Healthcare and Hospital Management
Contemporary Issues and Strategies

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Edited by

G.V.R.K. ACHARYULU
BHIMARAYA METRI
L. KALYAN VISWANATH REDDY

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Foreword

Preface

A National Conference on Emerging Trends in Healthcare and Hospital Management organised by the School of Management Studies, University of Hyderabad on 29th October, 2013, has provided an opportunity to compile a book of collections on wide range of topics connected to the emerging trends in Healthcare and Hospital Management focusing on contemporary issues and strategies in Hospital Management and Healthcare Management such as Human Resource Management, Quality and Accreditation, Information Technology, Medical Tourism and Health Insurance.

The healthcare industry today is a complex industry with ever changing relationships between patients, physicians, hospitals, insurers, employers, communities and government. A combination of factors – including the emergence of intense, dynamic competition and consolidation, increasing expectations of demanding, sophisticated consumers, and decreasing funding and utilisation – have generated an increasingly challenging environment for hospitals and the health care value chain.

The healthcare is at an influx of paradigm shifts in terms of changing disease patterns, increasing dual disease burden for both rural and urban India. On the supply side, there has been uneven distribution of healthcare infrastructure and resources posing various challenges to the sector. Healthcare industry's transition is dynamic and will be impacted by the changing economics of the country. The coming years will showcase a new and changed healthcare delivery system not only in terms of delivery formats, but also the way services are delivered. The technological advancements will have a major impact on the processes/services and how they are availed by consumers at not so high costs. In tandem with the changing disease pattern, the focus of service providers will change, stressing more on the preventive aspects and wellness of the population.

Hospital industry is an important component of the value chain in Indian Healthcare industry rendering services and recognised as healthcare delivery segment of the healthcare industry, which is growing at an annual rate of 14%. Healthcare organisations and providers are facing the challenge of delivering high quality services to their patients at affordable costs. High degree of specialisation of medical disciplines, prolonged medical care for the ageing population, increased costs for dealing with chronic diseases, and the need for personalised healthcare are prevalent trends in this information-intensive domain. The emerging situation necessitates a change in the way healthcare is delivered to the patients and healthcare processes are managed.

Hospitals present an interesting improvement challenge. The clinical methods used in health care and disease cure are easily understood. Yet when combined into institutions and broadened into social systems, the management of them becomes surprisingly convoluted.

The goal of the book is to bridge the gap in mutual understanding and communication between healthcare professionals and hospital administrators from industry and academia.

The book is a typical collection of articles from different authors from academia and healthcare industry focusing on the contemporary issues of Human Resource, Strategy and Operations Management.

This book serves as a compendium of introductory problems/projects and provides knowledge base to the practitioners in the industry and Health Care Management students as well as for MBA or MHM programs with an emphasis on Health Care and Hospital Management.

We hope that the readers of this book will surely understand and gain insights of the topic through recent and up-to-date information made available by rich experienced contributors.

G.V.R.K. ACHARYULU
BHIMARAYA METRI
KALYAN VISWANATH REDDY

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We are very grateful to Excel Publications, New Delhi, for their cooperation in bringing out this edited book in record time.

About the Editors

G.V.R.K Acharyulu, Associate Professor – Operations and Supply Chain and Coordinator (MBA Healthcare and Hospital Management), School of Management Studies, University of Hyderabad has combined experience of two decades in teaching and industry. An M. Tech. in Chemical Engineering from REC, Warangal and MBA from Osmania University, Dr Acharyulu worked in the area of Healthcare Supply Chain Management from Osmania University for his doctoral studies. He has many publications in national and international journals on Operations, Supply Chain and Healthcare and Hospitals areas. He has presented many papers in national and international conferences including the international conferences held in Australia, Dubai, Thailand, Singapore, Malaysia and USA. Five books on Marketing Research, Research Methods and Statistical Tools, Logistics and Supply Chain Management, Pharmacy Administration and Strategic Quality Management being published by him add credit to his expertise. His area of interest includes Operations Management, Quantitative Techniques, Supply Chain Management and Healthcare and Hospital Management.

Bhimaraya Metri is currently Dean (Academic) and Professor of Operations Management at IMI, New Delhi. Dr Metri received his PhD from IIT Bombay, India. He is an engineering graduate of Government College of Engineering, Karad and holds Postgraduate degree from Shivaji University, Kolhapur, India. Dr Metri has published over 100 research articles in international and national journals and proceedings. He has also co-authored books "Managing Global Services" and "World Class Manufacturing". He is on the editorial advisory boards of national and international journals. Dr Metri is deeply involved in consulting and executive education with a wide range of organisations including leading organisations of government, public sector and private sector. He is a Certified Lead Auditor in Quality Management System (QMS). Dr Metri is the Member of Decision Sciences Institute (DSI), USA. Currently, he is the President, Indian Subcontinent Decision Sciences Institute.

L. Kalyan Viswanath Reddy is an is an Academician, Lean Six sigma (Green belt) Auditor, licentiate from advisory board member, journal reviewer, author and consultant in the field of Hospital and Healthcare Management.

Dr Reddy is the manuscript reviewer of British Medical Journal and Anartha Journal. He is Consultant – Hospital Administration at Burt, Hill Design Pvt. Ltd., a Stantec Company, Ahmedabad and Expert Member of Research Foundation of Hospital and Healthcare Administration (RFHHA), Advisory Board Member of All India Pharma and Healthcare Council (AIPHC). He has to his credit more than a dozen research papers published in journals as well as in books

and presented papers in conferences at national and international levels. He has conducted conferences, workshops, MDPs and national conferences, funded by different national and international organisations. He has submitted many project proposals for funding to UGC, NMEICT, KACST, etc. His area of research interest includes Health and Hospital Management, Service Quality, Medical Informatics, Public Health, etc.

Dr Reddy is currently an Assistant Professor, Department of Health Management, College of Public Health and Health Informatics, University of Hail, Hail, Kingdom of Saudi Arabia.

List of Contributors

Dr Feroz Ikbal	*Assistant Professor, School of Health Systems Studies, Tata Institute of Social Sciences, Mumbai*
Dr G.V. R. K. Acharyulu	*Associate Professor, School of Management Studies, University of Hyderabad*
	Coordinator-MBA (Healthcare & Hospital Management)
Mr Ramaiah Itumalla	*Research Scholar, School of Management Studies, University of Hyderabad, Hyderabad*
Dr L. Kalyan Viswanath Reddy	*Assistant Professor, Department of Health Management, College of Public Health and Health Informatics, University of Hail, Hail, Kingdom of Saudi Arabia*
Dr Manjushri Sharma	*Assistant Professor UIAMS, Panjab University, Chandigarh*
Dr (Prof). Manisha Saxena	*Principal, Deccan School of Hospital Management, Hyderabad*
Prof. Shraddha Chowdhary	*Associate Professor, National Institute of Pharmaceutical and Education Research, Hyderabad*
V. R. Girija	*Assistant Professor, Deccan School of Hospital Management, Hyderabad*
Mehwesh Hasan	*Assistant Professor, Deccan School of Hospital Management, Hyderabad*
Dr Bayapa Reddy	*Assistant Professor, Department of Community Medicine, Meenakshi Medical College Hospital and Research Institute, Kanchipuram, Tamilnadu, India*
Dr Hamoud Al Shammari	*Vice Dean, College of Nursing and Assistant Professor, Health Service Management, College of Public Health and Health Informatics University of Hail, Saudi Arabia*
Dr Pavishi Agarwal	*Paediatric Physiotherapist, Hail University, Kingdom of Saudi Arabia*
Syed Murtuza Hussain Bakshi	*Associate Professor, Dept. of Hospital Management, Deccan School of Management, Hyderabad*
J. P. Pattanaik and Kasturi Ghosh	*Healthcare Professionals, Hyderabad*

Prof. M. Habeeb Ghatala	*Dean for Non-Medical Institutions, Apollo Hospitals Educational and Research Foundation, Hyderabad*
Prof. Lakshmi B.	*Dean of Management Programs, Administrative Staff College of India, Hyderabad*
Emmanuel D. Jadhav	*Assistant Professor, Department of Health Management and Policy, University of Kentucky, College of Public Health, Wilmore, Kentucky*
Dr Bhupinder Chaudhary	*Assistant Professor, Department of Hospital Management, H.N.G. University, Patan, Gujarat*
Ms Baljit Saini	*Lecturer, Department of Computer Engineering, K.D. Polytechnic, Patan, Gujarat*
Prof. Bhimaraya Metri	*Dean (Academic) Professor of Operations Management, International Management Institute (IMI), New Delhi*
Mrs Christy Solomon	*Research Scholar, School of Management Studies, University of Hyderabad, Hyderabad*

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A Study on Violence and Aggression towards Health Workers in Hospitals

Manisha Saxena*

Workplace violence is one of the most complex and dangerous occupational hazards in today's health care environment. This article includes the conceptual and empirical issues of violence in hospitals, a discussion of the need for methodologically intervention, effectiveness of research and a description of a process to reduce violence in hospitals. Even though health care workers may be exposed to different types of violence in the course of their work, the overwhelming majority of threats and assaults against caregivers come from patients and their attendants. Health care workers have very little influence over the level of violence in their workplaces, but through collective action policies designed, the health care workforce may be protected.

Keywords: *Health, Violence, Offence, Patient, Workforce*

INTRODUCTION

Violence is any physical assault, threatening behaviour or verbal abuse. Workplace violence includes beatings, stabbings, suicides, shootings, rapes, psychological traumas, threats or obscene phone calls, intimidation, verbal harassment, abusive or offensive language, gestures or other discourteous conduct towards supervisors, fellow employees, or the public. There may be disorderly conduct such as shouting, throwing or pushing objects, punching walls and slamming doors.

The World Health Organisation defines workplace violence as "The intentional use of power, threatened or actual, against another person or against a group, in work-related circumstances, that either results in or has a high degree of likelihood of resulting in injury, death, psychological harm, mal-development or deprivation."

Violence in the healthcare setting is not uncommon. Emergency department has the highest rate of violence in the hospital (Stultz MS, 1995). In 2004, the Bureau of Labor Statistics released

* Principal, Department of Hospital Management, Deccan School of Hospital Management, Hyderabad

data collected from 1996–2000, reporting that nearly half of all acts of workplace violence occur in healthcare settings (Osha, 2009). While often thought to be a phenomenon encountered primarily in large urban Emergency Departments, violent acts occur regardless of practice size and setting (Blando JD et al. 2009). Many acts of violence towards staff go unreported as they are considered "part of the job". Workplace violence influences job performance, retention, and stress. Hence, violence in the health-care sector needs to be addressed.

DEFINITIONS

Some important contextual terms and their definitions are given below:

- ***Health Care Worker:*** One who is employed by the health care facility.
- ***Violence or Violent Act*:** Any physical assault or verbal threat of assault or harm against a health care worker.
- ***EP 4 & EP 5:*** The Joint Commission with effect from January 1, 2009 added a standard in the "Leadership" chapter that addresses disruptive and inappropriate behaviours in two of its elements of performance:
  - *EP 4:* The hospital/organisation has a code of conduct that defines acceptable and disruptive and inappropriate behaviours.
  - ***EP 5:*** Leaders create and implement a process for managing disruptive and inappropriate behaviours.

ORIGINS OF VIOLENCE IN THE HEALTHCARE SECTOR

Workplace violence has its origins in a number of factors. Individual factors, organisational factors and environmental factors may contribute for the violence. Understaffing may increase the risk of violence due to longer patient waiting time.

Conceptual Frameworks

Three frameworks – the Haddon Matrix, the National Institute for Occupational Safety and Health/National Occupational Research Agenda (NIOSH/NORA) 'Work Organisation Framework' and the Broken Windows Theory – represent theoretical perspectives from injury epidemiology, occupational psychology and criminal justice applied to workplace violence prevention. Each theory has been advanced to guide workplace violence research, but none has been sufficiently tested in the published literature. Starting with the Haddon Matrix, each will be briefly described.

The Haddon Matrix

This matrix was used to critically evaluate published workplace violence intervention research. This framework proved to be quite effective in guiding injury epidemiology several decades ago (Haddon, 1972, 1974); but in 2000, it was suggested for use in workplace violence research (Runyon, 2000). The Haddon Matrix is a framework designed to apply the traditional public health domains of host, agent and disease to primary, secondary and tertiary injury factors.

When applied to workplace violence, the host is the victim of workplace violence such as a home health nurse. The agent/vehicle is a combination of the perpetrator and their weapon and the force with which an assault occurs. The environment is divided into two sub-domains: the physical and the social environments. The location of an assault such as the home, street or hospital ward is as important as the social setting such as patient interaction, presence of co-workers and supervisor support. Table 1 provides a hypothetical application of the Haddon Matrix to workplace violence research in the home visiting workplace setting.

TABLE 1: AN APPLICATION OF THE HADDON MATRIX TO WORKPLACE VIOLENCE PREVENTION IN THE HOME HEALTH WORKPLACE

Phases	Host	Agent	Physical Environment	Social Environment
Pre-Event (prior to assault)	Knowledge Self-efficacy Training	History of prior violence communicated	Assess objects that could become weapons, actual weapons. Egress.	Visit in pairs, or with escort
Event (assault)	De-escalation Escape techniques Alarms/2-way phones	Reduce lethality of patient via increasing your distance	Egress, alarm, cell phone	Code and security procedures
Post-Event (post-assault)	Medical care/ counselling Post-event debriefing	Referral Law enforcement	Evaluate role of physical environment	All staff debrief and learn

It is a classical epidemiological framework that uses a matrix to categorise "pre-event," "event," and "post-event" activities according to the infectious disease vernacular, host (victim), vector (assailant or weapon), and environment. A third dimension allows prevention strategies to be further classified as behavioural, administrative or environmental. Strengths of this model include the ability to assess "pre-event" or precursors to violence in order to develop primary preventive measures.

Work Organisation Framework

The National Institute for Occupational Safety and Health/National Occupational Research Agenda Organisation of Work team (NIOSH/NORA) developed this model during the multi-stakeholder National Organisational Research Agenda setting process (U.S CDC/NIOSH, 2001). Organisation of work refers to management and supervisory practices as well as production processes and their influence on the way work is performed. The NIOSH model theorises that work organisation (a multi-level and multi-dimensional construct) influences occupational illness and injury through the availability of occupational health services and activities (for example, violence prevention policies and programmes including training and engineering controls such as lighting) and by influencing exposure to psychosocial (i.e. threatening patients, families and

communities) and physical (i.e. violent patients and violence communities) hazards (McPhaul & Lipscomb, 2003).

In summary, NIOSH/NORA has developed the work organisation framework to explain the influence of job design on occupational injuries and it is potentially useful for guiding workplace violence research as well.

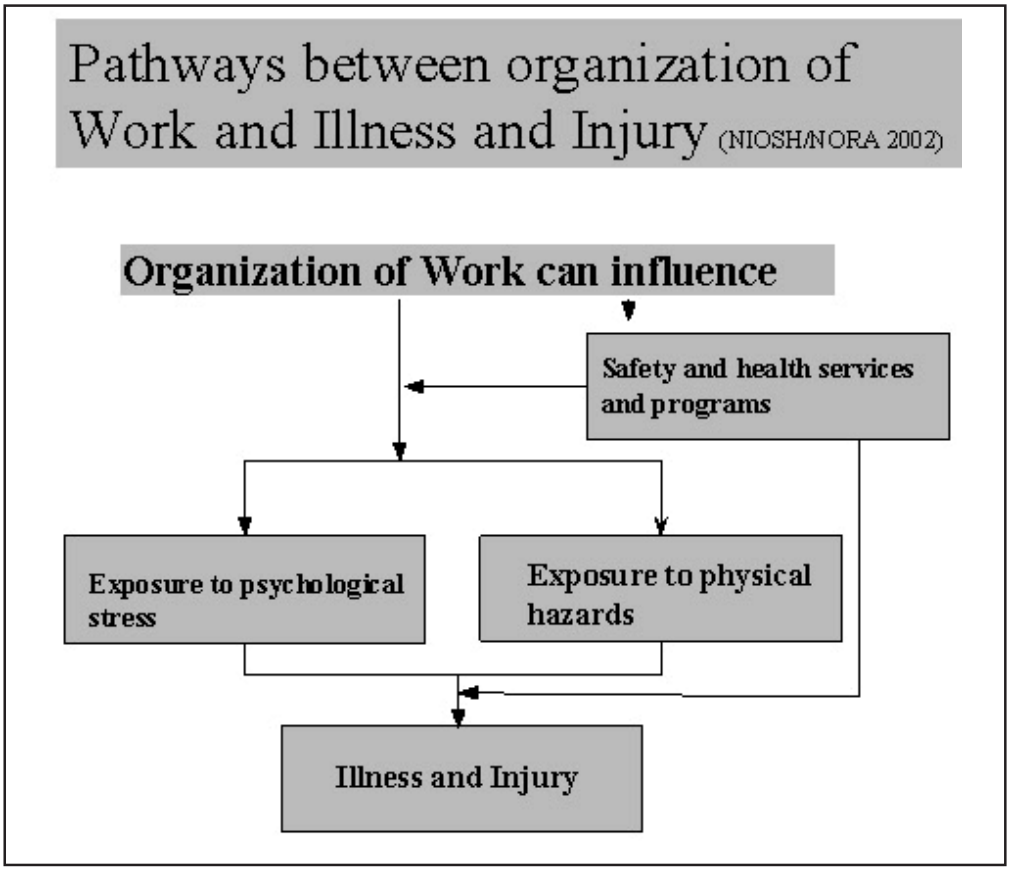


FIGURE 1: NIOSH/NORA WORK ORGANISATION FRAMEWORK FOR OCCUPATIONAL ILLNESS AND INJURY

Broken Windows Theory

This theory is a community criminal justice theory that embraces the notion that ignoring or tolerating low-level crime creates an environment conducive to more serious crime. Hesketh et al. (2003) argue that when verbal abuse, threats of assault and low-level daily violence are tolerated in health care environments, more serious forms of violence will follow. To test this theory, more sophisticated and representative measures of verbal threats and low-level assaults must be developed. Current U.S. occupational surveillance systems capture lost work time injuries due to assaults in private sector workplace (U.S. Bureau of Labor Statistics), crime victimisations (including assault) occurring on the job (U.S. Department of Justice, National Crime Victimisation Survey), and fatalities in all sectors (U.S. Census for Fatal Occupational

Injuries). There is widespread agreement that non-fatal assaults without lost work time and verbal threats of assaults are widely under-reported resulting in an incomplete picture of the extent of workplace violence (Bensley et al., 1993); and an inability to examine the relationship between verbal threats, low-level physical assault and more serious forms of assaults and violence.

TYPES OF VIOLENCE IN HOSPITALS

The types of violence in hospitals occur in a variety of forms. These types are violence by strangers, violence by customers or clients, violence by co-workers and violence by personal relations.

IMPACT OF WORKPLACE VIOLENCE

Violence at work can trigger a range of physical and psychological outcomes in victims. There may be physical assaults ranging from bruises to broken bones or being affected emotionally such as anger, shock, fear, depression, anxiety and sleep disruption. Additionally, workplace violence may affect a worker's career. Health service delivery may suffer from the threat of workplace violence. If health care providers fear a population they are serving, the quality of care they deliver may suffer as a consequence.

What is the Extent of the Problem?

US gynaecologists receive threats and actual murder over abortion. More than half of emergency room (ER) nurses experience physical violence such as spitting, shoving and kicking. The survey of 170 university hospitals revealed 57% of all ER employees threatened by weapons over a five-year period.

In UK, half of all doctors experienced some degree of violence or abuse, 20% of these physical (BMJ, 2003). Among general practitioners, the threat of violence was 1 in 500 consultations.

In China, in 2006, more than 5,500 medical workers were injured by patients or relatives. In June 2010, a doctor was stabbed to death by the son of a patient who died of liver cancer. Three doctors were severely burned when a patient set fire to a hospital office. A paediatrician jumped through the window to escape angry relatives of a dead newborn.

In Fujian, China, a patient died and his relatives took a doctor hostage, threw bottles injuring five employees and the hospital paid $ 31,000 to the family.

In Kuwait, 86% doctors experienced verbal insults or imminent violence; in addition, 28% had also experienced physical attacks. In Israel, surveyed physicians reported rates of violence against them to vary from 54% to 79%.

Why does it Occur?

According to Farooq, J. et al., "In health care settings, violence occurs mainly because of misunderstanding and mishandling." In society, there is the more availability of knowledge, the more aggression and violence on roads, public places, even in schools and hospitals.

BOX 1: RISK OF VIOLENCE IN HOSPITALS

- Working directly with volatile people, especially, if they are under the influence of drugs or alcohol or have a history of violence or certain psychotic diagnoses
- Working when understaffed-especially during meal times and visiting hours
- Transporting patients
- Long waits for service
- Overcrowded, uncomfortable waiting rooms
- Working alone
- Poor environmental design
- Inadequate security
- Lack of staff training and policies for preventing and managing crises with potentially volatile patients
- Drug and alcohol abuse
- Access to firearms
- Unrestricted movement of the public
- Poorly-lit corridors, rooms, parking lots and other areas

Source: NIOSH, 2002

Why among Doctors?

Not all adverse events end up in violence and not all violence is related to adverse events. Different precipitants are responsible. For instance, in Israel, prolonged waiting time (46.2%), dissatisfaction with treatment (15.4%) and disagreement with physician (10.3%); in UK, intoxication, mental illness and prolonged waiting lead to violence against doctors and other health workers.

Malpractice cases are not just a result of heightened patient expectations and entrepreneurial lawyers.

The Archives of Internal Medicine, 1994 perceived lack of caring and/or collaboration in health care, perceived unavailability, discounting patient and family concerns, poor delivery of information, more than half mal-occurrence suggested by health professional could be the reasons for violence against doctors and other health workers.

The unrealistic expectations by poor families who have travelled far and exhausted their savings on care expect medical miracles. Formerly, when religion was strong and science weak, men mistook magic for medicine; now, when science is strong, men mistake medicine for magic.

According to the Indian Scenario Bombay Hospital Journal, 2009, delay in attention of casualty, delay in admission of serious patients in ICU, death, denying entry passes, repeated delay or postponement of surgery, wrong surgery and denial of access to case papers can lead to violence against doctors and other health workers.

What can be Done?

Situations of violence should be dealt with utmost care. The grievances should be addressed, but also seek for help. Health workers must form groups, which can handle violent-related instances.

Violence in hospitals should be made a non-bailable offence. Offenders should be liable to pay up to twice the purchase price of damaged equipment. Those health workers who cannot communicate well are more likely to end up with litigations. "In the sick room, ten cents' worth of human understanding equals to ten dollars' worth of medical science (Vidushi & Suresh, 2011)." Dealing with human beings in extraordinary moments of fear, anxiety and doubt is a challenging task.

Information should be communicated to the public at large about diseases and medical problems. The doctor's intend to deliver the best and latest procedures. However, patient satisfaction primarily comes from a sense of being heard and understood. Doctors can only help people adjust to the sickness, pain and death and cannot carry out any miracles. The medical training requires reorientation to changing perceptions and language that implies scepticism. Lack of time can be managed by using paramedical staff delegation of the work of repeated explanations to counsellors.

Information should be displayed on boards, counters, etc. Do not escalate costs later or change plans frequently. Also, display rules regarding consequences of violence in the hospital. Mutual acceptance is very much required. Accept the diversity of patient backgrounds and accept the right of patients to respect and sense of fair play.

Mutual acceptance of the patient and health workers is desired. Acceptance of limitations of medical science is required. Health workers need to work peacefully by restricting public entry strictly by passes.

To err is not human and to forgive is not divine for the medical errors. Delicate situations of death have to be handled with utmost care and with a human approach.

In a video-taped study of 171 office visits, doctors who encouraged patients to talk about psychosocial issues such as family and job had more satisfied patients and the visits were only two minutes longer on average (Vidushi & Suresh, 2011).

Display warning in hospital premises must mention the consequences of violence against health workers in hospitals.

Many malpractice suits occur neither because of malpractice nor even because of lack of good care but as an expression of anger about some aspect of doctor-patient relationship and communication. Patients may want compensation, accountability, or just to be heard. Patients should ask the right questions and be prepared to accept realistic treatment goals. They should not be melodramatic or overly helpless.

Do not let things go too far. It is a big challenge to remain calm in the face of provocation.

INTERVENTION EFFECTIVENESS RESEARCH INTO VIOLENCE PREVENTION

None of the intervention studies to date evaluate a comprehensive violence prevention intervention that incorporates the risk/hazard assessment and documents baseline risk factors, assault experience, and violence prevention strategies. Nor do any of the published intervention studies document the organisational process for implementing a violence prevention intervention.

Finally, a comparison of post-intervention assault experience and risk factors to the pre-intervention levels along with the inclusion of control workplaces is essential to fully evaluate a comprehensive violence prevention intervention.

CONCLUSION

All healthcare workers have right to work in a safe working place. The safety of healthcare workers should deserve the same priority as patient safety. Various risk factors including social, cultural, environmental, organisational and personal elements play a role in the formation of workplace violence. Considering all those factors, the workplace violence in health sector should be seriously handled and the strategies and policies must be developed for prevention.

References

1. Haddon, W. (1972). A Logical Framework for categorizing Highway Safety Phenomena and Activity. Journal of Trauma-Injury Infection & Critical Care. 12(3):193-207
2. Haddon, W. (1974). Strategy in Preventive Medicine: Passive vs. Active Approaches to reducing Human Wastage. Journal of Trauma-Injury Infection & Critical Care. 14(4):353-4r
3. Bensley, L., Nelson, N., Kaufman, J., Silverstein, B., & Kalat, J. (1993). Study of Assaults on Staff in Washington State Hospitals – Final Report. State of Washington: Department of Labor and Industries
4. Stultz MS. Crime in Hospitals 1995: The Latest International Association for Healthcare Security and Safety Survey. J Healthc Prot Manage. 1996–1997 13-1-45. [PubMed]
5. WHO (1995). Violence: A Public Health Priority. Geneva: World Health Organization
6. U.S. Department of Labor, Bureau of Labor Statistics. (2001). Survey of Occupational Injuries and Illnesses, 2000. Available: www.bls.gov/iif/oshwc/osh/os/osnmr0013.pdf
7. McPhaul, K., & Lipscomb, J. (2003). Conceptual and Methodological Issues in Measurement of Work Organization and Workplace Violence. Paper presented at the American Psychological Association/NIOSH Workplace Stress Conference, Toronto
8. J. Farooq, et al. (2009): "Violence in Hospitals" in Journal of Academy of Hospital Administration, vol. 21 No. 1 & 2, Jan to June and July December, 2009
9. Guidelines for Preventing Workplace Violence for Health Care and Social Service Workers. Occupational Safety and Health Administration website. Available at: www.osha.gov/publications/osha3148.pdf. Accessed 8 September 2009
10. Blando JD, McGreevy K, O'Hagan E, et al. Emergency Department Security Programs, Community Crime and Employee Assaults. J Emerg Med. doi: 10.1016/j.jemermed.2008.06.026. Epub ahead of print Jan 2, 2009; [PubMed] [Cross Ref]
11. Sharma, Vidushi & Pandey, Suresh K (2011): "Violence & Aggression against Doctors", Kota, Rajasthan India

2

Knowledge, Attitudes and Practice

Survey of Quality and Performance of Human Resource Department in a Corporate Hospital

L. Kalyan Viswanath Reddy*
Bayapa Reddy**

The purpose of this research paper is to know the existing condition of Human Resource (HR) department and overall information on how various procedures undertaken in the department as per different HR policy and by Knowledge, Attitude and Practice (KAP survey) from that area of improvement as per quality tool is implemented for improvement if any fault is there which leads to improvement in quality and revenues effectiveness of department.

The study involved adopting the KAP survey questionnaires to corporate hospital. The name of the hospital is not disclosed as per the request from the hospital. The sample size is of 50. The Cronbach's Alpha reliability is calculated as 0.818. Out of 50 questionnaires, the knowledge about HR activities is calculated as Sig. (2-tailed) is 0.00, attitude of HR is calculated with behaviour of HR staff Sig. (2-tailed) is 0.001 and performance of HR department Sig. (2-tailed) is 0.000. All the null hypotheses tested for KAP analysis were rejected and all the alternative hypotheses were rejected.

Although the study has a limited sample size, it does appear that the KAP approach has a useful diagnostic role to play in identifying, measuring, analysing and calculating the performance of HR department. This enables the hospital staff to provide quality service and enhance performance of HR department. The study has raised a number of issues which would form the basis for useful further research.

The process quality from the hospital staff and patient's perspective should be routinely monitored and assessed.

* Assistant Professor, Department of Health Management, College of Public Health and Health Informatics, University of Hail, Hail, Kingdom of Saudi Arabia

** Assistant Professor, Department of Community Medicine, Meenakshi Medical College Hospital and Research Institute, Kanchipuram, Tamil Nadu, India

The findings should be useful to hospital quality department to assess and improve service quality.

Keywords: *KAP, Human Resource Department, Hospital, Health Services, Customer Satisfaction*

INTRODUCTION

The world recognised the importance of effective human resource management for organisational performance in 1800s (Kochhar et al., 2001). But in almost all organisations, still a gap exists to carry out effective and efficient manpower management. There is a growing body of evidence supporting an association between what are termed high performance or high commitment human resource management (HRM) practices and various measures of organisational performance. However, it is not clear why this association exists (Janssen, P.P.M et al., 1999). This paper argues that to provide a convincing explanation of this association, we need to improve our theoretical and analytic frameworks in three key areas. These are the (KAP) knowledge to the staff regarding nature of HRM, and especially the rationale for the specific lists of HR practices; the attitude of nature of organisational performance; and the performance linkage between HRM and staff. The existing literature on HRM and performance is reviewed in the light of this analysis to identify key gaps in knowledge and help to focus further the research priorities.

However, studies of the HR–performance relationship have provided limited insight into the effects of high-performance HR systems on the more proximal employee outcomes that they are likely to affect most directly (Dyer et al., 1995). Although a few recent empirical studies have provided support for the claim that high-performance HR practices work most immediately through employees' attitudes and behaviours such as job satisfaction, affective commitment, etc. (Takeuchi et al., 2009). Furthermore, empirical work has demonstrated that employees' perceptions of HR practices significantly vary from managerial reports of the HR practices in use (Liao et al., 2009).

In light of these extant research needs, the purpose of the present article is threefold: first, to propose a model explicating the effects of employee's collective knowledge about HR practices in hospital; second, to provide attitude of HR personnel behaviour to the job group level; and, third, to enhance multilevel relationships between staff of hospital and HR personnel for patient satisfaction with effective and efficient performance of the hospital.

LITERATURE REVIEW

The study on relation between the management and staff of any organisation is always given new horizons and results. In this study of KAP, the researcher wants to find the various ways the organisation and staff members strive for improving the performance of work and organisational development. Intractable and negative staff outcomes associated with working in hospitals is high levels of stress which undermine performance and lead to high staff turnover (Janssen et al. 1999). In line with this, recent work stresses the importance of integrated sets of ability, motivation and opportunity enhancing HR practices in relation to employee- and, in turn, firm-level outcomes (Gardner et al., 2011). HR practices positively affect organisational performance outcomes (Becker et al., 1997), yet how HR affects outcomes is not fully clear.

High-performance HR practices are assumed to enhance employee motivation and performance, and in turn, these more motivated and better performing employees improve firm performance. In line with this more central role of employees, authors emphasise the need to include employee perceptions in HR studies (Nishii and Wright, 2008). However, having a well-designed HR system on paper may not suffice to positively affect employees as rhetoric about the desired HR system and the reality of what is implemented may differ from each other (Legge, 2005). Studies on HR, generally find positive associations of these varying but integrated systems with outcomes such as productivity, turnover, financial and service performance, commitment, and satisfaction (Verburg, et al., 2007). HR can contribute both to "happy" and "productive" workplaces (Cropanzano and Wright, 2001). This happens by various subsystems, which include skills, motivation, and empowerment enhancing practices, and in combination this work system should enhance employee's skills, motivation and discretionary effort, ultimately leading to higher performance (Gardner et al., 2011). Employee ratings also tend to be related to manager ratings. As per the study in 2009, there is .60 correlation between manager and employee ratings of team effectiveness (Van Woerkom and Croon, 2009).

First, affective commitment has been shown to be affected by employee's work and organisational experiences (Meyer et al., 2002). Second, affective commitment has been demonstrated to relate strongly and consistently to desired work outcomes such as low absenteeism and organisational citizenship behaviours (Meyer et al., 2002), and its role as a key-linking mechanism between high-performance HR practices and higher-level performance participation affects workers' ability to derive a sense of meaning from work and to achieve satisfaction with work itself (Cartwright and Holmes, 2006). Practices such as teamwork and participation provide workers with greater autonomy and opportunities to contribute to decisions that can enhance satisfaction with influence. Rewards-related HR practices may enhance more extrinsic aspects such as pay satisfaction (Brown et al., 2008). Satisfaction with specific facets is likely to enhance overall job satisfaction. Thus, one way in which HR systems are assumed to affect firm performance is through their impact on employees as the degree to which employees are motivated to behave in line with organisational goals is seen as vital for firm performance (Gottschalg and Zollo, 2007).

Sun et al., 2007 noted that although high-performance HR practices have been empirically linked to retention and turnover (Batt, 2002), the underlying mechanisms of this relationship remain uncertain. HR practices are most likely to lead to desired outcomes when these are consistently perceived by employees in intended ways (Bowen and Ostroff, 2004). There, employee perceptions of HR practices might "matter more" than manager perceptions as they are more closely linked to employees (Gerhart et al., 2000). When managers are able to provide employees with accurate and useful task and organisational information, this aids employees' sense making and reduces uncertainty (Kernan and Hanges, 2002). (Sharbrough et al., 2006) found that the use of motivational language by managers relates positively with perceived manager effectiveness and employee satisfaction, and (Madlock, 2008) shows that managers' communication competence relates to satisfaction.

RESEARCH PROBLEM STATEMENT/AIM

Apart from the health workers in hospitals, the administrative people play vital role for smooth functioning of health care services in hospital. This study identifies the existing gaps in knowledge,

attitudes and skills that affect the individual performance (Manikandan and Anwar, 2008). It is therefore imperative to investigate knowledge and practices of doctors, nurses and other health professionals related with regard to HR management. These should give an insight of their Knowledge, Attitude and Practice (KAP) regarding the policies and practices of HR department so that appropriate interventions can be put in place.

RESEARCH OBJECTIVES

The research was carried out with the following objectives:

- Critical evaluation of existing practices and estimation of the Knowledge, Attitude and Practice (KAP) of awareness level of hospital staff about HR department policies, practices, procedures, etc.
- To recognise individual needs and group goals so that the hospital staff may work willingly and cooperate to achieve the organisation goals
- To establish and maintain a productive and self-respecting relationship among the staff and bring about maximum individual development of members in the organisation
- To find out how HR department maintain high morale and better human relations with hospital staff in the organisation so that the employees stick to their jobs for a longer period

RESEARCH HYPOTHESIS

The following hypothesis was framed for the study:

- ***Null Hypothesis (H0):*** There is no significant improvement in the knowledge, attitude and practice levels of staff in hospital staff against HR department.
- ***Alternative Hypothesis (H1):*** There is significant improvement in the knowledge but no significant improvement in the attitude and practice levels of hospital staff against HR department.
- ***Alternative Hypothesis (H2):*** There is significant improvement in the knowledge and attitude but no significant improvement in the practice levels of hospital staff against HR department.
- ***Alternative Hypothesis (H3):*** There is significant improvement in the knowledge and practice but no significant improvement in the attitude levels of hospital staff against HR department.
- ***Alternative Hypothesis (H4):*** There is significant improvement in the attitude and practice, but no significant improvement in the knowledge levels of hospital staff against HR department.
- ***Alternative Hypothesis (H5):*** There is significant improvement in the knowledge, attitude and practice levels of hospital staff against HR department.

RESEARCH METHODOLOGY

The research methodology adopted for the study includes the following:

- ***Research Design:*** An exploratory and descriptive study
- ***Sample Design - Sampling Unit:*** Hospital staff in corporate hospital
- ***Sampling Method:*** Simple random sampling, i.e. Convenience sampling
- ***Sample Size:*** 50
- ***Scaling Technique:*** Ordinal and Likert scale
- ***Data Collection Method:*** The data collection method consists of two types: Primary Data Collection and Secondary Data Collection.
  - *Primary Data Collection:* Observation, unstructured interviews and questionnaires
  - *Secondary Data Collection:* Hospital records/HR policy and annual reports
- ***Analysis:*** Through Microsoft Excel and SPSS

DATA ANALYSIS AND INTERPRETATION

The analysis and interpretation of the study is explained in the following sections.

Validity and Reliability

Based on the primary data collected through cross-sectional study, the validity and reliability analysis is as follows:

TABLE 1: VALIDITY STATISTICS

Case Processing Summary			
		N	%
Cases	Valid	50	100.0
	Excluded	0	.0
	Total	50	100.0
List-wise deletion based on all variables in the procedure.			

TABLE 2: RELIABILITY STATISTICS

Reliability Statistics	
Cronbach's Alpha	No. of Items
0.818	10

The reliability analysis indicates that the value of Cronbach's Alpha is 0.818, which is highly reliable and is tested for all the 10 items.

Testing Hypothesis

The Knowledge, Attitude and Practice (KAP) hypothesis (see hypothesis above) was tested by the following factors through carefully prepared, structured and drafted questionnaires.

TABLE 3: FACTORS FOR TESTING KAP HYPOTHESIS

1	Joining Formality
2	Induction and Orientation
3	HR Policies
4	Remuneration
5	Motivation
6	Overall Satisfaction from HR

TABLE 4: T-TEST

One-Sample Statistics				
	N	**Mean**	**Std. Deviation**	**Std. Error Mean**
Satisfaction from Job Responsibility	50	2.36	0.569	0.114
Satisfaction from Induction and Orientation	50	3.04	0.935	0.187
Satisfaction from Leave Policy	50	2.28	0.458	0.092
Satisfaction of Salary	50	2.92	0.759	0.152
Satisfaction from Reward System	50	2.52	0.510	0.102
Transparency of HR Department	50	2.92	0.640	0.128
Overall Satisfaction from HR Department	50	2.40	0.500	0.100

TABLE 5: SUMMARY OF KAP ANALYSIS

One-Sample Test						
Test Value = 2				**95% Confidence Interval of the Difference**		
	T	**df**	**Sig. (2-tailed)**	**Mean Difference**	**Lower**	**Upper**
Satisfaction from Job Responsibility	3.166	24	0.004	0.360	0.13	0.59
Satisfaction from Induction and Orientation	5.564	24	0.000	1.040	0.65	1.43
Satisfaction from Leave Policy	3.055	24	0.005	0.280	0.09	0.47
Satisfaction of Salary	6.058	24	0.000	0.920	0.61	1.23

Satisfaction from Reward System	5.099	24	0.000	0.520	0.31	0.73
Transparency of HR Department	7.184	24	0.000	0.920	0.66	1.18
Overall Satisfaction from HR Department	4.000	24	0.001	0.400	0.19	0.61

RESULTS

As per the data analysis, 40% employees received appointment letters on time, 44% employees were given their posting order on time, 12% employees received their job responsibility on same day, 68% of employees are satisfied from their job responsibility, 40% employees were satisfied from their induction and orientation programme, 72% employees believe that induction and orientation program is informative, 28% employees are receiving job-related training periodically, 28% employees are aware of different HR policies, 80% employees are aware of their rights and responsibilities, 72% employees are satisfied from hospital leave policy, 84% employees are aware of grooming and dress code system, 44% employees are aware of performance appraisal system, 56% employees are aware of mediclaim policy and its coverage, 68% staff members are aware of employee welfare scheme and 52% employees are aware of grievance redressal and disciplinary action policy.

TABLE 6: ONE SAMPLE STATISTICS

One-Sample Statistics				
	N	Mean	Std. Deviation	Std. Error Mean
Performance Analysis	25	2.56	0.651	0.130
Attitude Analysis	25	2.52	0.653	0.131
Knowledge Analysis	25	2.44	0.583	0.117

TABLE 7: KAP ANALYSIS

One-Sample Test						
Test Value = 2	95% Confidence Interval of the Difference					
	T	Df	Sig. (2-tailed)	Mean Difference	Lower	Upper
Performance Analysis	4.303	24	0.000	.560	0.29	0.83
Attitude Analysis	3.980	24	0.001	.520	0.25	0.79
Knowledge Analysis	3.773	24	0.001	.440	0.20	0.68

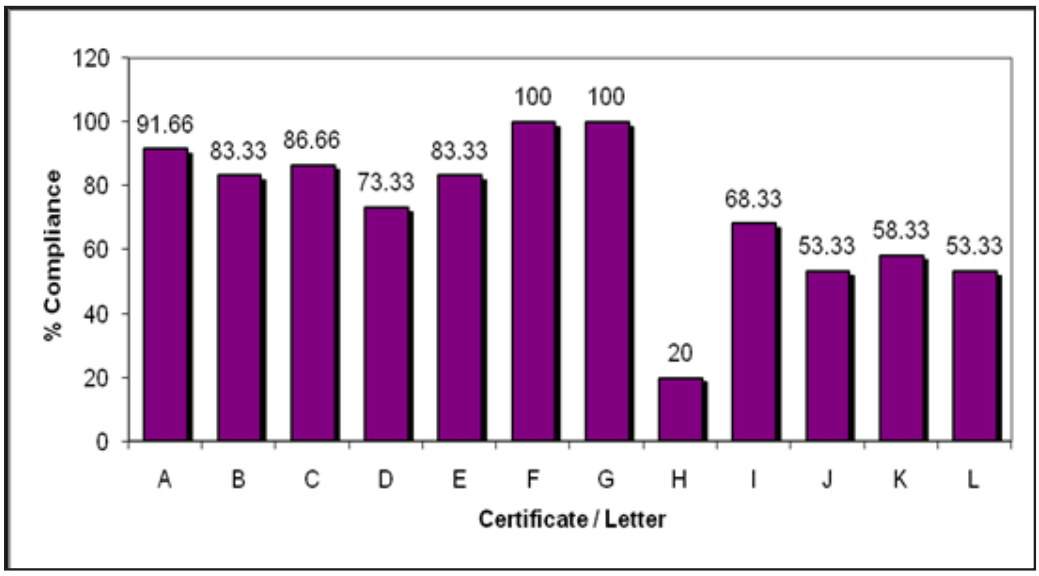
From the above analysis, we can conclude that mean of all null hypotheses are greater than the test value of the hypothesis. So, all the null hypotheses are rejected and all the alternative hypotheses are accepted.

LEVEL OF COMPLIANCE OF EMPLOYEE'S PERSONAL RECORD

To identify quality level of employee's personal record maintenance system, the compliance of employee's personal record study was conducted.

TABLE 8: COMPLIANCE OF EMPLOYEE'S PERSONAL RECORD

S. No.	Name of Documents	% of Compliance
1	Biodata + Application Form	91.66
2	Interview Rating Sheet	83.33
3	Educational Certificates	86.66
4	Professional Certificates	73.33
5	Joining Report Certificates	83.33
6	Pre-Employment Medical Report	100
7	Appointment Letter	100
8	Job Description	53.33
9	Induction and Orientation Assessment	20
10	Training Record	68.33
11	Financial	28.33
12	Letter of Appreciation	16.67
13	Letter of Advice Warning	20
14	Probation Assessment	53.33
15	Yearly Assessment	58.33
16	Resignation and Exit Interview Format	42.86(3)



GRAPH I: DATA ANALYSIS FOR COMPLIANCE OF EMPLOYEE'S PERSONAL RECORD

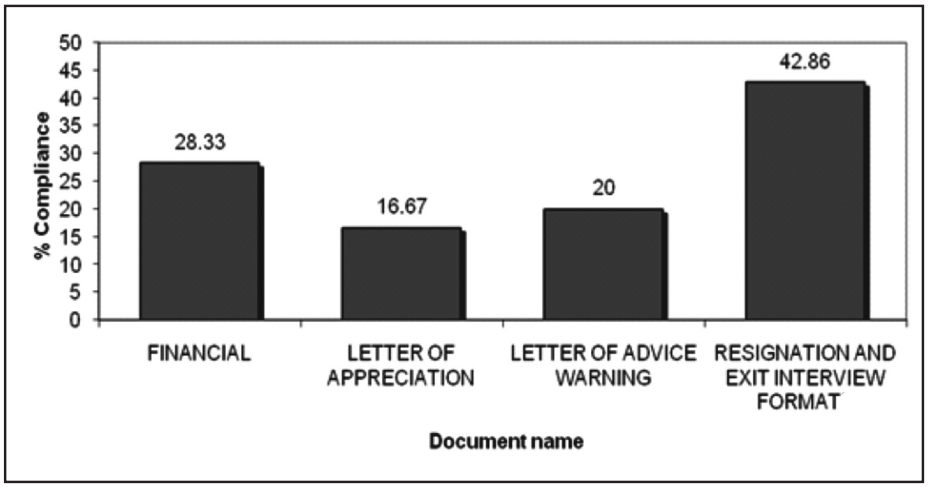
The above graph is represented as:

TABLE 9: EXPLANATION OF THE ABOVE GRAPH

Biodata + Application Form	A
Interview Rating Sheet	B
Educational Certificates	C
Professional Certificates	D
Joining Report Certificates	E
Pre-Employment Medical Report	F
Appointment Letter	G
Induction and Orientation Assessment	H
Training Record	I
Probation Assessment	J
Yearly Assessment	K
Job Description	L

Interpretation from Compliance of Employee's Personal Record

From the Graph I, the researcher concludes that employee's personal records are incomplete. The level of compliance of records varies from documents to documents. In employee training records, the level of compliance is very less (only 20%). While pre-employment test records and appointment letter is present in all file of employee. For this document, the level of compliance is 100%. Nearly about 60% of file has a yearly assessment records. It means all performance evaluation forms are not documented. Also, only 54% file have a job description. Generally, job description is given to all employees but here not proper filling of the same document is done. Interview assessment is also mandatory for recruitment process, but only 84% file have an interview assessment sheet. The reason may be that they are transferred from the other branch of hospital. Only 63.33% file have a probation assessment sheet. In this file, the letter of confirmation is present but assessment of probation with signature and remarks of HOD is not attached.



GRAPH II: DATA ANALYSIS FOR COMPLIANCE OF EMPLOYEE'S PERSONAL RECORD

The documents in Graph II are also attached in employee's personal records but it is not necessary to present all documents in all files. But for employees, who have resigned, I have audited 7 files among them and the level of compliance is only 42.86%. So, all resigned files did not contain exit interview sheet. From the above both graphs, we can say that most of the file is incomplete.

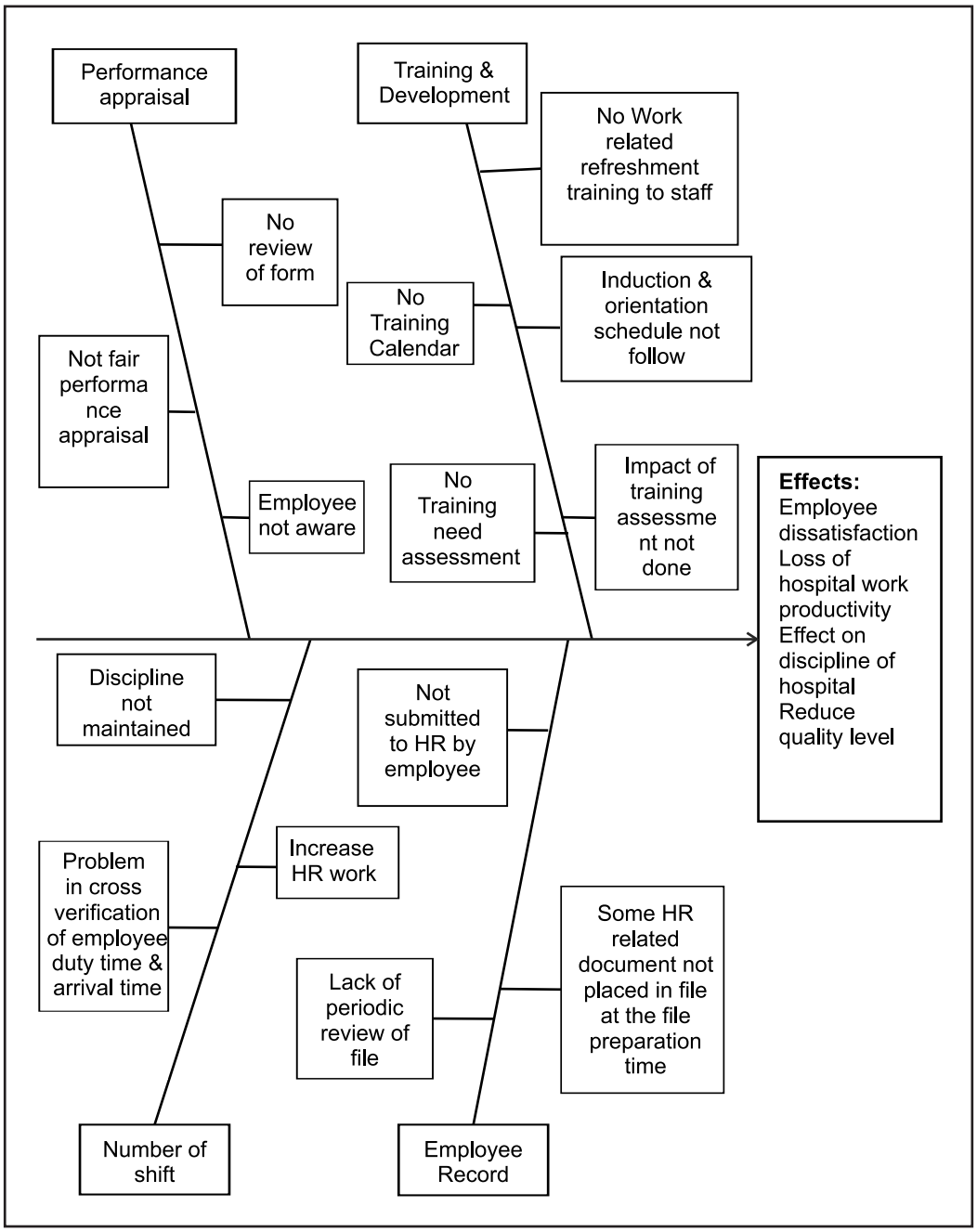


FIGURE 1: CAUSE AND EFFECT DIAGRAM

DISCUSSION AND RECOMMENDATIONS

This can be summarised as follows:

- The HR has to take regular or surprise audit of hospital for identifying work of employees against their job profile. The cross-checking of employees present or absent should be done.
- The HR should inform the employees regarding different HR policies. It may be given at the time of induction programme of new joining employees. For that, the HR can prepare one presentation regarding different HR policies.
- In HR department, there is one booklet "HR Manuals" that every employee has to give at the time of their joining. So, an employee can know something regarding HR policy and different activities. This booklet should be updated timely as per the change in policies and change in the hospital.
- A fair performance appraisal system should be in practice. Most of employees have complained that the HOD fills same report for all the staff without consideration of employee's actual work. So, employees who are doing really good work are not benefited properly as per their work.
- After finalisation of employees posting in particular department, proper and detailed job responsibility should be given to a new joiner with consent of departmental HOD.
- Once an employee's job responsibility is decided, then on the same day, written job responsibility should be hand over to employees. Proper and easily retrievable filing of the document should be done.
- Job-related training should be given to employees as per their training needs. For that, the performance appraisal form should be verified thoroughly to know the training need of employees. By this, productivity will be also improved.
- Any training schedule is not followed as per the policy. Some of the employees are sent directly to department without attending any induction programme because of unavailability of a trainer or any other reason. Thereafter, everyone forgets regarding the induction for him/her. This may be due to the new joining staff every day. So, there is need to arrange everyday induction programme. If they fix particular day for joining of staff, then it will become comfortable to arrange proper induction and orientation of employees without any problem.
- There is need to frame work of new policy for duty time punctuality.
- There should be fixed policy regarding an employee late arrival and early going, like one time early going and one time late arrival is acceptable. If an employee comes late and goes early more than two days, then the HR will calculate these days as a half-day casual leave (CL) or sick leave (SL) of that employees.
- For implementation of above working time disciplinary policy, management should reduce number of shifts to manage smooth and streamline line duty timing of employees. It helps to maintain the working time discipline in the organisation and employees will become punctual for their duty time.

- The shift time of employees is easy to know and the HR can be able to calculate employee's lost working time in a particular month.

CONCLUSION

From the detailed study of the department, the researcher concludes that there are some areas of the department which need to be reframed. The modification of some existing systems and implementation of some new policies can help in improving the overall performance of the department. Some loopholes were identified in the department of the hospital as per the NABH standards. As per the randomly identified parameters and issues which were affecting the quality and performance of the department, the root cause analysis was performed for these parameters. The primary and secondary data collection methods were used for data collection. On the basis of the data analysis, the researcher found that there are some problems in performance appraisal system, employee discipline towards time punctuality, induction, orientation and training programmes, employee's personal record file completion. These are some of the major issues hindering the performance and quality of the department. By reframing the existing policy and implementing the new policies, these problems can be overcome. These will lead to better performance and quality management of the department. Thus, the employee satisfaction level will also improve which is the ultimate goal of the human resource department.

References

1. Batt, R. 2002. Managing Customer Services: Human Resource Practices, Quit Rates and Sales Growth. *Academy of Management Journal*, 45: 587-597
2. Becker, B. E., Huselid, M. A., Pinckus, P. S. & Spratt, M. 1997. HR as a Source of Shareholder Value: Research and Recommendations. *Human Resource Management Journal*, 31: 39-47
3. Bowen, D. E. & Ostroff, C. 2004. Understanding HRM-firm Performance Linkages: The Role of the "Strength" of the HRM System. *Academy of Management Review*, 29: 203-221
4. Brown, A., Forde, C., Spencer, D., & Charlwood, A. 2008. Changes in HRM and Job Satisfaction, 1998–2004: Evidence from the Workplace Employment Relations Survey. *Human Resource Management Journal*, 18: 237-256
5. Cartwright, S., & Holmes, N. 2006. The Meaning of Work: The Challenge of Regaining Employee Engagement and Reducing Cynicism. *Human Resource Management Review*, 16: 199-208
6. Cropanzano, R., & Wright, T. A. 2001. When a "Happy" Worker is Really a "Productive" Worker: A Review and Further Refinement of the Happy-Productive Worker Thesis. *Consulting Psychology Journal: Practice and Research*, 53(3): 182-199
7. Dyer, L., & Reeves, T. 1995. Human Resource Strategies and Firm Performance: What do we know and where do we need to go? *International Journal of Human Resource Management*, 6: 656-670
8. Gardner, T. M., Wright, P. M., & Moynihan, L. M. 2011. The Impact of Motivation, Empowerment and Skill enhancing Practices on Aggregate Voluntary Turnover: The Mediating Effect of Collective Affective Commitment. *Personnel Psychology*, 64: 315-350
9. Gerhart, B., Wright, P. M., & McMahan, G. C. 2000. Measurement Error in Research on the Human Resources and Firm Performance Relationship: Further Evidence and Analysis. *Personnel Psychology*, 53: 855-872

10. Gong, Y., Law, K. S., Chang, S., & Xin, K. R. 2009. Human Resource Management and Firm Performance in China: The Different Role of Managerial Affective and Continuance Commitment. *Journal of Applied Psychology*, 94: 263-275

11. Gottschalg, O., & Zollo, M. 2007. Interest Alignment and Competitive Advantage. *Academy of Management Review*, 32: 418-437

12. Hitt, M. A., Biermant, L., Shimizu, K., & Kochhar, R 2001. Direct and Moderating Effects of Human Capital on Strategy and Performance in Professional Service Firms: A Resource-based Perspective. *Academy of Management Journal*, 44: 13-28

13. Janssen P.P.M., de Jonge J. & Bakker A.B 1999. Specific Determinants of Intrinsic Work Motivation, Burnout and Turnover Intentions: A Study among Nurses. Journal of Advanced Nursing 29, 1360±1369

14. Kernan, M. C., & Hanges, P. J. 2002. Survivor Reactions to Reorganization: Antecedents and Consequences of Procedural, Interpersonal and Informational Justice. *Journal of Applied Psychology*, 87: 916-928

15. Liao, H., Toya, K., Lepak, D. P., & Hong, Y. 2009. Do they see eye to eye? Management and Employee Perspectives of High Performance Work Systems and Influence Processes on Service Quality. *Journal of Applied Psychology*, 94: 371-391

16. Madlock, P. E. 2008. The Link between Leadership Style, Communicator Competence and Employee Satisfaction. *Journal of Business Communication*, 45(1): 61-78

17. Mahwah, NJ: Lawrence Erlbaum. Legge, K. 2005. *Human Resource Management: Rhetorics and Realities. Basingstoke*, UK: Palgrave Macmillan

18. Manikandan P and Anwar M M, (2008), Assessment of Management Training Needs of Agricultural Research Managers, *The IUP Journal of Management Research*, Vol.7, No.4, p.21

19. Meyer, J. P., Stanley, D. J., Herscovitch, L., & Topolnytsky, L. 2002. Affective, Continuance and Normative Commitment to the Organization: A Meta-analysis of Antecedents, Correlates and Consequences. *Journal of Vocational Behavior*, 61: 20-52

20. Nishii, L., & Wright, P. M. 2008. Variability within Organizations: Implications for Strategic Human Resources Management. In D. B. Smith (Ed.), *The People make the Place: Dynamic Linkages between Individuals and Organizations*: 225-248

21. Sharbrough, W. C., Simmons, S. A., & Cantrill, D. A. 2006. Motivating Language in Industry: Its Impact on Job Satisfaction and Perceived Supervisor Effectiveness. *Journal of Business Communication*, 43: 322-343

22. Sun, L., Aryee, S., & Law, K. S. 2007. High-performance Human Resource Practices, Citizenship Behavior and Organizational Performance: A Relational Perspective. *Academy of Management Journal*, 5: 558-577

23. Takeuchi, R., Chen, G., & Lepak, D. P. 2009. Through the Looking Glass of a Social System: Cross-level Effects of High-performance Work Systems on Employee Attitudes. *Personnel Psychology*, 62: 1

24. Van Woerkom, M., & Croon, M. 2009. The Relationships between Team Learning Activities and Team Performance. *Personnel Review*, 38: 560-577

25. Verburg, R. M., Den Hartog, D. N., & Koopman, P. L. 2007. Configurations of Human Resource Management Practices: A Theoretical Model and Empirical Test of Internal Fit. *International Journal of Human Resource Management*, 18: 184-208

ANNEXURE 1: FEEDBACK FORM RELATED TO HR ISSUES

FEEDBACK ON HR ISSUES FROM STAFF

Name:	Designation/Department:
Emp. ID	Date of Joining

Interview-related Equation:

1. Were you satisfied from your interview procedure?

   Yes No

Joining Formality:

1. Were you satisfied from your joining procedure?

   Yes No

2. Did you get offer letter before your joining?

   Yes No

3 Did you get appointment letter on the same day of joining?

   Yes No

4. Did you get your posting order on the same day of your joining?

   Yes No

5. Within how much time you received your job responsibility and job specification after your joining?

   (a) On same day

   (b) Within 7 days

   (c) Within 15 days

   (d) Within a month

   (e) More than a month

6. Are you satisfied from your job profile and is it as per your qualification and experience?

   (a) Very satisfied

   (b) Satisfied

   (c) Dissatisfied

   (d) Very dissatisfied

Induction and Orientation:

1. Were you satisfied from your induction programme?
   (a) Very satisfied
   (b) Satisfied
   (c) Dissatisfied
   (d) Very dissatisfied
2. How many days were your induction and orientation programme?
   (a) No any induction and orientation
   (b) One day
   (c) 2 days
   (d) 3-4 days
   (e) More than 4 days
3. Was induction and training programme informative and helpful to know Apollo Hospitals to you?

   Yes No

3. Are you receiving training as per your training need and job profile?

   Yes No

4. How many training you have attended till date?
   (a) Till not any
   (b) 2-5 sessions
   (c) 5-8 sessions
   (d) More than 8 sessions
5. Do you feel you need any further training which will help you to perform better?

   Yes No

HR Policies:

1. Are you aware of different HR policies?

   Yes No

2. Are you facing problem regarding your reporting structure?
   (a) Always
   (b) Sometime

(c) Rarely

(d) Never

3. Are you aware of employee right and responsibility?

Yes No

4. Are you satisfied of our leave policy?

(a) Very satisfied

(b) Satisfied

(c) Dissatisfied

(d) Very dissatisfied

5. Are you satisfied of our uniform policy?

(a) Very satisfied

(b) Satisfied

(c) Dissatisfied

(d) Very dissatisfied

6. Are you aware of performance appraisal system of organisation?

Yes No

7. Are you aware of grievance redressal and disciplinary action policy?

Yes No

8. Do you have any grievances?

Yes No

9. Are you aware of mediclaim procedure and coverage limit?

Yes No

10. Within how much time period your grievance solved?

(a) Within 2 days

(b) Within 4 days

(c) Within a week

(d) More than a week (how much time)

11. Are you aware of grooming and dress code system of organisation?

Yes No

12. Are you regularly following different rules and regulation of organisation?
    (a) Always
    (b) Sometime
    (c) Rarely
    (d) Never
13. Are you aware of exit procedure?
    Yes No
14. Are you facing punching problem any time?
    (a) Always
    (b) Sometime
    (c) Rarely
    (d) Never

Remuneration:

1. Are you receiving salary on time?
    Yes No
2. Are you satisfied from our recent performance appraisal?
    (a) Very satisfied
    (b) Satisfied
    (c) Dissatisfied
    (d) Very dissatisfied

Motivation:

1. Does our performance appraisal programme motivate you?
    (a) Strongly agree
    (b) Agree
    (c) Disagree
    (d) Strongly disagree
2. Are you satisfied with our reward system?
    (a) Very satisfied
    (b) Satisfied

(c) Dissatisfied

(d) Very dissatisfied

3. Are you aware of different welfare schemes?

Yes No

4. What do you think about different HR activities?

(a) Excellent

(b) Satisfactory

(c) Average

(d) Bad

Overall Satisfaction from HR:

1. Are you satisfied from our HR department?

(a) Very satisfied

(b) Satisfied

(c) Dissatisfied

(d) Very dissatisfied

2. Are you satisfied from the transparency of HR department?

(a) Very satisfied

(b) Satisfied

(c) Dissatisfied

(d) Very dissatisfied

3. How does HR behave with you when you approach to them?

(a) Excellent

(b) Good

(c) Average

(d) Poor

4. Rate the performance of our HR department.

(a) Excellent

(b) Good

(c) Average

(d) Poor

Any suggestion/comment for improvement:

3

Gap Analysis Study for Enhancing Operating Theatre Efficiency

in a Corporate Hospital through Turnaround Time

L. Kalyan Viswanath Reddy*
Bayapa Reddy**

The purpose of this study is to find the gap analysis and evaluate the effectiveness of process improvements on factors which impact operating room. This gap analysis study helps for improvement if any fault is there which leads to improvement in quality and revenues effectiveness of department. The objective of this study is to evaluate the effectiveness of process improvements on factors, which impact operating room turnaround time and utilisation. A cross-sectional study design was used involving a retrospective direct observation and record review. The name of the hospital is not disclosed as per the request from the hospital. The sample size is of 200.

The Cronbach's Alpha reliability is calculated as 0.708. In the turnaround time of OT, it is found that out of five steps only one step turnaround time is within the standard operating procedure (SOP). Only one null hypothesis is accepted and the remaining four null hypotheses were rejected.

Although the study has a limited sample size, it does appear that the gap analysis has a useful diagnostic role to play in identifying, measuring, analysing and calculating the performance of operation theatre. This enables the operating room staff to provide quality service and enhance operation theatre efficiency. The study has raised a number of issues which would form the basis for useful further research.

The process quality from the hospital staff and patient's perspective should be routinely monitored and assessed.

* Assistant Professor, Department of Health Management, College of Public Health and Health Informatics, University of Hail, Hail, Kingdom of Saudi Arabia

** Assistant Professor, Department of Community Medicine, Meenakshi Medical College Hospital and Research Institute, Kanchipuram, Tamil Nadu, India

The findings should be useful to hospital quality department to assess and improve service quality.

Keywords: *Gap Analysis, Operation Theatre, Hospital Management, Health Services, Patient Satisfaction*

INTRODUCTION

Nowadays, people are very much health-conscious. Healthcare industry is a service-driven, so patient satisfaction plays a prime role in all the domains of healthcare industry. Operation theatre is one of the critical parts which needs to be standardised and is getting a huge attention in the hospital setup. Enhancing the efficiency of operating theatre has been always a challenging process, especially in a quick changing healthcare sector with increased patient care complexity. In the modern practice of medicine, the issue of the costs of the medical treatments that physicians provide to patients is constantly influencing medical treatment decisions (Eddy, 1992). Balancing the needs to satisfy surgeons, support staff and meet the patient high expectations in healthcare would require clinical and cost effectiveness and require critical and close monitoring of revenue management inside the operating theatre to ensure efficient resource maintenance. Operating theatre management is a very sensitive issue and a complicated one. Many studies endeavoured in assessing efficiency of operating theatres and many formulas were structured to guide in concluding or measuring performance. Baker and Boyd (1997) suggested that activity-based costing should be used in theatres to review theatre performance and to accomplish cost efficiency in four areas, namely performance management and evaluation, strategic planning, managed care contract negotiation and managed care contract management.

Turnaround time is defined as the time measured from prior patient out of the operating room suite to succeeding patient in the room for sequentially scheduled patients. Denton et al. (2007) examine how case sequencing affects patient waiting time, operating room idling time (i.e. surgeon waiting time) and operating room overtime. Basso (2009) discussed the feasibility of organising a system of emergency theatre lists with its costs and gains which can be agreed upon with stakeholders. Wullink et al. (2007) examined whether it is preferred to reserve a dedicated operating room or to reserve some capacity in all elective operating rooms in order to improve the responsiveness to emergencies.

LITERATURE REVIEW

Operating theatre scheduling is a major contributing factor to enhance the efficiency of operating theatres. Accurate and real time scheduling assist in predicting staffing needs, ensuring availability of required equipment and supplies and thus contribute to a smooth running operating theatre (Malhorta, 2006). Schedules need to be rearranged according to agreed-on principles among all surgeons, on condition that guidelines are developed to define elective versus non-elective cases (Park et al., 2009). In addition, literature reflected the importance of defining the start time of each surgery and the impact of providing a precise duration to avoid confusion, allow proper allocation and distribution of surgeries and standardise data collection (Dexter et al., 2005). Managing all these factors besides decreasing staff scheduling variation and ensuring adequate

housekeeping services contributed in many studies to decrease the prolonged operating theatre turnover time (McIntosh et al., 2006).

Macario (2010) defined the prolonged turnover time to be more than sixty minutes and this shall not be counted within the regular turnover time. In addition, Shafer (2006) discussed elaborately the impact of cost reduction as a result of reducing the turnover time. Wachtel et al. (2008) elaborated on allocating OT time based on operational plans that is staffing hours rather on tactical plans and he emphasised that strategic decisions require years of planning before implementation. Calms and Shusterich (1992) described the operating theatre management and highlighted the need for a very strong coordination between human and material resources; in addition to the fact that the performance of the operating theatre is measured differently from different perspectives. Plaster et al. (2003) listed an analysis of the components disrupting the coordination, the root causes of the disruption and the methods of coping with the limitations or disruptions contributing to the communication process.

The problem consists of assigning patients to transporters, operating rooms and recovery beds in order to minimise a criterion function of their completion times. A Lagrangian relaxation approach is proposed to determine a near-optimal schedule and a tight lower bound (Augusto et al., 2008). Gibbs' (2005) safety standards specifically for patients begin to be considered in operating room practices. Mawji et al. (2002) interdisciplinary quality improvement programme for operation theatre is composed of 12 quality improvement (QI) projects that are a combination of ongoing operations improvement projects and new projects in patient safety. The projects stress delivery of cost-effective medical care while reducing preventable adverse events through improved communication, process redesign and evidence-based protocol use.

The operating theatres generally require a significant amount of resources (Shah et al., 2006). Therefore, operating theatres should be closely monitored for efficiency and quality of care. Monitoring and evaluation of a unit such as an operating theatre requires good quality data which is seldom available in developing countries (Littlejohns et al., 2003). In developed countries, hospitals are encouraged to use integrated, computerised theatre management systems to generate theatre schedules and lists, and to manage resources (Dowdall, 2003). An emergency theatre remains idle waiting for cases, which may or may not happen, thereby affecting the utilisation rate. The Audit Commission of the United Kingdom also suggested that the expenditure on theatre resources must match the changes in the case-load pattern of the theatre. This allows matching the resource allocation to caseloads as well as to clinical outcomes (Audit Commission, 2002).

SIGNIFICANCE AND SCOPE OF STUDY

The operation theatre is the major financial contributor to any hospital. Enhancing the profitability is always the key issue discussed by the management of hospital. But the under-utilisation of operation theatre profits and over-utilisation of time in operation theatre are major issues constantly popping up in board discussions of a hospital. This study will help the hospital to identify various problems with the management of operation theatre which come across by the management. Adonis (2006) found in Johannesburg Hospital that operation theatres had been greatly under-utilised with the average utilisation rate being 39%, which could be due to availability of the number of surgeons, anaesthetists and nurses, poor doctor practices and incorrect resource allocation. Because of this, the non-insured patients are made to pay extra

money to the hospital for unnecessary over utilisation of operation theatre by the hospital staff and even though it is of no fault of patient. This leads to the poor patient satisfaction and lack of patient turnover ratio to the hospital. Even for the insured patients, the majority of queries by the insurance company to the hospital are the high bill amount for over utilisation of operation theatre for a standard procedure compared with the standard time of that procedure. This study will help to find the gap analysis for enhancing operating theatre efficiency through turnaround time.

RESEARCH PROBLEM STATEMENT/AIM

Enhancing the efficiency of operating theatre has been always a challenging process, especially in a quick changing healthcare sector with increased patient care complexity (Al-Saffar. A, 2011). This study provides analytical and valuable information regarding the management of operation theatre process which in turn helps the organisation can take valuable managerial decisions. This will help them to confirm whether the operation theatre is working as per the set standard operating procedures (SOPs) or it needs further improvement. If it needs improvement, in which area does it need improvement. Balancing the needs to satisfy surgeons, support staff and meet the patient high expectations and cost benefits in healthcare would require clinical and cost effectiveness and require critical and close monitoring of business management inside the operating theatre to ensure efficient resource supply, guarantee quality safe care provided, and maintain fiscal sustainability. This not only needs careful assessment from the hospital authorities, but also from support staff of all concerns.

RESEARCH OBJECTIVES

The research objectives are summarised as follows:

- To study the steps involved in the movement of a patient from the ward to operation theatre and vice versa for surgery
- By following the steps, to identify the causes which contribute to over utilisation time of operation theatre
- To identify the reasons for the overuse of operation theatre or any delays occurring in operation theatre leading to over utilisation of operation theatre
- By turnaround time study, find out the criticalities of over utilisation of operation theatre by the hospital staff members which in turn ends up in the patients paying more money to the hospital
- To discuss, suggest, recommend and formulate strategies based on analysis and help in remodelling certain process for enhancing the efficiency of operation theatre

MATERIALS AND METHODOLOGY

According to Green and Tull (2009), a research design is the specification of methods and procedures for acquiring the information needed. It is the overall operational pattern or framework of the project that stipulates what information is to be collected from which sources by what procedures.

The research methodology adopted for the study comprises the following:

- ***Research Design:*** Exploratory and descriptive study
- ***Sample Design - Sampling Unit:*** Turnaround time in operation theatre
- ***Sampling Method:*** Convenience random sampling
- ***Scaling Technique:*** Interval scale
- ***Duration of Study:*** 2 months
- ***Sample Size:*** 200 (Total data is collected for 1.6 months and the sample size is of 201 but because of incomplete data, one sample is excluded from study.
- ***Data Collection:*** By following the patient and noting the time patient spending in each step of process and also by tracking the patient file.
- ***Analysis Tools:*** SPSS software and Microsoft Excel
- Simplified Turnaround Time of Patient from Ward to Operation Theatre and vice versa with Standard Time as per the Hospital Standard Operating Procedures:
  - ❖ Transfer of patient from ward to preoperative room (10 Minutes)
  - ❖ Transfer of patient from preoperative room to operating theatre (20 Minutes)
  - ❖ Time gap to start the operation procedure, after receiving the patient in operating theatre (20 Minutes)
  - ❖ Transfer of patient from operating theatre to the recovery room (10 Minutes)
  - ❖ Transfer of patient from recovery room to ward (10 Minutes)

RESEARCH HYPOTHESIS

The researcher developed the following hypotheses after studying the standard operating procedures (SOPs) set by the hospital to the each procedure in the operation theatre and also after tracking the previous patient's operating notes.

- ***H1:*** Transfer of patient from ward to preoperative room is within the standard time.
- ***H2:*** Transfer of patient from preoperative room to operating theatre is within the standard time.
- ***H3:*** There is no time gap to start the operation procedure, after receiving the patient in operating theatre.
- ***H4:*** Transfer of patient from operating theatre to the recovery room and ward is within the standard time.
- ***H5:*** The overall surgical procedures are within the standard time.

RESULTS AND ANALYSIS

The results and analysis of this study are summarised as follows:

Validity and Reliability

Based on the primary data collected through the cross-sectional study, the validity and reliability analysis is as follows:

TABLE 1: CASE PROCESSING SUMMARY

		N	%
Cases	Valid	200	99.5
	Excluded[a]	1	.5
	Total	201	100.0
a. List-wise deletion based on all variables in the procedure			

TABLE 2: RELIABILITY STATISTICS

Cronbach's Alpha	No. of Items
.708	8

The reliability analysis indicates that the value of Cronbach's Alpha is 0.708, which is reliable and is tested for all the eight items.

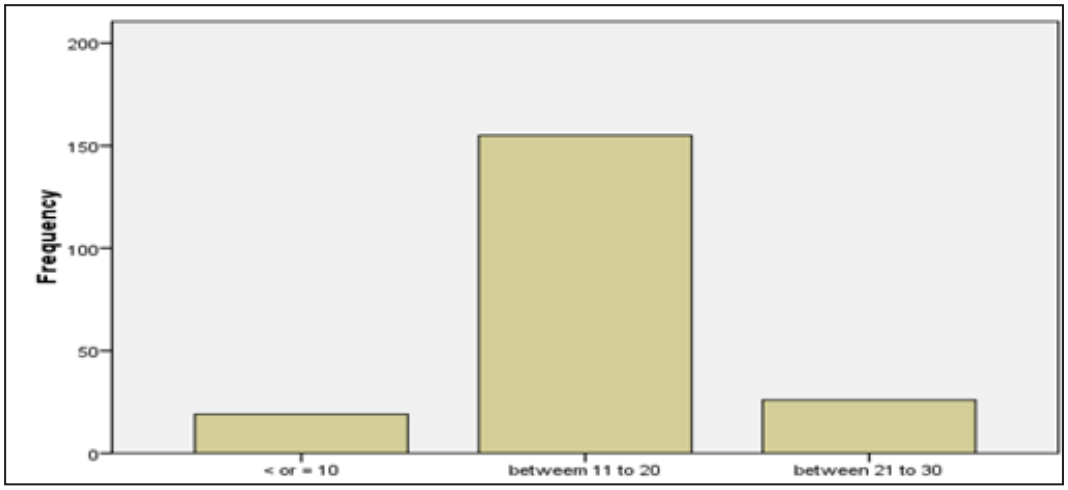
Testing Hypothesis

Transfer of Patient from Ward to Preoperative Room

- ***H0:*** Transfer of patient from ward to preoperative room is within the standard time, i.e. 10 minutes.
- ***H1:*** Transfer of patient from ward to preoperative room is not within the standard time, i.e. more than 10 minutes.

TABLE 3: PATIENT TRANSFER TIME FROM WARD TO PREOPERATIVE ROOM

		Frequency	Per cent	Valid Per cent	Cumulative Per cent
Valid	< or = 10	19	9.5	9.5	9.5
	between 11 and 20	155	77.1	77.5	87.0
	between 21 and 30	26	12.9	13.0	100.0
	Total	200	99.5	100.0	
Missing	System	1	.5		
Total		201	100.0		



GRAPH 1: PATIENT TRANSFER TIME FROM WARD TO PREOPERATIVE ROOM

Interpretation: From the above graph, we can conclude that there is

- 9.5% patient transfer from ward to preoperative room in < or = 10 minutes
- 77.1% patient transfer from ward to preoperative room in between 11 and 20 minutes
- 12.9% patient transfer from ward to preoperative room in between 21 and 30 minutes

T-Test

TABLE 4: ONE-SAMPLE STATISTICS

	N	Mean	Std. Deviation	Std. Error Mean
Patient Transfer Time from Ward to Preoperative Room	200	2.04	.474	.034

TABLE 5: ONE-SAMPLE TEST

	Test Value = 1					
	T	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Patient Transfer Time from Ward to Preoperative Room	30.865	199	.000	1.035	.97	1.10

Calculation

Difference of Mean = x-μ = 2.04 -1 = 1.04

Standard Error = Standard Deviation/Square Root of N = 0.474/14.14 = 0.034

Z value = Difference/Standard Error = 1.04/0.034 = 30.59

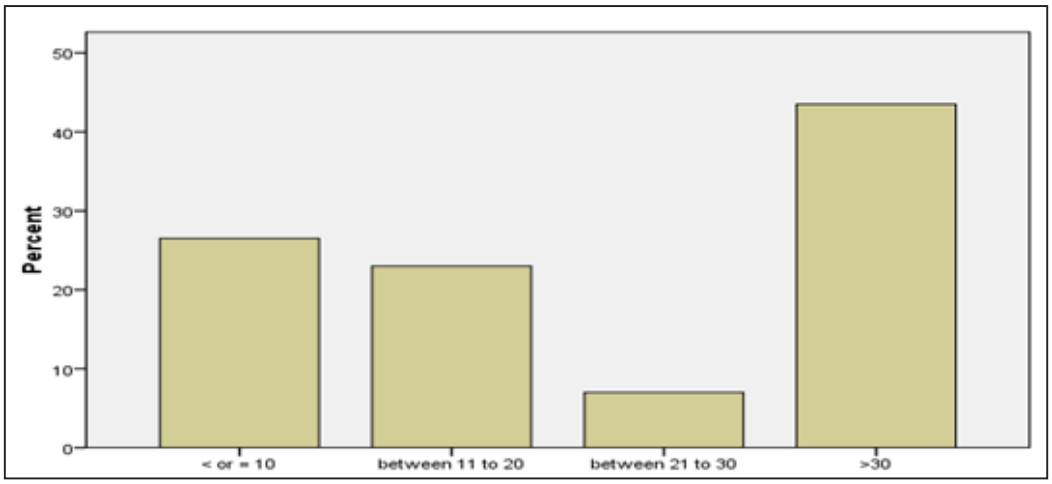
P value < 0.05(significance value) = Negative value. Hence, null hypothesis may be rejected.

Patient Transfer Time from Preoperative Room to Operation Theatre

- ***H0:*** Transfer of patient from preoperative ward to operative room is within the standard time, i.e. 20 minutes.
- ***H1:*** Transfer of patient from preoperative ward to operative room is not within the standard time, i.e. more than 20 minutes.

TABLE 6: PATIENT TRANSFER TIME FROM PREOPERATIVE ROOM TO OPERATION THEATRE

		Frequency	Per cent	Valid Per cent	Cumulative Per cent
Valid	< or = 10	3	1.5	1.5	1.5
	between 11 and 20	43	21.4	21.5	23.0
	between 21 and 30	57	28.4	28.5	51.5
	>30	97	48.3	48.5	100.0
	Total	200	99.5	100.0	
Missing	System	1	.5		
Total		201	100.0		



GRAPH 2: PATIENT TRANSFER TIME FROM PREOPERATIVE ROOM TO OPERATION THEATRE

Interpretation: From the above graph, we can conclude that there is

- 1.5% patient transfer from preoperative room to operation theatre in < or = 10 minutes.
- 21.4% patient transfer from preoperative room to operation theatre in between 11 and 20 minutes
- 28.4% patient transfer from preoperative room to operation theatre in between 21 and 30 minutes
- 48.3% patient transfer from preoperative room to operation theatre in > 30 minutes

T-Test

TABLE 7: ONE-SAMPLE STATISTICS

	N	Mean	Std. Deviation	Std. Error Mean
Patient Transfer Time from Preoperative Room to Operation Theatre	200	3.24	.840	.059

TABLE 8: ONE-SAMPLE TEST

	Test Value = 2					
	T	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Patient Transfer Time from Preoperative Room to Operation Theatre	20.872	199	.000	1.240	1.12	1.36

Calculation

Difference of Mean = x-μ = 3.24-2 = 1.24

Standard Error=Standard Deviation/Square Root of N = 0.840/14.14 = 0.059

Z value= Difference/Standard Error = 1.24/0.059 = 21.02

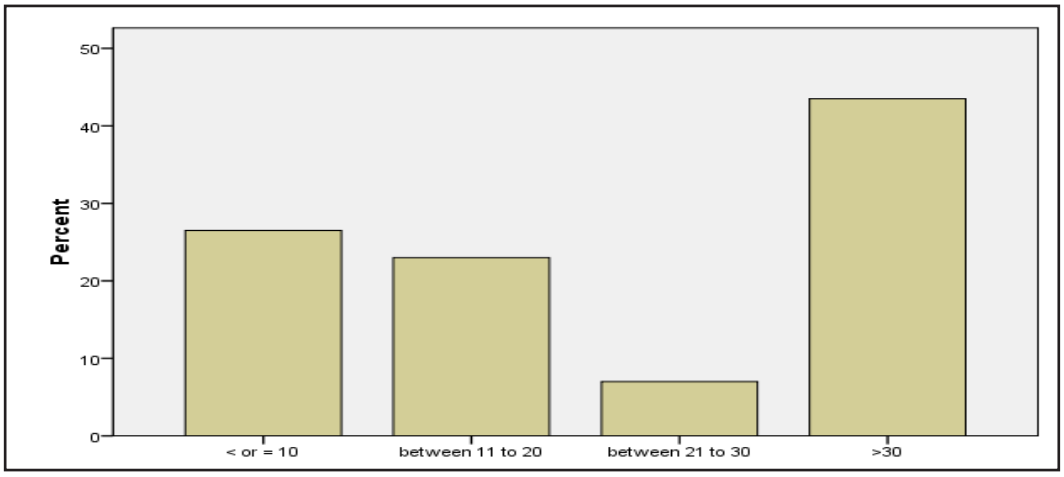
P < 0.05(significance value) = Negative value. Hence, null hypothesis may be rejected.

Difference between Actual OT Time and OT Starting Time

- ***H0:*** There is a time gap between the start of the operation procedure and after receiving the patient in operating theatre within the standard time, i.e. 20 minutes.
- ***H1:*** There is a time gap between the start of the operation procedure and after receiving the patient in operating theatre but more than the standard time i.e. more than 20 minutes.

TABLE 9: DIFFERENCE BETWEEN ACTUAL OT TIME AND OT STARTING TIME

		Frequency	Per cent	Valid Per cent	Cumulative Per cent
Valid	< or = 10	53	26.4	26.5	26.5
	between 11 and 20	46	22.9	23.0	49.5
	between 21 and 30	14	7.0	7.0	56.5
	>30	87	43.3	43.5	100.0
	Total	200	99.5	100.0	
Missing	System	1	.5		
Total		201	100.0		



GRAPH 3: DIFFERENCE BETWEEN ACTUAL OT TIME AND OT STARTING TIME

Interpretation: From the above graph, we can conclude that there is

- 26.4% difference between actual OT time and OT starting time is < or = 10 minutes
- 22.9% difference between actual OT time and OT starting time is between 11 and 20 minutes
- 7.0% difference between actual OT time and OT starting time is between 21 and 30 minutes
- 43.3% difference between actual OT time and OT starting time is > 30 minutes

T-Test

TABLE 10: ONE-SAMPLE STATISTICS

	N	Mean	Std. Deviation	Std. Error Mean
Difference between Actual OT Time & OT Starting Time	200	2.68	1.276	.090

TABLE 11: ONE-SAMPLE TEST

	Test Value = 2					
	T	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Difference between Actual OT Time & OT Starting Time	7.483	199	.000	.675	.50	.85

Calculation

Difference of Mean = x-μ = 2.68-2 = 0.68

Standard Error = Standard Deviation/Square Root of N = 1.276/14.14 = 0.090

Z value= Difference/Standard Error = 0.68/0.090 = 7.56

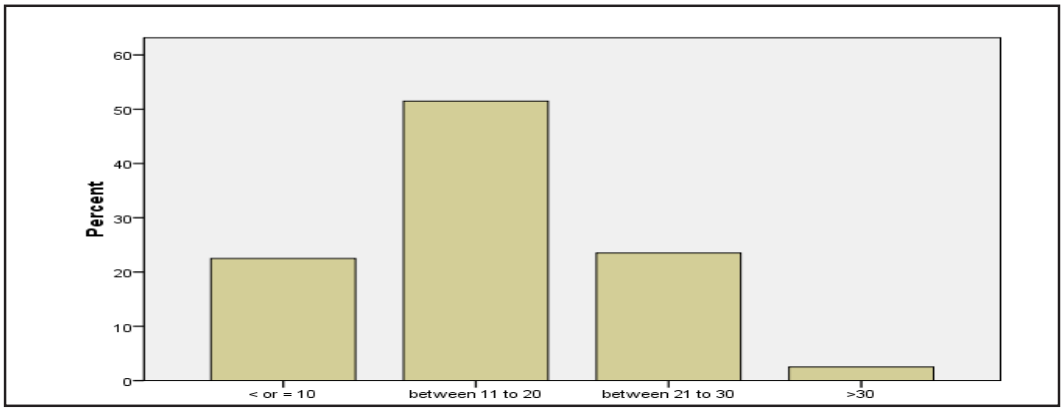
P Value is < 0.05(significance value) = Negative value. Hence, null hypothesis may be rejected.

Patient Transfer Time from OT to Recovery Room and Ward

- ***H0:*** Transfer of patient from OT to recovery room and to ward is within the standard time, i.e. 20 minutes.
- ***H1:*** Transfer of patient from OT to recovery room and to ward is within the standard time, i.e. 20 minutes.

TABLE 12: PATIENT TRANSFER TIME FROM OT TO RECOVERY ROOM AND WARD

		Frequency	Per cent	Valid Per cent	Cumulative Per cent
Valid	< or = 10	45	22.4	22.5	22.5
	between 11 and 20	103	51.2	51.5	74.0
	between 21 and 30	47	23.4	23.5	97.5
	>30	5	2.5	2.5	100.0
	Total	200	99.5	100.0	
Missing	System	1	.5		
Total		201	100.0		



GRAPH 4: PATIENT TRANSFER TIME FROM OT TO RECOVERY ROOM AND WARD

Interpretation: From the above graph, we can conclude that there is

- 22.4% patient transfer from OT to ward in < or = 10 minutes
- 51.2% patient transfer from OT to ward in between 11 and 20 minutes
- 23.4% patient transfer from OT to ward in between 21 and 30 minutes
- 2.5% patient transfer from OT to ward in > 30 minutes

T-Test

TABLE 13: ONE-SAMPLE STATISTICS

	N	Mean	Std. Deviation	Std. Error Mean
Patient Transfer Time from OT to Ward	200	2.06	.748	.053

TABLE 14: ONE-SAMPLE TEST

	Test Value = 2					
	T	Df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Patient Transfer Time from OT to Ward	1.135	199	.258	.060	-.04	.16

Calculation

Difference of Mean = x-μ = 2.06-2 = 0.06

Standard Error = Standard Deviation/Square Root of N = 0.748/14.14 = 0.053

Z value = Difference/Standard Error = 0.06/0.053 = 1.13

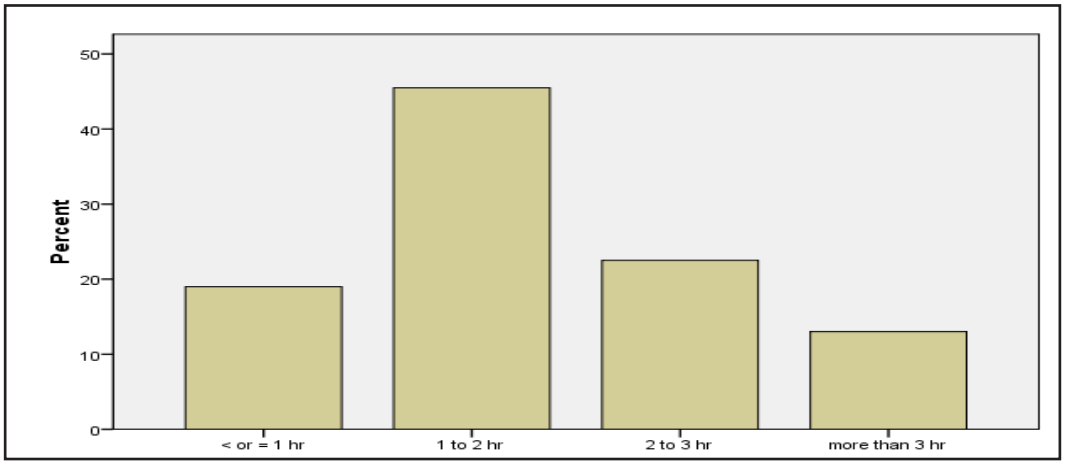
P value is > 0.05(significance value) = 0.1292. Hence, null hypothesis may be accepted.

Overall Surgery Time

- ***H0:*** The overall surgical procedure is within the standard time.
- ***H1:*** The overall surgical procedure is not within the standard time.

TABLE 15: OVERALL SURGERY TIME

		Frequency	Per cent	Valid Per cent	Cumulative Per cent
Valid	< or = 1 hr	38	18.9	19.0	19.0
	1 to 2 hr	91	45.3	45.5	64.5
	2 to 3 hr	45	22.4	22.5	87.0
	more than 3 hr	26	12.9	13.0	100.0
	Total	200	99.5	100.0	
Missing	System	1	.5		
Total		201	100.0		



GRAPH 5: OVERALL SURGERY TIME

Interpretation: From the above graph, we can conclude that there is

- 18.9% surgery perform in < or = 1hr
- 45.3% surgery perform in 1 to 2 hr
- 22.4% surgery perform in 2 to 3 hr
- 12.9% surgery perform in > 3 hr

One Sample T-Test

TABLE 16: ONE-SAMPLE STATISTICS

	N	Mean	Std. Deviation	Std. Error Mean
Overall Surgery Time	200	2.30	.923	.065

TABLE 17: ONE-SAMPLE TEST

	Test Value = 3					
	t	Df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Overall Surgery Time	-10.800	199	.000	-.705	-.83	-.58

Calculation

Difference of Mean = x-μ = 2.30 - 3 = 0.7

Standard Error = Standard Deviation/Square Root of N = 0.923/14.14 = 0.065

Z value= Difference/Standard Error = 0.7/0.065 = 10.77

P value is < 0.05(significance value) = Negative value. Hence, null hypothesis may be rejected.

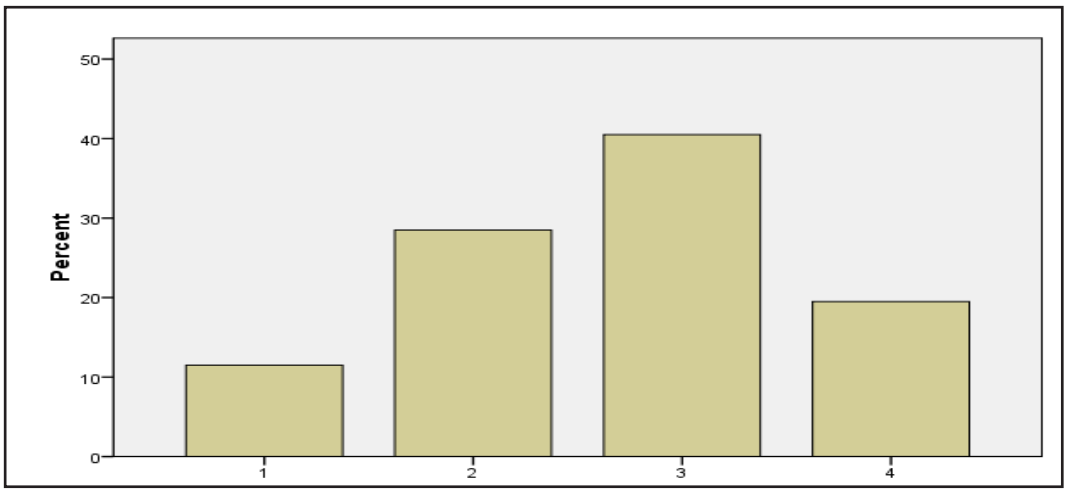
TABLE 18: HYPOTHESIS RESULT

Sl. No.	Null Hypothesis Testing	Accepted	Rejected
1	Patient transfer time from ward to preoperative room		
2	Patient transfer time from preoperative room to operation theatre		
3	Difference between actual OT time and OT starting time		
4	Patient transfer time from OT to recovery room to ward		
5	Overall surgery time		

Operation Theatres Utilisation time

TABLE 19: OT NUMBER

		Frequency	Per cent	Valid Per cent	Cumulative Per cent
Valid	1	23	11.4	11.5	11.5
	2	57	28.4	28.5	40.0
	3	81	40.3	40.5	80.5
	4	39	19.4	19.5	100.0
	Total	200	99.5	100.0	
Missing	System	1	.5		
Total		201	100.0		



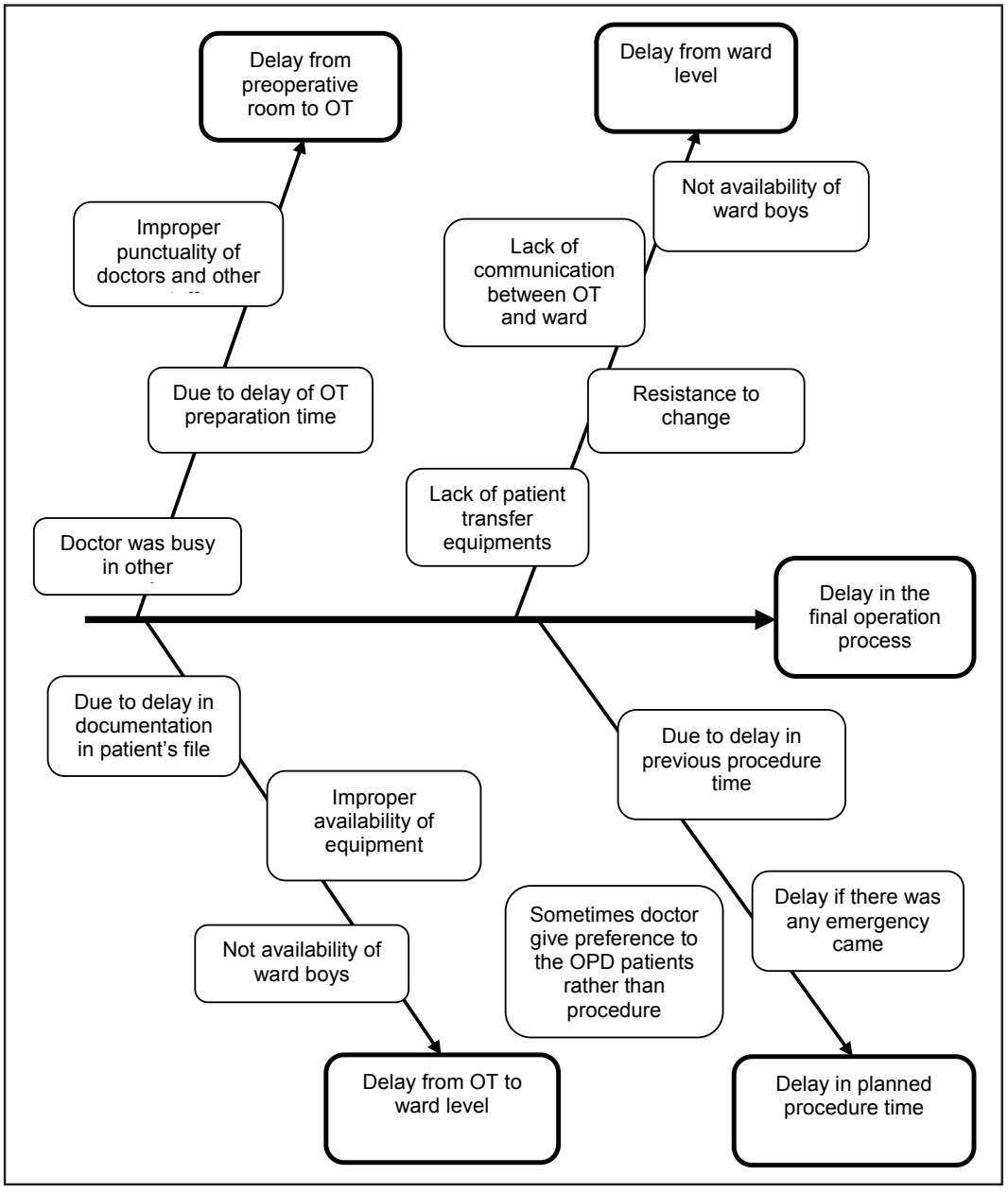
GRAPH 6: OT NUMBER

Interpretation: From the above graph, we can conclude that there is

- 11.4% utilisation of OT – 1 is minimally used among all 4 OTs
- 28.4% utilisation of OT – 2

- 40.3% utilisation of OT – 3 is maximum used among all 4 OTs
- 19.4% utilisation of OT – 4

Root Cause Analysis (Fishbone Diagram)



DISCUSSION AND FINDINGS

In analysis phase, the researcher found the reasons for delay by drawing the root cause analysis. They are as follows:

(i) ***Delay from Ward Level***

- ❖ Poor communication between staff, as sometimes they busy with other patients, especially in the general ward. So, they forget to inform the registered nurse who is responsible for that particular patient.
- ❖ The OT housekeeping staff has no information about the patient ward name, bed number and room number.
- ❖ Sometimes, there is non-functioning of communication devices such as telephone of specialty ward or general ward. So, the OT staff members have to inform the nurse to shift the patient, which leads to delay.
- ❖ Some staff members are very careless to do the work fast and wontedly. They do the work slowly by chitchatting with colleagues or nurses.
- ❖ For shifting of a patient, minimum 1 or 2 ward boys are required; but due to lack of staff, the staff nurse needs to find ward boys from other departments or wait for them.
- ❖ In ward, there was lack of patient transfer equipment, as there are only two stretchers and two wheelchairs.

(ii) ***Delay from Preoperative Room to OT***

- ❖ As per the planned OT time, patient shifted before 15 or 20 minutes in preoperative room but because of some doctors, assistant doctors and anaesthetics who were not time punctual, the patient had to wait in preoperative room only.
- ❖ Sometimes, the doctor was busy in other procedure or previous surgery. Especially, the laparoscopic surgery was more delayed.
- ❖ Sometimes, the OT was not ready to shift the new patient to OT.

(iii) ***Delay in Planned Procedure Time***

- ❖ The surgery was planned one day before but sometimes because of some other emergency led to delay in planned surgery time.
- ❖ In emergency, if the surgery of same group at the same time came, then there would be delayed in planned surgery time.
- ❖ Sometimes, the consumption of more time by the previous procedure leads to the delay in the planned surgery.

(iv) ***Delay from OT To Ward Level***

- ❖ Delay due to non-availability of ward boy.
- ❖ Sometimes, the concern nurse was busy with doctors in rounds.

RECOMMENDATIONS

The recommendations of this research study are as follows:

- Protocols of shifting patient from ward to operation theatre and operation theatre to ward should be strictly followed.
- Need to schedule surgeries more perfectly and there must be surgery time properly defined in OT booking form so that OT could be manage more effectively.
- There should be at least required 12 to 15 nursing staff in OT.
- There must be more allotment of housekeeping staff from 8 am to 4 pm, as more surgeries were performed during that time.
- The OT should be prepared for surgery before shifting the patient in OT to avoid the patient wait in preoperative room.
- There should be prior management for NO2 (Nitrous oxide) bottle.
- There must be pre-defined route for transportation of waste as a point of infection control.
- Need to streamline OT clearance process.
- To standardise time limits for each and every procedure of OT such as admission, ward procedures, patient preparation and staff preparation.
- There should be optimum time frame for the procedures in between two surgeries.
- There should be punctuality in clinical and nursing staffs.
- Communication devices should be properly checked to reduce communication gap between OT staff and ward staff.
- There should be enough patients' transfer equipment in ward to avoid delay for shifting.
- Try to maximally reduce the waiting time for patient in preoperative room (especially concerned to general and laparoscopic surgical patients).

CONCLUSION

A trip to the hospital can be an intimidating event for patients and their families. Operation theatre process is one of the critical parts which needs to be standardised and is getting a huge attention in the hospital setup. In this study, it is found that OT is one of the most dissatisfying parameters among the patients. So, a properly defined OT process needs to be required. Here, operation theatre process starts from OT nurse calling the ward nurse for shifting the patient, receiving at preoperative room, thereafter performing the surgery and transferring to post-operative room and finally shifting to the respective ward. After collecting the data for one and half month and through data analysis, the following things were concluded:

- OT – 3, which was especially for general, laparoscopic and arthroscopic surgeries is 40.5% utilised, and was maximum utilised among the OTs. So, we conclude that the maximum amount of utilisation is taken by general, laparoscopic and arthroscopic surgeries.

- OT – 1, which is especially for ophthalmology and joint replacement surgery is 11.5% utilised, and was minimum utilisation among 4 OTs. So, we can conclude that the ophthalmic and joint replacement surgery was not more performed.
- From the primary data, it could be concluded that before 7 am and after 7 pm, the OT was rarely used.
- There were 220 surgeries performed in one and half month. So, we could say that average 4 or 5 surgeries were performed in a day.
- The average duration of operation takes more than or less than standard time, which means 2 to 3 hrs.
- Average time for transfer of patient from ward to preoperative room was more than 10 minutes.
- Average time for transfer of patient from preoperative room to operation theatre was more than 20 minutes.
- Difference between actual OT and OT starting time was more than 20 minutes.
- Average time for transfer of patient from OT to ward was less than 20 minutes.

References

1. Adonis LF. 2006. Evaluation of the Johannesburg Hospital Operating Theatre. [Research Report] Johannesburg: University of the Witwatersrand
2. Al-Saffar A. 2011. Enhancing Operating Theatre Efficiency of Private Hospital in Kuwait; Business Management Approach [Masters Dissertation]. Dublin: Royal College of Surgeons in Ireland
3. Audit Commission, 2002. Use of Operating Theatres <http://www.niauditoffice.gov.uk> [Accessed: 01/07/2013.]
4. Augusto.V, Xie. X, Perdomo. V. (2008). Operating Theatre Scheduling using Lagrangian Relaxation, European Journal of Industrial Engineering, Volume 2, Issue November 2/2008, 172 – 189, DOI: 10.1504/EJIE.2008.01735
5. Baker, JJ and Boyd, GF, (1997). Activity-Based Costing in the Operating Room at Valley View Hospital, Journal of Health Care Finance, vol. 24, no. 1, pp. 1 - 9
6. Basso. O, (2009). Cost Analysis of a System of Ad Hoc Theatre Sessions for the Management of Delayed Trauma Cases. J Orthop Trumatol, vol. 10, no. 2, pp.91- 96
7. Calms, S.H. & Shusterich, K.M. (1992). Operating Room Management: What Goes Wrong and How to Fix it. Physician Executives, Nov-Dec
8. Denton. B, Viapiano. J, Vogl. A, (2007). Optimisation of Surgery Sequencing and Scheduling Decisions under Uncertainty, Health Care Management Science 10, 13–24
9. Dexter, F., Ledolter, J. & Wachtel, R. (2005). Tactical Decision Making for Selective Expansion of Operating Room Resources Incorporating Financial Criteria and Uncertainty in Subspecialties' Future Workloads. Anesth Analg, 100: 425- 432
10. Dowdall JM. 2003. The Use of Operating Theatres. 2003. Northern Ireland Audit Office. <http://www.niauditoffice.gov.uk> [Accessed 01/07/2013]

11. Eddy. DM, (1992). Medicine, Money and Mathematics. ACS Bulletin, vol. 77, pp. 36 – 49

12. Gibbs VC. (2005). Patient Safety Practices in the Operating Room: Correct-Site Surgery and Nothing Left Behind. Surgical Clinics of North America; 85(6):1307-19

13. Littlejohns P, Watt JC and Rawlinson J. 1999. An Evaluation Programme for Hospital Information System Northern Province. http://www.bmj.com/cgi/data/326/7394/860/DC1/1. [Accessed 01/07/2013]

14. Macario, A. (2010). Are your Operating Rooms being Run Efficiently? Medscape Anesthesiology

15. Malhorta, V. (2006). What should Anesthesiologists know about Operating Room Management? Revista medicacane de anestesiologisia, 29: S83-S88

16. Mawji Z, Stillman P, Laskowski R, Lawrence S, Karoly E, Capuano TA, Sussman E. (2002). First Do No Harm: Integrating Patient Safety and Quality Improvement. The Joint Commission Journal on Quality Improvement; 28(7):373-86

17. McIntosh, C., Dexter, F. & Epstein, R. (2006). The Impact of Service-specific Staffing, Case Scheduling, Turnovers, and First Case starts on Anaesthesia Group and Operating Room Productivity: A Tutorial using Data from an Australian Hospital. International Anaesthesia Research Society, 103: 1499-1516

18. Park, K.W. & Dickerson, C. (2009). Can Efficient Supply Management in the Operating Room Save Millions? Current Opinion Anaesthesiology, 22: 242-248

19. Plasters, C., Seagull, J. & Xiao Y. (2003). AMIA Symposium Proceedings, 521- 528

20. Przasnyski. Z, (1986). Operating Room Scheduling: A Literature Review, AORN Journal 44 (1) 67–79

21. Shah J, Ansari A and Bhattacharyya J. (2006). Cancellation of Urology Operations. Clinical Governance, vol. 11, (2). 128- 133

22. Wachtel, R. & Dexter, F. (2008). Tactical Increases in Operating Room Block Time for Capacity Planning should not be based on Utilisation. Anesth Analg, 106(1): 215-226

23. Wullink. G, Van Houdenhoven. M, Hans. E.W, van Oostrum. J.M, van der Lans. M, Kazemier. G, (2007). Closing emergency Operating Rooms improves Efficiency, Journal of Medical Systems 31, 543–546

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Gap Analysis Study of Medical Tourists' Perceptions on Service Quality in Indian and Saudi Arabian Hospitals

L. Kalyan Viswanath Reddy*
Hamoud Al Shammari**

This paper attempts to explore the concept of service quality for medical tourists in a health care setting. Based on Parasuraman et al.'s modified SERVQUAL variables, the author tried to identify the effects of each variable to satisfaction. Data were collected through field research among 246 patients who are foreign and the Indians working in Saudi Arabia and then the data were analysed using SPSS and Excel. The research problems find out the service quality gap analysis between private hospitals of India and Saudi Arabia of Medical tourists. The method of study is of exploratory study by judgement sampling method using structured questionnaire with Likert scale and SERVQUAL scale. Overall the results revealed Indian private hospital sector is performing better in encounter dimension, but specific Encounter-Responsiveness Saudi private sector has lowest score. The results revealed that the customers' perceptions did not exceed their expectations, as they were dissatisfied with the level of healthcare services rendered by both Indian and Saudi Arabian private sector hospitals. The paper adds a new perspective towards understanding how the concept of service quality is adopted in a hospital sector. The author wishes that this study identifies areas of dissatisfaction that can be quickly remedied and ensures improvement in the areas of satisfaction with ongoing notice and importance.

Keywords: *Service Quality, Customer expectation, Customer Perception, Hospital, Medical Tourism*

* Assistant Professor, Department of Health Management, College of Public Health and Health Informatics, University of Hail, Hail, Kingdom of Saudi Arabia

** Vice Dean, College of Nursing and Assistant Professor, Health Service Management, College of Public Health and Health Informatics, University of Hail, Saudi Arabia

INTRODUCTION

Medical tourism is made possible and has gained popularity due to the advancement in medical technology, more affordable travel and the availability of information provided by the mass media. As medical costs accelerate, patients are finding alternatives for low-cost treatment and going abroad to get healthy seems very appealing. Lured by the promise of high quality, reliable medical care at a lower cost, patients are flying across the globe for medical treatment that they otherwise would not have access to easily due to prohibitive costs, long waiting time or unavailability of treatment in their home country. The promise of medical care and the attraction of exotic places are taking people places for medical care.

Medical tourism can be broadly defined as the provision of 'cost effective' private medical care in collaboration with the tourism industry for patients needing surgical and other forms of specialised treatment. The process of healthcare tourism is jointly facilitated by the corporate sector involved in medical and healthcare as well as the tourism industry – both private and public. Medical tourism has become a common form of vacationing, and covers a broad spectrum of medical services. Medical tourism mixes leisure, fun and relaxation together with wellness and health care. There is no universally accepted definition for 'Medical Tourism' but it can be said as patients going to a different country for mainly elective medical procedures such as medical care, sickness and well-being, rehabilitation and recuperation.

There is a growing consensus within the NHS of the significance of obtaining feedback from patients in order to improve the quality of health care; consequently, many patient satisfaction surveys are now undertaken by health care sector. Knowledge about the patients' perception towards health care quality is one of the most important steps towards introducing reforms in the health care sector. Against a background of growing consumerism, satisfying patients has become a key task for all healthcare activities. Satisfaction in service provision is increasingly being used as a measure of health system performance. Customer satisfaction's importance is well-documented in the marketing literature and is speedily gaining extensive recognition in the healthcare industry. Many hospitals apply modern marketing ideas to serve customer markets in a more efficient and effective way. An important strategic variable in this respect is service quality. This paper attempts to explore the concept of service quality in a health care setting.

LITERATURE REVIEW

Service quality has become an important research topic in view of its significant relationship to costs (Crosby, 1979), profitability (Rust and Zahorik, 1993), customer satisfaction (Boulding et al., 1993), customer retention (Reichheld and Sasser, 1990), service guarantees (Kandampuly and Butler, 2001), and financial performance (Buttle, 1996). Curry and Stark (2000) studied the use of SERVQUAL across nursing homes in the UK, which provided a useful benchmarking tool. Wan Edura Wan Rashid, Hj. Kamaruzaman Jusoff, (2009) attempted to explore the concept of service quality in a health care setting. This paper probes the definition of service quality from technical and functional aspects for a better understanding on how consumers evaluate the quality of health care. It adopts the conceptual model of service quality frequently used by the most researchers in the health care sector. At the end, the researcher concluded that service quality in health care is very complex as compared to other services because this sector highly involves risk.

Daniel Butler, Sharon L. Oswald and Douglas E. Turner (1996) investigated the effects of demographic factors on users and observers of perceived hospital quality and noted that previous research suggests the components of perceived service quality are industry specific, and that calls have been made for academics to integrate their theory into practice. At the end, the researcher found that perceived quality is industry specific, users and observers differ in their perceptions of hospital quality and demographic factors do make a difference in perceived hospital quality. Ioannis E. Chaniotakis and Constantine Lymperopoulos (2009) aimed to study the effect of service quality (SQ) dimensions on satisfaction and word of mouth (WOM) for maternities in Greece. Based on Parasuraman et al.'s SERVQUAL variables, the authors tried to identify the effects of each variable to satisfaction and WOM. From survey result, the author found that in addition to "satisfaction", the only service quality dimension that directly affects WOM, is "empathy". In addition, "empathy" affects "responsiveness", "assurance" and "tangibles" which in turn have only an indirect effect to WOM through "satisfaction". Ritu Narang (2011) intended to measure the perception of patients towards quality of services in public health care centres in rural India. A 23-item scale that tested well for reliability and construct validity was employed for the study. Mixed sampling technique was employed to select the sample. The researchers found from the survey result that items, "availability of adequate medical equipment" and "availability of doctors for women" are negatively rated. Education, gender and income were found to be significantly associated with user perception. Abdul Majeed Alhashem, Habib Alquraini and Rafiqul I. Chowdhary (2011) aimed to identify factors affecting patient's satisfaction at primary health care clinics. The questionnaires were distributed in primary healthcare clinics that represent all heath care regions in Kuwait. From the survey result, researchers found that the majority (87 per cent) of the patients responded that the time for communication between physician and patient was not enough. Seventy-nine per cent of the surveyed patients said they would go to the emergency room of the hospital in future if needed instead of going to the primary care clinic. Regarding the quality of the communication relationship between physician and patients, most of the patients responded negatively.

Norazah Mohd Suki, Jennifer Chiam Chwee Lian and Norbayah Mohd Suki (2011) aimed to investigate whether patients' perceptions exceed expectations when seeking treatment in private healthcare settings in the Klang Valley Region of Malaysia. A survey was conducted among 191 patients in the Klang Valley Region of Malaysia to measure service quality of the private healthcare setting in Malaysia using SERVQUAL 5-dimension model. The results revealed that the customers' perceptions did not exceed their expectations, as they were dissatisfied with the level of healthcare services rendered by private healthcare settings in that they felt that the waiting time of more than an hour to receive the service was excessive and, when there was a problem, the healthcare provider did not provide a response fast enough. Raman Sharma, Meenakshi Sharma and R.K. Sharma (2011) aimed to address the issues of patient's satisfaction in health care sector. A cross-sectional study was conducted to assess the patient satisfaction level visiting the hospital with the objectives to know the behaviour and clinical care by the clinicians and paramedical staff and in terms of amenities available. A pre-designed and pre-tested structured questionnaire was given to the respondents after the patients had undergone consultation with the doctor. From the survey result, researchers found that 40.0 per cent were of the view that services were costlier than their affordability.

According to Karen L McClean (2008), medical tourism is a key industry. The Government subsidies, fiscal incentives and tax breaks form a major input for the growth. In 2003, the Finance Minister called for India to become a "global health destination". He suggested the promoted measures to improve infrastructure to support the medical tourism industry. The Ministry of Tourism promotes 45 "centres of excellence": cardiac surgery, minimally invasive surgery, oncology, orthopaedics and joint replacement and holistic care. Medical tourism is now far more than just an uninsured patient-based consumer issue. State legislators are also beginning to consider the financial benefits of medical tourism. Several corporations are also investigating potential benefits of medical outsourcing because of rising health care costs. Many major employers are self-insured, and they are considering medical outsourcing as an option for their employees in order to experience significant cost-savings. The export of patients to international hospitals is primarily based on the significantly lower cost of procedures offered outside the United States; however, the export of patients is just one aspect of this growing medical outsourcing practice.

MATERIALS AND METHODS

The following should be noted in this regard:

- ***Objective:*** The aim of this research is to compare, examine and measure the service quality of private sector hospitals rendered to medical tourists in Ahmedabad, India and in Hail, Saudi Arabia and offer suggestions based on results of the study.
- ***Research Design:*** Exploratory and descriptive study
- ***Sample Design - Sampling Unit:*** Indian and Saudi Arabian private hospitals
- ***Sampling Method:*** Judgement Sampling
- ***Sample Size:*** 246
- ***Research Instrument:*** The five dimensions of SERVQUAL as proposed by Parasuraman et al. (1988), Othman and Owen (2001, 2002) and Jabnoun and Al-Tamimi (2003) were adopted and modified in this study. SERVQUAL has emerged as perhaps the most popular standardised questionnaire to measure service quality. The instrument possesses a set of 22 structured and paired questions designed to assess customers' expectations of service provision and the customers' perceptions of what was actually delivered. A five-point Likert-type scale is used in this study, anchored by "strongly disagree" to "strongly agree". Content validity (wording and meaning) was checked carefully by experts. A pre-test was then conducted with a group of patients, and minor changes to the scales were made accordingly to ensure that the questions were not repetitive. The researchers have used 41 structured and paired questions to measure Expectation (E) and Perception (P) for service quality of hospitals. As per the SERVQUAL scale, the researcher inspected the service quality of hospitals by the following dimensions:
    - *Physical Aspects:* The first dimension, physical aspects, encompasses the appearance of the physical facilities (1-13) and the convenience offered to the customer by the layout of the physical facilities (14-16). The literature suggests that appearance is important to customers (e.g. Baker, Dhruv and Parasuraman, 1994). It also suggests

that customers value the convenience offered during the treatment such as the layout of hospital (Gutman and Alden, 1985; Hummel and Savitt, 1988; Mazursky and Jacoby, 1985; Oliver, 1981).

- *Reliability:* The second dimension is reliability. It has two sub-dimensions and other variations. Patients view reliability as a combination of doing it right and availability of all the information regarding treatment. So, the sub-dimensions of reliability are promises (statements 17 to 19 in the scale) and information availability (statements 20 to 24 in the scale).
- *Encounters:* The third dimension is encounters. It has two sub-dimensions — responsiveness (statements 25 to 26 in the scale) and empathy (statements 27 to 33 in the scale). These sub-dimensions are very closely related and capture how the customer is treated by the employee.
- *Process:* The fourth dimension is process (statements 34 to 38 in the scale). Process is critical for the success of any medical service. This dimension does not have any sub-dimension.
- *Policy:* The fifth dimension — policy (statements 39 to 41 in the scale) — captures aspects of service quality that are directly influenced by hospital policy. For example, when customers evaluate a hospital on the basis of convenient hours, it is viewed as whether the hospital's policy is responsive to customers' needs. This dimension does not have any sub-dimension.

Based on the above dimensions, the proposed measurement tool may be suitable for measuring the service quality of hospitals, gathering benchmark data regarding current levels of service quality, and conducting periodic 'checks' to measure service improvement. The instrument could also serve as a diagnostic tool to determine service areas that are weak and that need attention. However, in spite of its wide applicability and rigorous development, the use of the instrument should be properly tested under different contexts in order to determine its validity and reliability.

1. ***Physical Aspects***

- It is convenient to reach to this hospital.
- The waiting rooms, clinical and diagnostic test rooms, pre-operative and post-operative (or patient/resident ward) rooms, intensive care units, wards, bathrooms and toilets were adequate, comfortable and clean.
- The beds, pillows and mattresses were comfortable and clean.
- The wards are well-furnished, decorated, well-ventilated and clean all the time.
- Employees of excellent hospitals will have neat appearing.
- This hospital has visually appealing materials associated with the service (promotional brochures, service tracking documents, invoices, etc.).
- Wards, beds, operation theatres, intensive/post-operative care units and resident rooms are adequately available for patients in this hospital.

- ❖ Ambulance services are made available to patients with minimal costs in this hospital.
- ❖ Diagnostic facilities such as CT scans, MRI scans, X-rays and ultrasound; telemedicine, patient information and billing, operation theatres, labs, etc. are adequately and effectively available.
- ❖ Amenities such as continuous electricity and water supply, housekeeping and sanitation facilities, comfortable conditions such as temperature, ventilation, noise and odour-free facilities are available.
- ❖ Availability of required drugs in the pharmacy.
- ❖ Availability of the desired blood group in the blood bank in the hospital.
- ❖ The ergonomics (layout) of this hospital is conducive for physically challenged, elderly and emergency patients.
- ❖ This hospital provides for proper safety and comfort measures (e.g. handrails in aisles, rooms and bathrooms, ramps suitably designed for wheelchairs and stretchers, elevators and spacious corridors).
- ❖ The meals are offers food which is suitable to the patients.

2. ***Reliability:***

- ❖ This hospital will insist on error-free records.
- ❖ This hospital performs the service right the first time.
- ❖ Patients feel safe in getting treated by the doctors of this hospital.
- ❖ This hospital provides all the required information and instructions regarding admission, treatment, and discharge clearly to patients and attendants.
- ❖ The patient's attendants are kept informed about the patient's condition.
- ❖ The allergy or reaction to drugs is taken care of in this hospital.
- ❖ Employees of this hospital tell patients exactly when services will be performed.
- ❖ Patients feel safe in getting treated by the doctors of this hospital.

3. (a) ***Encounter:*** Responsiveness

- ❖ Employees in this hospital are never too busy to respond to the customer's requests.
- ❖ When the patient has a problem, this hospital will show a sincere interest in solving them.

(b) ***Encounter:*** Empathy

- ❖ Employees in this hospital are curious to know and solve my problems.
- ❖ Employees in this hospital are not rude in conveying the rules of the hospital (i.e. asking attendants of patients to maintain peace).

- ❖ Employees in this hospital understand my requirement and gives individualised attention.
- ❖ This hospital has their patient's best interests at heart.
- ❖ This hospital gives patients individual attention.
- ❖ Employees of this hospital have knowledge to answer patients' questions.
- ❖ Medical staff of this hospital is consistently courteous with people.

4. ***Process***

- ❖ The hospital provides for an inquiry-cum-complaint counter at a prominent place.
- ❖ Extent to which the time spent waiting for diagnostic tests and treatment, at the pharmacy, scan centres, blood banks and laboratories was reasonable.
- ❖ Frequency in delays or cancellation of scheduled surgeries due to reasons such as non-availability of operation theatres or surgeons, or lack of preparation of patients for surgery.
- ❖ A proper system of appointment is well-established.
- ❖ Overall process (e.g. admission, stay and discharge; procurement of drugs and hospital equipment; allocation of operation theatres and beds) are kept short and simple in this hospital.

5. ***Policy***

- ❖ The hospital provides for significant loyalty rewards through membership cards.
- ❖ This hospital has consulting hours convenient to all their patients.
- ❖ Overall, I am satisfied with the service quality of this hospital.

This is an analytical study based on the primary data collected through scientifically developed questionnaire. The validity and reliability analysis is as follows:

TABLE 1: VALIDITY STATISTICS

Case Processing Summary			
		N	%
Cases	Valid	246	100%
	Excluded[a]	0	.0%
	Total	246	100.0
a. List-wise deletion based on all variables in the procedure.			

TABLE 2: RELIABILITY STATISTICS

Cronbach's Alpha	No. of Items
0.818	41

The questionnaire has been personally administered on sample size of 246, chosen on a judgement sampling basis from the two cities, i.e. Ahmedabad and Hail. A literature review was undertaken to identify what parameters to consider in research. The data was collected through questionnaire consisting of 3 parts. The first two parts consist of the SERVQUAL items (Parasuraman et al., 1985), which measure service quality. In Part I, there were 41 statements measuring the expected service quality from excellent hospitals. In Part II, the same items were measuring the service quality perceptions of private hospitals in Ahmedabad and Gandhinagar region of India and Hail city of Saudi Arabia. Here, respondents were asked to evaluate the statements with regard to the hospital(s). All of the statements in Part I and Part II were measured on a five-point "Agree-Disagree" Likert scale. The last part of the questionnaire consisted of demographic questions. A questionnaire was constructed and piloted on 57 patients. The questionnaire was prepared keeping in mind the various outcomes possible. Care was taken to minimise the possibility of wrong interpretation and biased views. For the analysis of data, statistical methods are applied with the aid of SPSS (Statistical Package for Social Science) software, version 16.0 and excel. Sample size was determined using the following formula:

$$n = \frac{z^2 pq}{d^2}$$

Here Z = 1.96, p = 0.20, q = 0.80, d = 0.05, n = 245.8624 ≈ 246

SAMPLE

The sample was drawn from the people living in Ahmedabad and Gandhinagar, India and Hail, Saudi Arabia area that were above the age of eighteen. The judgement sampling method is used who were admitted in hospital for minimum two days. In order to collect quantitative data for the study, a total of 246 questionnaires were printed and distributed to respondents. The researcher selected 3 private hospitals in Saudi Arabia and 5 hospitals in India that include medium-scale clinics in which surgery is carried out were selected for survey.

TABLE 3: CHARACTERISTICS OF SAMPLE

Variables	Category	Frequency
Age	18-23	46
	24-29	63
	30-35	49
	35-40	41
	40+	47
	Total	246
Monthly Income	10,000-20,000	58
	20,001-30,000	73
	30,001-40,000	41
	40,000+	74
	Total	246

Occupation	Student	33
	Professional	109
	Businessman	27
	Housewife	17
	Govt. employee	32
	Others	28
	Total	246
Education Level	Undergraduate	8
	Graduate	78
	Postgraduate	160
	Total	246
Gender	Male	183
	Female	63
	Total	246

RESULTS AND ANALYSIS

The medical tourists that include NRI, foreigners and Indians working outside India were taken 246 respondents, who have recently benefited from hospital services in Ahmedabad and Gandhinagar regions of India and Hail city of Saudi Arabia. They were selected to answer a modified version of the SERVQUAL instrument. Results of a sample of 246 patients from 8 hospitals were analysed through SPSS and Excel. For all 41 statements of expectation and perception each, weighted arithmetic mean was calculated, and gap score was determined by deducting perception values from expectation values. Dimensions-wise mean score of perception and expectation of private hospitals was determined and comparative analysis was prepared keeping in mind the gap score of each dimension.

TABLE 4: STATEMENT-WISE MEAN SCORE OF PERCEPTION, EXPECTATION AND GAP CALCULATION OF INDIAN PRIVATE AND SAUDI PRIVATE HOSPITALS

	Indian Private Hospitals			**Saudi Private Hospitals**		
Dimensions	**E**	**P**	**G**	**E**	**P**	**G**
PA1	4.68	2.77	1.91	3.74	4.58	-0.84
PA2	4.75	2.34	2.41	3.37	4.37	-1.00
PA3	4.70	2.63	2.07	3.38	3.97	-0.59
PA4	3.89	2.87	1.02	3.27	3.01	0.26
PA5	3.69	2.53	1.16	3.52	3.29	0.23
PA6	4.43	2.58	1.85	3.17	2.43	0.74
PA7	4.42	1.89	2.53	3.29	1.47	1.82
PA8	4.64	2.10	2.54	3.37	1.99	1.38
PA9	3.98	1.91	2.07	3.88	1.62	2.26
PA10	3.77	1.74	2.03	3.62	1.57	2.05

PA11	4.44	2.45	1.99	2.22	2.55	-0.33
PA12	4.54	2.76	1.78	3.32	2.35	0.97
PA13	4.65	2.59	2.06	2.76	2.56	0.20
PA14	4.32	2.22	2.10	3.59	2.33	1.26
PA15	3.32	2.98	0.34	3.58	4.22	-0.64
PA16	3.57	2.64	0.93	3.18	3.89	-0.71
Average	**4.30**	**2.44**	**1.86**	**3.33**	**2.89**	**0.44**
R17	3.62	2.98	0.64	4.24	4.01	0.23
R18	3.84	2.63	1.21	4.81	4.53	0.28
R19	4.95	1.98	2.97	4.92	1.12	3.80
R20	4.77	2.03	2.74	4.75	1.34	3.41
R21	4.63	1.32	3.31	4.69	1.63	3.06
R22	4.82	1.48	3.34	4.86	1.39	3.47
R23	4.86	2.42	2.44	4.91	1.37	3.54
R24	3.82	3.13	0.69	3.95	3.27	0.68
Average	**4.41**	**2.25**	**2.17**	**4.64**	**2.33**	**2.31**
Res25	3.91	3.43	0.48	4.87	3.44	1.43
Res26	3.78	3.51	0.27	4.74	3.42	1.32
Average	**3.85**	**3.47**	**0.38**	**4.81**	**3.43**	**1.38**
E27	3.89	3.46	0.43	3.71	3.22	0.49
E28	3.33	3.21	0.12	3.38	3.14	0.24
E29	3.56	3.48	0.08	3.52	3.29	0.23
E30	4.39	1.22	3.17	4.07	4.04	0.03
E31	4.05	2.52	1.53	4.49	2.98	1.51
E32	4.61	1.62	2.99	4.98	4.79	0.19
E33	4.03	2.43	1.60	3.03	2.98	0.05
Average	**3.98**	**2.56**	**1.42**	**3.88**	**3.49**	**0.39**
Pro34	4.15	2.98	1.17	3.14	3.01	0.13
Pro35	4.17	2.43	1.74	3.13	2.45	0.68
Pro36	4.43	2.58	1.85	3.67	2.58	1.09
Pro37	4.65	2.01	2.64	3.89	2.65	1.24
Pro38	4.23	2.98	1.25	3.45	2.98	0.47
Average	**4.33**	**2.60**	**1.73**	**3.46**	**2.73**	**0.72**
Pol39	4.45	4.28	0.17	3.34	4.13	-0.79
Pol40	4.98	4.69	0.29	4.65	4.53	0.12
Pol41	4.01	3.90	0.11	4.83	4.71	0.12
Average	**4.48**	**4.29**	**0.19**	**4.61**	**4.79**	-0.18

E = Expectation, P = Perception, G = Gap, PA = Physical Aspects, R = Reliability, Res = Responsiveness, E = Empathy, Pro = Process and Pol = Policy dimension.

TABLE 5: DIMENSION-WISE SCORE OF PERCEPTION, EXPECTATION AND GAP ANALYSIS OF INDIAN PRIVATE AND SAUDI PRIVATE HOSPITALS

Dimensions	Saudi Private Hospitals			Indian Private Hospitals		
	E	P	G	E	P	G
Physical Aspects	4.30	2.44	1.86	3.33	2.89	0.44
Reliability	4.41	2.25	2.17	4.64	2.33	2.31
Encounter- Responsiveness	3.85	3.47	0.38	4.81	3.43	1.38
Encounter-Empathy	3.98	2.56	1.42	3.88	3.49	0.39
Total Encounter	7.83	6.03	1.80	8.69	6.92	1.77
Process	4.33	2.60	1.73	3.46	2.73	0.72
Policy	4.48	4.29	0.19	4.61	4.79	-0.18

TABLE 6: DIMENSION-WISE COMPARATIVE ANALYSIS OF INDIAN PRIVATE AND SAUDI PRIVATE HOSPITALS

Dimensions	Saudi Private Hospitals-GAP	Indian Private Hospitals-GAP	Best Performer
Physical Aspects	1.86	0.44	Indian Private Hospitals
Reliability	2.17	2.31	Saudi Private Hospitals
Encounter	1.80	1.77	Indian Private Hospitals
Process	1.73	0.72	Indian Private Hospitals
Policy	0.19	-0.18	Indian Private Hospitals

DISCUSSION

The mean expectation scores were high when compared to the perception scores, ranging from 3.34 to 0.08 for the Saudi hospitals and from 3.80 to -1 for the Indian hospitals. The lowest Saudi hospital expectation score was obtained from question 15 (This hospital provides for proper safety and comfort measures, e.g. handrails in aisles, rooms and bathrooms, ramps suitably designed for wheelchairs and stretchers, elevators and spacious corridors) and highest from question 40 (This hospital has consulting hours convenient to all their patients). The lowest Saudi hospital perception score was obtained from question 40 (This hospital has consulting hours convenient to all their patients) and highest from question 30 (This hospital has their patient's best interests at heart). The lowest Indian hospital expectation score was obtained from question 11 (Amenities such as continuous electricity and water supply, housekeeping and sanitation facilities, comfortable conditions such as temperature, ventilation, noise, etc. are available) and the highest Indian hospital expectation score was obtained from question 32 (Employees of this hospital have knowledge to answer patients' questions). The lowest Indian hospital perception score was obtained from question 19 (Patients feel safe in getting treated by the doctors of this hospital) and the highest Indian hospital perception score was obtained from question 32 (Employees of this hospital have knowledge to answer patients' questions.) Out of five dimensions, Indian private hospitals perform better than Saudi private hospitals in 4 dimensions, namely physical aspects, encounter, process and policy, while Saudi private hospitals perform better than Indian private sector only in one dimension, namely reliability.

Overall Indian private sector is performing better in encounter dimension, but specific encounter-responsiveness Saudi private sector has lowest score.

LIMITATIONS AND FUTURE RESEARCH DIRECTIONS

The findings of this study are limited to the cities such as Ahmedabad and Gandhinagar, India and Hail city, Saudi Arabia. It should be replicated in other part of countries especially with all major cities. Second, for the researchers' convenience, the study questionnaire included both expectation and perception questions. In future, the expectation and perception sections should be separated, although this may create difficulties contacting respondents just before their service and just after the service encounter. Future studies should also investigate the effects of service quality dimensions on the overall satisfaction, recommending behaviour and loyalty. Replication studies using large diversified samples elsewhere would be useful in order to corroborate our study findings.

CONCLUSION

This study set out to expand understanding of how consumers evaluate service quality in the context of a developing economy, an environment that differs significantly from the European and American context. The current research reinforces the fact that service quality is a complex and multidimensional construct. Our findings have important implications for Indian and Saudi private hospital owners, managers, government officials, academics and other related parties in the hospital services. Hospital administrations need to gather systematic feedback from their patients and to establish visible and transparent complaint procedures so that patients' complaints can be addressed effectively and efficiently. Most customers are reluctant (Ekiz, 2004) to make their needs and expectations explicit, including their complaints, although the opportunity to do so is clearly provided in order to promote healing environment.

References

1. Wan Edura Wan Rashid, Hj. Kamaruzaman Jusoff. Service Quality in Health Care Setting. International Journal of Health Care Quality Assurance 2009; 22, 5: 471 -- 482
2. Daniel Butler, Sharon L. Oswald, Douglas E. Turner. The Effects of Demographics on Determinants of Perceived Health Care Service Quality: The Case of Users and Observers. Journal of Management in Medicine 1996; 10: 8 – 20
3. Ioannis E. Chaniotakis, Constantine Lymperopoulos. Service Quality Effect on Satisfaction and Word of Mouth in the Health Care Industry. Managing Service Quality 2009; 19, 229 – 242
4. Ritu Narang. Determining Quality of Public Health Care Services in Rural India, Clinical Governance. An International Journal 2011; 16, 35 – 49
5. Abdul Majeed Alhashem, Habib Alquraini, Rafiqul I. Chowdhury. Factors influencing Patient Satisfaction in Primary Healthcare Clinics in Kuwait. International Journal of Health Care Quality Assurance 2011; 24, 249 – 262
6. Norazah Mohd Suki, Jennifer Chiam Chwee Lian, Norbayah Mohd Suki. Do Patients' Perceptions exceed their Expectations in Private Healthcare Settings? International Journal of Health Care Quality Assurance 2011; 24, 42 – 56

7. Raman Sharma, Meenakshi Sharma, R.K. Sharma. The Patient Satisfaction Study in a Multispecialty Tertiary Level Hospital, PGIMER, Chandigarh, India. Leadership in Health Services 2011; 24, 64 – 73

8. Rust, R.T., Stewart, G.L., Miller, H. and Pielack, D. The Satisfaction and Retention of Frontline Employees: A Customer Satisfaction Approach. International Journal of Service Industry Management 1996; 7, 62-80.

   http://www.emeraldinsight.com/journals.htm?articleid=851608&show=abstract

9. Sohail, M.S. Service Quality in Hospitals: More Favorable than You Might Think. Managing Service Quality 2003; 13, 197-206.

   http://www.researchgate.net/publication/228447489_Service_quality_in_hospitals_more_favourable_than_you_might_think/file/3deec52bc9badbd3e3.pdf.

10. Uzun, O. Inpatient Satisfaction with Nursing Care at a University Hospital in Turkey. Journal of Nursing Care Quality 2001; 16, 24-33.

    http://www.researchgate.net/publication/11683427_Patient_satisfaction_with_nursing_care_at_a_university_hospital_in_Turkey

11. Valdivia, M.T.R. and Crowe, T.J. Achieving Hospital Operating Objectives in the light of Inpatient Preferences. International Journal of Health Care Quality Assurance 1997; 10, 208-12

12. Karen L McClean. Cross Border Health Care, Medical Tourism Conference 2008

13. Chandra. R. Trade in Health Services. Bulletin of the World Health Organisation. The International Journal of Public Health 2002; 2, 158–163

14. Kher. U. Outsourcing Your Heart. Time Magazine (May 21, 2006), accessed May 9, 2009; at: www.time.com/time/magazine/article/0,9171,1196429,00.html.

5

Suggested Public Private Partnership (PPP) Model of Preparing Mobile Laboratories for Creating Sustainable Society in Rural Areas

L. Kalyan Viswanath Reddy*
Pavishi Agarwal**

Hospitals are very expensive to build and to operate. Their initial capital cost is high and their running cost year after year, especially for in-patient services is enormous. The first task of the health services is to reach all the people all the time at the best level of care the country can afford. Hospital provision is only one part of the health service, and the money devoted to it must not impoverish the rest of the service. At the same time, expenditure on health services, of which hospitals are a part should be regarded as an investment that will pay economic dividends in the form of lessened invalidity, reduced unemployment caused by sickness and increased industrial production. One of the primary means of attaining this desirable aim is via outreach programmes. In these cases, the aim is to reach out into the community and provide quality health care delivery facilities so that the need to visit a hospital is kept to a minimum. Outreach programmes cannot work unless there is effective hospital support in terms of material, manpower, money and management. The primary function of the clinical laboratories is to perform laboratory tests, which will provide information to clinicians in arriving at correct diagnosis and in the treatment and prevention of disease. The practice of modern medicine requires more and more laboratory examinations. With advances in technology, today's medical care may be said to have entered an era of laboratory medicine. A couple of decades ago, laboratory determinants were done manually covering only basic diagnostics tests needed for patient assessment. Most labs are now equipped with, to a varying degree, sophisticated automated instruments such as analysers, which have increased productivity. Tests are performed in a matter of minutes and with the highest degree of accuracy.

Keywords: *Outreach Programmes, Hospital, Mobile Laboratories, Hospitals, Pathology, Quality, Sample Collection Unit, Patients, Specimens*

* Assistant Professor, Department of Health Management, College of Public Health and Health Informatics, University of Hail, Hail, Kingdom of Saudi Arabia
** Paediatric Physiotherapist, University of Hail, Kingdom of Saudi Arabia

INTRODUCTION

The widely accepted definition of health is given by the World Health Organisation, (1948) in the preamble to its constitution, which is as follows:

"Health is a state of complete physical, mental and social well-being and not merely an absence of disease or infirmity".

In recent years, the statement has been amplified to include the ability to lead a "socially and economically productive life".

MOBILE SPECIALTY VEHICLES

Mobile Specialty Vehicles, founded in 1980, are headquartered in Jasper, Texas. MSVs specialise in designing and providing Command and Communication Centers and Trailers to law enforcement, fire, military and other agencies. It is applying its expertise in creating custom-designed multi-functional centres to local, country, state and federal government and first responders. These vehicles can be equipped with environmental defense systems to protect against nuclear, biological and chemical harmfulness. The outreach programme for the lab facilities of a large corporate hospital could be effective and efficiently carried out through a mobile unit.

The Need for such Facility

A mobile sample collection unit is an integrated facility offering the state-of-the-art diagnostic facilities. It combines convenience with affordability. The patients need not to come to the hospital. The lab services come to the patient. It will result in enormous savings in terms of zero travel and accommodation expenditure and reduced wastage of time. This unit offers tremendous flexibility and reach.

OBJECTIVES OF RESEARCH STUDY

The objectives of the research paper are as follows:

- A feasibility study on establishing mobile sample collection unit
- Assessing the need for mobile samples collection unit
- Cost analysis for the establishment of mobile van
- Estimating the profit and use of the mobile sampling collection units

LITERATURE REVIEW

The outreach laboratory services in India and abroad are described below.

(i) The Escort Heart Institute Mobile Unit is essentially a high-tech bus based in Delhi, and has facilities for laboratory facilities and for the conduct of C.M.E (Continuous Medical Education) programmes.

(ii) The Sunderbans area of West Bengal, which has extensive network of rivulets, has boat dispensaries. These floating dispensaries have on board two doctors and 14 medical

workers, besides medicines and telecommunications facilities. Similar floating units are also seen on the River Godavari in Andhra Pradesh and in the backwaters of Kerala. Many government and charitable institutions in India have mobile units designed for educational family planning surgeries and ophthalmic procedures.

(iii) The erstwhile CDR hospital based in Hyderabad had a mobile CAT scan unit, which had been integrated into their 'Sanjeevani' scheme whereby nearly 50 Hyderabad-based specialists in a couple of mobile vans were being used to carry the diagnostics equipment such as X-ray, dry chemistry to provide the back up support to the specialist technicians.

(iv) One typical mobile unit based in a light commercial vehicle is being run by the K. Pandyarajah Ballal charitable trust in Mangalore. It has on board equipment for X-ray and ultrasound. It also has facilities to collect specimen samples that are taken from the peripheries to laboratories located in Mangalore. This van is also used as a critical care ambulance.

(v) HealthCheckUSA is a fully accredited laboratory based on a mobile unit providing onsite medical testing and health screening service for corporations.

(vi) St. Joseph Hospital (USA) offers the Care-A-Van unit. It is a 40-foot self-contained vehicle that includes two examination rooms and a work area. The rear examination room also serves as a mammography suite. The van is capable of providing everything from routine health screening to psychiatric evolutions and alcohol counselling.

(vii) The Center for Occupational Health (USA) runs two mobile units. The first is an occupational medicine unit on which physical examinations, health and wellness education programmes and hearing vision and pulmonary function testing can be done. The second unit is used to determine which outreach locations would support a fixed rural health clinic. It is currently being equipped for telemedicine. Free cholesterol and blood tests were administered to raise corporate awareness and establish a presence in the outlying areas.

(viii) The Union of Palestinian Medical Relief Committee (UPMRC) began mobile clinics in 1979 with the goal of providing health care services to isolated communities. The mobile programme is now concentrating on screening and preventive activities. The standard tests performed include those for diabetic, vision hearing and blood parameters. It also offers some specialised services. The UPMRC staff can make referrals to specialists who accompany the clinic, thereby saving the patient expenditure on travel and accommodation.

(ix) Southern Indiana Radiology Association, SIRA, (USA) is an organisation that operates a mobile unit. Their mission is to reduce the time who accompany the clinic, thereby saving the patient expenditure and travel.

LABORATORY SERVICES

Traditionally, the laboratory services provided in the hospital were not able to satisfied patients' needs in terms of comfort as services required patients to travel all along to the city and delay in services provided in the laboratories. As a result, the mobile sample collection unit was a very

novel idea and has been practiced around the world. The following factors are responsible for the creation of a mobile sample collection unit:

(i) The treatment to the patient depends on the results of diagnostic test, but due to late report delivery, treatment would be delayed.

(ii) People or other employees undergoing treatment in other centres wait for the reports to consult doctor and some people like employees need to submit the health reports in workplace. Delay in report delivery irritates these people and it made lead to switch to other hospital.

(iii) Some of the patients come to other centres of the hospital for only lab test, keeping in view the best technology of hospital laboratory but late report delivery causes anxiety among the patient. So, next time they may switch on to some other hospital.

(iv) Word-of-mouth publicity about a particular laboratory may go negatively due to delay in report delivery.

General Laboratory Procedures

The following are the usual procedures for requesting and handling lab examination:

- Requests for examination should be in writing.
- The physician, nurse or lab technician should be responsible for obtaining lab specimens.
- Instituting time schedules for accepting certain types of specimens will facilitate the operations of the laboratory.
- Specimens should be sent to the lab in properly labelled containers.
- All requests should be well prepared request forms.
- No specimen or request should be left idle in the lab.
- Results of the tests are entered in two copies of request forms, and the original is then returned.
- The results are also entered in the daily records of the register.

The sample collection comprises the following:

i. For blood collection, a separate sample collection has to be provided.

ii. Sterile tubes, needles and syringes are provided for blood collection.

iii. The specimens at collection are given a unique identification number.

iv. The request form should also carry the identification number as that on the specimen.

General Specimen Collection Guidelines

The accuracy of any test procedure depends on the quality of the specimen, how and when it was collected, the care given to its preservation, and how soon it reaches the laboratory.

- ***Safety:*** To protect the safety of the healthcare worker collecting the sample, transports and laboratory personnel.
- ***Labelling:*** Proper identification of every patient sample is important.
- ***Collection:*** The patient specimen or collection site must be carefully selected so that it represents the active disease process. The common site of infection is often contaminated with indigenous flora, so precautions must be taken to obtain a valid specimen.
- ***Storage and Transport:*** Proper transport systems and prompt delivery of specimens to the laboratory for obtaining useful laboratory test results.

Specimen Transport to the Laboratory

Specimens are picked up from the patient's home. Before specimens are bagged for pickup, they should be checked to be sure that all laboratory forms are completely filled out and each specimen is tightly sealed and properly packaged for safe delivery. It is the responsibility of the clinic to ensure that laboratory specimens are not a hazard to transport personnel or to laboratory personnel that handle specimens. Laboratory personnel will be available at the laboratory for Sunday morning delivery by special arrangement.

Sample Preparation and Storage

The following should be noted in sample preparation and storage:

(i) It is mandatory to carry out sample preparation activity as early as possible for efficiency and for maintenance of sample integrity.

(ii) Serum/plasma must be separated within 30 minutes.

(iii) Critical/labile samples such as semen, ESR, etc. are sent for analysis immediately.

(iv) Necessary facility has been given for storage samples at ambient, refrigeration or frozen levels.

(v) Based on the type of test requested and depending on nature of analyte, the samples are stored from 4 days to 1 month. However, clinical trial samples are stored as per the requirement given by the sponsor.

(vi) The temperature requirements for specimen's transport listed below.

  (a) Frozen

  (b) Refrigerated (2-80C)

  (c) 18-20C

  (d) Room temperature

Use transport boxes. All gel packs should be frozen for at least 24 hours and less than zero0C prior to use. Use separate transport boxes for each of the temperature ranges, e.g. all frozen samples in one box.

RESEARCH METHODOLOGY

The research methodology for analysing the need for setting up mobile laboratories is as follows:

TABLE 1: ANALYSING THE NEED FOR SETTING UP MOBILE LABORATORIES

Sample Design	Sampling Plan for Survey of Patients
Defining the universe	All patients coming to city clinics, hospitals and laboratories
Survey population	All patients coming to city clinics, hospitals and laboratories.
Sampling unit	Only patients
Sampling method and selection	Cluster sampling
Sample size	150 patients
Sample extent	Only cities in India

The Data Classification Results

The total number of samples collected is 150. The number of samples collected in the morning is 105 and the number of samples collected in the afternoon is 45.

- The number of samples before 12:30 = 105
- The number of samples after 12:30 = 45
- The total time spent in other hospital activities in morning = 308 minutes

MARKET ANALYSIS

This is a comprehensive facility for preventive health that neither exists in Andhra Pradesh nor anywhere else in the India. Therefore, the market survey was intended to send out feelers as to the acceptability and possible future use of this facility. This is a product that the user may not be able to identify as the concept is introduced that we intend not to create a need rather to bring to the surface an unconscious need. This has been termed 'empathic research'. Empathic research deals with identifying potentially critical customer needs. Table 2 depicts the questionnaire analysis.

TABLE 2: QUESTIONNAIRE ANALYSIS

Sl. No	Questionnaire Analysis	
1	Is this your first visit to hospital?	
	Yes (25%)	No (75%)
2	What is the purpose of the visit?	
	Consultation (63%) Health checks (12%)	Admission (18%) Follow up (7%)

3	How much time do you spend for the visit along with travelling?
	Less than 60 minutes (22%) 1–2 hours (9%) 2–4 hours (64%) More than 4hours (5%)
4	What is the approximate expenditure for each visit along with travelling?
	Less than ₹ 200 (18%) ₹ 200 – ₹ 500 (26%) ₹ 500 – ₹ 1000 (43%) More than ₹ 1000 (13%)
5	How often did you visit a specialist in the last one year?
	Less than 5 times (36%) 5 - 15 times (46%) 15 - 30 times (12%) More than 30 times (6%)
6	What is the waiting time for various diagnostics tests?
	Less than 60 minutes (12%) 1–2 hours (6%) 2–4 hours (35%) More than 4 hours (47%)
7	If there were mobile services for your laboratory services, would you prefer them?
	Yes (69%) Can't Say (17%) No (14%)

DATA ANALYSIS AND INTERPRETATION

It would be beneficial for designing a mobile sample collection centre to deliver services to the different cadres of the people in the city. According to the above analysis, 65% of the people prefer to establish mobile sample collection centres. Nowadays, most of the people working in different areas are choosing better health care services including diagnostics within the short span of time with good quality of services. As far as selling the concept to organisations is concerned, a more aggressive marketing approach has to be adopted. The use of this service must be primarily targeted at the convenience factor and the range of tests offered. This is in order to attract more people (patients) and also to fulfil the needs of the people that they are, in fact saving their time and money by using mobile sample collection units.

FINANCIAL ANALYSIS

The financial analysis for a mobile unit estimated is as follows. This is only a suggestive model.

- ***Project Unit:*** This gives an estimate of the total investment needed to undertake this venture that contains financial information under various headings such as chassis van body equipment and working capital.

  Total project cost (amount of debt) = Rs 5, 00,000

  Interest@ 21% = Rs 1,05,000

- ***Revenue Generation:*** The revenue generation in this project is based on the sale of sample only. The use and sale of other facilities on the unit for a profit are assumed to contribute to the cash flow in a positive manner. The individual tests will be suitably priced so as to be competitive with the local facilities. For the purpose of the calculation, a maximum utilisation of 10 patients per day in 30 working days per month in the first year and 24

days in the succeeding years has been assumed a selling price of rupees that has been used which is the same rate as that of a similar packages at city the selling price of rupees is subject to a 10% increase every year.

- ***Costs Incurred:*** This head is further divided into direct material costs and fixed costs. The former is the total cost of all material used in a lab and the fixed costs include salary depreciation, insurance, road tax, fuel expenses, maintenance and convenience expenses.
- ***Financial Projection:*** The financial projections for the first 5 years of operation by way of the cash flow method, and the breakeven point in terms of the number of sample collections to be performed annually have been calculated. The rate of interest for debt is assumed to be 21% per annum. The rate of depreciation on the van is assumed at 5% per annum and straight line method is used to calculate depreciation. The rate of depreciation on medical equipment is taken as 7.7% per annum. The straight line method is used. The selling price of the tests increased by 10% every year and the material cost and fixed cost also increased by 10%; this is to account for inflation.
- ***Needed Equipment in the Mobile Van:*** The list of equipment included on the mobile facility is as follows:
  - ❖ Centrifuge
  - ❖ Kits
  - ❖ Microscope
  - ❖ Refrigerator
  - ❖ Deep freezer
  - ❖ Glassware (Test tubes, beakers, etc.)
- ***Waste Disposal System:*** The mobile unit shall dispose contaminated waste such as blood and body fluids, stool sample, contaminated swabs, storage vials, needles and syringes with chemicals. The chemical disinfection is carried out in a suitable receptacle kept at the workstation. Commonly used disinfectants are sodium hypo chloride, formaldehyde, Glutaraldehyde, phenol and hydrogen peroxide. The receptacle can be carried back to the base hospital where appropriate disposal through incineration is carried out.
- ***Safety Precautions of the Mobile Facility:*** *The safety precautions are listed below.*
  - (i) Provision for fire extinguishers
  - (ii) Provision for a first-aid box
  - (iii) Technicians should be trained to use safely measures.
  - (iv) Electrical installations should meet safely requirement.
  - (v) Written installation should be available and practiced to handle potentially infectious material.
  - (vi) Written instruction should be provided and practiced for the disposal of needles and other sharp instruments and potentially infectious waste.

(vii) The entire vehicle should be a no smoking zone.

(viii) Technicians should be vaccinated agents, e.g. Hepatitis B virus.

- ***Vehicle Design:*** The specification for designing the body of the vehicle, the interiors and other technical specifications will be according to those of the Maruti or Tata chassis. The basic specifications and dimensions are as follows:
  - ❖ Head room - 2ft
  - ❖ Interior width - 3ft
  - ❖ Overall length - 10ft
  - ❖ Overall width - 2ft
  - ❖ Wheelbase - 8ft
- ***Project Cost Details:*** The details of project cost are as follows:

❖ VAN chassis	4, 20,000
❖ Binocular microscopes	40,000
❖ Centrifuge	45,000
❖ Others	15,000
❖ Refrigerator with freezer	10,000
❖ Wireless set	10,000
❖ Others	10,000
❖ Total	5,00,000

Projections of Revenue from Sample Collection Packages Only

1st year; 10 patients per day × 20days 12months = 2400 patients

2nd year; 10 patients per day× 24days ×12 months' = 2880 patients

3rd year; 10 patients per day × 26days × 12months = 3120 patients

4th year; 10 patients per day × 28days× 12months = 3360 patients

5th year; 10 patients per day × 30days ×12 months' = 3600 patients

Direct Material Cost only for Sample Collection Package

S. No	Test	Amount (Rs)
1	Haemoglobin	12
2	Packed cell volume	31
3	Red blood cells	37
4	Complete blood count	41

5	Peripheral smear	21
6	Creatinine	14
7	Cholesterol	21
8	HDL	42
9	LDL	103
10	Triglycerides	21
11	Total protein	17
12	Total bilirubin	19
13	SGPT	24
14	SGOT	21
15	GGTP	80
16	Blood grouping	37
17	HBS Ag1	137
18	PAP smear	68
19	Stool routine	36
20	Urine routine	18
TOTAL		800

*Calculation of Fixed Costs**

	Particulars	Year 1	Year 2	Year 3	Year 4	Year 5
1.	Salaries	1,44,000	1,58,400	1,72,800	1,87,200	2,01,600
2.	Depreciation	3,1250	3,1250	3,1250	3,1250	3,1250
3.	Insurance	2,000	2,000	2,000	2,000	2,000
4.	Road tax	1,100	1,100	1,100	1,100	1,100
5.	Fuel expenses	4,6320	4,8500	5,0150	5,2100	5,4500
6.	Maintenance	6,000	6,500	7,300	8,200	9,500
7.	Conveyance	3,500	4,300	5,600	6,850	8,900
-	Total	2,34,080	2,52,050	2,70,200	2,88,700	3,08,850

* As applicable for vehicles of this type.

Assumption: A 10% increase in salaries fuel cost maintenance and conveyance costs to account for inflation.

Financial Projections

Particulars	Year 1	Year 2	Year 3	Year 4	Year 5
No of samples	2,400	2,880	3,120	3,360	3,600
Revenue	913750	1005125	1105638	1216201	1337821
Material cost	19,20,000	23,04,000	24,96,000	26,88,000	28,80,000
Fixed cost	2,34,080	2,52,050	2,70,200	2,88,700	3,08,850
Total cost	21,54,080	25,56,050	27,66,200	29,76,700	31,88,850

PBIT	8,43,178	12,93,663	14,36,737	15,83,140	17,32,869
Interest	1, 05,000	1, 05,000	1, 05,000	1, 05,000	1, 05,000
PBT	7,38,178	11,8,8663	13,31,737	14,78,140	16,27,869
Tax@40%	295271	475465	532695	591256	651148
PAT	4,42,907	7,13,198	7,99,042	8,86,884	9,76,721
Depreciation	7,121	7,121	7,121	7,121	7,121
Cash Flow	4,50,028	7,20,319	8,06,163	8,94,005	9,83,842

From the above analysis, we can infer that it would be beneficial for the unit to design different packages to suit all the different cadres of employees in an organisation. This idea is most acceptable to the organisation, if this is done. The price can remain the same or even slightly higher for individual users. Our survey among visitors to hospitals has revealed that the idea is very appealing to them as individual users. Therefore, the capability and use of the van may be extended to meet their requirements. This is further discussed under the recommendation section of the project. As far as selling the concept to organisations is concerned, a more aggressive approach should be targeted at the convenience factor and the range of tests offered. The package in price will have to be adjusted slightly higher than the average in order to attract more and also fulfil the psychological factor that they are in fact saving money for their companies by using this facility.

RECOMMENDATIONS

Two major areas of the laboratory must receive special attention to ensure efficiency and accuracy. They are workflow and information flow. In the organisation of the work flow, the two important aspects should be noted: the procurement of specimens and their delivery to the laboratory. The tests are performed according to established procedures on the basis of several factors such as the number and types of tests ordered, the time they are ordered, the extent of automation of the laboratory, etc. There are two phases in the information flow. In the first phase, the tests are ordered. In the second phase, the ordered tests are logged in and the results are reported. Two major factors that determine the efficiency, accuracy, workload and speed of performance of the laboratory are the extent of automation in the production cycle and the extent of computerisation of the laboratory. The lab processing system may be manual, partially computerised or fully computerised. There is an urgent need for cross-training efficiency. A technician trained exclusively in biochemistry must learn about systems in clinical pathology or haematology. In short, an efficient core laboratory must have versatile staff.

In addition to its core function of delivering sample collection units need at the consumer's doorstep, the additional uses of such facility can be as follows:

(i) It can be part of larger network of comprehensive outreach programmes, which could include facilities such as mobile sample collection units, etc.

(ii) The equipment on board the vehicle can be used to provide state-of-the-art back up support for general practitioners who have private practice but are unable to invest in a quality laboratory. In this case, door-to-door service would not be possible.

(iii) However, a dispatch driver on a two-wheeler could collect specimen samples from a pre-designated area at predetermined time and bring it back to the mobile unit for analysis and later deliver the reports. This is more acceptable in an area where laboratory penetration is minimal and imaging facility can be extended the USG and the high quality of services offered.

(iv) The mobile facility can provide convenient services at the doorstep of large-scale residential colonies where families might like to undergo the sample collection units. This can be done at their leisure preferably over the weekend. However, this will materialise only after a concerted marketing effort.

(v) The greatest benefits to society at large will emerge if the governance takes up such projects. Earlier attempts have mostly failed due to lack of proper planning and implementation. These vehicles can be converted into mobile van that will provide a powerful backup to each area.

(vi) The projects suggest that the vehicle works as a profit-making unit for only 20 days in a month and all financial projections have been made accordingly. The remaining week has been kept free so that the vehicle may be in the used for some specialised campaigns. For the needy, these programmes must be preceded by the well-designed media plan using both the press and local electronic media to educate the masses about facilities being offered.

CONCLUSION

At the end of this study, it may be concluded that the idea of a mobile sample collection unit is viable in terms of its theoretical design as well as its physical execution. The concept has generated a lot of enthusiasm and interest in all the people involved during the course of the study. The initiation of such project requires aggressive marketing and promotion. Even though the payback period of the project is considered to be rather extended, there are innumerable intangible benefits associated with this facility. In the long run, the hospital could expand and extend the facility using these mobile units to wider areas of operation, which will eventually revolutionise the concept of health care in the country. It is hoped that such an idea becomes a reality in the foreseeable future.

References

1. Stricoff Walters (2004), "Handbook of Laboratory Health and Safety", Vol II, Elsevier, Pg: 232 – 239
2. Leslie Cromwell (2007), "Biomedical Instruments and Measurements", Vol I, 5th Edition, Percentile Hall, Pg: 138 – 153
3. Theodore A. Matson (1996), "Restructuring for Ambulatory Care", Vol I, 1st Edition, Percentile Hall, Pg: 222 – 236
4. Kunders G.D, Gopinath S Katakam (2003), "Hospital Planning Design and Management" Vol I, Tata McGraw Mill, Pg: 86 - 98
5. Philip Kotler & Gary Armstrong (1999), "Principles of Marketing", Vol I, 2nd Edition, Macmillan, Pg: 123 – 134

6. Paul E Green, Donald's Stull, Gerald Albaum (1997), "Research for Marketing Decisions" Vol I, Elsevier, Pg: 198 – 202
7. I.M Pandey (2003), "Financial Management", Vol I, Jaypee Publishers, Pg: 156 – 164
8. GC Beri (2002), "Marketing research" Vol II, Tata McGraw Hill, Pg: 238 – 249
9. Gupta and VK Kapoor (1998), "Fundamentals of Mathematical Statistics", Himalaya publications, Vol I, Pg: 111 – 119
10. Llewellyn Davies and Macaulay (1996), "Hospital Planning and Administration", Macmillan, Vol I, Pg: 236 – 249
11. Report on Mobile Clinic Activities, Available at http//www.upmrc.org/mobile.html, browsed on 16th June, 2013
12. St. Joseph Hospital care-a-van, Available at http//www.stjosephs.org/caravan.html, browsed on 8th February, 2013
13. Health check labs, Available at http//www.healthcheckusa.com.html, browsed on 16th June, 2013
14. Mobile Medical recent Clients, Available at http//www.mobile medical.com/clients, browsed on 1st October, 2012
15. Specialty vehicles, Available at http/// www.ohiobus.com//medical.html, browsed on 15th January, 2013
16. Government of New Zealand, Available at www.cdhb.gov.nz, browsed on 16th February, 2013
17. Pathology Laboratory, Available at www.lalpathlabs.com, browsed on 16th June, 2013
18. Analytical designs, Available at www.pananalytical.com, browsed on 6th January, 2013
19. Government projects, www.tfhrcgov/about/corros.html, browsed on 16th June, 2013

6

Information System Fundamentals for Healthcare Professionals

Syed Murtuza Hussain Bakshi*

The Information System has been envisaged to help health administrators to exercise an enhanced monitoring control over the functioning of hospitals by using decision support indicators, to assist doctors and medical staff to improve health services with readily reference patient records and a work flow enabled less paper process and to provide efficient and timely treatment to patients through automatic alerts during patient treatment cycle. Hospital management information system has enabled the provision of better care to patients by automating all the major functional areas of government hospitals. It is also facilitating the monitoring of pre-defined health indicators by generating periodic reports for the hospital management as well as state-level administrators.

Keywords: *Information, Hospital, Technology, Healthcare, Data, Management*

INTRODUCTION

Information and communication technology tools are arguably the most rapidly growing segment of the world ecosystem. The development in the sector permeates every human activity; social, economic, cultural, religious, political and healthcare. Almost all the industries in the western countries are highly dependent on information technology and information systems even healthcare is not an exception .With increasing complexities of business operations, technology and management, organisations want to grow and keep the firm in good strategic position. This is possible only if the firm has adequate, fast, consistent and reliable information about the business environment. Information system is an important tool that provides information required by the business organisation and its stakeholders so that managers can initiate decisions which help growth of the organisation. As the modern business environment is highly interconnected, information is readily available as well as exposed to a growing number and wider variety of intimidation and vulnerabilities. Information is an asset like other important business assets,

* Associate Professor, Dept. of Hospital Management, Deccan School of Management, Hyderabad

which is essential to an organisation's business operations and consequently need to be up-to-date and protected.

Information technology has revolutionised the way medicine is practiced and how healthcare information is documented, archived and retrieved at the point of care. It is apparent that the use of modern information system offers tremendous opportunities to reduce clinical errors (e.g. medication errors, diagnostic errors), to support health care professionals (e.g. availability of timely, up-to-date patient information), to increase the efficiency of care (e.g. less waiting times for patients), or even to improve the quality of patient care. While information system is facing challenges of adoption, communication technology is striving to create health information exchanges for connecting providers within multi-organisation environments and across disparate geographical boundaries, using secure and fail-safe internet connectivity for high speed data, voice and video communication.

INFORMATION TECHNOLOGY IN HEALTHCARE

In many emerging countries of the world, there is a huge investment of resources into information technology with growing sophistication of computers and software. Information technology should play a vital element in reducing the risk by streamlining care, catching and correcting errors, assisting with decisions, and providing feedback on performance. Information technology has the potential to improve the quality, safety, and efficiency of health care. Healthcare professionals can no longer ignore the application of information technology. In this context, healthcare managers and professionals rely on a variety of information systems that use information technologies in their day-to-day operations. Drivers of investment in IT include the promise of quality and efficiency gains. Barriers include the cost and complexity of IT implementation, which often necessitates significant work process and cultural changes. The successful development and utilisation of Integrated Information Systems in healthcare setup is considered to be a great challenge. The healthcare organisation structure and processes should be examined carefully in order to identify all those factors that may be related with the impending successful introduction of Information Systems, thus leading to failure. With enormous investments and intervention of Information Technology, IT has become increasingly important. Furthermore, the impact of technology on non-financial outcomes such as customer satisfaction and quality is gaining interest.

In this paper, we understand the concepts of data, information, information systems and its resources, role of information in business, dimensions and attributes of information, and different perspectives of information system.

CONCEPT OF DATA AND INFORMATION

Data and information are considered to be building blocks of information system. Data is generated by every activity carried in an organisation. Organisational decision directly or indirectly depends on the data quality and accuracy. Data is defined as "raw unprocessed facts and figures that have no context or purposeful meaning". Data comes in various forms such as numerical, alphabet, alphanumerical, symbols and pictures. Data has a source of origin either primary or secondary. The entire data generated in an organisation is stored at database. If data is generated within the organisation, it is referred as internal data. If data is generated outside but

has an impact or is important to organisation, it is referred as external data. Data if not captured, stored and maintained properly, an organisation may have to fear losses. Figure 1 illustrates the path followed by data before becoming information cycle is termed as data life cycle.

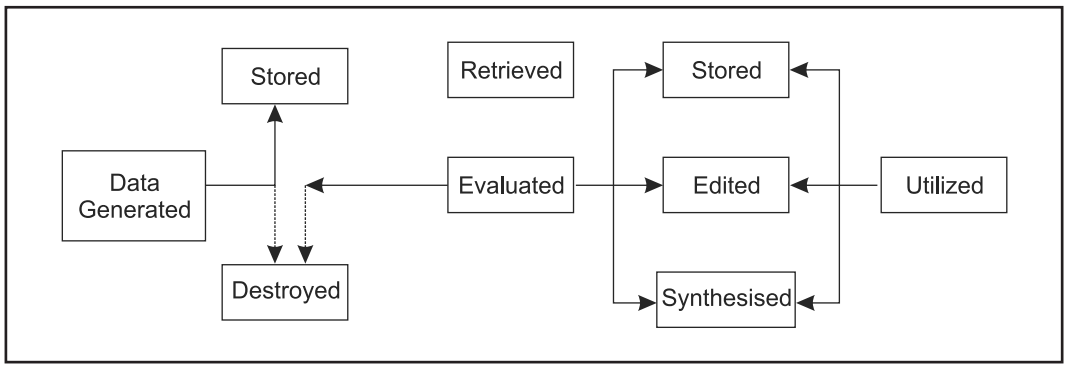


FIGURE 1: DATA LIFE CYCLE

Information can be defined as the data which is organised and presented at a time and place so that the decision maker may take necessary action. Information in other words is the result product of processing data, i.e. *Information is processed data that has meaning and is presented in a context or more technically "It can be said as information is behaviour initiating stimuli between sender and receiver*". There is a definite purpose of every piece of information. Information comes in certain formats. Information timeliness and accuracy has greater impact on organisational decision making.

EXHIBIT 1: EXAMPLES OF DIKW

Data: It is raining.

Information: The temperature dropped 15 degrees and then it started raining

Knowledge: If the humidity is very high and the temperature drops

Wisdom: It rains because it rains and this encompasses an understanding of all the interactions that happen between raining, evaporation, air currents, temperature gradients, changes, and raining. Substantially the atmosphere is often unlikely to be able to hold the moisture so it rains.

Knowledge is the appropriate collection of information such that its intent is to be useful. Knowledge is a deterministic process. Knowledge represents a pattern that connects and generally provides a high level of predictability as to what is described or what will happen next. Knowledge is composed of the tacit experiences, ideas, insights, values and judgements of individuals.

Wisdom is an extrapolative and non-deterministic, non-probabilistic process. It calls upon all the previous levels of consciousness, and specifically upon special types of human programming (moral, ethical codes, etc.). It beckons to give us understanding about which there has previously been no understanding, and in doing so, goes far beyond understanding itself. It is the essence of philosophical probing. Wisdom embodies more of an understanding of fundamental principles embodied within the knowledge that are essentially the basis for the knowledge being what it is. Wisdom is essentially systemic. The DIKW is illustrated in Figure 2.

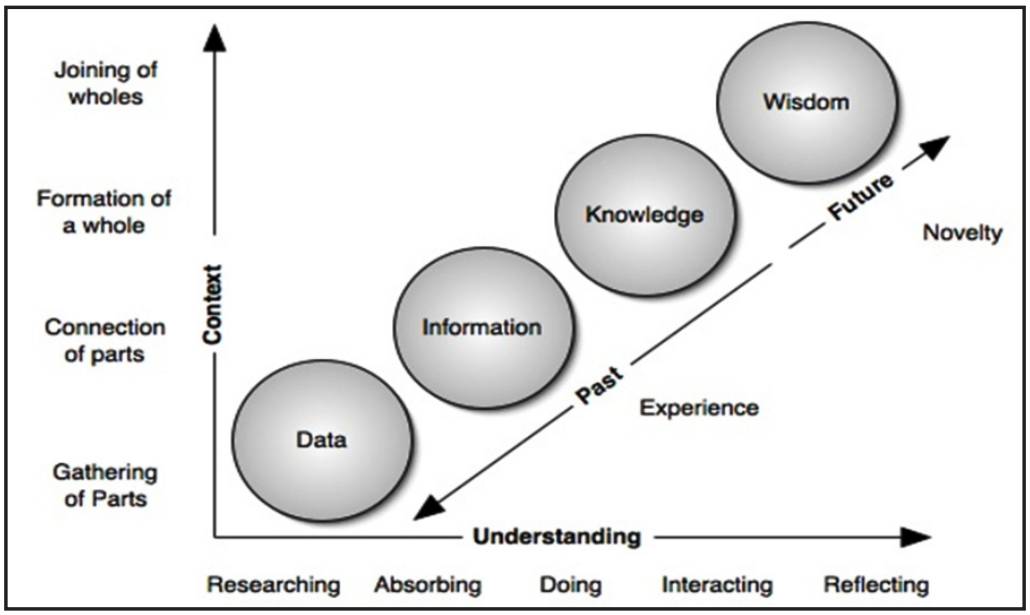


FIGURE 2: DIKWQ LINEAR CHAIN

CONCEPT OF SYSTEM

Systems are diverse. They are natural or manmade. Some of the natural systems are solar system, ecosystem and human body as a system; whereas manmade systems are computer system, decision support system, communication system, transport system and educational systems. This means we all live in an era of systems and are part of systems.

Systems are created to solve problems. One can think of the systems approach as an organised way of dealing with a problem. The system is integrated set of components and entities that interact to achieve a particular function or goal. A system consists of group of interrelated, interacting elements working towards a common goal by accepting input, producing output in an organised transformation process. In order to call it a system, it should have these core components.

Components of a System

A system consists of these components: input, process, output, boundary, environment, structure, interface, subsystem, feedback and control.

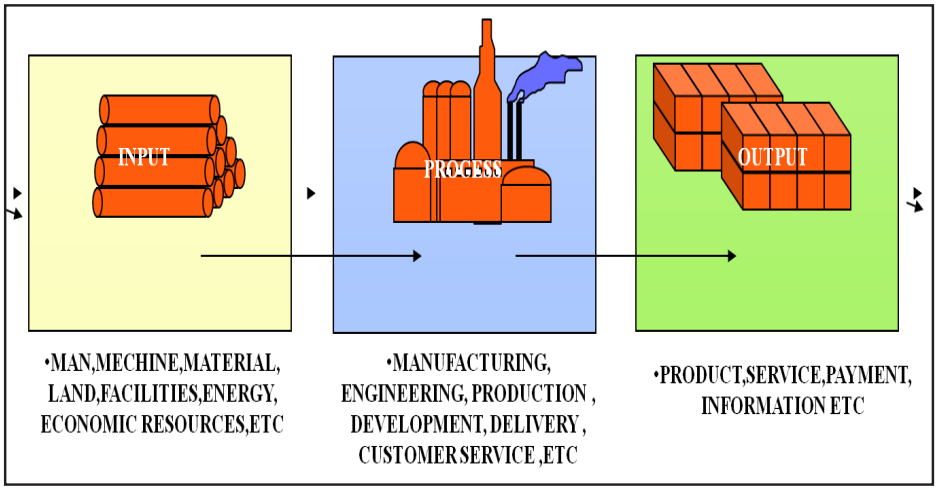


FIGURE 3: THE ORGANISATIONAL SYSTEM

Input involves capturing and assembling elements that enter the system to be processed. The quality of input elements decides the process efficiency and output.

Process is transformational activity that converts input to output. The process can be manual, semi-automatic, fully automated and computerised.

Output elements are those which have been produced after transformation process (end product). Output is a dependent variable and is based on quality of input and process, which is a main source of feedback.

Boundary defines the extent and scope of the system activity. A boundary separates a system from its external environment. A boundary can be physical/logical.

Environment is the surrounding of a system in which a system operates. It consists of interacting entities like customers, government, suppliers, etc. Environment also provides input to the system. Environment strongly influences the system and determines boundaries sometimes.

Subsystems are core components of a system (system within system). A subsystem provides specialised task relative to overall objective of system. A subsystem has individual objective in time with the systems overall objective. If a subsystem fails, the entire system has to suffer. The output of one subsystem becomes input to another subsystem.

Interface includes the common connection at the system and subsystem. Interface serves as a medium to convey the output from one system to another system. Information flow and exchange is through interface.

Feedback is an indicator containing information about the current performance of the system. Control involves monitoring and evaluating feedback to determine whether a system is making towards the achievement of its goals. With feedback and control, necessary adjustment to the system can be done to ensure good working of the system. A system which has feedback and control component is also called as cybernetics system (self-monitoring and self-regulating system). With effective feedback and control, a system can be continuously improved. Feedback

can be positive or negative. Positive feedback tells that system is moving in the right direction (activities can be repeated/improved). Negative feedback tells a failure/fault. So, necessary adjustments can be done to improve the overall system.

Types of System

There are various types of a system that exist and can be classified as closed system and open system illustrated in Figure 4 and 5.

A closed system is theoretical constructs. The components within the closed system are assumed to exist in a self-sufficient state. A closed system is self-contained and has high and rigid boundaries. In a closed system, there is no exchange of materials and parts with the external environment. All other influences or variables from outside the system are considered to be non-existent or insignificant.

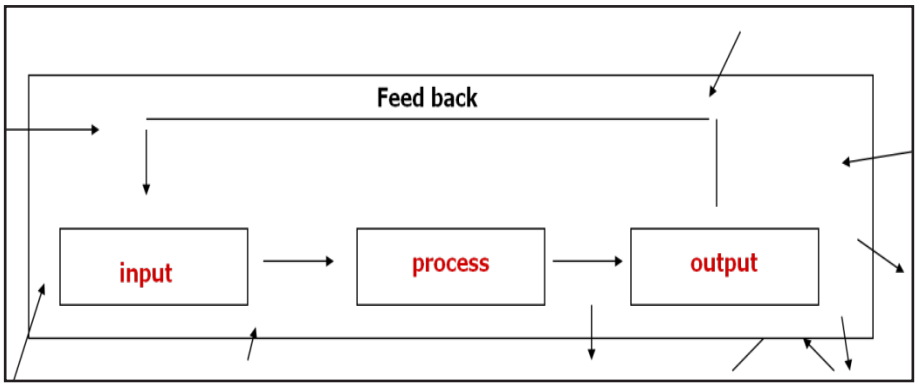


FIGURE 4: OPEN SYSTEM

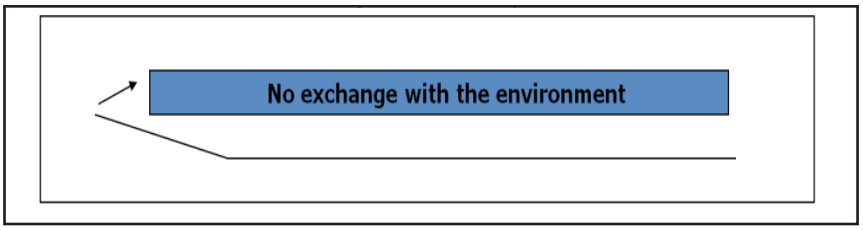


FIGURE 5: CLOSED SYSTEM

Open systems are the real-world systems that have permeable boundaries through which they continually exchange energy, material and information with their external environment in which they exist. It is open to the environment (interacts with other system in its environment).

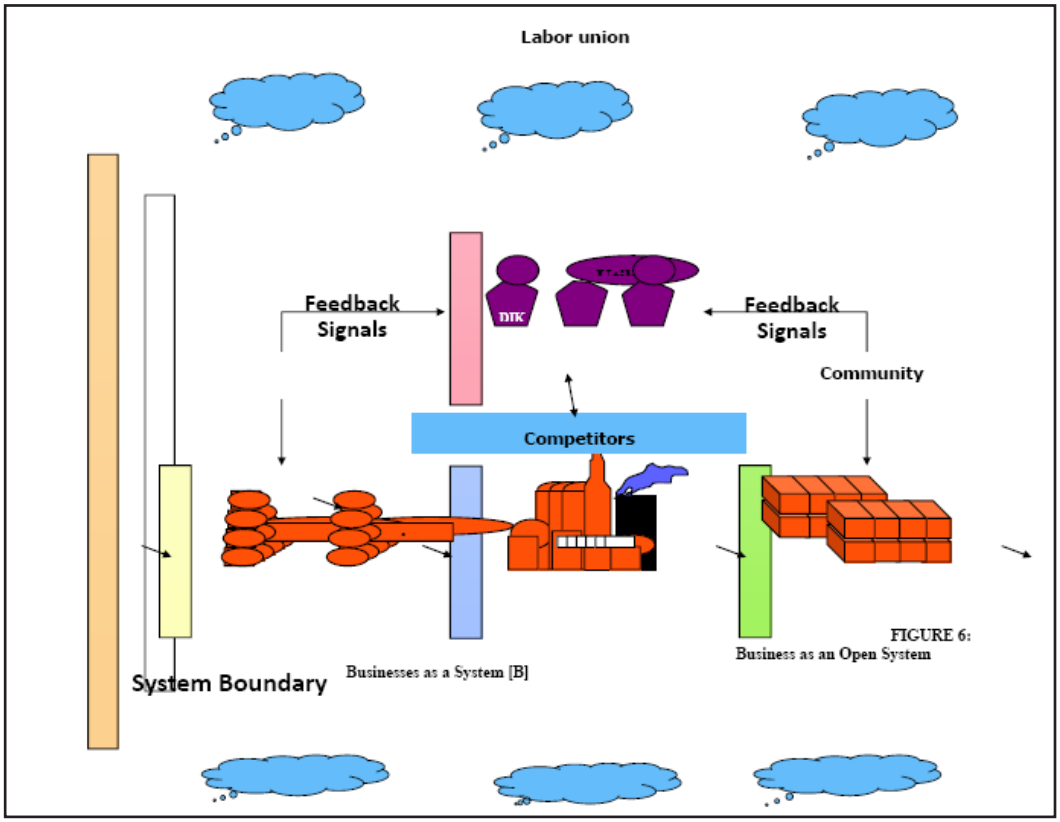


FIGURE 6: BUSINESS AS AN OPEN SYSTEM

Businesses as a System

Business is considered as organisational system. The economic resources (input) are transformed by various operations (processes) into goods/services (output). Information system provides (feedback) on the system to the management for the direction and maintenance of the system (control) as it exchanges input and output with its (environment). A system has various subsystems and boundaries, which separates itself from external environment and defines its operational territory. Business is considered as open system as there is free exchange of materials, information and data with the environment. It is an exposed system, which has free interaction with environment systems. The environment has great impact on an open system and it has to adjust according to it.

The characteristics of a business in general as a system may be listed as follows:

1. A set of interrelated components
2. With a clearly defined boundary
3. Working together

4. To achieve a common set of objectives
5. By accepting inputs and producing outputs

In an organised transformation process, the examples of administrative applications are given in Exhibit 2.

EXHIBIT 2: EXAMPLES OF ADMINISTRATIVE APPLICATIONS

- Patient administration systems include Admission, Discharge and Transfer Registration, Scheduling, Patient Billing or Accounts Receivable, Utilisation Management.
- Financial management systems including Accounts Payable, General Ledger, Personnel Management, Materials Management, Payroll and Staff Scheduling.

INFORMATION SYSTEM

Information system has been defined in terms of two perspectives: one relating to its function; the other relating to its structure. From a functional perspective, an information system is a technologically implemented medium for the purpose of recording, storing and disseminating linguistic expressions as well as for the supporting of inference making. From a structural perspective, an information system is an organised combination of people, hardware, software, communication networks, data resources that collect, transform and disseminate information in an organisation. Information system includes hardware, software, information, data and applications, communications networks and has a cohesive structure which serves some organisational purposes or functions.

Although there are a seemingly endless number of software applications, there are three fundamental reasons for all business applications of information technology and information systems. The three vital roles that information systems can perform for any business enterprise are as follows:

- Support of business processes and operations
- Support of decision making by employees and managers
- Support of strategies for competitive advantage

The role of information system in any domain area cannot be ignored if information systems are successfully developed and implemented in healthcare and can improve health care efficiency and effectiveness. However, their implementation is frequently resisted and results in failures. Information system in healthcare can be discussed on two core areas – first being administrative information system contains primarily administrative or financial data used to support the management functions and general operations of the health care organisation and second being clinical information system contains clinical or health-related information relevant to the provider in diagnosing, treating and monitoring the patient's care.

The core concern and barriers of many healthcare providers are on privacy and security issues when dealing with healthcare information or personal health data. Apart from this, a highly

fragmented nature of the healthcare information systems market indicates that there are so many different systems (old or new, advanced or simple, integrated or stand-alone) that interconnectivity issued between them is inevitable. But still the care of a patient comes together through the focus of many clinical disciplines—medicine, nursing, pharmacy, etc. Although the work of the various disciplines sometimes overlaps, each has its own primary focus, emphasis, and methods of care delivery in all disciplines; the quality of clinical decisions depends in part on the quality of information available to the decision maker. The emergence of the electronic medical record (EMR) as the key system for providing clinicians with an integrated view of clinical information in hospitals creates the requirement for ancillary systems, such as those of laboratories, radiology and pharmacy to accept orders from the EMR and replicate clinical data to it as components of an integrated clinical database. With the goal of creating a single view of a patient's health information, hospitals are investing heavily in information systems to pull together their various departmental systems into an integrated system.

Clinical Information System

CIS is an important tool that is used to improve the quality of care delivered and to reduce the chance of clinical errors. It allows the entire care team instant access to all the important information about the condition of the patient in real time. Important decisions are based on accurate, updated information, and care is delivered efficiently and CIS is an important tool that can be used for the purpose.

Areas of use are doctor's appointments, medical billing, patient's treatment history, diagnostics information and the administrative activities of a clinic or a hospital. The software should be simple, easy to use, fast in retrieving the data, and should be compatible for multi-user functionality.

The software also offer modules for the management of diagnostics, treatment, prescriptions, lab analysis reports, patient-information including history, administrative activities and billing.

Nursing Information System

Nursing Information System (NIS) is a computer system that manages clinical data from a variety of healthcare environments, and made available in a timely and orderly fashion to aid nurses in improving patient care. It serves to incorporate all the aspects such as nursing assessment, nursing plan, drug administration, nursing memo/note, nursing worksheet, body temp chart, nursing tabulation chart, nurse duty roster and nursing rhythm chart.

Some of the features of NIS are as follows:

- The system should be in such a way that the nurse must be able to capture the following:
  - ❖ Patient details
  - ❖ Vital signs of the patient
  - ❖ Doctors' orders
  - ❖ Treatment plan and care

- ❖ Easy retrieval

- The staff management includes the following:
  - ❖ Preparation of duty rosters and staff schedules
  - ❖ Facility to make alterations as per need
  - ❖ Capture data related to absenteeism, overtime, etc.
- The NIS will integrate the patient data entered by the doctors with that of the nursing module. All orders given by the physician are reflected and captured in the NIS that makes it easier for the nurses to follow the orders.

The benefits of NIS comprise the following:

- The NIS helps in easy and fast capture of patient data, thereby increasing the efficiency of the nursing department.
- Integration with the clinical module helps the nurses to have the physicians' orders and this leads to better assessments and evaluations.
- Electronic prescriptions reduce the chance for medication errors.
- Any missed order would be promptly shown as an alert.

Though the benefits are many, the implementation of NIS has been done only in a few hospitals in the country. This could be due to lack of awareness, resistance to change and lack of trained manpower. Also, little research has been done to show the benefits of implementation versus the conventional methods of patient data capture and monitoring.

Success and Failure of Information Systems

Despite the substantial opportunities for improvement in patient safety, the development, testing and adoption of information technology remain limited and numerous barriers exist. There is an urgent need to take a fresh look at IS from the perspective of the organisational structure of hospitals, the funding of such systems, and the role of all healthcare providers should play in their operation. Failing this, it is believed that IS and its medically related components will continue to suffer serious developmental lags. Perhaps the time has come to put a sharper edge on this message that the field of information technology is growing at an increasingly rapid pace.

MANAGEMENT INFORMATION SYSTEM (MIS) REPORTS

The Management Information System is a computer-based system used by hospitals for transforming data into useful information for better decision making. It helps management make better plans and carefully organise business operations. The reports provide the administrator with all the information that he needs for smooth functioning of the hospital and can be used as a tool to control and effectively manage the entire operation in the hospital in a very efficient manner and take it to the path of growth.

The keys of MIS reports are as follows:

- OPD Reports
- Daily Collection Report
- Total Revenue Report
- Main Department-wise Report
- Admitted Patient Report
- Discharged Patient Report
- Collection Summary Report
- Department-wise OPD Collection
- Department-wise OPD Revenue
- IPD Reports
- Room Summary

The Emerging Area of Information System in Healthcare

The following technologies and terms are often included in discussions of information technology in health care:

Electronic Health Record (EHR): EHRs were originally envisioned as an electronic file cabinet for patient data from various sources (eventually integrating text, voice, images, handwritten notes, etc.). Now they are generally viewed as part of an automated order-entry and patient-tracking system providing real-time access to patient data, as well as a continuous longitudinal record of their care.

Computerized Physician Order Entry (CPOE): CPOE in its basic form is typically a medication ordering and fulfillment system. More advanced CPOE will also include lab orders, radiology studies, procedures, discharges, transfers and referrals.

Clinical Decision Support System (CDSS): CDSS provides physicians and nurses with real-time diagnostic and treatment recommendations. The term covers a variety of technologies ranging from simple alerts and prescription drug interaction warnings to full clinical pathways and protocols. CDSS may be used as part of CPOE and EHR.

Picture Archiving and Communications System (PACS): This technology captures and integrates diagnostic and radiological images from various devices (e.g., x-ray, MRI, computed tomography scan), stores them, and disseminates them to a medical record, a clinical data repository, or other points of care.

DICOM (Digital Imaging and Communications in Medicine): DICOM is a standard for handling, storing, printing, and transmitting information in medical imaging.

HL7 (Health Level-7): It specifies a number of flexible standards, guidelines and methodologies by which various healthcare systems can communicate with each other.

Electronic Materials Management (EMM): Health care organisations use EMM to track and manage inventory of medical supplies, pharmaceuticals and other materials. This technology is similar to enterprise resource planning systems used outside of health care.

CONCLUSION

Healthcare managers should be able to see that the success of an information system should not be measured only by its efficiency in terms of minimising costs, time and the use of information resources. Success should also be measured by the effectiveness of the information technology in supporting an organisation's business strategies, enabling its business processes, enhancing its organisational structures and culture, and increasing the customer and business value of the enterprise. It is important to realise, however, that information technology and information systems can be mismanaged and misapplied in such a way that IS performance problems create both technological and business failures.

References

1. Ashish Mangalampalli, Chakravarthy Rama, Raja Muthiyalian, Ajeet K. Jain, Aparna Mudganti Parinam. (2007) High End Clinical Domain Information System for Effective Healthcare Delivery, International Journal of Electronic Healthcare, Volume 3, Number 2
2. Bailey J. E. (1990) Development of an Instrument for the Management of Computer User Attitudes in Hospitals. Methods of Information in Medicine. 1990:1
3. Bruce A. Friedman, James B. Martin (1987) in Developed Countries, the Golden Age of Medicine is at hand for the Patients, Journal of American Medical Association , 258(17)
4. D. Keith McInnes, Deborah C. Saltman, Michael R. Kidd, M.D. (2006)," General Practitioners' Use of Computers for Prescribing and Electronic Health Records" Medical Journal of Australia, 185(2)
5. David, Paul (1990), "The Dynamo and the Computer: An Historical Perspective on the Modern Productivity Paradox," American Economic Review 80(2)
6. Doyle, Stephen, Information Systems for You, 2nd edition, Cheltenham: Stanley Thornes, 1999 Lucey, T, Management Information Systems, 9th Edition, London: Continuum, 2005
7. Ganapati Mudur (2003). India Plans to expand Private Sector in Healthcare Review, British Medical Journal (BMJ), 326(7388)
8. Idowu P., Cornford D., Bastin L. (2008). Health Informatics Deployment in Nigeria. Journal of Health Informatics in Developing Countries, 2(1)
9. Information Technology Spending. Journal of Management Information Systems. 1996:2
10. Laudon, Kenneth C and Laudon, Jane P, Essentials of Management Information Systems: Managing the Digital Firm, Prentice Hall US, 2003
11. Management Information Systems", James A. O' Brien, Tata McGraw Hill, 7th Edition, 2007
12. Neeraj Gour, Dhiraj Srivastava (2010). Knowledge of Computer among Healthcare Professionals of India: A Key towards e-Health. Telemedicine and e-Health, 16(9)

7

Impact of Ineffective HR Practices in Indian Hospitals

An Analytical Study into the Recurring Incidence of Strikes by Nurses

Dr Feroz Ikbal*

Hospital is a highly labour-intensive industry and nurses form the single largest professional group in any hospital. Nurses in India in general and those hailing from Kerala are known for their skill sets and competencies. However, in the recent past and especially in the last one year, we have witnessed the same nurses striking their work across the hospitals in India. More often than not, they were demanding better wages and more ameliorative working conditions for them. Needless to reiterate here, that many of the hospitals where nurses resorted to strike are well known for and capable of rendering quality health care. This is more than adequately testified and officially accredited by agencies like National Accreditation Board for Hospitals (NABH) and JCI. A cursory review of literature reveals that there are hardly any analytical studies pertaining to Industrial Relations scenario in Indian hospitals. Prof. Balaraman's Committee appointed to look into the working condition of the nurses in the state of Kerala observed that the hospitals were found wanting in paying even the statutory minimum wages to their nurses. It is obvious that hospital service involves high level of interaction between the internal customer and the external customer. The basic tenets of Customer Relationship Management (CRM) exhort that an unsatisfied internal customer (Nurse) will never be able to satisfy the external customer (patient). An attempt is made in this Paper to study about the HR practices pertaining to nurses in Indian hospitals in the backdrop of demand-supply gap of nurses and issues pertaining to nursing education. The study will be both descriptive and analytical.

Keywords: *Strike, Working Conditions, Industrial Relations, Statutory Minimum Wage*

* Assistant Professor, School of Health Systems Studies, Tata Institute of Social Sciences, Mumbai

INTRODUCTION

Hospital services are one of the essential services, which will be working for twenty four hours and 365 days. Nurses are the frontline staff in the core operations in the various critical areas of the Hospital. The range of Human Resources (HR) in hospitals varies from highly qualified super specialist doctors to housekeeping staff with little or no qualifications. In any hospital, nurses form the single largest professional group. However, in Indian hospitals, nurses are often considered as support staff to doctors rather than as independent professionals. But, in western countries nurses are given authority and responsibility that make them highly engaged professionally when compared with their Indian counterparts. In the last couple of years, nurses working in several hospitals across the country resorted to strike for better pay packets and working conditions. Normal working of several hospitals got affected badly by the frequent strikes resorted to by the nurses. Many of the hospitals where the nurses' strike occurred are perceived to be best in class attracting patients even from foreign countries. The issues pertaining to strikes by nurses were so grave and consequential that they were taken up and also discussed at length in Indian parliament. Nurses' strikes have affected even the admissions to the nursing schools and colleges across the various states.

MATERIALS AND METHODS

This Paper intends to discuss the recent strike of nurses from the HR and Industrial Relations (IR) perspectives. The inadequate professionalism in the field of nursing, low social status, demand-supply mismatch of nurses, nursing education, and select cases pertaining to nurses and nursing students are also discussed. The study is both analytical and descriptive in nature.

INDUSTRIAL RELATIONS ISSUES PERTAINING TO NURSING IN INDIA

Current turmoil in the IR scenario in India can aptly be discussed with the help of a few cases of strikes resorted to by nurses in the recent past. Cases developed from the media reports pertaining to the strikes of nurses are discussed below.

Mar Baselious Hospital, Kothamangalam, Kerala

Kothamangalam is a small town in central Kerala. Mar Baselious Hospital is a 400-bedded charitable hospital owned by Malankara Syrian Church. The nurses of this hospital were involved in a protracted 117-day long strike. It was also very much widely discussed in media, when three nurses who participated in strike threatened to commit suicide as an extreme step. The strike was led by Indian Nurses Association (INA) and was called in to put an end to the problems faced by nurses that included abolition of the bond system, shift working, and minimum wages. Around 120 nurses were on strike. The sheer length of the strike and the way in which it was handled and brought to an end shows the sorry state of affairs of HR policies and practices pertaining to nurses adopted by the Hospital authorities. Three nurses threatened to commit suicide by jumping off the hospital on the Independence Day of 2012 creating a tensed situation that charged up the entire area.

The nurses had strategically positioned themselves on the terrace since morning on that fateful demanding, an immediate solution to their 114-day old strike. Police and fire brigade personnel were soon deployed near the building. As the news spread, a huge crowd thronged around the hospital and shouted slogans against the hospital management. After some time, they blocked the adjoining national highway linking Kochi to Dhanushkodi. Meanwhile, an Independence Day rally led by the municipal chairman was passing through the area and the agitating crowd and rally participants started shouting slogans against each other, heightening the tension.

The police had to chase the crowd on a couple of occasions when some of them started pelting stones. Top officials of the police, district administration, and labor department camped at the site of strike. The Labor Minister of Kerala, Shibu Baby John himself had talked to the nurses' representatives over phone to pacify the nurses. But the nurses insisted that they need the packages mutually agreed upon as per an erstwhile pact to be implemented immediately. They vociferously alleged a total credibility deficit on the part of hospital management, which had gone back on the agreements inked earlier on several occasions in the past. While three nurses had declined to take any food from morning, the nurses threatened to jump off the building when media persons tried to reach them. The main demands of the nurses included implementation of well-established working hour norms, proper shift work system, and total stoppage of dismissal of nurses by management under the pretext of some flimsy conditions incorporated in the earlier contracts. Unable to pay off the educational loans taken by them desperately for pursuing their studies, the three nurses had resorted to this extreme step out of sheer despair and despondency, and not being able to extricate them from out of deep debt trap. At a time, with a meagre salary, when the nurses were struggling very hard to make both the ends meet, the bank was getting ready to seize one of the nurses' houses as part of recovery proceedings.

Already a controversy that had erupted earlier was in circulation and gaining ground as the nurses claimed that the hospital secretary Shibu Kuriakose had taken obscene pictures of the nurses through a hidden camera placed in the washrooms and had threatened to make them public. According to the compromise formula accepted for adoption at the negotiating table, the management has agreed for immediate reinstatement of all striking nurses, payment of statutory minimum wages, and also for the introduction of a three-shift system at the hospital in place of the existing two-shifts system of 12-hour duration. The strike was called off only after the leader of Opposition and former Chief Minister Mr V S Acthuthanandan, who himself is a veteran trade union leader intervened.

Asian Heart Institute, Mumbai

Asian Heart Institute is a Joint Commission International (JCI) accredited hospital, promoted by Dr Ramakant Panda who performed surgery on Prime Minister of India, Dr Manmohan Singh. The nurses of Asian Heart Institute, Mumbai went on strike after a nurse, Beena Baby, allegedly committed suicide on October 18, 2012. Beena Baby's duty was at the ICU. The hospital authorities blamed her for losing the possession of the records of a patient. When she decided to resign, the authorities were not ready to give back her original certificates which led to her suicide. To protest against this, as many as 300 nurses began strike defying police lathi charge. K Sankaranarayanan, Governor to the state of Maharashtra, Oommen Chandy, Chief Minister of Kerala, and several political leaders intervened. The officials were forced to give

back all certificates and the nurses were given experience certificates too. Around 120 nurses, who were involved in the strike, left the hospital.

The striking nurses claimed that it was misbehaviour from the higher-ups that drove Beena to take her own life. Incensed by the death of their colleague, the nurses presented a united front, gathering outside the hospital, demanding respite from the alleged harassment and freedom from the bond system which, forces them to a mandatory service period of two years in the hospital. In case of premature termination or voluntary resignation, this bond makes them liable to make a payment of Rs 50, 000 to the management. Moreover, the nurses expressed anger over the fact that the hospital authorities collect their original mark sheets at the time of joining, and return them only after the completion of the two-year-long compulsory service period. Average salary of nurses at Asian Heart Institute was only Rs 10000 per month.

This makes it very difficult for nurses to make a payment of Rs 50,000 to get back the certificates. At the other end, the hospital authorities announced a compensation of Rs 5,00,000 for Beena's family.

Nursing Students' Strike at Ram Manohar Lohia Hospital, Delhi

Over 200 nursing students at Ram Manohar Lohia had gone on strike on November 12 , 2011 after the third-year student, hailing from Kerala, was reportedly taunted by her teachers for being "unable to spend even Rs 5" to get her uniform cleaned. The victim alleged that after she was taken to the vice principal by her teacher, the vice principal tore the sleeve of her kurta. She allegedly threatened to remove her trousers and parade her naked in the hostel. The vice principal and teachers, who allegedly manhandled and verbally abused the third-year nursing student, continue to be on forced leave. The medical superintendent formed a 2-member committee to enquire into the matter.

HR/IR SCENARIO IN INDIAN HOSPITALS: AN ANALYSIS OF CASE STUDIES

The three cases cited above give a picture of the HR/IR issues faced by nurses in Indian hospitals. In fact, nurses' problems start from the time they enter the nursing colleges as illustrated in the case of strike of nursing students at Ram Manohar Lohia Hospital. The concept of "discipline" and "submission to others" is forcibly imbibed into the minds of nurses during their training period itself. They are tutored to follow the instructions and orders of their prospective superiors rather than being trained for taking initiative and leadership skill. Nursing is developed as an intensive discipline and a restrictive professional discourse of service, obedience and self-sacrifice.

The moral purity of nurses, symbolised in their starched white dresses and winged caps, was diligently guarded through the imposition of a lifestyle akin to that of a nun. Here, because of the "cleanliness" of the uniform, an issue symbolic of purity of nurses, a nursing student was harassed by her own teachers who themselves were trained in nursing.

The cases of Mar Baselious Hospital and Asian Heart Institute need to be discussed from the perspective of Industrial Relations (IR) prevailing in the Hospital. The term IR may be defined as the sum total of management's attitude towards labor and of the labour to management's

policies and practices and the positions the two parties take on different issues that directly affect their interests. The State, as a party to IR, often intervenes in labour-management relations in order to protect the interests of the weaker party—normally the labor—and seeks to regulate IR by enacting labor legislation and requiring the employers/managements to comply with those laws and regulations. The degree and extent of state intervention determines the nature of tripartitism (Patil, 1992).

In this context, the term IR signifies the complex of interrelations among the labor, the management, and the State and characterised by legal and conventional norms, methods and techniques of regulated behaviours, organised and unorganised conflict, and cooperation in the achievement of institutional goals. This whole range of relations between workers, managers and the State seeks to determine the conditions under which the work is performed and the objectives of the enterprise, employees, the economy, and the society are achieved. In the backdrop of the recent strikes by the nurses, the role of these three players – Nurses, Hospital Management and Government – needs to be re-examined. Nurses, particularly in the private sector, were not having any association or trade unions till recently. This was particularly so because the job of nursing was largely taken up by females.

United Nurses Association was formed under the leadership of Mr Jasmine Shah and it gained popularity, especially in the last one year, by using social media such as Facebook. On many occasions, the gripes, grievances and other larger concerns of the members of staff working in hospitals have been aired by Indian Medical Association (IMA), which essentially is a union of doctors. Office bearers of IMA usually are the owners of small hospitals and nursing homes besides being shareholders in bigger hospitals. Despite Government playing its own role, it was often criticised for being tardy and slow in its response and for not acting in time. Officials of Labor Department are generally involved in most of the negotiations involving the nurses and the managements of hospitals.

Though Government of Kerala had constituted yet another committee to look into the working conditions of the nurses, the committee will also meet with the same fate that the other commissions faced earlier if its report is not going to be implemented through legislation to be made by the State Legislature or in the Parliament. On examining the recent incidents of strikes, one gets to know that there are several issues associated with the HR policies of hospitals. Poor remuneration stands first among the various issues of grievances of nurses. Remuneration continues to remain as the most critical component of IR in hospital settings. One of the major grievances of nurses working in private sector was that they were, by and large, denied the statutory minimum wages. Dr Balaraman Commission found that most of the nurses' salary ranged from Rs 2000 to Rs 8000 for working for a duration of 12 to 15 hours a day. Many of the nurses were receiving remuneration less than what domestic workers generally receive. It is reported that they were in receipt of amounts much less than the statutory minimum wages notified by the Department of Labor, Government of Kerala.

The scale of minimum wages notified for a B.Sc. (Nursing) graduate was Rs 5310-110-5860-120-6460 with dearness allowance and other allowances being fixed from time to time. Based on these salary scales, a freshly appointed nurse is supposed to be getting around Rs 9000 per month apart from other statutory benefits.

After the implementation of Sixth Pay Commission, the pay scales of nurses in the government sector have significantly improved. But nurses in the private sector are paid very less. For an illustration, the pay received by nursing staff at Postgraduate Medical Institute, PGI, Chandigarh, is shown in the Table 1. PGI, Chandigarh is one of the premier medical institutions of the country under the Ministry of Health and Family Welfare. Most of the State governments also have revised the pay scales of nurses.

Neo-classical economics discipline views the labor market as in perfect competition, with wage being determined by the competition between demand for labor and the supply of labor. It would therefore view any externally determined minimum wage, particularly if it is higher than the "market" determined wage, as causing distortions in the market, and hence leading to reduction in employment.

This view of wage definitely does not hold for a less developed economy. Typically a labour market in a third-world economy is a situation where a small number of employers control employment and determine wages, with surplus labour exerting a constant downward pressure on wage. The need for a minimum wage results from this structural imbalance between labour and capital. Though qualified nurses are in great demand, their salary and work conditions remain poor albeit the high attrition rate one witnesses among them. Long working hours, poor safety in workplace, bond system, appointing qualified nurses as trainees, are the other major issues.

Most of the nurses complain that they have to work for long hours ranging from 12 to 16 hours a day. Very few hospitals give them overtime allowance. Safety at the workplace is a major problem which nurses commonly face. Generally, nurses face two issues at workplace – workplace safety and work safety. Workplace safety refers to the safety issues pertaining to the nature of workplace and work timings. Work safety refers to the safety issue pertaining to the work itself. Many of the nurses complain of sexual harassment from the male employees in the workplace. The tragic incident of Aruna Shanbaug brings to light the seriousness of sexual harassment on nurses at workplace. On November 27, 1973, Aruna, a 25 year-old nurse, then working at Mumbai's KEM hospital, was attacked by a ward boy Sohanlal Bhartha Walmiki, while she was changing clothes in the hospital basement. Walmiki first choked her with a dog collar, then raped and robbed her. The asphyxiation cut off the oxygen supply to her brain. As a result, she has become cortically blind. While her eyes can see, her brain does not register the images. She is in vegetative state and has been looked after by the nurses of KEM hospital for almost four decades now. Many of the nurses even now are complaining of workplace harassment. Most of the hospitals lack a proper change room for the nurses.

Sexual harassment is an unavoidable experience for many of them and it happens at the hands of not only superiors and doctors, but also the ward boys, relatives of patients, and other workers in the hospitals. Nurses on night shifts are more vulnerable. This is not only a pointer to the low status enjoyed by women, in general, in society but also often acts as a reminder to women about the social stigma attached to and deviance of being seen in a public space at night. This deviance is attributed to their physical presence at nights and also to their unusual role as breadwinners (Nair, Sreelekha and Healey, Madelaine, 2008).

Based on the Case of Vishaka and Others vs State of Rajasthan and Others brought to it, the Supreme Court of India has laid down certain guidelines and norms to ensure the prevention

of sexual harassment of women at workplace. Now, it shall be the duty of the employer or other responsible persons in workplaces or other institutions to prevent or deter the commission of acts of sexual harassment and to provide the procedures for the resolution, settlement, or prosecution of acts of sexual harassment by taking all the necessary steps. All organisations should have a complaint committee headed by a woman to look into the matters pertaining to workplace harassment. But most of the hospitals do not have a mechanism to deal with the complaints regarding sexual harassment at workplace. Nurses are exposed to more occupational hazards owing to the continuous/long hours of direct contact with the patient (a minimum of eight hours), in an unsafe environment. The adverse unsatisfactory Doctor to Nurses and Patient to Nurses ratios in most of the healthcare facilities expose nurses to multiple risks. A few risks such as needlestick injuries (resulted in many nurses becoming HbsAg+ve, HIV +ve) while providing direct care (e.g., starting IV infusions, administering medicines – oral and parenteral), assisting in invasive procedures, collection of blood samples and body fluids, carrying out of nursing procedures, viz. oxygen administration (airborne infections like Tuberculosis), nasogastric feeding, suctioning (nasal/oral, tracheal), aerosol therapy, catheterization, etc. during which nurses are working in close contact with the patient can be cited in this context. As many of these procedures are performed at regular intervals, they not only increase the frequency of exposure but also add to the time period spent to carry out the procedure on a patient.

Many evidence-based empirical research studies support the increased incidence of needlestick injuries, HIV infection, and Hepatitis B and C infection among nurses. Demographical changes have also resulted in resurfacing of many new airborne infections (bird flu, meningococcemia, and encephalitis) and vector-borne diseases (malaria, dengue and haemorrhagic fever). In the tragic fire accident at AMRI Hospital in Calcutta, two nurses have sacrificed their lives while saving the lives of the patients. Therefore, it is justified that all the nursing professionals be given a special risk allowance amounting to 10% of their basic pays. Indirectly, the nurses are also exposed to tremendous amount of physical, psychological and emotional risk due to shift duties, gender discrimination, and lack of transport facilities. In such instances, fatigue can result in non-observance of practices related to universal precautions and thereby adding to the overall risk of getting infected.

LOW SOCIAL STATUS OF NURSES AND ITS IMPLICATIONS IN INDUSTRIAL RELATIONS

Though Indian nurses particularly from the state of Kerala are known for their competency in hospitals across the world, they have poor social status in India. Since they work in the night shift, the workplace safety of nurses is also a major issue. Patients often choose a particular hospital because of the brand image of a star doctor or the brand image of the hospital. But many times however actively and vigorously involved saving the life of the patients, nurses are not given the due recognition. Nursing profession being labelled as a "women's only profession" also contributes to the low social status.

The deep concern of India's nurses with professional status must first be located within the institution of nursing as it developed in the West. The models of nursing that were developed in India by western nurses had already been shaped by status problems encountered at home.

While, as Madsen (2003) suggests, carers and caregivers have been a feature of all societies, 'professional nursing is essentially a modern invention', developing from the mid-nineteenth century. The evolution of nursing during this time involved a deliberate and concerted effort to distance it from its working-class roots. Beginning with Florence Nightingale's influential and well-publicised reforms, nursing was remade as a respectable occupation, suitable for 'ladies'. Nursing became a dimension of the mid-nineteenth century trend that middle-class and elite women followed to participate in public life through philanthropic, charitable and religious projects (Helmstadter 2001:127–40).

Christian Missions in India were largely responsible not only for training Indian women as nurses but also for playing a dominant role in building and developing professional organisation and infrastructure. Initially, training for nurses was given to low-status Christian converts and large percentage of them was widows and orphans. Effectively, mission schools of nursing monopolised nursing education and even in the public eye, nursing inevitably became strongly associated with the destitute women they relied on for recruitment. Due to this distorted perception, both the non-Christian and 'respectable' Christian families never came forward to allow their daughters to get trained as nurses. As nursing in general as well as care of the sick and the old involved cleaning and bathing the sick and diseased bodies, it was always associated with and seen as unhygienic and "dirty work". This had a close similarity with the menial jobs of the 'lower' castes in the Indian context. Nursing, thus, was ascribed a low status, mediated through the structural hierarchies made visible by religion, caste and class.

Issues of caste and pollution thus clearly formed part of the daily experience of the average Indian nursing student. This is the reason they always tried to distance themselves from the 'polluting' aspects of the work, which had negative caste and class associations.

The substantive content of nursing duties in India thus strongly influenced the perception that nursing was low-status work in the country.

In the post-independence era, governments began to identify the importance of nursing as profession based on the recommendation of Bhore Committee. The first graduate programme in Nursing was started at Raj Kumari Amrit Kaur College of Nursing. The transformation brought out through training of nurses offered as an academic programme began to slowly attract women from all walks of life and across the society towards this profession. Last few years witnessed even an increasing number of men joining nursing programme. At least, few of the hospitals attribute the increased presence of male nurses to the recent episodes of strikes taking place all over the country.

BALARAMAN COMMITTEE FINDINGS AND THEIR IMPLICATIONS

After receiving several petitions alleging pitiable conditions of nurses working in private sector, the Government of Kerala appointed a committee under the leadership of Dr S Balaraman. Even the earlier official reports received by the government revealed that the nurses working in private sector were facing a lot of hardships and problems. The committee was asked to assess various parameters pertaining to the various issues such as salary, work environment, bond system and human rights issues. Following are the key recommendations of the committee:

1. Committee recommended that the basic salary of staff nurses be revised as Rs 12,900. Senior staff nurses who have three years' work experience should be given Rs 13,650. The salary of head nurses should be Rs 15,150.

   Deputy Nursing Superintendent, Nursing Superintendent and Nursing Officer have been recommended to give Rs 17,740, Rs 19,740 and Rs 21,360 respectively. Annual increments ranged from Rs 250 to Rs 500. The committee has also recommended for nurses, DA based on consumer price index, CCA, HRA and other benefits, including uniform and special risk allowance, overtime wages and bonus. Salary should be distributed to nurses through salary accounts in banks and should be credited before 5th of every month.

2. The government should take steps to ensure that none without the 'prescribed qualification' was appointed as nurse by private sector hospitals. There is a tendency among small nursing homes to appoint "trained nurse" than a "qualified nurse". No private hospital should be allowed to exploit a qualified nurse practitioner by appointing her as a 'trainee'.

3. It also recommended giving casual leaves, annual leave and sick leaves—all 12 apiece— in addition to 13 public holidays. For overtime job, extra pay or a compensatory holiday should be given while strictly implementing 'Eight Hours Shift'.

4. Bond system, including accepting deposits for employment, taking the original certificates of employees into custody should be made illegal.

CAREER PATH AND PROGRESSION IN NURSING PROFESSION

Like any other profession, nurses also look for their career enrichment. But in the current scenario, the scope for growth and enrichment is very bleak for Indian nurses. Most of the nurses entering nursing schools and colleges look for a career in foreign countries such as USA, UK, Europe and Middle East countries. Many of the nurses take jobs in Indian hospital to gain experience and to qualify in the examinations such as IELTS and CFFNS. But last few years saw increase in the number of nursing schools and colleges, which resulted in large supply of nurses. Job markets in foreign countries also have dried up.

There is an urgent need to find out away for job enrichment for nurses. Many of the nurses are looking at other career opportunities also. Nurses are entering into the coveted civil services. Alice Vaz who is currently an Additional District Magistrate in Hooghly is the first nurse to enter into Indian Administrative Service (IAS). Annies Kanmani Joy, a B.Sc. (Nursing) graduate, qualified in the 2011 Civil Services Examination securing 65th rank.

Today many of the nurses are taking up the managerial positions in hospitals. Most of the hospital management institutions are seeing an increased number of B.Sc. (Nursing) graduates opting for postgraduate programme in the last two years. Empowering the nurses as "Nurse practitioner" as in some countries can bring down the shortage of doctors. Nurse practitioners can provide basic healthcare both diagnosis and treatment to several common ailments and can undertake minor surgical procedures. Nursing graduates can also develop a career in public health by acquiring qualifications like Master of Public Health (MPH). Advanced specialisation in core nursing is also gaining popularity. New specialisations like Trauma Care Nursing, Intensive Care Nursing, etc. will enhance the career opportunities.

RECOMMENDATIONS

Some of the key recommendations of the study are as follows:

1. We need to have a statutory regulation in place to fix the wages of nurses considering the importance of their nature of work and a suitable monitoring mechanism to ensure that the fare wages are paid to them. In Kerala, though Balaraman Commission has recommended hike in wages, the current system doesn't have the power to make the hospitals comply with it.
2. Proposed regulation for hospitals, i.e. Clinical Establishment and Regulation Act needs to have an enabling provision for ensuring an appropriate bed to nurse ratio in various patient care units such as general wards, ICUs, etc. This will not only reduce the workload of nurses, but also improve the workplace safety as well.
3. Steps should be taken to ensure that unqualified nurses are not employed in hospitals, which can cause serious threat to the life of the patients.
4. Established hospitals having a minimum of 200 beds and with a consistent occupancy of patients alone should be given permission to start nursing schools and colleges. The current practice of permitting colleges that do not have their own hospitals to have a tie-up with other hospitals for clinical training is the root cause for bringing down the quality of students.
5. There is a need to regulate the fees for nursing programmes. In many of the colleges, fees range from four lakhs to six lakhs. Many of the students who have taken education loans are struggling repay as in the case of nurses who threatened suicide in the case of Mar Baseleous Hospital, Kothamangalam. Government should write off the education loans of nursing students as in the case of farm loans, as many of the girls who join nursing profession are from lower middle-class families.
6. There is an inequitable distribution of nursing colleges across the various states. Table 2 gives the uneven distribution of 1586 nursing colleges for the academic year 2012-13. Around 54% of the nursing colleges of the country are located in four southern states. Bihar, one of the most populous states, just has three nursing colleges. This disproportion will have serious impact on the Healthcare Human Resources Planning as well as quality. Some South Indian states are still struggling to fill the available seats.
7. Governments, both at the Centre and States, should take initiative to start nursing colleges attached to district hospitals so that meritorious students alone get admitted and quality of nursing education is not diluted.
8. To look into the complaints on sexual harassment, steps should be taken to ensure that all hospitals form committees to be headed by women as per the Supreme Court guidelines suggested in Vishaka vs Government of Rajasthan case.
9. Though Nursing Council of India has banned the "Bond" system by which nurses are forced to work in the college they have studied, it is still not implemented in spirit and Government should take necessary steps to stop the "Bond "system henceforth.

10. Bringing in professionalism in Human Resource Management in hospitals will help solve many of the HR problems pertaining to nurses. Though most of the hospitals have professional hospital managers, many hospitals still lack a dedicated HR department. It is advisable to appoint Welfare Officer/s to look into the matters pertaining to nurses in the same way we find them in other industries.

CONCLUDING COMMENTS

Strikes by nurses across the country should be an eye-opener to the various stakeholders of Indian healthcare. An important question which arises in the aftermath of the nurses' strikes is whether India continues to enjoy a competitive advantage in medical tourism due to the prevailing low wages of nurses and other employees. Hospital is an organisation which deals with the life of the patient. Any incident of strike can deteriorate the condition of patient in various patient care units. Hospital managements and government need to address the grievances and concerns of the nurses. An aggrieved and dissatisfied internal customer and stakeholder such as a nurse will not be able to provide quality service to the external customers, i.e. patients and bystanders. However, the problems of nurses always do not merely centre on wages and working condition alone. Though society is considerate towards nurses as the descendants of "lady with the lamp", the problems they face are deeply rooted into the basic issue of their social status itself. The foundation on which the entire edifice of nursing as a noble profession stands is still weak. This rickety structure continues to exist more as a vocation and the scope for professional innovation and creativity is limited as nurses lack autonomy and independence in their work.

References

1. George, Sheba Mariam,(200) '"Dirty Nurses" and "Men Who Play" Gender and Class in Transnational Migration', in Michael Burawoy (ed.), Global Ethnography Forces, Connections, and Imaginations in a Post-modern World, (pp. 144-174) Berkeley: California University Press
2. Helmstadter, Carol, (2001) 'From the Private to the Public Sphere: The First Generation of Lady Nurses in England'. Nursing History Review, 9, 127-40
3. Jesani A., (1998) Ethics, Rights, and Strike of Health Workers, Issues in Medical Ethics. 1998 Jul-Sep; 6(3), 73
4. Madsen, Wendy, (2003) 'The Age of Transition: Nursing and Caring in the Nineteenth Century'. JAS Australia's Public Intellectual Forum, no.78, 39-45
5. Nair, Sreelekha, (2007) "Rethinking Citizenship, Community and Rights: The Case of Nurses from Kerala in Delhi". Indian Journal of Gender Studies, Vol 14 (1), 137-56
6. Nair, Sreelekha & Healey, Madelaine, (2008) A Profession on the Margins: Status Issues in Indian Nursing, Working Paper, Centre for Women's Development Studies, 2008
7. Patil BR (1992), Industrial Relations in India, Working Paper, Indian Institute of Management, Bangalore

TABLE 1: REMUNERATION OF NURSES AT PGI, CHANDIGARH FOR THE MONTH OF SEPTEMBER, 2012

Sl. No	Designation	Pay Band	Grade Pay	Gross Pay (in ₹)
1	Nursing Superintendent	15600-39100	5400	54538
2	Assistant Nursing Supdt.	9300-34800	4200	39294 to 65871
3	Nursing Sister	9300-34800	4200	35531 to 65141
4	Public Health Nurse	9300-34800	4200	46718 to 57335
5	Staff Nurse	9300-34800	4200	35531 to 60536
6	Ward Aide	5200-20200	2400	27592 to 34081

Note: The pay scale and pay band of nurses were obtained from the Right to Information Act Document of PGI Chandigarh.

TABLE 2: DISTRIBUTION OF COLLEGES OFFERING B.SC. (NURSING) PROGRAMME ACROSS SELECT STATES

Sl. No	State	Number of Nursing Colleges	Percentage of Share of State
1	Karnataka	340	21.43
2	Andhra Pradesh	224	14.12
3	Tamil Nadu	166	10.46
4	Kerala	127	8.01
5	Uttar Pradesh	54	3.40
6	Bihar	3	0.19
7	All other states/union territories	672	42.37
	Total	1586	

Note: Number of nursing colleges in the various states was obtained from the website of Nursing Council of India.

8

Waiting Time in the Waiting Line
Improving Healthcare Management through Queuing

Shraddha Chowdhary*

The healthcare system, most of the time, is in a chaotic situation and queuing theory can be used to put this in order. Every minute of the patient waiting time saved, a fully utilised hour of the hospital staff to each bed that is never vacant, all help to increase profitability and also improve the quality of patient care offered. The total waiting time of patients can be minimised by total capacity utilisation of the hospital and its resources. For every patient that leaves the hospital without being treated due to lack of proper queuing system in place, causes a revenue loss to the hospital. A proper queuing system implementation helps to predict the variable arrival rates of patients based on the kind and severity of the health concern for which they have come to the hospital. With rapid growth of the Healthcare sector, new forms of services and excessive financial pressure on the healthcare organisations, the prevalence of queuing system has become widespread in the industry. Queuing theory helps to trade-off between an organisation's capacity and its service delays. This Paper highlights the contributions and applications of various types of queuing system models that can be employed in the Healthcare Industry for solving health care management problems.

Keywords: *Queuing, Health Care, Waiting Line, Waiting Time, Arrival and Service Rate*

INTRODUCTION

Queuing theory is a mathematical approach applied for analysis and solution of waiting lines. In the healthcare sector, patients randomly arrive and demand services such as emergency rooms, diagnostic services, inpatient and outpatient services, etc. In attending to customers walking in for these services, the application of queuing theory can be very helpful for providing timely service and also to minimise costs. Queuing theory was extensively used in many areas of operations such as telecommunications, airline industry, etc. and of late has gained importance in the healthcare sector too. The queuing theory graphs are simple but very efficient tools created

* Associate Professor, National Institute of Pharmaceutical and Education Research, Hyderabad

using functions of Excel that help users interpret data in different ways and also come to a more accurate and faster conclusion after a thorough analysis.

Most of the healthcare systems have excess capacity to accommodate random variations. Hence, queuing analysis can be used as short-term measures or for effective facilities and resource planning. Other uses of queuing analysis and simulation in healthcare includes the walk-in patient clinic, emergency room arrivals, and attending phone calls from physician office to health management organisation, clinics for outpatients and outpatient surgeries, pharmacy, inventory control, etc.

Queuing Theory is the mathematical study of waiting lines or queues. It involves the construction of a model so that queue lengths and waiting times can be anticipated. Queuing theory is studied under operations research as the results obtained through queuing are often used when making business decisions about the resources needed in order to provide a service.

The health care industry or medical industry is a combination of sectors within the economic system that provides goods and services to treat patients with preventive, curative, rehabilitative and palliative care. The new health care industry in the recent times is divided into many sectors and depends on interdisciplinary teams of trained professionals and paraprofessionals to meet health needs of individuals and populations. A health system, also sometimes referred to as health care system, is the organisation of people, institutions and other resources to deliver health care services to meet the health needs of the target population.

LITERATURE REVIEW

McClain's theory (1976) studied the impact of bed assignment policies on utilisation, waiting time and probability of losing patients. Noseck and Wilson (2001) proposed improving customer satisfaction by predicting and reducing waiting times and adjusting staffing. Green (2006) emphasised the relationship among delays, utilisation and number of servers, i.e. the basic M/M/s model applied in healthcare.

Broyles and Cochran (2007) calculate the percentage of patients who leave an emergency department without getting help using arrival rate, service time, capacity utilisation, and thus determining the ensuing revenue loss. Worthington (1991) presents an M (λq)/G/S model for service times of any fixed probability distribution and for arrival rates that decreases linearly with queue length and expected waiting time. McQuarrie (1983) shows when capacity utilisation is high, the waiting time can be minimised by giving priority to clients with shorter service time.

Bailey (1952, 1954) proposes appointment interval and consultant arrival time as two variables that determine the efficiency of an appointment system. The ratio of total idle time of all patients to the consultant's idle time should equal consultant's time relative to patients'. The ratio of demand to available service is very high.

QUEUING ANALYSIS IN HEALTHCARE

The use of queuing analysis is not as widespread in Healthcare Industry as it is in industries such as Banking, Airlines and Telecommunications, where it has found applications for years. These

industries have been routinely using queuing analysis to determine the available capacity levels and how best they can be used to fulfil demands in a timely fashion. Irrespective of this fact, the considerable delays seen in the healthcare industry, and the limited resources of this industry, has found some solace with queuing analysis that can give better solutions in allotment of beds for patients, staffing, identifying opportunities to improve services, etc.

Need for Using Queuing Theory in Healthcare

The need for application of queuing theory in healthcare settings is very important because the well-being and life of someone is dependent on this. The waiting time of a patient while waiting to be attended to by a doctor is critical to the patient and to the image of the hospital before the public. Both tangible and intangible costs involved with the healthcare industry such as capacity costs, costs involved with waiting, cost incurred to provide space for waiting, effecting cost to the society and the resulting loss to an organisation if customers are tired of waiting and go to some other service provider etc. can be minimised if effective queuing theories are used. With rapid growth of the healthcare sector, new forms of services and excessive financial pressure on the healthcare organisations, the use of queuing system has become mandatory in the industry. Queuing theory helps to achieve a trade-off between an organisation's capacity and its service delays.

Queuing system application in healthcare helps to:

- Reduce delays
- Prioritise service based on severity
- Determine required capacity to achieve desired level of performance
- Get simple formulae for predicting different performance measures
- Timely access

Hospitals are places where queuing is common phenomenon. Various cases have been reported where while waiting outpatients develop complications that can lead to death if quick medication is not provided. It is therefore necessary to evaluate the waiting times of outpatients with a view to reducing it to the minimum. Priority queuing that queues patients by the severity of their injuries seems justified in these situations, but might not always be the most efficient method. By this method, patients can be classified based on their priority level. Even though this may create a slightly longer waiting time for the less injured patients, the overall time saved has a positive effect. As hospitals and emergency rooms need multiple channels for patients and the staff services patients with varying injury levels, hospitals are most likely to use a multiple channel, multi-phase system queuing system.

Queuing Theory Application to Healthcare

Different problems of healthcare can be addressed by applying different queuing models. The main problem is to understand which queuing theory should be applied for which problem. A health care organisation can address the following issues with the help of queuing theory:

- How many nurses from the nursing department will be required in an inpatient ward?

- Does the radiology department need another CT scanner?
- How many beds are required in ED at different times of the day or in the week?
- Is there a necessity to employ another anaesthesiologist?
- What is the maximum occupancy limit an organisation can accommodate?
- How many beds/staff should the budget be formulated for?
- How much of additional resources (like nurses, beds, etc.) are needed?

The above questions arising in a healthcare organisation cannot be answered without using Queuing Theory. Healthcare system can be visualised as a complex queuing network in which delays can be reduced through synchronisation of work among stages of service, scheduling of available resources to match the arrival and Constant system monitoring linked to immediate actions.

Types of Queuing Systems in Healthcare

There are basically four types of queuing systems, which consist of different combinations.

- ***Single-Channel, Single-Phase System:*** In this system, there is only one queue of people seeking service from one phase. For example, a vaccination camp where there is one practitioner who does all the work involved like the paper work and the vaccination.

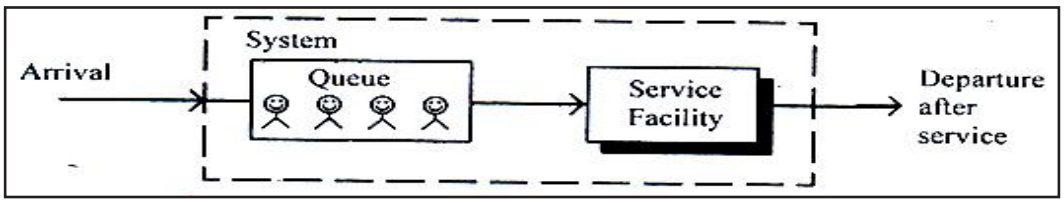


FIGURE 1: SINGLE-CHANNEL, SINGLE-PHASE SYSTEM

- ***Single-Channel, Multi-Phase System:*** In this system, there is a single queue seeking service from multiple phases. For example, people visiting a primary health care system first have to form a queue at the registration counter and again wait in another queue for obtaining service by the physician. Here at each phase of service, there is a necessity to form a queue.

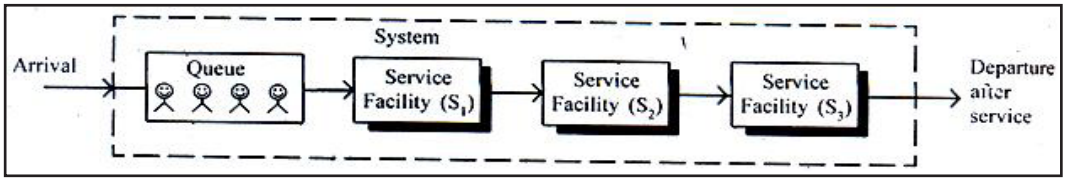


FIGURE 2: SINGLE-CHANNEL, MULTI-PHASE (3-PHASE) SYSTEM

- ***Multi-Channel, Single-Phase System:*** In this system, multiple queues are formed by customers to obtain service from a single system. Customers also have a choice to move from one queue to another. For Example, customers waiting at a medical shop.

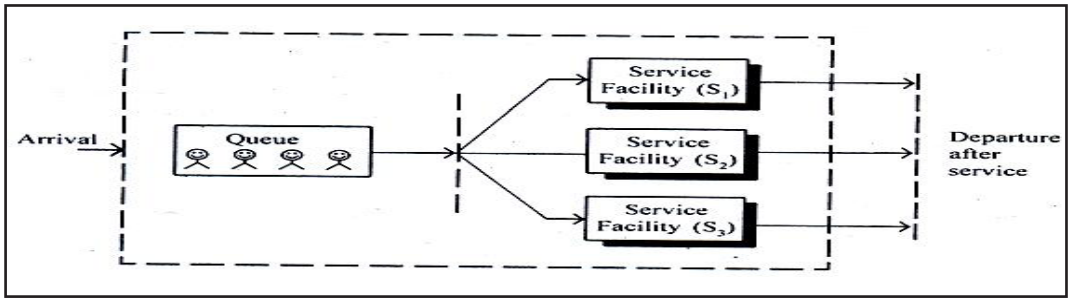


FIGURE 3: MULTI-CHANNEL, SINGLE-PHASE SYSTEM

- ***Multi-Channel, Multi-Phase System:*** In this system, there are multiple queues involved and also a multiple complex network of service systems. For example, a hospital where there are many departments such as Emergency, Multispecialty, Outpatient, etc. involved. In a hospital outpatient clinic, a patient first forms the queue for registration, then he/she is triaged for evaluation, then for clinical diagnostics, review, treatment, prescription or intervention and finally exit from the system or triage to different provider.

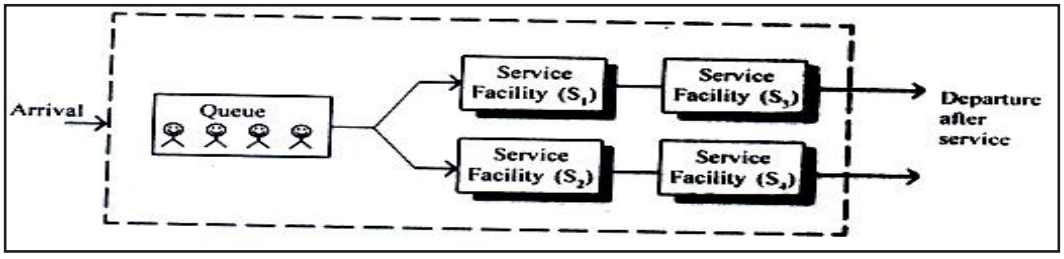


FIGURE 4: MULTI-CHANNEL, MULTI-PHASE SYSTEM

Measuring Performance of Queuing Systems in Healthcare

The efficiency of a queuing system can be analysed only by measuring its performance and identifying the gaps. The performance can be measured in the following ways:

- Identifying average number of persons waiting in the queue
- Identifying average waiting time
- Identifying to what extent the capacity has been utilised
- Identifying the costs involved at a given level of capacity
- Identifying the probability of how long an arriving patient will have to wait

Measuring performance of a queuing system helps the management analyse the results and make necessary modifications, if gaps exist. Measuring performance acts as the feedback loop in a planning cycle. Once the gaps are identified, a more specific queuing theory can be put in place for obtaining better efficiency.

Areas of Queuing Theory Application in Healthcare

The areas of queuing theory application in healthcare are as follows:

- ***Emergency Room Arrivals:*** Sometimes termed Emergency Room, this unit provides initial treatment to patients with a broad spectrum of illnesses including injuries, sometimes which may be even life-threatening and requiring immediate attention. The process from patient arrival in the ED to placement in a bed can be summarised as follows:
  - ❖ It begins with the triage nurse, who decides the urgency of attending to a patient based on his condition.
  - ❖ Next, the patient is seen by an ED physician, who, after possible diagnostic testing, determines whether or not the patient requires admission to the hospital.
- ***Walk-in Patients in Physician Offices, at Outpatient Clinics and Outpatient Surgeries in Hospitals:*** The management of healthcare facilities such as outpatient clinics is very complex and demanding. The most common objectives of studies on the clinics have included the reduction of patient's time in the system (outpatient clinic), improvement of customer service, improved resource utilisation, and minimisation of operating costs.
- ***Hospital Pharmacy and Pharmacy Stores:*** In Pharmacy, queuing theory can be used to assess a multitude of factors such as prescription fill time, patient's waiting time, patient's counselling time and staff at various levels. The application of queuing models may be of particular benefit in pharmacies with high volume outpatient workloads and/or those that provide multiple points of service.
- ***Health Care Resource and Infrastructure Planning for Disaster Management:*** In scenarios of disaster, queuing models are frequently used in conjunction with simulation to answer the "what-if" questions, and to plan, organise and be prepared for any calamities. For example, if H5N1 bird flu spreads to US and causes an epidemic, it would be a major crisis situation. Policy makers and administrators are aware of this scenario and they use queuing and simulation to plan for such activities. It gives them data regarding how many people and in what locations would be affected, speed of disease spread, number and characteristics of healthcare workers required, pharmaceutical supplies, vaccines, number of beds and so on.
- ***Public Health:*** Queuing models can also be used for public health. For example, the resources needed for mass vaccination camp in a particular area, facility and resource planning for new or changing disease profiles or changing demographics.

One of the most important techniques to be used in Healthcare is that of "Priority queuing", by means of which the customers needing utmost care quicker than the others is identified. The customers here might even be battling for life and excess waiting time might cause damage to it, and if these customers are not attended properly, there are chances that they go elsewhere for getting treated. The discomforts of waiting in a queue must be minimised by making the customer feel that they have been waiting to obtain the service that has been optimum.

CONCLUSION

In this era where reforming the healthcare system, improving its quality, addressing the safety issues and optimising costs involved with it have become important goals in comparison to older times. Applying a system which can manage the patient flow scientifically has become imperative. The healthcare sector faces challenges of overcrowded facilities and limited resources which do not allow the industry to buy or add resources to meet the excessive demands. This challenge can now be addressed by queuing theories that enable identification of priorities and most effective flow of work and minimisation of delays. Queuing theory attempts to provide a solution in order to strike a balance between capacity and the waiting time for service experienced by patients. Even though each hospital needs a separate way for dealing with their respective issues based on the number of patients arriving to the type of queuing models applicable and maximum costs that can be incurred, the general objective remains the same of optimising service rate and service quality while minimising the total cost. Though queuing theories have been employed recently in the healthcare industry, it has helped in saving time, bringing in additional revenue and also bettering patient and staff satisfaction.

References

Journals

- Simple Queuing Theory Tools you can use in Healthcare, Jeff Johnson
- Using of Queuing Models in Healthcare, Vikas Singh
- Queuing Theory Applied in Healthcare, 2007, Shreyas
- Application of Queuing Theory in Health Care, 2011, Reethu Mehandiratta
- A Queuing Model of Hospital Congestion, 2009, Pouya Bastani
- A Survey of Queuing Theory Applications in Healthcare, 2007, Samuel Fomundam, Jeffrey Herrmann

Websites

- Applying Queuing Theory to Healthcare, 2012, Institute for Healthcare optimisation
- Queuing Theory and Practice, 2010, Peter. J. Sherman

9

Cardiac Burden of Disease

Role of Non-conventional Risk Factors in Aetiology of CAD in India and its Impact on Policy Decision Process – A Hospital-based Study

Manjushri Sharma*

India, with a burgeoning population of more than a billion, is sharing more load of global burden of cardiac disease than could be explained by the presence of conventional risk factors for coronary artery disease (CAD). Rates of smoking, hypertension and levels of low density lipoprotein-cholesterol tend to be similar or lower in South Asians, although diabetes is more prevalent. Recent studies have suggested that the metabolic syndrome and abdominal obesity may play a causative role in both the prevalence of diabetes and the premature atherosclerosis noted in South Asians. It is possible that genetically susceptible individuals develop abdominal obesity and insulin resistance when exposed to a toxic environment of reduced energy expenditure and increased caloric consumption. This pattern is increasingly noted in parallel with urbanisation, suggesting that the increased cardiovascular risk in South Asians may be preventable through lifestyle interventions and the judicious use of medicines to attain optimal levels of blood pressure, lipids and glucose. The present study is being undertaken with the objective of understanding the extent to which the modifiable (diabetes, hypertension, location, education and occupation) and non-modifiable (age and gender) risk factors can predict the variance in the severity of outcome of CAD as shown in angiographic evaluation of patients reporting in the cardiac OPD.

Keywords: *Coronary Artery Disease, Diabetes, Hypertension, Angiography, Stenosis*

INTRODUCTION

India is on the verge of being catapult into the rising trajectory of the economic growth curve as postulated by Kuznets. But along with this ride on the economic growth come some bumps, those of health and social development and environmental degradation. The transition in health

* Assistant Professor, UIAMS, Panjab University, Chandigarh

status in the face of rapid development poses some dangerous implications for the developing nations. The factors that have an impact on the health of an individual, and consequently on the health care scenario of a nation, tend to vary across the developed and developing economies. The available literature on the economics of cardiac morbidity and mortality mostly talks about the role of modifiable and non-modifiable risk factors in the development of cardiovascular disease in the developed world. Amongst the studies available for developing nations, most have pointed at the developing nations being at the precursor phase of development cycle in keeping with the structural changes in industry that occur over the life cycle. Thus, India is in the stage of dual burden of disease, where the receding burden of communicable disease is coupled with the emerging burden of non-communicable diseases. Among the non-communicable diseases, cardiac ailments (that include a large spectrum of conditions affecting the heart) account for the highest burden of disease, and thus demand the greatest and urgent attention towards its prevention and control.

One-fifth of the world's population lives in India and a population equal to that of Australia is being added to this every year. Several studies have reported high rates of coronary artery disease (CAD) in this population. For example, men in New Delhi, North India, were found to have four times higher (2.5 vs 9.7 per cent) prevalence of CAD than in Framingham, Massachusetts's. The incidence, prevalence, hospitalisation, and severity of CAD in Asian Indians are three to four times higher than their American or European counterparts, and even higher in comparison to other Asians. Several factors have been postulated to be playing a role in the difference that is noted in the aetiology and presentation of CAD in developed and developing nations.

CAD among Asian Indians can be broadly categorised into 3 distinct forms: Type I or malignant type occurs in young individuals (<50 years) with marked prematurity and severity; this type is accompanied by the absence or low levels of conventional risk factors and the presence of high levels of emerging risk factors. Type II occurs in older individuals (>65 years) with high levels of conventional risk factors and low levels of emerging risk factors. Type III or mixed variety occurs between the ages of 50 and 65 and is accompanied by varying combinations of conventional and emerging risk factors.

Asian Indians with low socio-economic status (SES) have a higher prevalence of CAD and its risk factors such as smoking and high blood pressure. However, differences in SES do not explain the excess burden of CAD among Asian Indians, unlike all other populations. In general, uneducated and less educated people in rural India have a higher prevalence of high blood pressure, alcohol use, underweight, and low intake of fruits and vegetables. Urbanisation is accompanied by decreased physical activity and increased consumption of unhealthy fat and calorie dense food, resulting in abdominal obesity, insulin resistance and atherogenic dyslipidemia. These acquired metabolic abnormalities appear to have a synergistic effect on the development of heart disease in genetically susceptible individuals (such as those with elevated levels of Lp (a)). The same thing happens with affluence within the country and/or immigration to another country. The high rate of CAD (coronary artery disease) among South Asians is accompanied by similar or lower levels of traditional risk factors with the exception of diabetes.

OBJECTIVE OF THE STUDY

This retrospective study aimed at investigating the existence of conventional risk factors in patients diagnosed with CAD (established on angiography), comparing them to individuals with normal angiogram to correlate possible changes with the severity of the lesion. The main objective was to understand whether socio-economic variables could predict the variance in the severity of disease as found out on angiography, and whether the conventional risk factors of diabetes, hypertension and smoking could explain the variance in severity of disease in study population.

RESEARCH METHODOLOGY

The research methodology of the present paper comprises the following:

Study Population

A cross-sectional study was done on 360 consecutive patients (300 male, 60 female) who underwent coronary angiography between January, 2012 and December, 2012. The study was approved by the Institutional Ethics Committee of the hospital. Subjects were informed on the objectives and procedure of the study and informed consent taken. The consent form was both in English and Hindi languages. Demographic profile, socioeconomic status, personal habits and disease risk factor history were recorded. Blood Pressure (BP) was measured in the ward before the patients were sent to catheterization laboratory. Hypertension was defined as history of hypertension or taking antihypertensive drugs at referral or systolic blood pressure > 140 mmHg or diastolic blood pressure > 90 mmHg. Those patients with known history of Diabetes Mellitus (DM) or with fasting glucose higher than 110 mg/dl were labelled as DM. Smoking status was documented on the basis of duration and intensity of cigarette smoking. Patients were labelled as smokers if they smoked more than two cigarettes per day for preceding three months.

Inclusion criteria patients for angiography with history of chest pain, angina and previously diagnosed myocardial infarction were enrolled. Exclusion criteria subject with diseases such as nephrotic syndrome, acute or chronic renal failure, thyroid disorders, acute infections, stroke and diabetic ketoacidosis were excluded.

Angiography Evaluation

Coronary angiography was performed using the Judkins technique. Coronary angiography results were evaluated by interventional cardiologist. In coronary angiography, CAD is defined as the presence of at least a > 50 per cent stenosis of major coronary arteries (left anterior descending, left circumflex or right coronary arteries) or their major branches (diagonal, obtuse marginal, posterior descending, or posterior left ventricular arteries). If the stenosis happened to be less than 50 per cent in a single artery affected, the patient was given medical management; more than 50 per cent in one artery was single vessel, in two vessels was labelled double vessel and in all three labelled as triple vessel. Normal coronary patients were those that had no plaques in any of the artery.

Blood Collection and Analysis

Fasting blood samples were collected after 10 to 12 hours before cardiac catheterization. This test was done as a part of the pre-catheterization investigation package.

FINDINGS OF THE STUDY

Out of 360 patients, 30 per cent had normal coronaries and 70 per cent required interventional treatment in the form of angioplasty or cardiothoracic surgery depending upon the number of vessels having plaques causing significant stenosis and presence or absence of co-morbidity.

The mean age of the cardiac patients in the study sample is 58.32 years (minimum 21years and maximum 87 years) with a standard deviation of 11.57 years. As regards the gender distribution, 216 (70.4 per cent) were males and 91 (29.6 per cent) were females. On the basis of education, 42.3 per cent of the patients were educated till matriculates, 52.4 per cent were graduates and 5.3 per cent were postgraduates. Segregating on the basis of occupation, 27.4 per cent were not working, 9.8 per cent were from agriculture sector, 27.4 per cent were working in manufacturing sector, and 35.5 per cent in the service industry. As far as the location parameter was concerned, 26.4 per cent were from rural background and 74.6 per cent from urban areas.

Looking at the clinical variables in relation to the severity of disease (hypertension, diabetes, and smoking history), it is evident that the distribution of hypertension is almost equal in both the outcome groups, 53.7 per cent in patients with normal coronaries and 46.4 per cent in patients requiring interventional treatment. But for diabetes, 82 per cent of patients with positive history required interventional treatment. The percentage of smokers in the study population was small (9.4 per cent) and the outcome after exposure was almost equal for both the groups, two thirds of patients requiring intervention for both smokers and non-smokers group.

A logistic regression analysis was conducted to predict the severity/presence of CAD requiring interventional management using modifiable (hypertension, diabetes, smoking, location, education, occupation) and non-modifiable risk factors (age and gender) as predictors. A test of full model against a constant only model was statistically significant, indicating that the predictors as a set reliably distinguished between patients with normal coronaries and patients requiring interventional treatment (chi square= 39.5, p<.001, df 8).

Nagelkerke's R2 of .17 indicated a weak relationship between prediction and grouping. The Wald criterion established that out of all clinical and socioeconomic predictors, age, gender, hypertension and diabetes made a significant contribution to the prediction ($p < .05$). Smoking status, education level, occupation and place of residence were not significant predictors.

DISCUSSION

In our study, age and gender (maleness) as non-modifiable risk factors significantly predicted the variance in severity of CAD. This is in accordance with empirical data available in epidemiological studies present in the literature. Meenakshi Sharma and Nirmal Kumar Ganguly (2005) in their paper titled "Premature Coronary Artery Disease in Indians and its Associated Risk Factors" concluded that India is not only the high burden of cardiovascular diseases (CVDs), but also the effects of these diseases on the productive workforce aged 35–65 years. The mean age for

first presentation of acute myocardial infarction in Indians is 53 years in this study, which is similar to our finding.

But in the last one year, more male patients were reporting to the cardiac OPD for treatment as compared to females. In addition to higher predisposition of males, another factor could be that females were less likely to report to hospitals for treatment of cardiac symptoms and may be going for alternate system of medicine or no treatment. Out of diabetes and hypertension as co-morbid conditions that had significant role in predicting the variance in severity, diabetes had higher predictability value. This is in accordance to literature in studies that have shown greater role of hypertension in stroke than CAD. But looking at the socioeconomic variables, the predictors were not able to explain the variance in the severity of disease as noted in the angiography findings. This is in contrast to the findings reported in the developed world. In fact, similar trend where the conventional risk factors are not able to explain the variation in Asian Indian population living in United States of America has been found by the CADI research group.

CONCLUSION

In summary, this retrospective study of patients undergoing angiography for presence of risk factors and their role in predicting the variance in severity has shown the limited role of conventional risk factors, and thus points towards increased role of newer predictors which need to be evaluated by further studies. Coronary Artery Disease (CAD) that manifests at a younger age can have devastating consequences for an individual, the family and society. Prevention of these deaths in young people is a nation's moral responsibility. A strategy involving prevention of CVDs long before their onset will be more cost-effective than providing interventions at a stage when the disease is well-established. India is undergoing a rapid pace of urbanisation, industrialisation and major technological and lifestyle changes. Thus, monitoring the impact of these changes on cardiovascular risks is essential to enable the implementation of appropriate strategies towards countering the rise of CVD mortality. However, there are limitations to our study in that enrolled subject might not be representative of the entire population with CAD as subjects recruited were referred for coronary angiography in tertiary care hospitals.

References

1. Smith KR. Development, Health and The Environmental Risk Transition. In: Shahi G, Levy BS, Binger A, Kjellstrom T, Lawrence R, eds. International perspectives in environment, development, and health. New York: Springer; 1997: 51–62
2. Forouhi NG, Sattar N, Tillin T, McKeigue PM, Chaturvedi N. (2006): "Do Known Risk Factors Explain the Higher Coronary Heart Disease Mortality in South Asian compared with European Men? Prospective follow-up of the Southall and Brent Studies, UK.' *Diabetologia.* Nov 49(11):2580-2588
3. Geok Lin Kho (2001), 'Cardiovascular Epidemiology in the Asia–Pacific Region', Asia Pacific Journal of Clinical Nutrition 10(2): 76–80
4. Gupta R and Singhal S. (1997): 'Epidemiological Evolution, Fat Intake, Cholesterol Levels and Increasing Coronary Heart Disease in India.' Paper presented at: National Symposium on Hyperlipidemia; 21 March; New Delhi

5. Gupta R, Gupta V, Ahluwalia N. (1994): 'Educational Status, Coronary Heart Disease and Coronary Risk Factor Prevalence in a Rural Population of India.' *British Medical Journal*; 309(6965):1332-1336. http://archive.ispub.com/journal/the-internet-journal-of-cardiology/volume-1-number- / coronary-artery-disease-in-asian-indians-an-update-and-review.html#sthash.385wN20M.dpuf accessed on 18.05.13 at 4:30 pm

6. GYH Lip, AH Barnett,A Bradbury, FP Cappuccio, PS Gill, E Hughes, C Imray, K Jolly and K Patel(2007):'Ethnicity and cardiovascular disease prevention in the United Kingdom: a practical approach to management.', Journal of human Hypertension, 21, 183–211

7. Kinra S., Bowen LJ, Lyngdoh T, et al. Socio-demographic Patterning of Non-communicable Disease Risk Factors in RURAL INDIA: A Cross-sectional Study. *BMJ*. 2010;341:c4974

8. Klatssky AL, Takawa I, Armstrong MA, Sidney S. (1994): 'The Risk of Hospitalization for Ischemic Heart Disease among Asian Americans in Northern California'. American Journal of Public Health, 84:1672-1675

9. Meenakshi Sharma and Nirmal Kumar Ganguly (2005): 'Premature Coronary Artery Disease in Indians and its Associated Risk Factors', Vascular Health Risk Management, September; 1(3): 217–225

10. Milan Gupta, MD, Stephanie Brister, MD, and Subodh Verma (2006): 'Is South Asian Ethnicity an Independent Cardiovascular Risk Factor? Canadian Journal of Cardiology, March; 22(3): 193–197, PMCID: PMC2528919

11. Raja Babu Panwar, Rajeev Gupta, Bal Kishan Gupta, Sadiq Raja, Jaishree Vaishnav, Meenakshi Khatri and Aachu Agrawal (2011): 'Atherothrombotic Risk Factors and Premature Coronary Heart Disease in India: A Case-control Study' Indian Journal of Medical Research ,Vol. 134, July, pp. 26-32

12. S.L. Chadha, N. Gopinath, and S. Shekhawat (1997), 'Urban-rural Differences in the Prevalence of Coronary Heart Disease and its Risk Factors in Delhi', Bulletin of the World Health Organization, 1997, 75 (1): 31-38

10

A Study of In-Patient Admission Process and Timings in a Corporate Hospital

Ramaiah Itumalla*
G.V.R.K. Acharyulu**

The patient admission is the formal acceptance of a patient for care into a clinic, hospital or extended care facility. The admission procedure comprises two activities – Bed allotment and Preparation of admission papers. In a hospital, "Time" is vitally important factor. This "time" includes the time taken to fix an appointment, delay time, service time, timing with regard to medical treatment and surgery. So, waiting time affects the quality of services.

A well-structured tally sheet was prepared to collect the data of in-patient admission timings. Simple random sampling technique was used while collecting the data. The methods used in this project were personal observations and few interactions with the experts of a corporate hospital located in Hyderabad. The sampling unit was in-patients whose timings were noted and admitted in the hospital and sample size was 150. Content analysis and Cause-Effective Diagram (Fishbone Diagram) were used to analyse the data and the study was confined to certain patients only.

The study found that out of 150 admissions, most of the admissions 63(42%) was in between 16 and 25 minutes. The time for 50 admissions (33.33%) was 26 to 35 minutes. In 5 admissions (3.33%), the time was 56 and above minutes because the patients went outside after admission process. The time between entry of the patient and initial slip form given was 1.01 minute, initial slip form given and entry in the system was 2.13 minutes, entry in the system and bed confirmation was 2.12 minutes, bed confirmed and medical record made was 6.62 minutes and medical record made and patient accompanied (patient is on bed) was 15.27 minutes.

Keywords: *Health Care, Quality, In-patients, Time, Admission Process*

* Research Scholar, School of Management Studies, University of Hyderabad, Hyderabad
** Associate Professor, School of Management Studies, University of Hyderabad, Hyderabad

INTRODUCTION

The patient admission is the formal acceptance of a patient for care into a clinic or hospital. Hospital admission involves staying at a hospital for at least one night or more. There are two ways of admission. The first way is that patients come without being referred and therefore need to be admitted after consultation with the appropriate consultant doctor. Secondly, through the Casualty Medical Officer in the Casualty Department, if the patients are in urgent need of medical attention or if the patient's doctor refers him/her to the hospital and no urgent medical attention is required.

In a hospital, "Time" is an important factor. This "time" includes the time taken to fix an appointment, delay time, service time, timing with regard to medical treatment and surgery. Delay in time or waiting time affects the quality of services. The main purpose of this project is to study the admission procedure in hospitals and observes the waiting time of in-patient admission process. Then, the study goes on to evaluate and analyse the admission timings and to find the causes of delay in admission process. The present study deals mainly with in-patient admission process and timings in corporate hospital.

OBJECTIVES OF THE STUDY

The objectives of the study are to:

- Find the process flow for in-patient admissions in a corporate hospital
- Identify the waiting time and causes of delay in the admission process

RESEARCH METHODOLOGY

This can be understood under the following sub-headings:

- ***Designing of Tally Sheet:*** A well-structured tally sheet was prepared to collect the data of in-patient admission timings.
- ***Sampling Technique:*** Simple random sampling technique was used while collecting the data. The methods used in this project were personal observation and a few interactions with the experts of a corporate hospital.
- ***Sampling Unit:*** In-patients' timings were noted and who admitted in a selected corporate hospital are the sampling units.
- ***Sample Size:*** The sample size was 150 in-patient admissions.
- ***Data Collection:*** Both primary and secondary data were collected and used in the present study. Primary data constitutes in-patient admission timings. Secondary data constitutes quality concepts and in-patient admission process from internet, journals, magazines and books.
- ***Data Analysis Technique:*** Content analysis and Cause-Effective Diagram (Fishbone Diagram) were used to analyse the data and the study was confined to certain patients only.

IN-PATIENT ADMISSION PROCEDURE

The following may be noted in this regard:

- Admission counter is on the ground floor besides the registration counter. The counter is open round the clock.
- Submit the admission slip (by consultant doctor/Casualty Medical Officer from casualty), which contains the details of the patients.
- The patients or their attendants are requested to fill and sign the initial slip form at the admission counter.
- It should be noted that the information given in the initial slip form must be correct as the same is noted in the admission papers and is used for all practical purposes such as birth certificate, insurance claim, medico-legal purposes, etc.
- Select the class in which the patient would like to be admitted. (The Admission Department will allot a room of patient choice, subject to availability.)
- The admission procedure comprises two activities:
  - ❖ Bed allotment
  - ❖ Preparation of admission papers after payment of the required security deposit, which depends on the class of admission. The patients are then taken to the respective rooms/wards.
- The casualty and emergency cases are always at the utmost priority.
- The tie-up companies' patients are given admission in the class they are eligible for. Without security deposit, they submit an authority letter by the company.
- In case of non-availability of the beds, the patients are admitted in the available bed/class and are transferred to the desired class on priority.
- The emergency cases are admitted on the available bed/class and can be shifted to the desired class as and when available.
- Regarding billing, the following should be noted:
  - ❖ Based on treatment, bills should be paid to the hospital from time to time.
  - ❖ The patient will be given periodical payment advice slip for remittance of cash at the cash counter.
  - ❖ Patients have to pay the payments at cash counters and obtain receipts thereof.
  - ❖ If patients are insurance patients, the insurance department gives the necessary assistance. If patients notify at the time of admission as they are insurance patients, the Insurance Department can initiate action to obtain authorisation from the insurance companies or third party administrators as the case may be prior to commencement of treatment.

In-Patient Management (Admissions Desk)

The in-patient admission commences when the patient is being allotted a bed in the ward. It deals with the complete treatment of the patient during his/her stay in the hospital. This includes interaction with the OPD, billing, investigation, OT and pharmacy modules. The in-patient admission module contains information such as patient's name, IP No., age, sex, address, date and time of admission, room no., bed no., doctor's name, payment details, etc.

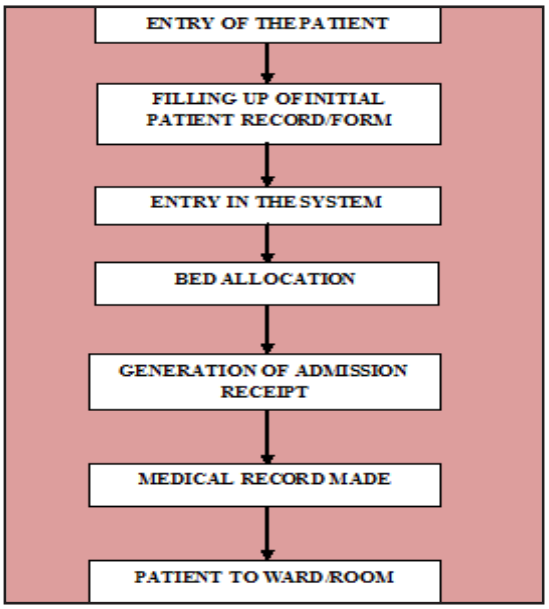


FIGURE 1: PROCESS FLOW FOR ADMISSION PROCESS IN HOSPITAL

The following standard symbols indicate:

- Ellipses to show the start and finish of the process
- Rectangles for individual steps in the process
- Lines with arrowheads to indicate movement from step to step with direction

DATA ANALYSIS AND INTERPRETATION

TABLE 1: DATA SHOWING NUMBER OF ADMISSIONS WITH TIMINGS

S. No.	Time (Min)	No. of Admissions	Percentage (%)
1	5 to 15	12	8
2	16 to 25	63	42
3	26 to 35	50	33.33
4	36 to 45	17	11.33
5	46 to 55	3	2
6	56 and above	5	3.33

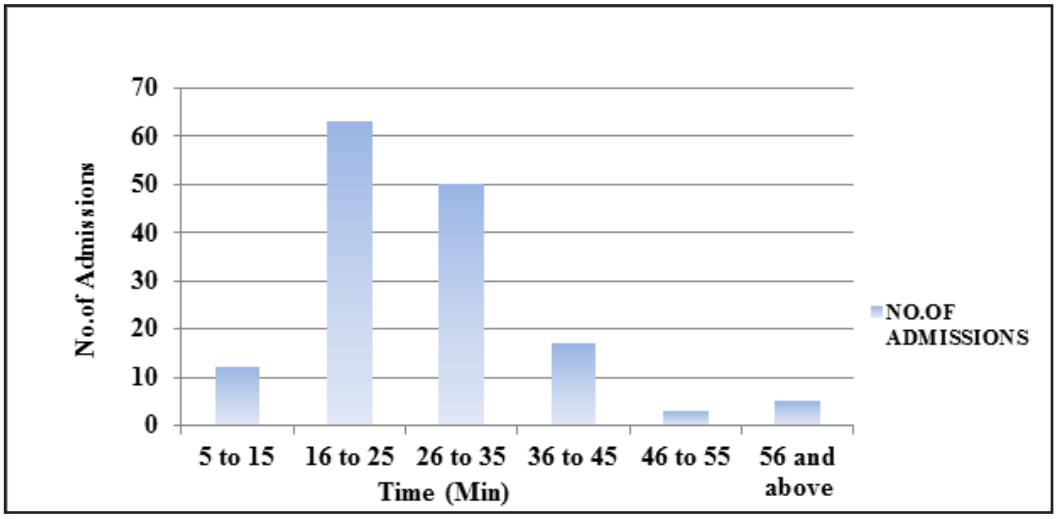


FIGURE 2: NO. OF ADMISSIONS WITH TIME

From the above column chart, we observe the following information:

- Time for 12 admissions was 5 to 15 min.
- Time for 63 admissions was 16 to 25 min.
- Time for 50 admissions was 26 to 35 min.
- Time for 17 admissions was 36 to 45 min.
- Time for 3 admissions was 46 to 55 min.
- Time for 5 admissions was 56 and above min.

The following picture shows the percentage of admissions:

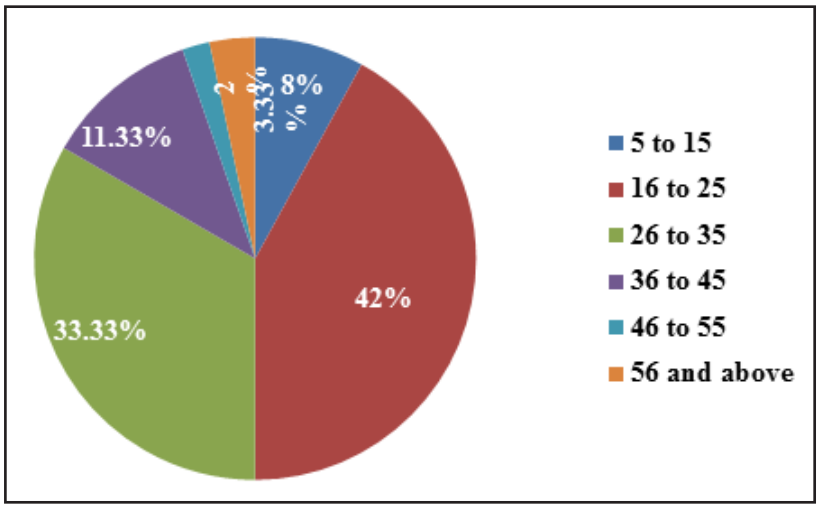


FIGURE 3: PERCENTAGE OF ADMISSIONS (%)

From the above pie chart, we observe the following information:

- 8% of the admissions were in between 5-15 min.
- 42% of the admissions were in between 16-25 min.
- 33.33% of the admissions were in between 26-35 min.
- 11.33% of the admissions were in between 36-45 min.
- 2% of the admissions were in between 46-55 min.
- 3.33% of the admissions were in between 56 and above min.

TABLE 2: DATA SHOWING MIN. PER PATIENT

S. No.	Time between	Min. per Patient
A	Entry of the patient and initial slip form given	1.01
B	Initial slip given and entry in the system	2.13
C	Entry in the system and bed confirmation	2.12
D	Bed confirmed and medical record made	6.62
E	Medical record made and patient accompanied	15.27

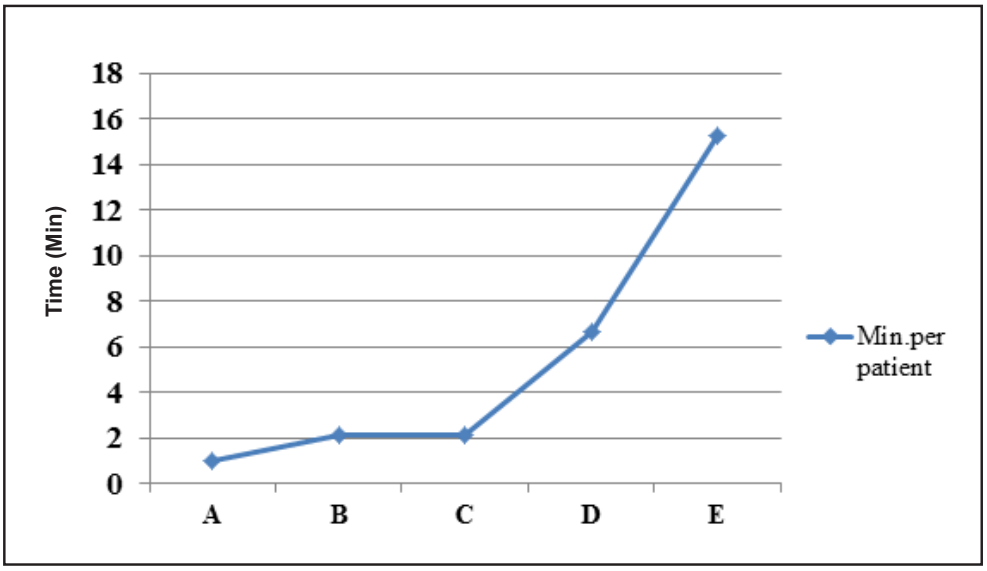


FIGURE 4: MIN. PER PATIENT

From the above line graph, we can say that

A. 1.01min was the time between entry of the patient and initial slip given.

B. Time between initial slip given and entry in the system was 2.13 min.

C. 2.12 min was the time between entry in the system and bed confirmation.

D. Time between bed confirmation and medical record made was 6.62 min.

E. 15.27 min was the time between medical records made and patient accompanied.

Explanation

A. The operator checked the admission slip which was written by doctors, company letters and ID card in case of insurance patients. So, the time between entry of the patient and initial slip given was 1.01 min.

B. Time between initial slip given and entry in the system was 2.13 min. because the patients filled the initial slip forms first with their details and then the operator enters the details in the system.

C. The time between entry in the system and bed confirmation was 2.12 min. because the operator enquired the bed availability from ward in-charge nurse through intercommunication.

D. The operator prepared the admission papers (medical record) and takes the signs of patient/ patient attendants. So, the time between bed confirmation and medical record made was 6.62 min.

E. The time between medical records made and patient accompanied (patient is on bed) was 15.27 min. because there is no helper while patients were going to their respective wards or rooms.

FISHBONE DIAGRAM (CAUSE-EFFECTIVE DIAGRAM)

Fishbone diagram was developed by Prof. Ishikawa of Tokyo University in 1943. Fishbone diagram enables to understand the linkage between the various causes and the end results. The effect or problem is stated on the right side of the chart, and the major influences or causes are listed on the left.

The fishbone diagram identifies many possible causes for an effect or problem. It can be used to structure a brainstorming session. It immediately sorts ideas into useful categories. The Fishbone diagram was used here to identify possible causes for the problem, i.e. delay in admission process.

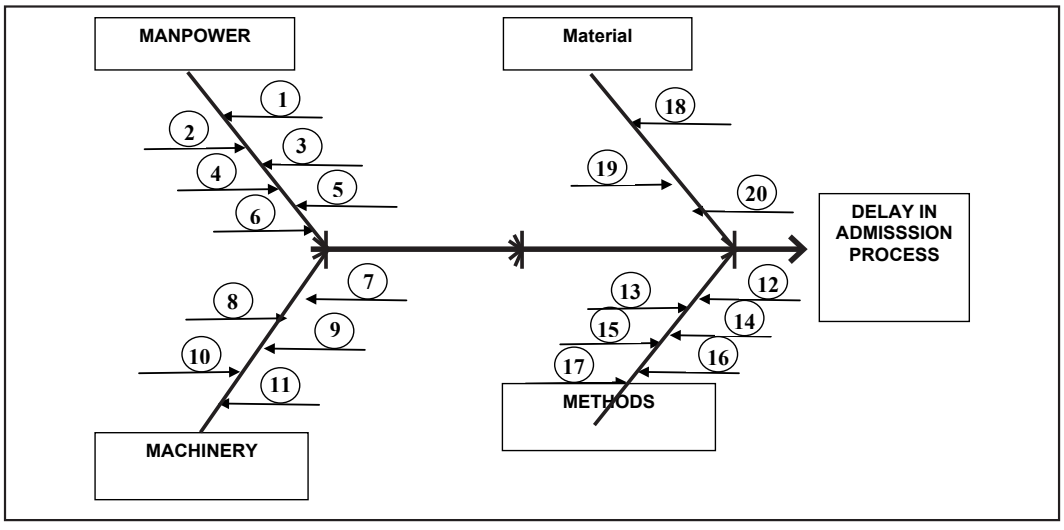


FIGURE 5: FISHBONE DIAGRAM

Fishbone Diagram Representation

The following are the various causes, which lead to delay in admission process.

Manpower:

1. Only one operator is logged in though there are two systems available.

   It means that one operator is doing admission process.

2. Two staff members are doing one admission process.

   It means that one operator entered the patient details in the system and another operator is made the admission papers (medical record).

3. Stock is not checked by the operator a day before.

   It means the staff members at admission counter do not checked the stock (materials such as medical records, initial slip forms, general stationery, etc.) whether the stock is sufficient or not for next day.

4. Substitute workers.

   If the regular employees are absent, substitute workers do admission process and they do slowly because they aren't doing same work regularly.

5. Admission receipt filled by the operator.

   If the printer is not printing the admission receipt properly, the operator fills the admission receipt manually.

6. No proper utilisation of manpower.

   It means manpower is available but they don't have work or don't assign the proper work to the staff.

Machinery:

7. Xerox machine is not available at admission counter or nearby admission counter, which creates a delay in admission process for insurance and Aarogyasri patients.

   For insurance patients, Xerox copy of the company ID card is required which is attached to the admission papers. If there is no Xerox machine, the patient will go for Xerox creates delay in admission process.

8. Cash counting machine is not in working condition.

   If cash counting machine is not working, the operator counts the cash manually which takes more time in case of large amounts.

9. Printer is not printing properly.

   If printer is not printing properly, the operator fills the receipts manually or the operator again prints the same receipts. This also causes delay in admission process.

10. Utilisation of one system though two systems are available.

    There are two systems available but one operator is logged and doing the admission process.

11. Frequently system failure.

    If system failure occurs many times at short intervals during the admission process, then the admission process will be delayed.

Methods:

12. Intercommunication problem.

    The operator enquires the bed availability from ward nursing in-charge through intercommunication but it is not connecting and causes delay in admission process.

13. In between the admission process check-outs are given.

    While doing admission, the operator gives the checkouts for bill clearance. It means that he signs out the admission process and signs in for the check-out details.

14. Admissions are not done at the respective counters, i.e. cash, corporate and insurance admissions.

    It means the patients confused with the signboards, i.e. the patient will go to which admission counter for admission.

15. Technicians should not check the system at regular intervals to prevent delay in admission process.

    It means during admission process, the system suddenly switched off or struck causes delay in admission process. So, the technicians should check the system regularly.

16. No helper to accompany the patient to the wards/rooms.

    The patients while going to their respective wards/rooms are confused sometimes if there is no helper to accompany the patient to the wards/rooms.

17. Lengthy process for Aarogyasri patients.

    It means after admission process, the patients are going to meet the Aarogyasri employee for approvals and also informed to the arogya Mithras.

Material:

18. No proper stock of initial patient slip forms.
19. No availability of medical records.
20. No proper availability of stationery when needed.

It means at the admission counter, initial patient slip forms, medical records and proper stationery are not available when needed and hence cause delay in admission process.

FINDINGS AND RECOMMENDATIONS OF THE STUDY [A]

The study found the following findings:

- The staff members at IP admission counter are not wearing the ID cards.
- In 23 cases, initial slips are filled by the operator and sometimes not at all given to the patient.
- Server down in 6 cases.
- Technical problem with the printer in 2 cases.
- In 4 cases, bed confirmation is late due to intercommunication problem.
- Contents of the case sheet are not explained to the patients/attendants.
- Patients are not informed until they enquiry about the floor/ward.
- In between the admission process, checkouts are given and swiping of credit cards is done.
- No initial slips for 1 hour on 24.6.2010.
- In 5 cases, patients went outside after admission.
- In 5 cases, bed number was entered wrong in the case sheets.
- Cash counting machine is not in working condition.
- Patients are confused with three sign boards, i.e. corporate admissions, cash admissions and insurance admissions because the operators doing admissions at one/two counters only.
- In 1 case, the operator filled the admission receipt manually.
- There is no escort service to the patients while patients are going to the wards/rooms.

The study suggests the following recommendations:

- There should be appointed a helper or a patient relation executive to assist the patients to their respective wards.
- Patients or patients' attendees should be asked to fill the initial slips.
- Technicians should routinely check the systems and printers.
- Before leaving the admission counter, the employee should ensure that there is enough stock of the initial slips and medical records for the next day.
- Proper stationery should be maintained at the counter.
- Need of Xerox machine.
- Steps should be taken to avoid the patients to go out after the medical record is made, i.e. after admission.
- Admissions should be done at their respective counters, i.e. credit admissions, cash admissions and insurance admissions.

- There should be proper utilisation of resources.
- There is need of proper monitoring system to check on regular basis about the process that is being followed by the staff at the admission counter.
- Arrange more seats on waiting lobby.
- General instruction can be put on the wall.

CONCLUSION

In today's global business environment, quality cannot be underestimated or overlooked by any firm whether it is a manufacturing or service firm, regardless of its size or assets. Quality has become the most important factor in the long-term profitability and success of any business organisation. Also, in the present environment of increased global competition, quality not only allows product or service discrimination, but it also has become a major marketing and competitive weapon. Managing quality and offering value to the customer is still a major concern for many organisations.

Presently, quality is the most important issue in health care sector because of patient safety, increasing costs, rising of patients' expectations, competition in health care industry and advances in medical and diagnostics technology. In health care, correct diagnoses, minimum wait time, lower cost, security and patient satisfaction are the basic parameters for quality. "Time" is an important factor in health care as delay in time affects the quality of services. No one knows this better than patients. With so much choice, customers become more focused on obtaining good quality and rejecting poor quality.

There are three types of patients who land up in the hospital for admission:

i) General/ordinary patients – only cash dealings.

ii) Patients who are either hospital employees or their dependents.

iii) Company employees or their dependents – credit dealing and the bills are raised to the company.

The data collected during the admitting process is vital to the quality of care the patient receives. This information is transmitted to the medical staff, nursing units, business office and ancillary services such as laboratory, which need accurate and timely information to function well. The efficiency of the department is measured by factors such as the length of time patients must wait during admitting process, system of helper to patients through service departments and their rooms and finally the demonstrated concern and courtesy of the staff. The admitting process is a seven-day a week round the clock function.

The admission process was simple. From the above analysis, out of 150 admissions, most of the admissions 63, (42%) were in between 16 to 25 min. The time for 50 admissions (33.33%) was 26 to 35 min. Sometimes patients went outside after admission process. So, in 5 admissions the time was 56 and above min. The main reasons of delay in admission process were using one system though there are two systems, the patients' initial slip forms were filled by the operators, no Xerox machine at admission counter or near by the counter, intercommunication problem,

technical problem with printer and frequent system failure, checkouts and credit card swiping in between the admission process, no helper to the patients while patients were going to the wards/ rooms, etc. These increase the waiting time of in-patients which leads to delay in admission process as well as affect the quality of services. Improvement of the process is the better way to reduce delay in admission process.

References

1. G.D. Kunders (2008), "Hospitals Facilities Planning and Management", Admitting Department, pp.331-336, Tata McGraw-Hill Publishing, New Delhi
2. R.P. Mohanty & R.R Lakhe (2006) "TQM in the Service Sector", TQM in the Health Care System, pp.342-343 and Analytical Tools for Quality improvement, pp.158, 179, 182, 187, Jaico Publishing House, Mumbai
3. K. Shridhara Bhat (2007), "Quality Management", Preface, Tools and Techniques for Quality Management, pp.231-233, Himalaya Publishing House, Mumbai
4. A.K.Saini (1999), "Management Information System (MIS) in Hospitals – A computer-based Approach for Quality in Hospital Services and Administration", Status of MIS in Hospitals, pp.189,Deep & Deep Publications Pvt. Ltd., New Delhi
5. G.D. Mogli (2001), "Medical Records Organization and Management", Hospital Information System, pp.175-177, and Quality Assurance with Latest Technology, pp. 259, Jaypee Brothers Medical Publishers (P) Ltd, New Delhi
6. S. L. Goel, R. Kumar (2004), "Hospital Supportive Services-Management of Hospitals-Vol.2", Quality Healthcare in India, pp.313-320 and Use of Hospital Statistics for Management, pp.91-93, Deep & Deep Publications Pvt. Ltd., New Delhi
7. William B.Martin (2004), "Managing Quality Customer Service", A Customer Feedback System, pp.64,Viva Books Private Ltd., New Delhi
8. CM Francis and Mario C de Souza (2004), "Hospital Administration", Quality Management in our Hospitals, Quality Management Programs: Techniques and Tools, Jaypee Brothers Medical Publishers (P) Ltd., New Delhi
9. S.M. Jha (2001), "Hospital Management", Total Quality Management in Hospitals, Himalaya Publishing House, Mumbai

Internet Sites

www.medical-dictionary.thefreedictionary.com/patient+admission

www.bombayhospital.com/inpati.htm

www.jaslokhospital.net/patient_facilities/adm_procedure.htm

www.kghospital.com/kghAdmitProcess.html

www.answers.com/topic/admission-to-the-hospital

www.reachouthyderabad.com/news/medwin.htm

11

Work-Study as a Decision Making Tool in Improving the Productivity of Radiology Department

V.R. Girija*
Mehwesh Hasan*

Effective and efficient utilisation of resources plays a key role in delivering quality healthcare. It is the decision of the operations manager to see how well the different activities of the hospital are planned and executed. Diagnostics department is the backbone of any hospital not only in terms of revenue generation, but also playing crucial role in diagnosing the problems. With the aim to streamline the diagnostic procedures, work study is conducted on radiographers in X-ray, MRI (Magnetic Resonance Imaging) and Ultrasonography thus accomplishing operations manager in decision making and resource planning. Total time for the x-ray procedure has been reduced by 2 minutes 15 seconds and for MRI by 3 minutes 41 seconds..

Keywords: *Decision Making, MRI, Radiology, Ultrasonography, Work Study, X-ray*

INTRODUCTION

Decisions regarding the effective utilisation of resources play significant role in providing quality healthcare. Work study is one such technique which helps in decision making by the top management regarding the effective and efficient use of human resources. Work study is the systematic examination of the methods of carrying out activities such as to improve the effective use of resources and to set up standards of performance for the activities carried out.

In today's competitive business environment, it is necessary that the employees be more productive, especially in hospitals, where each minute is vital in saving patient's life. Radiology technicians are skilled personnel in performing the diagnostic procedures. To facilitate less service costs, high service quality and improve operations, operations manager should decide on the effective means of carrying out the different operations of the hospital. In this direction,

* Assistant Professor, Deccan School of Hospital Management, Hyderabad

improving radiographers' productivity, reducing costs and time by improving work methods and simplifying the work, need special attention by the operations manager.

LITERATURE REVIEW

Jemima A. Frimpong et al. (2011) applied time use study of health workers to understand their productivity. Torrie P.J. (1963) reviews the progress and problems encountered in applying the normal techniques of work study to design work in a hospital environment. Ikbal F. and A.K. Jaiswal (2006) apply the work study procedures to understand the drug administration through injection by nurses. As unsafe injection practices have caused death and other complications, their study is aimed at understanding the existing injection practices and improving, so that it saves time as well it is made safe.

Kunders G D (2004) suggests that good medical and surgical care depend to great extent on the availability of prompt, thorough and skilful diagnostic services. A well-planned diagnostic department ensures efficient flow of service, prompt scheduling and minimum movement for patients and staff. In an average general hospital, almost 90% of the work in X-ray department consists of radiography and fluoroscopy.

OBJECTIVES OF THE STUDY

The objectives of the study are to:

- Undertake method study and work measurement of various diagnostic examinations in radiology department
- Develop standard work study for radiographers with reference to various diagnostic examinations in radiology department

MATERIALS AND METHODS

These can be summarised as follows:

- ***Research Design:*** The study is exploratory in nature.
- ***Data Collection Device:*** The data is collected through observation method and informal interview with the technicians.
- ***Sample:*** A sample of 15 patients in Magnetic Resonance Imaging (MRI) and a sample of 50 patents each in X-ray Department and Ultrasonography are observed for a period of one month. The study is performed at a tertiary care teaching hospital. The patients are randomly selected for study purpose.
- ***Data Collection Process:*** The time taken by radiologists for different diagnostic procedures was note down by observation method. Informal interviews were conducted with technicians to understand the different procedures and process flows in the radiology department.
- ***Data Analysis and Results:*** The data is basically analysed through work study. There are 8 basic steps, some of which are common to both Method Study (MS) and Work Measurement (WM).

1. Select (MS & WM)
2. Record (MS & WM)
3. Examine (MS & WM)
4. Develop (MS)
5. Measure (WM)
6. Define (WM)
7. Install (MS)
8. Maintain (MS)

Step 1: Select

In this step, identified topic is selected, i.e. work study of radiographers with respect to X-ray department, Magnetic Resonance Imaging (MRI) and ultrasonography.

Step 2: Record

The current activities involved during X-ray, MRI and ultrasonography examination have been recorded. The activities of X-ray procedure are shown in Table 1. The activities of MRI procedure are shown in Table 2 and activities of ultrasonography examination are shown in Table 3.

TABLE 1: ACTIVITIES OF X-RAY DIAGNOSTIC PROCEDURE

Sl. No.	Activity
1	Registration of patient
2	Verification by the radiographer
3	Serial number (Sl. no.) allotted to the patient
4	Technician moving from the reception to the X-ray room
5	Radiographer adjusting the equipment
6	Radiographer travelling from the x-ray room to the storeroom for cassette
7	Radiographer moving back to X-ray room from storeroom
8	Radiographer attaching the Sl. no. to the cassette
9	Inserting the cassette into the equipment
10	Patient is made to stand in correct position by the radiographer
11	Radiographer coming back to the controls
12	Image (x-ray) is taken
13	Radiographer removing the cassette from the equipment for developing
14	Radiographer moving from the x-ray room to darkroom for developing
15	Developing process in darkroom
16	Radiographer moving from darkroom to reception with the X-ray
17	X-ray is kept for drying
18	X-ray handed over to patient

TABLE 2: ACTIVITIES OF MRI DIAGNOSTIC PROCEDURE

Sl. No.	Activity
1	Patient coming to the radiologist
2	Radiologist verifying the receipt
3	Patient is asked to change (to and fro to changing room)
4	Patient entering the MRI scanning room along with radiologist
5	Patient lying down on the machine couch
6	Radiologist moving to control panel for adjustments on TV screen
7	Radiologists going back to the (patient) MRI scanning room
8	Radiologist arranging the patient on scanner's table
9	Radiologist moving from the MRI scanning room to control panel room
10	MRI procedure is carried out
11	Radiologist then moving from the control room inside the MRI scanning room
12	Deranging the patient on scanner's table
13	Patient getting up and moving out of the scanning room
14	Radiographer coming back to the control room
15	Arrangement of the snapshots by the radiologist on the TV screen
16	Print out/film is generated
17	Film handed to the patient

TABLE 3: ACTIVITIES OF ULTRASONOGRAPHY DIAGNOSTIC PROCEDURE

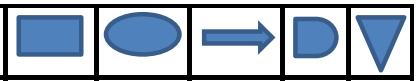
Sl. No.	Activity
1	Patient coming to the Ultrasonography department
2	Patient hands over the examination receipt to the sonographer
3	Sonographer verifying it
4	Patient lies on the examination table
5	Ultrasonography examination is done (desired images viewed on the TV screen are then selected)
6	Nurse wiping the gel on the body surface with cotton
7	Patient getting up from the examination table
8	Report is prepared by the sonographer and the print out of the screened images is attached to the report as well
9	Patient takes the report and moves away

The process chart is prepared based on following symbols:

Inspection	Operation	Transportation	Delay	Storage
				

A process flow chart is prepared for X-ray, MRI and Ultrasonography as shown in Tables 4, 5 and 6, respectively.

TABLE 4: PROCESS FLOW CHART FOR THE ACTIVITIES OF X-RAY DEPARTMENT

Sl.No	Activity	
1	Registration of patient	
2	Verification by the radiographer	
3	Serial number(sl.no) allotted to the patient	
4	Technician moving from the reception to the x-ray room	
5	Radiographer adjusting the equipment	
6	Radiographer traveling from the x-ray room to the store room for cassette	
7	Radiographer moving back to x-ray room from store room	
8	Radiographer attaching the sl.no to the cassette	
9	Inserting the cassette into the equipment	
10	Patient is made to stand in correct position by Radiographer	
11	Radiographer coming back to the controls	
12	Image (x-ray) is taken	
13	Radiographer removing the cassette from the equipment for developing	
14	Radiographer moving from the x-ray room to dark room for developing	
15	Developing process in dark room	
16	Radiographer moving from dark room to reception with the X-ray	
17	X-ray is kept for drying	
18	X-ray handed over to patient	

The following are the observations of X-ray department:

- Insufficient staff in the X-ray department
- At times, availability of only one technician handling both patient registrations as well carrying out examination procedures of patients
- Drying of x-ray on the reception table
- No proper provision of envelopes for X-ray films to some of the patients

TABLE 5: PROCESS FLOW CHART FOR THE ACTIVITIES OF MRI

Sl. No	Activity	
1	Patient registration	
2	Radiologist verifying the receipt	
3	Patient is asked to change (to and fro to changing room)	
4	Patient entering the MRI scanning room along with radiologist	
5	Patient lying down on the machine couch	
6	Radiologist moving to control panel for adjustments on TV screen	
7	Radiologists going back to the (patient) MRI Scanning room	
8	Radiologist arranging the patient on scanner's table	
9	Radiologist moving from the MRI scanning room to control panel room	
10	MRI procedure is carried out	
11	Radiologist then moving from the control room inside the MRI scanning room	
12	Deranging the patient on scanner's table	
13	Patient getting up and moving out of the scanning room	
14	Radiographer coming back to the control room	
15	Arrangement of the snap shots by the radiologist on the TV screen	
16	Print out/Film is generated	
17	Film handed to the patient	

The following are the observations of MRI department:

- The MRI department is very well-equipped with centralised air condition.
- MRI scans are very noisy. The noise is like a loud clanging inside the cylinder and it goes throughout the scan. Therefore, music is played making the patient comfortable.
- An intercom is present beside the control panel, which is used for the radiographer to communicate with the patient lying on the machine couch.
- The films are generated through the dry view camera (Laser Printer) which is connected to the control panel.
- The patients were asked to take the report/film on the next day to which the patients found it inconvenient.

TABLE 6: PROCESS FLOW CHART FOR THE ACTIVITIES OF ULTRASONOGRAPHY

Sl. No	Activity	
1	Patient registration	
2	Patient hands over the examination receipt to the sonographer	
3	Sonographer verifying it	
4	Patient lies on the examination table	
5	Ultrasonography examination is done (desired images viewed on the TV screen are then selected)	
6	Nurse wiping the gel on the body surface with cotton	
7	Patient getting up from the examination table	
8	Report is prepared by the sonographer and the print out of the screened images is attached to the report as well	
9	Patient takes the report and moves away	

The following are the observations of ultrasonography examination:

- No delay in the ultrasonography activity was observed
- Sufficient technicians working in different shifts

STEP 3: Examine

In the entire process of X-ray, a radiographer has done the following activities:

- ***Inspection:*** A radiographer has done 2 activities of inspection.
- ***Operation:*** A radiographer has done 9 activities of operation.
- ***Transportation:*** A radiographer has moved 6 times.
- ***Delay:*** There was a delay once.
- ***Storage:*** No activity.

In the entire process of MRI, a radiographer has done the following activities:

- ***Inspection:*** A radiographer has done 1 activity of inspection.
- ***Operation:*** A radiographer has done 7 activities of operation.
- ***Transportation:*** A radiographer has moved 6 times.
- ***Delay:*** There was delay thrice by the patient.
- ***Storage:*** No activity.

In the entire process of ultrasonography, a radiographer has done the following activities:

- ***Inspection:*** A sonographer has done 1 activity of inspection.
- ***Operation:*** A sonographer has done 7 activities of operation.

- ***Transportation:*** A sonographer has moved 1time.
- ***Delay:*** There was no delay.
- ***Storage:*** No activity.
- ***Step 4:*** Develop

The new method for X-ray procedure was developed as shown in Table 7.

TABLE 7: NEW METHOD FOR X-RAY PROCEDURE

Sl. No.	Activity
1	Registration of the patient
2	Clarification
3	Sl. no. allotted
4	Radiographer directly going to the store to get cassette
5	Radiographer moving from storeroom to the x-ray room
6	Sl. no. attached to the cassette
7	Inserting the cassette into the equipment
8	Patient is made to stand in correct position by radiographer
9	Radiographer moving back to the controls
10	X-ray taken
11	Radiographer moving from the controls to the equipment to remove the cassette
12	Radiographer taking the cassette to the darkroom
13	Developing and drying process in the darkroom
14	X-ray moved from the darkroom to the reception
15	X-ray handed to the patient in an envelope

It was found that most of the time in MRI department has been spent by the patients while lying down and getting up on the table scanners during MRI procedure. New method for MRI procedure was developed as shown in Table 8.

TABLE 8: NEW METHOD FOR MRI PROCEDURE

Sl. No.	Activity
1	Patient coming to the radiologist
2	Radiographer verifying the receipt
3	Patient is asked to change; to and fro to changing room (by the time the radiographer adjusts the controls on the TV screen)
4	Patient entering the MRI scanning room along with radiologist
5	Patient lying down on the machine couch

6	Radiologist arranging the patient on scanner's table
7	Radiologist moving from the MRI scanning room to control panel room
8	MRI scanning is carried out
9	Radiologist then moving from the control room to the MRI scanning room
10	Deranging the patient on scanner's table by the radiographer
11	Patient getting up from the scanner's table and moving out the scanning room
12	Radiographer coming back to the control room
13	Arrangement of the desired radiographic views by the radiologist on the TV screen
14	Print out/film is generated
15	Film handed to the patient

There was no delay in the ultrasonography activity. Therefore, there was no requirement of developing a new method only for ultrasonography activity.

Step 5: Measures

In this step, time taken for existing method of performing X-ray, MRI and ultrasonography has been recorded. Existing methods of diagnostic examination for X-ray and MRI procedures are shown in Tables 9 and 10, respectively.

TABLE 9: TIME CONSUMED FOR DIFFERENT ACTIVITIES OF X-RAY PROCEDURE

Sl. No.	Activity	Time Consumed
1	Registration of patient	1min 50 sec
2	Clarification by the radiographer	10 sec
3	Sl. no. allotted to the patient	40 sec
4	Technician moving from the reception to the x-ray room	15 sec
5	Radiographer adjusting the equipment	5 sec
6	Radiographer travelling from the x-ray room to the storeroom for a cassette	5 sec
7	Radiographer moving back to x-ray room from storeroom	7 sec
8	Radiographer attaching the sl. no. to the cassette	3 sec
9	Inserting the cassette into the equipment	5 sec
10	Patient is made to stand in correct position by radiographer	6 sec
11	Radiographer coming back to controls	2 sec
12	Image (x-ray) is taken	15 sec
13	Radiographer moving towards the equipment to remove the cassette	6 sec
14	Radiographer travelling from the x-ray room to darkroom for developing	30 sec
15	Developing process in darkroom	3 min 20 sec
16	Radiographer moving from darkroom to reception with the x-ray	20 sec

17	X-ray is kept for drying	2 min
18	X-ray handed over to patient	5 sec

The total time taken by the radiologist for an x-ray is 10 minutes 4 seconds.

TABLE 10: TIME CONSUMED FOR DIFFERENT ACTIVITIES OF MRI PROCEDURE

Sl. No.	Activity	Time Consumed
1	Patient coming to the radiologist	5 sec
2	Radiologist verifying the receipt	20 sec
3	Patient is asked to change; to and fro to changing room	1min 30 sec
4	Patient entering the MRI scanning room along with radiologist	1 min 15 sec
5	Patient lying down on the machine couch	2 min
6	Radiographer moving to control panel for adjustments on TV screen	2 min
7	Radiographer going back to the (patient) MRI scanning room	8 sec
8	Radiographer arranging the patient on scanner's table	1 min
9	Radiographer moving from the MRI scanning room to control panel room	5 sec
10	MRI procedure is carried out	45 min 45 sec
11	Radiographer then moving from the control room inside the MRI scanning room	8 sec
12	Deranging the patient on scanner's table	10 sec
13	Patient getting up and moving out of the MRI room	1 min
14	Radiographer coming back to the control room	6 sec
15	Arrangement of the desired radiographic views by the radiologist on the TV screen	6 min
16	Print out/film is generated	2 min 10 sec
17	Film handed to the patient	10 sec

The total time taken for MRI by the radiographer is 1 hour 3 minutes 52 seconds.

Step 6: Define

In this step, the proposed new method for the different procedures is given.

New methods of X-ray and MRI procedures are shown in Tables 11 and 12, respectively.

TABLE 11: TIME CONSUMED IN NEW METHOD OF X-RAY PROCEDURE

Sl. No.	Activity	Time Consumed
1	Registration of the patient	1min 50 sec
2	Clarification	11 sec
3	Sl. no. allotted	45 sec

4	Radiographer directly going to the store to get cassette	5 sec
5	Radiographer moving from storeroom to the x-ray room	6 sec
6	Sl. no. attached to the cassette	3 sec
7	Inserting the cassette into the equipment	4 sec
8	Patient is made to stand in correct position by radiographer	6 sec
9	Radiographer moving back to the controls	3 sec
10	X-ray taken	16 sec
11	Radiographer moving from the controls to the equipment to remove the cassette	5 sec
12	Radiographer taking the cassette to the darkroom	15 sec
13	Developing and drying process in the darkroom	3 min 40 sec
14	X-ray moved from the darkroom to the reception	15 sec
15	X-ray handed to the patient in an envelope	5 sec

The total time taken by a qualified radiographer for an X-ray of a patient is 7 minutes 49 seconds with the new method.

TABLE 12: TIME CONSUMED IN NEW METHOD OF MRI PROCEDURE

Sl. No.	Activity	Time Consumed
1	Patient coming to the radiologist	6 sec
2	Radiographer verifying the receipt	20 sec
3	Patient is asked to change (to and fro to changing room) and meanwhile radiographer adjusts the controls on the TV screen	1 min 20 sec
4	Patient entering the MRI scanning room along with radiologist	1min
5	Patient lying down on the machine couch	1min 30sec
6	Radiologist arranging the patient on scanner's table	1min
7	Radiologist moving from the MRI scanning room to control panel room	6 sec
8	MRI scanning is carried out	45 min
9	Radiologist then moving from the control room to the MRI scanning room	7 sec
10	Deranging the patient on scanner's table by the radiographer	10 sec
11	Patient getting up from the scanner's table and moving out from the scanning room	1 min 30sec
12	Radiographer coming back to the control room	4 sec
13	Arrangement of the desired radiographic views by the radiologist on the TV screen	5 min 50 sec
14	Print out/film is generated	2 min
15	Film handed to the patient	8 sec

The total time taken for MRI by the radiographer is 1 hour 11 seconds with the new method.

As per the new method, process flow chart was developed for X-ray as shown in Table 13.

TABLE 13: PROCESS FLOW CHART FOR THE NEW METHOD OF ACTIVITIES OF X-RAY

Sl.No	Activity					
1	Registration of the patient					
2	Verification by the radiographer					
3	Sl.no allotted					
4	Radiographer directly going to the store to get cassette					
5	Radiographer moving from store room to the x-ray room					
6	Sl.no attached to the cassette					
7	Inserting the cassette into the equipment					
8	Patient is made to stand in correct position by					
9	Radiographer moving back to the controls					
10	X-ray taken					
11	Radiographer moving from the controls to the equipment					
12	Radiographer taking the cassette to the dark room					
13	Developing and drying process in the dark room					
14	X-ray moved from the dark room to the reception					
15	X-ray handed to the patient in an envelope					

As per the new method, process flow chart was developed for MRI procedure as in Table 14.

TABLE 14: PROCESS FLOW CHART FOR THE NEW METHOD OF ACTIVITIES OF MRI

S. no.	Activity					
1	Patient registration					
2	Radiographer verifying the receipt					
3	Patient is asked to change (to and fro to changing room) & meanwhile radiographer adjusts the controls on the TV screen					
4	Patient entering the MRI scanning room along with radiologist					
5	Patient lying down on the machine couch					
6	Radiologist arranging the patient on scanner's table					
7	Radiologist moving from the MRI scanning room to control panel room					
8	MRI scanning is carried out					
9	Radiologist then moving from the control room to the MRI scanning room					
10	Deranging the patient on scanner's table by the radiographer					
11	Patient getting up from the scanner's table and moving out from the scanning room					
12	Radiographer coming back to the control room					
13	Arrangement of the desired radiographic views by the radiologist on the TV screen					
14	Print out/Film is generated					
15	Film handed to the patient					

In the entire process of X-ray, a radiographer has done the following activities:

- ***Inspection:*** 2 activities have taken time of 17 seconds.
- ***Operation:*** 7 activities have taken 6 minutes 43 seconds.
- ***Transportation:*** 6 activities have taken 49 seconds.

The total time taken for MRI by the radiographer is 1 hour 11 seconds with the new method.

- ***Inspection:*** 1activity has taken time of 20 seconds.
- ***Operation:*** 8 activities have taken time of 55 minutes 34 seconds.
- ***Transportation:*** 4 activities have taken 1 minute 17 seconds.
- ***Delay:*** 2 activities have taken 3 minutes.

Step 7: Install

The new method for X-ray has been installed successfully with the following changes:

- ***Inspection:*** Careful inspection of patient's diagnostic case sheet by the radiographer in order to carry out the required diagnostic examination
- ***Transportation Changes:*** The cassette is inserted into the equipment, and along with it the patient is made to stand/lie in desired position for X-ray, thus reducing the time in transportation.

The new method for MRI procedure has been installed successfully with the following changes:

- Transportation by the radiographer has been reduced resulting in reduction in overall MRI duration.
- Claustrophobic patients showed delay during the MRI examination. This can be dealt by the radiographer by explaining the procedure, and then discussing alternatives with the patient for helping them to relax. It includes counselling, education and therapeutic techniques.

Step 8: Maintain

The above-mentioned new methods of carrying out the X-ray and MRI procedures are maintained by frequent supervision of the department by superintendent.

FINDINGS OF THE STUDY

The findings of the study are as follows:

- The total time for the x-ray procedure has been reduced by 2 minutes 15 seconds and for MRI by 3 minutes 41 seconds.
- The recruitment of well-trained radiographers has resulted in the increase in work efficiency.

CONCLUSION

Work study is thus reducing the work content of the process and improving productivity through the saving of wasted effort and time. As human sources are vital, it is necessary to measure the work/service provided by individuals and group. The best method which can be applied for this purpose is the work study techniques. But, work study takes time and needs strong staff commitment so as to achieve hospital operations successfully.

References

1. Bamisaiye A, M.B. Abodunde, O. Ransome-Kuti (1984), "A Simple Work-Sampling System for use in Hospitals and Health Centers in the Developing World", Journal of Tropical Paediatrics, Vol. 30, (6) 299-303
2. Cleone W (1965), "Application of Work Study to the Design of Factory Surgery", Occupational Medicine, Vol. 15, (1) 59.64
3. Ikbal F., A.K. Jaiswal (2006), "Work Study of Nurses with reference to Safe Injection Practices in a Deluxe Room Unit of Corporate Hospital in Hyderabad", Journal of the Academy of Hospital Administration, Vol. 18, No.1
4. Jemima A. Frimpong, Stephane Helleringer, John Koku Awoonor-Williams, Francis Yeji and James F. Phillips (2011), "Does Supervision improve Health Worker Productivity? Evidence from the Upper East Region of Ghana", Tropical Medicine and International, Vol. 16, No. 10, pp. 1225–1233
5. Kunders G D (2004), "Hospitals Facilities Planning and Management" New Delhi, Tata McGraw-Hill Publishing Company Limited, pp.241-244
6. Robert L. Bard (2007), "Enhancing Radiology Workflow", Medical-magazine, December, pp.78-83
7. Torrie J. (1963) "The Development of Work Study in the Hospital Field", Occupational Medicine, Vol. 13, (1) 122- 124
8. Torrie P.J., (1963) "Work Study and Design in Hospitals", Work Study, Vol. 12 Iss: 11, pp.29 –37

12

Determinants and Strategies of Medical Tourism

M. Habeeb Ghatala*
Lakshmi B.**

World Tourism Organisation (WTO) defines medical tourism as tourism associated with travel to health spas or resort destinations where the primary purpose is to improve traveller's physical well-being through a process comprising physical exercises and therapy, dietary control, and medical services relevant to health maintenance. The high cost of medical care and frequently long waiting periods in the Western countries is unaffordable for many. These patients have an alternative to travel to medical tourism hubs in Asian countries which have superb hospitals accredited by the Joint Commission International (JCI) and offer world-class care at a fraction of the cost of the Western countries. There are several tangible and intangible determinants of medical tourism. The international patients expect high and comparable if not superior quality care at 50% of the cost in the West for both medical and tourism components. Demographic factors play a significant role in people who travel abroad for medical care. There are several factors that temper medical tourism and there are proven strategies for improving medical tourism in India and other medical tourism hubs as well.

Keywords: *Medical Tourism, Medical Care, Cost, Quality, Accreditation, Marketing*

INTRODUCTION

Broadly speaking, medical tourism is the act of travelling to obtain medical care. It is the act of travelling to another country or another region of the same country to seek specialised or economical medical care, well-being or recuperation of acceptable quality with the help of support system. According to World Tourism Organisation (WTO), tourism associated with travel to health spas or resort destinations where the primary purpose is to improve traveller's physical well-being through a process comprising physical exercises and therapy, dietary control, and medical services relevant to health maintenance" is defined as Medical Tourism.

* Dean for Non-Medical Institutions Apollo Hospitals Educational and Research Foundation, Hyderabad
** Dean of Management Programs Administrative Staff College of India, Hyderabad

The term 'medical tourism' has emerged from the practice of citizens of developed countries travelling to developing countries to receive a variety of tertiary care medical services mainly due to continually rising costs of the same services and complicated procedures to avail such medical services in their home countries.

There are three types of medical tourism:

- ***Outbound:*** Patients travelling to other countries to receive medical care.
- ***Inbound:*** Patients from other countries travelling to India to receive medical care.
- ***Intrabound:*** Patients travelling within the country to receive medical care outside their geographic area, typically to a 'Centre of Excellence' in another state or region.

There are dynamic "push" and "pull" factors which make patients travel abroad and hospitals which attract patients because of their expertise to give excellent care. There are several determinants of medical tourism depending upon cost of care, quality of treatment, use of medical technology, and a variety of demographic factors of prospective patients.

The fact that India's corporate hospitals offer world-class treatment at 10% to 25% of the cost in the U.S., an ever increasing number of international patients are making India their medical destination of choice. In spite of offering excellent medical care, a number of international patients are concerned about their safety and litigation rules in relation to failed medical intervention. Further development of medical tourism can be strategised by paying attention to the 7 Ps of marketing – product, price, place, promotion, people, process and physical evidence.

PUSH AND PULL FACTORS IN MEDICAL TOURISM

The major "Push Factors" that bring people for medical care, especially from other countries to India include but are not limited to:

- Lack of procedural insurance in their countries
- Seek care for non-covered procedures as an increasing number of medical conditions are not being covered
- Lack of insurance among increasing magnitude of population as in the U.S. because of ever increasing insurance premium
- Cosmetic procedures are rarely covered by insurance companies
- Vacation of convenience elements during travel
- Treatments which are not approved by the Food & Drug Administration (FDA) of U.S. or similar regulatory bodies of other countries
- Diaspora – Seek treatment back in their country
- More economical in the Asian countries

The "Pull Factors" are the major market drivers for medical tourism. A sample of the pull factors includes the following:

- Unwillingness of patients to accept long queues in Europe and Canada or high costs in the US
- Comparable or better quality of care in the Asian countries
- Shorter or no waiting period, thus quicker access to care
- An increasing number of super-specialist surgeons and physicians practicing in Asian hubs of medical tourism are returning to their respective countries following the completion of their overseas postgraduate medical training and extended duration of experience at leading academic health centres.
- Several Asian governments have taken bold initiatives to promote medical tourism, which are mentioned below:
    - *India:* The government is playing a critical role to utilise medical tourism opportunity to its best. It is estimated that 75–80% of health care services and investment are now provided by the private sector
    - *Philippines:* Produced medical tourism guidebook for distribution in Europe
    - *South Korea:* New medical institutions for international patients
    - *Taiwan:* Investment of $318 million to further develop medical services
    - *Malaysia:* Extended period of stay on medical visa from 30 days to six months
    - *Singapore:* Government formed a collaboration of industry and governmental representatives to create a medical hub
    - *Thailand:* Built hospitals with world-class infrastructure and continually promoting the country as a vacation destination

DETERMINANTS OF MEDICAL TOURISM

A noteworthy determinant of medical tourism is the safety and quality of care available in many offshore settings is no longer an issue. In a survey by Deloitte Center for Health Solutions (2007) on medical tourism indicated that two in five survey respondents said they would be interested in pursuing treatment abroad if quality was comparable and the savings were 50% or more. Medical care in countries such as India, Thailand and Singapore can cost as little as 10% of the cost of comparable care in the U.S. The price is remarkably lower for a variety of services and often includes airfare and stay in a resort hotel. The result is increased medical tourism.

In situations where patients are adequately covered by health insurance, price has not been a factor. However, the impact of dramatically rising health care costs is felt in every household and by every company. Even consumers with employer-sponsored health insurance are increasingly considering outbound medical tourism as a viable care option. Since India has the highest number of quality medical hospitals outside the U.S. and they are at par with the developed world, this factor alone boosts medical tourism. Indian corporate hospitals are best in cardiology,

cardiothoracic surgery, joint replacement, orthopaedic surgery, gastroenterology, ophthalmology, transplants, urology and in several other fields.

The total price of overseas medical care, travel tour packages and surgery procedure cost, doctor's/surgeon's fee, consultation charges, surgery treatment fees, medicines, drugs and procedure consumables, medical tests, investigations, pre-and post-procedure accommodations, personal assistance services, comfortable recuperation, private car transfers, travel and sightseeing tours can be 60%-90% cheaper than the cost for the same procedure in the developed countries.

As per the Confederation of Indian Industry (CII), India is in a unique position in the area of health care as it also offers holistic medicinal services. With yoga, meditation, ayurveda, allopathy and other systems of medicine, India offers a unique basket of services which are difficult to match by other countries. Furthermore, clinical outcomes in India's corporate hospitals are at par with the world's best medical centres because of modern infrastructure and superbly trained specialists from the best medical centres in India and abroad. Furthermore, complementing the world-class clinical care, India has one of the largest pharmaceutical industries in the world. The cost of medicines in India is at a fraction of the cost of the same medicine in the U.S. This combination also contributes as one of the determinants of continuing popularity as a country of choice for medical tourism.

An increasing number of private, not-for-profit, corporate and public sector hospitals are treating international patients and have dedicated support systems in place. The major hospitals are as follows:

1. Apollo Hospitals
2. Aravind Eye Hospitals
3. B. M. Birla Heart Research Center
4. Christian Medical College
5. Dr. Vivek Saggar's Dental Care and Cure Center
6. Escort Heart Institute and Research Center
7. Fortis Hospital
8. Leelavati Hospital
9. L V Prasad Eye Institute
10. Manipal Hospital
11. N M Excellence
12. PD Hinduja National Hospital and Medical Research Center
13. Tata Memorial Cancer Center
14. Wockhardt Hospitals

Among the public sector hospitals, India's number one hospital, the All India Institute of Medical Sciences (AIIMS) has established a dedicated International Healthcare Service Team with the responsibility to take care of patients from the time of their arrival till their departure.

SALIENT FACTS OF MEDICAL TOURISM

The landmark Deloitte study, "Medical Tourism: Consumers in Search of Value" indicates that health care costs are increasing @ 8% per year, well above the Consumer Price Index (CPI). Furthermore, the increasing health care costs are impacting corporate profits and household disposable income in the Western countries. Consequently, consumers are willing to travel to medical tourism hubs to obtain medical care that is safe as evidenced by the Joint Commission International (JCI) or similar internationally recognised accrediting agencies and less costly.

The value proposition in a consumer transaction usually involves consideration about price, quality and service. Because of increasingly escalating deductibles, price sensitivity is soaring. The growth of medical tourism might be a signal as to how consumers calculate their value proposition weighing all three – price, quality and service. Medical tourism will continue to be an interesting opportunity for specialty hubs with treatments unavailable elsewhere in the world or in commuting setting. The Deloitte survey about consumer interest in outbound medical tourism also found that almost 39% of U.S. respondents would consider having an elective procedure in a foreign country if they could save 50% or more and be assured the quality was equal or better than in the U.S. It was also noted that 3% of U.S. consumers travelled outside the country for treatment while 27% of respondents indicated they "may travel outside the U.S. for treatment."

The rapid expansion of facilities for overseas patients has helped to spur the growth of medical tourism. Over 35 countries are serving millions of medical tourists annually and the numbers are growing. The Gulf Countries of UAE, Kuwait, Qatar, Oman, Oman and Saudi Arabia have developed state-of-the-art tertiary and quaternary care medical centres and advertising their services using international electronic media. Following are the major well-established hubs of medical tourism listed below in random order with a sample of their expertise:

- ***Hungary:*** Mainly used by Europeans for dental and cosmetic surgery at 40%–50% of U.S. costs
- ***Gulf States:*** Increasing number of JCI accredited centres offering advanced health care services with liberal financial support by their respective governments
- ***India:*** On way to becoming medical destination of choice with JCI accreditations at outstanding corporate hospitals providing world-class treatment for virtually all clinical conditions at 10%–25% of U.S. costs
- ***Thailand:*** It has world-class JCI accredited private hospitals serving more international patients than almost any other country in the world at 30% of the U.S. cost
- ***Singapore:*** A popular destination with outstanding tertiary care facilities, clinical expertise, JCI accreditations, and at 35% of the U.S. cost
- ***Malaysia:*** A desired destination for alternative medicine and cosmetic surgeries, few JCI accredited hospitals, at 25% of the U.S. cost
- ***South Africa:*** Popular destination for cosmetic procedures and tertiary care especially for African patients at 30%–40% of U.S. costs

- ***Brazil:*** Internationally renowned for a long time for cosmetic surgery with several JCI accredited hospitals at 40%–50% of U.S. costs and a renowned tourist destination
- ***Costa Rica:*** Has the advantage of proximity to the U.S., popular for dental and cosmetic procedures at 30%–40% of the U.S. costs
- ***Mexico:*** Patients from the U.S. and Central American countries, primarily for dental and cosmetic procedures, few JCI accredited hospitals at 25%–35% of U.S. costs

DEMOGRAPHIC FACTORS AFFECTING MEDICAL TOURISM

The Deloitte study found that males, younger patients of Asian origin who are in good health and with commercial and other health insurance are more inclined to travel abroad for medical tourism. The demographic specifics of the survey respondents are presented below.

- ***Age:*** Fifty one per cent of younger respondents (Gen. Y) indicated that they would consider having elective procedures in a foreign country.
- ***Gender:*** A greater percentage of males (44.5%) than females (33.3%) would opt for travelling abroad for medical attention.
- ***Race:*** Of the survey respondents in the U.S. classified by race, 56.8% of Asians, 37.9% of Caucasians, 36.9% of African Americans, and 43.7% of people of other races expressed willingness to travel abroad for medical treatment.
- ***Health Status:*** It is interesting to note that 40.1% of respondents who were in top 20% on terms of their health were positively inclined for tourism as compared to 33.6% of respondents whose health was in bottom 50%.
- ***Medical Insurance:*** Highest percentage (40.6%) of respondents with commercial insurance followed by 35.4% of respondents with other insurance were favourably inclined to travel abroad for medical treatment as compared with 28.0% of respondents on Medicare (over 65 years) and 29.9% of those on Medicaid (those below the poverty line and living on government welfare) were candidates for medical tourism.

An analysis of the demographic factors shows that people in higher socio-economic status have higher education, are younger with higher income, are males with professional occupation, maintain their health, and have health insurance coverage because of the employment or business are prime candidates for outbound medical tourism. In the U.S., Asians enjoy the highest per capita income followed by the Caucasians.

The reason for lack of interest in medical tourism among African Americans, other racial groups such as Latinos, Native Americans (American Indians), etc. along with those on Medicare (older than 65) and Medicare (below poverty line) is due to the fact that these groups are educationally and economically disadvantaged.

FACTORS TEMPERING MEDICAL TOURISM

There are several factors that affect medical tourism. The most important being the supply capacity and infrastructure constraints especially in developing countries which face problems

of water shortage, poor means of transportation, disruption in electric power supply and the like. On the other hand, many countries have policies which do not cover services rendered by offshore providers. For example, U.S. insurance companies offer long-term care insurance, which pays a pre-determined amount per day for pre-determined length of time (maximum of five years) when the insured is unable to perform any two of the six activities of daily living (ADL) which includes bathing, dressing, transferring, toileting, continence and eating. The insurance companies will pay only when the insured is living in the U.S., either at home receiving paid care or in a nursing or assisted living home.

Several countries which wish to attract foreign patients do not compete more aggressively with outbound programs. Private Indian hospitals face a peculiar disadvantage because of the government's policy to increase the cost of hospital bed with air conditioning. Thus, hospitals are being categorised like hotels for taxing purposes. As mentioned earlier in demographic factors affecting medical tourism, patient's level of education, ethnicity, age and intangible personal factors play significant role in decision making for seeking treatment overseas. There are logistics related issues and lack of clinical support systems for continuity of care once back in the country of origin.

In addition, possibility of safety concerns and litigation rules in relation to failed medical intervention can have a tempering effect on medical tourism. A significant issue related to medical tourism is liability. In the event if anything goes wrong during a procedure in a foreign country, the consumer has to work through the host country's legal system. This can be burdensome because of geographical distance and related logistics. As a result of above-mentioned and related factors, many large health insurance companies have not embraced medical tourism because they are worried about potential lawsuits linked to bad outcomes.

STRATEGIES FOR IMPROVING MEDICAL TOURISM IN INDIA

The major competitive advantages that India enjoys in medical tourism include low cost advantage, strong reputation in the advanced health care segment, and the diversity of tourist destinations available in the country. The following marketing strategies are worthy of consideration by India's health care service providers. The strategies are based on Philip Kotler's 7 Ps of marketing mix.

Product: Several of India's corporate hospitals offer world-class treatments in almost all medical sectors. The medical staff members have international board certifications, which are also a valuable asset. The latest technology and equipment available is also used as one of the major products in the industry.

- ***Price:*** India's high standard of medical treatments offered to patients at a very competitive price is a successful strategy.
- ***Place:*** Strengthening the use of Internet for disseminating information about medical and non-medical care services offered by the health care providers is a useful strategy.
- ***Promotion:*** The big private hospitals groups are well represented at international medical fairs and exhibitions with support from the government. These promotional activities create awareness of the available alternative medical treatments as well as to build up a positive image of the high quality and international standard of medical care.

- ***People:*** It is acknowledged that having specialised and qualified doctors and staff give a competitive advantage to the hospital. Serious effort to understand and respect the patient's culture will serve as a successful strategy.
- ***Process:*** Since international patients are concerned with the quality of treatments, accreditation by agencies like JCI will go a long way in promoting medical tourism.
- ***Physical Evidence:*** Good ambiance in the infrastructure with spacious and luxury rooms and excellent amenities combined with cutting-edge technologies will give India a competitive advantage and build trust among international patients as well as their respective governments resulting in enhancement of medical tourism.

CONCLUSION

The future of medical tourism in India is highly promising because the corporate hospitals have demonstrated their ability to offer world-class medical care at the most competitive costs. Over the decades, the standards consumers used for assessing the reputation of a hospital have passed through several stages. The first was on the hospital's structure. Is the façade or the face of the building attractive? Is the building well-constructed? This was followed by the second criterion, process. Did the hospital conduct sufficient investigations to arrive at correct diagnosis or if the surgery was successful? Did the hospital have modern diagnostic and radiographic equipment for treatment? In the present decade, the attention is towards outcome. Did the patient get well?

It is a common knowledge that Indian doctors, nurses and allied health personnel are among the best in the world. They are in a class by themselves and are among the most respected health care professionals in the hospitals globally where they work. In view of the variety of challenges doctors are facing in the practice of medicine especially in the U.S. as a result of restrictive government regulations, cost containment, interference by the insurance companies affecting the best practice of their healing profession, medico-legal cases, escalating cost of malpractice insurance and the like, increasing number of experienced doctors are returning to India and assuming leadership positions in the corporate health care sector.

The corporate health care sector in India combines all essential requirements for promoting medical tourism and making India the global medical destination of choice. This goal can be achieved by the establishment of specialised travel intermediation services, travel desk in hospitals, staff trainers, medical tourism consultants, alternative medical care/rejuvenation centres and medical tourism brokers.

Finally, with the increase in health care budget in 12th Five Year Plan to three per cent from the one per cent in 11th Five Year Plan, financial assistance for further strengthening medical tourism will have a ripple effect in promoting economy and consequently generating jobs both in health care and supporting services.

References

1. Shree Devi G. and D. Manimegalai (2013), "Medical Equipment: Key to Success in Medical Tourism", Medical Equipment & Automation, 6(3), March/April 2013, pp. 40-43
2. Deloitte Center for Health Solutions (2008), "Medical Tourism: Consumer in Search of Value", USA

3. H. Baliga (2006), "Medical Tourism is the New Wave of Outsourcing from India", India Daily, Dec. 23, 2006

4. M. D. Horowitz and J. A. Rosensweig (2007), "Medical Tourism – Health Care in the Global Economy", The Physician Executive, Nov./Dec. 2007

5. http://www.deloitte.com./dtt/article/0%2C1002%2Ccid%25253D192707%COO.html

6. Niraj B. Pandit and Gaurav Desai (2011), "Ophthalmic Services in India: A Component of Medical Tourism for Future Indian Market", Medical Equipment & Automation, 4(5), July/Aug. 2011, pp. 72-75

7. Babu P. George and G. Anjaneya Swamy, (n.d.), "Medical Tourism: An Analysis with Special Reference to India", Journal of Hospitality Application and Research (JOHAR)

8. Suman Kumar Dawn and Swati Pal (2011), "Medical Tourism in India: Issues, Opportunities and Designing: Strategies for Growth and Development", International Journal of Multidisciplinary Research, 1(3), July 2011, pp. 185-202

9. P. Kotler and G. Armstrong (2008), Principles of Marketing, New Jersey, USA: Pearson Education, Inc

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Impact of Software Reusability in Health Industry

Bhupinder Chaudhary*
Baljit Saini**

In software reuse, we can use predefined software components in our new system. It will reduce cost as well as time. In hospital industry, there are some common modules which are used in hospitals. With the use of software reuse, we can increase the productivity of hospital information system. Reuse of stored data will give a powerful tool for hospital management and lead to improvement of hospital services.

Keywords: *Software, Reuse, Hospital, Productivity, Administration*

INTRODUCTION

Software reuse has been gathering the attention of software industry due to potential to revamp the software development process. The systematic use of the software reuse is practical and the industrial user data shows that it improves the productivity and quality of the software. Software reuses play an important role in hospital information system.

SOFTWARE REUSE

Software reuse is the process of creating software systems from existing software assets rather than building software systems from scratch. Assets can be software components, objects, software requirement analysis and design models, domain architecture, database schema, code documentation, manuals, standards, test scenarios and plans. It may occur within software system, across similar systems or in widely different systems. Software professionals have recognised reuse as a powerful means of potentially overcoming the problem of software crisis. Software reuse demands that existing components must be readily incorporated into new products. The productivity gain from reuse comes from integrating previously written components into new software projects.

* Assistant Professor, Department of Hospital Management, H.N.G. University, Patan, Gujarat
** Lecturer, Department of Computer Engineering, K.D. Polytechnic, Patan, Gujarat

The benefits of software reuse include the following:

- It increases the software productivity and decreases the time required for the development of software.
- By using the technique of software reuse, a company can improve software system interoperability and needs less people for software development; this provides a competitive advantage for the company and helps to produce better quality software and standardised software.
- Software reuse helps the company to reduce the costs involved in software development and maintenance. By using it, the software developers can be moved from one project to the other project easily.
- Using well-tested components increase the reliability of a software system. Moreover, the use of a component in several systems increases the chance of errors being detected and strengthens confidence in that component.
- Software reuse reduces the risk involved in software development process.
- Since the documentation is very important for the maintenance of a system, reusing software components reduces the amount of documentation to be written.

The following are software reuse approaches:

- Design patterns used in software development
- Component-based development
- Application framework used in software development
- Legacy system
- Service-oriented systems
- Software architecture

Software Component

An individual software component is a module that encapsulates a set of related functions or data. Component reuse is process of creating new software applications from existing components rather than designing and building them from scratch. Reusable components can be analysis document, design documents, software code, user interfaces, user documentation, or any other items associated with software. All the products of software life cycle model can be reused.

HOSPITAL INFORMATION SYSTEM

The purpose of a hospital information system (HIS) is to manage the information that health professionals need to perform their jobs effectively and efficiently.

Departments in Hospital Management System

Hospital management system is the state-of-the-art software that provides solution to healthcare industry. Hospital management system consists of various modules. The software application covers every aspect of hospital administration and management processes. The HMS is prepared keeping in mind the need to provide all relevant information in a hospital at the disposal of the hospital administrator to take effective decision with regard to patient care, hospital administration and finances. All the modules are integrated with each other. The following modules are mainly used in health care industry.

Hospital Administration

1. Stores
2. Payroll and Personnel
3. Security and Administration
4. HR Management
5. Equipment Management
6. Facilities Management
7. Case Sheet Management
8. Housekeeping and Laundry
9. Diet and Kitchen
10. Help Desk

Hospital Financials

11. General Ledger
12. Accounts
13. Materials Management
14. Payroll
15. Fixed Assets
16. Automated Daily System Close

Clinical Support

17. Computerized Physician Order Entry (CPOE)
18. Inpatient EMR

Patient Management

19. Appointments and Scheduling

20. RADT (Registration, Admission, Discharge and Transfer)
21. Patient Billing
22. Nursing Station and Ward
23. Management
24. Patient Portal

Ancillaries

25. Pharmacy Management
26. Operating Theatre Management
27. Emergency Department
28. Management
29. Radiology Management
30. Laboratory Management
31. Blood Bank

Interfaces

32. Patient Monitoring Systems
33. Laboratory Instruments
34. Imaging Equipment
35. Biometric Devices
36. Attendance Recording Devices
37. Barcodes and RFID
38. Smart Cards
39. Payment Gateways
40. Health Exchanges
41. Other Healthcare IT Systems

Decision Support

42. Clinical Decision Support
43. Clinical Pathways
44. Outcome Management
45. Case-Mix Management

46. Drug Formulary Management
47. Business Analytics

Common Departments in Hospital

Hospitals vary widely in the services they offer and therefore, in the departments they have. The following are the common departments in hospital.

- ***Accident and Emergency:*** It is a department specialising in acute care of patients who don't have a prior appointment and who come to the hospital either by their own means or by ambulance.
- ***Intensive Care Unit (ICU):*** It is a specialised department in a hospital that provides intensive care medicine.
- ***Operating Theatre:*** It is a room where operations are performed.
- ***Radiology or X-Ray:*** It is a department where radiographies are taken to patients.
- ***Laboratory:*** It is a place equipped for experimental study or for testing and analysis.
- ***Outpatients' Department:*** It is a department where you can find those patients who are not hospitalised overnight but who visit a hospital or a clinic for diagnosis or treatment.
- ***Kitchen:*** It is a place aimed at cooking and serving food.
- ***Pharmacy:*** It is a place where medicines are compounded or given out.
- ***Technical Services:*** It is a department that manages and maintains hospital facilities and critical services.
- ***Blood Bank:*** It is a place for storage of blood or plasma.
- ***Administration:*** It is a place where the execution of something is directed.

Benefits of Software Reuse in Hospital Management System

Some of the benefits of software reuse in hospital management system are as follows:

- Increase software productivity
- Shorten software development time
- Improve software system interoperability
- Develop software with fewer people
- Move personnel more easily from project to project
- Reduce software development and maintenance costs
- Produce more standardised software

CONCLUSION

Software reuse increases productivity and provides a powerful competitive advantage. Pre-defined software components will reduce cost as well as time in hospitals. It also facilitates to adopt some common modules very easily in the hospital information system.

References

1. Adams, R. (1993), "An Experiment in Software Retrieval", Proceedings of 4th European Software Engineering Conference (ESEC'93), Germany, vol. 7(7), pp. 380-396
2. Basili, B.R. and Rombach, H.D. (1991), "Support for Comprehensive Reuse", IEEE Software Engineering Journal, vol.6 (5), pp. 303-316
3. Burton, B., Aragon, R., Bailey, S., Koehler, K., and Mayes, L. (1987), "The Reusable Software Library", IEEE Software, vol. 4(4), pp. 25-33
4. Frakes, W.B. and Kyo Kang (2005), "Software Reuse Research: Status and Future", IEEE Transactions on Software Engineering, vol.31 (7), pp. 529-536
5. Prieto-Diaz, R. and Freeman, P. (1987), "Classifying Software Reusability", IEEE Software, vol. 4(1), pp. 6-16
6. http://www.cdacnoida.in/HIS/
7. http://www.gujaratinformatics.com/hmis.html
8. http://www.gujaratinformatics.com/hmis.html

14

Global Leadership
Adapt, Meet Challenges and Manage Change

Emmanuel D. Jadhav*

Leaders survive and excel because they participate in a lifelong learning process. In the context of a global healthcare system, the learning process is integral as it engages with cultural, social and historical situations. One of the ways leaders can prepare to address the complex and changing demands in critical care services is through competency-based instruction. This highlights the dissociation between positional leadership, which comes from position in the organisation, expert leadership that derives its power from technical knowledge and situational leadership that emerges from the organisational environment.

Keywords: *Healthcare, Leadership, Change, Public Health, Vision*

INTRODUCTION

In a healthcare system, especially the public healthcare system in which services are delivered through the complex interaction of health care providers and insurers, community-based organisations, educational institutions, law enforcement and public safety agencies, businesses, and other organisations through which local health departments operate; enormous pressure is exerted on the leadership. While emerging infections and deadly pathogens seem only a plane flight away, the traditional threats of infectious diseases, maternal child care and infection control to modern concerns of chronic diseases and terminal communicable diseases probably exert an influence on the cost of health care leading to a drain on a strained public healthcare system. This strain makes for a burden that can rest on leaders that can manage innovatively in turbulent times.

To contextualise the nature of our times, we can consider ourselves to be living in 'volatile times in an increasingly morally ambiguous world'. Our current practices may be able to solve

* Assistant Professor, Department of Health Management and Policy, University of Kentucky, College of Public Health, Wilmore, Kentucky

"technical" or routine problems, but the new century needs practices that can adapt to new problems in which solutions do not already exist. The new mantra for global leaders could be said to be that of adaptation to complex processes and becoming attuned to the environment to create relationships that synergise to form complimentary organisations and environment fit. This in the context of public health which is becoming increasingly interdisciplinary and heavily reliant on skills in government, policy, media, economics, sociology, ethics and other dimensions that expand beyond the scope of preventive health care reemphasise the need for innovative practice of leadership. This commentary discusses some key leadership themes and explores the dimensions of global public health leadership.

GLOBAL HEALTH LEADERSHIP

Leaders exist on both ends of the organisational hierarchy exercising power, authority and influence irrespective of their position. This implies that leadership is both a function of the social situation and individual personality. Studies have identified that both social and individual elements adequately establish leadership as a core function of management that is independent of managerial expectations and individual attributes. Providing the latitude to define leadership in the global context as the ability to adapt, meet challenges and manage change that takes organisations and society as an whole to adapt innovatively to achieve success for both the organisation as a representation of society and members that make up that society.

In healthcare, the rise of chronic diseases is overwhelming the healthcare system of the 21st century. Preventive strategies to contain chronic diseases find resonance in the essentials of public health services. Global health leaders thus have before them the task of inducing critical behavioural changes at a macro level. Leaders themselves have the task of changing their own long standing behavioural patterns and provide leadership to self to adapt to the environment and adopt healthy behaviours. Therefore, both institutional and individual care providers face the task of adapting to the needs of care that are different from what they are trained to provide which results in a situation of conflict since neither are mandated to extend themselves beyond their scope of care. Their ability to steer steadily and adapt to the pace of change to emerge in conformation with the goals of the individual and healthcare organisation in an effective and efficient way is reflective of leadership. Leadership in public health requires stretching the mind and soul in almost unimaginable ways. Leadership is a core function of management which is supported by managerial executive function. This implies that the direction of a formal organisation rests in the hands of a select cadre of management that collectively provide leadership, apparently then the organisation is only as good as its leadership. Leadership promotes vision, creativity and change whereas management promotes stability, order and problem-solving capabilities within the structure of an organisation.

Reviewing leadership literature through the perspective of evolutionary origins King, Johnson and Van Vugt observed five major transitions in the evolution of human leadership. These suggest that (a) leadership emerged as a mechanism to solve simple group coordination problems where an individual initiated an action and others followed; (b) it fostered collective action in situations involving significant conflicts of interest in which dominant or socially important individuals emerged as leaders; (c) dominance was attenuated in early human egalitarian societies which paved the way for democratic and prestige-based leadership facilitating group coordination;

(d) the increase in human group size selected for powerful social-cognitive mechanisms such as theory of mind and language, providing new opportunities for leaders to attract followers through manipulation and persuasion; and it was (e) the increase in social complexity of societies that took place after the agricultural revolution that produced the need for more powerful and formal leaders to manage complex intra- and intergroup relations — the chiefs, kings, presidents and CEOs — who at best provide important public services and at worst abuse their position of power to dominate and exploit followers. The leadership function has evolved over time from solving simple group coordination problems and fostering collective action in situations involving significant conflicts through democratic and prestige-based leadership to facilitating group coordination by powerful social-cognitive mechanisms to provide important public services at its best or dominate and exploit followers at its worst. This is probably the most neutral definition of leadership accounting for both positive and negative outcomes based in leadership that underscores the importance of general influence without exploring the means by which influence is exercised.

THEMES IN LEADERSHIP

Traditionally, the concept of social influence has dominated leadership literature. The traits of intelligence, values, confidence and appearance within individuals that lead were extensively observed and reported to understand good leaders that had significant followership. Implying that leadership occurs when others willingly adopt, for a period of time, the goals of a group as their own and persons can require others to do their bidding through persuasion and not dominance are leaders. Based in the behavioural approaches to leadership, the Ohio State studies identified consideration as the behaviour describing the leaders' ability to be sensitive and respectful to employees to establish mutual trust and initiating structure as the leader's behaviour towards task orientation and directing employee activity towards achieving organisational goal. The Michigan studies identified job-centred leaders whose focus was on achieving productivity while keeping costs low; and employee-centred leaders who focused on the human needs of individuals in the organisation. These two studies helped formulate the leadership grid which along the key developmental concepts of people concern and production concern proposed five major management styles: (i) impoverished management, (ii) country club management, (iii) authority-compliance management, (iv) middle-of-the-road management and (v) team management. Organisations however are dynamic and so is human development which interacts with one another sometimes creating conflict. Leaders have adapted to the constant nature of change and new leadership styles evolved. Some of these are categorised under contingency theory as situational theory and contingency theory. Accepting the dynamism of time and its effects on leadership style studies observing the interaction between the leaders' personality and followers needs have established key themes of leadership. Some of these themes are about leaders as creators of vision, creators of organisational culture, their interaction with followers and the transactional and transformational leadership styles.

As creators of vision, leaders are expected to set the direction of the organisation. According to the study about leadership vision by Bennis and Nanus, vision is defined as the leader's capacity to create and communicate a compelling picture of a desired state of affairs, to impart clarity to this vision (paradigm, context and frame) and induce commitment to it. They proposed that

leaders must in the form of a clear statement or tentative plan develop a vision that outlines the future state of the organisation and clearly communicate it to organisation and in detail to the key stakeholders. Leadership must inspire and motivate individuals by their organisational vision. These are the underlying fundamentals of charismatic leadership. Charismatic leaders are characterised by their ability to understand and empathise with organisational mood and by empowerment of subordinates create trust to achieve the lofty visions collectively. The leaders set up the vision and motivate the individuals within the organisation to collectively achieve this vision; much of the success in this is embedded in the leader's charisma.

The leader is also the creator of culture and is responsible to inculcate into the fabric of the organisation the values and beliefs of the organisation. According to Schien, organisational culture is defined as a pattern of basic assumptions invented, discovered or developed by a given group as it learns to cope with its problems of external adaptation and internal integration that has worked well enough to be considered valid and, therefore, to be taught to new members as the correct way to perceive, think and feel in relation to those problems. To establish this value system, the leader primarily through self-practice and teaching may use a variety of approaches driven by the path-goal theory that serves to reduce anxiety amongst organisation members. By participative leadership, the leader encourages group discussion and written suggestions to develop collectively the organisational value system, and provides support to individuals to guide them in this value system by being accessible and empathetic to individual needs using the supportive leadership style. Direction through planning, outlining behaviour standards, setting performance goals and directing task expectations the leader provide directive leadership that is complemented by achievement-oriented leadership which stresses on high-quality performance and improvement over current performance.

Interaction with followers enables the leader to understand the followers and identify good followers who may have leadership traits to hone and prepare the succession management team. The significance of this relationship was first recognised by Homans who proposed that the leader purchases influence over others at the price of allowing one's self to be influenced by others. Suggesting that acceptance of leader influence is contingent upon a process of exchange in which both the group members and leader give and take resources. Followers are categorised into five main categories. They are (i) the alienated follower who is capable, independent and a critical thinker but from past experiences of setback or broken promises focus on the shortcomings of the leader and do not participate in problem solving (ii) the conformist follower who actively and willingly is in a relationship with the leader but does not use critical thinking skills (iii) the effective follower is both critically enabled and actively involved in the relationship with the leader and are capable of self-management and do not avoid risk or conflict (iv) the passive follower has neither independent critical thinking nor active participation and accomplishes tasks only with supervision and (v) the pragmatic follower has qualities of all four follower types and uses the best followership style to minimise risk and benefit their own position. It is the reciprocal relationship between the leader and follower that mutually enhances each other's roles and therefore the interaction with followers will determine the direction of the organisation irrespective of the leadership capabilities.

The transactional and transformational leadership styles have the ability to positively predict a wide variety of performance outcomes at the individual, group and organisational level

variables. It is one of the fundamental themes of leadership consistently referred to and drawn upon since the time it was first published by Burns from his characteristics of political leaders' study. When one person takes the initiative in making contact with others for the purpose of an exchange of something valued, leaders approach followers with an eye towards exchanging and transactional leadership takes place. The result of transforming leadership is a relationship of mutual stimulation and elevation that converts followers into leaders and may convert leaders into moral agents. Whereas transformational leadership is based on more than the compliance of followers; it involves shifts in the beliefs, the needs and the values of followers.

DIMENSIONS OF LEADERSHIP IN GLOBAL PUBLIC HEALTH

One of the key requirements of global leaders is the generalist's approach who can appreciate the enormous variety of problems affecting the health of populations and the use of several interacting strategies to promote health and prevent disease, or to facilitate treatment when prevention has failed. As public health deals with assessment, assurance and policy development, it embraces a wide spectrum of disciplines that requires discipline proficiency and administrative expertise. This places upon the leaders an unrealistic expectation which can take away from the ability to perform making it very important for leaders to understand their limitations within their roles. As with any discipline it will almost impossible to have any one single leader with all requisite skill and resources to manage the complexities of assuring and assessing the health of the public. Leadership can be a perception that plays a part in the way people attempt to make sense out of organisationally relevant phenomena and in this sense-making process, leadership has assumed a romanticised larger-than-life image. In the context of this paper, I will explore public health leadership against the backdrop of adaptive leadership and define key dimensions for public health. Dimensions of public health leadership in this context are ambiguity, crisis, communication, interdependence and the public in public health.

Ambiguity is always one's companion in public health, a field characterised by partial knowledge and uncertain outcomes. Controlling disease outbreaks versus establishing guidelines for local restaurants and food suppliers to planning immunisation programmes versus providing healthcare and multiple other areas of work, the field is so vast that a situation can arise from a completely unknown or unaccounted source. The field of public health constantly works with ambiguity. It does not have an exhaustive existing database of evidence backed empirical interventions or observations. However, leaders need to be prepared for any situation. They need to make decisions with incomplete or minimal information. This ambiguous environment requires adaptive work in which there are no clear fixes or problem definitions. This is against the grain of leadership understanding since leaders are the ones who are expected to have the answers whatever be the situation. To be aware of this ambiguity would be the first step in applying the adaptive principle of leadership.

Crisis in the 21st century have become an inseparable part of lives. They have no more boundaries or border limitations. With the recent spate of crisis situations in the anthrax attacks, hurricane Katrina and SARS, there is an intentional effort directed in not taking any situation for granted. Crisis management has reached a new level of significant, singular attention promoting systematic preparedness across all organisations – public or private – that are geared to this effort. Crisis

leadership is not an independent activity in itself rather a conglomeration of organisational interdependencies that work together merging activities to achieve an advanced reporting system.

Interdependence both inter- and intra-departmentally is essential in the 21st century public health department. Departments cannot work in silos and block themselves to the surrounding environment; especially in the healthcare system that is traditionally accustomed to working independently. In the backdrop of crisis that has affected multiple parts of the nation, no one department can isolate itself and expect to not share their resources. It is critically necessary for leadership to understand the interconnectedness of all activities at some level. The cascade of interactions that could be triggered may have repercussions across the board and isolation would only help to isolate the organisation from the richness of diversity of expertise and resources.

Probably there is no other discipline of work that needs an intentional effort in succinct communication than public health. Marketing and communication though inherent in the nature of work in public health is probably the area which is taken for granted the most. It is a painstaking effort at most times to succinctly communicate what public health implies let alone the disciplines that make up the discipline. To get the message across as clearly and intentionally as possible, public health leaders need to use the art of communication to increase the awareness of public health and its role in society. Working in conjunction with mass media public health leadership needs to be aware of the differences between the objectives of mass media communication to get across the point as succinctly as possible to make a lasting impact.

To understand the public in public health is important to leadership. As noted by Keohane "the leader is always on duty, always on stage and anything he/she does is inescapably interpreted not as a private action, but as representing the organisation itself". The intensity of this kind of scrutiny associated with any position of leadership, let alone public health can be damaging. As with most decisions, there will be two sides; those for whom it is a benefit while for the other it may reflect a loss. It is imperative that leadership should be prepared to be the public leader.

CONCLUSION

The dynamic nature of public health and inability to control the natural environment necessitates global health leaders who can adapt, meet challenges and manage change. Leadership studies have identified several attributes that are significant to the overall development of the leader. However, the ability to be flexible and adapt to the environment of the organisation is most essential and is of highest attainable value for an effective leader. This ability to adapt will drive the philosophy of change management and crisis management to effectively guide an organisation. Keeping the themes of leadership constant and engaging in leadership roles as visionaries and agents of culture change along with managing interaction with followers and using leadership styles is essential for well-rounded leaders.

Leaders who rise to the top are characterised much more by their administrative qualities than by their science or technical knowledge. Understanding the dimensions of global public health in the context of ambiguity which lurks around as a constant companion, along with crisis management and efficient planning systems that have flexible span controls to facilitate working across situations outside defined boundaries. To be aware of the inherent nature of interdependence and be intentional in creating silos of work along with managing succinct

communication to reach out effectively to the public they work with is critical to positioning the public health department in the social context. Along with being fully aware of their roles as leaders who are responsible and accountable to the public would facilitate the leader's ability to have an attitude of service driven by the philosophy of adaptability to overcome the challenges and manage change.

References

1. Boggs GR, Kent EL. Presidents Academy: An Evolution of Leadership Development. New Directions for Community Colleges. 2002;2002(120):51-58. doi:10.1002/cc.89
2. Wright K, Rowitz L, Merkle A, et al. Competency Development in Public Health Leadership. Am J Public Health. 2000;90(8):1202-1207
3. Paul K H. Embracing the Strength of the Public Health System: Why Strong Government Public Health Agencies are vitally Necessary but Insufficient. Journal of Public Health Management Practice. 2002;8(1):98 - 100
4. Bloom BR. Public Health in Transition. Scientific American. 2005;293(3):92-99.Parks SD. Ledaership can be taught: A Bold Approach for a Complex World. Boston MA: Harvard Business Review Press; 2005
5. DeCrescenzo P. Leadership can be taught. [Review of the book Leadership can be taught: A Bold Approach for a Complex World, S.D. Park]. 2011. Available at: http://www.nclp.umd.edu/resources/bookreviews/BookReview-Leadership_Can_Be_Taught-DeCrecenzo-2011.pdf. Accessed April 27, 2012
6. Koh HK, McCormack M. Public Health Leadership in the 21st Century. Center for Public Leadership. 2006. Available at: http://dspace.mit.edu/handle/1721.1/55951. Accessed April 27, 2012
7. Srinivasan J, Holsinger JW. The yin–yang of Followership–Leadership in Public Health. Journal of Public Health. 2011;20(1):95-98. doi:10.1007/s10389-011-0438-y
8. Gibb CA. The Principles and Traits of Leadership. The Journal of Abnormal and Social Psychology. 1947;42(3):267
9. King AJ, Johnson DDP, Van Vugt M. The Origins and Evolution of Leadership. Current Biology. 2009;19(19):R911-R916. doi:10.1016/j.cub.2009.07.027
10. Bargal D, Schmid H. Recent Themes in Theory and Research on Leadership and their Implications for Management of the Human Services. Administration in Social Work. 1989;13(3-4):37-54. doi:10.1300/J147v13n03_03
11. Hogan R, Curphy GJ, Hogan J. What we know about Leadership: Effectiveness and Personality. American Psychologist. 1994;49(6):493
12. Bennis WG, Nanus B. Leaders: The Strategies for Taking Charge. New York: Harper & Row; 1985
13. Schein EH. Organizational Culture and Leadership: A Dynamic View. 1st ed. San Francisco: Jossey-Bass; 1985
14. Homans GC. Social Behavior: Its Elementary Forms. Harcourt, Brace & World; 1961
15. Burns JM. Leadership. New York: Harper & Row; 1978

16. Kuhnert KW, Lewis P. Transactional and Transformational Leadership: A Constructive/ Developmental Analysis. Academy of Management Review. 1987;12(4):648 - 657

17. Roemer MI. Preparing Public Health Leaders for the 1990s. Public Health Rep. 1988;103(5):443-452

18. Meindl JR, Ehrlich SB, Dukerich JM. The Romance of Leadership. Administrative Science Quarterly. 1985; 30(1):78-102. doi:10.2307/2392813

19. Keohane NO. On Leadership. Perspectives on Politics. 2005;3(04):705-722. doi:10.1017/S1537592705050395

20. Wren DA, Bedeian AG, Breeze JD. The Foundations of Henri Fayol's Administrative Theory. Management Decision. 2002;40(9):906–918

15

Strategy as a Discipline for Healthcare Organisations

J. P. Pattanaik*
Kasturi Ghosh*

Strategic management as a distinct practice has evolved over the years. A practice which was usually limited to key top executives in an organisation is been evolving as a distinct discipline. Organisations have established hierarchies like any other practice. Strategy as a distinct discipline is yet a reality in most healthcare organisations. It is imprecisely considered as part of business development activities or just top management activities. Now, healthcare organisations have learned the benefits of a professional approach towards strategy formulation and implementation from other organisations.

Strategy is about setting yourself apart from the competition. It's not just a matter of being better at what you do – it's a matter of being different at what you do.

– Michael E. Porter

Keywords: *Healthcare, Strategy, Performance, Customers*

INTRODUCTION

Strategy is a high-level plan to achieve one or more goals under conditions of uncertainty. Henry Mintzberg from McGill University defined strategy as a pattern in a stream of decisions to contrast with a view of strategy as planning while Max McKeown (2011) argues that strategy is about shaping the future and is the human attempt to get to desirable ends with available means. Dr Vladimir Kvint defines strategy as a system of finding, formulating and developing a doctrine that will ensure long-term success if followed faithfully.

Ever since Michael Porter conceptualised many strategic management theories, it has gained its popularity as a discipline in organisations of different nature. Organisations have recognised the importance of strategy in setting up long-term objectives and in achieving the same in an effective manner. Traditionally, key decisions are being made by a handful of senior executives in any organisation based on the information available. The communication has been unidirectional

* Healthcare Professionals, Hyderabad

– top to down. Strategy is a methodical approach driven by thorough research and probable risks associated with the path followed and its outcome. Thus, it focuses on achieving the best possible outcome with optimum utilisation of resources.

Strategy has evolved as a practice unit in most industries. However, strategy as a distinct practice in healthcare organisations is still in nascent stage and taking baby steps.

SCOPE AND BASIC CONCEPTS IN STRATEGY

The scope of strategic management is rapidly evolving. From few basic concepts to a distinct discipline, the journey has been really long. The various dimensions of strategic management include concepts of strategic management, models and frameworks of strategic management, strategy implementation, technology innovations, international business strategy, corporate governance, entrepreneurship and new ventures, change and transformation, mergers and acquisitions and the like. The table below provides an overview of changing dimensions of strategy:

TABLE 1: ALTERNATIVE VIEWS OF STRATEGY

The Implicit Strategy Model of the Past Decade	Sustainable Competitive Advantage
• One ideal competitive position in the industry	• Unique competitive position for the company
• Benchmarking of all activities and achieving the best practice	• Activities tailored to strategy
• Aggressive outsourcing and partnering to gain efficiencies	• Clear trade-offs and choices vis-à-vis competitors
• Advantages rest on a few key success factors, critical resources, core competencies	• Competitive advantage arises from fit across activities
• Flexibility and rapid responses to all competitive and market changes	• Sustainability comes from the activity system, not the parts

Source: Adapted from 'What is Strategy?' by Michael E. Porter, HBR, November – December, 1996

A few popular strategic concepts have been revisited briefly to understand the essence of components of strategy formulation and implementation.

PORTER'S FIVE FORCES THEORY FOR THE STRUCTURAL ANALYSIS OF INDUSTRIES

The essence of Porter's five forces theory states that it is not just the supply and demand that determine an industry's sustainability, rather a set of several factors determine an industry's overall sustainability and profitability. The factors or forces are as follows:

- Threat of new entrants
- Threat of substitute products and services
- Bargaining power of suppliers

- Bargaining power of buyers
- Rivalry among existing firms

The collective strength of these forces determines the ultimate profit potential in the industry and sustainability in a long term. These forces are dynamic in nature, thus an organisation need to continuously assess its industry position and revisit the strategies to the fast-changing industry demands. Porter's theory is an eye-opener for the practitioners and has given a whole new perspective to strategic thinking.

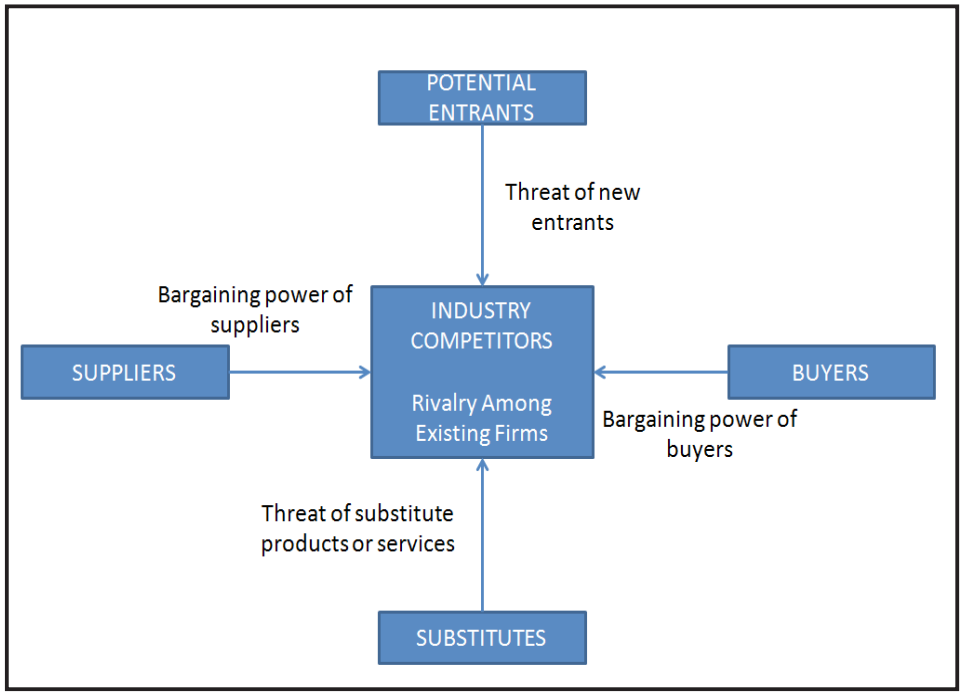


FIGURE 1: FORCES DRIVING INDUSTRY COMPETITION

Thorough understanding of these factors is important for a strategy practitioner to understand organisational challenges and formulate strategies accordingly.

BALANCE SCORECARD

Balance scorecard was developed by Robert S. Kaplan and David P. Norton. Balance scorecard is a fast but comprehensive view of the business. It is called "balanced" because it tries to distribute the goals and the indicators equally on four balanced perspectives without bias to any of them: financial, customer, internal business processes, and innovation and learning.

- How do customers see us? (Customer Perspective)
- What must we excel at? (Internal Business Perspective)
- Can we continue to improve and create value? (Innovation and Learning Perspective)
- How do we look to shareholders? (Financial Perspective)

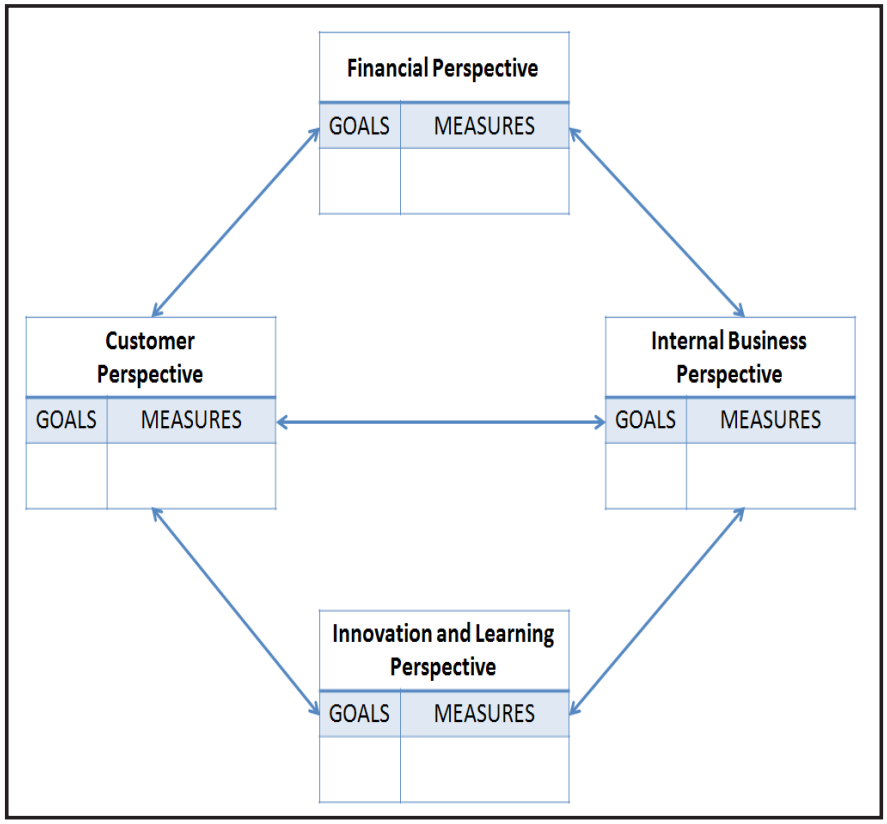


FIGURE 2: BALANCE SCORECARD

While giving business executives information from four different perspectives, the balance scorecard minimises information overload by limiting the number of measures used. The key objective of balance scorecard is to focus on key factors whose performance is critical for overall organisational sustainability. It is important to keep a balance among goals and the way they are being achieved. When one goal is achieved at the expense of others, it may not be in the best interest of the organisation.

STRATEGY DIAMOND

Donald Hambrick and James Fredrickson developed the 'Strategy Diamond' as a way to show what the actual bits and pieces of a strategy are and how they fit together. Strategy is about making important choices, and the real power of a strategy diamond is that it integrates important choices into a bigger picture, instead of as a piecemeal approach.

The beauty of a strategy diamond is that it can be applied anywhere and in any type of organisation.

The five key parts of a strategy are: arenas, vehicles, differentiation, staging and economic value. By answering key questions in each area, a picture of the required strategy can be painted with clarity.

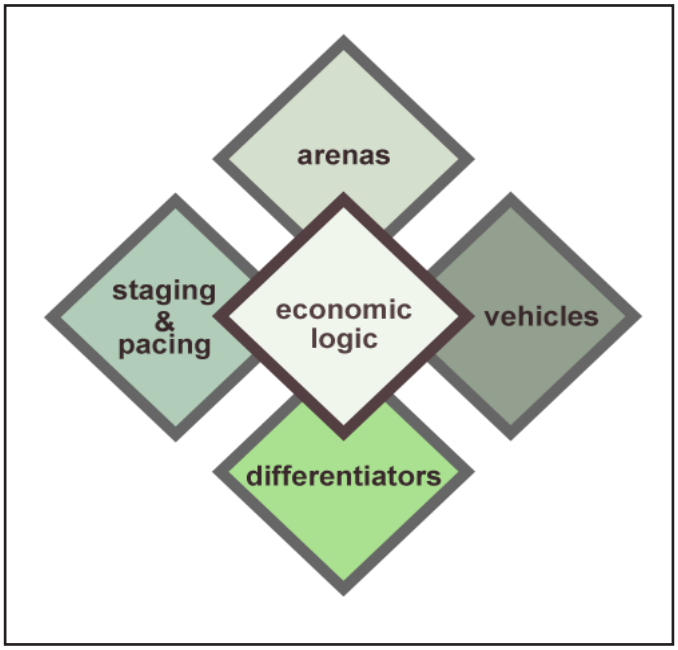


FIGURE 3: STRATEGY DIAMOND

1. ***Arenas:*** "Where will we be active and with how much emphasis?"
   - ❖ Which core technologies?
   - ❖ Which geographic areas?
   - ❖ Which market segments?
   - ❖ Which product categories?
   - ❖ Which value-creation stages?
2. ***Vehicles:*** "How will we get there?"
   - ❖ Acquisitions?
   - ❖ Joint ventures?
   - ❖ Internal development?
   - ❖ Licensing/franchising?
3. ***Differentiation:*** "How will we win?"
   - ❖ Customisation?
   - ❖ Image?
   - ❖ Price?
   - ❖ Product reliability?

4. ***Staging:*** "What will be our speed and sequence of moves?"
   - ❖ Speed of expansion?
   - ❖ Speed of initiatives?
5. ***Economic Value:*** "How will we obtain our returns?"
   - ❖ Lowest costs through scale advantages?
   - ❖ Lowest costs through scope and replication advantages?
   - ❖ Premium prices due to unmatchable service?
   - ❖ Premium prices due to proprietary product features?

(***Source:*** http://sourcesofinsight.com/strategy-diamond/)

BUSINESS MODEL CANVAS

The Business Model Canvas is a strategic management template for developing new or documenting existing business models. It is a visual chart with elements describing a firm's value proposition, infrastructure, customers and finances. It assists firms in aligning their activities by illustrating potential trade-offs. The Business Model Canvas was proposed by Alexander Osterwalder based on his earlier work Business Model Ontology.

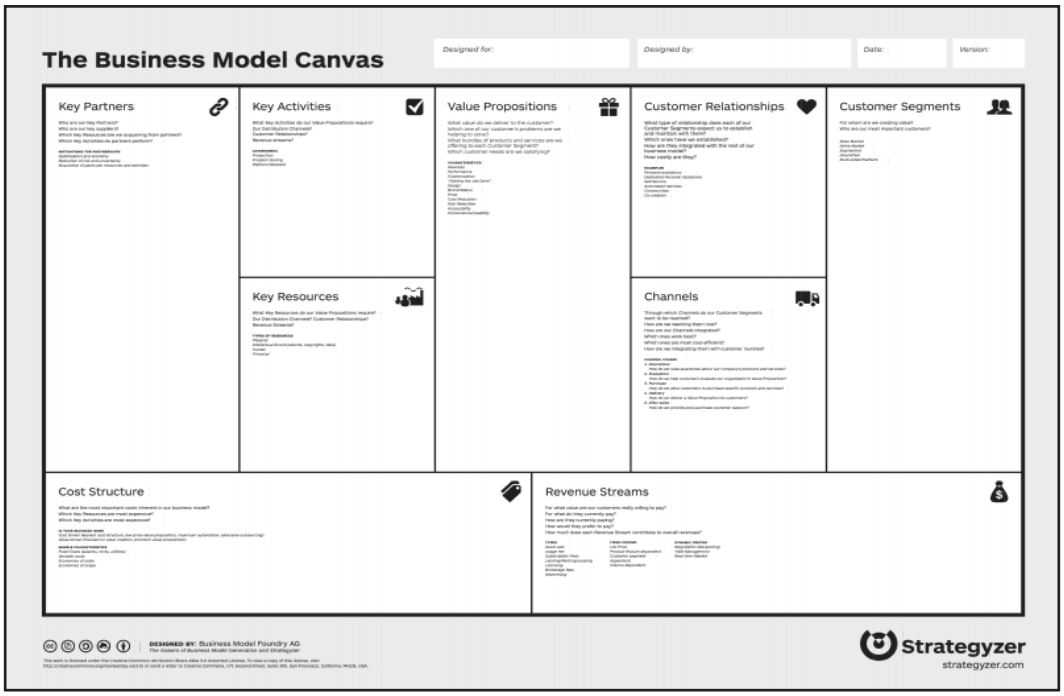


FIGURE 4: BUSINESS MODEL CANVAS TEMPLATE

From the basic concepts discussed above, one may conclude that strategic management relies on understanding of key factors that have maximum impact on overall organisational performance,

carrying out thorough research on strengths and weaknesses, identifying market opportunities, critically examining competitor's strategy and how to position the organisation in an ever-changing environment. Strategy is all about winning in the market place. It is important for the executives in healthcare organisations to have a thorough knowledge of basic strategic management concepts in addition to the knowledge of uniqueness of healthcare organisations.

HOW HEALTHCARE IS UNIQUE

Healthcare organisations, primarily hospitals are complex organisations and are different in many ways. It is a labour intensive organisation where a highly specialised team of doctors and other administrative staff work together for well-being of patients. Some of the key differences in healthcare organisations are as follows:

- Each patient is unique thus care need to be given uniquely.
- Defining and measuring outputs is difficult.
- The resources vary from skilled to highly non-skilled resources.
- Most of the functions are of emergency nature and so cannot be deferred easily.
- The consequences of error can be severe often a question of life and death.
- Activities by different groups are highly interdependent, requiring a high level of coordination.
- The work involves a high degree of specialisation.
- Employees are highly professional with a primary loyalty to the profession rather than to the organisation.
- The scope of effective organisational or managerial control over clinicians, who are most responsible for generating work and expenditure, is limited.
- There exist dual lines of responsibility which can create problems of coordination, accountability and confusion of roles.

STRATEGY AND HEALTHCARE ORGANISATIONS

Healthcare became recognised as an industry in early eighties, and has seen rapid progress over last three decades. Corporatisation has brought in adoption of management practices. Like any other corporate organisation, healthcare organisations have established different disciplines such as Human Resources, Marketing, General Operations, etc. However, strategic management seems to be a function limited to making key decisions by a handful of top executives. Current evolutions and challenges in the industry demands healthcare organisations to be more vigilant in thinking about organisational strategies. A good strategy requires an attempt to understand the ground realities, environment scanning, and trade-offs along the dimensions such as service, patient needs and patient access. Healthcare organisations also should be capable of adapting to the fast-changing environment. Thus, there is a need to review strategy constantly to remain viable. To win in the market place, healthcare organisations need to be more creative to sustain. The sustainability of any strategy can be adversely affected by increased buyer or supplier power,

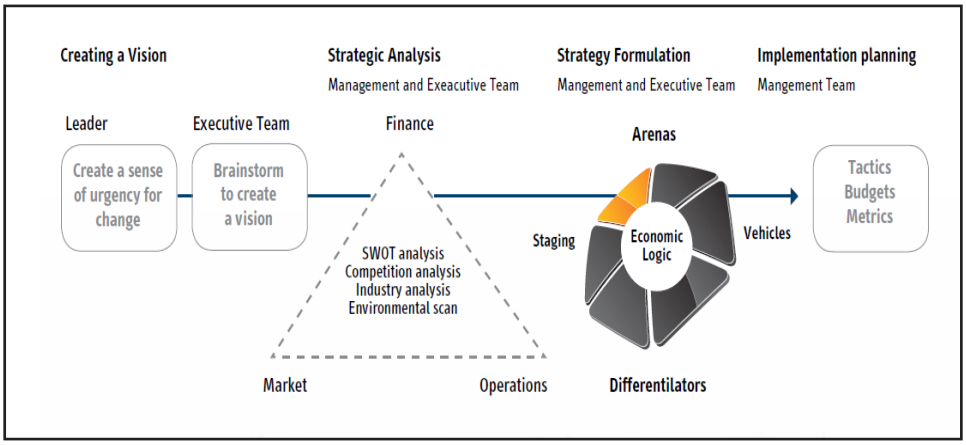
lowered barriers to entry, growing competitive rivalry, the threat of substitutes, and the like. By thinking more creatively, healthcare organisations can make trade-offs and select a focused strategic position. A well-designed strategy will help to sustain their performance in the face of changing environmental demands and competitive forces.

FRAMEWORK FOR STRATEGIC IMPLEMENTATION

Strategic Management experts have formulated many frameworks over the decades. The approach in achieving the end result may vary. However, one can see some commonalities in various formulated approaches. Below is a sample approach which the healthcare organisations can follow for strategy formulation and execution.

- Identify the Organisational Strategic Goals
  - ❖ Formulation of mission and vision statements
  - ❖ Statement on the key values to which the organisation is committed and strategic goals to ultimately achieve the vision
  - ❖ Establishment of strategic goals
- Analyse the Organisation's External Environment to identify Opportunities and Threats
  - ❖ Analysing the competitive forces within the industry
  - ❖ Understanding the opportunities and threats based on the analysis of competitive forces
  - ❖ Identification of the opportunities, and formulate and implement strategies to be more profitable
  - ❖ Identification of the threats, i.e. the conditions in the organisation's external environment that endanger the integrity and profitability of the organisation's business
- Analyse the Organisation's Internal Environment to identify its Strengths and Weaknesses
  - ❖ Identification of distinctive competencies which can act as the roots for organisation's competitive advantage. They are the strengths of the organisation which differentiate the products/services of the organisation from the competitors
- Formulate Strategies based on the Organisation's Strengths and rectify its Weaknesses to take advantage of External Opportunities and counter External Threats
  - ❖ Identification of strategies to take maximum advantage of the opportunities and strengths, minimise the impact of threats and rectify the weakness of the organisation
  - ❖ The strategies identified should be in accordance with the organisational statement and such that the goals of the organisation are met
- Implement the Strategies
  - ❖ Developing or modifying of the relevant policies and/or procedure as per the strategies identified

- ❖ Improving efficient and effectiveness of the processes
- ❖ Designing of new services and delivering them
- ❖ Change the culture within the organisation as per the strategies identified
- ❖ Allocate resources as per the strategies identified
- ❖ Develop annual operational goals in accordance with the strategic goals identified and development of action plan for each operational plan with deadlines



Source: Adapted from Practical Techniques for Strategic Planning in Health Care Organizations by Prathibha Varkey and Kevin E. Bennet

FIGURE 5: STRATEGIC PLANNING

CASE STUDY

Case Study 1: Mount Sinai Hospital Strategic Plan

The Mount Sinai Hospital Strategic Plan, 2010-2013, reaffirms the Hospital's long-standing commitment to excellence in patient care, teaching and research. Since its modest beginnings, Mount Sinai Hospital has developed a strong culture of excellence and caring and has established several leading, national and international programmes. The strategic plan sets the direction that Mount Sinai will take over the coming years to maintain and enhance its leadership position in these areas. In addition, the organisation believes by focusing on the patient experience and they will emerge as a stronger organisation, better positioned and prepared to deal with the challenges of health-care system.

The key business strategies are as follows:

1. Focus Centre of Excellence (CoE) on improving integrated team care and clinical outcomes
2. Advance translational research for personalised health care
3. Expand partnerships for coordinated care
4. Improved cost performance

The following are the key operating strategies:

1. A re-designed organisational structure to support the Centre of Excellence and the patient experience
2. A talent management strategy focused on leadership and interdisciplinary team development
3. Development of a fully integrated electronic patient record
4. Renewed facilities and equipment
5. Financial health

Case Study 2: The Sydney Children's Hospitals Network Strategic Plan 2012-2016

The establishment of the Sydney Children's Hospital Network (SCHN) in mid-2010 marked a defining moment in the delivery of health care, research and education to improve the health and well-being of children in NSW and beyond. As custodians of these services, the organisation has set a strategic direction to realise the benefits of coming together as a Network.

Charting a course for a new organisation is not without risks, so it is important to have a common understanding of the strategic directions and priorities of the organisation and work in partnership to achieve the following:

Vision: Children first and foremost

Mission: Working in partnership to improve the health and well-being of children through clinical care, research, education and advocacy

Values: Collaboration, Openness, Respect, Empowerment

The organisation will focus on a number of strategic areas to fulfil our aspiration to become world leaders in the field.

The strategic areas comprise the following:

1. Quality and Excellence
2. People and Leadership
3. Financial Sustainability
4. Infrastructure and Technology
5. Partnerships and Networks

Through a process of effective strategy implementation, the adoption of an integrated risk management approach, and monitoring and review of outcomes, the organisation is embarking on a journey that will firmly establish as leaders in health care delivery and place at the forefront of child health.

CONCLUSION

The practice of management theories has brought significant improvement in productivity and overall organisational performance. In today's dynamic and ever changing environment, organisations need to challenge themselves how to perform and achieve above average margins. Healthcare organisations cannot be exceptions. Learning and adapting the best management practices only improve the current position and help in capitalising new avenues. If strategy is practiced as a distinct discipline, healthcare organisations would truly benefit in improving the bottom line.

References

1. 'What is Strategy' By Michael E. Porter, HBR, November – December 1996
2. 'The Balance Scorecard – Measures that Drive Performance' By Robert S. Kaplan and David P. Norton, Best of HBR 1992
3. 'Practical Techniques for Strategic Planning in Health Care Organizations' By Prathibha Varkey and Kevin E. Bennet
4. Mount Sinai Hospital Strategic Plan 2010-2013
5. The Sydney Children's Hospitals Network Strategic Plan 2012-2016

16

Managing Operations in Healthcare Sector

A Review

G.V.R.K. Acharyulu*
Bhimaraya Metri**

This paper reviews the application of operations management concepts in the health care sector. There is urgent need to improve operational efficiency and effectiveness in the health care value chain. The review examines to identify on potential areas of hospitals which could exploit to improve their ability to meet the needs of the competitive market environment.

Keywords: *Healthcare, Strategy, Performance, Customers*

INTRODUCTION

The health care sector all over the world experiencing tremendous pressure to not only control the escalating costs, but also improve the quality of care it provides to its consumers.

Hospitals present an interesting improvement challenge. The clinical methods used in health care and disease cure are easily understood. Yet when combined into institutions and broadened into social systems, the management of them becomes surprisingly convoluted (Glouberman and Mintzberg 2001). From the viewpoint of operations management (OM) academics, there is a strong resonance between the need for dealing with the issue of sustainability in hospitals (even not-for-profit organisations must be able to manage their cash flow and deliver funds for reinvestment), the glut of resources required to run an inefficient system and the ability of core OM concepts to alleviate the situation.

OPERATIONS MANAGEMENT

At the core of operations management in health care, the topics discussed below are process flow and capacity management, process design, technology management, total quality management,

* Associate Professor, School of Management Studies, University of Hyderabad
** Professor, International Management Institute (IMI), New Delhi

lean manufacturing, supply chain management and operations strategy. These topics have not been diffused much into the health care setting.

Process Flow and Capacity Management

The achievement of improved process flow and the associated planning of capacity is one of the most fundamental OM preoccupations. Relatively simple techniques such as capacity and demand management have been shown to be useful in the health care environment. For instance, hospitals can achieve substantial improvement in patient flow and hospital throughput and reduction in unit costs through the application of techniques such as process mapping and simulation modelling. Henderson et al. (2004) report a successful implementation of a patient flow improvement project at St. John's Hospital located in Springfield, Missouri.

An important point for understanding and improving patient flow is to look at the whole system of care rather than the individual units in isolation. Coffey et al. (2005) investigate the use of critical paths to minimise delays and resource utilisation and to maximise quality of care. They document and show how critical paths developed through collaborative efforts of physicians, nurses, pharmacists and others help lower variation in the care provided, facilitate expected outcomes, reduce delays, reduce length of stay and improve cost effectiveness.

Process Design

The process design is the technique which has been deployed successfully in the manufacturing sector. Fundamental and radical change is not a concept that appeals in the health care environment. Continuous process improvement, which emphasises small and measurable refinements to an organisation's current processes and systems (sometime but not always linked to quality initiatives) has been more widely adopted. Process analysis has been a useful technique for pulling apart the relationships between clinical and managerial tasks. It is also one of the few techniques to be applied across the whole of the health sector (general medical practice, hospices, aged care provision, infrastructure, etc.) and not just in hospitals.

Technology Management

The clinical aspects of technology management are within the remit of clinicians, as they should be. However information technology (IT) as a supporting infrastructure is incredibly important. An effective IT infrastructure supporting key operational processes and management reporting is now seen as essential. Despite physician's reluctance to embrace the IT revolution, hospitals around the world are embracing internet and information technology to improve their client interface as well as to reduce the overall cost of providing quality care (Coile 2001).

RFID is a new technology in healthcare organisations. Insurance providers are interested in hospitals using RFID tags because the program could potentially hinder fraud. Because a patient's photo is printed on the card, the patient would not be able to give it to someone else for access to medical care. The PIN offers another form of authentication for a cardholder and would unlock the information stored on the card and in the central database. The new cards store a patient's demographic, insurance and emergency contact data, and basic medical information such as allergies. All the information is entered through a web-based interface and then loaded

on the card. The card body includes the patient's photo and name. While information will be stored on the card, some data will remain in an electronic database. The card will act as an electronic key to access the records.

Total Quality Management (TQM)

The quality gurus have transformed the way manufacturing is organised and the way products are created. It has been established within the literature that the successful implementation of quality relies heavily on the human factor. Most firms now believe that higher quality service and improved competitiveness will result from increased attention to issues within the organisation. It is understood that the implementation of any quality initiative should embrace a participatory management style, address the issue of changing attitudes and culture, employee involvement and empowerment together with investment in training, development and learning. These characteristics have not been evident though, in the quality improvement programmes implemented in the health care environment.

Shortell et al. (1995) suggest one noticeable difference between TQM applications in healthcare and other fields. The vast majority of applications in other fields of endeavour have been directed at the core processes of the firm in areas of greatest strategic priority. In contrast, in health care, the vast majority of applications to date have been in functions providing administrative support to patient care activities rather than directly addressing clinical processes themselves. This finding is to be correlated with the belief among the health care organisations that TQM is used for the sole purpose of cost containment; therefore the most evident area where it can be applied is administrative and other support functions.

Despite the enthusiasm raised by the potential benefits of TQM, many initiatives have not fully delivered the promised results. The reasons for failure can be traced to the "top down" implementation approach adopted (Bate et al. 2004), the insufficient support of health professionals, the lack of leadership commitment and the tendency to look at TQM in isolation rather than putting it at the core of the institution's strategy (Downey-Ennis et al. 2004).

Lean Production or the Toyota Production System (TPS) [B]

A key feature of TPS is the emphasis it places on employee empowerment, teamwork and other supportive personnel practices. Using the Toyota approach, for instance, the hospitals can deliver to patients exactly what they need when they need it, every time, error-free, in a safe environment at the lowest cost without waste. The most widely cited application of lean principles in a hospital setting is at the Canadian Hernia Repair Center, Shouldice Hospital (Heskett, 1993, Gunmesson, 2001). The hospital has designed its service around the needs of a single type of patient and makes its services available at a fraction of the total cost of alternative care facilities available to its patients. Through standardisation of its operating procedures and effective integration of strategy and systems, it has been able to offer exceptional care and value to its customers.

Supply Chain Management

More and more companies are recognising that managing a supply chain can pay big dividends in achieving cost containment and operational efficiency. Although supply chain management

has been extensively studied and researched in the manufacturing sector, significant research into the service sector is yet to come. In particular, research on how supply chain management concepts can be adopted to benefit health care sector is still in its infancy stage.

Tremendous opportunities exist for delivering significant improvements in the ability of hospital facilities, networks and other health care organisations to optimise the processes and work flows associated with materials management, and reduce the costs related to inventory and supply chain management (SCM). The health care value chain is plagued with many problems, including outdated and inaccurate data, laborious manual processes, lack of visibility into important order information, in addition to disparate IT investments levels among providers and suppliers, to name a few. Because supply spending represents up to 30% of a hospital's operating costs, second only to labour, many hospitals are striving to improve their materials management. Medical and surgical supplies present a huge target for cost savings.

Healthcare system today is a high cost system. There is continuous pressure to improve quality and responsiveness. Naturally, the patients are treated as if they are on a conveyor belt. Distributed supply chain management solutions in healthcare help in the efficient integration of the entire length of the supply chain comprising suppliers, warehouses, stockists and stores. Any merchandise that is purchased is done so in the right quantities to the right locations at the right time in damage-free conditions, thereby minimising total cost, subject to satisfying service requirements. Achieving strategic fit between the competitive strategy and supply chain strategy leads to effective supply chain management solutions that can decrease costs which has the same impact on profit as increase in revenue.

Operations Strategy

Shortell et al. (1985) define hospital business strategy as the selection of external markets and the services that the hospital would provide them with and the dimensions on which it would compete. Zelman and Parham (1990) characterises four strategies for hospitals in defining what business they are in: (i) a generalist strategy (ii) market specialist strategy where the hospital caters a wide range of services to specific markets, (iii) service specialist strategy which relates to a hospital providing specific services to a wide range of target groups, and (iv) super specialist strategy that refers to hospitals providing narrow range of services to a limited market. Hospitals would require different operational capabilities to support their mission and positioning in the market. It is important for hospitals to procure and allocate resources for the development of those operational capabilities which are aligned with the corporate mission.

The hospital operations strategy should be developed to support the hospital mission and business strategy, and help the hospital to gain competitive advantage in the market place. Operations strategy in the context of a hospital can be defined as a plan that configures and develops business processes which enable a hospital to serve and deliver quality care to their patients as specified by its business strategy.

CONCLUSION

Hospitals do not appear to strategically develop their operational competencies in a manner that fits with their mission. Resource allocation in hospitals tends to occur in an ad hoc fashion

without significant thought given to their wider repercussions. Successful improvement of health care operations has been localised. The large-scale implementations have been notable for their failure to achieve sustainable benefits. The approaches have been fragmented, reflecting the lack of an overarching objective and appropriate measures and incentives to align the various parties involved. Extensive application of operations management concepts within the health care sector will definitely improve the overall effectiveness and efficiency of the quality of care.

References

1. Bate, P., Robert, G., and Bevan, H. (2004). "The Next Phase of Healthcare Improvement: What can we learn from Social Movements?" Quality & Safety in Health Care, 13(1), 62-66
2. Bearnon, B.M (1998), "Supply Chain Design and Analysis: Models and Methods," International Journal of Production Economics, Vol. 55 pp. 281-2
3. Coffey, R. J., Richards, J. S., Remmert, C. S., and LeRoy, S. S. "An Introduction to Critical Paths." Quality Management in Health Care, 14(1), 46
4. Coile Jr., Russell C., Physician Executives straddle the Digital Divide, The Physician Executive, March- April, 2001
5. Glouberman, S., and Mintzberg, H. (2001). "Managing the Care of Health and the Cure of Disease - Part I: Differentiation." Health Care Management Review, 26(1), 56-69
6. Henderson, D. Â., Dempsey, C. Â., and Appleby, D. Â. (2004). "A Case Study of Successful Patient Flow Methods: St. John's Hospital." Frontiers of Health Services Management, 20(Issue 4), 25
7. Shortell, S.M., E. Morrison, S. Robbins, 1985, "Strategy making in Health Care Organizations: A Framework and Agenda for Research", Medical Care Review, Vol. 42, No. 2, Fall, pp. 219-266
8. Heskett, J.L., Shouldice Hospital Limited, Case 9-683-068, Boston, MA: Harvard Business School, 1993
9. Gunmesson, E., Are You looking forward to your Surgery? Managing Service Quality, 2001: 11:7-9
10. Zelman, W. N., and Parham, D. L. "Strategic, Operational, and Marketing Concerns of Product-Line Management in Health Care." Health Care Management Review, 15(1), 29

17

A Study on Radiology Services in Rural South India

Ramaiah Itumalla*

Radiology is a vital component in many patients' journeys. It is recognised that it is often a bottleneck with long waits, poor communication and lack of certainty and choice commonly reported. Radiological services in India are under pressure as a result of under-provision of equipment and manpower and increasing demand both in terms of numbers and complexity of investigations. Medical imaging utilisation in rural populations is very low, which may be a marker of poor access to medical imaging in rural areas. The objectives of the present study are to study the availability of the radiology services, cost, time and the quality of the radiology services, to study the satisfaction of the patients and to identify the factors affecting the demand for the radiology services.

The quantitative and qualitative research methodologies have been adopted for the study. Primary data was collected using structured questionnaire and the structured interviews from the patients and the doctors from hospitals/clinics located in the selected villages. The study found that though the routine lab investigations and the X-ray facilities are available to the rural people, they are not accessible and affordable to the modern diagnosis facilities such as digital X-ray, CT and MRI services. This study strongly suggests that the Teleradiology will be the best option to solve some of the issues faced by the rural people. The study identified key factors influencing demand for the radiology services.

Keywords: *Availability, Demand, Radiology Services, Satisfaction, Teleradiology*

INTRODUCTION

Radiology is an important component in patients' journeys. Radiological services in India are under pressure as a result of under-provision of equipment and manpower and increasing demand in terms of numbers and complexity of investigations. There has been recent additional provision of CT and MRI equipment, and changes in training and career structure are being implemented in an attempt to address this problem. Though these measures are important, they are not sufficient to solve the demand or capacity mismatch. Timely patient access to

* Research Scholar, School of Management Studies, University of Hyderabad, Hyderabad

radiology services is the key to the delivery of several major target areas in radiology services (Conall Garvey and Richard 2003).

Medical imaging utilisation in rural populations is very low. Access to appropriate services has implications for patient outcomes and for costs to the community in rural practice. For example, the use of ultrasound (US) in trauma may guide decisions regarding when (and how) to evacuate a patient from a rural setting; and its use in blunt trauma has had significant patient benefits (Freeman P, 1999). In addition, computed tomography is associated with better patient outcomes for extradural haemorrhage (Jones NR et al. 1993). Despite this, there is a projected shortfall of radiologists throughout India and in common with other medical services; it is likely that this will be felt disproportionately in rural communities. Most of the radiologists are based on urban areas. Therefore, the availability of radiology services to the rural population and the ability to access satisfactory radiology services by referring to third parties are both important issues in the health care of rural India. Despite the acknowledged clinical importance of radiology, an awareness of issues surrounding the rural radiology workforce and access to services and equipment, there is a paucity of information assessing the adequacy of rural radiology services in India.

RADIOLOGY SERVICES

Radiology services refer to those services and facilities that are used during the radiotherapy treatment procedure. These services include a range of medical treatments that are performed during diagnosis. The radiology services can be classified into technical support, expert support and external patient care amenities. For the best possible service, hospitals have to be equipped with dedicated radiology physicians, technical and supportive staff, advanced equipment, and optimal patient care and diagnostic assistance. Under the diagnostic procedures, physicians consider some radiological tests such as computed tomography (CT) scanning, magnetic resonance imaging (MRI), projection radiography, fluoroscopy, nuclear medicine, ultrasound, etc. These are the essential tests required for this minimally invasive therapy. To perform a CT scan, the doctor uses X-rays along with computing algorithms to view the image of the body. It is a kind of medical imaging method created by computer processing. In this method, a digital geometry procession is used to generate a three-dimensional image of the inside of the body. On the other hand, MRI scanner produces the same picture without using X-rays. In radiology, it is used to visualise the detailed internal structure and limited function of the body.

The MRI technology uses a powerful magnetic field with radio frequencies by which detailed pictures of organs, bones, tissues and other internal body structure can be accessed without using ionising radiation. MRI scans are used to produce the highest quality images of the soft tissues. This technology is beneficial for the imaging of the brain, breast cancer, spine and musculoskeletal system. Such detailed pictures enable physicians to evaluate parts of the body and certain types of diseases that may not be assessed in other methods. Another important radiological service is ultrasound or ultrasonography. It is an effective treatment modality that can visualise various organ systems with the help of high frequency sound waves. This technology is commonly used to examine veins, arteries, abdomen and female reproductive system. Some other specific radiological services are paediatric radiology, cardiovascular imaging, Central DEXA (Dual

Energy X-ray Absorptiometry), etc. Overall, there are large services under radiology treatment through which patient can effectively diagnose cancer and other fatal diseases.

LITERATURE REVIEW

The study of the radiology services has been attracting the attention of the scholars for the few years. In Australia, McLean and Condon (1999) assessed satisfaction with mammography screening in Darwin using a global four-point satisfaction scale, finding that the program was well-accepted by GPs; a similar global satisfaction rating was used to assess bone densitometer services in the UK. Franken EA Jr, Whitten P, Smith WL's (1996) Teleradiology Services for a Rural Hospital: A Case Study deals with interviews of administrators, technologists and physicians at the rural hospital, followed by a structured survey of all staff physicians. Responses were analysed both qualitatively and quantitatively. Both interviews and the survey indicated that teleradiology was perceived to be as accurate as on-site film interpretation. All other aspects of the service – efficiency, reports, communications and the overall contribution to patient care –were judged to be poorer than on-site radiology. They conclude that the provision of acceptable teleradiology requires considerable attention to all aspects of the radiology service, with attention to differences in institutional culture and mission, and to communicate.

Philipp DL, Wright DL, Killion J's (2006) Rural Radiology Services in Texas: An Assessment in Quality examines the quality of radiology services found in rural Texas hospitals as reported by radiology managers through online survey research in terms of staffing, radiologist availability, and quality control measures. Texas rural counties with fewer than 50 thousand citizens have only 9% of MRTs, 10% of LMRTs, and 12% of NCTs licensed to practice radiology imaging. Licensing all three levels of technologists through the some administrative bodies could result in more standard educational and training requirements, thereby increasing the quality of care given by these individuals. Patients saw at lower-volume rural facilities benefit from convenient scheduling and lower prices and are beginning to see faster reporting with the prevalence of teleradiology and voice recognition dictation.

The study on Teleradiology and Telemedicine of Goldberg MA (1996) provides a historical perspective as well as an update on the current state of teleradiology and telemedicine in the United States. Technical implementation issues are discussed and enabling technologies are described. Considerations that impact network design are outlined, including data transmission, data compression, applicable standards, and bandwidth requirements. Reimbursement, medico-legal, licensure and regulatory issues related to the delivery of teleradiology and other telemedicine services are reviewed. Insight is provided into the role of teleradiology and telemedicine in a changing health care environment. Neither of these work studies specifically the radiology services in rural India. However, the present study "A Study on Radiology Services in Rural South India" is intended to study the radiology services such as digital X-ray, CT scan and MRI in rural south India.

OBJECTIVES OF THE STUDY

The objectives of the present study are as follows:

- Studying the availability of the radiology services, cost, time and quality

- Studying the satisfaction of the patients with the radiology services
- Identifying the factors affecting the demand for the radiology services

RESEARCH METHODOLOGY

For the present study, the quantitative and qualitative research methodologies have been adopted. Primary data was collected using structured questionnaire and the structured interviews from patients and doctors from hospitals/clinics.

Sampling Method

All the hospitals/clinics located in the rural villages of Kanyakumari and Trivandrum districts are considering the population of the study. The convenient sampling method has been adopted for the selection of the villages. The random sampling method has been adopted for the collection of the data from the patients. By convenience sampling method, 40 panchayats are selected, i.e. 20 from Kanyakumari and another 20 from Trivandrum to conduct the survey. The data collected from five patients from each hospital/clinic located in the selected panchayats.

DATA ANALYSIS

The general characteristics of the data are as follows:

TABLE 1: CHARACTERISTICS OF THE DATA

S. No.	Data Characteristics	Sample
1	Convenient Sample Villages	40 Villages
2	Villages from Kanyakumari	20 Villages
3	Villages from Trivandrum	20 Villages
4	Sex	Male 100 and Female 100
5	Age (Years)	
6	< 25	60 Years
7	<45	80 Years
8	<60	60 Years
9	Data collected from Patients	200

Availability of Radiology Services

Out of the 40 villages, every village has the hospital or the Clinic either Govt. PHC, PHC-Sub Centre, Private Hospital/clinic or Trustee hospital/clinic. Fourteen villages have PHC sub-centres and six villages have PHCs. Therefore, the rural people of these villages are accessible to the general healthcare facilities. But the problem is that those hospitals are not providing the radiology services to the patients. The PHC and the private clinics are able to provide the basic lab tests to the patients. Out of 40 villages, only 15 villages are accessible to routine lab tests and X-rays, but all the hospitals in villages are unable to provide the digital X-ray, CT and MRI services to the patients.

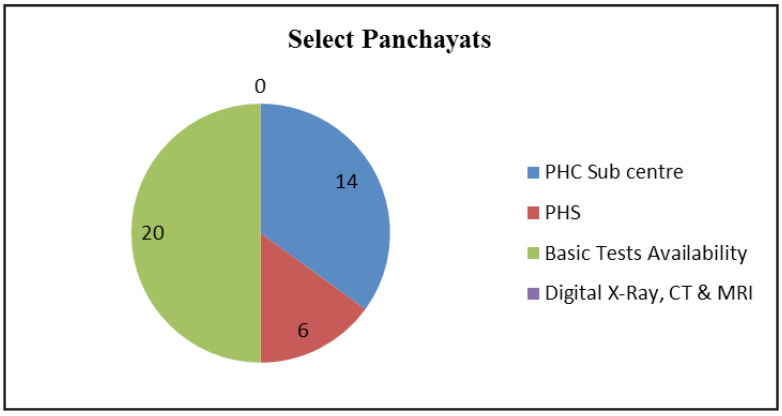


FIGURE 1: AVAILABILITY OF RADIOLOGY SERVICES IN VILLAGES

Cost, Time and Quality

The cost of the service is an important factor in the demand and the affordability of any service. The cost of X-ray, digital X-ray, CT and MRI services in the selected districts are as follows:

TABLE 2: COSTS OF RADIOLOGY SERVICES

S. No.	Type of the Test	Cost (₹)
1	X-Ray	130
2	Digital X-Ray	200
3	CT Scan	1500
4	MRI	7000

The time taken for the X-ray as reported by the respondents is 5 to 8 hours. In some cases, due to electricity problems, machine problems and the availability of the technicians, the service time takes more than a day. Since the digital X-ray, CT and MRI services are not available in the villages, all people did not respond for the time factor of the services. Those who responded said that in case of CT and MRI, it takes a week at maximum level and at minimum level one to two days.

The quality of the radiology reports is not excellent as per the data is concerned. Out of the total respondents, none reported that they are excellent. Fifty-five respondents said that reports are with the best quality, 118 respondents said they are with average quality and the rest of them said the reports are bad (27).

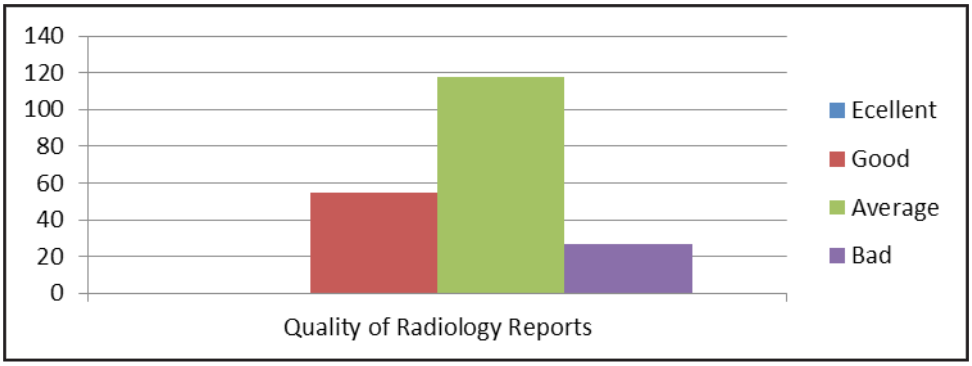


FIGURE 2: QUALITY OF RADIOLOGY REPORTS

Availability of Digital X-ray, CT and MRI Services

Since these services are not available to patients in their villages, most of them travel to the different places in the Kanyakumari and Trivandrum for the availing of services. Most frequently visited places for the CT and MRI services are Marthandam, Nagarcoil, Parasala and Trivandrum. The patients have to travel minimum 8 km to maximum 45 km for the availing of services. Since they are patients, they must accompanied by one or two attendants, they spend money on transportation and food, and patients' attendants lose their wages. This is becoming another issue for the rural people.

Satisfaction of the Radiology Services

It is interesting to know about the overall satisfaction with radiology services in Kanyakumari and Trivandrum. Eighty per cent of the respondents are not happy with overall radiology services of the hospitals. They are suffering with long waiting times, more cost, difficulty in travelling and the latest procedures in the hospitals. Ninety per cent of the respondent said that the cost of the CT and MRI is not affordable for them.

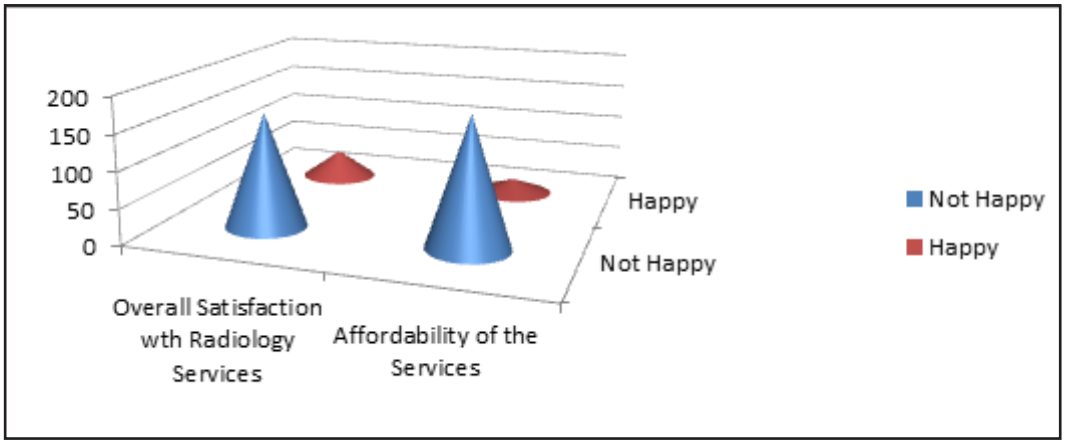


FIGURE 3: SATISFACTION OF RADIOLOGY SERVICES

People who have undergone X-ray, CT and MRI

The survey also covered the people who have undergone out of the X-ray, CT and MRI tests. Out of the collected 200 samples, 166 patients have undergone X-ray tests, 22 CT and 12 patients have undergone MRI.

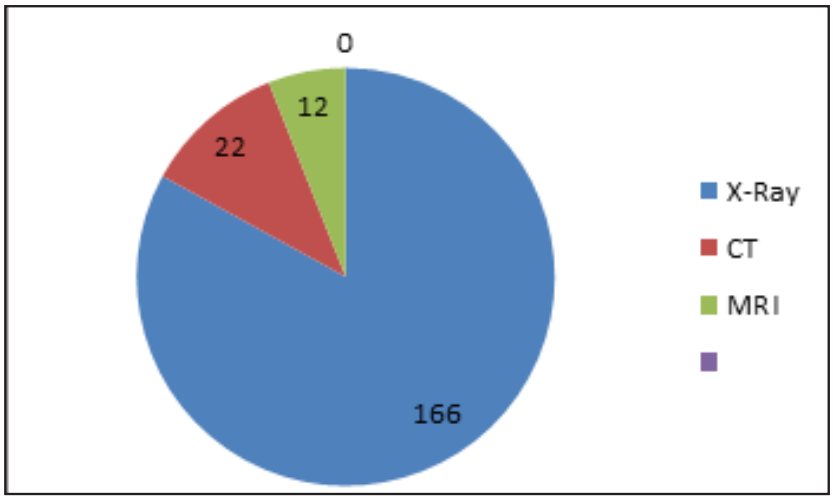


FIGURE 4: PEOPLE WHO HAVE UNDERGONE X-RAY, CT AND MRI

The people have gone to different places such as Martandam, Parasala, Nagarcoil, Trivandrum and Kanyakumari. In case of the X-ray, people have hardly travelled 5 km. But to get the CT and MRI, they have to travel maximum 45 km. Seventy of the respondents get done the CTs in Marthandam, Parasala and all MRIs are in Nagarcoil and Trivandrum.

The modes of the transpiration are bus and auto. The people have to pay more than the normal charges in the emergency conditions which will be sometimes even cross Rs 400.

Major Factors influencing Demand for Radiology Services

The major factors influencing demand for radiology services identified from the obtained questionnaire and the interviews are as follows and described below:

- Access to Service
  - ❖ Convenience to patients
  - ❖ Direct and indirect costs to patients
  - ❖ Cost-effectiveness limitations to improving level of service
- Promptness and reliability of services
- Equipment issues
- Access to training and skill levels
- Challenges presented to patients after hours

- ❖ Availability of local after-hours services
- ❖ Impact of treatment delays on quality of care
- ❖ Logistical difficulties involved in patient transfers
- ❖ Ability to access results

Access to Service: Having to travel to obtain radiology services was seen as an inconvenience to the patient related to the distance that the patient had to travel 'compared to just popping… to the next suburb… it is a major inconvenience' told by the respondent. Travel also leads to greater indirect costs to the patient and the community. It is noted from the data that patients not only incurred direct costs associated with the medical care and transport to and from the service, but also some lost wages. They were also aware that some patients (such as those with a disability) faced great difficulties, particularly if they needed to be accompanied by their career. The direct cost of services varied from the hospital to hospital. However, in some locations, costs of private radiology, particularly for after-hours services, had risen significantly.

Villagers were acutely aware that there were limitations on the type of service that could be provided: '…small community, small utilisation, high capital cost of installation, high cost of running to maintain the service… it just is not cost efficient'. It was acknowledged that radiology was one of many things that were more difficult to access in remote areas: '…we have a relatively good service, considering that the place is remote and difficult. It's easier to get an x-ray… than it is to get a lemon tree delivered' told by the local doctor. These views depended to some extent on the degree of remoteness of the area in which the rural hospitals are practicing:

I think we're extremely indulged and very spoilt in our accessibility and availability of services… there are huge numbers of communities in Kanyakumari and Trivandrum which are faced with frightful travel, time and difficulties told by a doctor from the Marthandam.

According to a respondent from Kulashekharam, *Well, for the very remote communities like Kanjiramkulam., it's a different situation in places such as Tengapattanam, Kulashekharam and Chekkada where you can just put someone in an ambulance and they can be in the hospital in an hour and two… So I think it needs a higher level of local radiology support.*

Promptness and Reliability of Services: Responsiveness and reliability of services were frequently mentioned, and were often framed in terms of differences in the level of service between private and public systems. One episode of care from a private provider was favourably described.

I had a person who I sent in for an x-ray, I saw them at my surgery at quarter past two, they drove straight in [to x-ray], I checked my email between 4, 4.30…, the report was there and I rang them [the patient] on their mobile and they were halfway home told by the doctor from Poovar.

In comparison, experiences described from the public system were predominantly negative. Some of this was due to reporting delays. The doctor from the Govt Hospital says:

I had one of Govt. Hospital, Marthandam this week, which was really annoying, I had a patient who went up there with a knee injury on Saturday night and I sent a request through on Monday morning to record for the report… I haven't got it yet; they just sent a note to say that it hadn't been reported.

Equipment Issues: In Kanyakumari and Trivandrum, villages had access to X-ray and the routine lab investigations. The X-ray equipment was the most common type of equipment used. The type and quality of this was very variable. A number of places had access to portable X-ray machines which patients found convenient and those with access to them seemed relatively happy.

Other patients had used fixed X-rays and felt there were some benefits of these, in particular perceiving that they reduced radiation doses to patients. Some patients felt that equipment was very poor. The maintenance also presented a challenge in the villages: 'We would report that it was malfunctioning, and wait for the health department to send a technician to repair it, which might be a week or two' told by the technician from Netaji Hospital, Choondigal. The patients have to travel to Marthandam, Nagarcoil and Trivandrum to avail the CT and MRI services. In general, this was considered cost effective and useful services.

Most people surveyed found getting help with interpretation relatively easy. However, opinion varied and some found it more difficult. These rural areas found it a challenge to get help.

Sometimes we … send it (the X-ray) down on the bus to (town) with a note saying please take this to fracture clinic and have them call us… if we want immediate assistance on it, we might ask a relative to drive it to town, a respondent from Padanandalamudu told.

Access to Training and Skill Levels: Some hospitals had a sense of satisfaction with taking their own X-rays:

It's good doing it yourself, and it's really quite good when you can read it properly too. It keeps your skills up tremendously compared to what happens with the standard general practice, a doctor from Domoni responded.

One technician stated, 'I'm pretty satisfied with my ability to handle the equipment I've got and I'm used to' (GP5). However, another technician reported:

I have only tried to do it (operate equipment) once… the first weekend I was on … I told the person look I haven't operated this machine and she said yeah go for it… I didn't get a good film and I haven't used the machine since.

The doctor's confidence in interpreting results also varied, ranging from definite discomfort: 'I don't do it really often enough to become confident or to stay confident'; through to 'I'm comfortable with my limitations. I think I'm aware of my limitations'.

The technician expressed the view that training courses for operating equipment were not relevant to their situation.

'I did a re-accreditation course … when I came here, which was absolutely useless to use our machine, I learnt by reading the instruction booklet that comes with the machine and practicing, used some roadkill actually to try it out.

Access to training for interpreting images was also an issue: A lot of CPD *(continuing professional development)…used to occur at lunchtimes because that suited the suburban hospitals*.

The technicians are interested in further training in areas including taking X-rays of limbs, shoulders, pelvic girdle and chests, taking and interpreting X-rays in children, chest XR interpretation, general X-ray interpretation, the use of CT and MRI and how to choose the best way to use radiology services.

Challenges presented to Patients after Hours: The process to access radiology after hours was consistently complex. One patient talked about her experience of having to make pragmatic adjustments to her clinical practice when she started working in a rural location.

We get a lot of broken bones on athletic weekends especially, and so Saturday is really busy. And when I first came here I sort of thought, oh you get an X-ray when people come in with an injured limb, but I was persuaded that you could put a back slab on it and wait until Monday most of the time.

The villagers were aware of the difficulties faced by their communities in accessing after-hours care. At times when the radiology service was not available, people from some communities had to travel long distances to a major public hospital or wait until the resumption of service. This was an inconvenience to the patients and could result in treatment delay.

This weekend I had somebody with a bowel obstruction who didn't want to go to hospital and it turned out… Monday when we got the X-ray he actually was quite constipated… had we known that we could have done something…over the weekend told by a villager.

If a decision was made to transfer the patient to access radiology, then a number of logistical problems could present themselves including coordinating services and arranging transportation.

Difficulty accessing results after hours was also a factor affecting patient satisfaction with after-hours services. A respondent said:

It all works well until you hit six o'clock or weekends, and then the whole thing just disintegrates. …A few years ago I really needed an important report, and I wrote it on the report that it was important and that I wanted the result, and nine o'clock I realised that I hadn't got it and I actually had to get the radiographer on call to go in and open up the building and get the report and phone me back.

Not all villages found after hours service difficult: It's actually easier to do an X-ray out of hours (at the hospital) because we haven't got another lineup of patients waiting… if they come into the rooms … then you're twenty minutes behind told by another respondent.

CONCLUSION

The present work discusses the radiology services in rural India. The study found that though the routine lab investigations and the X-ray facilities are available to the rural people they are not accessible and affordable to the modern diagnosis facilities such as Digital X-ray, CT and MRI services. This study strongly suggests that the teleradiology will be the best option to solve some of the issues faced by the rural people. The study identified key factors influencing demand for the radiology services. These include accessibility to service, promptness and reliability of services, equipment issues, access to training and skill levels and challenges presented to patients after hours. An issue of great concern identified by this study is a lack of after-hours radiology services to the rural people.

The study also found that radiologists were less concerned about X-ray quality as long as the image was sufficient for them to make a diagnosis and initiate treatment. This study identified the need for the training programmes to radiologists. In conclusion, the study provides new insights into rural radiology services. The findings of the study could help to inform the diverse stakeholders in the provision of rural health services, including policy makers and funding bodies.

Public and private radiology service providers who either already undertake work in rural areas or are considering expanding into rural areas could also use the findings to improve their services.

References

1. Conall Garvey and Richard Seymour (2003). *Modernizing the Radiology Services: A Practical Guide to Redesign*, Toolkit
2. Freeman P (1999). The Role of Ultrasound in the Assessment of the Trauma Patient. *Australian Journal of Rural Health*, 7: 85-89
3. Jones NR, Molloy CJ, Kloeden CN, North JB, Simpson DA (1993). Extradural Haematoma: Trends in Outcome over 35 Years. *British Journal of Neurosurgery*, 7: 465-471
4. McLean MJ, Condon JR. (1999). A single Issue Program in an Isolated Area: Mammography Screening in Darwin, NT. *Australian and New Zealand Journal of Public Health*, 23: 357-361
5. Madhok R, Kirby P, Fordham J, Stamp P, Green S, Cooper C. (1996). Bone Densitometry at a District General Hospital: Evaluation of Service by Doctors and Patients. *Quality in Health Care*, 5: 36-43
6. Franken EA Jr, Whitten P, Smith WL (1996), "Teleradiology Services for a Rural Hospital: A Case Study, Pub.Med.gov, *US National Library of Medicine National Institute of Health*. 2(3):155-60
7. Philipp DL, Wright DL, Killion J (2006), Rural Radiology Services in Texas: An Assessment in Quality, *Pub.Med.gov, US National Library of Medicine National Institute of Health*, 28(3):22-34
8. Goldberg MA. (1996), Teleradiology and Telemedicine, Pub.Med.gov, *US National Library of Medicine National Institute of Health*, 34 (3):647-65

18

Strategies in the Effective Management of Stakeholders for Tuberculosis Control in India

Christy Solomon*
G.V.R.K. Acharyulu**

India shares one fifth of the global TB burden. The success of TB partnerships has been established through NGOs who have proved that the partnerships are effective. However, very little is known about the large number of patients who first walk into the private clinics for service. The secondary data on private involvement shows a sharp decline in participation of the private practitioners who are self-sufficient in earning their livelihood. The aim of the national programmes to control TB is to promote the standardised treatment using the DOTs strategy that is universally accepted to be very effective in combating TB. The non-involvement and participation of this section of the stakeholders is very critical in the management of TB partnerships. The commonality and reality is that they do not have a system to track these patients and hence patients are lost in the crossroads of TB care. The demand for health care and TB care from private practitioners is over 65%. Ad hoc involvement of private players in public health care has led to irrevocable losses not only through social, political, economic and physical dimensions but also add to loss of life. True partnerships can minimise or neutralise risks in investments on infrastructure, services and equipment through careful and focused planning that can in turn have maximised benefits while ensuring quality care especially in the arena of Health.

Keywords: *Stakeholders, Private Practitioners, Tuberculosis, Management*

INTRODUCTION

The world over public health sector has grown and achieved set targets but the quality of services has markedly declined over the last decade. The quality of health services at the public sector health facilities is a prime concern for all the stakeholders involved in the development of the health systems. Private public partnerships as a strategy to ensure effective health care delivery

* Research Scholar, School of Management Studies, University of Hyderabad, Hyderabad
** Associate Professor, School of Management Studies, University of Hyderabad, Hyderabad

is becoming a norm as more and more private players are roped in to the care of the people through public funding. Private care is the most sought after and costly affair especially for the poor. Most people who are sick with chronic illnesses become poor due to the burden of disease which is borne by them individually.

The people forced to go for private care at the cost of selling their assets, inability to work and borrowing to the maximum are common when the need is beyond their means. The entire family bears the burden of the individual and the family systems are entirely disturbed, affecting the women and children that is an 'add on' to varied difficulties of the family. Poor nutrition, inability to go to school, need to earn as much as possible, facing the societal pressure when the moneylenders threaten and financial burdens and cost of living make it impossible for the family to sustain itself. It is not only the family but an entire gamut of people involved, who suffer as a result of ill-health.

The government has to provide for the health of the people and this was well-emphasised ever since the Bhore committee, in 1946, urged the government to provide public health facilities. The health policy and health being a state subject called for innovations to market the services at the government but various gaps exist today between the private and public services. The quality of care is lacking and this is not due to lack of funds but due to sheer mismanagement and inefficient implementation of properly planned programmes. Thus, there are more serious management problems than funding problems. NRHM has been operational since 2005 and aims at increasing the public spending on health from 0.9 % to 2-3 % of GDP. There are funds placed in the hands of Panchayati Raj Institutions and bottom-up planning. However, there is no marked change in quality of work. What can change the situation? The people seeking care have to run from pillar to post and finally lose hope in the public sector.

ASSOCHAM (2006) shows that private partnerships in India are being implemented since 1995 and evaluating the performance of the same over the last decade especially in the care and cure of people affected by tuberculosis has not been done. The main reason for such an exercise is that TB is a known disease, treatment is available and the government and private care givers are striving to control the spread of the disease. There is a need to explore the serious mismanagement of the TB cases and the growing cases of multi-drug-resistant TB (MDR-TB) cases need to be carefully addressed. This scenario is complicated by the multiplier effect of HIV/TB co-infections. Unless active steps are taken based on sound facts, there may be serious consequences beyond manageable levels.

MANAGEMENT OF STAKEHOLDERS

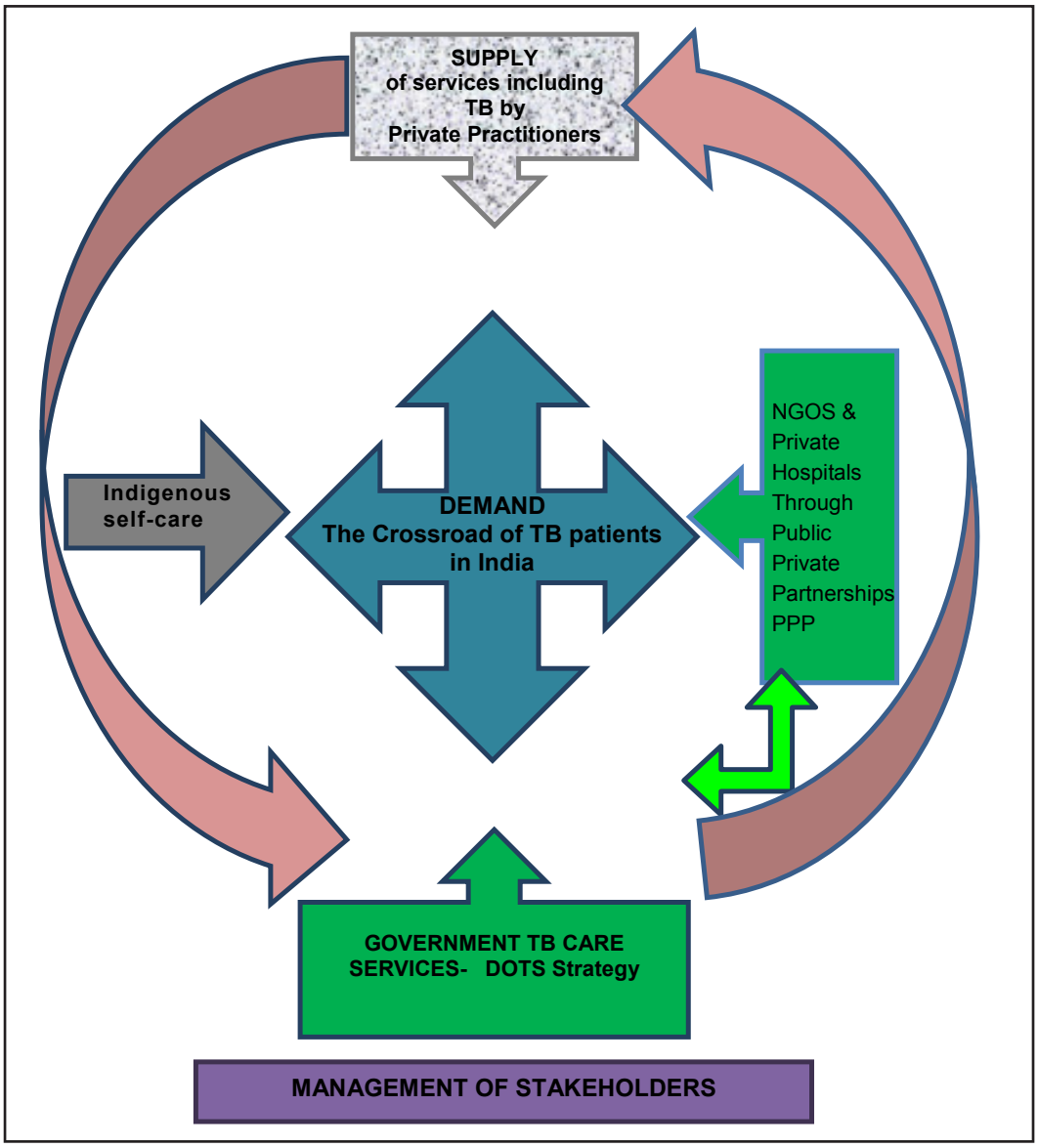


FIGURE 1: MODEL SHOWING CRITICAL LINKS AMONG STAKEHOLDERS IN THE CARE OF TB PATIENTS

The management of TB as per the Figure 1 shows the critical path in the supply demand cycle that the private practitioners play in the combat against TB. Patients either take the indigenous path due to fear and stigma or visit the private practitioner before reaching the government facility.

Private preference for care is seen in over 70% of the patients who prefer quality treatment at a cost over long waiting time and poor reception at the free government health facilities. Most of the people take a very long path in their journey seeking treatment for TB which may last from a few months to a couple of years when they are very sick.

The supply side is very crucial because it has been seen that over the years the participation of this sector in the PPP has declined. Figure 2 shows the declining trend in the involvement of PPs over the past five years based on TB reports of RNTCP.

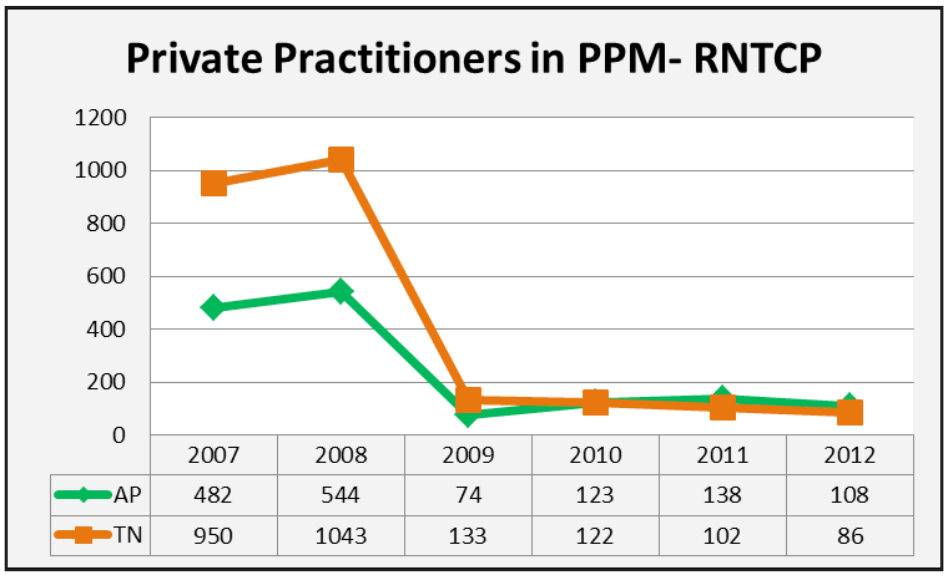


FIGURE 2: RNTCP STATUS REPORTS 2007-2012

ISSUES IN PRIVATE PARTNERSHIPS

The partnerships with private practitioners mean to bring together a set of factors for the common goal of improving the health of a population based on the mutually agreed roles and principles.

According to Harding et al. in 1993-1995, partnerships can be better understood by the following definition:

"…..a variety of co-operative arrangements between the government and private sector in delivering public goods or services provides a vehicle for coordinating with non-governmental actor to undertake integrated comprehensive efforts to meet community needs… to take advantage of the expertise of each partner, so that resources, risks and rewards can be allocated in a way that best meets clearly defined public needs" (Harding, 2003).

Entwistle et al. in 2005 reported that partnerships are increasingly popular in the field of development cooperation and sustainable development. Although not an altogether new phenomenon, the popularity of partnerships in policy circles has grown steadily since the late 1980s to a point where their promotion seems to have become a dominant development narrative (Entwistle, 2005) (Linder.S, 1999) (Roe, 1991).

According to Collins English Dictionary, the meaning of partnerships is equal commitment or a state of being a partner.

The Concise Oxford Dictionary defines partnerships to be one of a pair on the same side in a game or a person who shares or takes part with another, especially in business firm with shared risks and profits.

According to Carson's definition, partnerships can be defined as a shared commitment, where all partners have a right and an obligation to participate and will be affected equally by the benefits and disadvantages arising from the partnerships (Carson, 2007).

Thus, it is very obvious that the partnership between professionals and clients is beyond the normal definition of partnership and includes attributes such as support and advocacy, choice and equity, above all praise and encouragement. The additional attributes as defined by Carson are as follows:

- Trust and confidence in accountability
- Respect for specialist expertise
- Joint working
- Teamwork
- Blurring of professional boundaries
- Members of partnerships share the same vision and interests
- Appropriate governance structures
- Common goals
- Transparent lines of communication within and between partner agencies
- Agreement about objectives
- Reciprocity
- Empathy

In 2004, the processes and stakeholders in a health sector reform was clearly explained by Rufaro highlighting the linkages that are crucial and important to make a change in the financing and delivery of health care services for any interventions in health (Rufaro Chatora, 2004).

People are today no doubt interested in the private health services and are willing to exchange the last of a rupee that they have or even more by borrowing and loans to seek private care. However, we all know that the public sector is the largest network and no private manager can replace this sector. In order to create a demand for the public services, the quality of care should be improved to the highest level. This is not possible unless policy decisions are strongly adhered to and root causes of problems are addressed. A strong political commitment is required to address this issue and public private management can be an answer.

MODELS OF PARTNERSHIP IN INDIA

India has been very successful in some of the partnership projects in modern times providing varied essential public services across the central, state and local bodies. The partnership projects were implemented across various sectors such as healthcare, education, public transport and infrastructure, with a goal and hope of providing essential services of appropriate quality to vulnerable and wider sections of the population without cutting into the government's finances that is already very scarce.

There are various models in partnerships depending on the structure, function and context of each sub-system of a system. Large infrastructural projects follow the partnerships mode where the roles and responsibilities and risk sharing are very well-defined. However, in the service delivery systems like the health system, the models of partnerships do not show a definite pattern. In this chapter, we will look at the various partnerships models that have been observed in health care service delivery. The emphasis would be on partnerships that enable the preventive and promotive health care more than the curative aspects of health care. The prevention and promotion of TB care is the highlight of the partnerships and most of the models that are in vogue today will be presented in detail. India has experienced many successful partnership projects and lessons learnt from each of these projects have enabled timely corrections and alterations in the road to development, especially in the arena of health.

Contracts are specific area of work being taken up by a partner using public funding for public service or using private funds for public service, or private service using public funds.

Concessions are subsidies for various private services using public funds or for example, running a private centre using private funds or a property at a lower cost borne by the government or private provider to maximise care of the TB patient. This may be mainly related to drug supply and diagnostic services that are crucial for TB care.

Agreements are a written commitment stating the terms and conditions that are laid by either parties or signed to initiate partnerships. This is a very common model of partnerships.

An exhaustive list of stakeholders involved in partnerships was described by Venkatramana in 2009, which includes donors such as Global Fund and World Bank at the international level, Government of India and decision making bodies at different stages of implementation especially at the state, district and sub-district levels.

The programme has engaged all relevant health care providers for TB care and control through PPM. Despite best inputs provided through various models, 30-40% of the TB cases are still not notified under the programme. To achieve the objective of universal access, it is mandatory to bring all cases that are missing into the fold of RNTCP. The need to strengthen collaborations with the private sector and NGOs efforts though isolated have been made by RNTCP, at the initial stages itself to widen the quality of services and expand the TB control programme. New initiatives of PPM were undertaken by various stakeholders all over the country. A unique feature of all these PPM projects was that they adhered to the RNTCP guidelines and coordinated by the state and district level machinery. The PPM projects could document the involvement of private hospitals in TB care and found that case detection could be increased without compromising on the quality of treatment.

The first guidelines for the participation of NGOs and private practitioners were published by RNTCP in 2002 and revised in the year 2008 to cater to the changing needs of the partners. This provided a scope to include more options for involvement as per the priorities of the RNTCP.

There were two major donors who continued to support the programme through the twelfth five year plan: the World Bank support and the Global Fund support. The World Bank supported RNTCP since it started expanding coverage of DOTS from 1997 to 2012 when the programme was implemented in 28 states. The Global Fund supported DOTS expansion in India under

different rounds. Through the global fund grants apart from the DOTS implementation, following activities have also been done:

- Implementation of PPM through IMA and CBCI
- Scaling up of laboratory services through FIND
- Scaling up of drug-resistant TB with the help of WHO

There should be a joint commitment from all stakeholders to implement government policies to its fullest possible level as given in the latest TB India report of 2013.

STRATEGIES

The following are the strategies that may be useful in managing the partnerships with private practitioners in India:

1. The mapping of stakeholders by preparing a data base is very crucial.
2. The rapport building of the public functionaries with private care providers is rather weak and need to be strengthened.
3. The sensitisation process through training and involvement of NGOs should be done with highly effective and simple techniques to attract the attention of private practitioners.
4. Joint supervision and monitoring of the project is very crucial in sharing the risks involved.
5. A clear supply of TB service strategy that considers the principle of equity and cost effectiveness.
6. Documentation of referrals and patients managed at the private facility through improved and user-friendly computerised packages could be option to address the problem of tracking patients.
7. Constant review and corrective measures must be implemented to ensure supply of drugs and diagnostic services to avoid delay in treatment and cure of TB patients.
8. Patients referred by private practitioners should be followed up promptly at the government or private facility both for diagnosis as well as treatment.

CONCLUSION

The effectiveness and efficiency of public-private mix can be established only if all stakeholders in the implementation are studied carefully. Peoples' preference for private care and the need for combating TB at the first level of care are very crucial. But the private practitioners should cooperate in participating actively and correctly to implement a massive implementation plan of the public-private mix using DOTS as a treatment strategy. There is an urban bias when it comes to location of the subjects under study. The definition of private partnerships in public sectors in the case of TB is purely a public investment for global health in response to the Global emergency. True partnerships can be nurtured only when there are elements of effectiveness, efficiency and equity that addressed the needs of the poor. Private practitioners should be carefully managed to ensure smooth supply of services to the TB patients as majority of patients rely on

them. The cost of losing the patients due to lack of referral and prompt services will contribute adversely to the TB care programme leading to new and drug-resistant strains of TB. Thus, the private practitioner can be considered as the most critical stakeholder in the control and eradication of TB. The change is gradual but possible with integrated efforts.

References

1. 2012, M. (2012). Review Meeting with Secretaries of States-RNTCP. 11 & 12 September 2012 RNTCP
2. Sutton BS, A. M. (2009). The Cost of Intensified Case Finding and Isoniazid Preventive Therapy for HIV-infected Patients in Battambang, Cambodia. Int. J. Tuberc. Lung Dis. 13(6), 8 Sutton BS, Arias MS, Chheng P, Eang MT, Kimerling ME. The Cost of Intensified Case Finding and Isoniazid Preventive Therapy for HIV-infected713–718
3. A.Kochi. (2001). The Global Tuberculosis Situation and the New Control Strategy of the World Health Organization. Bull World Health Organ, 79(1):71-75
4. Aggarwal JK, C. B. DOTS Expansion under the Umbrella of IMA: Success Story continues along with Early Teething Difficulties. J Indian Med Assoc., 107(7):453-5
5. Ahmed J, A. M. (2009 Feb;59(2)). Public-Private Mix Model in enhancing Tuberculosis Case Detection in District Thatta, Sindh, Pakistan. . Ahmed J, Ahmed M, Laghari A, Lohana W, Ali S, Fatmi Z. Public-Private Mix Model in enhancing J Pak Med Assoc., Ahmed J, Ahmed M, Laghari A, Lohana W, Ali S, Fatmi Z. Public-Private Mix Model 82-6
6. Akshay, V. (December 2010). A Study of PPP Models for Social Healthcare Insurance. Kochi, Kerala: CPPR- Centre for Public Policy Research
7. AMRO. (n.d.). Background Paper on Partnership for Health Development. AMRO 4th Global Meeting of Heads of WHO Country Offices. AMRO
8. AP, S. R. (June 2009). AP State Report under NRHM. Hyderabad: GOAP
9. Aparajithan Srivathsan et al., M. S. (n.d.). Healthcare in India: Caring for more than a Billion. IBM Research Team Strategic Insights, hc2015
10. APHSRP, G. (2010). AS-IS report, CFW M&E,GOAP, APHSRP. Hyderabad
11. Ardian M, M. E. (2007 11(10)). Public-Private Partnership for TB control in Timika, Papua Province, Indonesia. INT J TUBERC LUNG DIS 2007, 1101–1107
12. ASSOCHAM. (2006). Public Private Partnerships
13. Barr., D. A. (January 2007 Vol. 97, No. 1). Ethics in Public Health Research. American Journal of Public Health, 19-25
14. BS, S. (2010, May). Evaluation of the Public-Private Mix: How Economics can contribute to Tuberculosis Control Expert Rev Anti Infect Ther. 489-91
15. Buckett, P. I. (2010). Implementing Health in all Policies. Adelaide: Government of South Australia and World Health Organisation
16. Carson, R. C. (2007). The Concepts of Partnership and Collaboration. In Effective Practice in Health, Social Care and Criminal Justice
17. CDC. (2009). CDC fact sheet. CDC

18. Chengsorn N, B. E.-a. (2009 Jul;13(7)). Tuberculosis Services and Treatment Outcomes in Private and Public Health Care Facilities in Thailand, 2004-2006. Int J Tuberc Lung Dis., 888-94

19. Chugh, S. (2007 April). Involvement of IMA in Tuberculosis Control. J Indian Med Assoc., 198,212

20. Collin. (1991). English Dictionary

21. Concise Oxford Dictionary. (1992)

22. CTD. (2010). RNTCP Status Report, Central TB Division. Delhi: GOI

23. Dagli CE, C. T. (2009). Multicentre Study of Doctors' Approaches to the Diagnosis and Treatment of Tuberculosis in Turkey. J Infect Dev Ctries., 357-64

24. Davila, E. a. (2006). Making Innovations Work. Wharton School Publishing

25. Deepak, B. (2008). Public-Private Partnership in Health Care Policy Framework and Emerging Trends in India. Medind, 1p26

26. Dewan PK, L. S. (2006). Improving Tuberculosis Control through Public–Private Collaboration in India. British Medical Journal 7541, 574–578

27. Dutta, N. (2013, March 24). Health.india.com. world tuberculosis day 2013

28. E&Y, F. &. (2012). Accelerating Public Private Partnerships in India

29. Entwistle, T. a. (2005). From Competition to Collaboration in Service Delivery: A New Agenda for Research

30. Ferroussier O, K. M. (2007 11(7)). Ferroussier O, Kumar M. K. A, Dewan P. K,Nair P. K. J, SaCost and Cost-effectiveness of a Public-Private Mix Project in Kannur District, Kerala, India. Ferroussier O, Kumar M. K. A, Dewan P. K, Nair P. K. J, Sahu S, Wares D. F, Laserson K, Wells C, Granich R,ChaINT J TUBERC LUNG DIS , 75

31. Floyd K, A. V. (2006). Cost and Cost–effectiveness of PPM-DOTS for Tuberculosis Control: Evidence from India. Bull. World Health Organ. 84(6), 437-445

32. Floyd K, A. V. (2006). Cost and Cost-effectiveness of Public and Private Sector Collaboration in Tuberculosis Control: Evidence from India. Bulletin of WHO 84, , 437–445

33. Garcia, A. (2003). A Sample Evaluation Plan for a TB program

34. Gidado M, E. C. (2009 Jan-Mar;8(1)). Tuberculosis Case Management and Treatment Outcome: Assessment of the Effectiveness of Public-Private Mix of Tuberculosis Programme in Kaduna State, Nigeria. Tuberculosis Case Management and Treatment Outcome: Assessment of the Effectiveness of pub Ann Afr Med., 25-31

35. Greaves F, O. H. (2007 Jan). Compliance with DOTS Diagnosis and Treatment Recommendations by Private Practitioners in Kerala, India. Int J Tuberc Lung Dis., 11(1):110-2

36. Hansen, A. L. (n.d.)

37. Harding, A. H. (2003). Private Sector Participation in Child Health: A Review of World Bank Projects, 1993-2002. Washington, DC: The World Bank

38. HSRAP. (2009, March). Changes in Health System Organisation, Delivery and Management, Article 1. HSRAP

39. http://www.ima-india.org/IMA-GFATM-RNTCP-PPM%20Project.html, 3. G.–R.-P.-2. (n.d.). GFATM –RNTCP-PPM Project Implementation Plan 2009-2015. IMA

40. IIPS. (2005-2006). National Family Health Survey Report 3, Summary of findings (pg 4). Mumbai: GOI

41. Jaitley, T. B. (2009). Emerging Health Care Models: Engaging the Private. Centre for Enquiry into Health and Allied Themes (CEHAT) (p. 35). Mumbai: CEHAT

42. JMM, C. (2009). Briefing Document for JMM. Delhi: Central TB Division, GOI

43. Kelkar-Khambete A, K. K. (Kelkar-Khambete A, Kielmann K, Pawar S, Porter J, Inamdar V, Datye A, Rangan S.India's Revised National Tuberculo 2008 Jan). KIndia's Revised National Tuberculosis Control Programme: Looking beyond Detection and Cure. Kelkar-Khambete A, Kielmann K, Pawar S, Porter J, Inamdar V, Datye A, Rangan S.India's RevInt J Tuberc Lung Dis. , Kelkar-Khambete A, Kielmann K, Pawar S, Porter J, Inamdar V, Datye A, Rangan S.India's Revised National Tuber87-92

44. Kiwuwa MS, C. K. (2005 Nov). Patient and Health Service Delay in Pulmonary Tuberculosis Patients attending a Referral Hospital: A Cross-sectional Study. BMC Public Health, 5:12

45. Krejcie table, R. K. (1970). Educational and Psychological Measurement

46. Krishnan N, A. R. (2009 Ja;13(1)). Impact of Advocacy on the Tuberculosis Management Practices of Private Practitioners in Chennai City, India. Krishnan N, Ananthakrishnan R, Augustine S, Vijayalakshmi NK, Gopi PG, Kumaraswami V, Narayanan PR. Impact of advocacy on the Int J Tuberc Lung Dis. , 112-8

47. Lagrada LP, U. N. (2003-2005). Analysis of Factors of Treatment in DOTS Health Facilities in Metro Manila, Philippines: A Case-Control Study. Manila, Philippines: Department of Health Policy Science, Graduate School of Tokyo Medical and Dental University, 1-5-45, Yushima, Bunkyo-ku, Tokyo 113-8519 Japan. lei-hcm@tmd.ac.jp

48. Lagrada LP, U. N. (2008 Dec;83(12), Dec). Analysis of Factors of Treatment Completion in DOTS Health Facilities in Metro Manila, Philippines: A Case-Control Study. Kekkaku. 2008 Dec;83(12):765-72., pp. 765-72

49. Lal SS, S. S. (2011 Jan). Intensified Scale Up of Public-Private Mix. Int J Tuberc Lung Dis, 97-104

50. Lambert ML, D. R. (2005 Dec). Lambert ML, Delgado R, Delays to Treatment and Out-of-Pocket Medical Expenditure for Tuberculosis Patients, in an Urban Area of South America. Ann Trop Med Parasitol., 99(8):781-7

51. Linder.S. (1999). Coming to Terms with the Public-Private Partnership: A Grammar of Multiple Meanings. In The American Behavioural Scientist (pp. 43:35-51)

52. Lonnroth K Uplekar, M. A. (2004 Aug;82(8):580-6. Epub 2004 Sep 13.). Public-Private Mix for DOTS What makes it Work? Bulletin of the World Health Organisation., 580-6

53. Lönnroth K, T.-A. W.-M. (n.d.). Social Franchising of TB Care through Private General Practitioners in Myanmar - An Assessment of Access, Quality of Care, Equity, and Financial Protection Health Policy and Planning (in press)

54. Mahendradhata Y, L. M. (2007). Engaging the Private Sector for Tuberculosis Control: Much Advocacy on a Meager Evidence Base. Mahendradhata Y, Lambert ML, Boelaert M, Van der Stuyft P. Engaging the Private Trop. Med. Int. Health 12(3), 315-316

55. Mahendradhata Y, U. A. (Volume 12, Number 10, October 2007). Private Practitioners and Tuberculosis Case Detection in Jogjakarta, Indonesia: Actual Role and Potential. Mahendradhata Y, Utarini A,Lazuardi U, Boelaert M, Stuyft P.Private Practitioners and Tuberculosis Case Detection in JogjakartaTropical Medicine & International Health, 1218-1224(7)

56. Maikisch, I. A. (2006). Public-Private Partnerships and Collaboration in the Health Sector. In An Overview with Case Studies from Recent European Experience. The International Bank for Reconstruction and Development/The World Bank

57. Maikisch, I. A. (2006). World Bank HNP Discussion Paper Series

58. MOHFW, T. (n.d.). Tamil Nadu State Report

59. Morgan, K. &. (1960 Vol.38). Small SampleTechniques. The NEA Research Bulletin

60. Mudur, G. (BMJ (0ct.3)1998). Private Doctors in India Prescribe Wrong Tuberculosis Drugs. BMJ, 317:904

61. Mukund Uplekar, M. R. (2001). Private Practitioners and Public Health: Weak Links in Tuberculosis Control. Lancet , 358:912-916

62. Murthy KJ, F. T. (2001 April). Public-Private Partnership in Tuberculosis Control: Experience in Hyderabad, India. Int J Tuberc Lung Dis , 27. Murthy KJ, Frieden TR, Y Azdani, Hreshkesh P. Public-Private Partnership 5(4):354-9

63. Narian, J. P. (2008). Involving the Private Medical Sector in Disease Control: A Critical Need. Medind, 1p59

64. Pantoja A, L. L. (2009). Economic Evaluation of Public–Private Mix for Tuberculosis Care and Control, India. Part II. Cost and cost–effectiveness. . Pantoja A, Lönnrothk, Lal SS et al. Economic Evaluation of Public–Private Mix for Tuberculosis Int. J. Tuberc. Lung Dis. 13(6), 705-712

65. Park, J. P. (1989). Social and Preventive Medicine

66. Partnership for TB Care. (March 2009). Indian J Med Res 129, 215-218

67. Patoja A, Floyd K, Unnikrishnan KP et al. (2009). Economic Evaluation of Public-Private Mix for Tuberculosis Care and Control, India Part 1. Int J. Tuberc.Lung Dis., 698-704

68. Peter A. Berman, P. &. (2000). A Decade of Health Sector Reform in Developing Countries: What have we learnt? Data for Decision Making Project. International Health Systems Group, Harvard School of Public Health

69. Pierre de Paepe, K. S. (2010; Pg 60). International Health and Aid Policies: The Need for Alternatives. Cambridge University Press

70. Piryani RM, K. S. (Piryani RM, Kohli SC, Shrestha G, Rawat T.Tuberculosis diagnosed/managed at NGMC, Teaching Hospita 2008 Jan-Mar). PiryTuberculosis diagnosed/managed at NGMC, Teaching Hospital, Kohalpur: A Joint Private-Public Effort. Piryani RM, Kohli SC, Shrestha G, Rawat T.Tuberculosis Diagnosed/managed at NGMC, TeachiKathmandu Univ Med J (KUMJ) , Piryani RM, Kohli SC, Shrestha G, Rawat T.Tuberculosis diagnosed / managed at NGMC, Teaching Hospi28-32

71. Probandari A, L. L. (2010 May 7). Missed Opportunity for Standardised Diagnosis and Treatment among Adult Tuberculosis Patients in Hospitals involved in Public-Private Mix for Directly Observed Treatment Short- course Strategy in Indonesia; A Cross-Sectional Study. BMC Helaht Serv Res, 10(1) 113

72. Puneet K Dewan, S. L. (2006). Improving Tuberculosis Control through Public-Private Collaboration in India. BMJ Volume 332 , 576

73. Quelapio MI, M. N.-C. (2010 Jun;14(6)). Responding to the Multidrug-Resistant Tuberculosis Crisis; Mainstreaming Programmatic Management to the Philippine National Tuberculosis Programme. Int. J Tuberc Dis , 751-7

74. Revankar, C. R. (2008). Public-Private Partnership in Public Health Programmes in India. medind, 1p24

75. RNTCP, G. (2012). TB INDIA 2013- status report. GOI

76. Roe, E. (1991). Development Narratives, or Making the Best of Blueprint Development. In World Development

77. Rufaro Chatora, P. T. (2004). In Health Sector Reform and District Health System. Brazaville: WHO, RO, Africa

78. Salim MAH, U. M. (2006). Turning Liabilities into Resources: The Informal Village Doctors and TB Control in Bangladesh. Bulletin of WHO 2006; 84: 479-84. , 479-84

79. Selvam JM, W. F. (2007 Feb). Health-seeking Behaviour of New Smear-Positive TB Patients under a DOTS Programme in Tamil Nadu, India. Int J Tuberc Lung Dis. 2007 Feb;11(2):161-7, 11(2)161-7

80. Sheikh K, P. J. (2006 Apr;100(4):312-20. Epub 2006 Jan 24.). Public-Private Partnerships for Equity of Access to Care for Tuberculosis and HIV/AIDS: Lessons from Pune, India. Trans R Soc Trop Med Hyg, Sheikh K, Porter J, Kielmann K, Rangan S. Public-Private Partnerships for Equity of Access to Care for tube312-20

81. Shirish, K. (1999). Health Resources, Investment and Expenditure: A Study of Health Providers in an Indian District. Ahmednagar: Foundation for Research in Community Health (FRCH), Pune

82. Sinanovic E, K. L. (2006). Financing and Cost–effectiveness Analysis of Public–Private Partnerships: Provision of Tuberculosis Treatment in South Africa. Cost Eff. Resour. Alloc. 4, 11

83. Storla DG, Y. S. (2008, Jan 14). A Systematic Review of Delay in the Diagnosis and Treatment of Tuberculosis. BMC Public Health. p. 8:15

84. T. Santha, R. (2002). Risk Factors associated with Default, Failure and Death among Tuberculosis Patients treated in a DOTS Programme, Chennai. INT J TUBERC LUNG DIS 6(9, 780-788

85. Ten Asbroek AH, B. M. (Ten Asbroek AH, Bijlsma MW, Malla P, Shrestha B, Delnoij DM.The Road to Tuberculosis Treatment 2008 Jan 11. The Road to Tuberculosis Treatment in Rural Nepal: A Qualitative Assessment of 26 Journeys. BMC Health Serv Res., Ten Asbroek AH, Bijlsma MW, Malla P, Shrestha B, Delnoij DM. The Road to Tuberculos8:7

86. The Compassion Capital Fund, U. d. (2002-2009). Strengthening Non-Profits. Capacity Builders Resource Library

87. Tuberculosis, I. J. (1998). Indian Journal of Tuberculosis . Indian Journal of Tuberculosis, 45:141-3

88. Uplekar M, L. K. (2007). Price of Delaying Engagement with all Care Providers for Control of TB and TB/HIV. Trop Med Int Health

89. Uplekar, D. M. (2008). Involving Private Health Care Providers in Delivery of TB Care: Global Strategy. medind, 1p38

90. Vandan N, A. M. (2009 484-9. Epub 2009 Jun, Jul;123(7)). Assessment of Doctors' Knowledge regarding Tuberculosis Management in Lucknow, India: A Public-Private Sector Comparison. Public Health. Epub, pp. 484-9

91. Vandan N, A. M. (n.d.). Lucknow, India: A Public-Private Sector Comparison. Hongo, Bunkyo Ku, Tokyo: Graduate School of Medicine, The University of Tokyo

92. Varma J K, W. D. (2004-2005). Evaluating the Potential Impact of the New Global Plan to Stop TB: Thailand. Bulletin of the World Health Organization 2007, 85:586–592

93. Venkat Raman and James Warner Bjorkman. (2009). Public- Private Partnerships in Health Care in India Lessons for Developing Countries. New York: Routledge

94. Venkat Raman and James Warner Björkman. (2009). Public- Private Partnerships in Health Care in India Lessons for Developing Countries. New York: Routledge

95. Vineeth, B. (2010). Enhancing Private Sector Contribution to TB Care in India

96. W., J. (2001). The Public Economics of Tuberculosis Control. Health Policy 57, 79–96

97. WHO. (2006). WHO Report. GFATM

98. WHO. (2006). WHO. Engaging all Health Care Providers in TB Control: Guidance on Implementing Public–Private Mix Proposals. Geneva, Switzerland: WHO

99. WHO. (2010). A Brief History of Tuberculosis Control in India. Geneva Switzerland: WHO

100. WHO. (Aug 2001). PPP for TB control. Chennai: WHO SEARO

101. WHO. (Oct 2007). Public Health Innovation. World Health Organisation

102. Wilkinson David, F. K. (1996). Costs and Cost-effectiveness of Alternative Tuberculosis Management Strategies in South Africa - Implications for Policy. SAMJ

103. www.indiastats.com. (2012). State-wise Number of Allopathic Doctors with Recognised Medical Qualifications

104. Zafar Ullah AN, N. J. (2006 March). Government-NGO Collaboration: The Case of Tuberculosis Control in Bangladesh. Health Policy Plan. Zafar Ullah AN, Newell JN, Ahmed JU, Hyder MK, Islam A. Government-NGO Epub 2006 Jan 24., 21(2):143-55