. The uneven distribution of private hospitals among districts is evident from the fact that while the public–private hospital ratio is 77:22 in Cuttack district, the same in Kalahandi (in western Orissa) is 95:5. The actual ratio may be slightly higher in favour of private facilities across the districts, because many single doctor clinics are not officially registered (Gupta, 2002).

Private providers include for-profit institutions (concentrated in urban areas) and Not-for-profit outlets (mainly rural). Private medical institutions, with the exception of a few in Bhubaneswar and Cuttack, are usually small with less than 30 beds, and provide both general and specialised care. Not-for-profit institutions in the rural areas are mission charities, and are found mainly in southern and south central Orissa.

More than one-third of the PMIs in the state are single doctor nursing homes or small clinics. Another one-third has 2 to 5 doctors. There are very few private hospitals having more than 10 doctors. (Gupta, 2002).

The public hospitals may be cheap but the poor have to pay extra in terms of speed money (referring to the un-billed charges) and still have to cope with poor quality of services. Such problems are not always due to the lack of the required facilities but also because of poor quality of management in tackling grievances of the users, particularly when they are poor. The public hospitals, which are supposed to play this crucial role, have little capacity development support in this vital area. There are no publicly stated standards of performance that public or private hospitals will have to adhere to. A wider awareness of procedures and standards, and mechanisms to make individuals publicly accountable for adherence to procedures and standards, would make a strong impression on the performance of the hospitals.

THE CHANGING SCENARIO IN THE HEALTH SECTOR AND CHALLENGES AHEAD:

Reform implies sustained, purposeful, and fundamental changes in the health sector. While it is difficult to define precisely what constitutes a true reform, there is widespread consensus that reform is a process of change involving the what, who, and how of health sector action. The health care environment is currently changing, and the dynamics of the health sector are being transformed to meet new challenges and to benefit from new opportunities. Health sector reform involves fundamental change in policy and institutional arrangements thus influencing all aspects of the sector viz., manpower, infrastructure and logistics from monitoring to corporatisation of the sector through participation of stakeholders etc.

Recently the World Bank has approved three projects totaling US$ 662 million for the health sector in India, which were held up for more than a year. The projects cover two in the Central sector, namely, Reproductive and Child Health-II Project (US$ 350 million) and National Tuberculosis Control Project-II (US$ 170 million). The third project for US$ 142 million is the Karnataka Health Systems Development and Reform Project.

Today the health care sector is not only one of the fastest growing sectors but also can march with rapid strides once the latent potentials are unleashed. India has already become a preferred destination for patients from Middle East, Africa and even the west. It is able to provide world class care at competitive rates , with the existence of big names in the field

like the Apollo hospitals, the All India Institute of Medical Sciences ,the Shankara Netralaya ,to name a few. According to Technopak Advisors' report – 'India Healthcare Trends 2008— This opens opportunities in insurance, healthcare and life sciences', healthcare is a USD 35 billion industry in India, and is expected to reach over USD 75 billion by 2012 and USD 150 billion by 2017.

With gradual unshackling of the sector by allowing private players in the field, the government has made an attempt to tap the hidden potential. The corporatisation of the sector is reflected by the entry of big MNCs in every related field of the health sector right from establishing well equipped hospitals to drugs market. Diagnostic services, medical devices/equipment, hospital chains, wellness products and services are some of the identified sectors for investments. Many incurable diseases which were earlier a menace to human lives have now been addressed through the implementation of new and better technologies and life saving superior drugs. Health technology is increasingly becoming a strategic component of health care delivery as the Government attempts to raise the health care standards and improve accessibility to health care facilities. Health care providers today require advance technological tools to bring about efficiency and consistency in health care delivery. This becomes all the more important in the present scenario where the government as well as the health care providers have to cope with the dual challenge of not only containing the rising costs of providing health care but also to find affordable ways to provide a reasonable level of care. Some of the major revolutions in the health sector scenario are highlighted below.

1. E-HEALTH

The overall aim for the development of modern and efficient e-health solutions to health care is to support clinical work through enhanced communication with and sharing knowledge between health care professionals and patients. This is expected to have the potential of strengthening patients safety with due accessibility to health care facilities and ensuring quality development. With nearly 70% i.e., 700 million people still living in villages in India, the digital data transmission technique has enormous potential to make health care more accessible to this outreach population. While healthcare becomes even more complex, technology is providing answers for some of the most challenging aspects of medicine. In Orissa, such technology would bring about the much needed revolution in taking the health care facilities to the remote tribal belts of the state which still remains inaccessible due to the unfriendly terrain and consequent reluctance of the health care professionals in going to such areas. With adequate connectivity and training the scarcity of specialists care in such areas can be addressed to a large extent.

eHealth is an informative and interactive method where both patients and health care professionals can come together and share information with others in the profession from around the world. Regardless of location, medical issue, health concern, etc. health care physicians can discuss data as well as past experience to provide the best possible solutions for the patient.

A broad range of elements which are covered by eHealth are such as:

1. EMR (Electronic Medical Records) and EHR (Electronic Health Record).
2. Telemedicine
3. Health Informatics
4. MHealth
5. Evidence Based Medicine

These represent only some facets of the ehealth technology which is on the verge of expansion. Thus many more would be added to it in the coming years with the advancement of technology.

E-health can be used in many different aspects of health care in the future. These can range from individual surveillance of patients, monitoring chronic diseases at an affordable price, keeping medical records to international control of changes in disease patterns etc. In doing this, electronic health records are employed to record all information and notes into an easily and readily accessible outlet (the internet) to minimize oversights and possible problems that the traditional paper work used to bring with it. The practitioners thus would be able to access all the required background about the patients being investigated. eHealth has the capacity to bring a low down on medical technologies that can change the way health care is provided.

'Telemedicine' is one area which though has been tapped to a limited extent, has the capacity to address the vast existing inequities if given adequate opportunity, given the rapid strides in computer literacy in India. Theoretically, it is far easier to set up an excellent telecommunication infrastructure in suburban and rural India than to place hundreds of medical specialists in these places. '*Tele'* is a Greek word meaning "distance" and "*mederi*" is a Latin word meaning "to heal". Time magazine called telemedicine "healing by wire" The World Health Organization (WHO) defines Telemedicine as, "The delivery of healthcare services, where distance is a critical factor, by all healthcare professionals using information and communication technologies for the exchange of valid information for diagnosis, treatment and prevention of disease and injuries, research and evaluation and for the continuing education of healthcare providers, all in the interests of advancing the health

of individuals and their communities."[3] In simple terminology, it can be defined as the use of communication networks for the exchange of healthcare information to enable clinical care.

In the past three years, ISRO's telemedicine network has expanded to connect 45 remote and rural hospitals and 15 super specialty hospitals including the difficult to access offshore islands of Andaman and Nicobar and Lakshadweep, the mountainous and hilly regions of Jammu and Kashmir including Kargil and Leh, Medical College hospitals in Orissa and some of the rural / district hospitals in the mainland states[4].

It is expected not only to simplify the health decision-making process / or communication between healthcare providers and individuals regarding prevention, diagnosis or management of a health condition but thus will also expose the users to a broader choice base.

The online telemedicine research projects are being carried out throughout the country, though off-course in limited centres now. For example the East India Telemedicine projects are being made effective in Tripura Sundari Hospital, Udaipur (ISRO), the Rabindranath Tagore International Institute of Cardiac Sciences, Kolkata, the Down Town Hospital, Guwahati, Assam, The R.C.Agarwal Memorial hospital, Tinsukia and in S.C.B. Medical College, Cuttack. The Orissa Telemedicine Network funded by the ISRO connects SCB Medical College, Cuttack, the VSS Medical College, Burla and the MKCG Medical College, Berhampur.

The functioning of the two software products developed by the Centre for Development of Advanced Computing namely the e-sanjeevani by Mohali and the Mercury by Pune throws light on the benefit of the system. Telemedicine technology developed at Mohali (Punjab) has been centered on an integrated application software which offers a spectrum of tools, applications and services for telemedicine linkages. The software christened as 'e-Sanjeevani' is an integrated web-based telemedicine package. It enables tele-consultations (primarily tele-radiology, tele-pathology and tele-cardiology) in the following manner-: When the patient-end doctor feels the need for a second opinion, he/she uses Sanjeevani, to consolidate relevant clinical information of that patient into an Electronic Patient Record (EPR) and then seeks an opinion of the specialist using tele-consultation. After the connection to the specialist-end is established, the electronic patient record is uploaded. The specialist also has Sanjeevani installed. Using the software, the specialist then examines the clinical information, and suggests a course of action. If need arises, the doctors on both the ends arrange for a video conferencing to arrive at the diagnosis in a collaborative manner and decide upon the course of treatment in a participative manner. This advice is then

formalized after the specialist sends back his opinion to the patient-end doctor. As a user of the integrated telemedicine software, the two doctors engaged in tele-consultation are able to get all the services from within Sanjeevani. The services include patient demographics, general information, patient's medical-history, other information or data including clinical data like ECG, radiographs, pathological reports, clinical images, appending queries and advice, conducting a video conferencing etc. It also enables clinicians to create, edit and view electronic patient record, generate prescriptions, work out interpretations for radiographs and pathological reports besides annotating digitized images, acquire and display ECGs and conduct video conferencing. Sanjeevani generates various reports regarding diagnosis, treatment chart, next visit to hospital etc as desired by the doctor.
(Sood and Bhatia, 2005).
However the main issues which have been identified as far as the smooth operation of the telemedicine technology is concerned are the availability of adequate infrastructural facilities for the connectivity, installation of the system in the urban and specifically in the rural areas and adequate maintenance of the installations, and the most important being the issue of the required training of the personnel required to handle the entire operation.

In the private sector, the major players are the Apollo Group of Hospitals, the Amrita Institute of Medical Sciences (AIMS), Narayana Hrudayalaya and the Escorts Heart Institute and Research Center to name a few. Recently, Sir Ganga Ram Hospital in New Delhi has launched its telemedicine centers in Haryana and Rajasthan states. With the support of ISRO, Sankar Netralaya, Aravind Eye Hospital, Meenakshi Eye Mission, and four other eye hospitals have launched a mobile tele-ophthalmology service for early diagnosis and treatment of ophthalmic diseases under the National Blindness Control Program. Sir Ganga Ram Hospital in New Delhi and AIMS in Kochi have launched mobile tele-hospitals for rural access to specialty health care services.
EMR or EHR integrates patients' data with decision making system. EMR contains perfect complete history by patient-computer interaction and records sensitive issues like addiction, abnormal sexual behavior, STD and HIV, mental illness and suicidal tendency etc. Ultimately EMR leads to data mining for newer scientific developments. EMR enable easy communication of patient data between different healthcare professionals like Gram Panchayats, specialists, care team and pharmacy. EMR may be integrated by e-mail for patient's education. It can be kept in patient custody in form of a CD-ROM or Smart card. Prescribing information is available on internet having drug database and drug dictionary.

Computerized prescription has the advantage of correct dose, duration, patient and pharmacy compliance.

Orissa hosted the 8th National e-Governance Conference in February, 2005.This conference provided an excellent opportunity to showcase the advances made in this front over the last few years. Orissa has taken several new initiatives in Information & Communications Technology (ICT) and e-Governance sector. The state is making sincere efforts to expand e-Governance programmes for the benefit of the common man. Of this, the GRAMSAT Project implemented under the aegis of the Department of Space, Government of India is a unique project connecting 314 blocks of the state with a dedicated VSAT network. The state also offers almost 20-25 per cent savings in cost of operation in comparison to other leading IT destinations in India due to very competitive rates of infrastructure inputs like land and electricity and low employee cost and cost of living. A strong education network also ensures the availability of a qualified talent pool at lower costs. Orissa has over 58 billion tons of coal reserves amounting to 25 per cent of India's total reserves. The total power generation potential in the state is 20,000 MW. Taking all these factors into consideration, it obviously has immense potential to tap these opportunities to widen the accessibility to health care facilities to the underprivileged in particular and all in general.

However many factors are working as impediments to the proper and faster implementation of e-healthcare in the state (though an honest attempt of addressing these issues have already been made) like absence of competition in health sector on the one hand with the public sector dominance as far as the preventive aspect of health care is concerned and on the other the unregulated mushrooming of for profit private players of different category and size catering mainly to curative health care, lack of consumer awareness with low bargaining power which makes them vulnerable to the health care providers, non-existence of funding system like insurance or social security agency, lack of adequate infrastructural facilities like computer-aid in medical and nursing education. Consequentially e-health care thinking is nearly non-existent and wherever it exists is still in its nascent stage. So it would be bit too early to come to any conclusions with regard to the achievement or failure of ehealth in widening accessibility of health care.

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