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Healthcare of India: Today and Tomorrow

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Abstract:
India needs accessible, affordable and high-quality healthcare. This paper deals with the challenges and opportunities in Indian Healthcare. We discuss the details of the healthcare system of India: its structure, expenditure by public and private, the presence of the alternate medicines and its impact on Indian healthcare and the management of healthcare at all levels. India currently has double burden of diseases. Further we discuss the challenges in Indian healthcare system and its causes. We highlight with a few examples how hospitals can innovate and reorganize themselves to address these challenges.

Key words*: Healthcare system, hospital management, affordable and accessible healthcare*

1. Introduction

Ancient India practised Ayurveda and Siddha medical systems during Vedic times. Also Unani, Tibb and Homeopathy though not of Indian origin, are still in use and have become part of Indian culture. According to the WHO report in 2003, these are used by 65% of the rural population for primary health care. Even now it forms an alternative medical system as it is based on natural herbs with no assumed side-effects [1]. Many pharmacy companies like Himalayas, Dabur etc. produce and market the Ayurveda medications. The scientific inventions later after independence changed the perspective of medical system. With modern medicine, the medical system moved towards specialization; preventive and curative medicine gained importance. This modern medicine had deep impact on human life, resulting in a complete health care system. According to the world-bank data Health expenditure per capita in 2011 of India is $59 [2]. The total healthcare spending in India is around 4.1% of its GDP, which is the lowest in the world [3][4][5][6]. The composition of this expenditure is shown in Table 1 and Figure 1.

Purpose	% of GDP
Total healthcare expenditure	4.1
Public financed	1.2
Primary healthcare and preventive healthcare	93.9% -1.12 of GDP
AYUSH	2.8% - 0.03 of GDP
Health research	3.3% - 0.05 of GDP
Out of pocket/private	2.9

Table 1: Healthcare expenditure

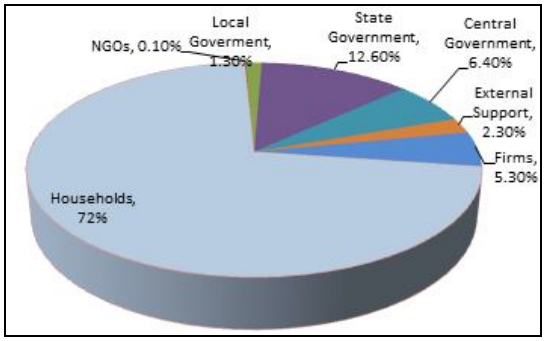

Figure 1: Contribution towards healthcare expenses

2. Healthcare System Structure

In India the population distribution is 30% urban and 70% rural according to Census 2011. The population in the cities is increasing because of urbanization. Though Indian cities are bursting with increasing population, majority of its population is in rural parts of the country whereas more than half of china's population lives in cities. Most of the facilities are provided to this 30% of population whereas the 70% of the population in the rural India does not get basic facilities. It is this population which needs the policy reforms. The backbone of India is the village which struggles to get basic amenities like water, electricity and healthcare. The absence of healthcare centres in these places is one of the reasons of unawareness of health and hygiene. This population faces the problems with communicable diseases and infectious diseases. The unavailability of timely care is often the reason which makes the situation worse. This is the population which has major problem with accessibility first and then with affordability. With these two problems the high quality healthcare remains a distant dream. It is this population which has not been reached and centred for healthcare facilities, policy reforms and also economic growth.

India as a country, has a central government and as it states have state government. The contribution in the health expenditure is 7% by central government, 12% by state government and 1% by local government [7]. Further, the areas are divided into districts, taluks and villages. So the responsibility of the Health sector in India is shared by central, state and local government. The service delivery is state responsibility whereas the central government is responsible for developing and monitoring national standards, regulations and funding agencies [8]. Healthcare delivery in India is by public and private care providers and very few NGOs. Figure 2 shows the structure of the healthcare system in India. Indian healthcare system broadly classifies into five groups: (a) Public health which consists of primary healthcare centres at rural level or confined to smaller area. There are ASHA workers at village level who educate the rural population on health and hygiene. Also there are state, municipal, railway and medical college hospitals. (b) Private healthcare is of two categories- for profit which consists of multi-specialty hospitals with laboratories, nursing homes and individual clinics. There are non-profit care providers which include charitable trusts by temples and educational institutes and NGOs.(c) Indigenous systems which is traditional healthcare system of Ayurveda, Yoga, Unani, Siddha and Homeopathy centres. (d) Voluntary health agencies like Indian Red Cross, Indian council of child welfare, Central social welfare board, International agencies and many more (e) National Health Programmes like Universal Immunization Programme, National Cancer Control Programme, National Program of Healthcare for the elderly, so on.

India has both public and private health care providers. 74% of hospital beds are contributed by the private sector. Private sector dominates especially tertiary care. 25% of the population is covered by public and private insurances and 71% of the population's expenses continue to be out of pocket [9]. According to the WHO, World Health Statistics 2011, 32% is public and 68% is private

spending. Rising incomes have led to greater affordability of superior quality private sector healthcare facilities [10]. In India, the quality of healthcare, availability of qualified doctors(specialized) and diagnostic equipment in the government run healthcare centres are inadequate, forcing the people for out of pocket expenditure [11].

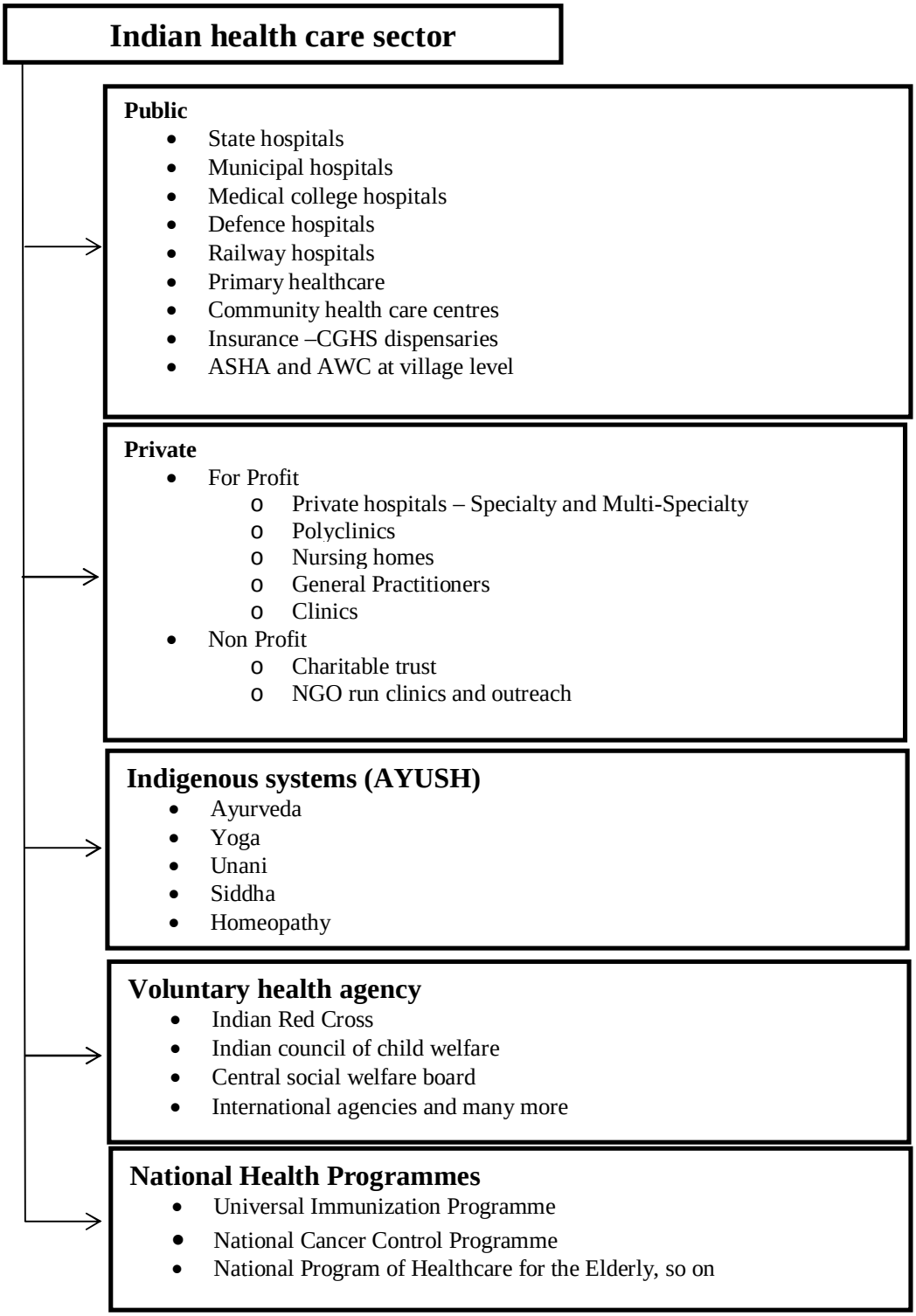

Figure 2: Healthcare system structure in India

Expensive drugs also add the burden to this expenditure. As a result many families slip into below poverty line [12]. Services provided in public hospital costs fraction of the private hospitals but still patients prefer private hospitals because in public hospitals they face

dismal sanitary condition, long waiting times, rude behaviour of staff, high infection rates and substandard clinical care [3]. The lack of good administration and management, inefficient use of scarce resources and deficiencies in the quality of services creates problems in accessing the care in public hospitals [13]. Poor in urban India are not able to pay for themselves because of increasing healthcare costs. Though urban India has both public and private care centres which are accessible, they are not affordable. The problems are with respect to cost, resource and geographical terrains. The poor in rural earn and live on very low income a day which is less than a 1$ [14]. This makes healthcare unaffordable. Added to that are problems with accessibility due to the locations. So many people turn to non-modern medicine AYUSH. The AYUSH is now integrated with the modern medicines [15]. The government spends about 0.05% in 1.2 % of its GDP. The policy reforms undertaken by the government have not helped the poor as the understanding of poverty is inadequate. Therefore much of anti-poverty policies have failed [16]. Now the Indian government is encouraging private investment by developing Public-Private-Partnerships (PPP models) to improve the availability and affordability of healthcare to its citizens. This will also bridge the gap in demand and supply. Private sector's expertise coupled with efficiencies in operation and maintenance would lead to improved healthcare services delivery to the masses [17][18][19].

Few philanthropists also have a share of the contribution to healthcare in India [20][21]. One example is Aravind Eye Care System (AECS) in Madurai, Tamil Nadu. AECS is one of the largest provider of eye care services and trainer of eye care personnel in the world with 1500 beds. It focuses on continuously improving and standardizing of its service processes and thus engineering and managing its company as an integrated system. The uniqueness of this hospital is that it treats more than 50% of its patients for free of cost and yet system is self-sustainable [22-29]. Aravind is studied as a model in business schools like Harvard, Stanford, Michigan, IMD –Lausanne and IIMs. AEH provide quality care with minimum cost because of their high level of operational efficiency by managing the resources effectively [30]. People from villages are screened and treated for eye problems in the hospitals through camps. AECS provide quality care with minimum cost because of their high level operational efficiency by managing the resources effectively. This model is suitable of our economy and offers accessible and affordable healthcare with quality.

Another example is Narayana Hrudayalaya (NH) in Bangalore, Karnataka, India which is a multi-specialty hospital with the concept of health city which means "one point for all healthcare needs" by a cardiac surgeon Dr.Devishetty in 2001. This tertiary care hospital performs over 4,000 surgeries a year (approximately half on paediatric patients).It has a vision as "Affordable Quality Healthcare for the Masses Worldwide" and mission as "A dream to making quality healthcare accessible to the masses worldwide" [31][32][33]. It continuously works on capacity utilization and staff productivity, technological innovations and staff training [34][35][36].

3. Challenges faced by Indian Healthcare:

Indian healthcare on one hand has world class hospitals, state of art technologies, qualified professionals and surgeons and on the other hand the average patient faces problems with accessibility, affordability (high cost treatments) and inconsistent quality. The India today has double burden of diseases where urban India faces lifestyle diseases (non-communicable diseases) and urban poor and rural India faces communicable diseases and infectious diseases [37].The sedentary lifestyle and the unhealthy diet of the people have resulted in diseases like diabetes and cancer, which are growing rapidly. The current health care system is not efficient to handle such scenarios efficiently. The major problem with the Indian healthcare system is accessibility, affordability and quality care. The high cost of diagnosis and treatments available in private hospital are unaffordable to most of the population. The healthcare costs are raising due to the technological advancement of the treatment procedures.

3.1. Ignorance about Health Insurance

Though the insurance sector is growing in India, still it has not reached the people in rural India. The benefits of insurance need to be communicated and its perception need to be changed [38].People are more concentrated on curative medicine. Insurance is a step further for preventive measure. People do not wish to pay for the insurance as they are not sure whether it will be useful for them. The premiums need to be paid every year and many a times the insurance is not used during that year. Why to have insurance with the hope of not using it. The attitude of majority of the people oversees the benefit insurance provides. The cost of healthcare services have increased in recent times and the uncertainty in one's health cannot be predicted. So one needs to be prepared for this uncertainty and insurance is one such solution for this. People when faced with serious medical calamity borrow the money from friends or relatives. A step further people sell their property to cover their medical expenses. This depends on the criticality of the disease. People hesitate to pay for insurance and oversee the benefits it offers [16].

3.2. Medical infrastructure

The 1.2 % of GDP spent on public healthcare is not sufficient for the second highest populated country in the world. There is a shortage of hospitals and primary healthcare centres. The scarcity in the number of government hospitals or care centres poses a challenge for people to reach the hospital on time and use the required services. The geographical terrain plays an important role to reach the hospital in time. High costs and the infrastructure go hand in hand. The higher medical equipment costs result in poor infrastructure of the hospital. There is a need for innovation of the low cost devices which added mobility to it would make the healthcare more accessible. Accessibility can also be improved with the technological interventions such as telemedicine and low cost devices.

3.3. Shortage of Doctors

According to 2010 WHO statistics, India has 0.6 number of physicians per 1000 people and the number of hospital beds per 1000 people is 0.9. The shortage in specialized doctors is even greater. Further adding to this challenging situation is the population growth rate of India which is 1.3 percent. This means the population of younger earning generation is less compared to the older generation Figure 3 shows the increase in aging population by 2050. The population aged above 60 years is projected to grow around 193 million. This change in the population pyramid will fuel the demand for the healthcare particularly because of lifestyle diseases.

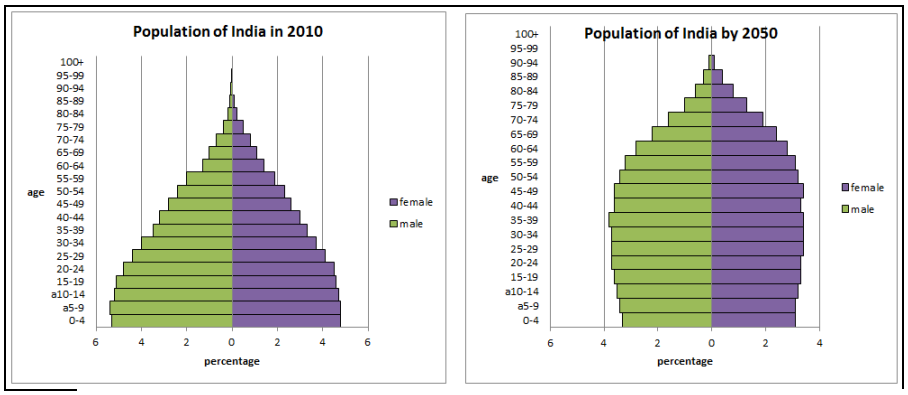

Figure 3: Comparison of aging population of India in 2010 and 2050, according to WHO

Accordingly the healthcare workers will also age and the gap between the supply and the demand will widen, with the existing number of medical educational institutions. There is a need to develop a healthcare system which is sustainable and provide quality healthcare. The technological upgrading of hospitals is a necessary step towards the healthy future. India has been using the telemedicine but it is limited to few areas. The utilization of the available resources, technology and equipment in an efficient way will result in an effective healthcare system.Healthcare can be made more accessible by mobility, simplicity and automation. The rural patients requiring care need to travel to the nearest town or city which will consume their time and money. Therefore the affordability and the accessibility of poor patients can be addressed by providing the care through mobile services. Examples are mobile eye surgery units by the Healthcare Technology Innovation Centre for Sankara Netralaya which is operated in two buses to perform cataract surgeries in remote locations. One more example is Sri Sathya Sai Mobile Hospital (SSSMH) which delivered mobile health care to 6 lakh patients. Telemedicine is another way to reach out to the patients. Here the doctor is electronically connected to the patient through nurse practitioners. Electronically saving the patient records is an added advantage from which the physician can retrieve the data from his home and provide necessary care to the patient's on time. The time required for a patient to get diagnosis and the treatment and the treatment procedures or tests take quite some time. Example: the fungus detection in the eye. Fungal infections kill at least 1,350,000 patients following AIDS, cancer, TB and asthma though the best drugs are available. The early detection would save over 1 million adults and children worldwide. The tools are not available for rapid diagnosis and treatment [39]. An intelligent decision system which would detect and analyse the fungus very quickly is needed [40]. In India we have large patient volumes and not enough trained personnel. For example, In India 50-70 patients are scanned/day using magnetic resonance imaging (MRI) machine where as it is 20-30 patients in U.S. and 5-8 sequences/day (15+ in the U.S.). The larger volume with less process variation highlights the need for automation [41].

4. Healthcare Ahead

Some of the hospitals have reinvented, reorganized and innovated to address and control these issues. But these few hospitals cannot supply for the huge Indian population, we need many more hospitals/healthcare centres to become flexible and smart so that the gap between the supply and demand be narrowed. Now is the healthcare system efficient enough to provide quality care for the patients? The major sources for this care in India are the hospitals [42]. Hospitals have to manage complex patient care, resources, administrative staff, doctors, insurances, policies, pharmacists, radiologists, laboratory staff, technicians and many more. Each type of patient requires unique patient pathways. The increasing gap between resource supply and patient demand, medical error[43], long waiting times and decreasing patient satisfaction and the pressure to reduce costs [44]to due healthcare reform have made managing a hospital a tough task [45][46]. To overcome this pressure the hospitals are using new approaches such as improved information systems (comprising Electronic Medical Records), outcome based goals and incentives, disciplined process management like lean and/or lean six sigma and reengineering, team based training to provide better care efficiently and effectively [46-51]. Implementation of IT in healthcare is a beneficial and at the same time the complexities tend to make the task more difficult [52]. To reduce long waiting time and increase resource utilization we can also optimize the hospital workflows. Patients with different diseases follow various workflows. These workflows need to be standardized to some extent. Different hospitals across the world use different theories and management practices. But are our hospitals flexible enough to experiment and implement the required changes?

From long, the traditional management theories have been used in the hospitals. To make hospitals economically sustainable systems, we need to address typical pressing issues like capacity, staffing, scheduling, patient flow, resource allocation and forecasting. Extending to these issues are geographic locations of facilities and facilities layout, engineering (design) of facility optimized

workflows and quality control techniques [53]. Traditional healthcare management is based on past experience, feelings, intuition, educated guesses, linear projections and calculations based on the average values of input variables. Management engineering methodology (operations research or management science) plays a major role in healthcare delivery process analysis. Mathematical models and simulation models are used to improve efficiency and quantitative decision making. Theories highlight the way the evidences are collected and interpreted. Theories include the hypothesis, working models and frameworks about facts and reality. These help in deep understandings of healthcare [54][55][56].

The healthcare industry is divided into pharmaceuticals, diagnostics, insurance and medical equipment and about 50% is hospital care. Comment: please add a reference for that. The major contribution is from hospitals. Hospital systems are undergoing tremendous changes in systems, structures and services. To manage hospitals efficiently, one must use relevant administrative theories and appropriate techniques. The penetration of IT in healthcare is a boon for structured administration. Though the initial process of paper to computerization is tedious but in the long run it is beneficiary. To reduce the health care costs, the hospital as a system should become efficient. In order to become efficient, a system should attain process efficiency, cost efficiency (optimization), time efficiency, resource efficiency, inter-skill competence and operational efficiency.

The diagnostic care is more practised than the preventive care. Only a few preventive care programmes such as immunization are carried out by the government. The impact of preventive care utilization is tremendous in public health. Preventive measures such as sanitation, drinking water, fitness regimes, nutritious diets and safety measures necessarily bring down the burden of medical expenses/costs on the individual as well as the hospital management and government. The Indian healthcare industry is expected to reach US $160 billion by 2017.The healthcare industry has tremendous opportunities in its sector like insurance, pharmacy, IT, management, strategies, medical technologies, business models, outreach programmes, policies, administration and nursing. These opportunities need to be tapped in competitive ways. India should adapt to the changing time and derive healthcare models which are appropriate to achieve the universal healthcare.

5. References

1. Ashok VikhePatil, K.V.Somasundaram and R.C.Goyal (2002). Current Health Scenario in Rural India, Austt.J.Rural Health, 129-135.
2. http://data.worldbank.org
3. National Health Profile (2009).
4. India's Healthcare System, Swedish Agency for Growth Policy Analysis (2013).
5. A Jilani, G Azhar, N Jilani and A.Siddiqui (2008). Private providers of Healthcare in India: A policy analysis, The Internet Journal of Third World Medicine. Vol. 8 No. 1.
6. Health and Family Welfare and AYUSH, Eleventh Five Year Plan, India.
7. "Annual Report to the people on Health", Government of India - Ministry of Health and Family Welfare, Sept 2010.
8. Cain Farmer, "India: Health Care System Structure and Organization", Care Continuum Alliance.
9. Ravi Duggal and Leena V. Gangolli (2005). Review of Healthcare in India.
10. ibef.org
11. http://mentortogethersocent.wordpress.com/2012/09/20/pathetic-conditions-of-government-hospitals-2/
12. Bhojani et al (2012). Out-of-pocket healthcare payments on chronic conditions impoverish urban poor in Bangalore, India, BMC Public Health.
13. Dr. Sandeep Moolchandani (2011). 3 reasons why Government Hospitals in India should provide good quality healthcare, Health and Karma Global.
14. Bhushan Reddy (2013). How to live on Rs.26 a day the income of officially poor in India.
15. RituPriya (2013). The status and role of AYUSH and local health traditions in public health, The Focus, No. 65.
16. Abhijit Banerjee and Esther Duflo (2011). Poor Economics: A Radical Rethinking of the Way to Fight Global Poverty.
17. Emerging Trends in Healthcare – A Journey from Bench to Bedside, A report by Govt. of National Capital Territory of Delhi, 2011.
18. www.phfi.org
19. Donald A.Barr (2007). Ethics in Public Health Research- A Research Protocol to Evaluate the Effectiveness of Public-Private-Partnerships as a Means to improve Health and Welfare Systems Worldwide, American Journal of Public Health.
20. Aashish Kamat (2013). Revealing Indian Philanthropy, Chief executive officer, UBS India.
21. Arpan Sheth and Anant Bhagwati (2013). India Philanthropy Report 2013, Bain & Company, Inc.
22. Dr.Bhupinder Chaudhary, Dr. Ashwin G. Modi and Dr. Kalyan Reddy (2012). Right To Sight: A Management Case Study on Aravind Eye Hospitals, ZENITH International Journal of Multidisciplinary Research Vol.2 Issue 1, January, ISSN 2231 5780.
23. Dr. Rani GeethaPriyadarshini(2011). A Case Study on Aravind Eye Care Systems, November 6, 2011 School of Business, Coimbatore.
24. Aravind Eye Hospitals: A Case in Social Entrepreneurship - IBS case development centre, Asia-Pacific's Largest Repository of Management Case Studies.
25. ibscdc.org/Case_Studies/Entrepreneurship/…/Aravind Eye Hospitals-Case Study.htm1
26. Angel Diaz Matalobos and Stephan Pahls (2010). Aravind Eye Health Care Operations", ie business school.

27. Arnab B Chowdhury (2012). When Technology Meets Health Care in Knowledge Society, CSI Communications.
28. Pavithra K. Mehta AndSuchitraShenoy (2011). Infinite Vision - How Aravind Became The Greatest Business Case for Compassion, Berrett-Koehler Publishers, Inc. San Franciso.
29. Larry Brilliant and Girija Brilliant (2007). Aravind: Partner and Social Science Innovator-Innovations Case Discussion: Aravind Eye Care System, innovations.
30. Christina Seelos and Johanna Mair (2006). Profitable Business Models and Market Creation in the Context of Deep Poverty: A Strategic View, IESE Business School – University of Navarra.
31. Rick Docksai (2012). Revolutionary Health: Local Solutions for Global Health Problems, the Futurist, A Magazine of Forecasts, Trends and Ideas about the Future, Vol. 46, No. 4.
32. Prabakar Kothandaraman and Sunita Mookerjee (2008).Case –Study-Healthcare for All: NarayanaHrudayalaya, Bangalore,Growing Inclusive Markets.
33. Barak D. Richman, Krishna Udayakumar, Will Mitchell, and Kevin A.Schulman (2008). Lessons from India in Organizational Innovation: A Tale of Two Heart Hospitals, Project HOPE–The People-to-People Health Foundation.
34. Susnato Sen, Saurabh Jain and Dhruv Thakkar (2010). Healthcare for All- A distant dream or a reality", Express Healthcare.
35. Narayana Hrudayalaya provides top quality open-heart surgery for 50% the cost of private hospitals, IPIHD Innovator Profiles and Case Studies 2013.
36. A.Venkat Raman and James Warner Björkman (2009). Innovations in the provision of health care services in India: a case study of Narayana Hrudayalaya, Innovation-EMPI Journal of Interdisciplinary Perspectives.
37. KanishkaBedi (2004). Production and Operations Management.
38. Innovative and sustainable healthcare management: Strategies for growth, All India Management Association, 2012.
39. DileepMavalankar and Ramesh Bhat (2000). Health Insurance in India - Opportunities, Challenges and Concerns.
40. David W. Denning (2013). Global Plague: How 150 People Die Every Hour from Fungal Infection While The World Turns A Blind Eye.
41. http://www.life-worldwide.org.
42. Gopi Katragadda(2013). What does it take to make healthcare more accessible-Forbes India.
43. Andrew (2011). Difference between Private Hospitals and Public Hospitals.
44. Bryony Dean, Mike Schachter, Charles Vincent and Nick Barber (2002). Causes of prescribing errors in hospital inpatients: a prospective study,The Lancet.
45. Freed DH (1992). Cost cutting for hospitals: a heuristic approach, Hosp Mater Manage Q...
46. Ron Ashkenas (2011). Hospitals Can Work Better, Harvard Business Review.
47. D.D.Ludwick and John Doucette (2009). Adopting electronic medical records in primary care: Lessons learned from health information systems implementation experience in seven countries", International Journal of Medical Informatics.
48. Jeremy PT Ward, Jill Gordon, Micheal J Field and Harold P Lehmann (2001). Communication and information technology in medical education, The Lancet.
49. Peter Reynolds, Alan Thorogood and Philip Yetton (2010). Allocation of IT decision rights in Multi-business Organizations: What decisions, who makes them, and When are they taken?-International Conference on Information Systems.
50. Lawrence F. Wolper, Jones and Bartlett Learning (2005). Physician Practice Management: Essential Operational and Financial Knowledge.
51. Marc Berg (2003). Health Information Management: Integrating Information and Communication Technology in Health Care Work.
52. Nancy M. Lorenzi, Robert T. Riley (2004). Managing Technological Change: Organizational Aspects of Health Informatics.
53. Marc Berg (2001). Implementing information systems in health care organizations: myths and challenges, International Journal of Medical Informatics.
54. Alexander Kolker (2012). Chapter 1-Efficienct managerial Decision-Making in Healthcare Settings: Examples and Fundamental Principles, Management Engineering for Effective Healthcare Delivery: Principles and Applications.
55. Priscilla Alderson (1998). Theories in health care and research-The importance of theories in health care, BMJ.
56. Wallace J. Hopp and William S. Lovejoy (2012). Chapter: 1.6.Principles-Driven Management: Marrying Theory and Practice – Hospital Operations: Principles of High Efficiency Health Care.
57. AngellaVassell and Tuyen D. Nguyen (2012). Theories of Social Systems: Implications for Health Care System, International Journal of Psychological Studies