A Study of the Operational Efficiency of the Dialysis Unit at a Multi Superspecialty hospital

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Introduction

- Dialysis services provided to both OPD and IPD patients.
- A total of 23 machines provide dialysis to almost 1800 patients per month.
- Each patient requires 3 sessions of dialysis (intermittent haemodialysis) per week
- A variety of treatment modules such as Haemodialysis, Continuous Renal Replacement Therapy, Peritoneal Dialysis and Slow Low Efficiency Daily Dialysis are offered.

- Only those patients with a plan for kidney transplant are provided service at this dialysis unit.
- Patients who are on supportive treatment are encouraged to seek dialysis services at a clinic run by the hospital at a separate site.
- It becomes difficult to accommodate new patients into the ongoing fixed schedule, with openings coming up as per scheduled kidney transplants.
- New patients are, thus, left waiting for a slot for initiation, with the current mean waiting time for a slot being 2.48 days.

Rationale

- The multi-superspecialty hospital believes in trying to cater medical service to all patients, so that every patient arriving at the hospital is assured of service and no patient is turned away.

Research Question

- Can the unmet demands of the OPD patients be met in a lesser time?

Objectives

- To understand the average waiting time for OPD patients for the 1st dialysis slot
- To understand the current distribution of IPD dialysis time slots
- To understand whether an interrelationship could be created between the management of the time slots of the OPD and IPD dialysis machines in order to better meet the overall demand for dialysis

Research Methodology

TYPE OF RESEARCH DESIGN

- **Study Type :** Cross sectional descriptive in nature.
- **Study site**: The Dialysis Unit of the Division of Nephrology, Medanta -The Medicity.
- **Study Respondents**: OPD and IPD patients
- **Study Duration:** 1st March 2014- 31st March 2014
- **Study tool**: Dialysis Scheduler as well as physical recording of data
- **Sample Size:** 1145 OPD patients and 214 IPD patients

- **Data collected:** UHID, patient name, date of dialysis, type of patient (Out Patient or In Patient), date of giving appointment, date of start of dialysis, time of start of dialysis for IPD patients

Observation

Machine distribution

- Total number of machines– 23
- Number of OPD machines – 16
- Number of IPD machines – 3
- Number of portable machines - 4

Assumptions

- Shifts possible for OPD machines – 3
  Number of slots available per month – 16*3*26
  - 1248
- Shifts possible for IPD machines – 4
  Number of slots available per month – 3*4*30
  - 360
- Shifts possible for portable machines – 4
  Number of slots available per month – 4*4*30
  - 480
- The OPD dialysis unit would ideally function at 100% capacity. Only unplanned cancellations could decrease the utilization of the OPD dialysis unit.

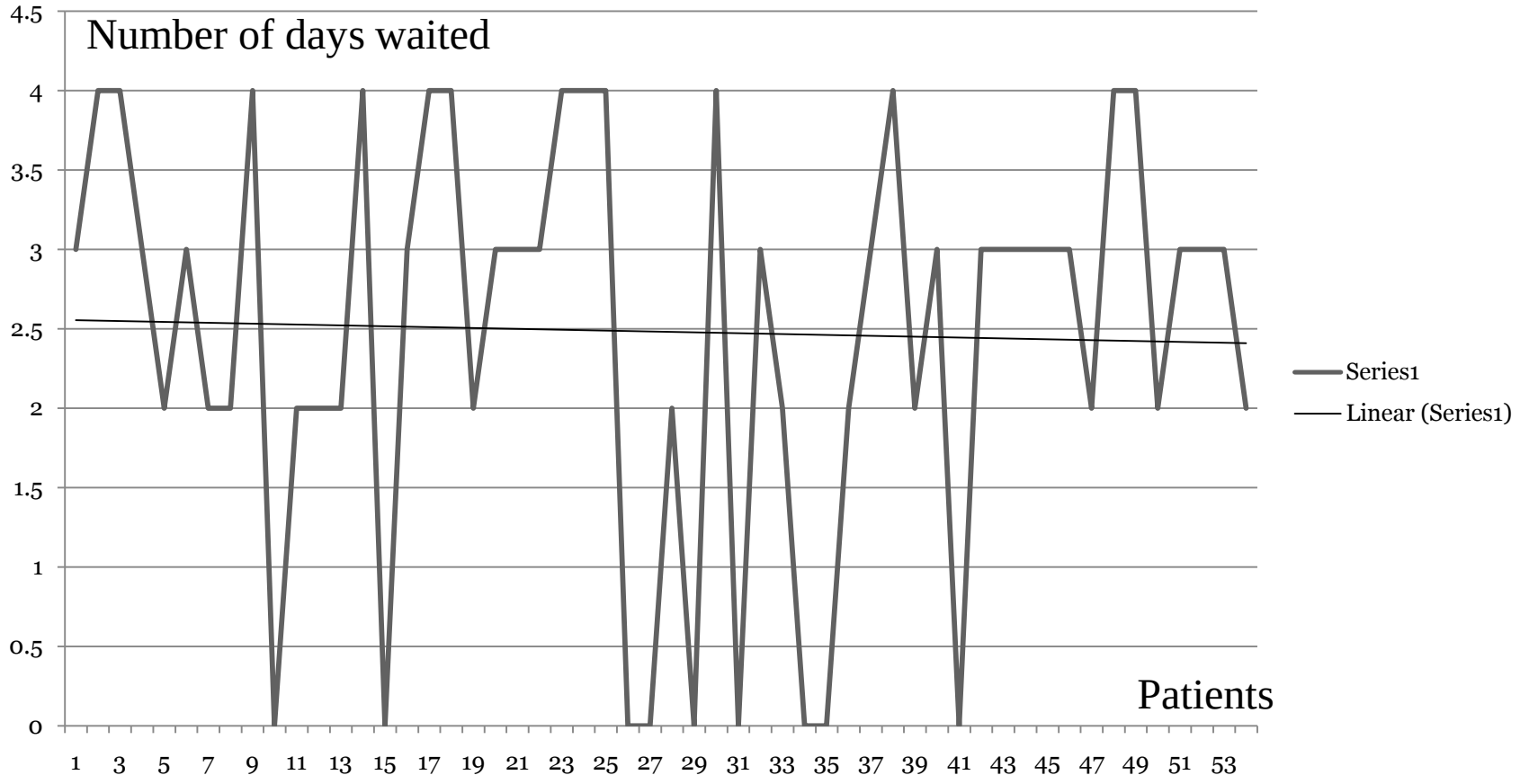
- Each machine can be allotted a maximum downtime of 20% of its possible utilization, for the purpose of maintenance and emergencies

- The IPD machines can be said to be working to according to the current demands of the In-Patients, with less than 100% utilization due to less demand from the In Patient Departments.

Machine Utilization in March 2014

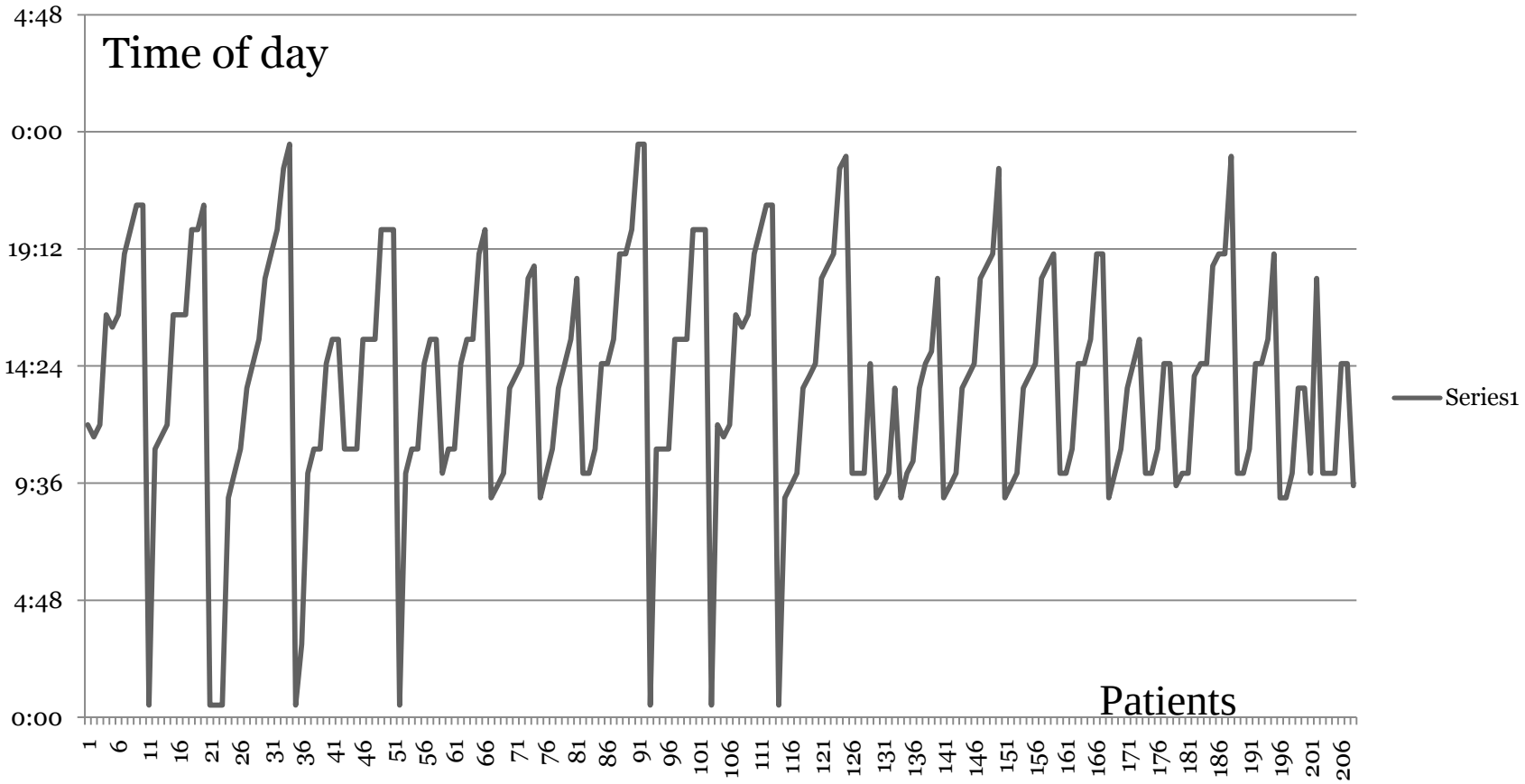
Area	Number of Dialysis Slots available	Number of Dialysis performed	Utilization
OPD	1248	1145	91.75%
IPD	360	214	59.44%
Portable Machine	480	466	97.08%

Waiting Time Plot from appointment to first dialysis for OPD patients



Average waiting time is 2.48 days

IPD Dialysis Start-time Plot



Time slots covered are from 00:00hrs on Day 1 to 05:00 hrs on Day 2

Limitations

- Communication with the patients cancelling their appointments was not possible. Thus, data on the distribution patterns of the number of cancellations could not be recorded.

Analysis

- Allowing a maximum possible 20% downtime for emergencies and maintenance, the OPD dialysis machines are working to maximum capacity

- The demand for dialysis from the In Patient departments cannot be planned.

Suggestions

- 2 out of the 3 IPD machines be reserved for OPD patients from 7am to 11am.
  This would create an additional (26*2= 52) slots for OPD patients
  This would also increase the utilization of the IPD machines by almost 13%.
- In order to maximize planned cancellations, the feasibility of taking payment in advance for the next appointment could be studied, with the payment being forfeited in case of an unplanned cancellation.

Projected impact

- Reserving the 2 IPD slots per day would create an increase of 4.5% of capacity to provide dialysis, without increasing the cost of manpower and cost of construction to increase capacity.

- Asking for prepayment for the next appointment could result in an increase of the OPD utilization by 10%.

Conclusions

- The requirement of OPD dialysis patients could be met in lesser time by increasing the utilization of the machines reserved for the IPD patients.

- Reducing the number of unplanned cancellations will increase the utilization of the OPD dialysis machines

Thank you