

APPLIED PHARMACOECONOMICS IN PUBLIC HEALTH

Introduction

Today's cost-sensitive healthcare ecosystem has created a competitive and demanding workplace for the clinicians. In the Indian healthcare scenario, the challenge is to provide healthcare to far-reaching places across inhospitable terrains amidst populace where literacy level is low. Availability of healthcare resources such as doctors, infrastructure and equipment is another huge necessity. The question is not of sufficiency; it is of equitable distribution of healthcare resources, which is a constant difficulty faced by our healthcare agencies. Present-day healthcare professionals also have to strive hard to provide quality patient care while assuring an efficient use of resources. Hospitals and physicians worldwide are increasingly facing problems in deciding which treatment is most effective medically and economically. There is an inherent dilemma of balancing cost and treatment. The decision is based on the most viable medical and economic options.

Pharmacoeconomic research is the process of identifying, measuring and comparing the costs, risks and benefits of programs, services or therapies and determining which alternative produces the best health outcome for the resource invested. The purpose of Pharmacoeconomics is to establish the relative worth of a product/service that can be used by decision-makers who have limited budgets.

Operationally, the field of Pharmacoeconomics deals with analysis and evaluation of outcomes (clinical, economic or humanistic), cost consequences and cost comparison (for example considering resource consumption); identification of alternatives; and decision-making considering limited (fixed) budget/resources. Healthcare costs or economic outcomes can be grouped into several categories: Direct medical, direct nonmedical, indirect nonmedical and intangible costs. It has also been defined as the description and analysis of the cost of drug therapy to healthcare systems and society. More specifically, it is of paramount importance to assess costs and consequences—the value of a pharmaceutical product or service—depends heavily on the perspective of the evaluation. Common perspectives include those of the patient, provider, payer, and society:

- *Patient Perspective:* Patient perspective is important because patients are the ultimate consumers of healthcare services. Costs from the perspective of patients are essentially what patients pay for a product or service—that is, the portion not covered by the insurance. Consequences, from a patient's perspective, are the clinical effects, both positive and negative, of a program or treatment alternative.
- *Provider Perspective:* Costs from the provider's perspective are the actual expense of providing a product or service, regardless of whether they are healthcare organizations or private-practice physicians. From this perspective, direct costs such as drugs, hospitalization, laboratory tests, supplies, and salaries of healthcare professionals can be identified, measured, and compared.
- *Payer Perspective:* Payers include insurance companies, employers, or the government. From this perspective, costs represent the charges for healthcare products and services allowed or reimbursed by the payer. The primary cost for a payer is of a direct nature. However, indirect costs are such costs as lost workdays (absenteeism), being at work but not feeling of health care to the payer.
- *Societal Perspective:* The perspective of society is the broadest of all perspectives because it is the only one that considers the benefit to society as a whole. Theoretically, all direct and indirect costs are included in an economic evaluation performed from a societal perspective.
- *Researchers Perspective:* A recent trend indicates that clinical trial is dependent on economic data collection. Some studies incorporate an element of modeling to adapt the findings of a trial to another trial. Several regulatory agencies are now evaluating the use of pharmacoeconomic parameters as a part of the drug regulatory process. A Pharmacoeconomics study from the researcher's perspective will usually consist of a decision analysis model containing an economic evaluation.

Methods of Pharmacoeconomics: The pharmacoeconomic methods of evaluation are various scientific tools, which can be separated into two distinct categories: economic and humanistic evaluation techniques. These methods have been used in a variety of fields and are economic tools such as CBA, CEA, cost utilization, etc. Simultaneously, humanistic

outcome parameters such as quality of life, patient satisfaction, DALY, etc. should be monitored. These parameters will help in distributing the limited resources into much needed areas.

Applications of Pharmacoeconomics in Hospitals

Healthcare practitioners, regardless of practice setting, can benefit from applying the principles and methods of Pharmacoeconomics to their daily practice settings. Applied Pharmacoeconomics is putting pharmacoeconomic principles, methods, and theories into practice to quantify the value of pharmacy products and pharmaceutical care services used in real-world environments. One of the primary applications of Pharmacoeconomics in clinical practice, today, is to aid clinical decision making and policy making. Through the appropriate application of Pharmacoeconomics, practitioners and administrators can make better, more informed decisions regarding the products and services they provide. Complete pharmacotherapy decisions should contain assessments of three basic outcome areas whenever appropriate: Economic, Clinical and Humanistic outcomes (ECHO). Traditionally, most drug therapy decisions were based solely on the clinical outcomes (e.g., safety and efficacy) associated with a treatment alternative. Over the past 20 years, it has become quite popular also to include an assessment of the economic outcomes associated with a treatment alternative. The current trend is also to incorporate the humanistic outcomes associated with a treatment alternative, that is, to bring the patient back into this decision-making equation. This ECHO model for medical decision-making has become prevalent in the current healthcare settings. In today's healthcare environment, it is no longer appropriate to make drug-selection decisions based solely on acquisition costs.

Clinical Pharmacy Service Evaluation

The most recent application of pharmacoeconomic principles and methods has been for justifying the value of various healthcare services, particularly pharmacy services. When a specific service is competing for hospital or MCO resources, Pharmacoeconomics can provide the data necessary to show that the service maximizes due to the resources allocated by healthcare system administrators.

Conclusion

The principles and methods of Pharmacoeconomics provide the means to quantify the value of pharmacotherapy through balancing costs and outcomes. Providing quality care with minimal resources is the future. By understanding the principles, methods and application of Pharmacoeconomics, healthcare professionals will be prepared to make better, more informed decisions regarding the use of pharmaceutical products and services, that is, decisions that ultimately represent the best interests of the patient, the healthcare system and the society.

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Guest Editorial 2

SOCIAL INTELLIGENCE FOR HEALTHCARE PROFESSIONALS

Keywords: Healthcare, Leadership, Performance, Social intelligence

Scholars generally associate intelligence with cognitive, academic, or mathematical–logical competence. Scholastic Aptitude Tests, GPA, ACT, GMAT, GRE, and other admission tests are considered as surrogates of cognitive intelligence. Although academic institutions offer programs that are associated with this intelligence, literature on management generally acknowledges the inadequacy of cognitive intelligence as a predictor of one’s success in life or effective leadership. Literature on management and administration generally ignored the contribution of noncognitive intelligence, such as emotional, social, and cultural that are necessary for successful leadership in management and administration.

My comments here are on social intelligence (SI) that is essential for healthcare professionals (HCPs) who provide services to the patients. These professionals are trained to maintain and/or restore physical, mental, or psychological health of the patients. The thesis of this essay is that HCPs must have social intelligence to be effective in their jobs.

SI is defined as the ability to be aware of relevant social situational contexts; to deal with the contexts or challenges effectively; to understand others’ concerns, feelings, and emotional states; and to speak in a clear and convincing manner that involves knowing what to say, when to say it, and how to say it and to build and maintain positive relationships with others. This definition consists of four categories of abilities—situational awareness, situational response, cognitive empathy, and social skills. Situational awareness is associated with one’s ability to collect data and information for the diagnosis and formulation of problem(s), and situational response is associated with one’s ability to use this information to make effective decisions to attain desired results. These two basic abilities or competencies are needed for one’s success in life or effective leadership.

Cognitive empathy and social skills are needed for better understanding the feelings and needs of people, to communicate with them effectively, and to build and maintain relationships. These two abilities can help HCPs to remain aware of various social situational contexts which, in turn, help them to improve their situational response competence. These two abilities mediate the relationship between situational awareness and situational response. The theoretical basis of the four-category nomenclature of the SI construct is described as follows.

Situational Awareness

This is associated with one’s ability to comprehend or assess relevant HC situations. HCPs must be very strong in this ability as it is needed to collect relevant information for effective HC from the internal and external environments and make appropriate diagnosis of the strengths, opportunities, weaknesses and threats in a timely manner. This ability enables a professional to formulate an HC problem correctly.

Situational Response

This is essentially the decision-making competence of HC professionals that is positively influenced by their problem formulation that took place before. One of the issues that is being discussed in the media is President Bush’s understanding of the Iraqi situation and his decision to send the US armed forces to topple Saddam Hussein and create a democratic system in that country. Because he made his decision on the basis of faulty information, the outcomes were fatal. It is possible for leaders to recognize or diagnose a situation or problem correctly, but they may not be able to make a decision that is likely to lead to desirable outcomes.

Cognitive Empathy

Cognitive empathy is associated with one’s ability to recognize the thinking, feelings, intentions, moods, and impulses of people inside and outside the organization. Cognitive empathy should help to improve a leader’s awareness of the feelings and needs of supervisors, subordinates, and coworkers as well as people from outside the organization. This ability to connect with people should help to improve a leader’s social skills.

Social Skills

This is associated with one's ability or competence to speak in a clear and convincing manner that involves knowing what to say, when to say it, and how to say it. Social skills also involve building and maintaining positive relationships, to act properly in human relations, to deal with problems without demeaning those who work with him or her, and to negotiate and manage conflict with tact and diplomacy. Social skills competence enables HC professionals to do their jobs effectively.

HCPs should also be encouraged to enhance their abilities through self-learning. Organizations should provide positive reinforcements for learning and improving their essential SI competencies needed for specific jobs. Organizations associated with HC should make appropriate changes in the organization design that involve creating flatter, decentralized, and less complex structures. They are also making appropriate changes in organizational culture that provides rewards for learning new competencies and for continuous questioning and inquiry. These changes in the organization design, culture, and positive reinforcements should encourage HCPs to acquire SI competencies needed for improving their own performance. Even though training is useful for improving supervisors' SI, there is a limit to what they can do to acquire the four competencies of SI. To deal with this problem, organizations may have to adapt the policy of recruiting healthcare providers with vision and charisma who are likely to be high on SI.

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Guest Editorial 1

INDIA IS LEAPFROGGING TO A NEW ERA IN HEALTHCARE DELIVERY

Providing healthcare services to 1.33 billion population is indeed a herculean task. India, with its compounding population, coupled with growing geriatric population, has been grappling with the rising triple disease burden, inadequate infrastructure and a low public health, for many years. Today, with increased commitment from the government along with clinical and technological advancements in the sector, India is at the cusp of entering a new era of reformed and re-defined healthcare delivery system. However, to fully gain from these reforms, we need to take certain steps to make the system sustainable while being affordable and accessible.

India has made notable improvements across the spectrum of health and development in the past couple of decades. The average life expectancy has risen steadily from 64 to 68 years between 2005 and 2016. We have reduced our infant mortalities and increased institutional births along with improved immunization coverage throughout the country.

In economic terms, healthcare has become one of India's largest sectors — both in revenue and employment. With burgeoning investments in the sector, it is expected to reach USD 372 billion by 2022 growing at a CAGR of 16%.¹ The country has also become one of the leading destinations for high-end treatment services along with tremendous capital investment for advanced diagnostic facilities. The hospital and diagnostic centers attracted foreign direct investment (FDI) worth USD 5.25 billion between April 2000 and June 2018.²

However, with a score of 41.2 in the Healthcare Access and Quality (HAQ) Index, India still scores way below the global average of 54.4 points. India also lags behind China (48), Sri Lanka (71), Bangladesh (133) and Bhutan (134).³

India has one of the lowest public healthcare expenditures in the world, which has just marginally increased from 1.2% of the GDP in 2013–14 to 1.4% in 2017–18.⁴ With an out-of-pocket health expenditure at 62%,⁵ approximately 63 million poor are pushed into poverty in India every year due to catastrophic health expenditures.

Further, for 16% of the world's population, we have a disproportionately high share of global disease burden at approx 21%, which is coupled with one of the fastest growing incidences of noncommunicable diseases like hypertension, diabetes, cardiovascular diseases, stroke, and cancer as well as mental illness and trauma.

The World Bank estimates that 90% of all health needs can be met at the primary healthcare level. However, primary health care in India is grossly underinvested in the country. For secondary and tertiary care, hospital bed density per 10,000 people at 7 is way below the global average of 21.6.⁶ In addition to the financial and physical resource constraint, another major concern is the shortage of skilled health workforce at all levels across the continuum of care.

Nevertheless, we cannot undermine the fact that given India's population and disease burden, developing the required infrastructure and provisioning for health care for all needs a massive economic as well as political commitment.

Although the Government of India, over the years, has launched various nationwide programs for prevention, control and eradication of communicable and noncommunicable diseases and improvement of maternal and child health; the launch of 'Ayushman Bharat' program is set to be a game-changer for the healthcare sector in India. The program with its two pillars — health and wellness centers (HWCs) and Pradhan Mantri Jan Arogya Yojna (PMJAY), world's largest public funded health insurance scheme — will help India enter into a completely new era of reformed and re-defined healthcare delivery system.

Successful implementation of 'Ayushman Bharat' will not only facilitate in achieving India's Sustainable Development Goal (SDG) — three targets, but also enhance health outcomes, spur investments in health sector as well as generate new job opportunities.

However, to build a truly healthy nation, India needs re-engineering of its healthcare delivery system at systemic, financial as well as infrastructural levels. It is imperative that a new paradigm is evolved in healthcare policy, program and practice that aim to rationalize costs while expanding access and reducing the need for advanced care. At the fundamental level, the focus needs to shift from 'sick' care to 'health' care through preventive, promotive and accountable care.

Our healthcare ecosystem needs to be more patient-focused by demonstrating greater sensitivity towards patients, understanding their expectations and engaging with them. We need to embed patient-centricity in designing and execution of core operating processes and systems to enable patients to get appropriate quality care.

The private healthcare sector, that has been providing nearly 60% of in-patient care and has contributed to 70% of bed capacity expansion in the last decade, will be a crucial partner in attaining this. The government can utilize the private sector expertise in skill development and infrastructure expansion as well as its CSR funds towards these endeavors. Appropriate and efficient collaboration between the government and the private sector will form the bedrock for effective implementation of all programs and strategies.

Considering the current healthcare demands and massive coverage expected under the Ayushman Bharat, we would need to substantially expand the network of healthcare facilities and add approximately 0.64 million beds with an investment of INR 3 trillion (USD 44 billion) over next 10 years. With limited public funds, government needs to provide appropriate long-term financing options along with incentives and tax benefits to the private sector to be able to contribute effectively.

While the government is working towards incentivizing accreditation and implementing standard treatment guidelines to attain quality of care, it is also crucial to formulate viable and sustainable strategies for healthcare cost reimbursement to the private sector. The government needs to develop a framework for standard package definition as well as reimbursement tariff determination that is based on a scientific costing methodology, with the ability to evolve in response to changing contexts, revised priorities and experiences gained over the years. Time-driven Activity-based Costing (TDABC) is a proven method for determining the actual costs incurred within the healthcare delivery system to arrive at rational reimbursement tariffs for healthcare services.⁷ The time has come to revisit the low tariff rates of procedures and diagnostics that were based on old CGHS rates. Also, the government should embrace quality by having differential tariff rates based on set parameters of quality that include the qualification and experience of the healthcare personnel and the quality of the equipment used in different hospitals. This is very much akin to the differential pricing mechanism prevailing in government-provided services like Indian Railways. It must be remembered that the land prices and cost of capital are higher in urban areas but the availability of qualified doctors, nurses and paramedical staff is a great challenge in semi-urban and rural surroundings that are also plagued with lack of infrastructure that includes availability of potable drinking water and 24 hours electricity.

India also needs to invest substantially in its healthcare workforce. While there is a need to increase the number of healthcare professionals, enhancing quality and skill development of existing workforce is also critical. We need focused and appropriate skilling, re-skilling as well as up-skilling programs for existing as well as additional manpower — doctors, nurses and allied healthcare professionals.

With acute shortage of specialist doctors in the country, we need to take some immediate steps like increasing PG seats, both in district hospitals and private healthcare facilities, creating layered Certificate and Bridge Courses and developing a credit accumulation framework. Further, the conversion of 58 District Hospitals to medical colleges needs to be fast-tracked and focus on setting up of medical colleges in rural areas with appropriate incentives for doctors and faculty needs to be prioritized.

Healthcare technology has been playing a crucial role in ensuring early diagnostics and improving precision of treatment and efficiency in care delivery. In future also, technology-enabled interventions such as remote medical advice, health call-centers, tele-radiology, artificial intelligence, emergency response and e-learning platforms, will play a significant role in ensuring timely access to quality health care. Government's plans should include and implement digitization and innovative health IT solutions even at the lowest level to ensure easy verification and monitoring of delivery and avoidance of fraud in health care at the ground level.

While working towards implementation of Electronic Health Record (EHR) Standards in the country, the government must also encourage adoption of information technology for all clinical establishments. New innovative IT solutions and app-based systems that are user-friendly should be adopted in a way that even small clinical establishments can also use them.

Trauma care systems in India are at a nascent stage of development and there exists a disparity between trauma care services available in different parts of the country — from rural health posts where staff do not have training as doctors to tertiary care centers staffed by specialists. We need national level strategies to reduce the burden of road traffic injuries and mortalities by improving and strengthening the existing system of trauma care in India, with system interventions for prehospital, hospital and posthospital care. Surgeons, anesthesiologists and provision of good blood banking services within 50 km of an accident shall be the pillars of these services.

Further, there is a need to increase the effectiveness of continuum of care in the country by strengthening linkages between primary, secondary and tertiary institutions. While we build and strengthen the primary healthcare system, we need to define and standardize our referral system across the continuum of care as well as between public and

private providers. This will not only help in enhancing the health outcomes, but also aid in cost-effective utilization of resources at each level.

In the past few years, public-private partnership (PPP) has been the preferred approach for collaborations between the government and private players. However, various challenges have been faced in execution of PPP projects. While the government is working towards strengthening and formalizing the PPP framework for the country, they need to create a conducive environment to make PPP more attractive and effective. There should be clear objectives and deliverables for the private partners and they should get greater autonomy to function within those targets.

The Central Government has been pushing the states to adopt the Clinical Establishment Act (CEA) which will help regulate the healthcare sector, which is crucial in order to achieve quality across the country. However, the implementation panel of CEA needs to include representatives from doctor's community and the private sector to create a balanced approach in its implementation and avoid a situation like License Raj.

Lastly, we need to encourage and recognize transparency, self-regulation and third-party ratings and going forward rewarding outcomes to help bridge the widening trust-deficit in the sector. Recently, the Federation of Indian Chambers of Commerce and Industry (FICCI) with the help of NATHEALTH has developed the Code of Ethics for the Health Services Industry, through extensive consultation with stakeholders. The Code encourages members to voluntarily and collectively commit to ethical professional conduct for patient care and is applicable to healthcare professionals, healthcare providers, diagnostic centers and other healthcare institutions operating in India. Government should mandate all the hospitals joining PMJAY to implement this Code.

Conclusion

India has already taken the road to help redefine and restructure delivery of healthcare services in the country. The above steps will further help to strengthen our capacities for providing affordable, accessible and sustainable care to the entire population. The country needs effective health system governance through a mix of regulation and encouragement through incentives for the private sector along with patient-centricity as the underlying principle.

Brig Dr Arvind Lal

Chairman and Managing Director, Dr Lal PathLabs
Chair, FICCI Health Services Committee

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Patient Satisfaction Survey among Inpatients in a Multispeciality Teaching Hospital, South India: A Feedback Analysis

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ABSTRACT

Introduction: Patient satisfaction is a subjective phenomenon and many factors contribute directly or indirectly. In today's competitive healthcare market, patients expect more than just satisfaction. So, patient satisfaction has become a high priority to hospitals and health plans across the country and is the strongest determinant of the hospital. A patient's satisfaction may not be totally influenced by the quality of physician available, but it reflects how medical care has been delivered. Although, their main expectation is getting cured and going back to their work, but there are other factors, which affect their satisfaction. It is an important and commonly used indicator for measuring the quality of healthcare.

Aim and objectives: (a) To study the level of satisfaction of inpatients in general wards at a multispecialty teaching hospital, (b) To study the different factors affecting patient satisfaction, (c) To find the causes for dissatisfaction, if any and suggest remedial measures for improvement of services leading to better patient satisfaction.

Methodology: It is a hospital-based cross-sectional descriptive study. The research was carried out among the patients who were previously admitted in general wards of multispecialty teaching Hospital, Mysuru. Data were collected from already available inpatient feedback forms. Data thus obtained was entered in MS Excel 2013 spreadsheet and analyzed using Statistical Package for the Social Sciences (SPSS) software package version 22. About 4800 inpatient feedback forms were analyzed for the study.

Observations and results: A total of 82% of patients were satisfied with the services at the admission counter, and 84% of patients were satisfied with the discharge process; 95% of patients were satisfied with the doctor's care and attentiveness and only 1% said it to be poor; 92% of patients were satisfied with the nursing services; 79% of patients were satisfied with the quality of food served in the hospital; 79% of patients were satisfied with the cleanliness maintained; 92% of the patients are satisfied with the overall services offered.

Conclusion: It was found in the present study that most of the patients are satisfied with most of the services provided in this multispecialty teaching hospital and the doctor's care and nursing service has the highest satisfaction level, which is very satisfactory and encouraging. Major satisfiers were quality and behavior of doctors, explanation about disease and treatment

by the doctors, courtesy of staff at the admission counter, behavior of nurses, timely discharge process. Dissatisfiers were lifted operators guidance, the behavior of the security guards, quality of food and dietary services. Explanation about hospital charges and costs in the billing counter, cleanliness maintained. To conclude, the majority of our patients are satisfied after availing health services. A small fraction of patients seems dissatisfied with our healthcare delivery. We have identified a few deficient areas in terms of service delivery and the same will be bridged as early as possible in order to achieve universal patient satisfaction at our hospital.

Keywords: Patient satisfaction, Teaching hospital, Wards.

How to cite this article: Raju NS, Bahuguna J, Rao JN. Patient Satisfaction Survey among Inpatients in a Multispeciality Teaching Hospital, South India: A Feedback Analysis. *Int J Res Foundation Hosp Healthc Adm* 2018;6(2):43-50.

Source of support: Nil

Conflict of interest: None

Ethical approval: The study was approved by the institutional Ethics committee.

INTRODUCTION

Patient's satisfaction is a person's feeling of pleasure or disappointment resulting from a service's perceived performance or outcome in relation to his or her expectations. As this definition makes it clear, satisfaction is a function of perceived performance and expectations.¹ If the performance falls short of expectations, the patient is dissatisfied. If the performance matches the expectations, the patient is satisfied. If the performance exceeds expectations, the patient is highly satisfied or delighted.² It is an important and commonly used indicator to measure the quality of care that can contribute to a balanced evaluation of the structure, process, and outcome of services. Patient satisfaction is a subjective phenomenon. It is also a multidimensional aspect as, many factors contribute directly or indirectly to patient satisfaction, including accessibility and convenience of services, institutional structure, interpersonal relationships, the competence of health professionals and a patient's expectations and preferences. More importance is now given to satisfaction of patients and their caregivers with hospital care. Patient Satisfaction is recognized as an important parameter for assessing the quality of patient care services.³ It is expected that this simple and cost-effective strategy involving continuous monitoring of expectations of patients will help

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to catalyze improvements in the quality of hospital care. It is important in case of inpatients who are seriously ill and require the plethora of nursing care and other variety of services, as the landscape of their problems make them expect highly from the hospitals. Patient satisfaction surveys will not only help the hospital administrators to revise their patient-care strategies but will also inform about patients health-related behavior.⁴ Patient satisfaction is one of the buzzwords of the last decade. In the last 10 years, hospitals have realized that one of the most valuable assets to their business is the loyal patient. In today's competitive healthcare market, patients expect more than just satisfaction. Patients are increasingly more demanding and more difficult to attract. So, patient satisfaction has become a high priority to hospitals and health plans across the country, because of its impact on patient loyalty, the hospital's reputation, perceptions of quality of care, employee satisfaction and retention and the health of a hospital's bottom line. Patient satisfaction is a pre-requisite for achieving the goals of healthcare as it influences the patient's decision to follow prescribed treatments and seek professional healthcare in the future.⁵ A patient's satisfaction may not be totally influenced by the quality of care and the quality of physician available, but it reflects how medical care has been delivered. Although, their main expectation is getting cured and going back to their work, but there are other factors, which affect their satisfaction. To provide the highest level of satisfaction that is profitable to both the patient and the provider, management must control both the perception of expectation and the quality of delivery of the healthcare services. Patients are the foundation of our medical practice, and it is very obvious that they must be satisfied while in or out of the hospital. So Patient satisfaction has become one of the strongest determinants of hospital functioning and also it is an internationally accepted factor which needs to be studied repeatedly for the smooth functioning of the hospital's/healthcare systems.⁶ In countries like India where healthcare is in a competitive marketplace, success will only be guaranteed if healthcare organizations have the temperature and pulse and thermometer of their ultimate customer which is the patient and the patient satisfaction is the tool much like the thermometer and stethoscope.⁷ Patient satisfaction is one of the important goals of any health system, but it is difficult to measure the satisfaction and gauge responsiveness of health systems as not only the clinical but also the nonclinical outcomes of care do influence the customer satisfaction.⁸ There are many studies available on the satisfaction of patients with regards to outpatient services but very few studies were carried out in India for measuring inpatient satisfaction with hospital services. The purpose of the present study is to carry out

an evaluation of inpatient care of hospital services from feedbacks provided by indoor patients.

AIM AND OBJECTIVES

Aim

To study the level of satisfaction of inpatients in general wards at a multispecialty teaching hospital.

Objectives

- To study the level of satisfaction of inpatients in general wards at a multispecialty teaching hospital.
- To study the different factors affecting inpatient satisfaction.
- To find the causes for dissatisfaction, if any and suggest remedial measures for improvement of services leading to better patient satisfaction.

RESEARCH METHODOLOGY

- Study of currently available national and international literature on the subject.
- *Study design:* Hospital-based cross-sectional descriptive study
- *Study area:* The study was carried out in general wards of a large Multispeciality teaching hospital, Mysuru, Karnataka, India.
- *Study tool:* The hospital's inpatient feedback form is the main tool used for this study. About 4800 Inpatient feedback forms were analyzed for the study. Data were collected from already available inpatient feedback forms which were filled by patients who utilized the healthcare services in August, September and October 2016 and was analyzed using appropriate statistical methods. The data from the feedback forms were entered into Microsoft Excel 2013. Sorting and coding processes were performed. The descriptive statistics, including frequency and percentages were used to the inpatient satisfaction with various services. The inpatient feedback form consisted of items like excellent, good, average and poor. Patients/respondents indicated their level of satisfaction by selecting responses ranging from excellent to poor. Those selected excellent, and good were considered satisfied and who chose average and poor were considered dissatisfied. Patients were also asked if they had specific comments or suggestions regarding their encounter in the hospital. The hospital's inpatient feedback form had the following six components in it:
 - Experiences with the front office
 - Experience with the doctor's care
 - Experience with nursing services
 - Opinion about the dietary services

- Opinion about the housekeeping services and cleanliness of the hospital environment.
- Opinion about other services provided in the hospital (lift operators, security guards behavior and guidance, overall hospital rating, etc.).
- *Study Period:* 3 months (August, September and October 2016)
- *Unit under Study:* The present study was based on the patient's feedback regarding healthcare services provided by the multispeciality teaching hospital, Mysuru.

OBSERVATIONS

Front Office

The proportion of patients/attendants indicating that time taken for admission was excellent and good were 34.3% and 59.6%, respectively, average and poor were 5% and 1%—a total of 94% of satisfied patients and 6% dissatisfied patients/attendees. Regarding briefing about hospital policies, 28% patients felt it was excellent, 62% patients felt good, indicating that 90% of the patients were satisfied 8% felt it was average and 2% of them said it to be poor. With regards to friendliness and courtesy of the staff at the front office, the majority of patients 94% (this includes 35.6% and 58.3% of the patients who selected excellent and good) were satisfied, while 6% (including 4.6% and 1.3% of the patients selecting average and poor) were dissatisfied.

With regards to information about payment of services, the majority of patients 82.6% (this include 24.6% and 58% of the patients who selected excellent and good) were satisfied, while 17.2% (including 12.6% and 4.6% of the patients selecting average and poor) were dissatisfied. Regarding discharge process, 31% patients felt it was excellent, 53% felt good, 8% felt it was average and about 8% of them said it to be poor (Graph 1 and Table 1).

Overall, 84% of patients were satisfied with the discharge process while 16% were not. So a good percentage of Patients were found to be satisfied with both the physical and behavioral dimensions of service and the overall patient satisfaction is good.

Doctors Care

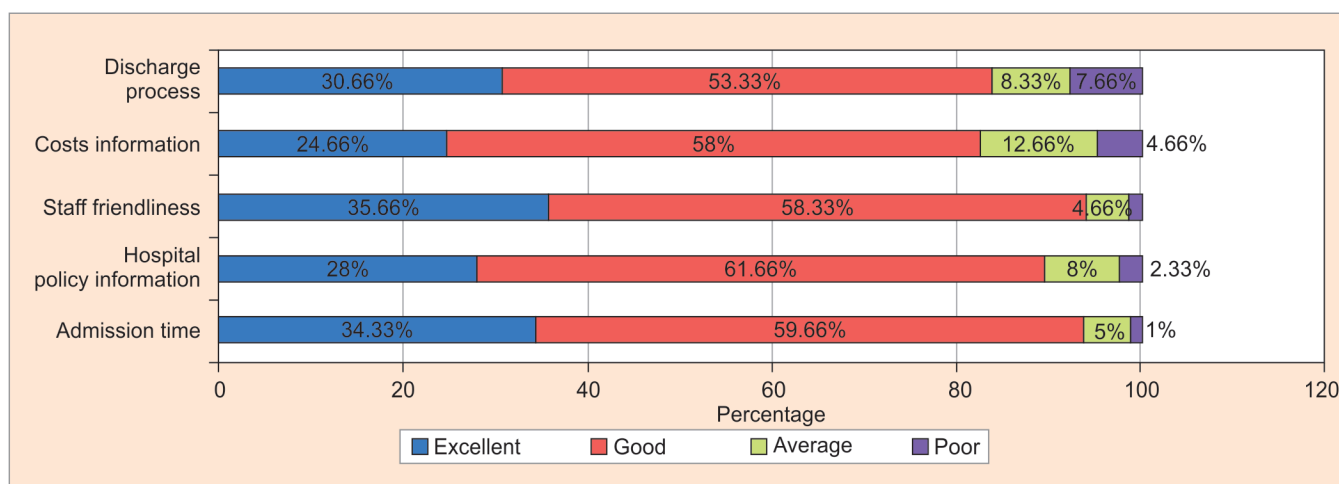
Regarding doctors care and attentiveness during his/her interaction with them), nearly 42% patients/attendants felt it was excellent, 53.3% felt it was good—indicating that 95.3% of satisfied patients, while 4% said it was average and only 1% said it to be poor indicating 5% dissatisfied patients (Graph 2 and Table 1). Regarding explanation by a doctor about illness, treatment and medicines nearly 45% patients/attendants felt it was excellent, 45% felt it was good indicating 90% of satisfied patients, while 9% said it was average and only 1% said it to be poor thus 10% of the patients were dissatisfied.

Dietary Services

About 26% of patients felt it was excellent, 52% felt good, 17% felt it was average. Four percent of them said it to be poor (Graph 3 and Table 1). It was he one of the major dissatisfiers. Overall, 78% of patients were satisfied with the quality of food served in the hospital while 21% were dissatisfied.

Nursing Services

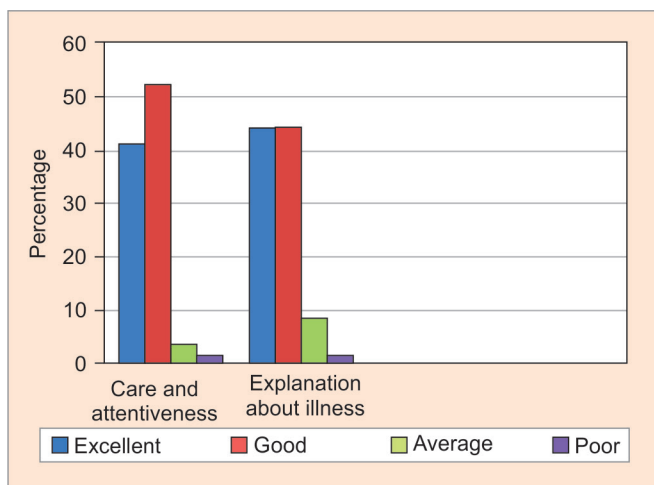
Regarding attitude and behavior of the nurses, promptness in meeting their needs and explanation about the process of treatment and progress and regarding medication administration to patients in time, 43% patients felt it was excellent, 49% felt good, 6% felt it was average; 1% said it to be poor (Graph 4 and Table 1). So on the whole, 93% of patients were satisfied with the nursing services while 7% showed dissatisfaction.



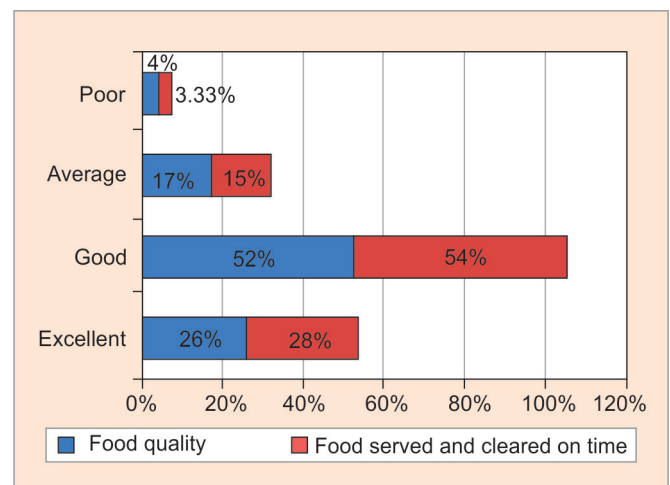
Graph 1: Distribution of patients satisfaction about front office services

Table 1: Responses to the inpatient feedback form

Sl. No.	Division		Excellent	Good	Average	Poor
1.	Front office	Time taken for admission	34.33%	59.66%	5%	1%
		Information about hospital policy	28%	61.66%	8%	2.33%
		Friendliness and courtesy of the staff	35.66%	58.33%	4.66%	1.33%
		Information about hospital charges and costs in the billing counter	24.66%	58%	12.66%	4.66%
		Timely discharge process	30.66%	53.33%	8.33%	7.66%
2.	Doctor care	Doctors care and attentiveness during his interaction	42%	53.33%	3.66%	1%
		Explanation by a doctor about illness, treatment, and medicines	45.33%	45%	8.33%	1.33%
3.	Dietary services	Quality and taste of food as per your expectation	26%	52.33%	17.33%	4.33%
		Food served and cleared on time	28%	53.66%	15%	3.33%
		Adequate information given about the procedure before starting the process	38.33%	52.33%	8%	1.33%
		Courteous and helpful by nurses/technicians	41.33%	55.33%	3.33%	0
4.	Nursing staff	Attitude and behaviour	43.33%	48.66%	6.66%	1.33%
		Promptness in meeting needs	43.33%	49%	6.66%	1%
		Explanation about the process of treatment and progress	43%	49.6%	6.3%	1%
		Medications / treatment in time	43.33%	49%	6.33%	1.33%
5.	Housekeeping	Cleanliness of the facility up to your expectation	33%	46.66%	19%	1.33%
		Lift operators helpful and guidance	8%	37.33%	52.33%	2.33%
		Guidance of the security guards	8%	54%	35.66%	2.33%
6.	Others	Overall services offered at this Hospital	38.66%	53.66%	6.33%	1.33%



Graph 2: Distribution of patients satisfaction about doctors care



Graph 3: Distribution of patients satisfaction about dietary services

Housekeeping

Concerning satisfaction of respondents with the housekeeping services and cleanliness of the hospital environment, 33%, 46% chose excellent and good respectively while 19% and 1% said they were average and poor in that order (Graph 5 and Table 1). This indicates, 79% of patients were satisfied with the cleanliness maintained while 20% were not.

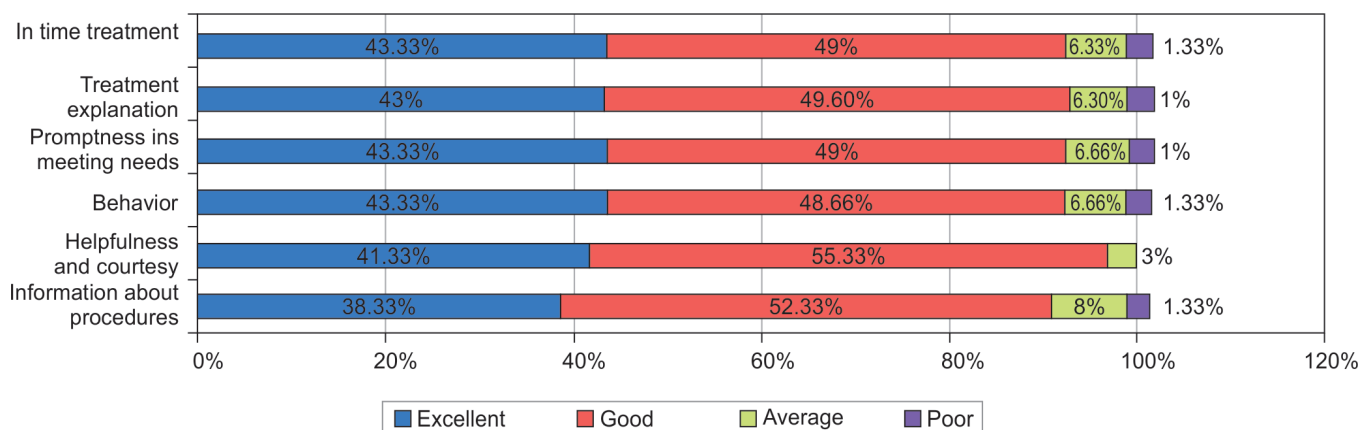
Others

Fifty-four percent of the patients were disturbed due to improper guidance of lift operators, while 45% patients

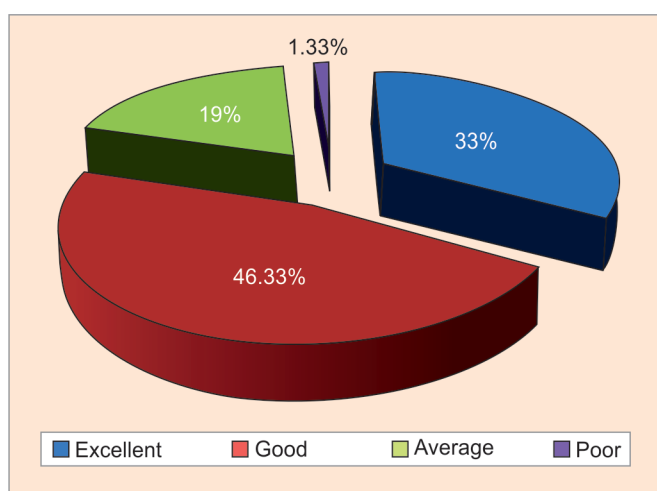
expressed their satisfaction and about 62% of the patients were satisfied with the guidance provided by security guards while 37% of patients were not (Graph 6 and Table 1).

DISCUSSION

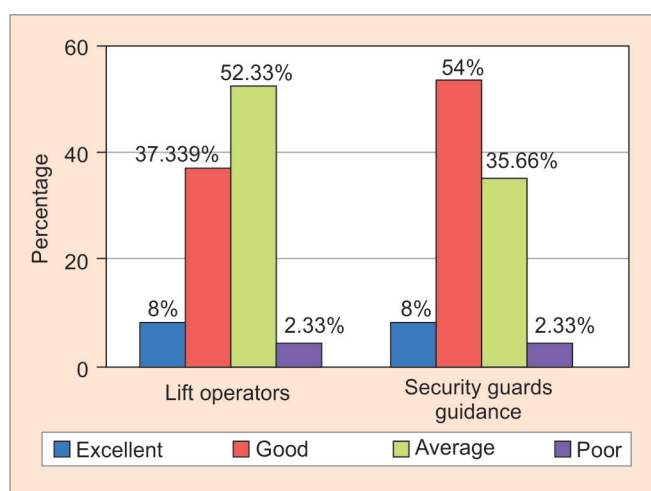
The healthcare system is basically service based, so patient experiences and their satisfaction is of the utmost importance. It has a direct impact on improving the quality of care in the health service.⁹ The theme of the current study touches a very important aspect of healthcare services, i.e., delivery of quality health services. We



Graph 4: Distribution of patients satisfaction about nursing services



Graph 5: Distribution of patients satisfaction about housing keeping services



Graph 6: Distribution of patients satisfaction about other services

attempted to assess the quality of services rendered at this multispeciality teaching hospital with a view to improving them by identifying the gaps and bridging them. In addition, this study also tried to identify factors associated with the perception of quality of services and overall satisfaction of the patients. The findings of the survey are quite helpful if they are transformed into actions for improving the quality of healthcare.

Measuring patient satisfaction has many purposes, but there are three prominent reasons to do so.

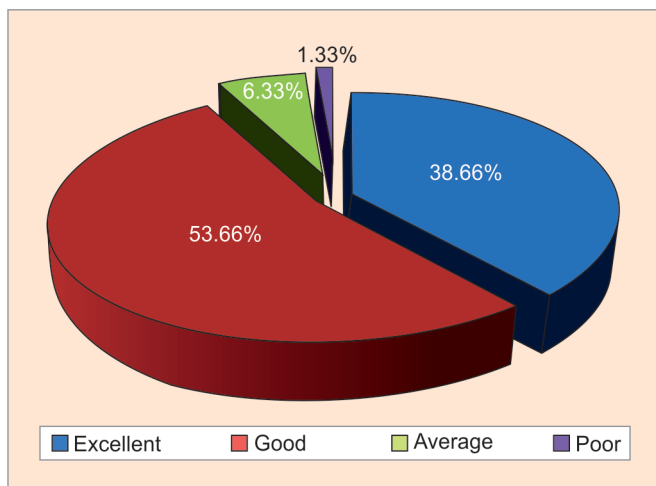
It will help to evaluate healthcare services from the patient's point of view, facilitate the identification of problem areas and help generate ideas towards resolving these problems. Despite a pretty good level of patient satisfaction, a small proportion of patients expressed dissatisfaction. The fact that patients expressed dissatisfaction with the services indicates that hospital administration needs to do more in the drive towards improving services.¹⁰

In this study, most of the patients were satisfied with most of the services offered at this tertiary care

multispeciality teaching hospital. The overall satisfaction of patients with services received from this healthcare center came out to be 92.32% (Graph 7). This is consistent with many other studies done elsewhere.

The patients intending to utilize the hospital services will have his or her first interface with the front office of the hospital. So it is vital for patients to receive adequate information at the front office regarding hospital policies and rules. In the present study, most of the patients were satisfied with front office activities like admission procedure, information about hospital policies and procedures and discharge processes, etc. The dissatisfaction with front office activities by few respondents could be due to their visit to the hospital during holidays or when the hospital had a heavy influx of the patients because of which there may be a slight delay in the activities.

Doctor's behavior has the greatest effect on patient satisfaction.¹¹ Attributes that hold steady for good doctor-patient relationship are sympathy and kindness, good communication between patients and



Graph 7:-Distribution of patients satisfaction about overall services offered

doctors, and patience and shared responsibility in managing illness of the patient. In the present study more than 90% of the patients were satisfied by the professional services rendered by the doctor like care and attentiveness towards them and discussion about their clinical conditions and treatment rendered, etc. which is quite similar to a study conducted by Verma et al.¹² where 84% of the patients expressed their satisfaction in response to the description of disease status by doctors. In a study by Kulkarni et al. patients were more satisfied with the behavior of doctors (87.8%).¹³ Bhattacharya et al. also reported 98.2% of patients were satisfied with the behavior of doctors.¹⁴

The nursing care provided by the nursing staff is regarded as the most important factor in the patient assessment of their satisfaction with healthcare. Nurses are the front-liners in healthcare; they stay with patients more than the other members of the healthcare team, and as claimed by Needleman and Hassmiller, nurses have a critical role in the delivery of high-quality, efficient care that will overall affect the patient satisfaction.¹⁵ In the present study, most of the patients were found satisfied with attention and care provided by nursing staff. In the current study, 92% of patients were satisfied with providing prescribed medications in a timely manner whereas it was 93% as studied by Verma et al., i.e., the results are quite similar.

In the present study, more than half of the patients were satisfied with the quality of food served in the hospital, while 21% of the patients expressed dissatisfaction. Aarti et al. in her study concluded that 19.8% of patients were dissatisfied with the quality of food served.¹⁶

In the present study, more than 80% of the patients/patient's relatives said that they were satisfied with cleanliness maintained in the wards as well as of this healthcare center. The better cleanliness could be due to a sufficiently trained class of hospital housekeeping

employees. Few studies have findings similar to the present study while the dissatisfaction level was at the higher side when compared to this present study. Verma et al.¹² in his study reported that 73% of patients were satisfied with cleanliness maintained in wards which is lower than the present study.

Present study revealed that, more than half of the patient's/patient's relatives were not satisfied with lift operator's guidance i.e., 54% of them expressed their dissatisfaction, the probable reason could be due to shortage of staffs which may cause overburden of work on them, and the staffs may be illiterates, so more regular training sessions on behavioral communication is required.

This study has several strengths. First, we have conducted this study to improve the quality of services rendered at this multispecialty teaching hospital. To our knowledge, such domain has not been analyzed by experts of the field in this hospital. Second, the paucity of literature also warranted this study. Third, data collection was done by a single author to reduce interobserver variation.

On the other hand, there have been a few limitations as well. First, the current study catered only indoor patients. To evaluate the actual quality of services it should have included OPD and emergency services also. Second, specialty ward wise services could not be compared due to time constraints. Third, the findings emerging out of the current study cannot be generalized or extrapolated to all other hospitals of India as the satisfaction levels of patients will be different in different studies. The responses of patients depend upon their socio-economic profile, personality, and their perceptions; some may be satisfied with average services, while others may be dissatisfied even with the best. In the present study, most of the respondents belonged to rural areas and middle or low socioeconomic class. Henceforth, it implies caution while comparing results from such a survey wherein the outcome may be largely associated with the socio-demographic profile of the study population.

CONCLUSION

Feedback of patients is one of the key parameters in assessing the quality of hospitals. The feedback results showed that most of the patients were satisfied with most of the services in Hospital under study and the doctor's care and nursing services have the highest satisfaction level, which is very satisfactory and encouraging but there is always a scope for improvement. More than 85% of the patients rated most of the parameters as good or excellent.

<p><i>Major satisfiers were:</i></p> <ul style="list-style-type: none"> • Quality and behavior of doctors • Explanation about disease and treatment by the doctors. • Courtesy of staff at the admission counter • Behavior of nurses. • Timely discharge process 	<p><i>Dissatisfiers were:</i></p> <ul style="list-style-type: none"> • Lift operators guidance • Behavior of the security guards • Quality of food and dietary services. • Explanation about hospital charges and costs in the billing counter • Cleanliness maintained
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RECOMMENDATIONS

An assessment of the level of patient satisfaction related to inpatient care reminded us of certain areas that need improvements, to upgrade the hospital's service quality further. Hence the following recommendations are made:

Front Office

It was observed that briefing about the hospital charges and costs at the billing counter has got an average response of 13% and poor response of 5%. Hospital charges should be explained well to the patient/patient relatives before getting admitted to the hospital. However, this policy of revising rates may be looked into. There should be package charges for some procedures to avoid running around by the patient's attendant for minor requirements.

Behavior of Doctors

Although 91% of responses showed that the doctors at Hospital were excellent, yet around 9% of people felt that the doctors have become less sensitive and empathetic to their problems. The new generations of doctors should be trained and the value of empathic care and soft skill must be re-emphasized

Dietary services have got a 17% average and 14% poor response. It was the second major dissatisfier. The quality and quantity of food, especially the quality of idly and its presentation should be improved. There were also some complaints of normal diet being given to diabetic patients and this needs careful monitoring.

Housekeeping

The cleanliness of toilets should be improved. Although it may be done thrice a day and housekeeping staff is posted in all the wards round the clock in sufficient numbers to maintain the cleanliness of the wards/toilets, frequent and surprise checks by housekeeping executives and administrators will instill a sense of responsibility and alertness among housekeeping staff.

The timing for activities like nursing, cleaning, ward rounds should be fixed, so that the patient is mentally prepared for the same and can take rest at other time and they should be regularly trained and sensitized about how to improve their image and behavior.

Behavior of Lift-operators/Security Guards

Fifty-two percent of the patients were disturbed due to improper guidance of lift operators and about 35% of the patients we are not satisfied with the security guards behavior. Some people complained about the bad behavior of hospital security personnel. Security guards and lift operators must be trained properly by the hospital authorities. The behavior of hospital staff should be improved by conducting special sessions for behavior change communication.

A follow-up study is recommended to be conducted among healthcare providers on challenges they are facing in meeting patients' expectations.

ACKNOWLEDGMENTS

Authors would like to thank the institution for permitting to conduct this study.

Authors would also like to thank public relation officer Mr. Jeevan for his constant support in the process of providing data and required information for this study.

Authors are also grateful to authors, editors, and publishers from where the literature for this article has been reviewed and discussed.

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Financial Prudence of Healthcare Screening Program in Urban Set-up

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ABSTRACT

Introduction: Health screening is one of the rapidly growing and accepted practice in healthcare setup across the globe. Public health screening programs are used to control epidemics of infectious disease and to target treatment for numerous chronic diseases.

Methods:

Duration of the study: The study was carried out from November 2018 to January 2019.

Study setting: The study was carried out at Meerut.

Study design: Traditional costing was done, and then a comparison was drawn to estimate the realistic costs incurred towards medical camp.

Results: The cost of screening during the camp was INR 616 per person. With this cost, a large number of disorders were detected in an early stage which has the potential to develop in full-blown disease which may cause more cost to society at large. Hence this study recommends such screening program for families should be carried out on the frequent interval at least annually.

Conclusion: Public health screening programs are used to control disease and to target treatment for acute or chronic diseases. Medical screening programs provide medical as well as socioeconomic benefits. Medical screening is a method for detecting disease or body dysfunction before an individual would normally seek medical care. The fundamental purpose of screening is early diagnosis and treatment of the individual and, thus, it has a clinical focus. Screening tests are generally administered to people who have not yet sought medical care, but at high risk for certain adverse health outcomes. This is a very cost-effective method of preventing the disease at an early stage. The study revealed the screening program is a very effective tool, as shown in this study.

Keywords: Cost-benefit evaluation, Cost-effectiveness, Healthcare, Screening program.

How to cite this article: Singh MM, Singh N, Kumar A, Patnaik SK, Sharma A, Paul T. Financial Prudence of Healthcare

Screening Program in Urban Set-up. Int J Res Foundation Hosp Healthc Adm 2018;6(2):51-56.

Source of support: Nil

Conflict of interest: None

INTRODUCTION

Health screening is one of the rapidly growing and accepted practice in healthcare set-up across the globe.¹ Public health screening programs are used to control epidemics of infectious disease and to target treatment for numerous chronic diseases.² Proponents of screening programs stress that in addition to the potential of early disease detection, they also provide the opportunity for screening participants to change unhealthy lifestyles through the so-called lifestyle counseling.

Health screening tests have a great impact on public's health because they involve testing of asymptomatic populations for specific diseases or health conditions.³ Medical screening is conducted by the examination of individuals with no signs for the disease to detect those at higher risk of having or developing a disease. Its result in identifying the disease early for better interventions and management of the disease. It divides the people into two categories who are likely to develop and those who are unlikely to develop the disease.

A cost-effectiveness analysis is used when a cost-benefit analysis is not a viable analysis option because you can't place value on the outcome. This method is most commonly used in healthcare when evaluating various treatment plans, health screening program, etc. Providers can assess the cost of a given course of action/program such as physical therapy versus surgery or medical camp. However, it is difficult to predict and value outcomes because patient success and obstacles are all unique and different.

METHODS

Duration of the Study

The study was carried out from November 2018 to January 2019.

Study Setting

The study was carried out at Meerut.

¹Commanding Officer, ^{2,3}Medical Officer, ⁴Associate Professor, ⁵HOD, ⁶Dental Officer

^{1-3,6}Field Hospital, C/O 56 APO

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Study Design

Traditional costing was done using the existing information, and then a comparison was drawn to estimate the realistic costs incurred towards medical camp.

P1 Cases
Focal reversible pulpitis
Acute palpititis
Chronic pulpitis
Chronic hypoplastic pulpitis
Periapical abscess
Periapical cyst
Periapical granuloma
Cellulitis
Acute necrotizing ulcerative gingivitis
Chronic herpetic gingivostomatitis
chronic marginal gingivitis
Pericoronitis
All root stumps/extraction
all denture cases
P2 Cases
Periodontal pocket
Tooth attrition abrasion erosion
Smooth surface caries
Cervical caries
P3 Cases
Grade 1 calculus
Tarter
Stains
Deposit cases without marked gingivitis and pinpoint cavities

Data Collection, Tabulation, and Computation

The cost information was collected from each department and facilities involved in the medical camp. The health screening was conducted for families (women > 25 years of age) to ruled out any impending healthcare problem. The following examination was conducted by a doctor and dental officers to check.

- Checking of vital parameters: pulse, BP, temperature, respiratory rate, weight, a sign of anemia
 - Any skin disorder, eye checkup, sign for any thyroid disorders
 - Dental checkup for all 3 categories (P1, P2, and P3)
- After screening medical and, dental examination following lab test was conducted:
- Biochemistry (Include)
 - Hematology (TLC, DLC)
 - Urine RE
 - Cholesterol
 - Triglyceride
 - Uric acid
 - Sugar: Fasting and postprandial
 - Hemoglobin

After lab result were obtained the data were analyzed using appropriate statistical data and Excel. The cost of manpower, vehicle, lab reagent was calculated as under in Table 1.

The cost of lab reagent taken for medical camp for lab investigation as shown in Table 2.

The total cost is calculated as under Table 3.

The lab results were analyzed as shown in Table 4.

Out of 232 female respondents, following medical abnormalities were detected as shown in Table 5. The results of the screening program were overwhelming. The female population screened were suffering from overweight (19 %), out of which 4 were required under attention to reduce their weight (>30%) overweight. These patients were advised diet as well as moderate exercise to start with and follow-up. The skin disorders were mostly related to environment related like dry/cracked skin, eczema, psoriasis, acne, rosacea, ichthyosis, vitiligo, hives, and seborrheic dermatitis.

The female respondents showed clinical features of thyroid disorder while screening was dry, itchy skin, dry, coarse hair, hair loss, weight loss, despite normal eating habits, enlargement of the thyroid gland (goiter), change in menstrual cycles and bulging eyes.

All these patients were referred to a concerned specialist for future treatment. The eye problems were also detected during screening mostly near, and distant vision all of them sent to an ophthalmologist for an opinion.

Out of 232 female respondents, following dental abnormalities were detected as shown in Table 6. The dental abnormalities are common in all ages because of poor dental hygiene and not using appropriate dental products.⁴

A large number of respondent were not aware of their blood group. The blood grouping was conducted in the camp. The results are shown in Table 7.

Table 1: Cost of manpower, vehicle per day

Manpower	Per day salary	Total
Medical officer-01	4000	4000.00
Dental officer-01	4000	4000.00
Health JCO-01 (paramedic)	1800	1800.00
Health NCO-01 (paramedic)	1100	1100.00
Dental JCO-01 (paramedic)	1800	1800.00
Dental NCO-01 (Paramedic)	1600	1600.00
LAB NCO-02 (Paramedic)	1650 + 1650	3300.00
BTA NCO-01(Paramedic)	1600	1600.00
Nursing Assistant-01 (paramedic)	1300	1300.00
Ambulance Asst - 03 (paramedic)	1066 + 1066	3200.00
Housekeeper-02	1300+1300	2600.00
Driver-01	1100	1100.00
LS Vehicle-01	14 + 3 +14	558.00
	= 31 km 4 km/ltr	
	= 7.75 × 72.00	
		27958.00

Table 2: Cost of lab reagent per day

S. No.	Nomenclature	A/U	Qty	Supply rate	Qty reqd	Qty/01	Qty /100	Day 1 (72)	Day 2 (71)	Day 3 (99)
1.	Glucose kit of 400 mL	Kit	1	370.00	2	1.95	194.74	140.2105	138.2632	192.7895
2.	Urea kit of 100 mL	Kit	1	1160.00	1	12.89	1288.89	928	915.1111	1276
3.	Creatinine kit of 100 mL	Kit	1	1060.00	1	11.78	1177.78	848	836.2222	1166
4.	Uric acid kit of 100 mL	Kit	1	1458.00	1	16.20	1620.00	1166.4	1150.2	1603.8
5.	Cholesterol kit of 100 mL	Kit	1	1044.00	1	11.60	1160.00	835.2	823.6	1148.4
6.	Triglyceride kit of 100 mL	Kit	1	2310.00	1	25.67	2566.67	1848	1822.333	2541
7.	HDL cholesterol kit 100 mL	Kit	1	1230.00	1	13.67	1366.67	984	970.3333	1353
8.	LDL cholesterol kit 100 mL	Kit	1	1230.00	1	13.67	1366.67	984	970.3333	1353
9.	Bilirubin kit of 100 mL	Kit	1	925.00	1	10.28	1027.78	740	729.7222	1017.5
10.	Total protein kit of 100 mL	Kit	1	470.00	1	5.22	522.22	376	370.7778	517
11.	Albumin kit of 100 mL	Kit	1	725.00	1	8.06	805.56	580	571.9444	797.5
12.	SGOT kit of 100 mL	Kit	1	1210.00	1	13.44	1344.44	968	954.5556	1331
13.	SGPT kit of 100 mL	Kit	1	1325.00	1	14.72	1472.22	1060	1045.278	1457.5
14.	Drabkin's solution.	Ltr	1	210.00	5	1.05	105.00	75.6	74.55	103.95
15.	Leshmen stain bott of 500 mL	Bott	1	380.00	1	0.76	76.00	54.72	53.96	75.24
16.	Glass slide pkt of 50	Pkt	1	80.00	2	1.25	125.00	90	88.75	123.75
17.	Anti sera A 10 mL/100 test	MI	1	87.00	0.1	0.87	87.00	62.64	61.77	86.13
18.	Anti sera B 10 mL/100 test	MI	1	87.00	0.1	0.87	87.00	62.64	61.77	86.13
19.	Anti sera O 10 mL/100 test	MI	1	87.00	0.1	0.87	87.00	62.64	61.77	86.13
20.	Anti sera AB 10 mL/100 test	MI	1	87.00	0.1	0.87	87.00	62.64	61.77	86.13
21.	Anti sera D 10 mL/100 test	MI	1	87.00	0.1	0.87	87.00	62.64	61.77	86.13
22.	Urostrippkt of 100	Pkt	1	440.00	1	4.40	440.00	316.8	312.4	435.6
23.	Urine cotainerpkt of 100	No	1	7.00	1	7.00	700.00	504	497	693
24.	Vacutainer Sterile	No	1	4.80	1	4.80	480.00	345.6	340.8	475.2
25.	Vacutainer EDTA	No	1	4.80	1	4.80	480.00	345.6	340.8	475.2
26.	Vacutainer sodium fluoride	No	1	4.80	2	4.80	480.00	345.6	340.8	475.2
27.	Microtips 200–1000 yl pkt of 500	No	1	200.00	1	0.40	40.00	28.8	28.4	39.6
28.	Microtips 0.5–200 yl pkt of 1000	No	1	200.00	1	0.20	20.00	14.4	14.2	19.8
29.	Syringe 5 mL pkt of 100	No	1	3.90	2	7.80	780.00	561.6	553.8	772.2
30.	Sterilium	No	1	390.00	1	390.00	390.00	390.00	390.00	390.00
31.	Cotton 50 g	Roll	1	25.00	1	25.00	25.00	25.00	25.00	25.00
32.	Gloves pkt of 25	No	1	362.50	1	14.50	14.50	14.50	14.50	14.50
33.	BMW polythin	No	1	9.00	3	10.00	30.00	30.00	30.00	30.00

Table 3: Total cost of screening camp

S. No.	Cost Head	Per day cost	Total
1.	Manpower + veh	27958.00 x 3	83875
2.	Lab reagent cost (N = 232)	14913 +14712 + 20333	59058
			1,42,932
Total screening cost per patient (N = 232)			1,42,932/232 = 616.08 inr

Table 4: Lab investigation

Test	Total Number of tests	Abnormal Test	% abnormal	% normal	Remark
Biochemistry	3952	67	1.69	98.31	
Hematology	964	33	3.42	96.58	
Urine	1046	26	2.48	97.51	Abnormal urine RE
Cholesterol	232	43	18.53	81.46	High cholesterol (> 200 mg %)
Triglyceride	232	8	3.44	96.55	High triglyceride (> 150 mg %)
Uric acid	232	8	3.44	96.55	High uric acid (> 7 mg)
Blood sugar	232	12	5.17	84.82	High blood sugar (F: > 110 mg /dL. PP > 140 mg/dL)
Low Hemoglobin	232	33	14.22	85.77	Anemia (Hb < 9 gm %)
Bilirubin	232	2	0.86	99.13	High Bilirubin (Icterus ++)

Table 5: Medical abnormalities detected

Disease/abnormality detected	Number of cases
Skin disorders	08
Sign of thyroids disorders	04
Low vision (distant/near)	26
Overweight (> 10 %)	46
Anemia (< 9 gm % Hb)	33
High Blood sugar (F : > 110 mg /dL PP > 140 mg /dL)	12
Jaundice high bilirubin (Icterus ++)	2
High uric acid (> 7 mg)	8
High cholesterol (>200 mg %)	43
High triglyceride (>50 mg %)	8
UTI	4

Table 7: Blood grouping result

Blood group	Positive	Negative	Total
A	57	03	60
B	73	03	76
AB	19	02	21
O	72	03	75
Total	221	11	232

The cost of screening during the camp was INR 616 per person. With this cost, a large number of disorders were detected in an early stage which may develop in full-blown disease which may cause more cost to society at large. Hence this study recommends such a screening program for families should be carried out on the frequent interval at least annually.

DISCUSSION

Screening is commonly used for case finding—identifying a previously unknown or unrecognized clinical condition in apparently healthy or asymptomatic persons and offering treatment to those individuals. Screening might be defined as the active search for a disease (or a pre-disease condition) in patients who are presumed and presume themselves to be healthy. In such a setting, screening is, in general, not able to reduce the likelihood of a certain disease; however, it may reduce its negative consequences. Therefore, screening is a form of secondary prevention.

The cost-benefit evaluation and the cost-effectiveness evaluation are two different tools that we choose to use evaluate business decisions. Both methods are used to comparing the future or impending purchase of new equipment or programs based on their cost and their expected benefits to the company, but one may be more suitable for certain circumstances than the other.

The cost-effectiveness methods are a more appropriate method for any health screening prog. A cost-effectiveness evaluation use to compare is more complex than the cost-benefit method because it involves more components.

Table 6: Dental abnormalities found during medical screening CAMPB 4

Cases	Number of cases detected
P1 cases	50
Focal reversible pulpitis	5
Acute palpitis	4
Chronic pulpitis	6
Chronic hypoplastic pulpitis	2
Periapical abscess	12
Periapical cyst	2
Periapical granuloma	1
Cellulitis	2
Acute necrotizing ulcerative gingivitis	3
Chronic herpetic gingivostomatitis	2
Chronic marginal gingivitis	1
Pericoronitis	6
All root stumps/extraction	4
All denture cases	NIL
P2 cases	51
Periodontal pocket	10
Tooth attrition abrasion erosion	6
Smooth surface caries	28
Cervical caries	6
P3 cases	77 (Overlap of diseases)
Grade 1 calculus	28
Tarter	22
Stains	22
Deposit cases without marked gingivitis and pinpoint cavities	61
Fit cases	54

A cost-effective analysis provides more insights into potential success.

Criteria for an effective screening test.⁵The following criteria need to be met to have an effective screening program:

- Significant societal burden
- Detectable asymptomatic phase
- Accurate screening test
- Acceptable and feasible test
- Effective intervention for those screened positive
- Effective prognostication of those screened positive.
- Cost-effectiveness of the screening program and its availability on a continuing basis
- Presence of safeguards to ensure informed consent and patient confidentiality

Criteria of Wilson and Jungner (Bull World Health Organ, 1968)

- The conditions sought should be an important health problem.
- There should be an accepted treatment for patients with recognized disease.
- Facilities for diagnosis and treatment should be available.



- There should be a recognizable latent or early symptomatic stage.
- There should be a suitable test or examination.
- The test should be acceptable to the population.
- The natural history of the condition, including development from latent to declared disease, should be adequately understood.
- There should be an agreed policy on whom to treat as patients.
- The cost of case-findings (including diagnosis and treatment of patients diagnosed) should be economically balanced in relation to possible expenditure on medical care as whole.
- Case-finding should be a continuing process and not a “once and for all” project.

Cost-effectiveness analysis (CEA) is the best decision-making tool. It identifies the economically most efficient way to fulfill an objective. CEA of screening prog is used to determine whether a screening intervention is economically efficient, by comparing its costs and effects with costs and effects of all alternatives including doing nothing.

Over-diagnosis and overtreatment is a main concern for many screening tests particularly when evidence either points to net harm or it is insufficient, conflicting or supports only a few magnitudes of net benefit.⁶

Gender bias results in the neglect of female children and selective abortion and excess female mortality in China, India, and other South Asian countries, explaining the “missing” women in population counts. The global burden of disease for 2001 proportionally affects males slightly more than females.

Good maternal health services are one of the keys to strengthen the entire health system. A healthcare facility that is well equipped to provide the most essential obstetric care can also treat accidents, trauma, and other medical emergencies.⁷

Recently, in one of the reports of World Bank (2006) has also reported that chronic and noncommunicable diseases are now main leading causes of death across the globe, amounting for about 60% of all deaths.⁸

Another recent study conducted in Andhra Pradesh by Joshi et al.⁹ points to similar evidence with regard to the majority of deaths occurring due to non-communicable diseases and injuries. Nevertheless, India is known for gender discrimination in terms of healthcare utilization, food allocation, etc. Studies conducted during the 19th-century point out females being restricted from seeking healthcare leads to poorer health status.¹⁰ The India GBD Collaborators¹¹ reported that leading cardiovascular diseases—*ischaemic heart disease* and *stroke*—are one of the largest contributions to the total mortality in India in 2016, at 28.1%.

National program in India is running in a focal manner where more emphasis on providing secondary care. Screening program is running without the provision of lab reagent due to lack of fund.

CONCLUSION

Public health screening programs use to control disease and to target treatment for acute or chronic diseases. Medical screening programs provide medical as well as socioeconomic benefits. Medical screening is a method for detecting disease or body dysfunction before an individual would normally seek medical care. If medical screening programs are poorly conceived, organized, or implemented, they may lead to interventions of questionable merit and result may be biased. The fundamental purpose of screening is early diagnosis and treatment of the individual and, thus, it has a clinical focus. Screening tests are generally administered to people who have not yet sought medical care, but at high risk for certain adverse health outcomes. This is a very cost-effective method of preventing the disease at an early stage. The study revealed the screening program is a very effective tool, as shown in this study.

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A Study on Prevalence of Domestic Violence among Women in Servant's Quarters of a Tertiary Care Hospital in North India

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ABSTRACT

Introduction: Domestic violence (DV) is a major human right and public health problem which can have physical as well as mental health-related adverse effects.

Aim: To study the magnitude, type, and causes of domestic violence against women in the servant's quarters of a tertiary care hospital in North India.

Materials and methods: A questionnaire-based study was conducted in servant's quarters of AIIMS, New Delhi from March 2018 to September 2018 among women of 18 to 65 years. A questionnaire was specifically designed, validated and subsequently used for collecting data on domestic violence. It covered all the information regarding socio-demographic details of the participants as well as their experience with domestic violence. The data collected was then analyzed using the Statistical Package for Social Sciences (SPSS).

Results and discussion: In the study population it was found that 36.4% (75) women suffered from domestic violence, out of which 35.5% (71) were married, 4% (3) unmarried and 1.33% (1) widow with a mean age of 34 years. It was seen more among young age group, less educated females, early years of marriage, more number of family members living as a joint family and among females having spouses with alcohol addiction. The most common type of abuse was emotional (psychological) followed by physical and economical. Majority of them responded that alcohol addiction and financial difficulties were primary reasons for violence happening more than once in a month in (57.3%). The most common consequence suffered by females was psychological followed by 17.3% complaining of severe health effect. 33.4% of respondents took a corrective step of which only 4% showed improvement.

Conclusion: Domestic violence was found to be highly prevalent and alcohol emerged out to be a major risk factor.

Keywords: Abuse, Addiction, Domestic violence.

How to cite this article: Bhatnagar A, Gupta SK, Hans G, Vikas H, Garg N, Pandey V. A Study on Prevalence of Domestic Violence among Women in Servant's Quarters of a Tertiary Care Hospital in North India. *Int J Res Foundation Hosp Healthc Adm* 2018;6(2):57-62.

Source of support: Nil

Conflict of interest: None

INTRODUCTION

Domestic violence (DV) is prevalent among women in India and has been related to poor mental and physical health consequences.¹ It is considered similar to violence against women and is described as a phenomenon influenced by multiple determinants.² It refers to needs of domination, the hierarchy of authority and obliteration of the other which can be used consciously in marriages as a path for the subordination of women by their partners.³

World Health Organization (WHO) defines DV as "the range of sexually, psychologically and physically coercive acts used against adult and adolescent women by current or former male intimate partner declaring it a public health epidemic".⁴

The Protection of Women from Domestic Violence Act (PWDVA), 2005 defines domestic violence as "any act, omission or commission or conduct of the respondent, which includes the threat or actual abuse".⁵ In India, a National Family Health Survey (NFHS) III 2005 to 2006, carried out in 29 states found that 37.2% of women experienced violence after marriage, 87% were spousal violence.⁶ After implementation of PWDVA, the data from 16 states in NFHS-4 (2014–2015) shows a substantial decline among states, implying a maximum a fall of 15.8% in 10 years for spousal violence.

Among various proposed causes of DV and its increasing frequency in India are deep-rooted patriarchal roles of males and long-standing societal norms that propagate women as inferior throughout their lifespan.⁷ It can be manifested in form of physical, psychological, financial, emotional, social isolation, verbal or coercive control, etc. Several studies have found significance of factors that are associated with DV including individual's factor (young age,

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heavy drinking, depression, personality disorders, low academic achievement, low income, witnessing or experiencing violence as a child, employment, drug addiction, poor housing, childhood abuse) relationship factors (marital conflict, marital instability, male dominance in the family, economic stress, poor family functioning), community factors (weak community sanctions against domestic violence, poverty, low social capital) and societal factors (traditional gender norms, social norms supportive of violence). DV has substantial public health consequences, which includes general health and reproductive health in a woman. It can be chronic pain/fatigue, injuries, fractures, disability, psychiatric comorbidities, unwanted pregnancy, sexually transmitted diseases, and post-traumatic stress disorders. Also, it has a bad influence on the economic progress of a country in the form of increased economic costs including loss of woman's labor hours and health-care costs.^{8,24} Children are also known to suffer from health consequences, in the long run, having symptoms like depression and anxiety, externalizing behaviors like aggression and trauma-related symptoms in children and adolescents. They are likely to face troubles in domains like academic difficulties, high-risk sexual behaviors, substance abuse and adverse environmental risk factors like poverty, neglect, and malnutrition which further making their prognosis worse. DV is variable with the level of literacy, age, local social and cultural norms. It is important to assess this in a given geographical area in order to initiate supportive measures.⁹

With this background, the present study was undertaken to find out the prevalence, types, causes, effect on women/children and the corrective measures of the domestic violence in the servant quarters of a tertiary care hospital in North India.

METHODOLOGY

A questionnaire-based cross-sectional study was conducted in the servant's quarters of a tertiary care multi-specialty teaching hospital in North India. All women of age group 18 to 65 years residing in the servant's quarters who were available and consented to be a part of the study were distributed the questionnaire. Oral consent was obtained from all the participants in the study and they were explained about the details and intent of the study in a language they could easily understand. The study was conducted between March and September 2018. The ethical clearance was taken from the institutional ethics committee for conducting the study.

Inclusion Criterion

- Women residing in servant's quarters of AIIMS.

- Women aged 18 to 65 years and agreeing to give consent and available for participation in the study.

Exclusion Criterion

- Women not willing to be a part of the study.
- Women who were not available during the time of the visit.

A questionnaire was specifically developed by the authors for the purpose of collecting the details of the participants. A pilot study on 34 participants was conducted to ascertain the face and content validity of the questionnaire. It was validated using the subject's responses.

For the conduct of the study, a local guide was accompanied along with the corresponding author for better communication. The households of groups C and D employees were visited in all the 3 residential campuses of the hospital. The questionnaire was distributed to a female from each household who fulfilled our inclusion criteria. The participants were detailed about all the aspects of the study and informed that their identity will be kept confidential. Oral consent was taken before the registration of the subject. The participants were guided about all the sections of the questionnaire. A total of 206 females were enrolled in the study out of 428 households visited. The data was entered in Microsoft Excel software and analysis was done by using SPSS software version 20.

RESULTS

Out of the total sample size of 206, 75 (36.5%) were affected and 110 (53.4%) were unaffected from domestic violence. Table 1 shows the demographic profile of participants under three heading, i.e., patients having no history of domestic violence, patients having a history of the domestic violence and total. It shows that women of younger (37.3%) age group are affected more with a mean age of 34 years. Out of 75 males practicing domestic violence, 63.38% (45) of them had barely completed school, 22.86% (8) graduates while 29.33% (22) had no education at all, it was found to be statistically significant. It was seen that domestic violence was seen most among the helpers 72% (54), 21.3% (16) private jobs and 10% (8) were having permanent jobs. 10.66% (8) were having a nuclear family whereas 56% (42) were living in a joined with maximum 1 earning member (68%) from which 10.6% (8) had 1–3 members 32% (24) 4–6 members and 57.07% (43) had more than 6.58.7% (44) had 1–2 children, 25.4% (19) had 3–4 children and 9(12%) had more than 4 which was found to be statistically significant with domestic violence. 46.5% had completed 1 to 5 years of marriage, 33.4% completed 5–10 years while 14.5% had more than 10 years marriage which was proved to be significant.

Table 1: Demographic profile of participants

Demographic factors		No history of domestic violence		History of domestic violence		Total	
		N	%	N	%	N	%
Age	18–30	52	62.65	31	37.3	83	40.1
	30–45	45	64.2	25	35.7	70	33.9
	>45	34	64.1	19	35.8	53	25.7
Education of men	Uneducated	0	0	22	100	22	10.6
	Attended school	54	54	45	45.9	99	48.05
	Graduate	78	90.6	8	9.3	86	41.7
Education of women	Uneducated	23	17.5	34	45.4	57	23.1
	Attended school	83	63.3	40	53.4	123	59.7
	Graduate	25	19.08	1	1.3	26	12.6
Occupation of men	Helper	55	41.9	54	72	109	55.2
	Private job	54	41.2	16	21.3	70	61.7
	Permanent job	22	16.7	8	10.66	30	14.5
Status of relationship	Unmarried	0	0	3	4	3	4
	Widow	0	0	1	1.3	1	1.3
	Married	131	100	71	94.7	202	98.05
Type of family	Nuclear	61	46.5	33	44	94	45.63
	Joint	70	53.4	42	56	112	54.36
Duration of marriage	1–5years	31	23.6	35	46.5	66	32.03
	5–10 years	30	22.9	25	33.4	55	26.7
	More than 10 years	70	53.4	19	14.5	89	43.2
Earning member	1	50	38.1	51	68%	128	49.02
	1–2	81	61.8	24	32	113	50.97
Total number of members	1–3	14	10.6	8	10.6	22	10.67
	4–5	44	33.5	24	32	76	33
	>6	73	55.7	43	57.3	116	56.31
Number of children	1–2	33	25.1	44	58.7	77	37.37
	3–4	60	45.8	19	25.4	79	38.34
	>4	20	15.2	9	12	32	14%
Satisfaction with life	Yes	85	64.8	23	30.7	108	52.42
	No	46	35.11	52	69.4	98	47.5

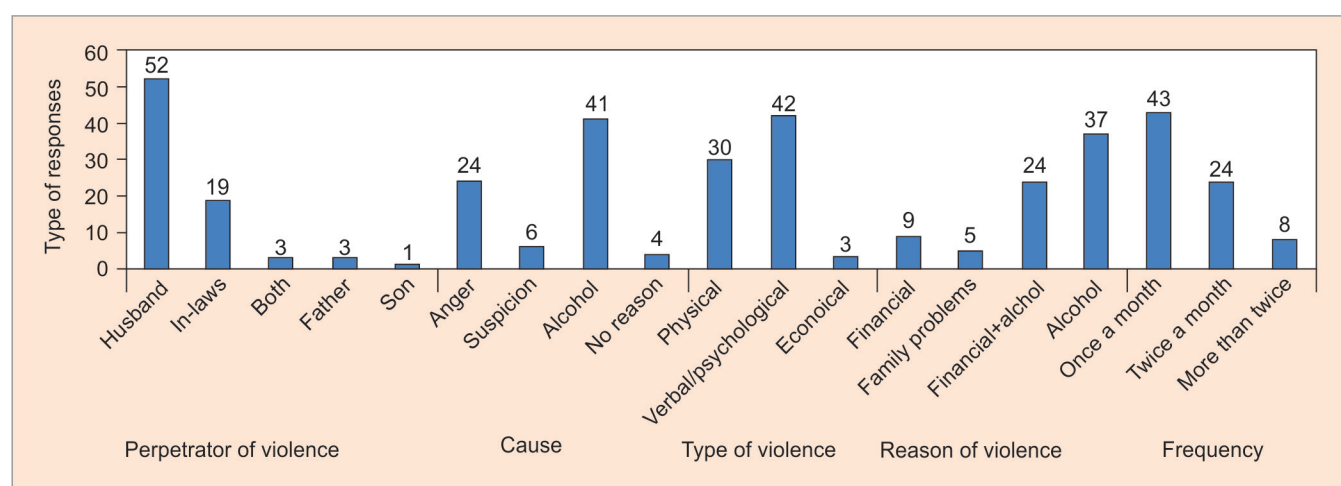
**Graph 1:** Magnitude, type, and cause of violence

Table 2 and Graph 1 deals with data regarding the magnitude, cause, type, reasons and frequency of domestic violence. The data presented here is out of the affected population, i.e., 75, (36.4%).

Among the affected population, 54.6% complained alcohol to be the main cause of violence followed by anger (32%), suspicion (8%) and no reason (5.3%). The most common type of violence was psychological (56%)

Table 2: Magnitude, type, and cause of violence

Magnitude of DV	Affected	75	36%
	Nonaffected	110	53.3%
Perpetrator of violence	Husband	52	69.3%
	In-laws	19	25.4%
	Both	3	5.4%
	Father	3	4%
	Son	1	1.3%
Cause	Anger	24	32%
	Suspicion	6	8%
	Alcohol	41	54.6%
	No reason	4	5.3%
Type of violence	Physical	30	40%
	Verbal/psychological	42	56%
	Economical	3	6%
Reason of violence	Financial	9	12%
	Family problems	5	6.7%
	Financial+alcohol	24	32%
	Alcohol	37	49.3%
Frequency	Once a month	43	57.3%
	Twice a month	24	32%
	More than twice	8	10.6%

physical and verbal (40%), economical (4%) happening once a month (57.33%), twice a month (32%) and thrice a month (10.67%).

There were a total of 57.7% (119) men suffering from alcohol addiction out of which 85.3% (64) practiced domestic violence whereas 14.7% (11) did not have any addiction yet practiced domestic violence. This result was found to be statistically significant.

During an episode of domestic violence out 75, 17.3% had severe health effect whereas 36% had less severe effects. 49.33% have suffered from serious injuries like a fracture, laceration, contusion, and bruises 30% has mental instability and 23% from chronic fatigue out of which only 22.67% had consulted a doctor.

Out of 75, 39.4% women coped up by complaining to their parents, 49.4% by crying, 16% left house, and 4% by being violent with children. Concrete steps were taken by involving police (2.6%), family and friends (24%) and by taking a superstitious step (6.1%) out of which improvement was seen only in 4.1%.³

In this study, it was found that out of 206, 53.3% (110) were aware of the concept of domestic violence maximum among the educated section of women (75%).

DISCUSSION

The prevalence of DV in our study was found to be 36.4% corresponding to data obtained by studies conducted in south India (52.7%),¹⁰ East India (52%),¹¹ and Mumbai¹²

(36.9%). According to WHO, 37.7% of South-East Asia has DV, 37% of the east-Mediterranean region, 36.6% South-African region and 29.8% in the regions of America.¹³

According to this study, the husbands were the usual perpetrator of violence (69.6%) similar to other studies conducted in different regions of India.¹⁴

A study conducted in Goa by Kamat et al.¹⁵ reported that illiterate women suffer 4 times more than the educated and our study found a similar association where 43% have no education and 53% barely completed their high school. According to our study, 41.4% of women belonged to the age group 18 to 30 years with a mean age of 34.4 years which is in concordance with a study by Fahmy et al. among 18 to 50 years who found a significantly higher percentage of domestic violence in younger women (less than 30 years).¹⁶ Women in the younger age group were currently facing domestic violence while women in older age groups gave a history of life experience of domestic violence.

The per capita difference between both the groups was found to be insignificant because the study sample selected had similar salaries. In our study, we found that domestic violence was more in joined families than nuclear which is in agreement with a study conducted by Fernandez.¹⁷ It was observed that violence was found more in the early years of marriage rather than later and also a statistically meaningful relationship with a number of family members which is in with the results obtained in a study conducted in Iran.¹⁸

In our study it was observed that only 37.8% were satisfied with their lives and 54.44% were not able to bear expenses which are in line with the results of the study conducted by Lucena et al.¹⁹ which showed that there is an association between domestic violence and poor quality of life index. The most common type of violence was seen as psychological in form of verbal abuses and isolation followed by physical which was similar with findings of a study by Shrivastava et al.¹² who found total prevalence of domestic violence in Mumbai to be 36.9% with verbal to be the most common form of domestic violence in 87 (86.1%) followed by physical violence in 64 (63.4%) and other type violence among 24 (23.8%). Physical violence is prevalent in 40% of participants corresponding to the data of NFHS-3 for the state Tamil Nadu (49%).²⁰

The most common consequence suffered by females was psychological (verbal) 56% which corresponds to studies from North Bengal (54.5%).²¹

Domestic violence happening in front of children and adolescents also has adverse effects on them in the form of depressive symptoms, personality disorders, anti-social behavior, misbehavior and indulgent in bad habits like gambling and alcohol. Such results are also evidenced in various studies.²²

A study conducted by Klap et al.²³ in US stated that only 7% of women reported were ever asked about domestic violence or family violence by a general practitioner of which 46% were asked in a primary care setting, and 24% were asked in a mental health specialty setting which stresses on the need of screening since such issues are not reported by women voluntarily. By screening not only will it help to increase their level awareness but also can help to know the root cause of any condition been presented in OPD for optimum care of the patient.

The likelihood of DV occurrence was common among women who reported problem drinking by their partners (76%). Alcohol was responsible in 49.33% cases as a single factor giving rise to any fight/argument resulting in violence. This is supported by evidence from previous studies conducted in Ghana,²⁴ North India,²⁵ Bangladesh,²⁶ Haiti,²⁷ and Kolkata²⁸ making alcohol the most common risk factor of domestic violence against women. Another study conducted by White et al.²⁹ also shows that heavy drinking by partners put women at greater risk for female victimization. It is shown that alcohol operates as a situational factor, increasing the probability of violence by decreasing inhibitions, clouding decision making and disabling an individual's ability to think about consequences.³⁰

In our study, 50% of women had compromised with the situation, which is in agreement with other studies (2012).³¹ The results of several other studies indicate that

intervening social support acts as an external medium that reduces domestic violence in families.³² This correlation shows compassionate relationships peripheral to the family can promote healthy behaviors inside the family, and how the presence of social support may act as a protective and an immunizing factor to omit violence towards women from their spouses. A study conducted by Vameghi³³ and Gillum³⁴ showed a direct relationship between the lack of social support and domestic violence.

However, in our study, it was observed that the steps taken by women against domestic violence did not show a significant improvement and it was seen only in 4% households.

LIMITATION

Since the sample was taken from a relatively homogenous sample of similar socio-economic background the generalisability of the study findings is difficult since it is well known that the prevalence varies to a great extent in different socio-economic conditions.

CONCLUSION AND RECOMMENDATIONS

- Domestic violence is highly prevalent among females in the servant's quarter.
- Alcohol addiction, low education status in men, younger age and number of family members are found to be major risk factors.
- Psychological effects on women followed by chronic fatigue and a bad influence on children are found to be major after-effects of domestic violence.
- Healthcare system can play a vital role by screening women first as a part of examination increasing their awareness and diagnoses of any condition arising from it.
- Further, analyses should be done in relation to the mental health of women suffering from DV and de-addiction services should be offered to the spouses of women suffering from domestic violence
- Self-help groups/ASHA help should be taken to carry out mass awareness programmes among illiterate women about their legal rights and domestic violence act
- Overall, education should be increased among girls and boys from a young age

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Improving the Efficiency of Refraction Services at a Tertiary Care Eye Hospital Using an Action Research Methodology

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ABSTRACT

Background: The hospital under study is a 300 bedded tertiary care eye hospital in New Delhi, India. The hospital being the apex tertiary care eye institute of the country faces a constant issue of demand-supply mismatch. Due to the demand-supply, the appointment system for refraction posed problems of uncertainty and non-availability of appointments for the same resulting in delay in diagnosis and hence patient dissatisfaction.

Objective: The main aim of the exercise was to ascertain the cause and to find an amicable solution for the uncertainty in the appointment system for refraction.

Methodology: Action research methodology was applied to the process in the form of planning, implementation and evaluation in 2 cycles. The existing registration process was analysed in the first phase and the problems identified. In the first cycle, the detailed workflow process analysis and capacity calculation of Refraction services was carried out following which the problems were identified and actions were planned in a collaborative manner. The planned actions were implemented and evaluated. Based on the evaluation of the cycle 1 changes were planned for cycle 2 and implemented.

Results: The problems identified in cycle 1 were absence of knowledge about the present capacity, slow registration process, uncertainty of appointment for refraction and lack of display of timings for registration and confirmation of appointments. The calculated capacity for refraction varied between 156 and 120 due to variation in the availability of consultation chambers. The changes planned were sensitisation of staff to the changes, increasing the capping limit of appointments to 160 in the morning and 80 in the afternoon (which included 33% above the capacity to cater to no shows). The results of cycle 1 were evaluated and the problems were identified. The corrective actions were planned for cycle 2 and planned actions were implemented. The capping limit for appointments was increased to 200 in the morning and 100 in the evening

Conclusion: The main objective of the study was to address the patient grievance with regard to uncertainty in appointment by the participatory approach of action research methodology. In conclusion, action research is socially oriented and the intended

outcome will therefore be evidenced through changes in social situations, systems and conditions.

Keywords: Action research, Refraction services, Uncertainty in appointment.

How to cite this article: Kabir I, Tyagi M, Gupta SK. Improving the Efficiency of Refraction Services at a Tertiary Care Eye Hospital Using an Action Research Methodology. *Int J Res Foundation Hosp Healthc Adm* 2018;6(2):63-67.

Source of support: Nil

Conflict of interest: None

INTRODUCTION

As any organization grows with time and in size, it requires assessment of its ongoing processes and adjustment to the changing situation. The processes, defined once, after thorough work up require change with time. However it is well known that "change" in an organization, is always challenged with resistance. The entire efforts of improvement go waste, if the stakeholders involved refuse to adopt the improvement plan. Only a collaborative approach with step wise planning and implementation leads to a successful process change implementation.

Action research is one of the methodologies adopted in these situations as it bridges the divide between research and practice. It rejects the concept of a two-stage process in which research is carried out first by researchers and then applied by practitioners. The findings of the research are fed back directly into practice with the aim of bringing about change. It directly addresses the problem of the persistent failure to make a difference in terms of bringing about actual improvements in practice. Action research places emphasis on the full integration of action and reflection, and on collaboration between those involved in the enquiry process.¹

No social research process can actually avoid changing the situation it investigates: human beings will always respond (in one way or another) when research in any form appears on their scene.²

There is a dual commitment in action research to study a system and concurrently to collaborate with members of the system in changing it in what is together regarded as a desirable direction.³

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Action research is characterized by spiralling cycles of problem identification, systematic data collection, reflection, analysis, data-driven action taken and finally, problem redefinition. Action research is not about learning why we do certain things, but rather how we can do things better.⁴

Our study was aimed at improving the efficiency of the refraction services with minimal addition of resources.

Refraction examination is the first step of eye examination, any delay in this leads to delay in further diagnosis and treatment. The primary requirement at a tertiary care eye institution is a quality and efficient refraction services. The agony of the patients waiting for days for their refraction with no certainty on when the services will be provided to them was understood by the administrators of the study hospital and action research methodology was adopted to bring changes in the present processes to improve the efficiency of refraction services.

The flexible spiral process of action research, involving stages of planning, implementation, evaluation and modification allowed action (change and improvement) and research (understanding and knowledge) to be achieved at the same time.

Problem Statement

The study hospital is a Tertiary Care Eye Hospital in New Delhi, India. The hospital being the largest public sector eye hospital of the country always faces a demand supply mismatch. In the month of February, 2017 a group of patients reported to the Medical Superintendent with a grievance that they were denied consultation for refraction as the number of patients crossed the ceiling limit of 150 appointments and they were not getting a confirmed appointment date, lack of certainty causes multiple visits for refraction examination. There were recurrence of incidences of such complaints from patients regarding delay and uncertainty of appointment for refraction.

The purpose of the study was to ascertain the cause and to find an amicable and sustainable solution for this.

METHODOLOGY

Initially the workflow process was studied. Thereafter two cycles of planning, implementation and evaluation steps were carried out.

Present Scenario

There are five consultation chambers, which are functional in two shifts; 9–1 and 2–4 PM on Monday, Wednesday, Thursday and Friday and single shift 9–1 on Tuesdays and Saturdays, however the chambers are not

available exclusively for refraction as on certain days, some of them are used for routine consultation.

There is one registration counter for registration of refraction patients.

The patients advised refraction on the previous days start queuing up in front of the registration counters as early as 7:30 AM. After 9:30 AM the patients from the doctor's consultation chambers also join the queue.

The security staff deployed collects the cards and deposits them at the registration counter. Once he has collected 150 cards he asks the rest of the patients to come the next day, however the patients do not leave the queue till refused from the register counter.

Registration Process is Manual

Writing the patients detail in the register and writing the room number and patient's number in the queue to that room on the patient's card. The registration starts at 8:30 AM, after 150 patients are registered the rest of the patients are asked to try at 12 PM for the refraction in the evening shift (except for Tuesday and Saturday) or the next day. The patients who decide to wait for the evening shift again queue up. The registration starts at 1:30 PM, after 15 patients are registered the rest of the patients are asked to come on the next day.

The next day they come early and start queuing, if not accommodated continue coming on subsequent days till accommodated.

ACTION RESEARCH CYCLES

Cycle One

Problems Identification and Planning Action

The movement at the refraction counter were observed for five successive days. The written records of the patient's complaints were collected. With this initial data, the administrator held discussions with the stakeholders, that is chief optometrist, medical record officer, the data entry operators, nursing informatics services (NIS) staff and the security supervisor. The problems identified and the action planned is as below:

Absence of Knowledge about Present Capacity

It was brought out during the discussion that the limit of 150 patients has been set long time back when there were more rooms for providing services and the rooms were exclusively used for refraction.

Cause Identification: Lack of scientific data on present capacity for refraction.

Action Planned: Assessment of the Capacity: The total capacity was planned based on a past observational

study,⁵ where 90 observations were made to see the time taken for refraction of one patient, showed that the time taken for refraction of one patient is 5.59 minutes with a Standard Deviation of 2.27 minutes, though the highest limit of time for refraction at 99 CI% brings it to value of 7 minutes and 4 seconds. However further interaction and involvement of refractors reached a mutually agreed of 10 minutes per refraction. Table 1 shows the capacity per room, shift and day wise.

Slow Registration

As stated the patients start queuing up at 7:30 AM and registration starts at 8:30 and total time taken for 150 registrations is 150 minutes (8:30 to 11:00 AM).

Cause Identified: Only one registration counter, registration is manual and time consuming.

Action Planned: Change in registration process: (a) Increase number of registration counters for refraction to two, (b) Computer based registration, installation of two computers for registration, (c) Training of the staff for the registration "Appointment Module" to be provided by the NIS, (d) Sensitisation of staff: All the staff that is the optometrist, registration staff and the security staff were sensitised to the new appointment system to be carried out.

Uncertainty for Refraction

The reason for patient grievance was the uncertainty related to the date of their refraction.

Cause Identified: No appointment system.

Action Planned: Introduction of appointment system: It was decided to start with 100% appointment with some over booking to cater to the vacant slots anticipated to arise out of "no shows"

Lack of Display of Registration Time

Cause Identified: The registration timing was displayed only at the registration window.

Action Planned: Display of registration timing at identified prominent places.

Further based on the capacity calculated and to cater to the no shows, the capping limit of appointment

was set at 33% above the calculated capacity, to 160 patients for morning shift and 80 patients for evening shift.

Implementation

Time taken for this step was one month.

- Computers were installed, short training and sensitization of the staff was carried out.
- The timings displayed as below:
 - 8:30–10:30: Confirmation of appointments and issue of current day's appointments
 - 11:00–1:00: Subsequent days appointment for patients who report from the OPD
 - 2:00–4:00: Confirmation of appointment and subsequent days appointment
- Two counters were made functional from 8:30 to 10:30 AM and separate queues were made for the current day patients and patients with previous appointment.

Evaluation

The evaluation was carried out after one week, through direct observation of the process and analysis of data for appointment and registration. Table 2 shows the data of registration

Cycle Two

Problems Identified and Planning

The observations and the registration data was discussed with the stakeholders, the problems identified and the action planned are as below:

Overutilization of Slots

On an average 27 slots (22.5%), out of the calculated capacity were being over utilized:

- *Cause Identified:* Lack of discipline in reporting of appointment patients: The patients with appointment reported even after the displayed registration timing that is 10:30 AM and demanded for the refraction service, as they had appointment for the day. Accommodating them led to controversies with the walk-in patients, which in turn resulted in

Table 1: Capacity of the chambers for refraction

Day	Mon	Tues	Wed	Thurs	Fri	Sat
Room No. Time	9-1	2-4	9-1	9-1	2-4	9-1
E-1	---	12	24	24	---	---
E-2	24	12	24	24	12	24
E-3	24	12	24	24	12	24
E-4	24	12	24	24	12	24
E-5	24	12	24	24	---	24
Capacity/shift/ room	96	60	120	120	36	96
Refraction Capacity/day	156		120	156		144

Table 2: Registration data after cycle 1

Days	No of appt given (A)	No of appt patients turned up(B)	Vacancy created (120-B)	Walk in/ late reporting appt. accommodated	Overutilization
Day 1	178	139	0	0	0
Day 2	144	122	0	60	60
Day 3	144	117	3	24	21
Day 4	172	114	6	29	23
Day 5	146	99	21	43	22
Day 6	168	115	5	28	23
Day 7	164	109	11	21	10
Day 8	150	117	3	39	36
Day 9	166	123	0	45	45
Day 10	162	105	15	41	26
Average	159.4	116	6.4	33	26.6

accommodating more patients than the calculated limit.

- *Action Planned:* (i) The reporting time for the appointment patients was fixed. The staff was instructed to inform the patients while giving appointment that in case they report later than 9:30 AM, their appointment will be cancelled.

The appointment slips given to the patient to have the written instruction “Reporting time till 9:30 AM, in case of reporting late the appointment shall be cancelled.”

(ii) *Reduction in % overbooking:* The ratio to the no shows, the capping limit of appointment which was set at 33% above the calculated capacity, to cater to the no shows was reduced to 25%, that is to 150 patients for morning shift and 75 patients for evening shift.

Delay in Information about the Vacant Slots

The patients with appointment arrived as per their convenience.

- *Cause Identified:* No reporting time for appointment patients is fixed
- *Action Planned:* The timing of the appointment confirmation in the morning was revised as 8:30 to 9:30 AM, during this time both the counters to be used for confirmation of appointment.

The subsequent day appointment patients and the patients desirous to be accommodated the same day were asked to wait till 9:30 (these patients start reporting usually after 9:15 AM).

Underutilization of Current Booking Counter

This queue depended on information of appointment patients turning up, it was underutilized.

- *Cause Identified:* No time difference between confirmation of appointment and registration of new(current booking) patients.
- *Action Planned:* Action taken in point no. 2 resolves the problem.

Implementation

The planned actions were taken.

Evaluation

The evaluation was carried out after two weeks, through direct observations and analysis of data for appointment and registration. Table 3 shows the data of registration.

- Patients with appointment started reporting within the time limit.
- The vacancy created was timely assessed and was utilized for the current day patients.
- There were no over utilization of services.

Achievements after Two Cycles

- The capacity based on workflow process worked out.
- The complaints from the patients related to uncertainty addressed completely.
- Change of manual registration to computer based registration.
- Appointment system introduced.

DISCUSSION AND CONCLUSION

Action research has long been the method of choice when undertaking research in clinical practice improvement.

Table 3: Registration data after cycle 2

Days	No of appt given(A)	No of appt patients turned up (B)	Vacancy created (120-B)	Walk in patients accommodated	Vacant slots
Day 1	155	68	52	46	6
Day 2	152	71	49	46	3
Day 3	162	62	58	50	8
Day 4	151	55	65	61	4
Day 5	191	81	39	23	16
Day 6	140	56	64	61	3
Day 7	141	60	60	53	7
Day 8	136	63	57	39	18
Day 9	126	63	57	53	4
Day 10	159	72	48	10	38
Average	151.3	65.1	54.9	44.2	11



It is a method aimed at engendering ownership by the participants in order to sustain practice change. Action Research is socially oriented and intends that outcomes will be evidenced through changes in social situations, systems and conditions.⁶

Eather et al.⁶ in their study on patient safety utilized the PDSA cycle, referring to the non static healthcare environment in relation to high staff turnover in form of shift duties, attrition etc., their study was focused for a long term continuous intervention however in our study the staff involved in the process was on regular duties and the intervention was continual rather than continuous.

Searson has used the action research methodology in introducing bedside handovers in a coronary care unit wherein the system adopted was designed by the nurses and they dealt with any on-going problems as a group. In our study the problems along with their solutions were identified in group discussions with the staff involved in the registration and refraction process.

The focus of our study was on action with the aim to address the patient's grievance as early as possible, the objective was to be fulfilled within a constrained environment of demand supply mismatch already faced by the organization.

The objective was achieved through the repeated cycle of plan, implement, evaluate. The uncertainty faced by the patients was removed completely. The efficiency of the refraction clinic was improved. The participatory approach of the action research methodology helped up smoothly changing over from the manual registration and appointment system to computerized registration and appointment.

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A Correlational Approach on the Influence of Stress Level on the Job Performance of Employees in a Private Hospital

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ABSTRACT

Aim: This study assesses the level of stress and its relationship to the job performance of the employees in a private hospital.

Materials and methods: This study used a descriptive-correlational design using a questionnaire. The total enumeration was used in this study to represent the population adequately with 295 respondents. To analyze the data frequency, percentage, mean, and Pearson-r were utilized.

Results: Results include: (43.70%) are 25–34 years old; (63.40%) are females; (52.20%) of them is rendering their service less than five years; (31.20%) are earning 9060 to 10059 pesos; (32.20%) are in the nursing department. The stress level of the respondents had a mean score of 2.31. The overall job performance of the employees shows a mean score of 3.43. Also, Pearson-r revealed a score of ($r = -0.17$, $n = 295$, $p = 0.01$).

Conclusion: The researchers conclude that: the hospital employees in a secondary hospital in Urdaneta City are young adults, that is female dominated and are relative neophytes who are making a decent amount of money, who are nurses. Hospital employees are experiencing minimal stress. The employees are a high-performing human resource. The stress level of the employees has a minimal damaging connection with their overall job performance.

Clinical significance: The results of this study will be a guide for the plans and activities in stress control, and enhancement of employees' job performance. Moreover, the results of this study will increase the employees' awareness about the stress they are experiencing, their job performance level, and how stress influences their job performance. The findings of this study will also give patients information about the quality of service the employees provide to them.

Keywords: Correlational study, Job performance, Private hospital, Stress level, Urdaneta city.

How to cite this article: Maramba RO, Llego JH. A Correlational Approach on the Influence of Stress Level on the Job Performance of Employees in a Private Hospital. *Int J Res Found Hosp Healthc Adm* 2018;6(2):68-73.

Source of support: Nil

Conflict of interest: None

INTRODUCTION

Human capital is the greatest asset of an organization. Job performance of employees will dictate the success of an organization. Therefore it is the thrust of an organization to maintain, enhance and uplift the performance of its employees. There are several factors that could affect the performance of employees, and one of them is stress.

The American Institute of Stress, state that stress is a highly subjective phenomenon that it defies definition. However, Hans Selye coined the first definition of stress in 1936 which he defined as "the non-specific response of the body to any demand for change." Moreover, stress is a circumstance of the environment in which powers from the inside or outside world affects the individual, either one's emotional or physical well-being, or both.¹

Stress has many effects on a person it can affect the nervous system, musculoskeletal system, respiratory system, cardiovascular system, endocrine system, and gastrointestinal system. Furthermore, stress is linked to depression, anxiety, heart attacks, stroke, hypertension, immune system disturbances that increase susceptibility to infections,² this effect of stress could affect any individual. If a worker or an employee is undergoing stress, it might affect their performance in their job.

According to Tan, stress can overthrow a person that may result in depression, resorting to destructive behavior, toward self and others.³ The author also claims that Filipinos do not say they are stressed when facing one. Instead, it is manifested by producing illnesses, both physical and mental, both fleeting and serious, life-threatening ones. The cause of stress or "stressors" is not universal; the author claims that stressors vary differently from sensory stressors such as noise, and many other sources like work and family.

Moreover, according to Hamlett, the adverse effects of stress include poor time management, strained relationships, and lack of focus.⁴ At the organizational level, the poor performance, unmet deadlines, and expectations will affect the organizations overall performance. Stress could also lead to high turnovers, sacrificing human capital. Stress also leads to health problems like hypertension, ulcers, gastric upset, sexual problems, appetite changes, and weight changes.^{4,5}

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The definition of job performance at first glance is very straightforward, according to The Wharton School, the University of Pennsylvania, job performance is a person's performance in a job, or how a worker performs his job.⁶ Job Performance is an essential factor in every business or service. Business success relies on its employees because they are considered the most significant assets. An intense level of job performance is a suggestion that the human resources department is doing their job. Moreover, excellent job performance boosts the business's reputation and is essential not just to consumers and shareholders, but also to possible clients and possible new hires, beyond the organization.⁷ On the other hand, if employees are poor performing the business will be jeopardized.

According to Ankari, depending on the level of stress, it can be helpful or harmful. The author claims that as stress gradually increases the job performance also increases because stress aids a worker to collect and utilize the available resource in the completion of his job.⁸ The author further claims, that high-stress level is destructive to one's job performance, this finding is supported by the claim of sincero that as stress becomes unmanageable, a person may experience a gradual to a drastic decrease in job performance.⁹ Thus, there will be a decline in enthusiasm and productivity.

Healthcare workers are essential in the overall health of people in the community and play an essential role in the sustenance of a healthy community. It is the role of the Department of Human Resource to keep the human capital healthy so that they will be productive and proactive. With all these premises in mind, the researcher wants to assess the level of stress of the healthcare workers, their job performance, and the relationship between the two variables. This study will also be a baseline for the private hospital in developing a program to lessen the stress being experienced by the healthcare workers.

This study assesses the level of stress and its relationship to the job performance of the respondents in a private hospital. Specifically, it answers the following problems:

- What is the profile of the respondents regarding:
 - Age;
 - Sex;
 - Length of service;
 - Monthly income; and
 - Assigned department?
- What is the stress level of the respondents?
- What is the level of the job performance of the respondents?
- Is there a significant relationship between the stress level and job performance of the respondents?

The following hypothesis guided this study and was tested at the alpha level of 0.5. There is no significant relationship between the stress level and job performance of the respondents.

With the findings of this study, it will be beneficial to the following groups and people: to the Hospital Administrators. The results of this study will be a guide for the plans and activities in stress control, and enhancement of employees' job performance; to the Department of Human Resource. The results of this study will serve as baseline data for the department, and will also be a mirror of their performance in keeping their employees' wellness and productivity; to the Hospital Employees. The results of this study will increase the employees' awareness about the stress they are experiencing, their job performance level, and how stress influences their job performance; to the patients. The results of this study will give the patients a concrete evaluation of the job performance of the employees. The findings of this study will also give them information about the quality of service the employees provide to them, and to future researchers. The findings of this study could be a future reference for researchers who are of interest in the same research endeavor.

MATERIALS AND METHODS

Research Design

This study used to use a descriptive-correlational design. A descriptive study design aims to examine a sample at one specific point in time without making any inferences or causation. The present study describes the variables being examined and a correlational study aims to look at the relationship between two variables.¹⁰ The current study describes the demographic profile, stress level and job performance of the respondents, and examines the relationship between stress level and job performance without inferring causation. Thus, these research designs apply to this study.

Respondents of the Study and Sampling Scheme

The locale of the study will be at a secondary private hospital located at Urdaneta City, Pangasinan. Specifically, the study will focus on first-line employees and their respective department head. The total enumeration was used in this study to represent the population adequately¹¹ with 295 respondents.

The respondents of this study will be first-line employees of the secondary private hospital in Urdaneta City, regardless of age and sex and department being assigned, they will assess their stress level. Meanwhile,

the department heads will be the one to assess the job performance of the first-line employees directly supervised by them.

Ethical Consideration

Before the actual data collection, one of the researchers passed the research proposal to the research review board of the secondary hospital.

There is a letter of consent/implied consent that is attached to the questionnaire that will be answered by the respondents, indicating the purpose of the study, the time needed to finish answering the questionnaire, the pros, and cons of the study. In the consent form of the employees, it will also be indicated that their department heads will evaluate them. Further, the respondents have the right to refuse not to participate in the study without any coercion.

All data is treated with the highest respect, confidentiality, and anonymity.

Data Gathering Instrument

The primary data gathering tool for the study is a questionnaire. There are two sets of questionnaires the first one is the questionnaire to be answered by the first-line employee, and the department heads answer the second one.

The first questionnaire is composed of two parts. Part I (one) covers the demographic profile of the respondents, this includes the respondents’ age, sex, length of service, monthly income, and the current department assigned. Part II (two) was adopted and modified from the perceived stress scale, this was used because of it is already tested to measure the stress level of an individual, and it is widely used and already available, the instrument yielded a 0.72 Cronbach’s Alpha coefficient, this means that has the right internal consistency and reliability.¹² Part II is composed of 10 items and is answerable by the following scale “1–never,” “2–sometimes,” “3–fairly often,” “4–very often.” Moreover, items 4, 5, 7, and eight will be treated with reverse scoring.

The second set of the questionnaire will be adapted from the performance evaluation tool of the hospital. The questionnaire is scaled as follows “1–unsatisfactory,” “2–needs improvement,” “3–satisfactory,” “4–very good.”

Collection of Data

After securing all the approval needed by the researcher, the researcher personally administered the questionnaire; the researcher stays with the respondents during the data gathering so that if there are any questions, the researcher is available for clarifications.

Data collection and retrieval had occurred in July 2018.

Treatment of Data

The data that was collected in this study were analyzed using the Statistical Package for Social Sciences (SPSS) version 22.

To answer sub-problems number one, frequency and percentage is used because the data in this part are nominal and categorical.

To answer sub-problem number two, mean is utilized. For the type of data that will be collected here is continuous, and is described as follows:

Score	Statistical range	Descriptive equivalent	Transmuted rating
4	3.25–4.00	Very often	High stress
3	2.50–3.24	Fairly often	Moderate stress
2	1.75–2.49	Sometimes	Slight stress
1	1.00–1.74	Never	No stress

To answer sub-problem number three, mean is used. For the type of data that was collected here is continuous data and is described as follows:

Score	Statistical range	Descriptive equivalent
4	3.25–4.00	Very good
3	2.50–3.24	Satisfactory
2	1.75–2.49	Needs improvement
1	1.00–1.74	Unsatisfactory

To answer sub-problem number four, Pearson-r is utilized, because the data that will be analyzed are both continuous data.

RESULTS

Table 1 displays the distribution of the respondents regarding their age, sex, length of service, monthly income, and the department assigned. It can be seen that many (43.70%) are 25 to 34 years old; some (33.60%) are 35–54%; very few (18.60%), and (4.10%) are below 25 years old and 55 years old above. Regarding the sex of the respondents, it can be gleaned that the vast majority (63.40%) are females, and some (36.60%) are males. In terms of their length of service it shows that the majority (52.20%) of them is rendering their service under five years; few (24.40%) of them are in the hospital for 6-10 years, and very few (13.20%), (10.20%) are serving in the hospital for 11 to 15 years and 16 years and above respectively. Regarding their monthly income, some (31.20%), (27.80%) are earning 9060 to 10059 pesos, and 11060 to 12059 pesos, and very few (18.30%), (14.90%) and (7.80) are earning 13060 pesos and above, 8060 to 9059 pesos and 12060 to 13059 pesos respectively. In terms of the department assignment by the employees, it shows that some (32.20%) and (23.70%) are in the nursing and



Table 1: Distribution of the respondents according to age, sex, length of service, monthly income, and department assigned N = 295

Variable	Frequency	Percentage (%)
Age		
Below 25 years old	55	18.60
25–34 years old	129	43.70
35–54 years old	99	33.60
55 years old and above	12	4.10
Sex		
Male	108	36.60
Female	187	63.40
Length of service		
Below five years	154	52.20
6–10 years	72	24.40
11–15 years	39	13.20
16 years and above	30	10.20
Monthly Income		
8060–9059 Pesos	44	14.90
9060–0059 Pesos	82	27.80
11060–12059 Pesos	92	31.20
12060–13059 Pesos	23	7.80
13060 and above	54	18.30
Department assigned		
Medical	7	2.40
Dietary	16	5.40
General support	70	23.70
Nursing	95	32.20
Ancillary	60	20.30
Administrative	47	15.90

general support department respectively, few (20.30%), and (15.90%) are assigned in the ancillary and administrative department respectively, and very few (5.40%), and (2.40%) are assigned in the dietary and medical services.

Table 2 depicts the stress level of the respondents; it can be seen that the mean score revealed a score of 2.31.

Table 3 shows the job performance of the employees with a mean score of 3.43.

Table 4 summarizes the relationship between the stress level and job performance level of the hospital employee. In this test of a relationship, the researcher coded the stress level and job performance in an increasing manner. To interpret the table, it must be made clear that the null hypothesis (H_0) was tested at alpha 0.05. At this significance level in SPSS, the H_0 is to be rejected if and only if the p-value is equal to or less than 0.05.

Table 3: The Job performance level of the respondents N=295

Work performance	Weighted mean	Interpretation
	3.43	Very good
Legend		
Statistical Range	Descriptive Equivalent	
1.00-1.74	Unsatisfactory	
1.75-2.49	Needs Improvement	
2.50-3.24	Satisfactory	
3.25-4.00	Very Good	

Table 2: Stress level of the respondents N = 295

Stress Level	Weighted mean	Transmuted rating
	2.31	slightly stress
Legend		
Statistical Range	Transmuted Rating	
3.25-4.00	High Stress	
2.50-3.24	Moderate Stress	
1.75-2.49	Slight Stress	
1.00-1.74	No Stress	

Pearson-r revealed ($r = -0.17$, $n = 295$, $p = 0.01$), the null hypothesis is rejected; there is a significant weak negative relationship between the stress level of the employees and their work performance.

DISCUSSION

The data showed in Table 1 that the vast majority of the hospital workers are young adults, and this is parallel to the data of the Labor Force Survey of the Philippine Statistic Authority wherein a vast majority (67.90%) of workers in the Philippines are young adults with ages 15- 45 years old.¹³ In terms sex, the number infers that female employees dominate the hospital, this is opposed to the data of Philippine Statistics wherein, males are in a higher number than females with a 2:1 ratio.¹³ The result in the number of years in the length of service infers that a significant majority of the previous employees have sought another career and left the hospital, this is congruent to the finding of Rigby, who said that the average year spent of an employee is 4.6 years.¹⁴ In terms of monthly income, the data show that the vast majority of the employees are receiving more than the minimum wage in region 1.¹⁵ This finding also means that employees can provide their basic needs and more. In terms of the department the employees are assigned it can be seen that nurses still dominates the workforce of the hospital, this is supported by the claims of McLaughlin and Olson that the most numbers of hospital employees are the nurses.¹⁶ Moreover, Jones said that nurses are the bloodline of a hospital¹⁷ and Keagy and Thomas, said that if there is no nurse, a hospital cannot operate well.¹⁸

Regarding the stress level of the employees, the mean score means that hospital employees are experiencing slight stress. Low level of stress according to experts at the University of Bristol and the Karolinska Institute in Sweden as cited in the Daily Mail, can lead to physical

Table 4: The relationship between the stresslevel and job performance level of the respondents N = 295

Job performance	Pearson correlation	Stress level
	Sig. (2-tailed)	-0.17**

**Correlation is significant at the 0.01 level (2-tailed).

and mental problems.¹⁹ Moreover, the constant exposure to mild stress has been found out to increase the risk of developing physical disability by 70% and developing a psychiatric condition doubles.

In terms of their job performance, employees have an excellent rating for their job. A high-performance organization provides a competitive advantage.^{20,21} This finding is good for the hospital; since it is a privately owned having a high-performing human resource is good for the business side of the hospital.

This result in Pearson-r means that as the stress level goes up, the employees are poorly performing. This finding confirms the claim of “The Inverted-U Theory” that as stress goes high work performance is decreasing. The finding is parallel to the study of Alkubaisi, that stress has a negative impact on employees work performance.²²

CONCLUSION

In light with the following findings, the researchers conclude that: the hospital employees in a secondary hospital in Urdaneta City are young adults, that is female dominated and are relative neophytes who are making a decent amount of money, who are nurses. Hospital employees are experiencing minimal stress. The employees are a high-performing human resource. The stress level of the employees has a minimal damaging connection with their overall job performance.

Recommendations

Based on the results and conclusion of this study the following recommendations are drawn:

The hospital administrators may think of ways to lessen the turnover rate of the hospital so that the hospital will retain the quality of human resource.

The hospital human resource department should have a wellness program that addresses the stress that is being experienced by the employees.

The hospital human resource department and other department heads should continue the performance evaluation that they are conducting so that they can monitor the progress of the job performance of the employees, the data from the evaluation could also be a basis for the enhancement or modification of the proposed plan that was formulated out from this study.

The hospital human resource department is encouraged to execute the proposed plan that was formulated out of this study, so that employees will have high job satisfaction, effective stress management of the employees, and to promote the overall wellness of the employees, thus, enhancing their productivity.

For future researchers, it is encouraged to replicate the same study with a broader scope that includes the government hospitals, and hospitals that are classified as primary and tertiary hospitals. It is also encouraged to conduct a study that will test the different stress levels experienced by hospital employees since that is one of the limitations of this study. Moreover, it is also recommended that a study to seek the major sources and causes of the stress of hospital employees should be explored.

CLINICAL SIGNIFICANCE

The results of this study will be a guide for the plans and activities in stress control, and enhancement of employees' job performance. Moreover, the results of this study will increase the employees' awareness about the stress they are experiencing, their job performance level, and how stress influences their job performance. The findings of this study will also give patients information about the quality of service the employees provide to them.

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Evaluation and Impact Assessment of Application of Lean Six Sigma in Healthcare Service

Meeta M Ruparel

ABSTRACT

Purpose: In the current competitive scenario, the demanding corporate strategies and the ever-rising branding world many a healthcare set-ups strive to implement the best and stand out as a benchmark. There have been many attempts to improve quality in healthcare, but most have been unsustainable. Internationally many healthcare organizations have already benefited from lean six sigma (LSS) strategies. The research aimed to deploy LSS methodologies in hospital systems to evaluate and assess the healthcare service delivery process performance on important performance criteria; namely efficiency, patient safety, care pathway, productivity, standard compliances, patient satisfaction, and employee satisfaction and further evaluate their retrospective cost Impact.

Methodology: Observation/case study (CS) techniques were used on site of stratified segment sample identified from exploratory research of only hospitals/units where LSS was allowed to be implemented; to study and analyze LSS deployment project results. A focus group feedback Pre and Post project deployment was also taken from process owners

Findings: It was statistically evident that the application of LSS methodologies significantly improves the hospital/healthcare service delivery process performance. It was observed that in an LSS deployed process project, with an improvement even in one measurable indicator that was critical to the quality of the process performance resulted in improvement of a mix of Impact Factors, which in turn resulted in its retrospective cost Impact

Originality value: The primary research was structured around the study of efficient utilization of the key resources like care time, physicians' time, manpower, material, space and equipment and management arrangements with practical project deployments of LSS methodologies. The study further addressed the problem of high incidences of adverse and sentinel events and its reductions with appropriate LSS applications in real situations.

Keywords: Green hospitals, Lean six sigma in healthcare/hospitals, Mistake-proofing in hospitals/healthcare, Patient safety in healthcare, Performance excellence in hospital services, Quality management in hospitals.

How to cite this article: Ruparel MM. Evaluation and Impact Assessment of Application of Lean Six Sigma in

Healthcare Service. Int J Res Foundation Hosp Healthc Adm 2018;6(2):74-79.

Source of support: Nil

Conflict of interest: None

INTRODUCTION

In a hospital, everything is built on care, trust, and integrity. Healthcare systems are continually innovating in clinical practices and management; however significant and sustained changes are necessary to avert the crises in healthcare quality. To meet all these demands and more concepts of branding, image building and the desire to provide quality services with cost containment and higher satisfaction for all stakeholders, more and more hospitals are on the go to implement quality initiatives to constantly improve. This could be implemented with lean six sigma (further referred to as LSS) practices in the organizations. LSS organizations have the ability and willingness to adopt contrary objectives, like reducing medical errors and getting things done faster. It is customer focused and raises performance at a breakthrough level. The benefits are evidential with quantifiable indicators of operations and profits. LSS is a complement to other quality initiatives such as ISO, JCI, NABH, etc., and works as a tool to achieve and sustain standards requirements.¹

Concepts

Six sigma's approach to quality is rigorous and is an exigent to perfection approach; defects are controlled to just 3.4 DPMO. Lean is a systematic approach to identifying and eliminating waste through continuous improvement. Lean principles and six sigma techniques work together and build on each other. LSS is the combination of improvement methods that allow organizations to achieve improvement in service, quality, cost, and profitability. Controlling healthcare cost increases, improving quality, and providing better healthcare are some of the benefits of this approach. A combination of both provides a structured improvement approach and effective tools to solve problems. This creates rapid transformational improvement at a lower cost. LSS alone may not be the

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savior of healthcare delivery, but its judicious application along clinical paths, combined with the best treatment, technology, and expertise available, will certainly improve care for the patient.²

Literature Review

Patient safety was defined by the IOM as “the prevention of harm to patients”.³ Many studies confirm that medical error is prevalent in our health system and that the costs are substantial. Bates et al. found that adverse drug events were common and that serious adverse drug events were often preventable.⁴ A paper reviewing the safety initiatives in the health systems of the UK, Canada, Australia, and the US, indicated that these countries have all engaged in safety initiatives such as patient safety agencies, adverse event reporting and learning systems, and the use of safety performance indicators.⁵ A national survey of six sigma applications in US Hospitals conducted by Qianmei (May) Feng and Chris M Manuel indicated that cost benefits and improvements, typical implementation durations, efficiency and assessments related to major barriers in implementation were common LSS projects implemented in the hospitals.⁶ UMCG in the Netherlands made LSS an integral part of the hospital’s culture and showed how an evidence-based approach to reviewing and improving procedures not only resulted in reduced costs, efficient use of resources, but also improved patient experiences.⁷

Significance

The rising reports of medical errors and functioning of the public and private health sector brought out the fact that there was an urgent need to prescribe and improve systems of healthcare service. Healthcare delivery deals with nothing less than the precarious balance between life and death; therefore, becomes exigent to consider exacting approaches that can significantly reduce potential errors and improve the care process. Efforts like TQM, QMS, and process re-engineering although made a noticeable impact on the healthcare environment, it, however, failed to translate into sustainable results. Currently, several LSS strategies have been endorsed as transformational by healthcare leaders and from their practices, it is evident that these efforts produce results. Such research and communication are critical to demonstrate the effectiveness and to provide insights for ensuring proper implementation in the system.

METHODOLOGY

Aim

The aim of the research was to study the application of LSS driven hospital service process and scope of clinical

care pathways success by adapting LSS methodologies and tools to improve and ensure optimal healthcare quality and the highest level of patient safety in the healthcare service delivery process:

- *Scope*: To deploy LSS projects in real situations and study results of case studies (further referred as CS) on the application of LSS methodologies in a healthcare service delivery process and observe process performance improvements (further referred as PI) if any on applying the LSS tools and methodologies. The PI could be an overall process PI that enabled improvement in a mix of impact factors like care pathway, patient safety, standard compliance, productivity, efficiency, employee satisfaction, and patient satisfaction. The indicators measured varied from process to process with unique process specific criteria. It was observed that the process improvement resulted in performance improvement of varied impact factors, further resulting in financial gains in terms of revenue gain, indirect gain, savings gain. The study aimed to observe and analyze overall PI in a process where LSS was deployed further to observe its influences on performance impact factors

Primary Research

Observation/case study techniques were utilized and LSS projects were implemented in hospitals/healthcare units’ service processes, in real situations; in the identified hospital/healthcare service unit to further study and analyze the project case results and its impact on the overall performance and its cost impact.

Case Studies

A total of 22 LSS deployment projects were deployed, on visits to sites and discussions with the hospital management of the identified hospitals.

Process Owner’s Insight

A focus group feedback from process owners was taken before project start to estimate the overall performance improvement (PI) % expected by the process owners, post LSS deployment in the applied process retrospectively; in terms of:

- “*Expected PI % (Least)*”: That is the minimum improvement expected
- “*Expected PI % (Desired)*”: That may be a stretched goal but an improvement desired.

The feedback from the process owners was also taken post- project completion to identify the performance impact factors that were influenced by the overall

improvement, namely standard compliance, patient safety, patient satisfaction, efficiency, employee satisfaction, productivity and care pathway and its retrospective cost impact whether revenue gain, indirect gain or savings gain.

Primary Research Data Analysis and Results, Interpretations

Data of 22 case studies (CS) results of LSS deployment done during Primary research were processed and analyzed. An overview of this data analysis is discussed here.

The project results data indicated that the mean of expected PI % (Least) was 9.42% and mean of expected PI % (desired) was 29.27%.

Graph 1 shows case study wise achieved PI %, expected PI % (least) and expected PI % (desired):

- The PI % varied from case to case from 12.09% to 100%; depending on the process selected and its specific indicator measured for improvement.
- The feedback from process owners of each case revealed that:
 - In 21 cases the achieved PI % was higher than both the expected PI % (least) and expected PI % (desired)
 - In one case (CS12) the achieved PI % was more than expected PI % (Least) but less than the expected PI % (Desired).

Graph 2 is the normal probability plot of the case wise achieved PI %. As indicated; at 95% confidence interval $\alpha: 0.05$, the p value: 0.249 was more than α -level, hence statistically evident that the data followed a normal distribution. Since the achieved PI % data fitted the normality test and as indicated followed a normal distribution;

the hypothesis test was run with the one-sample T-test. The test mean required for the one-sample T-test was derived from the feedback taken by the process owners. This feedback was taken from the process owners before the project started. The mean of responses for:

- Mean expected PI % (least) was 9.42%; approximated to 10%
- Mean expect PI % (desired) was 29.27%; approximated to 30%

On brainstorming with the process owners revealed that:

- The expected PI % (least) was the minimum improvement expected failing to meet this expectation would result in a dissatisfaction scenario
- Any improvement above that could be considered as a “satisfaction” status

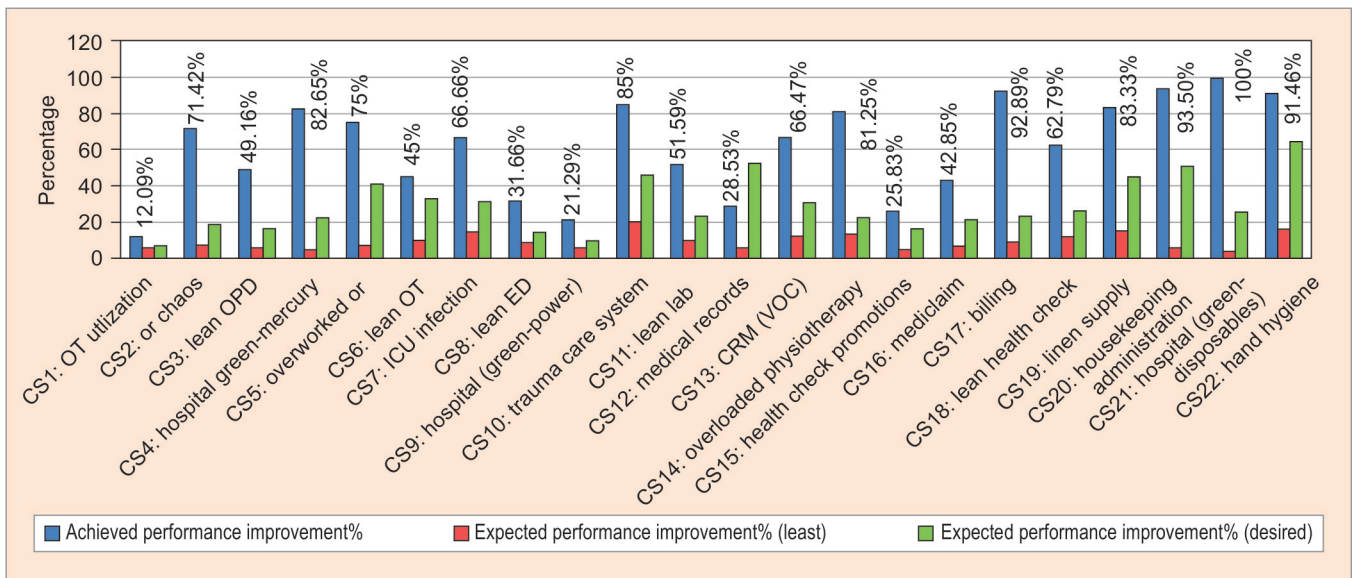
An achieved improvement that is more than the expected PI % (desired) would be a “delighted” situation and termed commendable to celebrate the success of the project.

The derived mean of expected PI % (least) was 10% and that of expected PI % (desired) was 30%. Hence the mean expected PI % (desired) of 30% was considered as the test mean for the hypothesis.

As derived; the hypothesis test mean; $\mu = 30\%$

Hypothesis Statement

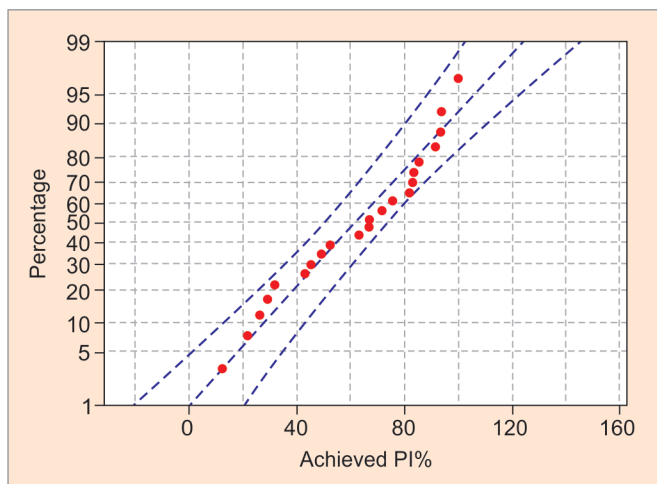
- *Ho:* Application of LSS tools and methodologies has no significant impact on hospital/healthcare service delivery process performance
- *Ha:* Application of LSS tools and methodologies in a hospital/healthcare service delivery process results in a mean of Achieved PI % greater than the mean of expected PI % (desired): 30%



Source: Compiled by the researcher on the basis of primary data

Graph 1: Primary case study wise PI %: achieved PI %, expected PI % (Least) and expected PI % (Desired)





Source: Compiled by the researcher on the basis of primary data

Graph 2: Normal probability plot of the achieved PI %

- *Significance Level:* Confidence level of 95.0% and test mean: 30; was considered.

Hypothesis Test

One-Sample t-test was run to test the hypothesis and determine whether Application of Lean Six Sigma tools and methodologies in a Healthcare Service Delivery process improved the process performance, i.e. to determine whether the mean of the achieved performance improvement (Achieved PI %) was more than the defined PI % test mean of 30%.

Thus for one-sample t-test for the hypothesis test: Ho: $\mu = 30$ and Ha: $\mu > 30$

Test results

Table 1 is the one-sample t-test results of Achieved PI %. The results indicated that: At a 95% confidence interval, $P: 0.00001 < \alpha: 0.05$. Hence the null hypothesis ($H_0: \mu = 30$) was rejected and the alternative hypothesis ($H_a: \mu > 30$), that the mean achieved PI % was more than the mean expected PI % (desired): 30%, was accepted.

A retrospective power calculation was done to analyse the statistical power of the hypothesis test. Table 2 is the retrospective statistical power calculation.

Table 1: One-sample T-test results

One-sample T: achieved PI %				
Descriptive statistics				
N	Mean	St dev	SE mean	95% lower bound for μ
22	61.85	26.51	5.65	52.13
μ : mean of achieved PI %				
Test				
Null hypothesis			$H_0: \mu = 30$	
Alternative hypothesis			$H_1: \mu > 30$	
T Value	p value			
5.64	0.00001			

Source: Compiled by the researcher on the basis of primary data

As indicated in Table 2, the statistical power was 0.999927. i.e., the probability of correctly rejecting the false null hypothesis was 0.999927.

As shown in Graph 3, for sample size 20, 22 and 30; considering the retrospective study test, the difference between true mean and the test mean was 31.85. For this difference:

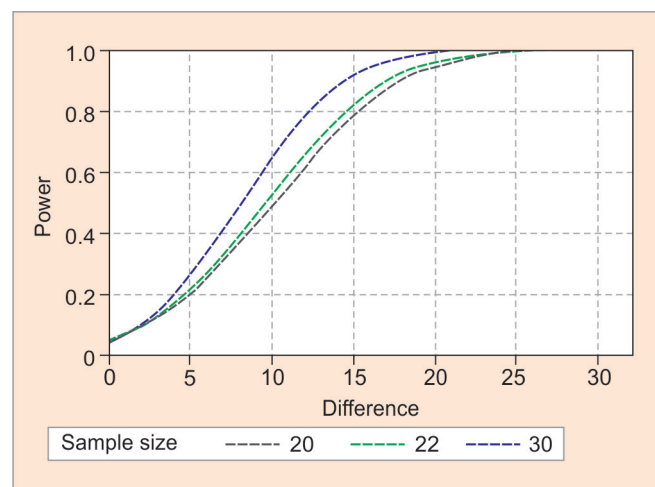
- For sample size 20, the statistical power value: 0.999789
- For sample size 22, the statistical power value: 0.999927
- For sample size 30, the statistical power value: 1.00
- Thus evident that the considered sample size of 22; was adequate for the test.

The test indicated that the true mean was greater than the test mean 52.125 at a confidence interval of 95% and Table 2 and Graph 3 indicated that there was 99.99% chance of the significant difference of true mean and test mean, being detected with sample size: 22.

Thus it was statistically evident that “Application of LSS tools and methodologies significantly improves the hospital/healthcare service delivery process performance”.

The Dotplot in Graph 4 indicated case study wise impact factors improved and their respective cost impact, each PI resulted in improvement of a mix of impact factors that resulted in its retrospective cost impact:

- 1 Case (CS10), resulted in an improvement of a mix of six impact factors



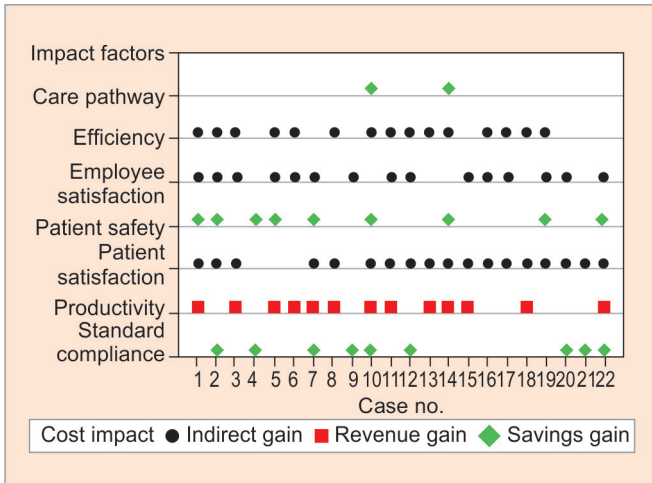
Source: Compiled by the researcher on the basis of primary data

Graph 3: Retrospective power curve for different sample size

Table 2: Retrospective power calculation

Power and sample size		
1-Sample t test		
Testing mean = null (versus > null)		
Calculating power for mean = null + difference		
$\alpha = 0.05$ Assumed standard deviation = 26.51		
Results		
Difference	Sample size	Power
31.85	22	0.999927

Source: Compiled by the researcher on the basis of Primary Data



Source: Compiled by the researcher on the basis of primary data

Graph 4: Dotplot of primary case study wise impact factors and its cost impact

- Five Cases (CS1, CS2, CS7, CS14, CS22), resulted in an improvement of a mix of five impact factors
- Six Cases (CS3, CS5, CS11, CS12, CS13, CS19), resulted in an improvement of a mix of four impact factors
- Seven Cases (CS6, CS8, CS15, CS16, CS17, CS18, CS20), resulted in an improvement of a mix of three impact factors
- Three Cases (CS4, CS9, CS21), resulted in an improvement of a mix of two impact factors

The PI resulted in its retrospective cost impact in a varied manner:

- Improvement in productivity resulted in a revenue gain.
- Improvement in efficiency, employee satisfaction and patient satisfaction resulted in indirect gain.
- Improvement in patient safety, standard compliance and care pathway resulted in savings gain.

Overall improvement in 22 processes resulted in 82 improved impact factors of which 49 improved factors retrospectively resulted in indirect gain, 13 improved factors resulted in revenue gain and 20 improved factors resulted in savings gain.

Observations and Findings

- It was statistically evident that the application of LSS methodologies significantly improves the hospital/ healthcare service delivery process performance.
- LSS methodologies when applied to a healthcare service delivery process a performance improvement ranging from 12 to 100% was achieved, depending on the process, its enablers and measurable objectives.
- There was zero cases with Nil PI %, which made it evidential that the application of LSS methodologies improved a healthcare process, although at varied PI levels.

- It was observed that the improvement varied depending on the process and its impact factors. These impact factors contributed to healthcare service performance. The study indicated that the process Improvement resulted in improving one or a mix of Impact factors namely; care pathway, standard compliance, patient safety, efficiency, productivity, patient satisfaction, and employee satisfaction and its retrospective cost impact also varied with respect to the Impact factor improved.
- It was found to be best appropriate practice to identify relevant indicators that were based on the critical to quality and process requirements, internal environment, hospital system, applicable policies, regulations, clinical case and process specific.

CONCLUSION

The research study indicated that application of LSS in healthcare improved healthcare service delivery in various ways viz., Improved care pathways, utilization of resources, increased patient safety, compliances, satisfaction scores, reduced medical errors and improved costs. LSS can be strategically deployed in various departments of a healthcare service. The processes generally focused were on the administrative systems; with creative and innovative adaptations it can impact clinical care pathways tremendously by reducing risks and opportunities of medical errors.

Any level of improvement impacted cost gains (direct/indirect).

Considering the efficacy of LSS initiative in hospitals, it was observed that LSS techniques improve the performance of most processes substantially. Even if some processes are unable to achieve expected ambitious goals, it does not diminish its importance. LSS methodologies assist in minimizing errors, achieving set quality benchmarks, optimal utilization of resources, elimination of wastes and guides as to how a set goal is achieved in terms of tangible results. Cost implications to implement LSS methodologies are very minimal compared to the losses/wastes occurring in any process variations, without any quality initiative.

Future Scope

- More application in the care delivery / clinical care process will assure optimal care process and minimum medical errors.
- More project deployment focusing specifically on particular process enabler can help identify key influencing indicators.

ACKNOWLEDGMENTS

Author takes this opportunity to thank Professor Dr PS Rao, Dean Research Department of “Prin LN Welingkar Institute of Management Development and Research,



Mumbai (We School)"; for his patience, insightful comments and encouragements at all time of this research work. The Author is also grateful to the research department at We School for their motivating support to her at every stage of this scholarly paper preparation. The Author further extends her sincere gratitude to all the hospitals' senior management for allowing her to conduct research and accomplish real-world process improvement projects at their facilities. The Author thanks all the hospital process owners, other hospital team members and LSS green belt/yellow belt trainees for their enthusiasm and active participation during the LSS orientation training and project deployments at their respective hospitals.

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Cost of Hospitalization for the Patients in Corporate Hospitals in India: A Retrospective Analysis of Five Years of Data from 2012 to 2017

Dinesh Bammidi

ABSTRACT

This is a research article for the 'cost of hospitalization' for the in-patients in private hospitals in India. I restricted the review to the corporate hospitals and analyzed the cost of hospitalization for the patients throughout five years. The average 'cost of hospitalization' for in-patients over the years in these hospitals, shows surprisingly less increase and the inflation-adjusted rise of these costs is marginal. This is counter intuitive, and I am publishing this analysis so that there can be further studies dissecting these costs and if this data reflects the accurate picture. If so, it would be interesting to understand why this is so.

Keywords: Healthcare spending, Hospital costs, Trend analysis

How to cite this article: Bammidi D. Cost of Hospitalization for the Patients in Corporate Hospitals in India: A Retrospective Analysis of Five Years of Data from 2012 to 2017. Int J Res Foundation Hosp Healthc Adm 2018;6(2):80-81.

Source of support: Nil

Conflict of interest: None

AIM

To calculate the average 'cost of hospitalization' for the in-patients in corporate hospitals.

OBJECTIVES

- To derive the cost of hospitalization from the validated and available data.
- To compare the costs over the years.

SCOPE

Two of the largest corporate hospitals in India by bed strength and by the number of inpatients treated.

METHODOLOGY

For five years of period of study from (2011–2012) to (2016–2017), the validated data regarding the average

length of stay (ALOS) and average revenue per occupied bed (ARPOB) were taken from the Annual reports of 'Fortis Healthcare limited' and 'Apollo Hospitals Enterprise limited' respectively, the two hospitals which were considered for this analysis. These numbers were in the published audited reports of these publicly listed companies, and no separate validation was done by me.

Average revenue per occupied bed (ARPOB)/day was calculated based on the available ARPOB/year and (ALOS)*(ARPOB/day) gave me the average cost of hospitalization per patient in that year.

Average revenue earned by the hospitals per patient = (ALOS)*(ARPOB/day)

The same would be the average cost of hospitalization for a patient in that particular year for the particular group of hospitals.

The average cost of hospitalization for the mentioned years was calculated as stated above and the final values are analyzed for year on year and 5-year changes.

Sources of Data

Annual reports of Apollo Hospitals Enterprise Limited from the years 2012 to 2017

Annual reports of Fortis Healthcare limited from the years 2012 to 2017

ANALYSIS AND RESULTS

Cost of Hospitalization for Apollo Hospitals Enterprise Limited

	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17
ALOS ¹	4.78	4.65	4.54	4.43	4.17	4.04
ARPOB ¹	7466075	7929260	8644660	9264065	10901455	11508085
ARPOB/day	20455	21724	23684	25381	29867	31529
Average cost of hospitalization per in-patient	97774.9	101016.6	107525.4	112437.8	124545.4	127377.2
Yoy increase in costs	NA	0.033155	0.064433	0.045687	0.107682	0.022737

Cont...

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Cost of Hospitalization for the Patients in Corporate Hospitals in India

Cont...	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17
% Yoy increase	NA	3.315473	6.443258	4.568662	10.76823	2.273685
Increase from 12-17						30%
Inflation-adjusted gains ²	97775	107607	112695	118814	124510	126952
	NA	-6.12%	-4.59%	-5.37%	0.03%	0.33%

^All costs are in INR

Cost of Hospitalization for Fortis Healthcare Limited

	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17
ALOS ³	4	3.83	3.81	3.64	3.56	3.56
ARPOB ³	9300000	10400000	11200000	12600000	13700000	14500000
ARPOB/day	25479	28493	30685	34521	37534	39726
Average cost of hospitalization per in-patient	101917.81	109128.8	116909.6	125654.8	133621.9	141424.7
Yoy increase in costs	NA	0.070753	0.071299	0.074803	0.063405	0.058394
% Yoy increase	NA	7.075269	7.129946	7.480315	6.340485	5.839416

Cont...	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17
Increase from 2012-17						39%
Inflation-adjusted gains ²	101918	112166	117470	123848	129786	132331
	NA	-2.71%	-0.48%	1.46%	2.96%	6.87%

^All costs are in INR

SUMMARY

It is evident from the above that the average 'year on year' increase in the 'cost of hospitalization' for Apollo Hospitals is around 6% and for Fortis Hospitals, it is around 7% for the last five years considered. The exact increase can be noted from the data above.

And considering the average inflation for these years of 5.39% (based on CPI₂), the increase in the cost of hospitalization over these years does not seem to be much more than the average cost of inflation.

I expected the increase in 'cost of hospitalization' to be much more when I started the analysis and the results were somewhat surprising. It would be interesting to see why this is so if more data can be accessed from these hospitals to understand the same.

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Hospital Administration Control Room: An Effective Concept for Managing Hospital Operation Issues: A Study in Tertiary Care Public Sector Hospital

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ABSTRACT

Introduction: Hospitals are complex organizations comprising of the myriad of core clinical, diagnostic and support services departments. Conventionally, administrative issues at public sector hospitals are managed by medical superintendent with a mainly clinical background. In the hospital under study, there is a hospital administration control room managed by resident administrators attended to various routine and challenging issues in hospital operations. A study was contemplated to explore the modality of organizing control room services, the issues encountered and their management for the benefit of hospital administrators faced with similar challenges related to hospital operations

Methodology: A descriptive and observational study of various issues was conducted from March to June 2017 in the Hospital Administration Control Room at All India Institute of Medical Sciences, New Delhi. At the control room, all matters reported were recorded in a report book and submitted before the medical superintendent. Review of those daily reports for the year 2016 was conducted. Frequency distribution tables of issues were made. Important issues were described in brief.

Results: The infrastructure of a control room had all the communications channels and other wherewithal needed for accurate inputs for implementing quick decisions—management information system, monthly duty roster, a big chart listing the important phone numbers, telephone directory, hotline, news on television. It was manned by a senior resident administrator holding an MD degree in hospital administration and a junior resident administrator pursuing it. For further support, the matters were escalated to medical superintendent, and support from residents and faculty concerning their hospital areas were sought. Training was provided as understudy duty and supervised duty. Centralized repository of important circulars, resident manual, hospital administrators manual were available in the control room.

The duty officer was responsible for ensuring statutory and legal compliances like brain death, coordinating organ transplant, examination of an asexual assault victim, bed management, local purchase (LP) in an emergency. The duty officer initiated a well-established VIP emergency plan or the disaster

management plan by informing all concerned, personnel management and took necessary actions including escalations to ensure smooth delivery of patient care services. Duty officer got arranged ventilators and provided directions regarding ABG machines. In dispute resolution duty officer played a crucial role. During fire issues, the security cum fire control room was informed, and the quick reaction team (QRT) was activated. At workplace violence, local police were also informed.

Conclusion: The study introduces to a time tested the concept of the administrative concept of control in a hospital room and succinctly describes and management of important issues encountered. It adds to domain knowledge where little is available.

Keywords: Control room, Decision making, Hospital administration.

How to cite this article: Kausar M, Ranjan R, Singh AR, Siddharth V, Sharma DK. Hospital Administration Control Room: An Effective Concept for Managing Hospital Operation Issues: A Study in Tertiary Care Public Sector Hospital. *Int J Res Foundation Hosp Healthc Adm* 2018;6(2):82-90.

Source of support: Nil

Conflict of interest: None

INTRODUCTION

Hospitals are intricate organizations comprising of the myriad of core clinical, diagnostic and support services departments. Conventionally, administrative issues at Public sector hospitals are managed by medical superintendent with a mainly clinical background. Qualified and trained hospital administrators are critical to successfully managing hospital operations, being the actual orchestrators. In the hospital under study, there is a hospital administration control room which is the hub of administrative activities managed by resident administrators. Acting on behalf of the medical superintendent, they attended to various routine and challenging issues in hospital operations. Considering relevance and importance of control room, a study was contemplated to explore the modality of organizing control room services, the issues encountered and their management for the benefit of hospital administrators faced with similar challenges related to hospital operations. It initially required understanding the concept of a hospital administrator's control room as well.

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METHODOLOGY

A descriptive and observational study was conducted from March to June 2017 in the Hospital Administration Control Room at All India Institute of Medical Sciences, New Delhi) in India after obtaining due approval from the competent authority. In order to understand the functioning of control room direct observations were conducted to identify the issues being managed. As per the established procedure, all matters reported were recorded in a report book and submitted before the medical superintendent, for information and further action. These were categorized into those related to bed availability, public security, patient/staff/visitor/attendants' complaints, support services, engineering services, sanitation and housekeeping, transport services, any incident reports of fire, theft, breakdowns, molestation, and others. Review of those daily reports for the year 2016 was conducted. Frequency distribution tables of issues were made. Important issues were described in brief.

RESULTS

Concept of Control Room

The control room is an extension of the office of medical superintendent meant to address various administrative issues encountered during hospital operations. It ensured 24 × 7 availability of a qualified and trained hospital administrator in a hospital set-up where operations continue to prevail incessantly. A single control room catered to a conglomerate of the main hospital and six specialties/super specialty centers comprising of more than 2000 inpatient beds.

Infrastructure

The control room was strategically located on the ground floor in the Department of Hospital Administration near

the medical superintendent office. Equipped with a computer having internet connectivity, a laptop, Government of India–Restricted Automatic Exchange (RAX), Hotline, multiple multiline phones, a security alert bell, contingency buzzer, a mobile, a television with cable connectivity, closed circuit television (CCTV) system covering the adjoining department areas, etc., it had all the communications channels and other wherewithal needed for accurate inputs for implementing quick decisions (Figs 1 and 2).

Hospital information system (HIS) installed on the computer had a customized dashboard. Management information system consisted of an admissions blocking module, inventory management module, employee health scheme (EHS) module for temporarily adding beneficiaries, etc. for discharging assigned responsibilities. Monthly duty rosters of faculty and resident doctors from all departments, nursing staff, the staff of support facilities are kept handy to contact concerned officials when required. A big chart listing the important telephone numbers of various areas of the hospital and external agencies like nearby hospitals (for referral) was displayed on the office table. A telephone directory containing contact details of the hospital staff was also available. The hotline offered immediate information



Fig. 1: Control room inside view

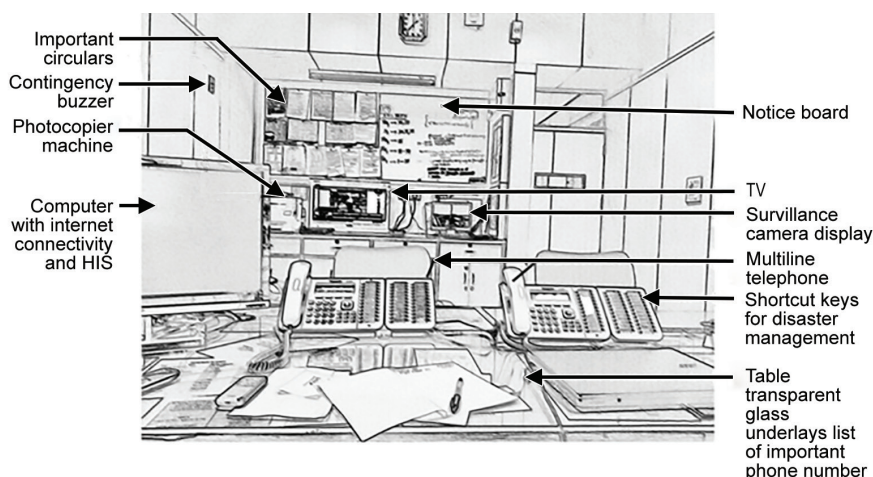


Fig. 2: Control room infrastructure

during emergencies involving very important persons (VIPs) like Ministers. The CCTV system displayed public movement in the department. The news on television set helped in staying abreast and live with incidents in the country crucial for preparedness during contingency and disaster management. A washroom and an anteroom furnished with a settee were attached to the control room for the convenience of administrators on duty.

The control room was manned 24 × 7 by two resident hospital administrators (having a medical qualification, i.e., MBBS) on duty called “duty officers”. One of them was a senior resident (SR) administrator holding an MD degree in hospital administration while the other was a junior resident (JR) who was pursuing the MD course in the Department of Hospital Administration. An experienced senior resident was designated as control room SR in-charge and one Faculty of Hospital Administration as Officer-in-charge have been assigned the responsibility of control room for day to day functioning (including policy matters). For further support, the matters were escalated to the medical superintendent as per the established matrix (Fig. 3). The duty officer could seek support from residents and Faculty concerning their hospital areas as assigned by the medical superintendent and the Head of the Department of Hospital Administration.

Training of Duty Officers

The newly joined duty officers (resident hospital administrators) were made aware of the functioning according to a comprehensive induction programme that introduced them to various hospital areas, common administrative issues and discharge of routine responsibilities including disaster management and VIP protocol in conjunction with “under study” and “supervised control room duties”. During the “under study duty”, the trainee observed the functioning and learned while during “supervised duty”, actual duties were being independently performed under the supervision of a senior colleague. The experienced Duty Officer trained, enabled and empowered them for independent decision making. The duty officers

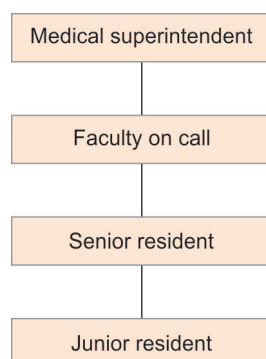


Fig. 3: Escalation matrix

participated in informal discussions on important issues faced during the control room functioning, under the guidance of the medical superintendent, Head of the Department and other faculty members of Department of Hospital Administration over a cup of tea at noon. The department provided platform for teaching, training and research in the field of hospital administration.

Guiding Policies

Centralized Repository of Important Circulars

All important hospital circulars or office orders or memoranda related to policy matters about hospital functioning are either directly received or are down marked for Control Room by the medical superintendent. These essentially spelled out actions and guided decision making for the duty officers pertaining to the functioning of the hospital. These were kept as a hardbound/paperback compendium of circulars, and new circulars were added in a new file for compilation. A soft copy of scanned circulars was sent on a Google control room group e-mail account specially created for the department of hospital administration. This enabled accessing requisite notification on personal e-mail as well. A catalog of optical character recognition (OCR) enabled searchable PDFs of the important circulars had been created as a centralized repository in Google drive. All the available existing compendium of documents (since the 1980s) had been scanned and uploaded. The folder was shared with all duty officers.

Manuals

A resident manual providing briefs on functioning and processes related to various hospital areas including outpatient department (OPD), wards, casualty, support services, diagnostic services, disaster management, infection control, biomedical waste management, patient welfare services, employees health scheme, etc. and a Hospital Administrator’s Manual of Department of Hospital Administration were also available for reference.

Functioning of the Control Room

The duty officer was approached by the hospital employees/officials, patients, visitors, VIPs (by anyone and everyone) either in person or via telephonic interactions. The major duties and responsibilities of hospital administrators in the control room were:

Statutory Requirements

The duty officer was responsible for ensuring statutory and legal compliances including giving permission for

requisite interventional procedures for unknown unconscious patients, declaring brain death as a member of the team, coordinating organ retrieval and transplant, preservation of dead bodies and embalming after checking requisite legal documents like a formal request, no objection certificate from the police (and/or embassy in case of foreign national) and a death certificate. Examination of a sexual assault victim was also facilitated as per existing law and necessary escalations in case of a delay.

Bed Management

The hospital had emergency wards for patients requiring emergency care. In case a department did not transfer its patients from emergency wards to its parent ward within 48 hours, their routine admissions were temporarily blocked by the duty officer until these beds were vacated for casualty patients awaiting admission. The duty officer had rights to allot any hospital bed to seriously ill patients on a life-saving basis (referred to as a peripheral bed). He/she also allotted the EHS beds for institute employees routinely and isolation beds for needful patients. The duty officer authorized an ambulance pool for referring patients to other hospitals in case of non-availability of beds and those with communicable or psychiatric illnesses to earmarked specialty hospitals.

Local Purchase (LP) in Emergency

During the off duty hours, in case of non-available medicines, surgical consumables, etc. required as a life-saving measure, the duty officer arranged these from authorized LP vendor after receiving justification for emergency procurement from treating doctor. However, before placing an order, the assistance of the nursing supervisor was sought to confirm if these were available in any other patient care area.

Preparedness for Emergency Care of VIP and Disaster Management

For both external and internal disasters, duty officer acted as nodal officer and control room was designated as command centre.

For both external disasters causing a sudden surge of patients and internal disasters like fire incident, main pipeline burst, building collapse, etc., the duty officer acted as nodal officer and the control room was designated as the command and control centre for receiving and passing necessary instructions and information to concerned stakeholders. Information for VIP emergency was received from Police and media or other sources for any disaster situation. The duty officer initiated a

well-established VIP emergency plan or the disaster management plan by informing all concerned.

Personnel Management

In case of absenteeism of housekeeping personnel, security, hospital attendant, ECG technician, radiographer, etc. the duty officer ascertained the cause of absenteeism and took necessary action including escalations to concerned officials and authorities and ensured smooth delivery of patient care services.

Arranging Ventilators and Directions Regarding ABG Machines

A location wise list of ventilators and ABG machines was kept handy for providing required services needed on an emergency basis at surge or during down times.

Deferment of Charges

For poor, indigent patients hospital charges were deferred on authorization by duty officers (until next working day) after socio-economic assessment by casualty medical social service officer (MSSO) available during or after office hours as well.

Request for Duplicate Receipts

In case of lost receipts for investigations still not performed or receipts required for claims reimbursement, duty officer authorized duplicate receipt issue from the billing department, after establishing the genuineness of request.

Special Rights for Privileging Hospital Staff

To extend medical benefits to newborns of hospital staff, temporary addition as EHS beneficiaries, valid for 1 month, was done by the duty officer through e-hospital applications and provided a buffer for completion of formalities through routing channel.

Unattended Patients

Allied health service staffs (hospital attendants) were provided for the care of unattended patients on authorized by duty officer.

Hearse Van

Provision of hearse van was not routine services. However, the contract with the vendor for shifting dead bodies from inpatient wards to mortuary was leveraged. Contact details maintained in the control room were provided to the next of kin. For poor patients, the duty officer facilitated the same free of cost with the assistance of the MSSO from the poor patient fund.

Dispute Resolution

Conflict among employees or with patients or their attendants is resolved amicably by the duty officer.

Absconded Patients

Details of absconded patients from the hospital were received by the duty officer who reported them to local police and informed the Medical Superintendent on daily basis.

Administrative Issues Encountered in Control Room

Various issues were categorized as follows (Tables 1 to 3):

Patient/staff/attendant complaints/problems, Incident reports (fire/theft/breakdown/molestation, etc.) and other issues were further analysed (Table 2).

Other problems encountered less frequently, were regarding cross consultation not done/delayed, monkey bite.

Issues detected only on one occasion were delayed examination of sexual assault, lift malfunction, lost patient medical record, delay in radiodiagnosis procedure, ceiling or false ceiling fall off, doctor unavailable, breakdown of ABG machine, missing patient from casualty, delayed discharge, unauthorised stay in waiting hall, procurement

of drugs for transplant during off duty hours, accident at construction site and a natural devastation created by storm winds and torrential rain leading to flooding and uprooting of electric poles and trees.

Issues needing more attention are elaborated as follows:

Fire and Related Incidents

Of the total 37 Incidents of fire alarm incidents reported, false alarms were noted in only four cases while 33 were actual fire incidents. In 19 of such incidents, a short circuit was the causal factor and in two instances, the fire started in the UPS (uninterrupted power supply) units. The security cum fire control room was informed and QRT (that included fire supervisors and guards trained in handling fires) was activated. Patient safety and uninterrupted functioning of vital medical equipment were ensured by involving the electrician and oxygen supply to the non-critical area were closed.

Examination of a Victim of Sexual Assault

The opinion of the duty officer was sought for a case of alleged sexual assault on a male child (oral intercourse) brought by the police. Duty officer suggested consultation by forensic medicine specialist and psychiatrist.

Consent Related a Few Incidents

- *Incident 1:* A patient accompanied by her employer presented with ectopic pregnancy and underwent a lifesaving laparotomy after valid consent. During the surgery, gut exploration was required. The assistance of the duty officer was sought as the attendant was not traceable and intra-operative consent was required. In view of life-saving procedure, consent of treating doctor countersigned by duty officer was documented and the procedure performed.

A case of perforation peritonitis needing exploratory laparotomy on an emergency life-saving basis was managed in the same manner.

Table 2: The majority of the complaints, incidents and other issues were following

S. No.	Issue	Frequency
1.	Fire/false alarm/short circuit/burning smell	37
2.	Computerization related	27
3.	Misbehavior by staff	27
4.	Violence against staff	17
5.	Theft	15
6.	Admission related	12
7.	Delayed service	11
8.	Misbehavior by patient attendants	9
9.	OPD related	9
10.	Security-related	9
11.	Billing and cash counter related	8

Table 1: Observations of duty officers on control room daily reporting parameters

Issues	Observations (n = 365)
Bed Availability	In all the observations it was noted that bed availability for admission of emergency patients was restricted and not all patients requiring admission could be admitted
Incident reports (fire/theft/breakdown/molestation, etc.)	122
Among Patient/staff/attendant complaints/problems	104
Compiled various least frequent issues	71
Any VIP in private ward	Reported on 17 occasions only
Related to the provisioning of hospital services:	
Radiology, Laboratory, Electrocardiograph	10
Engineering services	24
Sanitation services	8
Telecommunication facilities	7
Ambulance/transport services	7
Any unusual occurrence	5
Support services	4

Table 3: Summarized details of complaints, incidents and other issues are as following

<i>Category</i>	<i>Incident</i>	<i>Action taken</i>
Admission-related Issues	Disagreement among doctors regarding the specialty under which the patient should be admitted	The faculty on call in an emergency was designated authority to assign patient under the care of the concerned department.
	Despite prior information by EHS beneficiary doctors expressed an inability to admit due to non-availability of a temporary pacemaker	A temporary pacemaker was arranged with the assistance of a nursing officer
	SR requested to provide a bed for a child with an alleged history of sexual assault. A discharged patient refused to vacate the bed as he had some court case pending against him.	A peripheral bed was provided by the duty officer Security and police informed. The patient left the hospital
Allotment/exchange of beds under the authority of administration	Nonbeneficiary patient admitted on earmarked beds	Patients were verified, and matter escalated to medical superintendent. The instruction was passed to Chief Nursing Officer for all nurses to comply that bed under administration has to be provided on duty officer verification and consent.
	Beneficiary admitted on EHS bed without the approval of duty officer	
	At the time of verification of bed status by the duty officer, found that EHS bed exchanges allowed without permission.	
Issue of bed bugs infestation		Protocol for management of bed bugs initiated. It comprised the use of hot air gun, filling of crevices, treatment of mattresses and furniture with chemicals
Census-related	A patient was allotted isolation bed did not report to ward for 4 days.	Patients discharged (as abscond) and bed vacated
Computerization related issues	After the patient was shifted to ICU he was declared absconded from ward and discharged from the census.	Entries in the admission-discharge module modified with the assistance of Nursing Informatics Staff
Inebriated staff on duty	Two such incidences were observed	The staffs were handed over to police after MLC generation and examination by the casualty medical officer.
Hospital meal issue	Complaint regarding stale dinner given to the patients	Inspection of the kitchen and other areas where the food was distributed was done. The issue with only this patient was found probably due to leftover lunch in his unwashed plate.
Overstay emergency patients	Patients occupying observation beds for more than 7 days.	Concerned Doctor was asked to shift patient in their ward. Reported to the department HOD
Security related issues	CT scan premises not locked	Guard was placed in night and Radiology SR on call informed.
Seepage/flooding	Complaint of water leakage Main OT.	Duty officer reached the spot and assessed the situation. Plumbers called in for source identification and do the needful. Carpenters contacted for protecting false ceiling from collapse. Lift operators instructed to shut down operations. Engineers informed. Water supply shut. Definitive repair started in the morning.
Theft	Cases of theft of oxygen adaptor and regulator, pulse oximeter, water taps, mobile, purse, cash office stationary were reported	Informed higher security official
Unauthorized entry by an outsider	Unauthorized private vendor wooing patients for investigations	Police complaint lodged and matter escalated to Chief Security Officer

- *Incident 2:* A patient under police custody was admitted and refused medical management. Duty officer advised for informed consent and written communication was sent to the concerned jail authorities.
- *Incident 3:* In a case of an eloped couple brought by police, the gynecological examination was refused by the girl (above 18 years) despite insistence by parents and this decision was upheld by Duty Officer.

Workplace Violence

Altercation, verbal and physical assault were reported among staff and patient attendants in eight cases and staff members in four cases. Death of patients and the generation of MLC at casualty were important causes of violence. In an isolated incident, an impersonator posing as a youth leader threatened to implicate duty officer for allotting beds in lieu of informal payments. In all security-related matters QRT was activated, and local police were informed.

Billing and Cash Counter Related Issues

Incident 1: Enquiry into a complaint of harassment by asking for photocopies from outside, during bill settlement had revealed an on-going fraud. A billing executive counterfeited signature to take unutilized deposits. He was traced from system profile account and penal provisions were initiated.

Incident 2: A patient complained that the procedure categorized as "others" in the bill could not be claimed through insurance. The matter was escalated to concerned officials for necessary amendments.

Drugs/Consumables-related Issues

Two incidents of intravenous solutions having fungus occurred. Recall of the entire lot supplied to various wards was done and samples were preserved. The matter was escalated to the medical superintendent.

For facilitating emergency liver transplant at midnight, duty officer arranged expensive medicines (like injections albumin, methylprednisolone, and hepatitis immunoglobulin) through local purchase vendor and a rare AB negative blood.

Lost/Found Child

A case of a lost child was reported. The duty officer activated QRT and instructed to monitor all exit gates. Later it was informed that the child had reached home.

DISCUSSION

The Concept of Control Room

The study provides a vision on how a control room can be planned, staffed and operated in a hospital setting.

It also highlights that administrative issues in health-care services vary in complexity which itself drives the concept of the control room. Managed by doctors qualified, trained and experienced in administration, it seems to be the ideal approach. Empowered with the delegated authority of the medical superintendent, the duty officer is a classic example where responsibility is supported by necessary authority.

Decision Making in Control Room Evidence-based

Hospital communication has an important role in the management of disasters.¹ An established communication system comprising of telephonic calls, short message services (SMS), pre-recorded voice messages, etc. are utilized for this. Circulars and manuals ensure that written communication provides a permanent record of communication for reference.² It contributes to evidence-based management by delving upon on the professional experience and organizational data for decision making. Evidence-based management practice relies on scientific, organizational, experiential and stakeholder evidence.^{3,4} The duty officer utilized the experience gained through under study and supervised duties, consultations with senior duty officers, advice from the faculty of hospital administration and medical superintendent in addition to knowledge gained from formal education from literature, classroom learning and experiential learning from discussions about important control room issues during informal tea clubs.

Decision making in a control room in Brazil was aligned with the well-defined protocol.¹ In the present study, the control room has a crucial role in decision making during preparedness for emergency care of VIP/disaster are guided by a well-established and rehearsed protocol. Organizational relations and coordination structures are crucial for disaster management operations.⁵ Similarly, the present study, coordination with stakeholders viz. clinicians, security (including the quick response team) and support service is done. Mock drills are also conducted by both external and internal agencies. This help evaluates and validate contingency plans for preparedness of the facilities and personnel.⁶

Soft Skills

The amicable resolution of issues involving aggrieved attendants and actual violence reflects that the duty officers are groomed to be soft (yet firm) on sound decision making.

Bed Management

Overcrowding and prolonged waiting time for admissions in an emergency are associated with increased

mortality.⁷ Interventions have been adopted such as leadership involvement, hospital-wide coordinated strategies and are data-driven.⁷ The duty officers ensured efficient and effective utilization of hospital beds through blocking of admissions; it is, and leadership was involved in developing this hospital-wide strategy.

Organizational Effectiveness

Duty officers was pivotal in facilitating hospital operations and supporting staff in their work. This may contribute to higher job satisfaction in addition to organizational effectiveness.⁸

Consent

The featured issue was consent. Good decisions were taken related to intraoperative consent for life-saving procedures. Although a procedure specific informed consent must be taken from an adult patient, their courts have taken exceptions for emergency lifesaving procedures. In *Samira Kohli vs. Dr Prabha Manchanda and Anr* case, although the doctor was held negligent for performing an additional procedure without taking her prior consent, however, the court added, "that unless the unauthorized additional or further procedure is necessary in order to save the life or preserve the health of the patient, and it would be unreasonable (as contrasted from being merely inconvenient) to delay the further proceedings until the patient regains consciousness and takes a decision, a doctor cannot perform such procedure without the consent of the patient".⁹ In *Pravat Kumar Mukherjee vs. Ruby General Hospital and Ors* (2005), the National Commission observed that "emergency treatment was required to be given to the patient who was brought in seriously injured condition; there was no question of waiting for the consent of the patient or a passerby who brought the patient to the hospital and was not necessary to wait for consent to be given for treatment." "In emergency or critical cases let them discharge their duty/social obligation of rendering service without waiting for fees or consent."¹⁰ Refusal for treatment in jail inmate was accepted by the doctors. Competent patients have the legal right to refuse treatment, even in life-threatening emergency situations. An informed refusal must be obtained; patient's witness's signature taken and two doctors document the reason for non-performance of life-saving surgery or treatment as an express refusal by the patient or the authorized representative and inform the hospital administrator about the same.¹¹ Information sent to jail authorities closed the loop of communication.

Refusal for gynecological examination of an adult patient exemplified sound decisions. Even sexual

assault survivor above 12 years can legally refuse examination or collection of evidence or both.¹²

Spectrum of Issues not Reported

Heads of Departments and services carried out routine administrative responsibilities. As regards hospital administration, with a full-fledged department, the core administrative responsibilities of the entire hospital of various areas were delegated to various officer in-charges. The entire hospital is covered in entirety. With such a matrix, routine and non-emergent matters were managed by the respective heads and were not reported to control room. It is reflected in the low frequency of issues from CSSD, laundry, mortuary, dietetics, store, etc.

Recommendations

The study paves way for future work on standard operating procedures. Follow-up studies on minimizing contentious administrative issues by preventive actions may be conducted for the strategic outlook on day to day issues.

Limitations

Limitations related to documentation review based studies are also a limitation of the study and information lacked related to issues handled directly by concerned officials. Long term preventive actions instituted by Heads of respective areas are also missed.

Strengths

Conduct of study in the department pioneer in hospital administration and time tested concepts are the strength of the study.

CONCLUSION

The study introduces to a time tested concept of administrative control room in a hospital and succinctly describes management of important issues encountered. It adds to domain knowledge where little is available

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Pharmacovigilance: Present Scenario and Future Goals

AK Mohiuddin

ABSTRACT

Pharmacovigilance is the science and activities associated with gathering, recognition, appraisal, checking, and counteractive action of untoward impacts with pharmaceutical items. Pharmacovigilance essentially safety of medicine. Pharmacists have key roles in wellbeing frameworks to keep up the reasonable and safe utilization of medicine for they are medicated specialists who are unequivocally prepared in this field. The perspective of drug store understudies on pharmacovigilance and adverse drug reaction (ADR) revealing has additionally been examined with an intend to center the need to improve content identified with ADR announcing and pharmacovigilance in undergrad drug store educational programs. Globally, despite the fact that the job of pharmacists inside national pharmacovigilance frameworks contrasts, it is exceptionally all around perceived. Reconciliation of ADR announcing ideas in instruction educational modules, preparing of pharmacists and deliberate commitment of pharmacists in ADR revealing is imperative in accomplishing the safety objectives and preservation of general wellbeing. Likewise, these learning holes can be placed through nonstop expert improvement projects and fortifying hypothetical and reasonable information in undergraduate drug store educational programs. Without adequately distinguishing and acknowledging preparing requirements of pharmacists and other human services experts, the capability of national pharmacovigilance frameworks is probably not going to enhance which may trade off patient's safety.

Purpose: Discussion and projection of present situation analysis and future demand for pharmacovigilance. The pharmacists have a vital role to play which is thoroughly discussed.

Methodology: Research conducted a year-round comprehensive literature search, which included technical newsletters, newspapers journals, and many other sources. The present study was started at the beginning of 2018. PubMed, ALTAVISTA, Embase, Scopus, Web of Science, and the Cochrane Central Register of was thoroughly searched. The keywords were used to search for different publishers' journals like Elsevier, Springer, Willey Online Library, Wolters Kluwer extensively were followed. Medicine and technical experts, pharma company delegates, hospital nurses and chemists were given their valuable suggestions. Predictions were based on estimates such as drug end users, providers or prescribers, general knowledge of rational use, consequence and types of different incidences of ADR and

non-compliance, their management or overlooking. Studies regarding inclusion and information sources of pharmacovigilance were given priorities. Several factors that influence medication-taking behavior, non-compliance, ADR reporting by pharmacists were communally analyzed and added to the article. Issues regarding economic and cultural barriers were found to be different from subcontinents, countries and even states. Most significant features of pharmacists' role in the therapeutic intervention were added afterward to maintain a logical sequence. Drug factors, environmental factors and provider-patient interaction followed by pharmacist's role in handling patients and to change or correction of medication counseling, dispensing, monitoring was added to reveal their effect on patient compliance which is the eventual goal of meeting therapeutic guidelines. Many studies found regarding pharmacists' role in therapeutic cost minimization, role in hospital and other healthcare settings, disease prevention, and lifestyle management found to be not within the scope of this article.

Findings: Pharmacists are an integral part of the healthcare management system, and the importance of their role play is not after doctors and nurses. Any future role for the pharmacist in counseling, monitoring and vigilance could be addressed as part of a formalized, strategic approach by creating an integrated healthcare team, with attention to further enhancement of pharmacovigilance in any country, community or a healthcare setting.

Research limitations: Research has a major limitation with dealing too many information on pharmacovigilance worldwide. An only important aspect of the expanded role of pharmacists, the present situation of vigilance in different countries and a few future prospect, demand and provisions of pharmacists in meeting those emerging demands are discussed.

Practical implication: The soul of this article was to detail about the present situation and future demands of pharmacovigilance. Along with students, researchers and professionals of different background and disciplines, e.g., pharmacists, marketers, doctors, nurses, hospital authorities, public representatives, policy makers, and regulatory authorities have to acquire much from this article.

Social implication: The article should contribute an integrated guideline for patient compliance, demand pharmacovigilance and last but not the least a silver lining of better healthcare situation in near future.

Keywords: Adverse drug reactions, Medicine, Monitoring, Pharmacists, Prevention, Safety.

Abbreviations: Computerized provider order entry (CPOE); Clinical decision support (CDS); Drug-drug interactions (DDIs); Healthcare professionals (HCPs); Hypersensitivity drug reactions (HDRs); European medicines agency (EMA); Fatal adverse drug reactions (FADRs); Medicines use review (MUR); Uppsala monitoring centre (UMC); International society of pharmacovigilance (ISOP); Pharmacovigilance program of India (PvPI).

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How to cite this article: Mohiuddin AK. Pharmacovigilance: Present Scenario and Future Goals. *Int J Res Foundation Hosp Healthc Adm* 2018;6(2):91-98.

Source of support: Nil

Conflict of interest: None

INTRODUCTION

World Health Organization

World Health Organization (WHO) characterized pharmacovigilance as “the science and exercises identifying with the identification, appraisal, comprehension, and counteractive action of antagonistic impacts or some other medication-related issue”. It is a vital and indistinguishable piece of clinical research. Both clinical preliminaries safety and post-showcasing pharmacovigilance (regularly known as post promoting studies or phase IV clinical preliminaries) are essential all through the item life cycle. With a sensibly high number of late prominent medication withdrawals, both the pharmaceutical business and in addition different administrative offices over the globe have expanded the bar. Early flag identification from the post-advertising observation thinks about and clinical preliminaries in early stages have now been adjusted by significant pharmaceutical organizations so as to recognize the dangers related with their therapeutic item/s as right on time as could be expected under the circumstances. An ADR is characterized by the WHO as “a toxic, unexpected impact of a medication that happens in portions regularly utilized in people for the conclusion, prophylaxis, and treatment of ailment”. The indications of ADRs rely upon age, sex, hereditary, polypharmacy, portion exactness, and ecological and other interior variables like illness conditions. ADRs ordinarily answered in because of known or obscure pharmacological highlights, poor item quality (e.g., misleading, polluted, misbranded, fake, mediocre), prescription mistakes in recommending, getting ready, overseeing, or taking the medicine which requires hospitalization, causing critical handicap/insufficiency, now and then hazardous and furthermore demise announced.

Incorporation

Pharmacovigilance is a procedure which incorporates:

- The observing of utilization of therapeutic items in regular clinical practice, to have the capacity to recognize already undisclosed unfriendly responses or an adjustment in the idea of unfavorable responses.
- Risk-advantage evaluation of restorative items, which picks what activity, if vital, is basic for a more secure utilization of therapeutic items.

- Providing data to human services experts and additionally to patients so as to enhance the protected and power utilization of therapeutic items.

Wellsprings of Data in Pharmacovigilance

Pharmacovigilance utilizes data from numerous sources:

- Natural detailing of unfavorable responses from medicinal services experts (connection to antagonistic responses)
- Clinical preliminaries and epidemiological investigations
- Published worldwide therapeutic writing
- Pharmaceutical organizations
- Healthcare and populace measurements
- Information on the utilization of restorative items

Types and Prevalence of ADRs

ADRs in hospitalized patients can be partitioned into two classes: those that are the reason for clinic confirmation, and those that happen amid hospitalization. There is restricted information on ADRs, particularly with respect to the responses that happen after confirmation. It is evaluated that ADRs happen in 10% of the overall public and 10 to 20% of in-patients, beyond what 15% of these ADRs can be lethal^{1,2} about 15 to 20% of ADRs relate to HDRs, which are actuated by presentation to a medication in a portion that is generally endured by solid people, and the responses are classified by target side effects that can be multiplied after resulting re-introduction.² ADRs speak to an essential reason for dismalness and are thought to cause somewhere in the range of 10% and 30% of all healing center confirmations in more established patients.³ In the USA, over 90% of grown-ups matured multi-year and more seasoned utilize one prescription for every week and 10 to 25% experience an antagonistic medication response.⁴ These ADRs are responsible for 3–7% of healing facility confirmations. The predominance of ADRs was more in female patients when contrasted with men. ADRs generally happened in the age gathering of 41 to 50 years.⁵

Value of Patient Reporting

Patient announcing includes new data, and point of view about ADRs in a way generally inaccessible. This can add to better decision-making techniques in administrative exercises in the EU, there were 48,782 patient reports in 2015, showing an expansion of 30% in 2014.⁶ Most patients did not know about detailing frameworks and others were befuddled about announcing. Patients were fundamentally propelled to make their ADRs known to turn away comparative enduring in different patients. By expanding patient associate and giving clear

announcing procedures, revealing frameworks could more readily achieve patient detailing of ADRs. The WHO screens indiscreet ADR detailing in the greater part of nations. A typical issue is under-reporting. It is anticipated that just 5 to 10% of ADRs are accounted for. In spite of the fact that there is no gauge of patient revealing, 95% of HCPs do not report ADRs. In 1976, a British doctor, Inman, was the first to distribute explanations behind under-reporting by HCPs, including:

- Contentment (believing that serious ADRs are well documented when the drug is released on the market)
- Fear of being involved in a lawsuit
- Guilt for having been responsible for damage observed in a patient
- Ambition to publish a case series or financial benefit
- Lack of awareness of the notification process
- Insecurity about reporting suspicions of an ADR
- Indifference⁷

Value of Healthcare Professionals' Reporting

The information collected during the premarketing phase is incomplete with regard to adverse drug reactions, and this is mainly because:

- Patients used in clinical trials are limited in number and are not illustrative to the public at large. In addition, the conditions of use of medicines differ from those in clinical practice and the period is limited.
- Information about rare but serious untoward reactions, chronic toxicity, and use in special groups (such as children, the elderly, or pregnant women) or drug interactions is often incomplete.

Consequently, post-showcasing reconnaissance is imperative to allow the location of less normal yet now and then intense ADRs. It is vital to allow the location of less normal yet in some cases intense ADRs. Wellbeing experts worldwide should give an account of ADRs as it can spare existences of their patients and others.⁸ Flag discovery is noteworthy to recognize the medication-related unfriendly impacts. Notwithstanding, the quantity of reports sent to national pharmacovigilance focuses is essential and additionally the nature of reports. The nature of reports is unquestionably predominant when they are filled by wellbeing experts who have pharmacology information, i.e., pharmacists, specialists, medical attendants, doctor collaborators, dental specialists and so on. It will be far and away superior in the event that it very well may be archived and recuperated from drug store data frameworks.

Factors of ADR Reporting

ADRs have emerged as a noteworthy clinical and general medical issue responsible for around 5 to 35% of healing center confirmations in both created and creating

nations. In the US and EU, ADRs are among the main ten reasons for fleetingness and in addition rising the expense of consideration. The fast revealing of ADRs to medicate administrative bodies is a critical medication safety check yet under-detailing is a noteworthy test even in created nations with satisfactory human and material assets to stand up to the issue.⁹ Variables that may add to underreporting among HCPs incorporate learning, carelessness, the absence of time and drive. The absence of institutionalized revealing procedures and holes in human services data frameworks additionally causes underreporting.¹⁰ Studies recorded ADEs in outlines to help dauntlessness of consideration however never announced them to outside organizations. Suppliers confronted time imperatives, and detailing would have required duplication of documentation.¹¹ Reviews of human services suppliers in intense healing centers have discovered that medical caretakers are bound to report episodes than specialists and that there are different subtleties for staff not revealing, including not realizing how to report events, time limitations, vulnerability about what to report, the desire for fault or discipline, and a discernment that detailing occurrences does not result in enhancements.¹²

Biological Medicines Pose Specific Challenges for Pharmacovigilance

An ongoing rule distributed by the EMA centers four key contemplations for the pharmacovigilance of biologicals; in particular, immunogenicity, fabricating fluctuation, solidness/chilly chain necessities, and item detectability. Organic medicines are the essential factors and albeit distinctive bunches of the equivalent natural medicine are not alike, the nature of each cluster is firmly controlled to guarantee the safety and adequacy of the medicine. In any case, required assembling process changes can affect quality characteristics of the organic and this can happen unbeknownst to medicinal services experts and patients. In uncommon cases, these progressions can affect the immunogenicity of an item. Natural medicines including biosimilars are ending up logically accessible. Biosimilars are unmistakable from the generics of synthetic medicines as, attributable to the troubles of natural substances and their assembling forms, and biosimilars are not totally indistinguishable to the first medicine on which they are based (reference medicine). The likeness to the reference medicine is set up through a thorough equivalence practice guided at the quality, pre-clinical and clinical dimensions. All recently affirmed natural medicines, including biosimilars, are liable to additionally checking for a time of 5 years after endorsement.¹⁰

Medical and Economical Burden of ADRs

The therapeutic weight of FADRs is noteworthy. The most critical concerns are recommended medicines, oversight of essential treatment, inability to screen treatment and poor frameworks. These were identified with imperfections in instruction or preparing, the absence of clear rules or conventions and inability to invention existing rules, among different reasons.¹³ An expected 106,000 deaths expressed somewhere in the range of 1966 and 1996 in the US. Be that as it may, it is evaluated that just 6% of ADRs are accounted for.² What's more, half 70% are accepted avoidable. An anticipated 197,000 deaths for each year in the EU are caused by ADRs, and the aggregate expense to society of ADRs in the EU is €79 billion. ADRs exemplify the fifth most regular reason for death in a healing center setting.¹⁴ In intensely sick grown-ups, superb proof demonstrates that liberal oxygen treatment expands mortality without enhancing other patient-imperative results.¹⁵ Somewhere in the range of 1976 and 2007, 28 drugs were pulled back from the US to advertise for safety reasons.¹⁶ Death rates due to ADRs are evaluated from 0.1 to 2.9%. An intelligent eight-year (1999–2006) examine led in the US of >2 million deaths uncovered that 2341 death (0.1 per 100,000) were ADR-related deaths. In 2005, drugs were the main source of death evaluated at 739, 936 every year.¹⁷ The anticipated aggregate money related expense of \$17.88 billion speaks to 1.55% of Australian total national output.¹⁸

Pharmacovigilance in Healthcare Education

Social insurance experts have little cognizance of pharmacovigilance and ADR revealing, and just a couple of instructive associations effectively affected this mindfulness. Future human services suppliers ought to along these lines obtain a sufficient arrangement of pharmacovigilance capabilities to normally recommend, circulate, and screen drugs. Anticipating, diagnosing, overseeing, and detailing ADRs are a critical piece of normal and safe recommending and are acclimatized into various strides of the WHO-six-advance Guide to Good Prescribing.¹⁹ Various examinations have communicated worry about the absence of medicinal services proficient skills in pharmacovigilance.^{20,21} This absence of undergrade instruction and preparing in pharmacovigilance is predictable with the low dimension of information, abilities, and activities seen in doctors as well as in rehearsing pharmacists, dental practitioners, and medical attendants.²²⁻²⁴ Newness to pharmacovigilance, a low dimension of ADR-detailing abilities, an absence of learning joined with negative demeanors like obliviousness, fear legitimate risk, and absence of significance are

believed to be identified with the current deficient reaction to numerous ADRs.²⁵⁻²⁸ A few medications (actualizing conventions, instructive workshops, or continued messaging or phone calls) have been executed trying to enhance the fitness of social insurance experts,²⁹⁻³² yet these intercessions are exorbitant or neglect to deliver clinically applicable and long-haul impacts.²³

Pharmacovigilance in Pharmaceutical Industries

The aims of pharmacovigilance within the industry are essentially the same as those of regulatory agencies; that is to protect patients from unnecessary harm by identifying previously unrecognized drug hazards, elucidating pre-disposing factors, refuting false safety signals and quantifying risk in relation to benefit. Although the perspectives of companies and the regulatory agencies may be different, they now work more and more closely together and share information.³³

Worldwide Monitoring of Pharmacovigilance

In 2002, in excess of 65 nations have their own pharmacovigilance focuses. Enrollment of the WHO for International Drug Monitoring is facilitated by the WHO Collaborating Center for International Drug Monitoring, known as the UMC. Pharmacovigilance is presently solidly dependent on sound logical standards and is basic to successful clinical practice. The order needs to grow further to meet open desires and the requests of current general wellbeing. A mind-boggling and indispensable relationship exists between wide scopes of accomplices in the act of medication safety checking.

- *Quality Assurance and Safety:* The group is a piece of the Department of Essential Drugs and Medicines Policy, inside the WHO Health Technology and Pharmaceuticals bunch.³⁴
- *UMC, Sweden:* A free, not-revenue driven establishment, a middle for universal logical research, situated in Sweden—firmly related to WHO, since 1978. The chief capacity of the UMC is to deal with the universal database of ADR reports got from National Centers.³⁵
- *National Pharmacovigilance Centers:* National Centers have assumed a vital job in expanding open attention to tranquilize safety. This advancement is somewhat owing to the way that numerous national and local focuses are housed inside doctor's facilities, restorative schools or toxic substance and medication data focuses, as opposed to inside the points of confinement of a medication administrative expert.³⁶
- *Hospitals:* various medicinal foundations have progressed ADRs and drug blunder close watch frameworks in their centers, wards, and crisis rooms.

- *Academia*: Academic focuses of pharmacology and drug store have assumed a vital job through instructing, preparing, look into, strategy improvement, clinical research, morals councils (institutional survey sheets) and the clinical administrations they give.³⁷
- *Health Professionals*: Originally doctors were the main experts welcomed to report as making a decision about whether sickness or medicine causes a specific side effect by practicing the aptitude of differential determination.³⁸
- *Patients*: Only a patient knows the genuine advantage and mischief of medicine taken. Coordinate patient investment in the revealing of medication-related issues will build the proficiency of the pharmacovigilance framework and make up for a portion of the inadequacies of frameworks dependent on reports from wellbeing experts as it were.

Necessity of Collaboration

Pharmacovigilance framework usage is the need which is conceivable by a joint effort between the scholarly world, human services suppliers including a pharmacist, patient, maker, government, media, and common society, UMC Sweden working under WHO, FDA, ISOP and other worldwide association taking a shot at medication safety.³⁹ There are five WHO Collaborating Centers working for pharmacovigilance, each in pro regions. Notwithstanding UMC in Sweden, these are in India, Morocco, the Netherlands, and Norway.

- *The focus in Rabat (Morocco)*: Became a WHO Collaborating Center in 2011. The Rabat focus underpins WHO by building limit in the WHO Eastern Mediterranean Region, in francophone, and Arabic nations.
- *Pharmacovigilance Center Lareb (Netherlands)*: Netherlands' national pharmacovigilance community for Pharmacovigilance in Education and Patient Reporting. It turned into a WHO Collaborating Center in 2013.
- The Center in Norway was built up in 1982 in Oslo at the Department of Pharmacoepidemiology at the Norwegian Institute of Public Health, sponsored by the Norwegian Government.
- Founded in 2010, the PvPI was assigned as an expert focus by WHO in Geneva, 2017.^{40,41}

Role of Pharmacist in the Management of ADRs

In the United States alone, DDIs add to 20% everything being equal, which cause about 770,000 passings and result in \$30 billion to \$180 billion in human services costs and four hospitalizations for every 1,000 individuals yearly. A pharmacist assumes a pivotal job in the distinguishing proof, location, counteractive action, and

the board of DDIs, sedate sustenance collaborations and ADRs.^{42,43} The pharmacist can complete such exercises in the inpatient setting, while at the same time partaking in survey diagrams amid ward rounds, and amid drug the executives while managing solutions.

The prevalence of patients who visited different healing facilities with the equivalent or comparable condition was about 40% among patients going to government outpatient divisions in Hong Kong, 23% among essential consideration patients in Japan, and 23.5% among outpatients in Taiwan.⁴⁴ Patients who get restorative consideration from various human services suppliers, especially from various healing centers, are bound to endure ADRs. A few scientists suggested that pharmacists use mechanized screening programming to distinguish potential medication treatment issues and avert unfavorable occasions. Others proposed utilization of CPOE with CDS to recoup medicine mistakes.

The intercession of pharmacists by sorting out addresses and gathering dialogs in this way giving data about the significance, earnestness, preventability, and stipulation of revealing shows increased enhancement of learning, demeanor, and discernment about ADRs.

All wellbeing experts assume their particular jobs in adjusting among advantages and dangers of prescription when it is presented in the market. Be that as it may, the aptitude of a pharmacist about a medication, particularly if recently advertised, assume a progressively huge job in ADRs answering to the experts which help in either withdrawing the item from the market or cause naming changes.⁴⁵ Following thalidomide-induced phocomelia catastrophe, Bowles asked ADR revealing as a factor in the underwriting of pharmacists in 1964.⁴⁶

Pharmacists working in network drug store have an additional advantage of distinguishing and revealing ADRs while managing on the counter medicines and natural items. In a network drug store, a pharmacist might not have immediate and unmistakable patient rundown but rather the patients going to a similar drug store to refill their remedy offers the pharmacist a chance to identify a conceivable ADR that the patient may understanding and can help in the administration and the detailing of the said ADR. Pharmacist conference aptitudes should be assessed if MURs are to understand their imagined points.⁴⁷

Role of Pharmacist in Pharmacovigilance

The commitment of the pharmacist to pharmacovigilance should be that as it may, not be restricted to ADR announcing. Particularly, healing facility pharmacists can assume a huge job in ADR announcing on the grounds that the most genuine antagonistic medication occasions happen

in doctor's facilities, and ADRs represent a significant extent of doctor's facility confirmations.⁴⁸ The pharmacist could be an organizer between various individuals from social insurance group and the patients, to guarantee both carefulness and consistency. Along these lines, support of pharmacists in wellbeing the executive's framework is ending up extremely crucial step by step. Pharmacists are associated with conveying social insurance offices and in addition proposing therapeutic staff on a legitimate collection of medications. They additionally plan, screen and assess medicate projects to upgrade wellbeing and diminish wellbeing aberrations.^{49,50} Healing facility pharmacists guarantee that medicines are overseen securely and adequately with the goal that they are suitable for the age, sex, body weight and clinical status of the patient. Network pharmacists then again come in direct contact with the general population, and they apportion drugs as well as guidance's patients seeing general wellbeing themes, for example, diet, work out, push the executives, over-the-counter prescriptions and so forth.^{51,52} Some people group pharmacists additionally furnish specific administrations to assist patients with diabetes, asthma, smoking suspension, chronic drug use, and patients with hypertension. The job of pharmacists in pharmacovigilance frameworks is expanded under Affordable Care Act or the present social insurance change, since individuals who generally had no protection, presently meet all requirements for protection; and this could build the case for drug store administrations. More pharmacists will be required in conveying wellbeing training, including instruction on DDIs.⁵³ Pharmacists can forestall sedate association, a direct patient with respect to the sickness and prescription, e.g. giving data, guidance, and support about medicine and treatment because of their entrance of relational correspondence. The changing job of the pharmacist from conventional 'tranquelize gadget' idea towards 'pharmaceutical consideration supplier' extended the job of pharmacists. In this way, pharmacists can assume a key job in deflecting drug maltreatment by giving clear data about the antagonistic impacts of prescriptions.⁵⁴ Plus, the advancement of electronic data frameworks has been an earth-shattering in distinguishing and interceding drug-related issues, for example, dose, unfriendly responses, associations, consistency or inadequacy.

CONCLUSION

Being drug master and coach of sheltered and compelling medication use, pharmacists have critical pretend in identification, report, observing alongside avoidance of ADRs. The absence of anxiety still exists among pharmacists who are restricted to change from item situated

to patient arranged. The hole can be limited through proceeded with expert improvement programs and in addition fortifying information base in undergrad level. A strengthening and commitment of network pharmacists to patient record check and electronic announcing may likewise lessen ADR related occasions. Without successful distinguishing proof and satisfaction of preparing needs of pharmacists and other medicinal services experts, the effectiveness of national pharmacovigilance frameworks is probably not going to enhance, which may bargain patient safety. To achieve this objective, administrative bodies should make enactments to rouse pharmacists to be effectively engaged with the framework. Other than their dynamic cooperation, their allotted job ought to have a more extensive range to acquire the greatest help dependent on their aptitude. Compelling utilization of pharmacists' workforce will enhance the result of the pharmacotherapy and in addition decline worldwide wellbeing costs.

ACKNOWLEDGMENT

It's an extraordinary appreciation and respect to be a piece of social insurance research and training. Pharmacists of all teaches that I have led was especially useful in talking about pharmacovigilance circumstance at the home and abroad, giving books, diaries, bulletins and valuable time. The best help was from my understudies who paid enthusiasm for my subject as class address and urged to compose such article including ADR the board and pharmacovigilance. In spite of an extraordinary shortage of subsidizing this reason from an expert, the experience was sufficient to continue to inquire about.

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