10.5005/jrfhha-7-2-iv

# EDITORIAL

## WAY AHEAD FOR HEALTHCARE SECTOR POST-COVID-19

The COVID pandemic has brought to forefront the challenges of the public health system. India needs well-equipped government hospitals and not grand buildings, which will serve no public purpose. In our country there is a gross mismatch between the healthcare resource distribution and the needy clientele. With less than 1 physician per 1000 population, India is well behind its peer countries. It needs an additional 3.6 million hospital beds to reach the recommended capacity. Only about 27% of India's population is covered around any form of health insurance and the out of pocket expenditure on health is 62.4% in India as compared to the world average of 18.2%. Two-thirds of hospital beds in India and almost 80% of available ventilator-equipped ICU beds are in private hospitals. At 3.6% of GDP, India's overall health spending is among the lowest compared with peer and advanced economies. Of this, government spending on health is less than 1%. Alarmingly, out-of-pocket health expenditure for households is extraordinarily high in India. About 65% of all health expenditure in India (approx 2.5% of GDP) is borne privately by households. India could find itself in an acute health crisis over the next few months and the direct cause of it will not be the SARS-CoV-2 virus. Hundreds of thousands of children might already have missed vital immunizations. The shutdown of the economy has inflicted unbearable social and economic costs. An estimated 122 million jobs in the formal and informal sectors have been lost. The informal sector, which employs 90% of the workforce and the MSMEs, are worst hit.

In the past 10 years, there is a shift in disease pattern, India's growing noncommunicable disease — cardiovascular ailments, cancer, respiratory diseases, diabetes, and mental health conditions are seeking most attention, both resource wise and financially. While containing the surge of COVID-19, we will also have to be on alert for other contagions, which assume menacing proportions during the summer in various states.

### Challenges

- Currently routine healthcare has taken a back seat due to disrupted hospital services, primary care services are being provided by government and private providers. Post-Covid-19 prevalence of virus in community is going to stay. This will result in reduced foot falls and elective procedures. Health expenditure will get pushed back in the list of priorities.The fear of catastrophic expenditure becoming a norm cannot be ruled out.
- The epidemic has compromised the Ayushman Bharat Pradhan Mantri Jan Arogya Yojana's (PMJAY) ability to reach out to critically ill patients — including those afflicted with cancer and below the poverty line. Hospital industry is going through trying times. There has been a deep fall in OPD volumes and planned surgeries.
- Financial recession in hospitals/ Reduced Revenue will be due to lockdown hospitals are witnessing a drop in both domestic and international patient footfalls and elective surgeries, resulting in occupancy levels to fall to a mere 40% by late-March vis-à-vis pre-COVID occupancy levels of ~65-70% and is expected to reduce further.
- There is a huge liquidity crisis due to revenue loss and slow reimbursements (CGHS, ECHS, Insurance).

**Way ahead:** The support that government can provide to revive the healthsector and keep it viable for facing more challenges are as under:

- *Facilitating Finanacial Improvement:*
  - Government should provide a **tax holiday** for at least two years to start with to all health sector private hospitals to boost up their financial position.
  - Government should give **two-year moratorium** on all working capital, principal, interest payments on loans and overdrafts, bringing in liquidity and enabling business continuity.
  - A **waiver of GST** on input costs and services for 2 years.
  - **Twenty percent rebate** on the current commercial rates of power and water rates currently being paid by hospitals, diagnostics centers, pathology labs and other healthcare service providers to ensure sustenance of business.
  - Subsidy of salary and contributions toward government funds such as ESIC and PF
- *Surge Capacity Building*
  - It is time to invest in **Invest in Public Health** and increase preparedness for new emerging health threats.
  - We have to create rapid **re-tasking models** especially at lower skill levels in health system.
  - Non-healthcare volunteer personnel can be trained and maintained as pool for re-tasking (Like a reserve force). This will allow up scaling of lower level health manpower for higher role. E.g. ANMs can be re-tasked for independent nursing duties up to a certain level
  - Concept of **RESERVISTS** implemented for al healthcare personnel trained at public cost.
  - Identifying existing infrastructure that can be re-appropriated on demand is highly essential
- *Mandating Health as Social Security.*
  - Comprehensive medical and life insurance benefits for all employees in health sector.
  - Advance payment for patients being treated under various government schemes such as Ayushman Bharat, CGHS, etc.
  - Revision and realistic rates for various procedures be put in place for various schemes.
  - PHCs should be made attractive to doctors by providing incentives and making rural service mandatory for medical students.

- *Developing MAKE IN INDIA Resources*.
  - Right opportunity for Pharma and Medical Device Industry to encash by exporting Drugs and Medical Devices to large number of countries who need these support.
  - More AMTZ like facilities need to be opened across the country to promote Make in India thereby making india a power to reckon with in Manufacturing hub.
  - Good opportunity to attract FDI in manufacturing sector as many countries want to withdraw from China.
  - Right time to explore developing alternative sources of getting raw material for manufacturing drugs rather than depending on China alone.
  - Encourage entrepreneurship - Providing tax incentives, rebate on factors and facilitate industrial hubs for medical equipment. Provisioning of R&D support to the maximum.
  - MSMEs need to be given a special push and encouragement for enhancing the production, increasing the product line and turnover capacities in a phased manner across the country by not loosing the status MSME.
  - MSMEs only can absorb the semi skilled and low skilled wage earners. To enhance output of the same units the skill development of trade specific can be imparted at Industries as per registration by industry and its demand at nominal fee. This would reduce crowd aggregation at a general place for skill development training and can reduce the Covid-19 infection spreading in the present scenario.
- *Innovation and Standard Based Care*
  - Standardized clinical processes, which were not being accepted due to reflex defence of "clinical autonomy", will be the primary basis for excellence. This needs to change. Standard based care is the new norm.
  - Especially useful for handling ethical dilemmas - if and when resources reach their limits, such as rationing ventilators.
  - It should put out standard treatment guidelines for public and private providers, frame a patients charter of rights, engage with professional associations and civil society, and establish a regular audit system.
  - The government's National Innovation Council, which is mandated to provide a platform for collaboration amongst healthcare domain experts, stakeholders and key participants, should encourage a culture of innovation in India and help develop policy on innovations.
- *Protecting Workforce*: Workforce needs to be protected against occupational hazards and they should be properly equipped. Besides short-term motivating events such as clapping, fly-pasts, flower-shower, etc. long-term sustained motivation in terms of improved pay, facilities, etc. should be ensured.
- *Redefining Health Architecture*: Need to encourage nature integrated and ventilation-based constructions rather completely climate controlled structures. In Covid-19, even though an infection spreads by contact and air-borne droplets, the same failed to infect individuals in open spaces and high ventilation areas. Hence the planning and designing of Health facilities may need a fresh look. Brown field project development and retrofitting to suit the existing demand of ventilation and air circulation will be important

**Shakti Kumar Gupta**
Medical Superintendent
All India Institute of Medical Sciences
Dr RP Centre for Ophthalmic Sciences
New Delhi, India
Editor-in-Chief, IJRFHHA

**Maj Gen Sunil Kant, VSM**
MG (Med), EC
Editor-in-Chief, IJRFHHA

ORIGINAL ARTICLE

# Determinants of Hospital Discharge Process: Experience from an Apex Tertiary Care Autonomous Institute of National Importance of Eastern India

Mukunda Chandra Sahoo[1], Susmita Dora[2], Yatin Talwar[3]

## Abstract

**Background:** The discharge of a patient is a time-consuming process comprising of clinical, financial, legal, and administrative and record-keeping aspects that require proper execution. The discharge process is considered as an important quality indicator of the healthcare services of a hospital. Every hospital has its own discharge policy.

**Objectives:** To study the steps in the discharge process in a tertiary care teaching hospital and identify the causes of delays in in-patient discharges in major clinical wards.

**Materials and methods:** The study was conducted in four major clinical wards of AIIMS, Bhubaneswar. The discharge process was recorded using a structured format that was distributed in all the wards. The patient satisfaction and impression regarding the discharged process were recorded using a questionnaire.

**Results:** The various steps identified in the discharge process were discharge summary writing, billing clearance, and patient leaving the hospital. Billing clearance contributed the maximum time from the total time taken for discharge followed by the discharge summary writing. Most of the patients rated their discharge process experience as above average and opined that the discharge process in the hospital was well organized.

**Conclusion:** Discharging patients on time is a challenging task. With adequate manpower and proper patient counseling, the time taken for the process can be reduced. Improving the time taken for a discharge can improve the patient's satisfaction as well as effective bed management for the hospital.

**Keywords:** Discharge process, Discharge at tertiary care institute, Patient discharge, Patient satisfaction, Time taken for the discharge.

*International Journal of Research Foundation of Hospital and Healthcare Administration* (2019): 10.5005/jp-journals-10035-1112

## Introduction

An "inpatient" is a person who has been admitted to a hospital for purposes of receiving inpatient hospital services.[1] A patient has to go through a set of stages during his/her stay in a hospital like admission, management, and discharge.[2]

As per National Accreditation Board for Hospitals and Healthcare providers (NABH), "Discharge is a process by which a patient is shifted out from the hospital with all concerned medical summaries ensuring stability." The discharge process starts after the approval of the treating physician and ends with the patient leaving the clinical ward.[3] Two of the bottlenecks in hospital services are the admission and discharge processes. These processes can affect the quality of services of a hospital adversely (Davies and Macaulay). The discharge process is also a quality indicator for the quality of care and patient satisfaction as well.[1] Delay in discharge of the patient also reduces bed availability of the hospital. Delay in discharge is bad for both hospitals and patients. It increases the cost from both the hospital and patient perspective. The increased the length of stay and also exposes the patient to hospital-acquired infections (Hendy et al., 2012).[4] So, there is a requirement of effective strategies to effectively manage the discharge process. A standard time duration of 3 hours (180 minutes) is being suggested by the National Accreditation Board for Hospitals and Health Care Organizations.

According to Silva et al. (2014), the faulty operation processes are the major reasons for the delay and appropriate interventions can improve the process.[5] The study was conducted in four clinical wards of a tertiary care teaching institute of national importance. The main reasons identified for the delay were waiting for the test reports and delays in making clinical decisions and providing specialized consultation.

[1,3]Department of Hospital Administration, All India Institute of Medical Sciences, Bhubaneswar, Odisha, India

[2]Department of Community and Family Medicine, All India Institute of Medical Sciences, Bhubaneswar, Odisha, India

**Corresponding Author:** Mukunda Chandra Sahoo, Department of Hospital Administration, All India Institute of Medical Sciences, Bhubaneswar, Odisha, India, Phone: +91 9438884113, e-mail: mcsahoo1@gmail.com

**How to cite this article:** Sahoo MC, Dora S, Talwar Y. Determinants of Hospital Discharge Process: Experience from an Apex Tertiary Care Autonomous Institute of National Importance of Eastern India. Int J Res Foundation Hosp Healthc Adm 2019;7(2):55–57.

**Source of support:** Nil

**Conflict of interest:** None

## Materials and Methods

The present investigation was limited to AIIMS, Bhubaneswar. The study was conducted in four major clinical wards (medicine, pediatrics, obstetrics and gynecology, general surgery) of the hospital. All the inpatients who got discharged from the hospital in the month of June 2018 were considered for the study and those who did not give consent for the interview were excluded. However, all the patients consented for the interview and were

included. A total of 250 patients were discharged during the study period. A structured proforma was used to record the break-up time of discharge and it was distributed in all the wards during this study period. The staff nurse of the concerned clinical wards were trained to fill the proforma. A self-administered questionnaire was distributed among a sample of 123 patients to record patient opinion and satisfaction for the discharge process. For statistical analysis, SPSS, IBM-20 was used.

## Results and Analysis

The total number of discharges during the study period were 41, 35, 28, and 19 in obstetrics and gynecology, pediatrics, medicine, and surgery wards, respectively (Table 1).

The mean time taken for the discharge process was 195 minutes (±32). The longest discharge process was seen in patients where the average length of stay crossed more than 10 days. The time taken for patients of the gynecology department was significantly less than those of patients admitted under general surgery. This was primarily due to more residents in the department and also due to part preparation of discharge summaries a night before the day of planned discharge. The pediatrics department had the highest delay in discharges, primarily due to the center being a tertiary care facility that gets patients from a long distance.

This can also be attributed to the requests made by next of the kin to adjust discharge as per their convenience and travel schedules. As per the below-mentioned graph, more than 90% of discharge summaries were either prepared by the previous night or within 30 minutes of the advice of discharge being given (Fig. 1).

Figure 1 depicts the time taken for discharge summary preparation. It was observed that less than 10% of the discharge summaries were prepared after 30 minutes of the advice given for discharge.

Another attributable factor leading to delay in discharge was the time taken for billing clearance. It was observed that approximately one-third of the discharges were delayed by more than 1 hour due to the time consumed for billing clearance (Fig. 2).

**Table 1:** Distribution of total number of patient discharges according to various departments

| *S. no.* | *Department* | *Total discharges (%)* |
|---|---|---|
| 1 | Obstetrics and gynecology | 41 (33.33) |
| 2 | Pediatrics | 35 (28.45) |
| 3 | Medicine | 28 (22.76) |
| 4 | Surgery | 19 (15.44) |

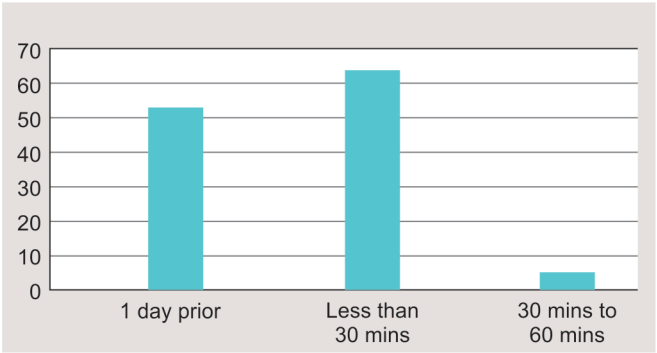



**Fig. 1:** Time taken for discharge summary preparation

The time taken for writing discharge summary, typing of discharge summary, and completion of billing was found to contribute immensely to the delay in total time taken for discharge. Except for the department of pediatrics, the time taken for the patient to leave the ward contributes only 10% of delays. The results obtained are found to be statistically significant with $p < 0.05$. The billing process was mentioned as one of the longest steps in the discharge process that contributed around 50% of the total process. Next to it, discharge summary completion was mentioned as the second-longest process in the discharge process. Around 40% of the patients attributed their preference of time and date of discharge as a cause of delay in discharge.

On the evaluation of patient readiness for discharge, it was found that for general patients and all short procedures that had an approximated average length of stay, possible date of discharge at the time of their admission itself was intimated to the relatives and the patient. However, for super specialty cases and trauma cases, the average length of stay and possible time of discharge could not be intimated because of the presence of many variables. This was also a key reason for the preparedness of relatives toward the discharge process and hence leading to the relatives evacuating the bed earlier.

### Patient Satisfaction for the Discharge Process

*Experience*

The majority of the patients rated the behavior of the hospital staff as good, which conciliates that they were satisfied with the behavior of the staff involved in the discharge process. Whereas for the experience of the discharge process, most of the patients rated the process as average, which also can hint that the fall of ratings was attributed to the delay in the billing process and other clearances.

## Findings and Recommendations

Of the total patient's discharges, 2.5% (30) discharges had taken more than that of the standard time prescribed by the NABH, i.e., 3 hours (180 minutes). The key recommendation to correct this deviation, where the time was found to be increased beyond the cutoff values (as prescribed by the NABH), can be to appoint a ward-based coordinator cum medical typist, who can coordinate and monitor the discharge process and discharges. Billing was the step that took the longest time in the discharge process followed by discharge summary completion as mentioned by the patients.

Hence, adequate staff deployment in the billing counters depending on the patient load can also be sought for. The billing time was found to be reduced by 10% in those wards having nursing trainee students. So, trainee students can be utilized for effective management of the discharge process, especially billing time.

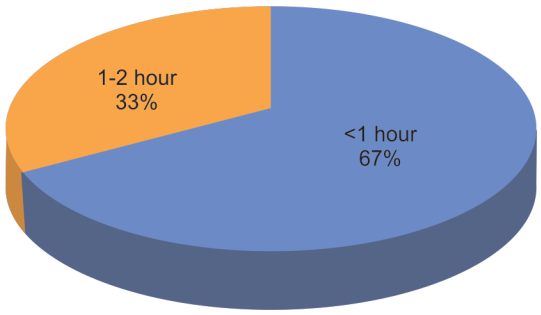



**Fig. 2:** Time taken for billing clearance

Discharge summary preparation was another contributing factor for delay in the process of discharge. Training of the staff in the discharge process, especially the communication skills, for effective communication and coordination is required, which can eventually lead to a decrease in the delay of the discharge process.

It was also observed that many patients were not counseled for the prerequisites of the billing process. This increased the time taken for billing completion as the majority of the patients would not be ready with the billed amount during the billing process. A simplified solution to counsel the patients and relatives about their discharge date and prerequisites of the billing prior to the day of the discharge can lead to a reduction in time for the discharge. It was observed that the areas where patients and the attenders were made active participants of the discharge process, the delay in discharge was the lowest.

There is a requirement of regular feedback from the patients regarding the discharge process and corrective measures as per the feedback can substantially improve the process and reduce the turnaround time.

## Conclusion

The discharge of a patient from hospital requires coordination at all the steps involved and also cooperation of the different staffs involved in the process. Discharge of a patient is an activity common to every hospital—small, large, community, teaching or nonteaching. Discharging the patient in a timely manner is a challenging task. Timely discharge not only increases satisfaction of patient and their relatives but also increases the inpatient bed turnover in the hospital. In this study, steps in the discharge process and the time involved were calculated and analyzed. It was found that the step in consuming most of the time of discharge was billing completion. With optimal staffs and counseling of the relatives at the time of discharge, the time for billing clearance can be reduced. The clearance charts and the hospital planning checklist must be regularly monitored to keep a track of all the delays and control them immediately. To successfully implement the discharge process, improvements in communication, doctors discharge order, discharge summary preparation, entry into electronic database, and analysis must be the methods to keep a record of the discharge process.

## References

1. Sunil S, Sarala KS, Shilpa RG. Analysis of time taken for the discharge process in a selected tertiary care hospital. Int J Manag Appl Sci 2016;2(10):4–8. ISSN: 2394-7926.
2. Kumari JV. A study on time management of discharge and billing process in tertiary care teaching hospital. Elixir Int J 2012;52A: 11533–11535.
3. Ajami S, Ketabi S. An analysis of the average waiting time during the patient discharge process at Kashani Hospital in Esfahan, Iran: a case study. Health Information Management Journal 2007;36(2):37–42. ISSN 1833-3583.
4. Hendy P, Patel JH, Kordbacheh T, et al. In-depth analysis of delays to patient discharge : a metropolitan teaching hospital experience. Clin Med (Northfield Il). 2012;12(4):320–323.
5. Freitas A, Silva-Costa T, Lopes F, et al. Factors influencing hospital high length of stay outliers. BMC Health Serv Res 2012;12:265.

ORIGINAL ARTICLE

# Reduction in Needle Stick Injury Rate among the Healthcare Workers in a Tertiary Care Hospital

Neha Dang[1], Suryasnata Das[2]

## Abstract

**Introduction:** Needle stick injuries (NSIs) are a commonly encountered underreported occupational hazard faced by healthcare workers (HCWs).

**Aim:** The aim of the study was to determine the causes of the NSI and reduce the NSI rate among all HCWs (doctors, nurses, technicians, general duty assistants/housekeeping staff) at a tertiary care hospital.

**Objectives:**

- To determine the rate of NSI among various categories of HCWs at a tertiary care hospital.
- To study the causal factors and circumstances for NSIs.
- To implement corrective actions and prevent these through improvement in training, usage of safety devices, and providing a safe environment.
- To reduce the NSI rate per healthcare worker per year.
- To reduce the NSI rate below the set benchmark of the hospital, i.e., one NSI per 1,000 in-patient days.

**Materials and methods:** The causes for NSI were identified by collating the data from January 2016 to May 2017 and the Pareto analysis was used to find out the main factors leading to NSI. Continuous and scheduled training for nurses, doctors, phlebotomists, housekeeping staff, and general duty assistants (GDAs) on waste segregation [biomedical waste (BMW) management], handling of sharps/sharps container, and PPE usage was provided and the same was monitored by the infection control nurse and quality team during rounds. The NSI rates were presented to the clinical department heads and awareness was created among doctors to segregate the waste. Needles with safety device were made available for the nursing team for sample collection. The corrective action was implemented in the month of June 2017 and data for 3 months, i.e., June, July, and August 2017, were continuously monitored.

**Results:** In the study, the main reasons for NSI were improper segregation of sharps in trained HCWs (38.46%), unavoidable accidents (30.77%), and improper handling of sharps (11.54%), followed by untrained person (6.41%), recapping of the needle (5.13%), and the safety device not being used at the time of sample collection (3.85%). After training and awareness of HCWs and promoting use of safety devices, data were collected and analyzed. Needle stick injury per HCW per year was reduced to 0.03 (June 2017–October 2017) from 0.05 (Jan 2016–May2017). Similarly, there was reduction in the NSI rate per thousand patient days to 0.63 (June 2017–Oct 2017) from 1.19 (Jan 2016–May2017).

**Conclusion:** Needle stick injuries can be reduced by identifying the causative factors and implementing corrective measures like use of a safety device for sample collection, creating awareness about segregation of waste, and handling of sharps among all the HCWs including doctors.

**Keywords:** Biomedical waste, Healthcare workers, Needle stick injury, Occupational hazards.

*International Journal of Research Foundation of Hospital and Healthcare Administration* (2019): 10.5005/jp-journals-10035-1110

## Introduction

Healthcare workers (HCWs) are exposed to several types of occupational hazards including sharp injuries, harmful exposure to chemicals and hazardous drugs, latex allergy, back injuries, violence, and stress.[1]

Needle stick injury (NSI) is one of the most common hazards in a healthcare setting. A NSI, percutaneous injury, or sharps injury is the penetration of the skin by a needle or other sharp object, which has been in contact with blood, tissue, or other body fluids before the exposure.[2]

Sharp injuries pose a serious threat to HCWs. Exposure to sharps carries a significant occupational risk of transmission of blood-borne pathogens, such as human immunodeficiency virus, hepatitis B virus, and hepatitis C virus, to the HCWs.[3]

Healthcare workers are exposed when blood and body fluids come in contact with the mucous membrane, open wounds, nonintact skin such as observed in eczema, or percutaneous injuries.[4]

Considering the risk of exposure of HCWs to deadly and dangerous blood-borne pathogens, the Needle Stick Safety and Prevention Act came into effect in April 2001 to further reduce it. The Act in the United States mandated employers to ensure the provision of safety-engineered devices for HCWs to reduce NSI exposures in hospitals.[5]

According to a report of the Centers for Disease Control and Prevention (CDC), on an average 385,000 sharp injuries occur annually among the HCWs in hospitals worldwide.[6]

Because of the environment in which HCWs work, many of them are at an increased risk of accidental NSI. It is believed that the rate is actually much higher than reported as HCWs do not consider it

[1]Department of Administration, Baba Saheb Ambedkar Medical College and Hospital, Delhi, India

[2]Department of Laboratory Medicine-Microbiology, Jaypee Hospital, Sector 128, Noida, Uttar Pradesh, India

**Corresponding Author:** Suryasnata Das, Department of Laboratory Medicine-Microbiology, Jaypee Hospital, Sector 128, Noida, Uttar Pradesh, India, Phone: +91 8860764401, e-mail: Suryasnatadas23@gmail.com

**How to cite this article:** Dang N, Das S. Reduction in Needle Stick Injury Rate among the Healthcare Workers in a Tertiary Care Hospital. Int J Res Foundation Hosp Healthc Adm 2019;7(2):58–62.

**Source of support:** Nil

**Conflict of interest:** None

serious enough to bother and lack of the proper reporting method across the globe. More than half of the NSIs are not reported by HCWs; thus, the actual incidence is much higher and should not be underestimated.[7]

In India, the data on the occupational injuries are not known; thus, it is not possible to estimate an annual incidence of NSIs.[8]

Most common reasons observed for the underreporting of sharp injuries may be fear of contracting disease, follow-ups, huge documentation, retrenchment from job, and failure to acknowledge the potential consequences of such injuries.[9]

Supportive measures available to prevent infections due to sharps injuries include training of HCWs on usage of the personal protective equipment and safe working practices such as usage of safety-engineered devices, puncture-proof disposal containers, and safe injection practices.[10]

There is economic burden in the form of direct and indirect cost of these injuries. The cost of the postexposure management is usually borne by the healthcare administration, which includes cost of laboratory investigations of the exposed person and testing the source patient, counseling, and cost of prophylactic treatment.[11]

Many effective interventions have been proposed from time to time, which include adoption of safe work practices like provision of disposable containers for sharps objects, introduction of sharp devices with integrated safety feature, and education and training to reduce NSIs.[12]

## Materials and Methods

### Design and Sample Population

This is a prospective study on all HCWs including doctors, nurses, contractual staff (housekeeping and GDA), and technical staff. Needle stick injuries were identified by way of self-reporting through a needle stick reporting form structured to identify predictive factors associated with NSIs. The NSI data from January 2016 to May 2017 were reviewed for category of HCWs, training status of HCWs, cause of injury, and circumstances under which NSI occurred. The root cause analysis was done for each injury to identify the cause. The Pareto analysis was done to determine the significant causes of NSIs.

The fishbone analysis of the most significant cause was done to determine the factors responsible for it.

Post that the corrective action implementation phase was initiated for 10 days in June 2017. The NSI data were continuously monitored and the NSI rate was observed between June 2017 and October 2017.

### Statistical Analysis

All data were tabulated in the Microsoft Office Excel version 2007. Only exploratory and descriptive statistics are presented and no statistical tests were applied. Illustration was done using pie charts and graphs.

## Results

The analysis of data for NSIs from the month of January 2016 till May 2017 was done from the hospital infection control indicator format.

Monthwise number of NSIs, number of in-patient days, the NSI rate per 1,000 patient days, and comparison of the NSI rate between the pre- and postcorrective action phase were recorded (Table 1). Comparison of NSI per HCW per year, between the pre- and postcorrective action phase, was done (Table 2).

Incidence of NSI among the category of HCWs during the precorrective action phase was calculated. Among the HCWs, nurses are most prone to NSI (26%) followed by housekeeping staff (24%), GDA (21%), doctors (20%), and technicians (0%) (Figs 1 and 2).

The root cause analysis and the Pareto analysis were done to identify the causal factors responsible for NSIs. The main reasons

**Table 1:** Monthwise number of needle stick injuries (NSIs), number of in-patient days, NSI rate per 1,000 patient days, and comparison of the NSI rate between the pre- and postcorrective action phases

| *January 2016–May 2017* | | | | *June 2017–October 2017* | | | |
|---|---|---|---|---|---|---|---|
| *Month* | *No. of NSIs* | *No. of in-patient days* | *NSI per 1,000 patient days* | *Month* | *No. of NSIs* | *No. of in-patient days* | *NSI per 1,000 patient days* |
| January 2016 | 4 | 3.156 | 1.27 | June 2017 | 2 | 4.550 | 0.44 |
| February 2016 | 4 | 2.924 | 1.37 | | | | |
| March 2016 | 10 | 3.125 | 3.2 | | | | |
| April 2016 | 3 | 3.125 | 0.96 | July 2017 | 4 | 4.920 | 0.81 |
| May 2016 | 4 | 3.401 | 1.18 | | | | |
| June 2016 | 4 | 2.680 | 1.49 | | | | |
| July 2016 | 3 | 3.459 | 0.87 | | | | |
| August 2016 | 3 | 3.716 | 0.81 | August 2017 | 4 | 5.314 | 0.75 |
| September 2016 | 2 | 5.629 | 0.36 | | | | |
| October 2016 | 6 | 4.411 | 1.36 | | | | |
| November 2016 | 4 | 4.086 | 0.98 | September 2017 | 3 | 5.122 | 0.59 |
| December 2016 | 5 | 4.052 | 1.23 | | | | |
| January 2017 | 5 | 3.988 | 1.25 | | | | |
| February 2017 | 2 | 3.428 | 0.58 | October 2017 | 3 | 5.608 | 0.53 |
| March 2017 | 4 | 4.446 | 0.9 | | | | |
| April 2017 | 7 | 4.768 | 1.47 | | | | |
| May 2017 | 8 | 5.270 | 1.52 | | | | |
| Total | 78 | 65.664 | | Total | 16 | 25.514 | |
| Average NSI/1,000 patient days | 1.19 | | | Average NSI/1,000 patient days | 0.63 | | |

for NSI were improper segregation by trained HCWs (38.46%), unavoidable accidents (30.77%), and improper handling of sharps (11.54%), followed by untrained HCWs (6.41%), recapping (5.13%), needle with safety device not used for collection (3.85%), improper segregation by untrained HCWs, improper handling of sharp container, and lack of patient counseling (1.28% each) (Tables 3 and 4).

The fishbone analysis (Fig. 3) of the most significant cause was carried out to determine the factors that could be responsible for NSI (for the precorrective action phase).

After the reasons for NSI were determined, following steps were taken to reduce the NSI rate such as continuous and scheduled training of nurses, doctors, phlebotomist, housekeeping staff, and GDAs on waste segregation, handling of sharps, handling of sharp container, usage of the personal protective equipment, and reinforcement on using the single-use insulin (lantus) needle. Usage of the safety device in all areas and availability of a sharp container at the logistically appropriate sites (i.e., near the patient bedside/waste generation site) were ensured. Size of the sharp container was changed as per usage in the area to avoid overfilling and repeated change of the container in a day. Brochures on infection control were prepared and used for educating the patients/attendants. Adequate display of BMW posters was done in all areas. Further monitoring of segregation of waste by the infection control nurse and quality team during rounds and audits was done.

Since the improvement phase was started in the month of June, thereafter all the actions were taken to reduce the NSI rate. It is evident from Tables 1 and 2 that there was reduction in both the NSI rate per 1,000 patient days and the NSI rate per HCW per year post implementation of measures from 1.19 to 0.63 and 0.05 to 0.03, respectively.

**Table 2:** Comparison of needle stick injuries (NSIs) per HCW per year—between the pre- and postcorrective action phase

| *Category of staff* | *Average (January 2016–May 2017)* | *Average (June 2017–October 2017)* |
|---|---|---|
| Doctors | 221 | 242 |
| Nurses | 445 | 526 |
| Contractual staff (housekeeping and GDA) | 336 | 326 |
| Technical staff | 204 | 227 |
| Total HCWs | 1.206 | 1.321 |
| NSI rate per HCW | 0.06 | 0.01 |
| NSI rate per HCW per year | 0.05 | 0.03 |

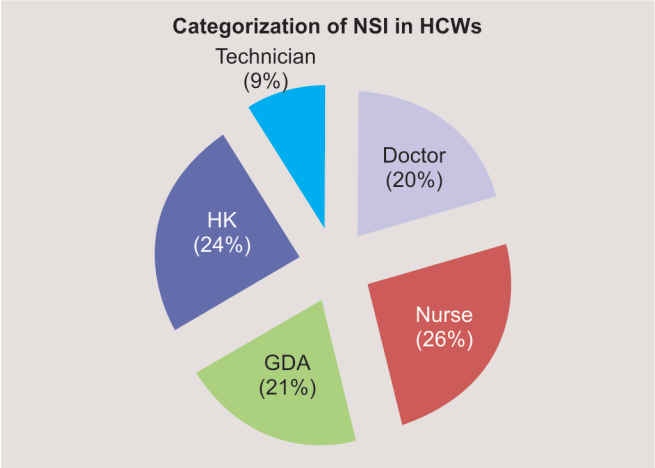



**Fig. 1:** Needle stick injury incidence among the healthcare workers during the precorrective action phase

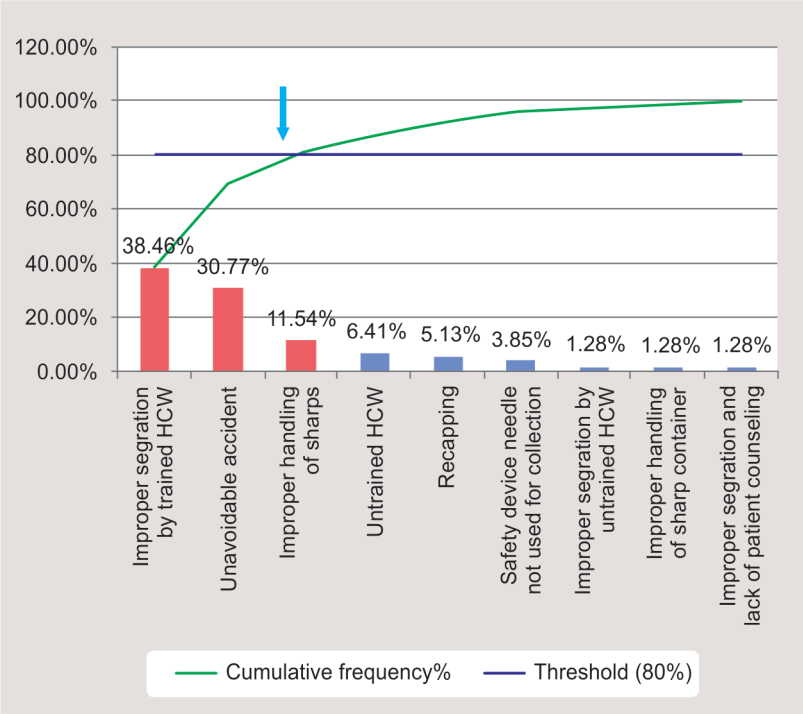



**Fig. 2:** Pareto analysis for needle stick injury causal factors (for the precorrective action phase). The cumulative percentage is shown with the green line in the graph and the purple line in the graph represents cutoff at 80%. The intersection of green and purple lines shows us which parameters are vital few (red bars), i.e., 20% of the causes accounting for 80% of the problems and trivial many (blue bars)

**Table 3:** Pareto analysis depicting frequency, cumulative frequency, percentage, and cumulative percentage for different types of causes for the precorrective action phase

| *Causal factor* | *Frequency* | *Cumulative frequency* | *Causal factors (%)* | *Cumulative frequency (%)* |
|---|---|---|---|---|
| Improper segregation by trained HCWs | 30 | 30 | 38.46 | 38.46 |
| Unavoidable accident (while suturing) | 24 | 54 | 30.77 | 69.23 |
| Improper handling of sharps | 9 | 63 | 11.54 | 80.77 |
| Untrained HCWs | 5 | 68 | 6.41 | 87.18 |
| Recapping by HCWs | 4 | 72 | 5.13 | 92.31 |
| Needle with safety device not used for collection | 3 | 75 | 3.85 | 96.15 |
| Improper segregation by untrained HCWs | 1 | 76 | 1.28 | 97.44 |
| Improper handling of sharp container by HCWs | 1 | 77 | 1.28 | 98.72 |
| Lack of patient counseling | 1 | 78 | 1.28 | 100.00 |

**Table 4:** Reasons and situations for needle stick injury (for the precorrective action phase)

| *Reasons* | *Situations faced* |
|---|---|
| Improper segregation by trained HCWs | Needle was discarded in black bin/red Bin/medicine trolley/dressing trolley/anesthesia trolley/pantry/female changing room/OT linen/paper/instrument tray/sink in the ambulance rather than in sharp container |
| Unavoidable accidents | During IV cannulation, while giving insulin, while performing procedure/surgery, during lumbar puncture, while assisting resuturing, during ear piercing, while washing instruments, while withdrawing sample, while cleaning microtome knife, while handling used insulin syringe, while suturing, while opening surgery blade, while handling used insulin syringe, during grossing of liver, while checking RBS, and on doing root cause analysis, there was not any breach observed in PPE usage, sharp/sharp container handling, and waste segregation |
| Improper handling of sharps | While performing cannulation/surgery, either the sharp was not kept in the kidney tray before discarding it or the sharp was handed over to the other person without using the kidney tray |
| Untrained HCWs | Untrained HCWs handling sharp without the proper use of PPE, untrained HCWs handling sharps and sample, and untrained person handling cleaning of biopsy gun |
| Safety device not used for sample collection | While withdrawing sample of the patient |
| Recapping | Accidental prick while recapping the needle after checking RBS, after performing ascitic tapping, and while recapping the lantus |
| Improper handling of sharps container | While handling a sharps container that was filled up to top level |
| Improper segregation by untrained HCWs | Used needle was discarded on the floor and incident occurred while picking it up (without using PPE) |
| Improper segregation and lack of patient counseling | Used insulin needle was discarded by patient's attendant in black bin and incident occurred while picking it up |

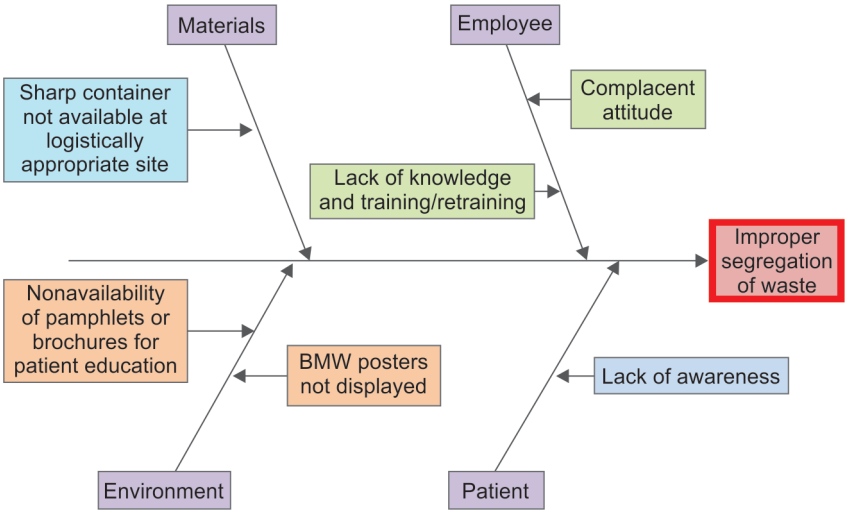



**Fig. 3:** Fishbone analysis of the most significant cause was carried out to determine the factors that could be responsible for needle stick injuries (for the precorrective action phase)

## Discussion

Needle site injury is a serious hazard, which exposes the HCWs to various dangerous drugs, microorganisms including multidrug-resistant organisms, and biological materials. Many interventions have been recommended in an attempt to reduce the recognized risk and infection from NSIs.[13]

In our study, the NSI rate was 0.05 per HCW per year before intervention. Global burden of sharps injury in a study conducted by the WHO was estimated to be 0.2–4.7 per HCW per year.[14]

A study conducted in Egypt shows a rate of 4.9 NSI per HCW per year.[15] A study conducted in a tertiary care hospital in Delhi shows the average number of NSIs ever for a HCW as 3.85.[16] The NSI rate in our study is lower than the WHO estimates and the study done in Egypt.

The NSI rate per in-patient days could not be compared with study done by Sharma et al. in Delhi as the rates had been calculated differently.[16]

In the study by Gita et al., nursing had the highest rate of NSI at 54.5%.[17] Gholami et al. identified nurses to be at highest risk of NSIs among HCWs at 39.7%.[18] Similarly, in our study the rate of NSI was highest among the nurses at 26% followed by the housekeeping staff at 24%.

The most common reason for NSI was improper segregation by trained HCWs (38.46%) followed by unavoidable accidents (30.77%), improper handling of sharps (11.54%), improper segregation by untrained HCWs (6.41%), recapping (5.13%), safety device needle not used for blood sample collection (3.85%), improper segregation by untrained HCWs, improper handling of the sharp container, and improper segregation with lack of patient counseling (1.28% each). Similar to our study, NSI during handling and disposal of the biomedical waste was the most common situation for NSI for HCWs in the study conducted by Gita et al. (36.4%).[17] Segregation or the act of separating different types of waste is an imperative component of handling biomedical waste and should be done at the source of generation for all patient care areas including diagnostic services areas and procedure rooms.

In our study, reduction in the NSI rate was achieved through a comprehensive approach including adequate training of HCWs on handling and disposal of sharps, use of safety device, focusing on a safe environment like availability of a sharp container near the site of waste generation, and adequate display of BMW posters. There was a reduction in the NSI rate from 1.19 per 1,000 patient days to 0.63 per 1,000 patient days and from 0.05 NSI per HCW to 0.03 NSI per HCW per year. Similarly, a CDC report states that use of safety-engineered devices would reduce NSIs by 76%.[19]

Multiple strategies help in reducing the burden of NSIs. Efforts toward providing structured training programs on safe use, handling, and disposal of sharps, changing the attitude and practice of HCWs, reinforcing use of devices with better safety features, and substitution of needles with safety devices help reduce NSIs. Baburao et al. in their study also recommended similar multipronged strategies.[20]

## Conclusion

Needle site injury is a problem faced by all healthcare organizations. The main reasons accounting for NSIs were improper segregation, unavoidable accidents, and improper handling of sharps. Multiple approaches for all HCWs will help reduce the cases of NSI and probably also help in increasing the awareness to report cases.

## References


1. Centre for Disease Control and Prevention (CDC) (2017) Healthcare Workers. The National Institute for Occupational Safety and Health (NIOSH).
2. Centers for Disease Control and Prevention (CDC) (2013). Stop Sticks Campaign. The National Institute for Occupational Safety and Health (NIOSH).
3. Healthcare wide hazards: needle stick/sharps injuries. Occupational Safety & Health Administration. (https://www.osha.gov/SLTC/etools/hospital/hazards/sharps/sharps.html. Accessed March 9, 2016).
4. Alonso A. Cementing sharps safety in the European Union: The importance of complying with the 2010 EU council directive on sharps injury prevention. J Nurs Care 2014;3(03):1–2. DOI: 10.4172/2167-1168.1000169.
5. Needlestick Safety and Prevention Act of 2000. PL 106.430. (http://www.gpo.gov/fdsys/pkg/PLAW-106publ430/html/PLAW-106publ430.html. Accessed December 4, 2015).
6. Centers for Disease Control and Prevention: Stop stick campaign-NIOSH. (http://www.cdc.gov/niosh/stopsticks/sharpsinjuries.html. Accessed on 27th March 2015).
7. Rodrigues C. Needle stick injuries & the health care worker – the time to act is now. Indian J Med Res 2010;131:384–386.
8. Jayanth ST, Kirupakaran H, Brahmadatan KN, et al. Needle stick injuries in a tertiary care hospital. Indian J Med Microbiol 2009;27(1):44–47.
9. Azadi A, Anoosheh M, Delpisheh A. Frequency and barriers of underreported needlestick injuries amongst Iranian nurses, a questionnaire survey. J Clin Nursing 2011;20(3-4):488–493. DOI: 10.1111/j.1365-2702.2010.03252.x.
10. Jahangiri M, Rostamabadi A, Hoboubi N, et al. Needle stick injuries and their related safety measures among nurses in a university hospital, Shiraz, Iran. Saf Health Work 2016;7(1):72–77. DOI: 10.1016/j.shaw.2015.07.006.
11. Oh HS, Yoon Chang SW, Choi JS, et al. Costs of post exposure management of occupational sharps injuries in health care workers in the Republic of Korea. Am J Infect Control 2013;41(1):61–65. DOI: 10.1016/j.ajic.2012.01.030.
12. Yang L, Mullan B. Reducing needle stick injuries in healthcare occupations: an integrative review of the literature. ISRN Nurs 2011. DOI: 10.5402/2011/315432, Article ID 315432.
13. Rice BD, Tomkins SE, Ncube FM. Sharp truth: health care workers remain at risk of blood borne infection. Occup Med (Lond) 2015;65(3):210–214. DOI: 10.1093/occmed/kqu206.
14. Sharps injuries: Global burden of disease from sharps injuries to health-care workers. Geneva: World Health Organization; 2003. (WHO Environmental Burden of Disease Series, No. 3).
15. Talaat M, Kandeel A, El-Shoubary W, et al. Occupational exposure to needlestick injuries and hepatitis B vaccination coverage among health care workers in Egypt. Am J Infect Control 2003;31(8):469–474. DOI: 10.1016/j.ajic.2003.03.003.
16. Study of Prevalence and Response to Needle Stick Injuries among Health Care Workers in a Tertiary Care Hospital in Delhi, India. (Rahul Sharma, SK Rasania, Anita Verma and Saudan Singh).
17. Gita N, Rao NP. Needle stick injuries in a tertiary care hospital in India: observations from a clinical audit. Int J Res Med Sci 2017;5(7):2938–2942. DOI: 10.18203/2320-6012.ijrms20172593.
18. Gholami A, Borji A, Lotfabadi P, et al. Risk Factors of needlestick and sharps injuries among healthcare workers. Int J Hospital Res 2013;2(1):31–38.
19. Lal P, Singh MM, Malhotra R, et al. Perception of risk and potential occupational exposure to HIV/AIDS among medical interns in Delhi. J Commun Dis 2007;39(2):95–99.
20. Baburao B, Syam Sundar J. Study of prevalence and response to needle stick injuries among healthcare workers in a tertiary care hospital in Hyderabad, India.

ORIGINAL ARTICLE

# A Study to Assess the Factors Contributing to Delay in Discharge Process in a Teaching Hospital

Jenyz M Mundodan[1], KS Sarala[2], V Narendranath[3]


## Abstract

**Background:** Delay in obtaining discharge is often a reason for dissatisfaction for patients, even for those who may have had a comparatively uneventful stay in the hospital.

**Aim:** To study the factors contributing to delay in discharge process in a teaching hospital.

**Materials and methods:** A time motion study was conducted in a teaching hospital wherein the time taken for discharge was measured for 69 patients. The outcome variable in the study was the time needed for the discharge process in total as well as for each individual step. Mean time at each step was identified and compared between groups using *t* test and analysis of variance (ANOVA).

**Results:** The mean time for discharge process was 5 hours 41 minutes. The mean time between advice of discharge and physically leaving the ward varied from 6.62 hours in urology to 3.01 hours in ear, nose and throat (ENT). Only 13 patients (18.8%) were discharged within the National Accreditation Board for Hospitals and Healthcare Providers (NABH) prescribed time limit of 180 minutes. The maximum delay occurred during time taken for discharge summary completion.

**Conclusion:** Very few patients were discharged within the prescribed time limit, with considerable delay in the time taken for discharge summary completion.


**Keywords:** Delay, Patient discharge, Patient waiting time, Teaching hospital, Time and motion studies.

*International Journal of Research Foundation of Hospital and Healthcare Administration* (2019): 10.5005/jp-journals-10035-1113

## Introduction

Discharge is "the process of activities that involves the patient and the team of individuals from various discipline working together to facilitate the transfer of patient from one environment to another."[1] The patient discharge process as "the final step of the treatment procedure during a patient's length of stay," and timely discharge as "when the patient is discharged home or transferred to an appropriate level of care as soon as they are clinically stable and fit for discharge."[2] There are clinical, legal, and administrative aspects involved in addition to record keeping while discharging a patient from the hospital. This includes settlement of hospital bills, procurement of drugs, arranging transportation, and so on.

After a stay in the hospital, no matter how short the duration, the patients and their relatives are eager to leave the hospital premises and return to their home environment. Any aspect that causes delay in this can lead to discontent among the patients. It has been observed that the delay in obtaining discharge has most often been a reason for dissatisfaction for patients, even for those who may have had a comparatively uneventful stay in the hospital.

The reasons for delay also vary with regions as well as type of hospitals. A study in Esfahan, Iran, in 2004 showed that the average time for patients to complete the discharge process was 4.93 hours, with the main factors affecting average waiting time being patients' financial problems and distance between different wards.[3] A similar study in a tertiary care teaching hospital of Bengaluru found that the time taken for billing completion contributed the most to the total time taken for discharge followed by time taken for discharge summary writing.[4] Another study in a 500-bedded hospital found that discharge was often delayed beyond the scheduled time; the reasons of being late included delay in clinical rounds by consultants, delay in correction of discharge summary, insurance clearance, and delay after billing settlement when patient is not prepared for discharge.[5]

There are time limits prescribed by the NABH for individual components within the discharge process.[6] In a study carried out in wards of Sher-i-Kashmir Institute of Medical Sciences (SKIMS), Srinagar, the average time taken for all types of discharges was more than the prescribed NABH criteria. The SKIMS was following many objective elements of standards AAC 13 and 14 but the discharge process and time need to be defined and documented.[7] Similarly, Tak et al. conducted a comparative time motion study of all types of patient discharges, comprising insurance patients, self-payment patients, and discharges against medical advice, wherein there was a delay in all types of discharges in this hospital in all the steps, except for the time needed to return unused medicines to the pharmacy; the average time taken for each step of discharge

[1]Department of Community Medicine, Government Medical College, Idukki, Kerala, India

[2,3]Department of Hospital Administration, Ramaiah Memorial Hospital, Bengaluru, Karnataka, India

**Corresponding Author:** Jenyz M Mundodan, Department of Community Medicine, Government Medical College, Idukki, Kerala, India, Phone: +91 9846788680, e-mail: jenyz.ali@gmail.com

**How to cite this article:** Mundodan JM, Sarala KS, Narendranath V. A Study to Assess the Factors Contributing to Delay in Discharge Process in a Teaching Hospital. Int J Res Foundation Hosp Healthc Adm 2019;7(2):63–66.

**Source of support:** Nil

**Conflict of interest:** None

procedure was markedly higher when compared with the standards prescribed by NABH.[8]

In order to reduce the turnaround time for the discharge process, the time taken for the whole discharge process beginning from discharge order till the patient leaves the hospital needs to be studied. This is important to identify the bottlenecks and their root causes. It becomes necessary to identify the exact points where there is a delay in the "substeps" of process of discharge, so that necessary corrective steps may be taken. This study was done to understand the factors that influenced the time for discharge process in a teaching hospital in South India.

## Materials and Methods

A descriptive time and motion study was conducted in a 1,000-bedded teaching hospital in Kerala from July to September 2018. The study included patients admitted in the selected wards who were to get discharged during this period.

The sample size was calculated to be 56 using the formula for time motion studies [$n = \{(z/p)(\sigma/t)\}^2$] considering mean time ($t$) from discharge being 105 minutes ($\sigma = 80$), with a 20% precision. Stratified random sampling was used so as to get proportional number of cases from the departments of cardiology, urology, medical oncology, surgical oncology, pediatrics, ENT, and ophthalmology.[9]

The time taken for discharge from physician writing orders on the case sheet to completion of billing process in all the departments was observed and measured using a checklist, on which the concerned staff would mark the time. The pro forma was attached to the individual case sheets. All the concerned staff in the wards, pharmacy, billing section and insurance section were sensitized regarding the need to mark the time at each individual check point. The staff nurses in the corresponding wards were asked to cross-check this. The process was monitored by the quality control team.

The pro forma contained details such as the patient's hospital number, department/ward, type of payment, mode of discharge summary, etc. The outcome variable in the study was the time needed for the discharge process—in total as well as for each individual step.

Data thus collected were compiled and analyzed using SPSS (version 20). Mean time at each step was identified and compared between groups using $t$ test and ANOVA. The key points of delay were identified. Personal/sociodemographic details of individual patients were not taken for analysis.

## Results

A total of 69 patients/case sheets were taken in to the study. These cases were from seven different wards, namely, cardiology, urology, medical oncology, surgical oncology, pediatrics, ENT, and ophthalmology (Fig. 1). Discharge summary was generated by medical transcription in 22 (31.9%) cases, while it was generated manually for 47 (68.1%) patients. About two thirds (68.1%) of the patients made their payment by cash, while the remaining were those who availed any one type of insurance.

### Discharge Process Time (in Hours)

The mean time for discharge process from the time the patient is advised discharge till the patient physically leaves the hospital ward was found to be 5.68 hours [±2.25] (5 hours 41 minutes). This time was 5.47 (5 hours 28 minutes) for the cash patients and 6.15 hours (6 hours and 9 minutes) for those availing cashless/insurance service. This difference was not statistically significant ($p = 0.118$). The mean time between advice of discharge and physically leaving the ward varied between departments from as high as 6.62 hours in urology and 5.64 hours in cardiology to as low as 3.01 hours in ENT (Table 1). Only 13 patients (18.8%) were discharged within the NABH prescribed time limit of 180 minutes. For 24 patients, the net time between advice for discharge and leaving the hospital premises extended beyond 6 hours (Fig. 2).

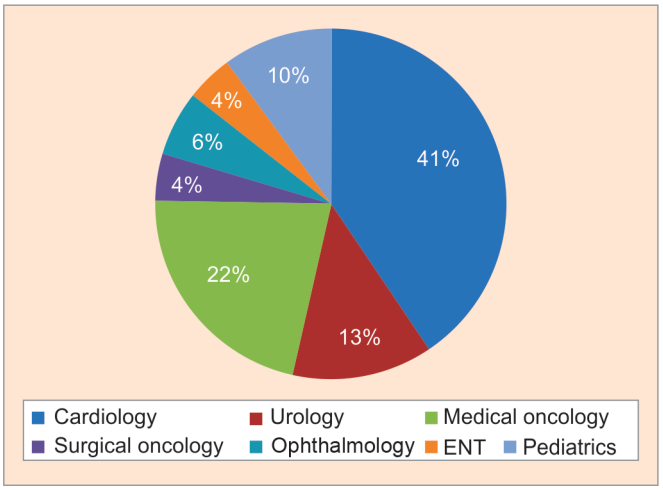



**Fig. 1:** Distribution of cases according to department

Further break down showed that the maximum delay occurred during time taken for discharge summary completion—and average of more than 4 hours, this was followed by the time taken for bill clearance. The mean time required for bill clearance was significantly higher in those cases where the case sheets were filled in manually as compared to the cases sheets that were filled in by transcription (30.33 minutes vs 77.89 minutes, $p = 0.08$). No significant difference was seen in this time period between those availing insurance service and those who paid by cash ($p = 0.136$) (Table 2).

### Major Bottlenecks Identified

- Time taken for summary preparation
- Time taken for picking the chart from ward for billing
- Time delay in communication regarding the final bill
- Final bill settlement
- Final check out.

## Discussion

### Discharge Process Time

For majority of the patients (91.2%), the discharge process took more time than the standards prescribed by NABH, i.e., 180 minutes.[6] The mean time for discharge process from the time the patient is advised discharge till the patient physically leaves the hospital ward was found to be 5.68 hours [±2.25] (5 hours 41 minutes). In a similar study by Kumari in a teaching hospital in Karnataka, the average time taken for the whole discharge process of an individual patient was found to be 2 hours 22 minutes.[10]

In another study done in Bengaluru, the average time taken for the discharge process was 218 minutes (3 hours and 38 minutes). About half (49.1%) of patients got discharged within 180 minutes,

**Table 1:** Time taken for discharge in various departments

| *Department* | *n* | *Minimum* | *Maximum* | *Mean* | *Std. deviation* |
|---|---|---|---|---|---|
| Cardiology | 28 | 75 | 620 | 327.57 | 163.853 |
| ENT | 3 | 139 | 240 | 180.67 | 52.767 |
| Medical oncology | 15 | 172 | 325 | 260.40 | 58.939 |
| Ophthalmology | 4 | 215 | 393 | 276.50 | 80.372 |
| Pediatrics | 7 | 61 | 496 | 291.29 | 154.467 |
| Surgical oncology | 3 | 110 | 540 | 356.67 | 221.886 |
| Urology | 9 | 285 | 480 | 397.44 | 58.318 |

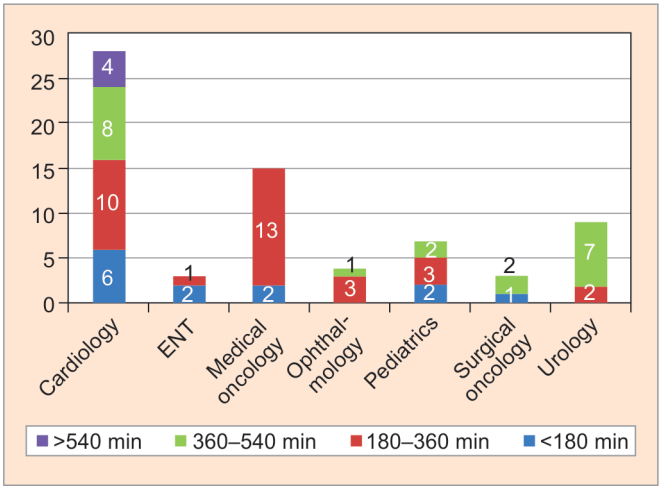



**Fig. 2:** Time for discharge in various departments

**Table 2:** Mean time taken for each process in discharge

| *Check points* | *Time taken* |
|---|---|
| Time taken for starting summary preparation | 16 minutes 44 seconds |
| Time taken for discharge summary completion | 4 hours 07 seconds |
| Time taken for chart movers to pick the chart from the ward to the counter for billing | 12 minutes 31 seconds |
| Time taken for billing | 25 minutes 31 seconds |
| Time taken for replacing case sheet to ward | 39 minutes 23 seconds |
| Time taken for final bill clearance by patient relatives | 59 minutes 12 seconds |
| Time taken by the patients to physically leave the ward | 50 minutes 14 seconds |

40.4% of patients got discharged between 181 minutes and 361 minutes and about 10.4% of the patients got discharged after more than 362 minutes.[4]

The inter process time, i.e., time taken for the activities in the discharge process in the billing department was only 25 minutes in the study by Kumari, while in this study it was seen to be 2.05 hours. However, this difference may partly be attributed to the difference in the sequence of activities involved in completion of discharge process.[10]

### Reasons for Delay in Discharge

In our study, the main reason for delay was found to be the time taken for preparation for summary, followed by the delay in picking the chart from ward for billing and the delay in communication regarding final bill. Kaur and Dilawari studied the feedback given by the patients getting discharged; they found that 38.5% patients responded that they did not know the reason for the delay, 19% blamed the nursing staff, and 18% said it was due to the delay in billing.[11]

## Recommendations

- Discharge summary can be prepared before confirming the discharge to the patient. Time for discharge process can be fixed for a time as, say, 2:00 PM as the interns and junior residents will be busy with the ward rounds and clinical discussion till that time.
- Updating the patient file on a daily basis will ensure that the complete information is recorded, allowing faster discharge summary dictation. This would involve central electronic patient charts and adopt an efficient electronic medical records (EMR) system.
- After summary preparation from outpatient departments, the case sheet can be sent directly to the billing counter.
- Billing counter staff can be arranged to contact and inform the ward staff directly once the bill is ready.

## Conclusion

The study clearly shows that there is a significant delay in discharges in this hospital, and the duration varies considerably between departments. Delay is seen in all the steps, especially in the preparation of discharge summary.

Time and tedious discharge procedures often contribute to patient dissatisfaction and thus reflects on the image of such hospitals. Moreover, timely discharge of patients will help to improve the bed management in the hospital.

## Acknowledgments

This study was conducted as part of the Post Graduate Diploma in Hospital and Health Management (PGDHHM) under Indira Gandhi National Open University—School of Health Sciences, New Delhi. The authors like to thank the Faculty for Hospital Administration at Ramaiah Memorial Hospital for their guidance. The authors also thank the members of the quality control team of the hospital where the study was conducted for their involvement and support in the design and implementation of this study.

## References

1. Sakharkar BM. Principles of Hospital Administration and Planning. 2nd ed. New Delhi: Jaypee Brother; 2009.
2. Nagaraju D. Improvement of hospital discharge process by value stream mapping. In: Proceeding of 17th Annual Society for Health Systems conference. Dallas; 2005.

3. Ajami S, Ketabi S. An analysis of the average waiting time during the patient discharge process at Kashani Hospital in Esfahan, Iran: a case study. Heal Inf Manag J 2007;36(2):37–42. DOI: 10.1177/183335830703600207.
4. Sunil S, Sarala KS, Shilpa RG. Analysis of time takne for the discharge porcess in a selected tertiary care hospital. Int J Manag Appl Sci 2016;2(10):4–8.
5. Shrivastava P. Study on Discharge Process in 500 Bedded Multispeciality Hospital [Internet]. IIHMR University; 2014. Available from: https://www.iihmr.edu.in/student-dissertation/2012-2014/study-on-discharge-process-in-500-bedded-multispeciality-hospital.
6. National Accreditation Board for Hospitals and Healthcare Providers. Guide Book to Accreditation Standards December 2015 National Accreditation Board for Hospitals and Healthcare Providers (NABH). 2015; (December): p. 240.
7. Hamid S, Jan FA, Rashid H, et al. Study of hospital discharge process viz a viz prescribed NABH standards. Int J Contemp Med Res 2018;5(8):H1–H4. DOI: 10.21276/ijcmr.2018.5.8.29.
8. Tak S, Kulkarni S, More R. A comparative time motion study of all types of patient discharges in a hospital. Glob J Med Public Health 2013;2(3):1–4.
9. El-eid GR, Kaddoum R, Tamim H, et al. Improving hospital discharge time: a successful implementation of Six Sigma methodology. Medicine (Baltimore) 2015;94(12):e633. DOI: 10.1097/MD.0000000000000633.
10. Kumari JV. A study on time management of discharge and billing process in tertiary care teaching hospital. Elixir Mgmt Arts 2012;52A:11533–11535.
11. Kaur L, Dilawari PK. A study to assess the efficiency of discharge process in inpatient, cause of discharge delays, and their impact on increase average length of stay. Int J Sci Res 2017;6(5):2251–2254.

ORIGINAL ARTICLE

# A Project to Improve Management of Biomedical Equipment in Selected Units of District General Hospital, Gampaha, Sri Lanka

PD Koggalage[1], Sunil De Alwis[2]

## Abstract

**Introduction:** It is vital to manage biomedical equipment efficiently in planning, acquisition, maintenance, repair, and disposal stages. It was observed and experienced that there were issues in management of biomedical equipment in District General Hospital (DGH), Gampaha, which is a provincial tertiary care hospital in Sri Lanka.

**Aim:** To identify the gaps and improve the existing system for management of biomedical equipment in the Operation Theaters (OTs) A and B, Medical Intensive Care Unit (MICU), and Ward No. 1 of DGH, Gampaha.

**Materials and methods:** This interventional research project was conducted in three phases in three randomly selected units: MICU, OTs A and B, and Ward No. 1. The preinterventional phase identified the gaps in the existing system through key informant interviews, desk review of documents, and surveys. Based on the findings, interventions were designed and implemented in the second phase. The postinterventional phase assessed the effectiveness of the interventions using the same techniques in phase I.

**Results:** Lack of a systematic mechanism to record and quickly access information required for equipment management and incompleteness of information was found. A central-level computer-based Biomedical Equipment Inventory Management System (BEIMS) was implemented along with a personal record keeping system at the unit level. The postinterventional evaluation revealed that the interventions made the vital information available and significantly improved quick accessibility to necessary information about biomedical equipment ($p < 0.05$). Also, there was a significant improvement in the level of convenience ($p < 0.05$) and satisfaction ($p < 0.05$) of the stakeholders with the new mechanism.

**Conclusion:** The BEIMS was effective in improving the management of biomedical equipment. It is recommended to link the BEIMS online with the respective units to improve accessibility to information and also to replicate this project in other units of the hospital.

**Keywords:** Biomedical equipment, Biomedical equipment inventory management, Health technology management, Inventory management system, Medical equipment management.

*International Journal of Research Foundation of Hospital and Healthcare Administration* (2019): 10.5005/jp-journals-10035-1109

## Introduction

Health technologies are of utmost importance in day-to-day functioning of health system. Nowadays, with the continuous advancement in health technologies, different types of medical devices/equipment are being used in the healthcare setup in the prevention, diagnosis, and treatment of illness and disease as well as patient rehabilitation. Demand for medical equipment is increasing day by day. At the same time, costs are also increasing.[1]

### Health Technology

It is the application of organized knowledge and skills in the form of devices, medicines, vaccines, procedures, and systems developed to solve a health problem and improve quality of life.[2]

### Medical Device

An article, instrument, apparatus, or machine that is used in the prevention, diagnosis, or treatment of illness or disease, or for detecting, measuring, restoring, correcting, or modifying the structure or function of the body for some health purpose.[2] Medical devices range from small, inexpensive items such as thermometers to expensive complex items such as computerized tomography (CT) scanners, magnetic resonance image (MRI) scanners, and radiosurgery equipment costing several millions of dollars.[3]

[1,2]Ministry of Health and Indigenous Medical Services, Colombo, Western Province, Sri Lanka

**Corresponding Author:** PD Koggalage, Ministry of Health and Indigenous Medical Services, Colombo, Western Province, Sri Lanka, Phone: +94718766870, e-mail: dineshkoggalage@yahoo.com

**How to cite this article:** Koggalage PD, De Alwis S. A Project to Improve Management of Biomedical Equipment in Selected Units of District General Hospital, Gampaha, Sri Lanka. Int J Res Foundation Hosp Healthc Adm 2019;7(2):67–74.

**Source of support:** Nil

**Conflict of interest:** None

### Medical equipment

These are interchangeably known as "biomedical equipment". They are the medical devices that require calibration, maintenance, repair, user training, and decommissioning which are usually managed by biomedical engineers. Implantable, disposable, or single-use medical devices are excluded from medical equipment.[2]

Healthcare providers should provide an efficient health service of high quality and safety, and the services should be economical as

well. Having the appropriate medical equipment in the right place at the right time, fit for purpose, and well maintained is essential for the delivery of good quality healthcare. Hence, it is vital that the healthcare providers pay more attention on efficient and appropriate utilization of biomedical equipment.[3]

### Management of Biomedical Equipment

Majority of medical equipment are technically complex and require specific expertise to use, maintain, and repair. The unavailability or failure of medical equipment can lead to significant risks to patients and the staff as well. Therefore, it is the responsibility of any healthcare provider to manage their own medical equipment which includes planning, acquisition, maintenance, repair, and disposal.[3]

### Biomedical Equipment Inventory

The inventory is a working document that is regularly checked and updated to accurately reflect the status of healthcare technology assets.[2] The first step in managing biomedical equipment is to develop an inventory. When the inventories are regularly updated and maintained, they serve as an important and powerful tool to improve management of key aspects of biomedical equipment.[2]

### District General Hospital, Gampaha

It is the largest provincial hospital in the Western province of Sri Lanka, and it provides outpatient and inpatient services. Outpatient Department and the Preliminary Care Unit play a significant role in providing outpatient services. The hospital has 19 wards providing curative services under major clinical specialties and under some subspecialties. The MICU, Surgical Intensive Care Unit, and the Coronary Care Unit serve the critically ill while the needy newborns are cared at the Neonatal Unit. The hospital has five OTs. All these units are equipped with a large number of biomedical equipment.

### Statement of the Problem

Biomedical equipment are important assets in diagnosing, treating, monitoring, and rehabilitating patients with various diseases. Most vital decisions on management of patients are heavily dependent on biomedical equipment. DGH, Gampaha, as a tertiary care provider in Sri Lanka, with numerous high-tech biomedical equipment was facing many issues in day-to-day management of them. Lack of proper mechanisms at the central as well as at the unit level to record and quickly access necessary information, which are important at every stage of the equipment management cycle was the main highlighted problem.

*There was no proper systematic mechanism to maintain records and quickly access vital information required for efficient management of biomedical equipment at DGH, Gampaha*.

### Justification

Similar to other countries, in Sri Lanka also, the demand for biomedical equipment has been increasing day by day with the advancement in medical technologies. At the same time, their costs have also been rising, and the gap between needs and resources have been widening. Hence, it is important to use and maintain the available biomedical equipment in a cost-effective manner to maximize their utilization. On the other hand, suboptimal usage and maintenance of them may lead to wrong outputs and also challenge safety of the patient and the user.[4]

The DGH, Gampaha, is also equipped with many high-tech biomedical equipment which are of high cost. However, it had been observed and experienced that there were issues in efficient management of them at various stages of their life cycle as there was no proper mechanism to record and quickly access information needed for the management of biomedical equipment. The World Health Organization (WHO) emphasized that the first step in managing biomedical equipment is to develop an effective record keeping mechanism which will serve as a powerful tool to improve the management of key aspects of biomedical equipment.[2]

Therefore, it was a very important and a timely requirement to conduct this research project in order to identify the gaps in the system for management of biomedical equipment and also to design and implement suitable interventions to improve the management of biomedical equipment in DGH, Gampaha.

### Objectives

*General Objective*

To improve the existing system for management of biomedical equipment in the OTs A and B, MICU, and Ward No. 1 of DGH, Gampaha, Sri Lanka

*Specific Objectives*

- To describe the current processes, practices, and perceptions of the health staff to identify gaps in the existing system for management of biomedical equipment in OTs A and B, MICU, and Ward No. 1 of DGH, Gampaha;
- To design and implement interventions to address the identified gaps in order to improve the existing system for the management of biomedical equipment in OTs A and B, MICU, and Ward No. 1 of DGH, Gampaha;
- To evaluate the effectiveness of the interventions to improve the existing system for the management of biomedical equipment in OTs A and B, MICU, and Ward No. 1 of DGH, Gampaha.

## Materials and Methods

### Project Design

This interventional research project was phased out as follows.
Phase I: In this phase, the existing processes and practices were reviewed and analyzed and also gaps and issues were identified in the management of biomedical equipment.
Phase II: During this phase, interventions were developed and implemented to address the identified gaps and issues.
Phase III: Effectiveness of implemented interventions to address the gaps and issues was evaluated to measure the success of the project.

### Project Setting

This project was conducted in DGH, Gampaha, in the three randomly selected units: MICU, Ward No. 1, and OTs A and B.

### Project Duration

This project was conducted over a period of 15 months starting from April 2018 to June 2019.

### Project Stakeholders

The director, deputy director, two medical officers (quality management and planning), surgical pharmacist in-charge of biomedical equipment (BME), management assistant in-charge of BME, four consultants in selected units, four in-charge nursing

officers in selected units, four special grade nursing officers, and eighteen nursing officers in selected units involving in the management of BME were selected as stakeholders (a total of 35) of the project, depending on their involvement at different stages of the management cycle of biomedical equipment. No sampling method was applied.

### Project Instruments/Techniques

During phases I and III, following quantitative and qualitative research methods were applied:

- *Key informant interviews (KIIs)* with the director/DGH, Gampaha, the surgical pharmacist handling management of biomedical equipment and a nursing sister in-charge of three selected units using "interviewer guides".
- *Desk review of documents* by perusing biomedical equipment inventories and records related to the management of biomedical equipment.
- *Surveys* using a structured self-administered questionnaire with selected group of project stakeholders as mentioned above. It included 35 participants from different staff categories.
- *Biomedical equipment survey* using a "checklist format" to identify the availability of selected details about biomedical equipment in selected three units.

The interviewer guides, checklist formats, and the questionnaires were developed following discussions with experts in the field and review of literature.

### Collection of Data and Analysis

Data collection was done by the principal investigator. Survey data were analyzed using Statistical Package for Social Sciences (SPSS) software. Paired *t* test was the statistical test applied to check the statistical significance of the pre- and postinterventional parameters. Means for the parameters were calculated by assigning a score to each response depending on the favorability with the statement (more favorable means higher score and less favorable means lower score).

For example,

| | |
|---|---|
| • Very convenient/very satisfied | 05 points |
| • Convenient/satisfied | 04 points |
| • Somewhat convenient/somewhat satisfied | 03 points |
| • Inconvenient/dissatisfied | 02 points |
| • Very inconvenient/very dissatisfied | 01 points |

Key informant interviews were recorded with the consent for easy compilation, and narrative analysis was done.

### Project Management

#### *Project Planning*

The information gathered during phase I was used to identify the problem to be addressed by the project. The best possible solutions were identified and a package of interventions to improve the existing system for management of biomedical equipment was developed accordingly (refer to the section on Results). The following activities were carried out:

- *Identification of resources* to develop planned interventions [e.g., information technology (IT) support] after discussing with director and Medical Officer (Planning).
- *Feasibility assessment* of proposed interventions was conducted through discussions with relevant stakeholders.
- *Biomedical equipment survey* was conducted to collect relevant details of the equipment in the selected units using a "checklist" format which also gathered information about the availability of relevant details about equipment. The checklist was developed using the WHO inventory data collection form as a guiding document.[2]
- *Selection of equipment* to be included in the inventory was carried out based on the inclusion criteria developed using Fennigkoh and Smith Model for inventory inclusion of biomedical equipment. This was customized to the local setting with inclusion of the approximate value of the equipment at acquisition after discussing with relevant stakeholders of the project (the director and the surgical pharmacist).

#### *Project Execution*

Following strategies were used to implement this project.

- *Establishment of a focal point*—The surgical pharmacist who has been handling the biomedical equipment was identified as the focal point for this project.
- *Assign responsibility at unit level*—The responsibility and coordination at unit levels were assigned to the in-charge nursing sister of the respective unit.
- *Obtaining IT support*—The necessary IT support to implement the interventions was obtained from an expert in the field.
- *Training of staff*—An orientation training was conducted for the surgical pharmacist in-charge and in-charge nursing sisters in three selected units about the usage of interventions.

#### *Project Evaluation*

The effectiveness of the project was evaluated during phase III using the same techniques in phase I.

### Administrative and Ethical Requirements

Approval for the project proposal was obtained from the Board of Study in Medical Administration of the Postgraduate Institute of Medicine (PGIM), University of Colombo. Permission was obtained from the Regional Director of Health Services, Gampaha and Director of DGH, Gampaha was taken.

Ethics approval was obtained from the Ethics Review Committee, PGIM. Informed consent was taken from all participants using an information sheet. Confidentiality of information and anonymity of participants were preserved.

## Results

The qualitative and quantitative techniques used in this research project revealed the following findings. They are described under the three phases of the project.

### Phase I—Preinterventional Assessment

The preinterventional KIIs conducted with the director, surgical pharmacist in-charge of biomedical equipment and the nursing sister of the selected unit identified the existing processes and practices involved in the management of biomedical equipment and issues/gaps in the processes.

*Identification of Gaps*

The preinterventional KII revealed that there was no proper systematic mechanism to record and access information required for management of biomedical equipment in the hospital.

The director mentioned that timely availability of accurate information is vital in every stage of equipment management cycle. He said that the existing record keeping mechanism has some inefficiencies such as lack of vital information and difficulty in quickly accessing information about location, condition/level of functioning, services, maintenance details, etc., of an equipment. Therefore, he emphasized the importance of easily and quickly retrievable information system to facilitate optimum management of biomedical equipment.

The surgical pharmacist and the nursing sister mentioned that there was no proper system to maintain separate records for each equipment at unit/ward level. Further, the nursing sister mentioned that the lack of relevant information at unit level led to inefficiencies in management of biomedical equipment. Personal records and tagging systems were not available for each and every equipment. The surgical pharmacist reiterated that the existing record keeping mechanism was incomplete and completely paper based, hence had difficulties in accessing required information quickly. Also, sorting, filtering, and searching relevant information was difficult with the manual system.

Therefore, the following could be identified as the main gaps in the process of managing biomedical equipment.

- Lack of a systematic mechanism to easily and quickly access information (e.g., location, functionality, details about service/maintenance) about biomedical equipment at the central level.
- Lack of important details (data completeness) in the existing system (e.g., condition/level of functioning, service-related details, etc.)
- Lack of a systematic mechanism to maintain separate "record files" for each equipment at the unit/ward level.
- Unavailability of "identification tags" for each selected equipment.

*Biomedical Equipment Survey*

As mentioned earlier, a biomedical equipment survey was conducted in selected three units using the checklist format.

All checklist and survey results in phase I are described under postinterventional section (phase III) for easy comparison.

## Phase II—Design and Implementation of Interventions

A package of interventions was developed and implemented to address the gaps identified in phase I after several rounds of discussions with the director, surgical pharmacist, and the selected nursing sister.

- **Intervention 1**—A central-level computer-based BEIMS was developed using Microsoft Access software as shown in Figures 1 and 2.

The system included the following key features.

- A data entry interface with general information, service, maintenance details, and availability details of biomedical equipment
- A facility to generate a summary report of each equipment entered into the inventory
- A facility to search equipment quickly with ID or serial number
- Facilities to sort equipment according to different parameters (e.g., location, functionality, etc.)

Selection of equipment to be included in the BEIMS was done in biomedical equipment survey. Accordingly, a total of 55 equipment were identified from three selected units as follows.

- OTs A and B—28
- MICU—15
- Ward 01—12

- **Intervention 2**—A "record file" was introduced for each selected equipment included in the BEIMS. This record file was maintained at the respective units by the in-charge officers and consisted of information sheet generated by the BEIMS with all

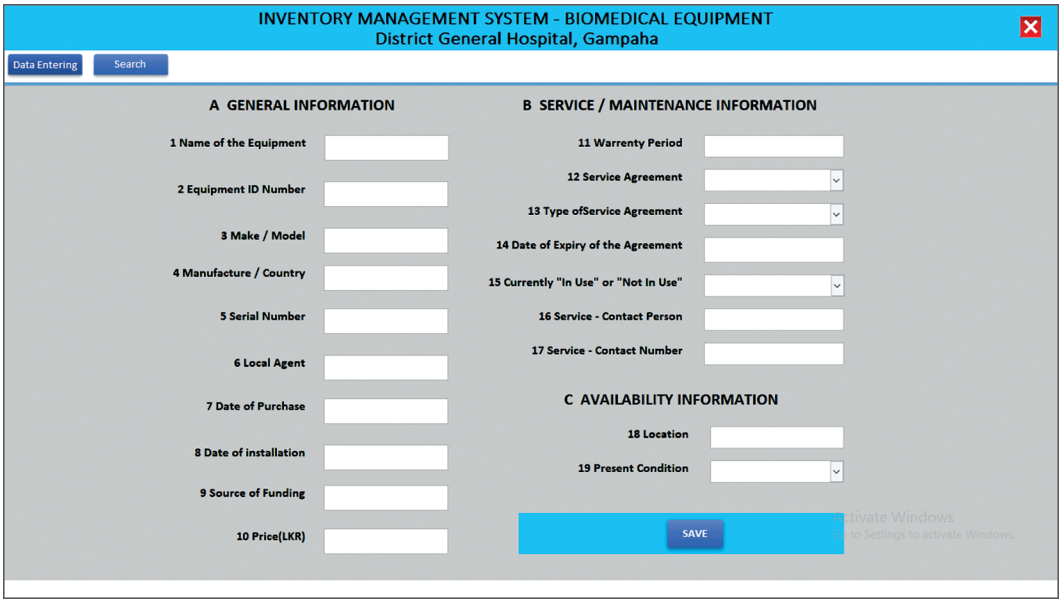



**Fig. 1:** Biomedical Equipment Inventory Management System—Data entry interface

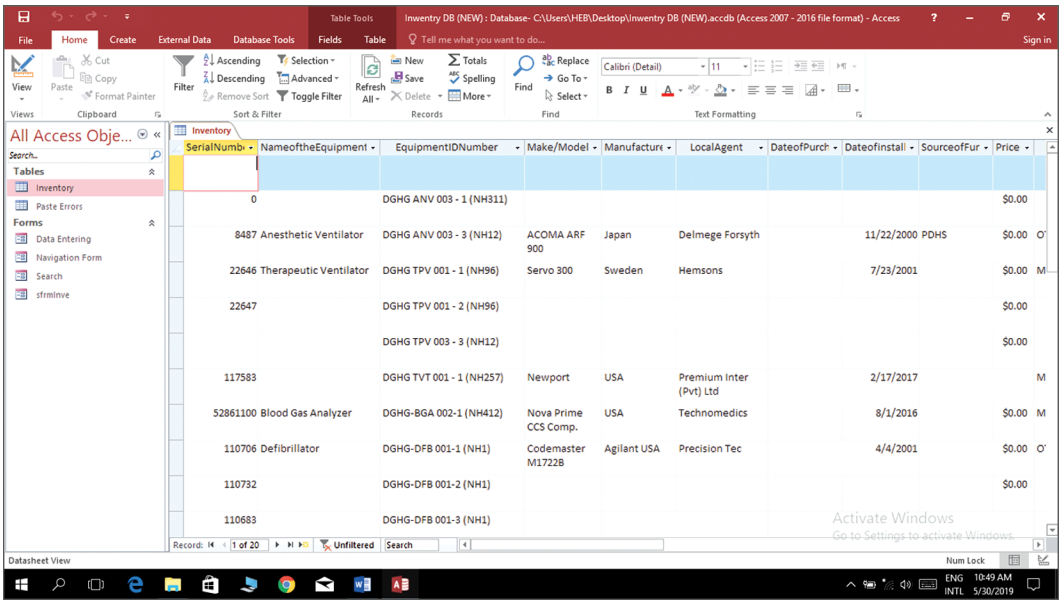



**Fig. 2:** Biomedical Equipment Inventory Management System—Database

**Table 1:** Frequency distribution of selected biomedical equipment according to the availability of selected key details/features before and after the interventions ($n$ = 55)

| | *Preinterventional* | | *Postinterventional* | |
|---|---|---|---|---|
| *Details/features* | *Yes (%)* | *No (%)* | *Yes (%)* | *No (%)* |
| Personal record file at unit level | 12 (21.8) | 43 (78.8) | 55 (100.0) | 00 (0.0) |
| Identification tag | 08 (14.5) | 47 (85.5) | 55 (100.0) | 00 (0.0) |
| Warranty details | 15 (27.3) | 40 (72.7) | 55 (100.0) | 00 (0.0) |
| Service agreement details | 12 (21.8) | 43 (78.8) | 50 (90.9) | 05 (9.1) |
| Type of service agreement | 12 (21.8) | 43 (78.8) | 50 (90.9) | 05 (9.1) |
| Service contact person's name | 08 (14.5) | 47 (85.5) | 55(100.0) | 00 (0.0) |
| Service contact telephone number | 08 (14.5) | 47 (85.5) | 55 (100.0) | 00 (0.0) |
| Present location | 53 (96.4) | 02 (3.6) | 55 (100.0) | 00 (0.0) |
| Present condition | 12 (21.8) | 43 (78.8) | 55 (100.0) | 00 (0.0) |

relevant details of the equipment including a record of services and maintenance and any other relevant documents.

- **Intervention 3**—An "identification tag" was introduced for each selected equipment for easy access to relevant details.

The users were given an orientation training on how to use and maintain the new mechanisms.

## Phase III—Postinterventional Assessment

Effectiveness of the interventions to address the identified gaps was assessed and the results are shown below.

### *Findings of KIIs*

In comparison to phase I, the postinterventional KIIs with the same participants revealed the following. The director mentioned that the newly established computer-based BEIMS had made the central-level inventory management more systematic. He further said that the required information are readily accessible with the new system.

The surgical pharmacist mentioned that the data entry interface of the system was very user-friendly and contained vital information about general identification, service/maintenance, and availability of the equipment which are important for efficient management. Also, the surgical pharmacist stated that the editing, sorting, searching, and printing facilities in the system were very useful and convenient for recording and quick accessibility to information. The record sheet generated by the system with key information for each equipment was helpful to provide information to be included in personal records at the unit level. However, the surgical pharmacist emphasized that the system can be updated with all required information with the receipt of new equipment as most of the old equipment lack some information.

The nursing sister also, in agreement with other key informants said that the new system was very useful for maintaining records for biomedical equipment. The unit-level personal record system and the identification tags had helped them to maintain systematic records for each selected equipment. Nevertheless, the nursing sister mentioned that if the central-level computer-based system can be extended to unit/ward level, it would be more efficient in biomedical equipment management in the whole hospital.

### *Checklist and Survey Results*

Of the 35 stakeholders considered, 32 (91.4%) and 29 (82.9%) responded in pre- and postinterventional surveys, respectively.

***Availability of selected details/features in the mechanisms before and after the interventions for the management of biomedical equipment:*** Table 1 shows the results of checklist data on the availability of selected key details/features in records for each

**Table 2:** Significance test statistics for differences in responses of participants in pre- and postinterventional assessments on timeliness of selected processes

| | *Mean (SD)* | | |
|---|---|---|---|
| *Indicator* | *Preinterventional (n = 32)* | *Postinterventional (n = 29)* | *Significance (p value)* |
| Average time taken to obtain information required for management of equipment | 4.93 (0.47) | 5.86 (0.36) | 0.000 |
| Timeliness of services/maintenance of biomedical equipment in hospital/unit | 2.89 (0.67) | 3.14 (0.44) | 0.090 |
| Frequency of delays in service and maintenance due to nonavailability of information | 3.55 (0.51) | 2.28 (0.45) | 0.000 |

**Table 3:** Significance test statistics for differences in responses of participants on level of convenience and usefulness of pre and postinterventional mechanisms to access information

| | *Mean (SD)* | | |
|---|---|---|---|
| *Indicator* | *Preinterventional (n = 32)* | *Postinterventional (n = 29)* | *Significance (p value)* |
| Convenience to obtain information about a particular equipment | 2.41 (0.73) | 4.37 (0.68) | 0.000 |
| User-friendliness of the mechanism to staff in managing biomedical equipment in the selected units | 2.34 (0.67) | 4.00 (0.71) | 0.000 |
| Usefulness of the mechanism to facilitate management of biomedical equipment in selected units | 2.21 (0.67) | 4.10 (0.67) | 0.000 |

**Table 4:** Significance test statistics for differences in responses on the level of satisfaction about the pre- and postinterventional mechanisms

| | *Mean (SD)* | | |
|---|---|---|---|
| *Indicator* | *Preinterventional (n = 32)* | *Postinterventional ( = 29)* | *Significance (p value)* |
| Satisfaction on quick availability of relevant information required for equipment management | 2.72 (0.75) | 4.10 (0.67) | 0.000 |
| Satisfaction on convenience of the mechanism | 2.66 (0.61) | 4.17 (0.71) | 0.000 |
| Overall satisfaction about the mechanisms | 2.89 (0.90) | 4.37 (0.68) | 0.000 |

selected biomedical equipment before and after the intervention. Accordingly, personal records (100%) and identification tags (100%) were made available for each selected equipment after the intervention. Other key details such as service agreement details (90.9%), type of service agreement (90.9%), service person's contact details (100%), present location (100%), and present condition (100%) which were lacking before the intervention were made available after implementing the BEIMS.

***Timeliness of selected processes in biomedical equipment management:*** Table 2 presents significance test statistics of pre- and postinterventional perceptions of participants on the timeliness of the selected processes. A significant difference ($p < 0.05$) was observed in the reduction of the average time consumed to obtain information and the frequency of delays in services/maintenance due to nonavailability of information. However, the improvement in timeliness of services/maintenance was not statistically significant ($p > 0.05$).

***Level of convenience and usefulness of the mechanism:*** The significance test statistics on responses of participants on levels of convenience and usefulness of the pre- and postinterventional mechanisms are depicted in Table 3. A significant improvement ($p < 0.05$) was observed in levels of convenience, user-friendliness, and usefulness of the pre- and postinterventional mechanisms to access information about biomedical equipment.

***Level of satisfaction about the mechanism:*** The significance test statistics for the levels of satisfaction of participants about the pre- and postinterventional mechanisms are presented in Table 4. A significant increase ($p < 0.05$) was observed in the levels of satisfaction on quick accessibility to required information and the convenience of the mechanism. Also, the increase in their overall satisfaction was statistically significant ($p < 0.05$).

## Discussion

With the rapid advancement in health technologies, different types of biomedical equipment are being used in healthcare setup in the prevention, diagnosis, and treatment of illness and disease as well as patient rehabilitation. Demand and the costs for medical equipment are increasing day by day.[1] Therefore, it is very important to manage biomedical equipment effectively for maximum utilization. Furthermore, proper management is important in order to render best quality and safe healthcare for patients while maintaining equipment in the best cost-effective manner.[5]

Inventory management and documentation is one of the important assistive stages in the life cycle.[6] This can be considered as the first step in designing an effective equipment management program in any organization. Hence, each healthcare organization should maintain an inventory for medical equipment.[7] The WHO also has identified medical equipment inventory as an essential part of an effective healthcare technology management system.[2] However, lack of a systematic mechanism at the central as well as the unit level to easily access information and incompleteness of available information was identified as the key issue in the management of biomedical equipment in DGH, Gampaha.

The existing mechanism was completely paper based and lacking some vital information. This had resulted in some inconveniences and inefficiencies in managing biomedical equipment in the selected units of the hospital. A similar research project conducted in primary and secondary healthcare institutions in the regional directorate of health services (RDHS), Gampaha, Sri Lanka, to improve the maintenance of biomedical equipment found lack of medical equipment inventory, guiding principles for decision-making, proper information, communication and record keeping methods and capacity building and training for the staff as main reasons for poor maintenance program.[8]

In the present research project, the central-level BEIMS was developed using MS Access with key information. It had the ability to quickly access information of a particular equipment. Also, it had facilities for searching, sorting, filtering, and printing information sheets. Furthermore, a separate record keeping mechanism and tagging system was introduced at the unit level to supplement the central inventory. The whole system comprised general, service/maintenance-related and availability-related information about selected equipment. The previous research project conducted in RDHS, Gampaha, also developed a medical equipment inventory, a guideline including prioritization, information, communication, and record keeping criteria for medical equipment management program as interventions.[8]

The postinterventional KIIs revealed that the BEIMS at the central level and the record keeping mechanism at the unit level had made the management of biomedical equipment more convenient and efficient. Further, the system was user-friendly and contained essential information required by the staff to facilitate management of equipment. With the searching, sorting, filtering, and printing facilities, the computer-based system had made access to information more efficient. Similar to this, the previous project in RDHS, Gampaha also found significant improvements in maintenance activities carried out by primary and secondary care institutions.[8]

With the establishment of the BEIMS, many of the important information of equipment like general identification details, locations, and service/maintenance details were made available for selected equipment. The medical equipment management guideline of the MedPro Group also states to include unique identification number, the equipment manufacturer, model number and serial number, description of the equipment, location of the equipment (for equipment generally kept in a fixed location), identity of the department considered to "own" the equipment in the inventory.[4]

According to the perception of the stakeholders of the present research project, the average time taken to obtain necessary information about an equipment had significantly reduced with the implementation of interventions ($p = 0.000$) (Table 2). Also, they perceived that the frequency of delays in services/maintenance due to unavailability information had significantly reduced ($p = 0.000$) (Table 2). The WHO has also mentioned that when inventories are regularly updated and maintained, they improve the management of these aspects of biomedical equipment. Even though, the perceived timeliness of services/maintenance had improved, it was not statistically significant ($p = 0.090$) (Table 2). This may be due to many other factors that affect timeliness of servicing/maintenance of equipment such as delays in procurement processes and approval processes, etc. which should be further researched. The parameters considered were measured by staff perceptions as an alternative proxy measure due to the limited time.

The convenience to access information and the user-friendliness had increased after implementation of the new system and the increase was statistically significant ($p = 0.000$) (Table 3). The new system was more useful to facilitate the management of biomedical equipment compared to the manual paper-based system ($p = 0.000$) (Table 3). The project conducted in RDHS, Gampaha, also found a significant improvement in the perception of the staff regarding the above aspects in the management of biomedical equipment.[8] The staff satisfaction on convenience and quick accessibility to information and also their overall satisfaction about the mechanism had significantly improved with the new system ($p = 0.000$) (Table 4).

With the above findings, it was evident that the newly established mechanisms have improved the system for management of biomedical equipment in selected units of the hospital. However, an assessment of a longer duration is required for more detailed evaluation of effectiveness.

### Limitations

The research project was confined to selected units of DGH, Gampaha, due to feasibility issues. Also, only the selected equipment were included in the BEIMS due to limited time duration of the project.

The effectiveness of the project was assessed mainly through proxy indicators using the questionnaire as a longer time period is required to assess the real outcome of the intervention.

The linking of the BEIMS with the respective units was unable due to technical limitations.

## Conclusion and Recommendations

### Conclusion

Lack of a systematic mechanism to quickly access necessary information and unavailability of vital information required for management of biomedical equipment were identified as key issues in DGH, Gampaha.

Considering the above gaps a computer-based central BEIMS, the unit-level record file system and identification tag system for biomedical equipment were designed and implemented in the MICU, Ward No. 1, and OTs A and B.

The interventions were effective in improving quick accessibility to necessary accurate information about a particular biomedical equipment and, in turn, helped management of biomedical equipment. Also, a significant improvement was observed in the level of convenience and satisfaction of the stakeholders about the newly established mechanism to improve the management of biomedical equipment.

### Recommendations

It is recommended to link the BEIMS online with the respective units to further improve accessibility to information. The mechanism should be further improved by incorporating comprehensive service/maintenance schedules for each biomedical equipment, with an alert system to users as this will improve timely servicing of equipment.

It is desirable to implement this project in other units of the hospital as well. So that the management of biomedical equipment in the whole hospital can be improved.

## References


1. Ministry of Health Republic of Zambia. Medical Equipment Management Guidelines. Medical Equipment Management Guidelines. Republic of Zambia: Ministry of Health, Republic of Zambia, September 2012.
2. World Health Organization. Introduction to medical equipment inventory management: WHO Press, World Health Organization, 20 Avenue Appia, 1211 Geneva 27, Switzerland, 2011.
3. Office of the Auditor General.Management of Medical Equipment. Western Australia: Office of the Auditor General, 2017.
4. MedPro Group.Guideline: Medical Equipment Management. Fort Wayne: MedPro Group, 2016.
5. Aruna M, Uma G, Saadia N. Efficient equipment management for biomedical engineering. Int Rev Manage Market 2018;8(3): 69–74.
6. Saleh N. Medical Equipment Management. Asian Hospital & Healthcare Management. [Online] 2019. https://www.asianhhm.com/technology-equipment/medical-equipment-management.
7. MedPro Group. Medical Equipment Management. Fort Wayne: MedPro Group, 2019.
8. Perera A, A project to assess and improve the medical equipment maintenance program of Gampaha regional director of health service division [dissertation]. Postgraduate Institute of Medicine, University of Colombo; 2018.

RESEARCH ARTICLE

# Awareness amongst Different Strata of Society Regarding the "Good Samaritan Law"

Stuti Verma[1], Vijay K Tadia[2], Shakti Gupta[3]


## Abstract

**Introduction:** The current annual death toll on Indian roads is over 140,000. Over 70,000 lives can be potentially saved if bystanders come forward to help the victims. According to the World Health Organization (WHO), in the absence of established emergency medical services, bystanders can play a crucial role in saving lives. The Law Commission of India report says that 50% of the victims who died of preventable injuries could have been saved had they received the medical care on time. A Good Samaritan can save a life in many emergent situations.

**Aim and objective:** A study on awareness among different strata of society regarding the "Good Samaritan Law" (GSL).

**Materials and methods:** The study involved a qualitative research design using in-depth semistructured questionnaires to elicit participant perspectives on the rescue principles in relation to their awareness of the law. A simple random sampling method was used to arrive at the representative sample. A pilot study was conducted, and a sample size of 60 responses each was required from seven groups representing different strata of society. The survey was conducted in Delhi NCR region, India. It included doctors and nurses from six hospitals (three government and three private), police, general public, lawyers, media personnel, and teachers. The study was conducted from January 2017 to August 2017. A questionnaire- and interview-based study was conducted taking into account representative sample of various representatives from different strata of society. The method of simple random sampling was used to arrive at representative sample size. Data was collected after instituting questionnaires and interviewing 420 participants from different occupations over a period of 8 months. Doctors and nurses were interviewed from over six different hospitals (three public and three private) of Delhi/NCR region in India. The questionnaires were given to police personnel, lawyers, media personnel, teachers, and general public.

**Results:** The study revealed that people from different strata of society in India hesitated to come forward to help road accident victims. In total, 85% of them had attributed this hesitation to fear of legal and procedural hassles. These hassles include intimidation by police, unnecessary detention at hospitals, and prolonged legal formalities.

**Conclusion:** Many people die in road crashes with treatable injuries but no one helps out of fear of getting into trouble. On March 30, 2016, the Supreme Court of India gave "force of law" to the guidelines for the protection of Good Samaritans issued by the Ministry of Road Transport and Highways. The purpose of a Good Samaritan law is to provide legal protection to bystanders who come to the aid and rescue of victims of road crashes. Enforcement of Good Samaritan Law may motivate the people to help the road accident victims in the hour of need.


**Keywords:** Accident victim, Good Samaritan Law, Road safety.

*International Journal of Research Foundation of Hospital and Healthcare Administration* (2019): 10.5005/jp-journals-10035-1108

## Introduction

The current annual death toll on Indian roads is over 140,000. Over 70,000 lives can be potentially saved if bystanders come forward to help the victims. According to the WHO, in the absence of established emergency medical services, bystanders can play a crucial role in saving lives. The Law Commission of India report says that 50% of the victims who died of preventable injuries could have been saved had they received the medical care on time.[1,2] To ensure the effective implementation of the road safety guidelines and standard operating procedures, it is imperative that a comprehensive GSL is enacted at the central and state level.[3]

The GSL was not found on the statute books earlier, but as a concept, the honorable courts have applied its tenets in various judgments. A study had been undertaken for timely reminder to health practitioners regarding the doctrine of the Good Samaritan.[4]

In India, Karnataka was the only Indian state to have passed a Good Samaritan Bill in the State Assembly, under Karnataka Good Samaritan and Medical Professional (Protection and Regulation During Emergency Situations) Act 2016.[5,6]

Injury and trauma are increasingly becoming a major public health problem in the country. Road traffic accidents (RTAs) have risen at 3% annually. Indian roads have witnessed vehicular accidents every 2 minutes and death every 8 minutes. The majority of fatal victims are pedestrians and two-wheeler riders. The victims are majorly (22.8%) in the productive age group of the developing country and the future of young India.[7]

India has lost approximately 2–2.5% of its gross domestic product to only road traffic injury thus adding excess mortality, apart from tremendous burden of disability. It is not only the health-care

[1]MHA, Amity Institute of Hospital Administration, Noida, Uttar Pradesh, India

[2]Department of Hospital Administration, All India Institute of Medical Sciences, New Delhi, India

[3]Dr RP Centre for Ophthalmic Sciences, All India Institute of Medical Sciences, New Delhi, India

**Corresponding Author:** Vijay K Tadia, Department of Hospital Administration, All India Institute of Medical Sciences, New Delhi, India, Phone: +91 9871097100, e-mail: vijaytadia@gmail.com

**How to cite this article:** Verma S, Tadia VK, Gupta S. Awareness amongst Different Strata of Society Regarding the "Good Samaritan Law". Int J Res Foundation Hosp Healthc Adm 2019;7(2):75–84.

**Source of support:** Nil

**Conflict of interest:** None

industry but also the society whose response and functioning as a responsible citizen are required for the timely response.[7]

The WHO in its "World Report on Road Traffic Injury Prevention, 2015" has projected that by 2020, road accidents will be the biggest killers in India. The problem may be expected to decline by 2042. There is a strong need for set of laws that protect a Good Samaritan from legal ramifications.[8]

California was the first state in the world to legislate laws protecting good Samaritans since 1959.[9] The first study on Good Samaritan Policy was conducted by Lewis and Marchell in 2006 at Cornell University. The GSLs were named after a parable told in Luke 10:25–37 of the Bible. This story is known as the Parable of the Good Samaritan. The Bible verses tell the story about aid that was given by one traveler from Samaria to another traveler of different religious and ethnic beliefs who had been beaten and robbed by bandits.[10]

In a landmark case of the name Parmanand Katara vs Union of India, 17 most basic guidelines for the treatment of the road accident victim were laid down.[11]

The Ministry of Road Transport and Highways had issued the Good Samaritan guidelines in 2015. Honorable Supreme Court was instrumental in giving the guidelines force of law in 2016 with the primary benefits of:

- Protection from any legal complication to anyone who helps the victim.
- Good Samaritan can choose to file a police complaint without disclosing the name.[12]

### Aim and Objective

A study on awareness among different strata of society regarding the "Good Samaritan Law."

## Materials and Methods

### Research Design

The study involved a qualitative research design using in-depth semistructured questionnaires to elicit participant perspectives of the rescue principles in relation to their awareness of the law.

### Sampling

A simple random sampling method was used to arrive at the representative sample. A pilot study was conducted, and a sample size of 60 responses each was required from seven groups representing different strata of society.

### Study Area and Study Population

A survey was conducted in Delhi NCR region, India. It included doctors and nurses from six hospitals (three government and three private), police, general public, lawyers, media personnel, and teachers.

### Study Period

The study period was conducted from January 2017 to August 2017.

A questionnaire- and interview-based study was conducted taking into account representative sample of various representatives from different strata of society. The method of simple random sampling was used to arrive at representative sample size. Data were collected after instituting questionnaires and interviewing 420 participants from different occupations over a period of 8 months. Doctors and nurses were interviewed from over six different hospitals (three public and three private) of Delhi/NCR region in India. The questionnaires were given to police, lawyer, media, teachers, and general public.

## Results

It was noted that 73.33% of the police personnel at some point of the time in their lives had acted as Good Samaritans, whereas 26.66% did not get a chance to do so (Fig. 1). Despite the fact that around 93.33% of them come across some form of accidents almost daily, only 46.66% were aware of the fact that a Good Samaritan would be awarded by the state government (Fig. 2). While giving the answer to question regarding their personal experience about accident cases, 48.33% admitted to have had some minor or major accident at some point of time during their life. Around 41.66% of them had received help themselves when the injury was minor, and they were in conscious state of mind. About 63.33% felt that it was always better option to make an attempt to take the victim to government hospital (Fig. 3). Around 59% felt that even if the injury is minor, it is better to at least stop and help the victim to make them feel comfortable during panic. Even after the release of guidelines by the Honorable Supreme Court, only 60% of the police personnel felt that the police are not called for minor accident cases, and such cases mostly go unreported at times. In total, 71.66% police personnel felt that being

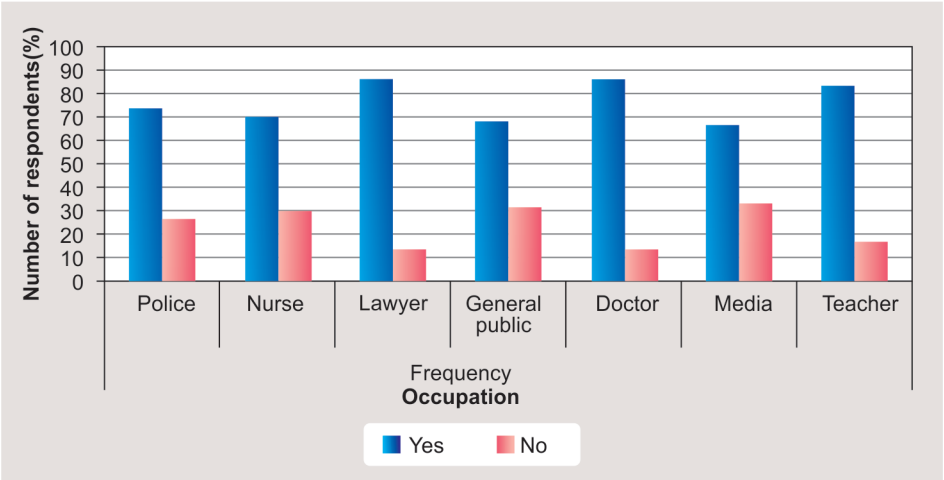



**Fig. 1:** Acted as Good Samaritan

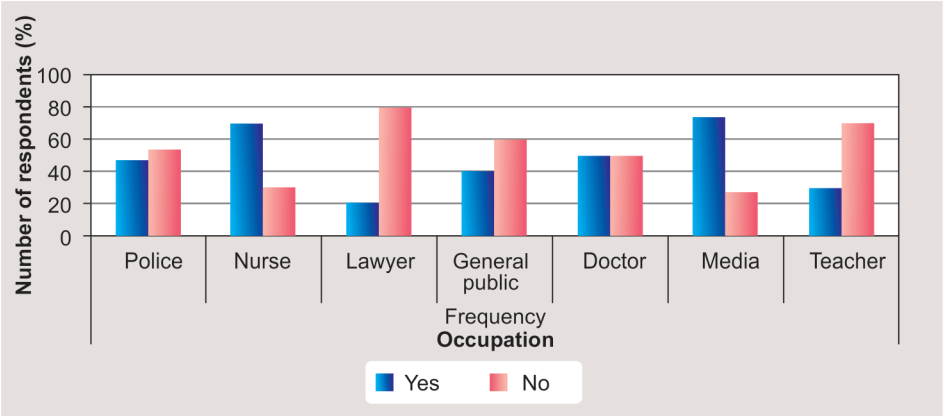



**Fig. 2:** Awareness of award

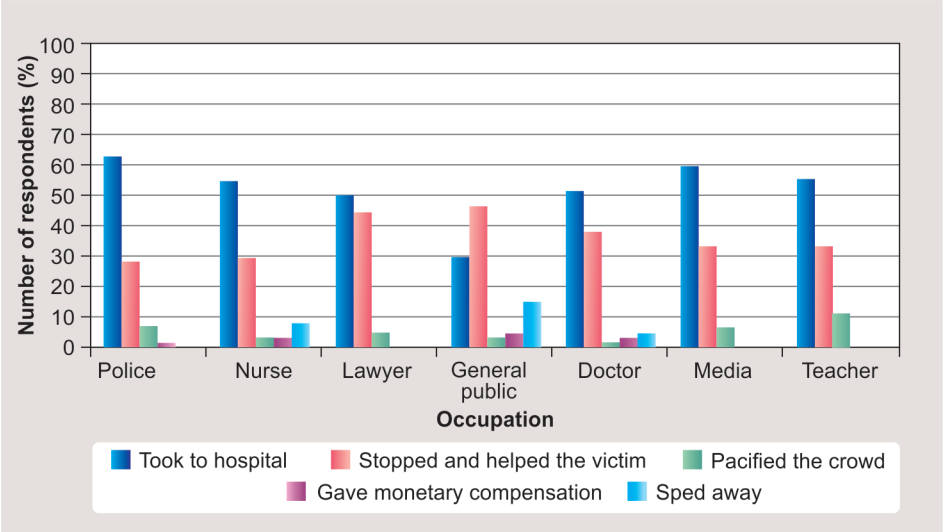



**Fig. 3:** Response to an accident victim

in a profession to act as a safety guide for public and maintaining the law and order of the state, it does not really matter whether one is on duty or not while helping the victims. In total, 3.33% responses revealed that in major or multiple casualties, it was better to wait for area in charge to turn up or help the victims with the help of bystanders take them to the nearest hospital. When they were asked as to which hospital would they prefer to take the victim(s), 98.33% admitted that government hospitals are always preferred rather than private hospitals as many times only the first aid treatment is given in private hospitals, and the police were asked to call up the victims' relatives apart from making medicolegal cases which was mandatory (Fig. 3). They believe that the public sector hospitals are more concerned for treating the patient rather than knowing or enquiring details of person concerned. Police personnel also felt that 50% of the public expects that it was the responsibility of the police to help the victims and 53.33% of the public was reluctant to even call the emergency contact numbers. Out of the total sample, 81.66% were males, and 71.66% of all respondents felt that helping someone has nothing to do with being a male or female that is totally a humanitarian gesture when it comes to being a Good Samaritan (Fig. 4). If someone genuinely wants to extend help just dialing the emergency number would also be fruitful or informing the nearest police post is the least public can do. In total, 66.66% of the Good Samaritans revealed that personal details were asked of them when either the victim was unconscious or did not seem to be the local resident. In case of unidentified victims, the Good Samaritan had been asked for details so as to ease the investigation process in future.

Highway crimes have been reported majorly in recent years, and one rarely finds people coming forward to help the victims even for hours at a stretch irrespective of the fact that most of the victims are usually families with women and children involved. As the movement of public is scanty at such deserted stretches, police patrolling is something that needs to be present. Police personnel themselves admitted that about 41.66% are afraid of being robbed of belongings followed by the safety of female counterparts, and 7% believed that lack of highway patrolling teams on the national highways make people reluctant to stop and help the victim (Fig. 5).

It is not that only the public faces harassment, sometimes even police personnel (51.66%) felt that they were also harassed usually by the area in charge regarding the report on investigation/interrogation before the GSL was passed. Many (48.33%) felt that asking for basic details does not bound to harassment, but public tend to overreact at times. Despite of fear of being interrogated by the police, 41.66% have never denied disclosing the details as they feel that there is no fear of being framed if one is not a culprit (Fig. 6). The answer to question about whether police personnel have asked them to wait for the medico-legal case (MLC), 58.32% answered

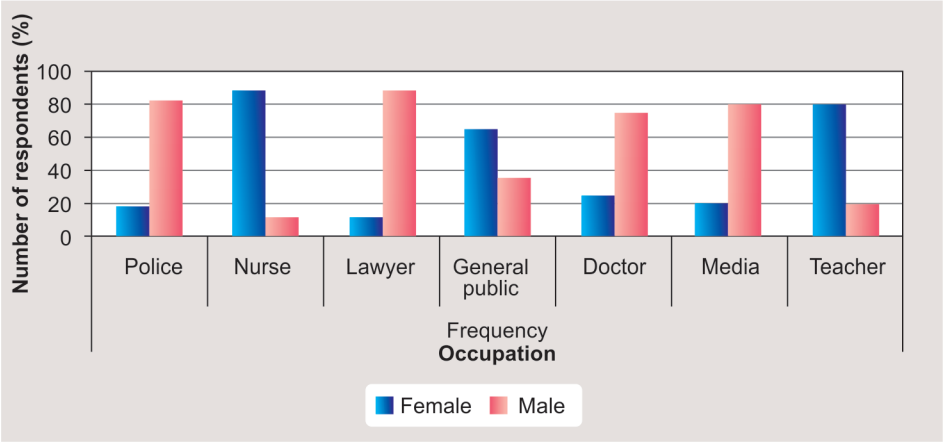



**Fig. 4:** Gender distribution across different occupations

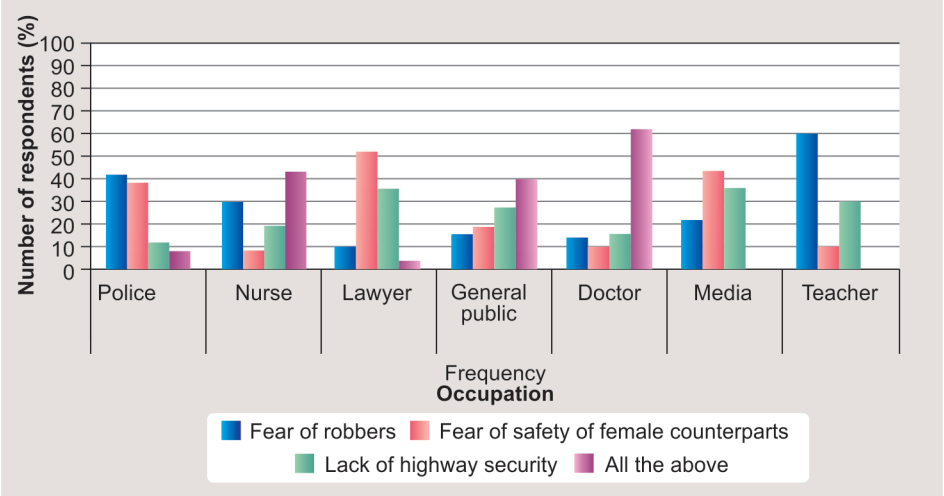



**Fig. 5:** Response to highway accident victims

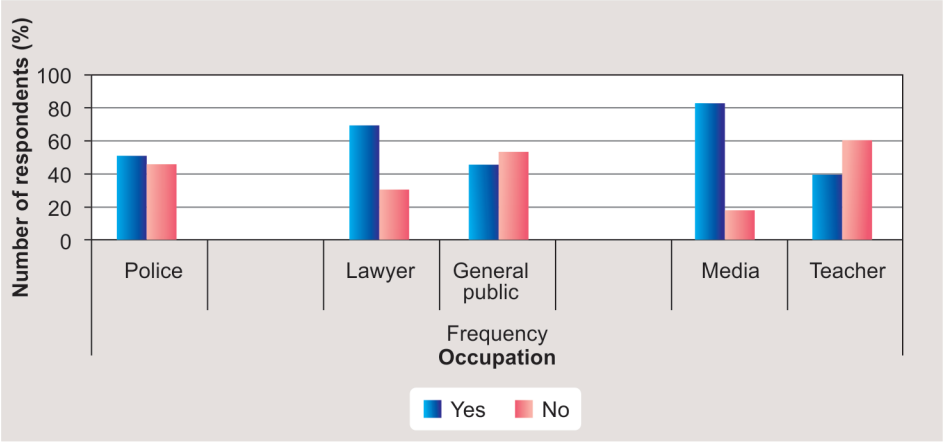



**Fig. 6:** Fear of harassment by authorities

that they had to wait for the MLC, and the police questioned them in case of grievously injured victims.

India is a country of diverse cultures, religions, castes, and creeds since times immemorial. The study revealed that (20%) victims of North Eastern India and foreign land faced discrimination by public as per the observation of the police. Delhi Metro has emerged as a lifeline of the city and is being extended with upcoming proposals in NCR region too. Delhi Metro Rail Corporation (DMRC) must be given additional responsibility toward announcing/disclosing the GSL guidelines (56.66%) apart from which guidelines

should be displayed/announced in the public (65%). The police personnel responded that GSL should not be taken as the political topic (53.33%) as it will lead to unnecessary debate rather than any positive outcome. The police personnel strongly agreed (65%) that central helpline would be of definite help at the time of distress situation rather than a normal emergency number. Apart from this, a dire need of the National Ambulance was suggested by 90% for transporting the patients timely to the nearest hospital.

The second study group included nurses of both public and private hospitals across Delhi NCR. The study the nurses posted in the emergency department comprised of 21–40 years age group (about 88.32%) females (Fig. 7). In total, 58.33% nurses claimed that it was during their posting in emergency department in particular they became aware of the GSL. Despite their lack of awareness, 70% had acted as Good Samaritans at one point of the life or another (Fig. 1). It was in the emergency department where the RTA cases were initially reported, 64.99% had witnessed all kinds of the RTAs on a daily and weekly basis between the time intervals 2 p.m. and 10 p.m. (43.33%). The maximum number of patients/victims is wheeled in the casualty/emergency by the police in police control room (PCR) van, auto drivers, or centralized accident and trauma service ambulances (78.33%). The Good Samaritans usually are the police personnel or the less educated auto drivers (58.53%). Although college students and office goers also contribute toward this social cause (39.99%), the nurses were interviewed about their personal experience, if they had met with accident and had received help when required. Out of 70% of the nurses who had met with an accident, only 53.33% had received help (Fig. 8). Helping victim is the duty of certified nurse (60% believed) as per the Nightingale Oath implies them to do professionally. While the rest 40% of them answered that helping the victim is purely based on the condition of victim and circumstances in which the victim is found and had nothing to do with the credentials. In total, 55% nurses responded that they would prefer to take the victim to the government hospital if they come across any victim and 73.33% would do so if some accident occurs due to their fault (Fig. 3). The study revealed that 78.33% of the times public was reluctant to even provide a helping hand because they feel it was the main responsibility of the driver to take the victim to the hospital or give him monetary compensation in case if there were other losses apart from the limb or life. In total, 86.66% of the female respondents felt that sometimes they had asked the bystanders for help but people usually turn deaf ear (Fig. 8). Before the GSL was implemented, 61.66% respondents said that the details were asked from the Good Samaritan only for initial investigation and not for harassing them. The police provide security to their citizens

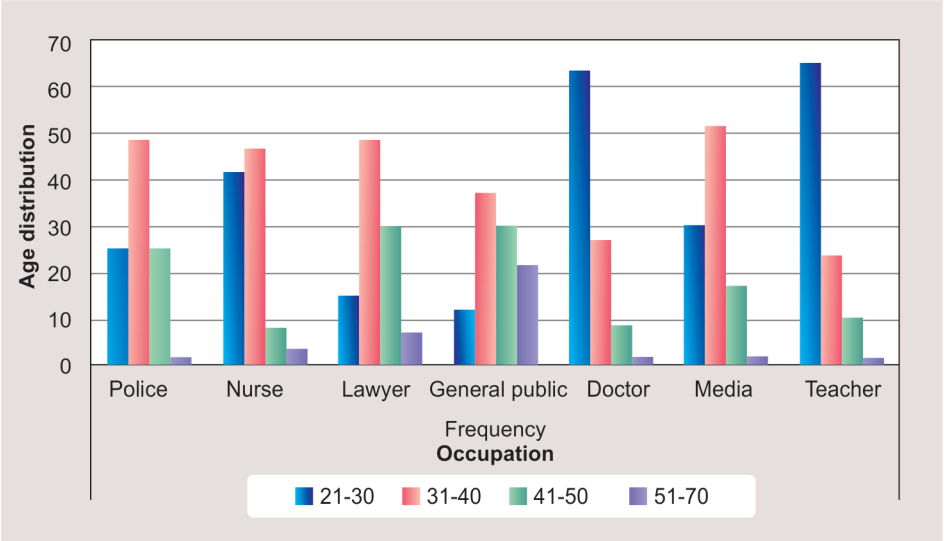



**Fig. 7:** Age distribution across different occupations

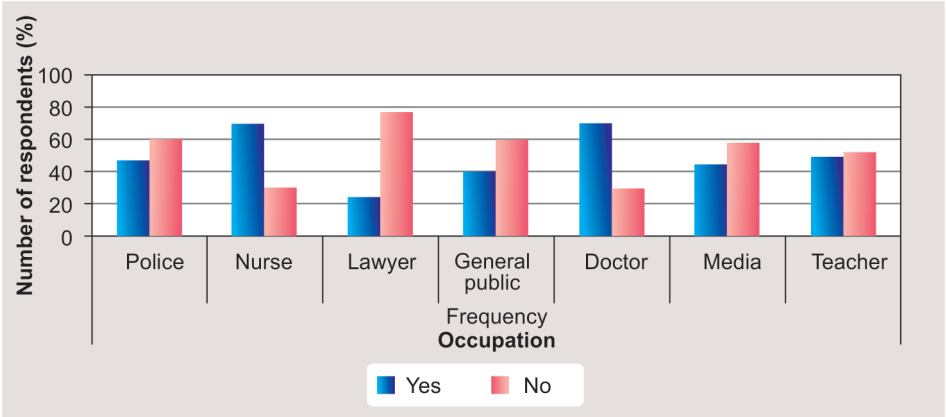



**Fig. 8:** Help received after accident

round the clock irrespective of being in metro cities or in villages. The connecting links that are the highways are the most vulnerable stretches where victims are not helped basically because of the fear of the robbery, lack of the highway patrolling team, and the lack of the safety of females on such deserted stretches (43.33%). About 38.33% nurses claimed to have enquired about the details of the Good Samaritans only when the victim was unconscious state of mind and was not able to recall the series of events. Unfortunately, 41.66% of the Good Samaritans were asked to wait till the MLC was filed before the guidelines came into force. Many victims specially the Northeastern and foreigners face racial discrimination in the National Capital region (30%) (Fig. 9). The study revealed that the efforts of Save Life Foundation had been satisfactory as per the lawyers (30%). Majority of them felt that there was a lack of implementation (45%), and the trial courts had seen about 10% decrease in cases against the Good Samaritans. Even though the guidelines have been framed to help the Samaritans who help victim in RTA cases, but the worst part lies in the criminal liability (91.66%) since no central law has been imposed by the parliament. Lawyers felt that even people who have caused the accident can be easily let off or might not even come under the scanner of police investigation if details are not taken. About 83.3% of the lawyers had not come across any Good Samaritan cases in the court. In total, 8% of the Good Samaritans were asked to provide evidence that they were not the culprits. The responses were analyzed after 60 lawyers were randomly interviewed (48.33%) who were of age group 31–40 years and (30%) of 41–50 years of age (Fig. 7). Out of the 88.33% lawyers being interviewed, 58.33% were aware of the GSL and 86.66% had also acted as a Good Samaritan at some point of their life (Fig. 1). It is realistic that while commuting daily one may come across accident at some point of the time or another. In total, 58.33% of the lawyers claimed to have seen accident at least once in a month with in Delhi NCR. Most of them were aware of the GSL, yet only 20% were actually aware of the Delhi government's approved "Good Samaritan Policy" under which monetary incentive of Rs 2,000 and appreciation certificate was announced by Deputy CM of Delhi (*The Indian Express*). In total, 85% of the lawyers told that they had not faced any major accident, and 21.66% who had met with minor accidents has received help from bystanders. In total, 95% of the lawyers believed that one needs to help the victim in case of accident even if it is caused by oneself regardless of the nature of the injuries to the victim. In total, 46.66% felt that it was better to take the victim to the government hospital rather than a private hospital (Fig. 10). Those who had given the preference for private hospital felt that it was better to get first aid in emergency and then to shift patient to the government hospital for further treatment. In total, 35% of the public come to lend a helping hand on their own, and 3.33% need to be instructed to dial emergency number in case mobile battery of the initiative taker has discharged. In total, 71.66% of the female lawyers felt that helping the victim is

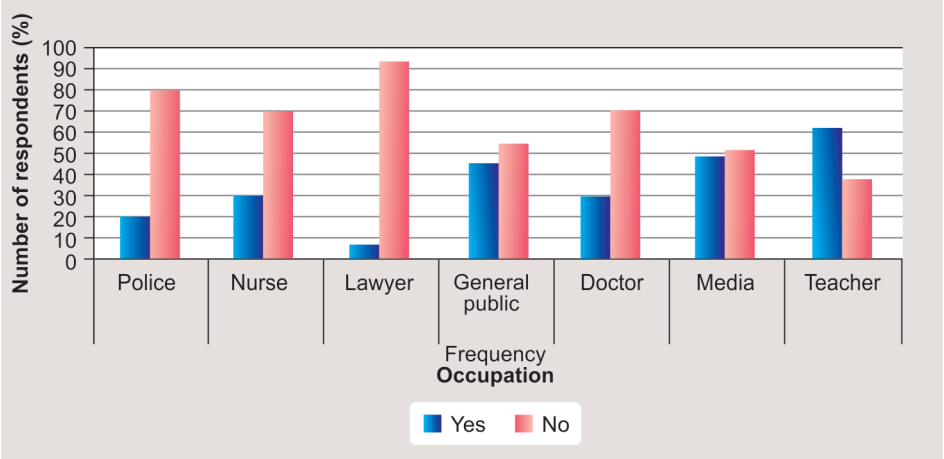



**Fig. 9:** Do victims face racial discrimination?

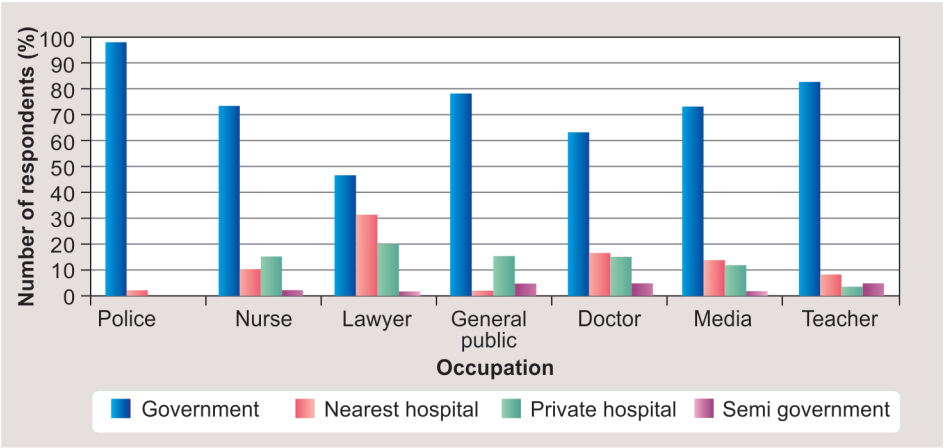



**Fig. 10:** Preferred type of hospital

duty of everyone. In total, 85% of the lawyers were of the opinion that details of Good Samaritans must be recorded for purpose of keeping the record as token of appreciation, and this may help during the investigation. Around 70% of them revealed that they were initially apprehensive of harassment from the police, and 46.66% were willing to share their details when the victim was in unconscious state of mind or unable to recollect the happenings of the events. In total, 35% remarked that the lack of the highway patrolling is the main reason as to why people avoid helping the victim. In total, 51.66% responded that the lack of personal security has always been a major issue on national highways regardless of the time of day. When asked about the laws regarding the MLC in case of rib fracture during the cardio-pulmonary resuscitation (CPR), 91.66% claimed that it does not come under the MLC as CPR is a life-saving procedure. Regarding ambulances, 86.66% were of the opinion that they lack the basic first aid facilities. When asked about charging of bills by private hospitals, 80% of the lawyers stated that the initial basic life support is not chargeable under law.

The respondents from general public comprised a mix of people of different age groups, gender, occupation, and socioeconomic status and education. Random sampling included 11.66% of the age group 21–30 years, 36% of the age group 31–40 years, and 30% of the age group 41–50 years (Fig. 7). In total, 65% of the selected samples were males (Fig. 4). In total, 60% of the representatives of general public admitted that they were not aware of the GSL and 51.66% of them had met with an accident during their life at least once or twice. In total, 48.33% of them were of the opinion that Good Samaritans should never be harassed as they had received help irrespective of the time of the day and place of accident. In total, 46.66% of them felt that it was better to stop and help the victim. In total, 30% opined that victims must be taken to the government hospital, and 78.33% of them told that government hospitals do not charge for such cases unlike the private hospitals. When asked about the reaction of public toward the victim, 73.32% of the times no one wanted to come forward thinking that someone else may give a helping hand to the victim. In total, 68.33% felt that there was no point in asking someone to dial emergency number as one tends to get annoying looks (Fig. 11). In total, 48.33% of the female respondents were not sure of helping the victim in case there was bleeding or any open wound (Fig. 12). Regarding highways, 40% claimed that lack of security, fear of the safety of females, and fear of highway robbers were the main reasons for not coming forward to help the victims. In total, 55% felt less fear of harassment by local authorities, yet 46.66% had denied giving the personal details. In total, 38.33% of the respondents told that they were asked to wait till the MLC was filed before the GSL was passed.

Doctors are important stakeholders in any such study. A random sample of 60 doctors was interviewed from three public hospitals and three private hospitals across the NCR region. Most of the doctors in the study were in the age group 21–30 years (63.33%)

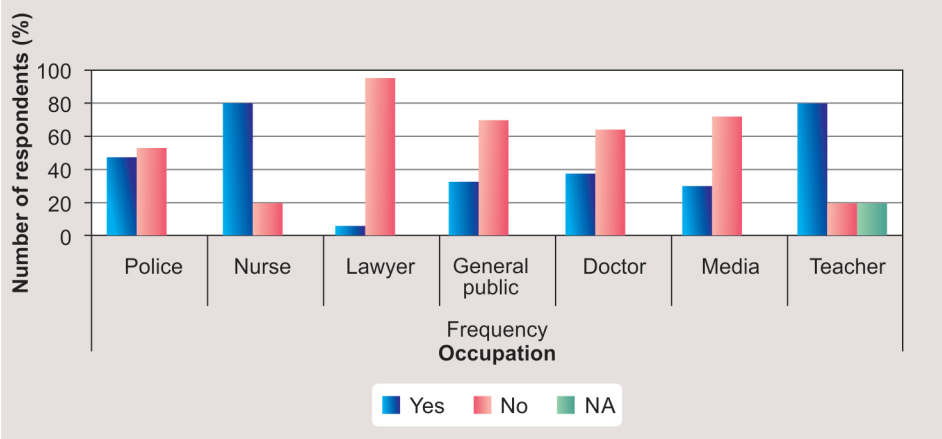



**Fig. 11:** Response to dial 100

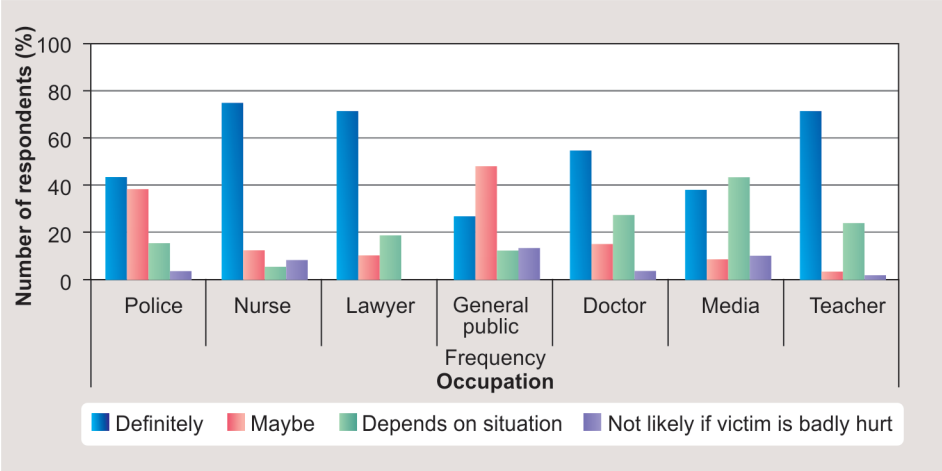



**Fig. 12:** Response of female professionals

(Fig. 7). In total, 75% of the male respondents were aware of the GSL and 80% as they had been posted in the trauma and emergency department. In total, 50% of the respondents had acted as Good Samaritans and were also aware of the reward announced by Delhi Cabinet. In total, 70% of the doctors had been involved in accidents and 61.66% felt that they were lucky enough to have received help after the accident. In total, 89.99% respondents believed that it was better to help the victim and to take them to the hospital rather than abandoning the victim. Among doctors, 63.33% preferred to take victims to the government hospitals as public sector hospital give priority to the treatment of the patient rather than the documentation. Doctors claimed that most of the victims were brought by males (78.33%) and most of the victims were brought to the hospital (55%) during the time period 10 p.m. to 8 a.m. either in PCR van by the police or by the auto drivers. Most of the cases were of drunk and rash driving or people performing dangerous stunts on the roads during the night. Doctors opined that public turned indifferent in 63.33% cases when they find that the victim is being attended to by some passerby and in about 38.33% of the cases one has to request a bystander to dial the emergency numbers. Even though asking details of the Good Samaritan can be of some importance and might help to solve some cases where the bystander was the actual eye witness (61.66%), but people feel that it is harassment at times and the police are not able to close the case. It is not that people within the city are reluctant to offer the help. Simple guidelines that have been issued forbid enquiring about details of the Good Samaritan and one does not find any record of a Good Samaritan the hospital (63.33% cases) unless the Samaritan has willfully mentioned the same (23.33% cases). When the doctors were questioned about their views regarding the efforts put up to implement the GSL, 35% said that such efforts need to be appreciated, and 51.66% felt that no noticeable change was visible because of is lack of implementation and lack of awareness among the general public (Fig. 13). Regarding the role of telemedicine, only 43.33% of the doctors feel that the GSL was effective in this respect.

There is scarcity in ambulances provided by the government, and 90% of the doctors feel that the victims can be helped if adequate number of national ambulances are provided (Fig. 14).

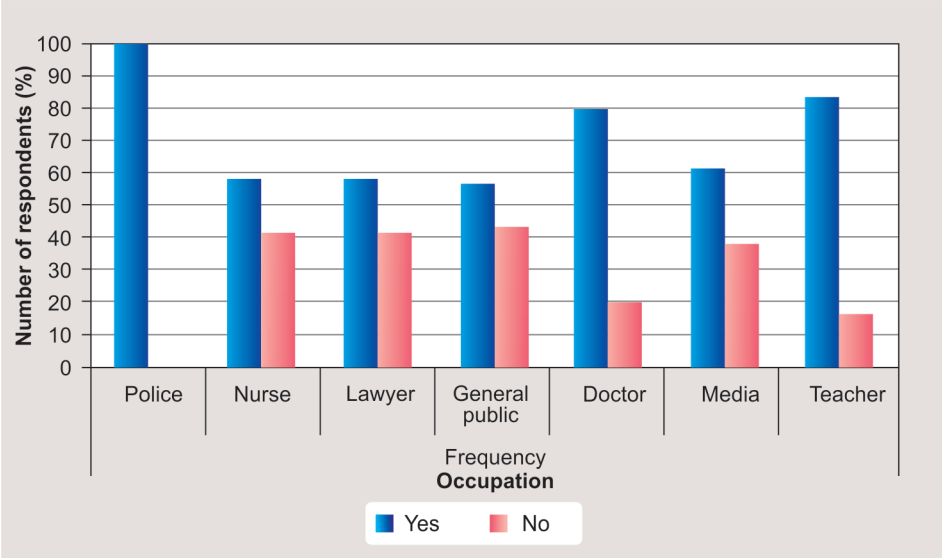



**Fig. 13:** Awareness of Good Samaritan Law

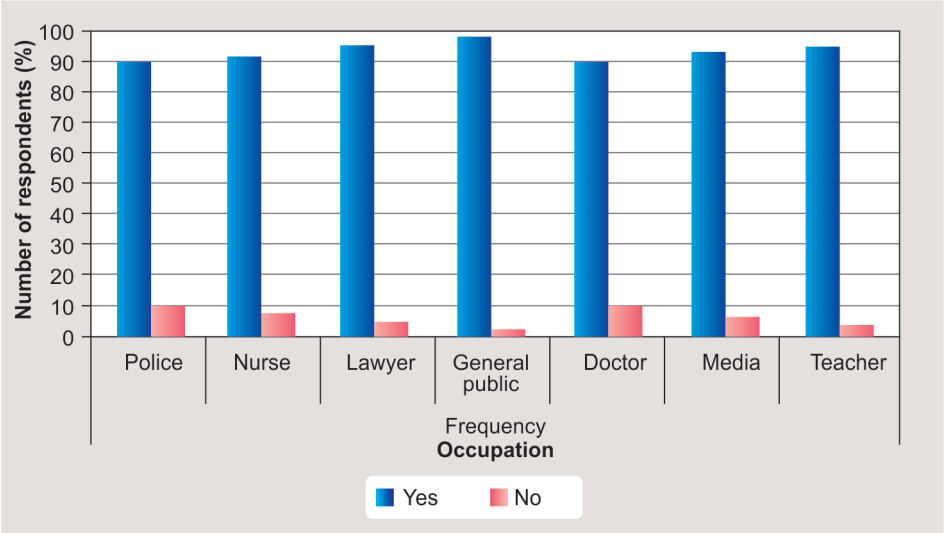



**Fig. 14:** Is there need for National Ambulance Service in India?

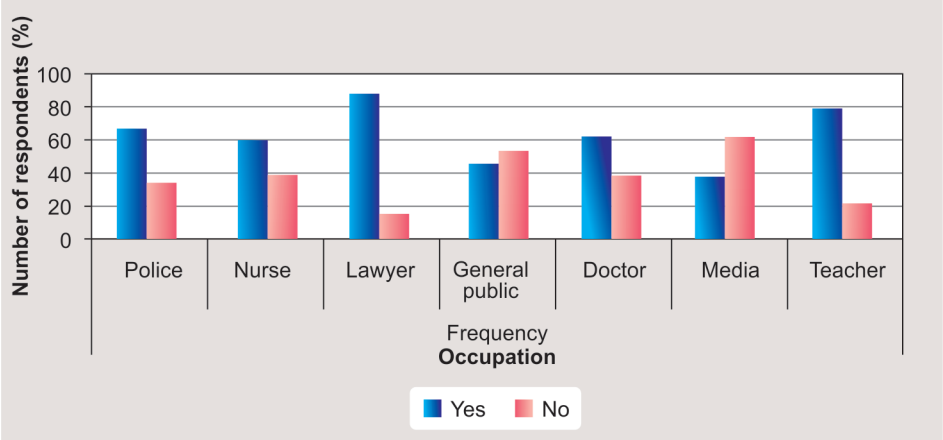



**Fig. 15:** Do the authorities ask about details of Good Samaritan?

The random sample of 60 media persons comprised of 51.66% people between 31 years and 40 years of age, followed by 30% between 21 years and 30 years of age (Fig. 7). In total, 80% of the respondents were males. It was assumed that media persons would be largely aware regarding the GSL, but only 61.66% of them were aware of GSL. The rest 38.33% had some idea of the guidelines. About 66.66% had acted as Good Samaritan at some point in time (Fig. 1). Media personnel (55%) usually come across accident cases once in 15 days. In total, 73.33% of the media personnel were aware of the award for the Good Samaritan (Fig. 2). In total, 55% of the media personnel surveyed had met an accident, and they had also received the help. Media personnel responded that in case of the accident caused by them, they would prefer to take the victim to the hospital (60%) or at least stop to help the victims (33.33%). In total, 64.99% of the media personnel were not sure whether the Good Samaritan guidelines had reduced the task of the authorities in helping the victims. In total, 81.66% of the media personnel felt that even if one is on duty, the life of a victim is of prime importance. In total, 73.33% of the media personnel responded that one can completely rely on the government healthcare sector to help the victim. In total, 38.33% of the media personnel felt that the details of Good Samaritan must be taken for initial investigation or during the course of investigation.

The media personnel opined that the fear of safety of female counterparts and lack of the availability of the highway security was the main reason why people do not want to help the highway victims. In total, 81.66% of them remarked that it was out of fear of the harassment that the people do not want to help the victims. When the media people were enquired if they had denied giving the details after the GSL was passed, 55% of them claimed that they had denied giving the details in case the victim was in the conscious state of mind, but in case the victim was unconscious state of mind, 45% of the media personnel had never denied to give the details as they felt that they were not the culprits.

The last study group consisted of the teachers from both the private and government schools. A random sample of 60 teachers was taken for conducting the survey: 65% (21–30 years) and 23.33% (31–40 years), and 80% of them were females. When asked about the GSL, 83.33% were aware of GSL and had also acted as Good Samaritans irrespective of the condition of the victim and the time and place of accident. In total, 63.33% of the teachers claimed that they came across road accidents once in a month and 30% of them were aware of the fact that the state government rewarded the Good Samaritans. In total, 88.33% of the teachers remarked that they would prefer to stop and help the victim by taking the victim to the government hospital for further treatment. In total, 23.33% of the teachers pointed out that in case if the victim was grievously injured, they would prefer to call up the emergency number rather than helping all by themselves. In total, 78.33% of the teachers told that the details of Good Samaritan must be taken up, but they should not be harassed in the name of investigation. The fear of robbery rape and lack of the highway security was pointed out to be a major cause for not helping the highway victims, and 40% had the fear of harassment also. In total, 60% of the teachers felt that educating the child regarding the GSL was of primary importance. In total, 90% of the teachers emphasized on inculcation of values in the children, and 83.33% suggested that workshops should be conducted to spread the message through interaction. In total, 98.33% of the teachers suggested that schools should institute bravery awards for children who have acted as Good Samaritans at any point of time.

Furthermore, 98.33% of the teachers suggested that the drivers of the school buses must also be given the first aid training. In total, 81.56% of the teachers claimed that they had never denied giving their details to the authorities if asked for (Fig. 15). In total, 50% of the teachers claimed told that before the Good Samaritan guidelines came into being, they had to wait till the MLC was filed.

## Conclusion

The study revealed that people in India hesitated to come forward and help road accident victims. In total, 85% of them had attributed this hesitation to fear of legal and procedural hassles. These hassles include intimidation by the police, unnecessary detention at hospitals, and prolonged legal formalities.

In spite of fast-paced motorization, India does not have a scientific accident investigation agency. Even today under the archaic motor vehicles act and the Indian Penal Code, the police adopt simplistic methods to determine driver's fault, rather than looking at composite factors while fixing responsibility of accidents.[13] It is unlikely that GSL will lead to dramatic improvements but even after guidelines being released by the Honorable Supreme Court of India. Many people die in road crashes with treatable injuries but no one helps out of fear of getting into trouble. On March 30, 2016, the Supreme Court of India gave "force of law" to

the guidelines for the protection of Good Samaritans issued by the Ministry of Road Transport and Highways. The purpose of a Good Samaritan law is to provide legal protection to bystanders who come to the aid and rescue of victims of road crashes. Enforcement of Good Samaritan Law may motivate the people to help the road accident victims in the hour of need.

## References


1. Good Samaritan Law | SaveLIFE Foundation [Internet]. [cited 2018 Aug 22]. Available from: https://savelifefoundation.org/good-samaritan-law/.
2. Rao JMJ, Shri D, Ji B, Law Commission of India: 201st Report on Emergency Medical Care to Victims of Accidents and During Emergency Medical Condition and Women Under Labour [Internet]. 2006 [cited 2018 Aug 22]. Available from: http://lawcommissionofindia.nic.in/reports/rep201.pdf.
3. SC Guidelines Now Protect Good Samaritans Who Help Road Accident Victims [Internet]. [cited 2018 Aug 22]. Available from: https://thewire.in/health/sc-guidelines-now-protect-good-samaritans-who-help-road-accident-victims.
4. Gulam H, Devereux J. A brief primer on Good Samaritan law for health care professionals. Aust Heal Rev [Internet] 2007;31(3):478–482. Available from https://doi.org/10.1071/AH070478.
5. Karnataka Drafts Good Samaritan Bill to Protect Those Who Help Road Accident Victims [Internet]. [cited 2018 Aug 22]. Available from: https://thewire.in/law/karnataka-drafts-good-samaritan-bill-protect-help-road-accident-victims.
6. National issues | NammaKPSC [Internet]. [cited 2018 Aug 22]. Available from: http://nammakpsc.com/wp/national-issues-5-march-2016/.
7. Trauma in India-Factfile [Internet]. [cited 2018 Aug 22]. Available from: http://traumaindia.org/traumainindia.htm.
8. World report on road traffic injury prevention [Internet]. [cited 2018 Aug 22]. Available from: http://apps.who.int/iris/bitstream/handle/10665/42871/9241562609.pdf;jsessionid=F6D5CF1D5E09071B4B81EA23A33A4C3D?sequence=1.
9. Kumar V, Venkatraman B, Good Samaritan Laws-Requirement And Analysis [Internet]. vol. 2, www.jurip.org. 2017 [cited 2018 Aug 22]. Available from: http://jurip.org/wp-content/uploads/2017/05/B.-Venkat.pdf.
10. Zimmermann R, The etho-poietic of the parable of the good Samaritan (Lk 10:25-37). The ethics of seeing in a culture of looking the other way [Internet]. [cited 2018 Aug 22]. Available from: http://www.scielo.org.za/pdf/vee/v29n1/15.pdf.
11. Maydon G, Moral Luck and the Good Samaritan: Law, Morality, and the Duty/Protection of Volunteer Rescuers [Internet]. 2017 [cited 2018 Aug 28]. Available from: http://bbktheses.da.ulcc.ac.uk/241/1/MaydonPhD Final 310317.pdf.
12. CitizenCOP – Report Crime, & More, Anonymously, With This Mobile App [Internet]. [cited 2018 Aug 28]. Available from: https://www.thebetterindia.com/50729/citizencop-mobile-app-for-police-municipal-complaints/.
13. Making our roads safe - The Hindu [Internet]. [cited 2018 Aug 28]. Available from: https://www.thehindu.com/opinion/op-ed/Making-our-roads-safe/article14558833.ece.

RESEARCH ARTICLE

# A Project to Improve the Process and Practices of Provision of Diet to Inward Patients in a Government Hospital, Sri Lanka

SMNS Maleesha Mallawarachchi[1], CH Mallawarachchi[2], KCS Dalpatadu[3]

## Abstract

**Aim:** The research project was implemented in Base Hospital Warakapola (BHW) with the aim of improving provision of diet for inward patients in BHW.

**Materials and methods:** The process of providing diet to inward patients in BHW was mapped and gaps were assessed. A patients' survey, a checklist to assess consumption of hospital food, desk review of records, and key informant interviews (KIIs) were used.

**Results:** The menus were not appealing, the patients were unaware of the menu till the food was served, and their preferences were never considered when ordering diet. Tea and soup were served too close to times of main meals. It was found that the diet requirements were estimated assuming the patient who has requested diet for a given day would need all three meals. But it was noted that only 11.64% (39/335) inward patients expected all three meals from the hospital. The food wastage, calculated by the number of diets not consumed, was 24.26% in the preintervention phase. Existing diet menus were modified by offering a diet with appealing variety in texture and color. The schedule of diet menu for each day was displayed in all wards. Estimation of diet requirement was improved by introducing a form to record diet requirements attached to the bed head ticket (BHT) of each patient to be filled by the nursing officer (NO) every morning. Post-interventional KIIs and survey of patients showed that satisfaction of staff and patients regarding the process and practices had increased. Wastage of food had been reduced significantly to 9.47%.

**Conclusion:** The process and practices of providing diet to hospitalized patients were assessed and it was found that there were gaps in patients' satisfaction on the menu, timeliness, and appearance of food and there was a significant waste of food. The project improved the issues identified.

**Keywords:** Diet, Diet ordering form, Food wastage, Government hospital, Inward patients, Menu, Patients' satisfaction.

*International Journal of Research Foundation of Hospital and Healthcare Administration* (2019): 10.5005/jp-journals-10035-1111

## Introduction

Provision of diet to inward patients free of charge is a core component of total care in the Sri Lankan health system. A patient's diet for a day includes the entire requirement of food for 24 hours starting from 12 noon in each day to 12 midnight of the following day.

The objectives of provision of diet to inward patients are as follows:

- To provide a relevant diet depending on the illness
- To provide a hygienically cooked balanced meal
- To serve patients with their meals at a fixed time avoiding disturbances to other patient care activities in the ward
- To facilitate the poor patients have the relevant diet especially from distant areas
- To prevent unhygienic food being consumed by inward patients
- To restrict unauthorized visitors from coming to the wards under the pretext of bringing food to their patients
- To prevent pilferage[1]

The raw provisions are ordered each day considering the number of diets required for patients in need of hospital food, by 11:00 am on each day (Ministry of Health, Sri Lanka, 1995). A clerk is assigned to receive the raw material from the supplier. Distribution of diets from the kitchen to the wards takes place in bulk, in the presence of diet stewardess. The nursing sister (NS) or nursing officer (NO) in charge should take over the food brought to the ward by minor staff and distribute to patients.

The diet clerk must visit each ward daily and scan each bed head ticket (BHT) manually to calculate the diet order. The process of estimating and recording the number of diets required each day is time-consuming and error-prone. It is not efficient or worker-friendly.

Base Hospital Warakapola (BHW) is one of the secondary care government hospital serving more than 500 patients daily while functioning as a referral center for number of smaller local hospitals in the district of Kurunegala. Catering to the hospitalized patients with an appropriate diet timely, minimizing food waste, and using limited human resources effectively have been challenging for the hospital management.

Basic amenities have been proven to be among the factors that affect patient satisfaction in hospitals.[2] Yet hospital diet is reported to be one of the dissatisfiers of patients and relatives.[3] Exploring the gaps that exist between patients' perceptions and expectations

[1]Department of Health, Ministry of Health, Colombo, Sri Lanka
[2]Department of Health, Medical Research Institute, Colombo, Sri Lanka
[3]Department of Health, Institute for Health Policy, Colombo, Sri Lanka
**Corresponding Author:** SMNS Maleesha Mallawarachchi, Department of Health, Ministry of Health, Colombo, Sri Lanka, Phone: +94 772325410, e-mail: navodasandamali79@gmail.com

**How to cite this article:** Mallawarachchi SMNSM, Mallawarachchi CH, Dalpatadu KCS. A Project to Improve the Process and Practices of Provision of Diet to Inward Patients in a Government Hospital, Sri Lanka. Int J Res Foundation Hosp Healthc Adm 2019;7(2):85–90.

**Source of support:** Nil

**Conflict of interest:** None

may improve the quality of diet services not only to maximize patient satisfaction but also to aid in speedy recovery from illness.[4]

Therefore, the issues in providing diet to patients need to be identified and evaluated to ease out the bottlenecks in order to improve the utility services of the hospital.

The provision of food to patients remains a multidimensional phenomenon, which is yet to be explored despite the wealth of studies performed all over the world.

Diet services of a hospital are of utmost importance as they affect the patient's satisfaction and the quality of the overall care for the patient. Optimal supply of food is identified as a prerequisite for optimization of specific treatment offered to patients.[5] Although the food service in a hospital is a vital component of the process of patient care, studies have pointed out gaps in the quality of such services worldwide.[6]

Feeding is not just a significant element of comfort for patients during their hospital stay but also a vital necessity.[7] Issues with practical aspects of the hospital's food provision are among the recognized factors for inadequate nutritional care offered to the patients.[8] It is of utmost importance that public health care institutions preserve the food and nutrition rights of the human, which are considered among the most widely violated economic rights of people.[9]

Insufficient food intake during hospital stay, which remains a largely unrecognized issue in hospitals, worsens the degree of malnutrition and is associated with higher morbidity, increased length of stay, and mortality.[10] The Australasian Nutrition Care Day Survey (ANCDS), which is the largest multicenter study in the region, focused on the prevalence of malnutrition and poor food intake in Australian and New Zealand hospitals and revealed that malnutrition and poor food intake were independently associated with in-hospital mortality.

The study further found that the median length of stay of patients who consumed less (<25%) amount of food offered from hospital was significantly longer.[11] The fact highlights the need to emphasize the attention on clinical nutrition in all health care settings.

Food wastage observed in hospitals has raised the need of reviewing hospital feeding policies.[12] Researchers have observed that higher food wastage in health care facilities is associated with delays in serving food and poor presentation of diets.[13]

Huge total waste exceeding 40% of the hospital food served has been reported in studies.[12] Nonconsumption of food creates extra costs while the wasted resources could be used to enhance other aspects of health care.[14]

Rigid administrative regulations leading to less flexible catering and feeding policies of hospitals minimize the opportunity for patients' choice in food selection. Allowance for menu choices for patients has been suggested to improve the compliance with the diet plans.[15]

The interference with meals by ward rounds and procedures has been identified to negatively affect the food intake during hospitalization.[16] Proper timing of serving the food and the availability of undisturbed location to consume them are identified to promote the food intake during the hospital stay.[15]

In the dynamic environment of health care, the hospital diet service practices need to be improved keeping up the pace with change. Novel concepts such as on-site catering, self-operated food kiosks, etc., are being discussed in hospital industry worldwide.[17] Yet, selection of best measures to improve the process and practices in providing diet to hospitalized patients in the Sri Lankan health care setup must be well supported with a scientific evidence and a strategic approach.

## Materials and Methods

The project was carried out from January 2019 to June 2019. The instruments used for the study included the following:

### A Patients' Survey

The interviewer-administered questionnaire was used for the patient satisfaction survey regarding the diet provided and the process and practices of its provision.

The questionnaire was initially prepared in English after reviewing relevant literatures and the finalized questionnaire was then translated into Sinhala and Tamil and retranslated back into English to ensure the consistency. The questionnaire was pretested and validated.

A five-point Likert scale rating of very dissatisfied, dissatisfied, neutral, satisfied, and extremely satisfied was used to gather data on patients' satisfaction on following aspects:

- Timeliness in provision of food
- Cleanliness in food handling
- Hospitality of the staff when providing food
- General presentation/appearance of food
- Taste of food
- Aroma of food
- Freshness of food

To calculate the level of patient satisfaction on each aspect, very dissatisfied and dissatisfied were considered as dissatisfied and satisfied and very satisfied were considered as satisfied. Individuals with neutral rating responses were excluded.

Four hundred inward patients were recruited for the survey and interviewed. The number of patients selected for participation for the survey from each ward was calculated based on the proportion of admissions from each ward in the first quarter of year 2018 and the patients were selected within each ward by convenient sampling.

### Key Informant Interviews

Key informant interviews (KIIs) were held with:

- Medical superintendent, BHW
- NSs of BHW
- Diet clerk of BHW
- Diet stewardess of BHW

### Desk Review

The desk review of secondary data relevant to quantify provision of diets to the patient was carried out, namely, by accessing:

- Records of diet clerk
- Records of kitchen

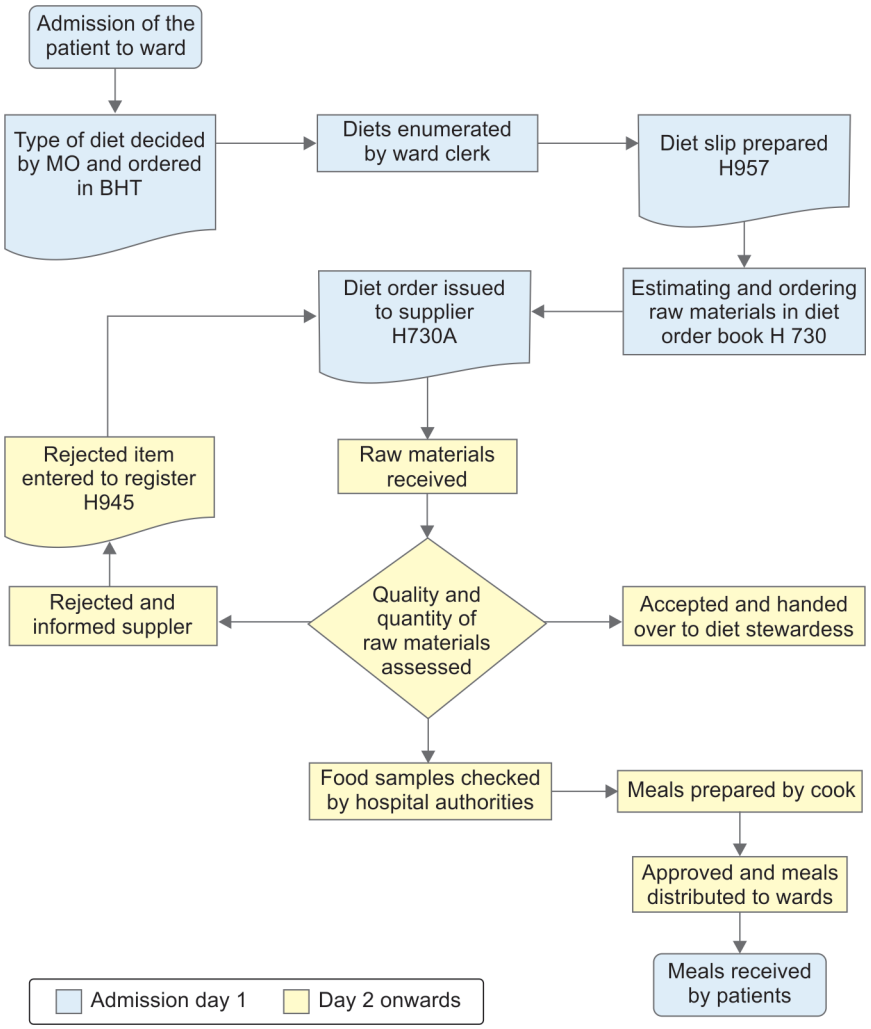
### Checklist

The checklist was developed and used to estimate waste of food by assessing the number of diets ordered and number of diets refused by patients when it was served in each ward.

## Results

The process of providing diet to inward patients in BHW was studied extensively and mapped (Flowchart 1).

**Flowchart 1:** Process map of providing diet to inward patients in Base Hospital Warakapola




Based on the KIIs and patients' survey, the following issues in the current process and practices of providing diet to inward patients in BHW were identified. The issues were classified into three groups:

- The diet menus
  - The menus of the diet were solely prepared by the diet clerk with no inputs from MOs or NOs.
  - The current menus were poor in variety and were not appealing.
  - The menus were never known by patients till they receive food.
- Estimating diet requirement
  - The diet clerk had to scan the whole BHT to estimate diet requirement for each patient and that was time-consuming and error-prone.
  - Communication between the ward staff and the diet clerk was poor.
  - Whether a patient expected a vegetarian or nonvegetarian diet was never asked.
  - The diet requirement of a patient was calculated for the entire day without taking into consideration which meals he/she needed and which meals did not.
- Serving of diet
  - The diet was not served at the bedside and the patient or the bystander had to walk to the health worker to obtain it.
  - The tea and soup were served with the main meal to save time, which made the patients to refuse them.
  - The dinner was served too early between 4:00 pm and 5:00 pm.

The patients' requests for hospital diet were assessed through the questionnaire. Only 11.64% (39/335) of total had expected all three meals from the hospital. It was observed that a majority of patients (82.68%; 277/335) required breakfast and dinner (Fig. 1).

Patients' choice to be inquired about whether they need diet, and how often they wanted the staff to do so was studied. Majority of patients (97%; 388/400) liked it to be asked whether they needed hospital food. Out of them, 90.75% (363/400) preferred to be asked daily about their diet requirements.

The patient choice of homemade meal over hospital diet was assessed. Among the total, 81.2% (325/400) choose to have a combination of both (Fig. 2).

Wastage of food was evaluated by percentage of diets not consumed by the patients out of the ordered. It was studied in each

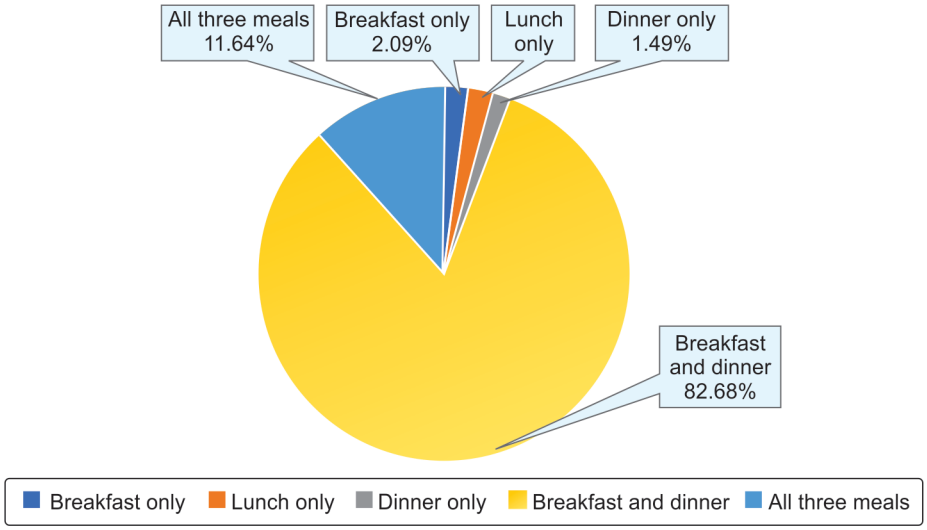



**Fig. 1:** Patients' request for hospital diet

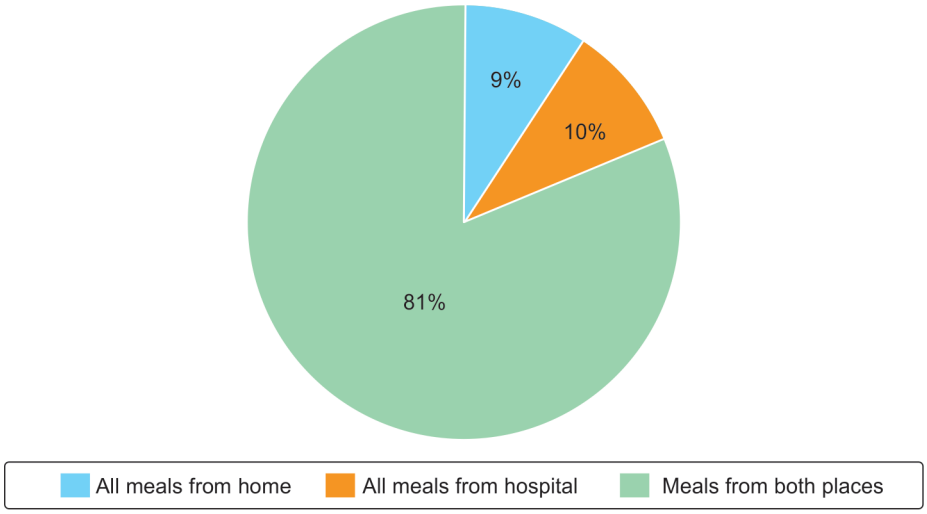



**Fig. 2:** Patients' place of choice to obtain meals during hospitalization

**Table 1:** Patient satisfaction on selected attributes of provision of diet in Base Hospital Warakapola

| *Attribute* | *Percentage satisfied (%)* |
|---|---|
| Timeliness of serving food | 223/400 (56) |
| Cleanliness in food handling while it was served | 281/389 (72.24) |
| Hospitality of the staff when serving diet | 299/393 (76.08) |
| General presentation/appearance of food | 198/389 (50.51) |
| Taste of food | 325/389 (83.54) |
| Aroma of food | 335/389 (88.62) |
| Freshness of food | 377/390 (91.54) |

ward using the checklist in 1 month (May 2018). The total wastage of hospital food was 24.26% (649/2675).

Patient satisfaction on selected attributes of the provision of diet was given in Table 1.

The lowest satisfaction was observed regarding the timeliness of serving food (56%), cleanliness in handling food when it was served (72.24%), and general presentation/appearance of food served (50.51%).

## Discussion

Process mapping was the technique chosen in the current project to study the process of providing diet to the inward patients, which has been successfully applied in the past to introduce process reengineering to dietary services.[18] The functional flow considered in this project extended from setting the menu to the serving of diet.

Assessing patients' satisfaction on hospital diet services was found to have a better response rate with inward patients rather than with discharged patients.[19] This project used an interviewer-administered questionnaire for inward patients to assess their satisfaction.

Gaps were identified in setting the menu, estimating diet requirement, and serving of diet, which increased food wastage and lowered patients' satisfaction and ultimately reducing the efficiency of the diet service.

The menu of the diet, which was prepared routinely by the diet clerk, had the primary focus on the quantity not the quality of food. The presentation of the portion did not have an appealing combination of color and texture.

As assessing the individual food intake of hospitalized patients[20] to quantify food wastage was not feasible here with time and resource constraints, the project attempted to quantify the number of food portions not consumed by patients as an alternative measure.

It was a proxy indicator of the popularity of the menu as well. It was observed that food wastage was higher in medicine and surgery wards, which were relatively busy wards. Since the diet was estimated in the morning for the whole day, there is certain wastage of diets associated with day's discharges, which is proportionate to the patient turnover which explains the above observation.

Fragmentary nature of the hospital food service management and difficulties in communication between the kitchen and wards as was found in another project[21] were an issue, brought about in the preinterventional interviews.

The poor communications between the ward staff and diet clerk are recognized as a major barrier to prevent food waste.

The practice of calculating the[1] requirements of food for a patient was not on a mealwise basis, because when diets were ordered it was considered as for all three meals. But among the patients who expected hospital diet, majority (88.36%) did not mean to have all three meals from the hospital, leading to overestimation and wasting of food.

The patients' choice of having a vegetarian diet was never considered before estimating the daily need of diets. So, the patients either refused the nonvegetarian items when it was served or those who were not expressive enough to do so discarded such components of the plate later.

The perceived hospitality of diet services in the hospital is associated with the manner food is served.

The serving schedule of extras including tea and soup was unsatisfactory according to the informants. The ward staff attempted to save time by serving the soup with the main meal. As per the government circular of the provision of diet in hospitals, the dinner was cooked sooner the raw materials were received by the same staff of the kitchen who covered the day duty shift, which caused the evening tea and the dinner to be served almost at the same time. This led to the tendency that tea was generally refused by the patients (KIIs). This project made the minor staff of the wards to collect the tea for patients first and serve it. The expected advantage of saving time by serving the dinner and tea together was outweighed by considering the convenience of patients and thereby reducing the waste of food.

The assessment of patients' satisfaction about hospital diet was based on patients' perceptions. As a result, comparison of some attributes such as satisfaction about taste and aroma of food among the two groups might have had limited objectivity.

Wastage of food was only assessed with the percentage of diets not consumed by patients. The wastage during preparation, storage, and distribution was disregarded due to constraints in time and resources. Therefore, the actual wastage would have been higher than what was estimated.

## Conclusion

The process and practices of providing diet to inward patients in BHW were found to have gaps, which reduced patients' satisfaction and increased wastage of hospital food. The gaps were observed in setting of menu, estimating diet requirements, and serving of food.

These gaps were overcome by improving the setting of menu, displaying planned menu for patients in all wards, introducing a form to obtain diet requirements accurately, and improving the serving of food.

The level of satisfaction of both the patients and staff has significantly improved after the intervention regarding the processes and practices of providing diet and the wastage of food was also significantly reduced.

The outcome evaluation shows that the interventions implemented had been successful in improving the process and practices of providing diet to inward patients in BHW.

## References


1. Ministry of Health, Sri Lanka. Manual of management of Teaching, Provincial, Base and Special Hospitals [Internet]. 1995. Available from: http://www.health.gov.lk/moh_final/english/public/elfinder/files/publications/2017/ManualTHPHBHmanage.pdf.
2. Kamra V, Singh H, Kumar De K. Factors affecting patient satisfaction: an exploratory study for quality management in the health-care sector. Total Qual Manag Bus Excell 2016;27(9–10):1013–1027. DOI: 10.1080/14783363.2015.1057488.
3. Mishra PH, Mishra T. Study of patient satisfaction at a super specialty tertiary care hospital. Indian J Clin Pract [Internet] 2014. Available from http://medind.nic.in/iaa/t14/i12/iaat14i12p624.pdf.
4. Hwang L-JJ, Eves A, Desombre T. Gap analysis of patient meal service perceptions. Int J Health Care Qual Assur Inc Leadersh Health Serv 2003;16(2–3):143–153. DOI: 10.1108/09526860310470874.
5. Beck AM, Balknäs UN, Camilo ME, et al. Practices in relation to nutritional care and support–report from the Council of Europe. Clin Nutr Edinb Scotl 2002;21(4):351–354. DOI: 10.1054/clnu.2002.0555.
6. Hartley BA, Hamid F. Investigation into the suitability and accessibility of catering practices to inpatients from minority ethnic groups in brent. J Hum Nutr Diet Off J Br Diet Assoc 2002;15(3):203–209. DOI: 10.1046/j.1365-277x.2002.00364.x.
7. Dupertuis Y. Food intake in 1707 hospitalised patients: a prospective comprehensive hospital survey. Clin Nutr 2003;22(2):115–123. DOI: 10.1054/clnu.2002.0623.
8. Kondrup J, Johansen N, Plum LM, et al. Incidence of nutritional risk and causes of inadequate nutritional care in hospitals. Clin Nutr Edinb Scotl 2002;21(6):461–468. DOI: 10.1054/clnu.2002.0585.
9. Robinson M. The human right to food and nutrition. SCN News 1999(18):17–18.
10. McWhirter JP, Pennington CR. Incidence and recognition of malnutrition in hospital. BMJ 1994;308(6934):945–948. DOI: 10.1136/bmj.308.6934.945.
11. Agarwal E, Ferguson M, Banks M, et al. Malnutrition and poor food intake are associated with prolonged hospital stay, frequent readmissions, and greater in-hospital mortality: results from the nutrition care day survey 2010. Clin Nutr 2013;32(5):737–745. DOI: 10.1016/j.clnu.2012.11.021.
12. Barton AD, Beigg CL, Macdonald IA, et al. High food wastage and low nutritional intakes in hospital patients. Clin Nutr 2000;19(6):445–449. DOI: 10.1054/clnu.2000.0150.
13. Edwards J, Nash A. Catering services. measuring the wasteline. Health Serv J 1997;107(5579):26–27.
14. Tucker HN, Miguel SG. Cost containment through nutrition intervention. Nutr Rev 1996;54(4 Pt 1):111–121. DOI: 10.1111/j.1753-4887.1996.tb03885.x.
15. Allison S. Institutional feeding of the elderly. Curr Opin Clin Nutr Metab Care 2002;5(1):31–34. DOI: 10.1097/00075197-200201000-00006.
16. Löwik MR, van den Berg H, Schrijver J, et al. Marginal nutritional status among institutionalized elderly women as compared to those

living more independently (dutch nutrition surveillance system). J Am Coll Nutr 1992;11(6):673–681. DOI: 10.1080/07315724.1992.10718266.
17. Silverman MR, Gregoire MB, Lafferty LJ, et al. Current and future practices in hospital foodservice. J Am Diet Assoc 2000;100(1):76–80. DOI: 10.1016/S0002-8223(00)00023-7.
18. Sharma S, Mehrotra S. Application of principles of process re engineering for improvement of functional flows of dietary services of a tertiary care hospital. Int J Sci Res Publ [Internet] 2015;5(5):Available from: http://www.ijsrp.org/research-paper-0515/ijsrp-p4136.pdf.
19. Watters CA, Sorensen J, Fiala A, et al. Exploring patient satisfaction with foodservice through focus groups and meal rounds. J Am Diet Assoc 2003;103(10):1347–1349. DOI: 10.1016/s0002-8223(03)01077-0.
20. Shahar S, Budiningsari D, Abd Manaf Z, et al. A simple dietary assessment tool to monitor food intake of hospitalized adult patients. J Multidiscip Healthc 2016;9:311–322. DOI: 10.2147/JMDH.S105000.
21. Hartwell HJ, Edwards JSA, Symonds C. Food service in hospital: development of a theoretical model for patient experience and satisfaction using one hospital in the UK NHS as a case study. [Internet] 2006. 226–238. Available from: http://eprints.bournemouth.ac.uk/12175/1/Food_Service.pdf.

RESEARCH ARTICLE

# Assessment of Satisfaction Levels of the Outpatients Attending Outpatient Departments in a Quaternary Care Hospital

Satish Kumar Saginela[1], Arun Kanth Madri[2], Rama Mohan Desu[3], Venkata Ramya Bola[4]


## Abstract

**Background:** The quality of service (QOS) needs to be assessed at regular intervals by hospitals in the form of patient satisfaction. The outpatient department (OPD) is a "shop window" of a hospital and measurement in this area is a key determinant of health care. This study aims to assess the level of satisfaction among outpatients attending the superspecialty departments of a quaternary care teaching hospital.

**Materials and methods:** Our study was conducted in the OPDs of Narayana Medical College Hospital, Nellore, India, from July 2017 to August 2017. The consent was obtained from 205 patients and were enrolled randomly. The short-form patient satisfaction questionnaire (PSQ-18) was used to collect the data and analyzed using the SPSS (19) statistical software.

**Results:** Out of 205, 146 (71%) were males, 59 (29%) females. The mean scores for subscales, general satisfaction, communication, interpersonal manner, technical quality, financial aspects, and consultation time spent during the visit, accessibility, and convenience, were 4.03 ± 0.79, 4.39 ± 0.66, 4.60 ± 0.55, 3.86 ± 0.67, 3.37 ± 0.83, 3.77 ± 0.89, and 3.77 ± 0.67, respectively. Subscale scores for interpersonal relation and communication are high for the patients. The scores for interpersonal relation and financial aspects were statistically significant.

**Conclusion:** The subscales general satisfaction, communication, interpersonal relation, technical quality were rated better to good with mean ± SD as 4.13 ± 0.66 and consultation time and finance aspects were rated good with mean ± SD as 3.57 ± 0.86. The variables affecting are age, socioeconomic status, expectations and clinical quality of doctor. Feedback surveys and training of staff are recommended.


**Keywords:** Consultation time, Patient satisfaction, PSQ-18, Quaternary care hospital.

*International Journal of Research Foundation of Hospital and Healthcare Administration* (2019): 10.5005/jp-journals-10035-1114

## Introduction

The patient care perception compared with the expectation is the recent measure of patient satisfaction.[1] By measuring this component in health care, problems can be identified and also further evaluation can be done.[2] Fulfillment of this aspect shall retain the existing patients and also attract new patients. It also reduces malpractice claims.[3] Lot of standardized questionnaires are available to assess patient satisfaction.[4–7]

The aim of our study was to determine the level of satisfaction among outpatients attending the superspecialty departments of a quaternary care teaching hospital.

## Material and Methods

Study design: descriptive cross-sectional study.

Study setting: A 1,420-bedded quaternary care teaching hospital.

Study period: July 2017–August 2017.

Sample size (*n*): 205.

Sampling technique: random sampling and face-to-face interview.

Institutional ethical committee (IEC) approval has been obtained.

### Data Collection

The data have been obtained from the subjects of the study after a written informed consent and face-to-face interview were conducted in the local Telugu language.

The standard PSQ-18 questionnaire[8] was distributed and it consists of three parts:

- Personal details
- Consultation subscale (Q12, Q15)
- Other subscales
  - Communication (Q1, Q13)
  - General satisfaction (Q3, Q17)
  - Technical quality (Q2, Q4, Q6, Q14)
  - Interpersonal relation (Q10, Q11)
  - Finance (Q5, Q7)
  - Accessibility and convenience (Q8, Q9, Q16, Q18)

The five-point Likert scale ranging from "strongly agree" to "strongly disagree" was used after scoring for each item of seven subscales. Thus, these items were averaged together to create all seven subscale scores.[5,8]

[1–3]Department of Hospital Administration, Narayana Medical College, Nellore, Andhra Pradesh, India

[4]Department of Management Information System, Narayana Medical College, Nellore, Andhra Pradesh, India

**Corresponding Author:** Arun Kanth Madri, Department of Hospital Administration, Narayana Medical College, Nellore, Andhra Pradesh, India, Phone: +91 8801297089, e-mail: arunmadri@gmail.com

**How to cite this article:** Saginela SK, Madri AK, Desu RM, *et al.* Assessment of Satisfaction Levels of the Outpatients Attending Outpatient Departments in a Quaternary Care Hospital. Int J Res Foundation Hosp Healthc Adm 2019;7(2):91–98.

**Source of support:** Nil

**Conflict of interest:** None

### Statistical Analysis

Data were analyzed by the SPSS version 19 statistical software. Descriptive statistics presented as proportions, mean, median, and standard deviation. The standard "*t*" test was used and a *p* value of <0.05 was considered significant.

## Results

### Demographic Characteristics

A total of 205 patients participated in the study. Majority of them were males—146 (71%); 48 (23.4%) were above 60 years. Out of 205, the education of 89 (43.4%) was up to the school level. The employment status of most of the patients (94, 45.9%) was farmers, self-employed, and workers categorized under others. Majority of the participants (156, 76.1%) were follow-up patients (Table 1). Out of 205, participants have consulted in the urology (54, 26.3%), cardiology (53, 25.9%), and cardiothoracic vascular surgery (39, 19.0%).

### Patient Satisfaction Scores

The mean scores obtained for the subscales when arranged from highest to lowest satisfaction scores are as follows:

Interpersonal relation (4.60 ± 0.55), communication (4.39 ± 0.66), general satisfaction (4.03 ± 0.79), technical quality (3.86 ± 0.67), consultation time (3.77 ± 0.89), accessibility and convenience (3.77 ± 0.67), finance (3.37 ± 0.83) (Table 2).

### Genderwise Patient Satisfaction

Subscale scores for general satisfaction, communication, interpersonal relation, and technical quality are high for female patients. Whereas financial aspects, doctor consultation time, accessibility, and convenience are high for male patients. The *p* value suggests that general satisfaction scores are statistically significant (Table 3).

### Age Group and Patient Satisfaction

Subscale scores for interpersonal manner are high for the patients who fall under the age group of 31–40 years. The scores for interpersonal manner are statistically significant. In general, patients with age group >60 are satisfied (Table 4).

### Education Level and Patient Satisfaction

Subscale scores for interpersonal manner and general satisfaction are high for the patients who are not educated while in communication, patients of the school education level are more satisfied (Table 5).

### Employment Status and Patient Satisfaction

Interpersonal relations, communication, general satisfaction, and accessibility were high for retired employees. Employed category is more satisfied with technical quality and financial subscales. Students expressed satisfaction for Doctor consultation time (Table 6).

### Visit and Patient Satisfaction

Subscale scores for interpersonal relation are high for the new patients. Subscale scores suggest that follow-up patients are more satisfied while in communication the attenders/others are more satisfied (Table 7).

**Table 1:** Demographic characteristics of study subjects (*n* = 205)

| *Characteristics* | *n (%)* |
|---|---|
| Gender | |
| Male | 146 (71.2) |
| Female | 59 (28.8) |
| Age (years) | |
| 18–30 | 41 (20.0) |
| 31–40 | 29 (14.1) |
| 41–50 | 47 (22.9) |
| 51–60 | 40 (19.5) |
| >60 | 48 (23.4) |
| Education | |
| No education | 42 (20.5) |
| School education | 89 (43.4) |
| College education | 74 (36.1) |
| Employment status | |
| Unemployed | 39 (19.0) |
| Student | 12 (5.9) |
| Employed | 36 (17.6) |
| Retired | 24 (11.7) |
| Others | 94 (45.9) |
| Visit to hospital | |
| New patient | 36 (17.6) |
| Follow-up patient | 156 (76.1) |
| Others | 13 (6.3) |
| Department | |
| Cardiology | 53 (25.9) |
| CTVS | 39 (19.0) |
| Endocrinology | 15 (7.3) |
| Medical gastroenterology | 21 (10.2) |
| Nephrology | 11 (5.4) |
| Neurology | 6 (2.9) |
| Plastic surgery | 6 (2.9) |
| Urology | 54 (26.3) |
| Waiting time | |
| <1 hour | 152 (74.1) |
| 1–2 hours | 33 (16.1) |
| >2 hours | 20 (9.8) |
| Consultation time | |
| <15 minutes | 113 (55.1) |
| 15–30 minutes | 67 (32.7) |
| >30 minutes | 25 (12.2) |
| Overall opinion | |
| Very good | 57 (27.8) |
| Good | 120 (58.5) |
| Fair | 23 (11.2) |
| Bad | 4 (2.0) |
| Very bad | 1 (0.5) |
| Group | |
| A | 92 (44.9) |
| B | 113 (55.1) |

**Table 2:** Patient satisfaction score distribution for subscales

| *Characteristics* | *Mean ± SD (n = 205)* |
|---|---|
| General satisfaction | 4.03 ± 0.79 |
| Communication | 4.39 ± 0.66 |
| Interpersonal relation | 4.60 ± 0.55 |
| Technical quality | 3.84 ± 0.57 |
| Finance aspects | 3.37 ± 0.83 |
| Doctor consultation time | 3.77 ± 0.89 |
| Accessibility and convenience | 3.77 ± 0.67 |

**Table 3:** Patient satisfaction score distribution with respect to the gender

| | *Male (n = 146)* | *Female (n = 59)* | |
|---|---|---|---|
| *Gender* | *Mean ± SD* | *Mean ± SD* | *p value* |
| General satisfaction | 3.96 ± 0.83 | 4.22 ± 0.65 | 0.020 |
| Communication | 4.36 ± 0.68 | 4.48 ± 0.58 | 0.228 |
| Interpersonal relation | 4.56 ± 0.57 | 4.68 ± 0.48 | 0.156 |
| Technical quality | 3.82 ± 0.54 | 3.89 ± 0.63 | 0.700 |
| Finance aspects | 3.41 ± 0.74 | 3.27 ± 0.01 | 0.319 |
| Doctor consultation time | 3.79 ± 0.91 | 3.71 ± 0.85 | 0.534 |
| Accessibility and convenience | 3.78 ± 0.67 | 3.75 ± 0.65 | 0.760 |

## Outpatient Departments and Patient Satisfaction

Subscale scores for general satisfaction and technical quality are high in cardiology outpatient department (OPD). Subscale scores for communication, interpersonal manner, and financial aspects are high in neurology OPD. Subscale score for time spent with the doctor is high in the cardiovascular thoracic surgery OPD. Subscale score for accessibility and convenience is high in the nephrology OPD. The *p* value suggests that difference in the scores of interpersonal manner, financial aspects, and time spent with the doctor are statistically significant (Table 8).

## Waiting Time and Patient Satisfaction

Subscale scores for interpersonal relation and communication are high for the patients whose waiting time is less than 1 hour. The scores for interpersonal manner and financial aspects were statistically significant. Even though the waiting time of the patient is more than 2 hours and if the doctor consultation time is convincing, the general satisfaction score is high (Table 9).

## Consultation Time and Patient Satisfaction

Subscale scores for interpersonal relation and general satisfaction are high for the patients whose consultation time is more than 30 minutes. The scores of general satisfaction are more or less same

**Table 4:** Patient satisfaction score distribution with respect to the age group

| | *18–30 (n = 41)* | *31–40 (n = 29)* | *41–50 (n = 47)* | *51–60 (n = 40)* | *>60 (n = 48)* | |
|---|---|---|---|---|---|---|
| *Age group (Years)* | *Mean ± SD* | *Mean ± SD* | *Mean ± SD* | *Mean ± SD* | *Mean ± SD* | *p value* |
| General satisfaction | 3.89 ± 0.77 | 4.19 ± 0.51 | 4.13 ± 0.71 | 3.98 ± 0.85 | 4.03 ± 0.96 | 0.503 |
| Communication | 4.40 ± 0.64 | 4.41 ± 0.52 | 4.44 ± 0.68 | 4.23 ± 0.78 | 4.48 ± 0.64 | 0.463 |
| Interpersonal relation | 4.40 ± 0.70 | 4.78 ± 0.41 | 4.69 ± 0.41 | 4.59 ± 0.58 | 4.58 ± 0.56 | 0.049 |
| Technical quality | 3.79 ± 0.54 | 3.76 ± 0.47 | 3.89 ± 0.56 | 3.79 ± 0.64 | 3.92 ± 0.59 | 0.644 |
| Finance aspects | 3.40 ± 0.69 | 3.50 ± 0.78 | 3.42 ± 0.87 | 3.38 ± 0.88 | 3.24 ± 0.91 | 0.726 |
| Doctor consultation time | 4.11 ± 0.75 | 3.97 ± 0.72 | 3.71 ± 0.86 | 3.58 ± 0.93 | 3.59 ± 1.02 | 0.022 |
| Accessibility and convenience | 3.82 ± 0.65 | 3.71 ± 0.41 | 3.83 ± 0.77 | 3.71 ± 0.69 | 3.79 ± 0.71 | 0.876 |

**Table 5:** Patient satisfaction score distribution with respect to the education level

| | *No education (n = 42)* | *School education (n = 89)* | *College education (n = 74)* | |
|---|---|---|---|---|
| *Education* | *Mean ± SD* | *Mean ± SD* | *Mean ± SD* | *p value* |
| General satisfaction | 4.10 ± 0.83 | 3.98 ± 0.75 | 4.05 ± 0.80 | 0.708 |
| Communication | 4.39 ± 0.72 | 4.44 ± 0.58 | 4.33 ± 0.71 | 0.527 |
| Interpersonal relation | 4.70 ± 0.44 | 4.54 ± 0.62 | 4.60 ± 0.51 | 0.314 |
| Technical quality | 3.82 ± 0.59 | 3.83 ± 0.54 | 3.84 ± 0.58 | 0.717 |
| Finance aspects | 3.31 ± 0.89 | 3.34 ± 0.81 | 3.44 ± 0.83 | 0.644 |
| Doctor consultation time | 3.61 ± 0.92 | 3.88 ± 0.88 | 3.72 ± 0.88 | 0.231 |
| Accessibility and convenience | 3.67 ± 0.69 | 3.71 ± 0.60 | 3.90 ± 0.71 | 0.126 |

**Table 6:** Patient satisfaction score distribution with respect to the employment status

| | *Unemployed (n = 39)* | *Student (n = 12)* | *Employed (n = 36)* | *Retired (n = 24)* | *Others (n = 94)* | |
|---|---|---|---|---|---|---|
| *Employment* | *Mean ± SD* | *Mean ± SD* | *Mean ± SD* | *Mean ± SD* | *Mean ± SD* | *p value* |
| General satisfaction | 3.87 ± 0.87 | 4.12 ± 0.74 | 4.02 ± 0.79 | 4.20 ± 0.72 | 4.05 ± 0.77 | 0.558 |
| Communication | 4.25 ± 0.68 | 4.45 ± 0.45 | 4.40 ± 0.64 | 4.62 ± 0.53 | 4.38 ± 0.70 | 0.316 |
| Interpersonal relation | 4.52 ± 0.63 | 4.29 ± 0.75 | 4.59 ± 0.54 | 4.72 ± 0.46 | 4.63 ± 0.50 | 0.187 |
| Technical quality | 3.64 ± 0.62 | 3.77 ± 0.63 | 3.89 ± 0.44 | 3.96 ± 0.47 | 3.87 ± 0.58 | 0.130 |
| Finance aspects | 3.43 ± 0.83 | 3.54 ± 0.78 | 3.59 ± 0.82 | 3.41 ± 0.81 | 3.23 ± 0.83 | 0.199 |
| Doctor consultation time | 3.82 ± 0.94 | 3.83 ± 0.77 | 3.76 ± 0.78 | 3.68 ± 0.85 | 3.77 ± 0.94 | 0.984 |
| Accessibility and convenience | 3.69 ± 0.65 | 3.54 ± 0.69 | 3.95 ± 0.58 | 4.01 ± 0.60 | 3.71 ± 0.70 | 0.081 |

**Table 7:** Patient satisfaction score distribution with respect to their visit

| | *New patient (n = 36)* | *Follow-up (n = 156)* | *Others (n = 13)* | |
|---|---|---|---|---|
| *Visit* | *Mean ± SD* | *Mean ± SD* | *Mean ± SD* | *p value* |
| General satisfaction | 4.02 ± 0.83 | 4.07 ± 0.75 | 3.61 ± 1.00 | 0.133 |
| Communication | 4.38 ± 0.75 | 4.37 ± 0.64 | 4.61 ± 0.58 | 0.465 |
| Interpersonal relation | 4.62 ± 0.52 | 4.59 ± 0.56 | 4.61 ± 0.58 | 0.948 |
| Technical quality | 3.86 ± 0.54 | 3.84 ± 0.58 | 3.77 ± 0.53 | 0.881 |
| Finance aspects | 3.44 ± 0.91 | 3.33 ± 0.81 | 3.73 ± 0.78 | 0.216 |
| Doctor consultation time | 3.56 ± 1.14 | 3.80 ± 0.83 | 4.00 ± 0.76 | 0.241 |
| Accessibility and convenience | 3.85 ± 0.76 | 3.77 ± 0.64 | 3.63 ± 0.69 | 0.586 |

**Table 8:** Patient satisfaction score distribution with respect to the outpatient departments

| | *CARD (n = 53)* | *CTVS (n = 39)* | *ENDO (n = 15)* | *MGE (n = 21)* | *NEPH (n = 11)* | *NEU (n = 6)* | *PLS (n = 6)* | *URO (n = 54)* | |
|---|---|---|---|---|---|---|---|---|---|
| *Departments* | *Mean ± SD* | *Mean ± SD* | *Mean ± SD* | *Mean ± SD* | *Mean ± SD* | *Mean ± SD* | *Mean ± SD* | *Mean ± SD* | *p value* |
| General satisfaction | 4.24 ± 0.81 | 3.85 ± 0.60 | 4.20 ± 0.75 | 3.95 ± 0.89 | 4.18 ± 0.78 | 3.41 ± 1.15 | 4.16 ± 0.40 | 3.97 ± 0.80 | 0.131 |
| Communication | 4.49 ± 0.73 | 4.32 ± 0.45 | 4.33 ± 0.55 | 4.07 ± 0.81 | 4.45 ± 0.65 | 4.66 ± 0.40 | 4.33 ± 0.51 | 4.46 ± 0.69 | 0.295 |
| Interpersonal relation | 4.67 ± 0.59 | 4.51 ± 0.45 | 4.63 ± 0.63 | 4.50 ± 0.50 | 4.40 ± 0.73 | 5.00 ± 0.00 | 3.91 ± 0.86 | 4.68 ± 0.45 | 0.012 |
| Technical quality | 4.05 ± 0.65 | 3.72 ± 0.39 | 3.75 ± 0.69 | 3.61 ± 0.59 | 3.77 ± 0.42 | 3.62 ± 0.54 | 3.75 ± 0.61 | 3.86 ± 0.51 | 0.307 |
| Finance aspects | 3.21 ± 1.05 | 3.15 ± 0.65 | 3.86 ± 1.00 | 3.26 ± 0.70 | 3.59 ± 0.62 | 4.00 ± 0.83 | 3.58 ± 0.80 | 3.46 ± 0.64 | 0.029 |
| Doctor consultation time | 3.35 ± 0.90 | 4.37 ± 0.67 | 4.33 ± 0.79 | 3.90 ± 0.88 | 3.86 ± 0.71 | 3.00 ± 0.77 | 4.00 ± 0.63 | 3.58 ± 0.80 | <0.0001 |
| Accessibility and convenience | 3.90 ± 0.71 | 3.45 ± 0.44 | 3.73 ± 0.64 | 3.71 ± 0.81 | 4.13 ± 0.76 | 3.83 ± 0.68 | 3.83 ± 0.49 | 3.83 ± 0.65 | 0.035 |

CARD, cardiology; CTVS, cardiothoracic vascular surgery; ENDO, endocrinology; MGE, medical gastroenterology; NEPH, nephrology; NEU, neurology; PLS, plastic surgery; URO, urology

**Table 9:** Patient satisfaction score distribution with respect to the waiting time

| | *<1 hour (n = 152)* | *1–2 hours (n = 33)* | *>2 hours (n = 20)* | |
|---|---|---|---|---|
| *Waiting time* | *Mean ± SD* | *Mean ± SD* | *Mean ± SD* | *p value* |
| General satisfaction | 4.03 ± 0.78 | 3.86 ± 0.84 | 4.27 ± 0.71 | 0.182 |
| Communication | 4.41 ± 0.64 | 4.39 ± 0.64 | 4.27 ± 0.80 | 0.690 |
| Interpersonal relation | 4.65 ± 0.45 | 4.43 ± 0.75 | 4.42 ± 0.76 | 0.04 |
| Technical quality | 3.86 ± 0.68 | 3.85 ± 0.75 | 3.85 ± 0.52 | 0.996 |
| Finance aspects | 3.43 ± 0.78 | 3.01 ± 0.87 | 3.50 ± 1.01 | 0.023 |
| Doctor consultation time | 3.77 ± 0.89 | 3.65 ± 0.96 | 4.00 ± 0.77 | 0.389 |
| Accessibility and convenience | 3.77 ± 0.66 | 3.73 ± 0.64 | 3.82 ± 0.77 | 0.890 |

**Table 10:** Patient satisfaction score distribution with respect to the consultation time

| | *<15 minute (n = 113)* | *15–30 minute (n = 67)* | *>30 minute (n = 25)* | |
|---|---|---|---|---|
| *Consultation time* | *Mean ± SD* | *Mean ± SD* | *Mean ± SD* | *p value* |
| General satisfaction | 4.05 ± 0.76 | 4.00 ± 0.83 | 4.06 ± 0.79 | 0.899 |
| Communication | 4.45 ± 0.61 | 4.33 ± 0.73 | 4.28 ± 0.64 | 0.328 |
| Interpersonal relation | 4.61 ± 0.52 | 4.56 ± 0.61 | 4.66 ± 0.49 | 0.711 |
| Technical quality | 3.94 ± 0.74 | 3.72 ± 0.60 | 3.83 ± 0.52 | 0.085 |
| Finance aspects | 3.25 ± 0.80 | 3.52 ± 0.79 | 3.54 ± 0.98 | 0.062 |
| Doctor consultation time | 3.82 ± 0.85 | 3.67 ± 0.93 | 3.80 ± 0.96 | 0.524 |
| Accessibility and convenience | 3.80 ± 0.63 | 3.75 ± 0.69 | 3.73 ± 0.78 | 0.842 |

as that of <15 minutes, which means patients are not focused to the consultation time either <15 minutes or >30 minutes but are more toward the quality of care provided. Patients are uncertain to express satisfaction about the financial aspects (Table 10).

## Overall Opinion and Patient Satisfaction

Patients, who are satisfied generally and also with accessibility and convenience, rated overall very good. Patients, who are satisfied with communication, technical quality, doctor consultation time, and financial aspects, rated overall good. Patients, who are satisfied with interpersonal relation, rated overall fair. As the frequency of the patient who expressed overall poor is only $n = 1$, the scores are neglected. The *p* value suggests that the scores of the general satisfaction and communication are statistically significant (Table 11).

## Groupwise Patient Satisfaction

The subscale scores of the group B (patients who visit doctor twice in a day, once for advice and second time along with the advised investigation reports) are high for interpersonal relation, communication, general satisfaction, technical quality, financial aspects, accessibility, and convenience. While the scores of group A (patients who consult the doctor at once on that particular day)

**Table 11:** Patient satisfaction score distribution with respect to the overall opinion

| | *Very good (n = 57)* | *Good (n = 120)* | *Fair (n = 23)* | *Bad (n = 4)* | *Very bad (n = 1)* | |
|---|---|---|---|---|---|---|
| *Overall opinion* | *Mean ± SD* | *Mean ± SD* | *Mean ± SD* | *Mean ± SD* | *Mean ± SD* | *p value* |
| General satisfaction | 4.24 ± 0.81 | 4.05 ± 0.71 | 3.60 ± 0.86 | 3.12 ± 0.94 | 4.00 ± 0.00 | 0.002 |
| Communication | 4.36 ± 0.75 | 4.44 ± 0.56 | 4.41 ± 0.59 | 3.25 ± 1.50 | 4.50 ± 0.00 | 0.011 |
| Interpersonal relation | 4.54 ± 0.70 | 4.62 ± 0.44 | 4.65 ± 0.61 | 4.12 ± 0.75 | 5.00 ± 0.00 | 0.335 |
| Technical quality | 3.87 ± 0.63 | 3.90 ± 0.70 | 3.64 ± 0.62 | 3.56 ± 0.65 | 4.00 ± 0.00 | 0.447 |
| Finance aspects | 3.34 ± 0.98 | 3.40 ± 0.79 | 3.28 ± 0.59 | 3.25 ± 1.04 | 4.00 ± 0.00 | 0.878 |
| Doctor consultation time | 3.73 ± 0.98 | 3.89 ± 0.82 | 3.30 ± 0.77 | 3.50 ± 1.47 | 3.50 ± 0.00 | 0.060 |
| Accessibility and convenience | 3.86 ± 0.76 | 3.77 ± 0.56 | 3.60 ± 0.82 | 3.18 ± 0.94 | 4.50 ± 0.00 | 0.148 |

**Table 12:** Patient satisfaction score distribution with respect to the group

| | *A (n = 92)* | *B (n = 112)* | |
|---|---|---|---|
| *Group* | *Mean ± SD* | *Mean ± SD* | *p value* |
| General satisfaction | 3.92 ± 0.78 | 4.12 ± 0.78 | 0.080 |
| Communication | 4.35 ± 0.72 | 4.42 ± 0.60 | 0.479 |
| Interpersonal relation | 4.53 ± 0.58 | 4.65 ± 0.52 | 0.149 |
| Technical quality | 3.82 ± 0.77 | 3.88 ± 0.59 | 0.509 |
| Finance aspects | 3.33 ± 0.69 | 3.40 ± 0.93 | 0.538 |
| Doctor consultation time | 3.96 ± 0.87 | 3.61 ± 0.88 | 0.005 |
| Accessibility and convenience | 3.75 ± 0.63 | 3.79 ± 0.70 | 0.643 |

are high for the doctor consultation time, which are found to be statistically significant (Table 12).

## Discussion

The factors of various studies that determine patient satisfaction are age, socioeconomic condition, competence, technologies, admission and discharge procedure, emergency, interpersonal communication, etc.[9] These studies improve the quality of service (QOS) in the healthcare sector, thus increasing the patient satisfaction levels and reach out their expectations; thereby, outcomes of dissatisfied patients also can be improved.[10]

When compared with Chander et al. study,[11] our study had higher scores in general satisfaction, technical quality, communication, and interpersonal relations. The courteousness and friendly behavior of doctors resulted in higher satisfaction scores among the patients. The scores were lower for finance aspects as it varies from subject to subject depending on their socioeconomic conditions and expectations.

## Conclusion and Recommendations

Out of total sample of 205, there are specialitywise urology (54, 26.3%), cardiology (53, 25.9%), and cardiothoracic vascular surgery (39, 19.0%) departments. The waiting time of 74.1% (*n* = 152) was <1 hour at urology, cardiology, CTVS departments. While 55.1% (*n* = 113) had the consultation time of <15 minutes, 32.7% (*n* = 67) had 15–30 minutes and the rest 12.2% (*n* =25) had >30 minutes. Overall opinion of majority of the patients was good (*n* = 120, 58.5%).

Based on the mean scores, the subscales of all domains of the study are as follows: interpersonal relations (4.60 ± 0.55), communication (4.39 ± 0.66), general satisfaction (4.03 ± 0.79), technical quality (3.86 ± 0.67), doctor consultation time (3.77 ± 0.89), accessibility and convenience (3.77 ± 0.67), and finance aspects (3.37 ± 0.83).

It is to conclude that the general satisfaction, communication, interpersonal relations, technical quality, accessibility, and convenience are rated better to good.

Consultation time with doctor and finance aspects even though rated good, the variables affecting are many ranging from age, socioeconomic status, expectations, clinical quality of doctor, approach, and answering queries by specific doctors, which shall influence the satisfaction at that moment and time.

There is always scope for improvement in proper information and communication to the needy at right time, convenience, comfort, and waiting time reduction.

Annexure feedback and surveys at regular intervals shall only guide administrators to constantly monitor and identify issues and appropriate action and decisions be implemented. Regular training to all categories of staff on attitudes, behavior, and communication is recommended.

## References


1. Aiello A, Garman A, Morris SB. Patient satisfaction with nursing care: a multilevel analysis. Qual Manag Health Care 2003;12(3):187–190. DOI: 10.1097/00019514-200307000-00009.
2. Westaway MS, Rheeder P, Van Zyl DG, et al. Interpersonal and organizational dimensions of patient satisfaction: the moderating effects of health status. Int J Qual Health Care 2003;15(4):337–344. DOI: 10.1093/intqhc/mzg042.
3. Prakash B. Patient satisfaction. J Cutan Aesthet Surg 2010;3(3):151. DOI: 10.4103/0974-2077.74491.
4. Ziaei H, Katibeh M, Eskandari A, et al. Determinants of patient satisfaction with ophthalmic services. BMC Res Notes 2011;4(1):7. DOI: 10.1186/1756-0500-4-7.
5. Ganasegeran K, Perianayagam W, Abdul Manaf R, et al. Patient satisfaction in Malaysia's busiest outpatient medical care. Scientific World Journal 2015;2015:714754. DOI: 10.1155/2015/714754.
6. Kleefstra S, Kool R, Zandbelt L, et al. An instrument assessing patient satisfaction with day care in hospitals. BMC health services research 2012;12(1):125. DOI: 10.1186/1472-6963-12-125.
7. Tran BX, Nguyen NPT. Patient satisfaction with HIV/AIDS care and treatment in the decentralization of services delivery in Vietnam. PloS One 2012;7(10):e46680. DOI: 10.1371/journal.pone.0046680.
8. Marshall GN, Hays RD. The patient satisfaction questionnaire short-form (PSQ-18). CA. Rand Santa Monica; 1994.
9. Cheng SH, Yang MC, Chiang TL. Patient satisfaction with and recommendation of a hospital: effects of interpersonal and technical aspects of hospital care. Int J Qual Health Care 2003;15(4):345–355. DOI: 10.1093/intqhc/mzg045.
10. Mindaye T, Taye B. Patients satisfaction with laboratory services at antiretroviral therapy clinics in public hospitals, Addis Ababa, Ethiopia. BMC Res Notes 2012;5(1):184. DOI: 10.1186/1756-0500-5-184.

11. Chander V, Bhardwaj A, Raina S, et al. Scoring the medical outcomes among HIV/AIDS patients attending antiretroviral therapy center at Zonal hospital, Hamirpur, using patient satisfaction questionnaire (PSQ-18). Indian J Sex Transm Dis 2011;32(1):19. DOI: 10.4103/0253-7184.81249.
12. Rao GN. Human resource development. Community Eye Health 2000;13(35):42.
13. Thiedke CC. What do we really know about patient satisfaction? Family Pract Manag 2007;14(1):33.
14. Thayaparan AJ, Mahdi EJ. The patient satisfaction questionnaire short form (PSQ-18) as an adaptable, reliable, and validated tool for use in various settings. Med Educ Online 2013;18:21747. DOI: 10.3402/meo.v18i0.21747.
15. Bergenmar M, Nylén U, Lidbrink E, et al. Improvements in patient satisfaction at an outpatient clinic for patients with breast cancer. Acta Oncol 2006;45(5):550–558. DOI: 10.1080/02841860500511239.
16. Nabbuye-Sekandi J, Makumbi FE, Kasangaki A, et al. Patient satisfaction with services in outpatient clinics at Mulago hospital, Uganda. Int J Qual Health Care 2011;23(5):516–523. DOI: 10.1093/intqhc/mzr040.

## Annexure

## ANNEXURE I

**NARAYANA MEDICAL COLLEGE AND HOSPITAL**

Chinthareddypalem , Nellore

**PATIENT FEEDBACK**

**Consent**

Please express your opinion on the following statements about the hospital to serve you better. Your personal information and responses will be kept confidential. We request your consent for filling this form and thank you for sparing your valuable time.

**Date:** _____ **Reg No:** _____ **Patient Name:** _____ **Age:**___ **M/F Dept.:**_____

**Doctor:** _____ **OP Registration Time:** _____ **First Consultation In Time:** _____ **Out Time:** _____

**Second Consultation In Time:** _____ **Out Time:** _____ **Mob No:** _____ **Signature:** _____

**How strongly do you AGREE or DISAGREE with each of the following statements?**

**(Tick One Number on each Line)**

| | Strongly Agree | Agree | Uncertain | Disagree | Strongly Disagree |
|---|---|---|---|---|---|
| 1. Doctors are good about explaining the reason for medical tests…….. | 1 | 2 | 3 | 4 | 5 |
| 2. I think my doctor's office has everything needed To provide complete medical care…… | 1 | 2 | 3 | 4 | 5 |
| 3. The medical care I have been receiving is just about perfect….. | 1 | 2 | 3 | 4 | 5 |
| 4. Sometimes doctors make me wonder if their diagnosis is correct…….. | 1 | 2 | 3 | 4 | 5 |
| 5. I feel confident that I can get the medical care I need without being set back financially…… | 1 | 2 | 3 | 4 | 5 |
| 6. When I go for medical care, they are careful to check everything when treating and examining me……. | 1 | 2 | 3 | 4 | 5 |
| 7. I have to pay for more of my medical care than I can afford…… | 1 | 2 | 3 | 4 | 5 |
| 8. I have easy access to my medical specialists I need……. | 1 | 2 | 3 | 4 | 5 |
| 9. Where I get my medical care, people have to wait too long for emergency treatment……. | 1 | 2 | 3 | 4 | 5 |
| 10. Doctors act too impersonal and business like towards me…. | 1 | 2 | 3 | 4 | 5 |
| 11. My doctors treat me in a very friendly and courteous manner……. | 1 | 2 | 3 | 4 | 5 |

| | | | | | |
|---|---|---|---|---|---|
| 12. Those who provide my medical care sometimes hurry too much when they treat me……. | 1 | 2 | 3 | 4 | 5 |
| 13. Doctors sometimes ignore what I tell them…….. | 1 | 2 | 3 | 4 | 5 |
| 14. I have some doubts about the ability of the doctors who treat me….. | 1 | 2 | 3 | 4 | 5 |
| 15. Doctors usually spend plenty of time with me……. | 1 | 2 | 3 | 4 | 5 |
| 16. I find it hard to get an appointment for Medical care right way……. | 1 | 2 | 3 | 4 | 5 |
| 17. I am dissatisfied with some things about the medical care I receive…… | 1 | 2 | 3 | 4 | 5 |
| 18. I am able to get medical care whenever I need it…….. | 1 | 2 | 3 | 4 | 5 |

**Some Information about you**

| GENDER | | YOUR AGE | | VISIT TO HOSPITAL | |
|---|---|---|---|---|---|
| Male | 1 | Under 18 | 1 | New patient | 1 |
| Female | 2 | 18-30 | 2 | Follow-up patient | 2 |
| | | 31-40 | 3 | Others | 3 |
| | | 41-50 | 4 | | |
| | | 51-60 | 5 | | |
| | | Above 60 | 6 | | |

| EDUCATION | | EMPLOYMENT STATUS | | OVERALL OPINIION | |
|---|---|---|---|---|---|
| No education | 1 | Unemployed | 1 | Very Good | 1 |
| School Education | 2 | Student | 2 | Good | 2 |
| College Education | 3 | Employed | 3 | Fair | 3 |
| | | Retired | 4 | Bad | 4 |
| | | Others | 5 | Very Bad | 5 |

***Thank you very much for your feedback!***