Business Process Reengineering in Dialysis Unit

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Hospitals in present scenario have to explore new management tools to improve patient satisfaction & quality of treatment. There is high patient demand, manpower shortage and financial pressure in the present healthcare setup which can be surmount by applying tools like Business Process Reengineering (BPR). Application of BPR can help bring innovations in work processes of dialysis units and help make renal replacement therapy available to general population. Present study was conducted at a Dialysis center located in the city of Hyderabad. By implementing BPR the quality of the processes in the Dialysis unit were enhanced.

Key words: Business Process Reengineering, Dialysis unit, Quality improvement and Redesigning of the Existing processes.

1. Introduction

In India anywhere between 16,50,000 to 22,00,000 people develop end-stage renal disease annually, out of which only 10% or less receive treatment. Such cases need compulsory Dialysis treatment. Most of the dialysis patients die due to inaccessibility and unaffordability of the treatment. With 26% of population below poverty line and low penetration of health insurance cover, the large out-of-pocket expenditure is often out of reach. Increasing patient demand, Shortage of trained man-power and associated Rise in health care costs necessitate tools such as BPR which could help optimize existing processes and thereby the costs. In the current set-up, it is imperative that hospitals take a re-look at the care that is provided by them so as to improve the patient satisfaction, quality of care and reduce overall healthcare costs.

2. Review of Literature

Davenport, T.H. (1993) defines business process as a set of logically related tasks performed to achieve a defined business outcome. Malhotra Y(1998) gives an overview on BPR and observes several authors opinions on BPR. Al-Mashari, M. & M. Zairi (1999) provides a holistic view of the Business Process Re-engineering (BPR) implementation process. They review the literature relating to the hard and soft factors that cause success and failure for BPR implementation, classifies these factors into subgroups, and identifies key factors of success and failure. Finally, explain how these factors influence the process of BPR implementation.

Rachel Varghese ((2001-01 - 2001-06) applies BPR in the radiology department to analyze the performance of the existing system with regards to various radiological investigations and re-engineers processes to improve efficiency of the system. Lai, Y. F. et al (1999) describes the BPR experience at Singapore's Alexandra Hospital Accident & Emergency and how it was transformed through the exercise. Anjali Patwardhan and Dhruv Patwardhan (2008) examines that in the health sector, a wide variety of patient groups make the healthcare service a complex project to redesign, thereby rendering changes context and time sensitive. Bertolini Massimo et al (2011) carry out the business process re-engineering (BPR) of a surgical ward in a hospital in order to improve the efficiency of the ward.

3. Objectives

1. To study the existing process in the dialysis unit.
2. To identify the problems and inconsistencies in the existing process.
3. To assess the changes required in the existing process of dialysis unit.
4. To reengineer the entire process of the dialysis unit using BPR as a tool.

4. Methods

4.1 Research Design

The research design used in this study is Applied Research where the technique of BPR is applied to redesign the process in a dialysis unit. This prospective study was conducted at haemodialysis unit of a Kidney and Laparoscopic centre located in the city of Hyderabad**.**

4.2 Tools for Data Collection

Primary as well as secondary data was collected for the study.

Primary data was collected using Observation and Interview methods.

a) **Observation Method**
The study includes the observation and instant documentation of the various processes in the unit.

b) **Interview Method**
- **Structured Interview**: Structured interviews were conducted with the hospital staff of dialysis unit with the help of a questionnaire.
- **Unstructured Interview**: Data was collected through face to face interaction with the dialysis staff.

Secondary data was collected through:

a) **Patient Register**
b) **Patient Case Sheets**

4.3 Data Analysis
Data analysis was done using BPR.

5. Discussion, Findings and Suggestions

5.1 Existing process in dialysis unit

Staff discusses among themselves and allots a bed to the patient
⇩
A nurse checks the vitals, other allots the bed, yet another gives injection etc.
⇩
Dialysis for the Patients is started
⇩
Vitals are checked twice, immediately after starting dialysis and before ending dialysis
⇩
Injections/medications if any required are given to the patient but it is not recorded in the case sheet
⇩
Dialysis for patients ends
⇩
Next shift patients enter the dialysis unit and wait inside the unit until the beds are made ready, priming is done till the first shift patients leave
⇩
Then next shift patients dialysis is started
⇩
The same process is followed for the rest of the shifts

5.2 Detailed Description of Existing Process
- The morning shift starts from 7:00 AM and ends at 11:00 AM.
- Morning 7:00 AM ward boy changes the linen of all the beds.
- The Housekeeping staff cleans the unit.
- Total 5 staff in the morning shift.
- Morning shift dialysis patient enter the dialysis unit, they themselves check the weight and enquire about their appointment and the bed to be allotted to them.
- Dialysis for the morning shift patients is started.
- Vitals are recorded immediately after starting dialysis and before ending dialysis.
- Any one staff member will check the vitals, other will start dialysis, yet another will give injection to the patient as per his/her requirement. There is no concerned nurse in-charge for a patient.
- If any medication or injection is being given to the patient as per his/her condition, it is not being recorded in the case sheet.
- The morning patients shift ends by 11:00 AM.
- The afternoon shift patients enter the dialysis unit and wait inside the unit, till priming is done, unit is cleaned, beds are made ready and the morning shift patients leave.
- As the morning shift patients leave, the dialysis for the afternoon shift patients is started.
- The afternoon shift starts at 11:00 AM and ends at 3:00 PM.
- In the afternoon shift out of 5 staff members 2 of the staff members will take the responsibility of washing the dialyzers and the rest 3 staff members will do priming, checking vitals and start dialysis for the entire 12 patient of this shift.
- At 3:00 PM 5 staff members of morning shift sign out and 7 staff members of evening shift sign in. The evening shift timings 3:00 PM-7:00 PM.
- For rest of the shifts the same process as mentioned above is followed.

- The timings for night shift dialysis patients is from 7:00 PM-11:00 PM but most of the staff members sign-out by 10:00 PM and hardly one or two staff members stay back for washing the dialyzers and disinfecting the dialysis machine.
- The unit is closed by 11:00 PM.

5.3 Existing Patients and the Staff Shift Details

The details of existing patients and the staff are shown in table 1.

Table1 *Patients and Staff Shift Details*

Total beds	Pts' shifts	Pts' shift timings	Staff shift timings	Total staff in each shift
12	Morning	7 AM-11 AM	7 AM-3 PM	5 staff members
12	Afternoon	11 AM- 3 PM		
12	Evening	3 PM- 7 PM	3 PM- 11 PM	7 staff members
12	Night	7 PM-11 PM		

5.4 Patient's Census for the Month of June (01-06-2014 to 30-06-2014)

Table 2 shows the patients census for the month of June '14

Table 2 *Patients Census for the Month of June'14*

DATE	DAY	MORNING SHIFT	AFTERNOON SHIFT	EVENING SHIFT	NIGHT SHIFT
01/06/2014	Sunday	7 pt's	10 pt's	-	-
02/06/2014	Monday	12 pt's	12 pt's	12 pt's	3 pt's
03/06/2014	Tuesday	12 pt's	12 pt's	12 pt's	5 pt's
04/06/2014	Wednesday	10 pt's	11 pt's	12 pt's	3 pt's
05/06/2014	Thursday	12 pt's	11 pt's	8 pt's	2pt's
06/06/2014	Friday	12 pt's	12 pt's	12 pt's	7 pt's
07/06/2014	Saturday	11 pt's	12 pt's	12 pt's	2pt's
08/06/2014	Sunday	11 pt's	5 pt's	-	-
09/06/2014	Monday	12 pt's	10 pt's	12 pt's	2 pt's
10/06/2014	Tuesday	12 pt's	10 pt's	3 pt's	2 pt's
11/06/2014	Wednesday	10 pt's	12 pt's	12 pt's	5 pt's
12/06/2014	Thursday	12 pt's	12 pt's	8 pt's	-
13/06/2014	Friday	12 pt's	12pt's	11 pt's	7 pt's
14/06/2014	Saturday	12 pt's	12 pt's	12 pt's	2 pt's
15/06/2014	Sunday	11 pt's	2pt's	-	-
16/06/2014	Monday	12 pt's	11 pt's	11 pt's	3 pt
17/06/2014	Tuesday	12 pt's	12 pt's	7 pt's	6 pt's
18/06/2014	Wednesday	12 pt's	12 pt's	10 pt's	5 pt's
19/06/2014	Thursday	12 pt's	12 pt's	9 pt's	-
20/06/2014	Friday	12 pt's	10pt's	12 pt's	2 pt's
21/06/2014	Saturday	12 pt's	12 pt's	12 pt's	1 pt's
22/06/2014	Sunday	10 pt's	6 pt's	-	-
23/06/2014	Monday	12 pt's	11 pt's	12 pt's	-
24/06/2014	Tuesday	12 pt's	11 pt's	12 pt's	5 pt's
25/06/2014	Wednesday	12 pt's	10 pt's	11 pt's	4 pt's
26/06/2014	Thursday	12 pt's	12 pt's	10 pt's	1 pt's

27/06/2014	Friday	12 pt's	12 pt's	12 pt's	5 pt's
28/06/2014	Saturday	11 pt.'s	11 pt's	10 pt's	3 pt's
29/06/2014	Sunday	7 pt's	6 pt's	-	-
30/06/2014	Monday	12 pt's	10 pt's	12 pt's	7 pt's

5.5 Graphical Representation of the Patient Census for the Month of June'14 is shown in fig 1

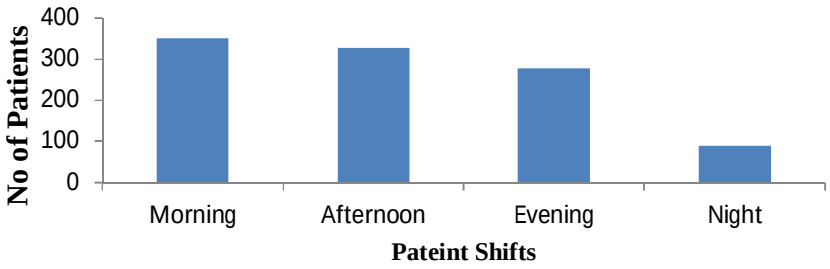

Figure 1 *Graphical Representation of the Patient Census for the Month of June'14*

5.6 Problems Constraints and Bottlenecks Identified

A study on the existing process of the dialysis unit reveals the following details:

- There is no proper delegation of task among the staff, which is leading to negativity, dissatisfaction among employees and creating chaos in the department.
- To decrease nurse workloads, bring responsibility in employees and improve patient safety.
- There should be more nurses working in hospital per patient. This is measured as the nurse-to-patient ratio which is not being followed.
- Vitals of the Patients are not checked prior to the dialysis.
- Monthly rosters are not prepared due to which leaves are taken by the staff as per their convenience, thus resulting in non-adherence to the shift timings.
- On Sundays, there are only two shifts for the patients and the occupancy in these shifts is very low.
- The used dialyzers are carried in hands leading to spillage of blood on floor and thereby may lead to infections.
- The ownership of the entire activities of the unit is not taken by the In-charge.
- As per the timings of the fourth shift, the staff is supposed to leave by 11:00 PM, but due to very little bed occupancy in this shift (as shown in table 2) and lack of proper supervision by the management, almost all the night shift staff sign out by 10 PM. Hardly one or two staff members stay back for washing the dialyzers and to disinfect the machines.
- If any injection/medicine is being given to the patient as per his/her condition it is not recorded in the case sheet. It is important for staff to realize that Medical Records have become the single, crucial and effective weapon in their hands to counter the false claims of the consumers, when they file a case for compensation.
- Patients monthly schedule is not properly prepared.

In order to overcome the above problems and for the smooth functioning of the unit the existing process has been re-designed**.**

5.7 The Redesigned Process

Business Process Re-engineering has been used as a quality enhancement tool to redesign the existing process.

As per Nurse to Patient ratio, duties are assigned to the staff before the shift begins

⇩

Patient comes as per his/her appointment

⇩

Prior to dialysis, patients vitals and weight are checked and recorded. Bed numbers are allotted to the patient

⇩

Patient enters the unit and goes to the bed allotted
The concerned in charge nurse takes hand-over of the patient

⇩

Dialysis is started

⇩

Every half hourly/hourly vitals are checked and recorded

⇩

Any treatment or medication given to the patient (if required) is recorded in the case sheet

⇩

Dialysis is completed and patient leaves

⇩

Between every shift there is half an hour time gap for the staff to get the beds ready, for priming, changing of the linens etc

⇩

Information regarding the presence of the next shift patients is communicated to the in charge of the unit in advance so that bed arrangements can be made as per the patients requirements and nurse to patient ratio can be assigned

⇩

The same procedure as mentioned above will be followed for the remaining shifts

5.8 Redesigned Process in Detail

- Morning shift staff will sign in by 6:45 AM.
- The ward boy will change the linen of all the beds.
- The housekeeping will clean the unit.
- Total 5 staff members will take over the responsibility of the entire unit in the morning shift.
- The in charge will delegate tasks to nurses and supportive staff, prepare work schedules, maintain inventories of medicines and supplies, in addition to all these duties; he will simultaneously perform his regular nursing tasks.
- From 6:50am one staff will check patient's vitals, weigh and allot bed numbers to the patients.
- Dialysis for morning shift patients will be started by 7:00 AM.
- Every hourly/half hourly vitals will be recorded.
- Treatment that is being provided to the patient will be recorded in the patient's case sheets.
- In between the shifts the security will keep a check of the unit so that if there is any attendee inside the unit they will be asked to wait outside the unit.
- By 11:00 AM the security will provide the list of patients present for the next shift to the concerned in charge of the unit.
- The case sheets of the afternoon shift patients will be made ready.
- At 11:00 AM, 2 of the staff members sign in the duty.
- Total staff on duty is 7 members.
- At 11:00 AM the dialysis of the first shift patients ends.
- At 11:00 AM one of the staff members will be assigned the duty of checking and recording the vital of the next shift patients and allotting them bed numbers.
- 11:05 AM two staff members will be assigned the responsibility of washing the dialyzers.
- The in charge will assign the duties to the staff as per the Nurse: Patient ratio i.e. 4:3.
- By 11:30 AM priming of the machine, changing of the linen, cleaning of the unit etc will be done and it will be made ready for the afternoon shift patients.
- At 11:30 AM afternoon shift of patients will start and it will end at 3:30 PM.
- Every half hourly/hourly vitals will be recorded.
- At 1 PM, 4 staff members will sign in the duty.
- Total 11 staff members will be on duty.
- 1 PM-1:30 PM 4 staff members will go for lunch by assigning their duty to other staff members in the unit.
- 1:30 PM - 2 PM other four staff members will go for lunch.
- 2:00 PM -2:30 PM the rest 3 staff members will go for lunch.
- The in charge should assign his duty to the most senior staff member before signing out.
- At 3 PM, 5 staff members will hand over their duties to other staff members and they will sign out.
- Now total 6 staff members will take over the entire responsibility of the unit.
- By 3:30 PM the afternoon shift ends and by 4 PM the night shift will start.
- 4:3 Nurse to patient ratio will be followed.
- And in the rest of the shifts same process as mentioned above will be followed.
- At 7 PM, 2 staff members will hand over their duty to other staff members and they will sign-out.
- The next day's dialysis patients list of all the three shifts will be made .One list should be handed over to the security and other will be kept in the unit.
- By 8 PM the dialysis of night-shift patients will end.
- Total 4 staff members will be present in the unit.
- All the machines will be disinfected, the unit will be cleaned, dialyzers will be washed and finally the unit will be closed by 9 PM.

5.9 Redesigned Patients and the Staff Shift Details are shown in Table 3.

Table 3 *Redesigned Patients and the Staff Shift Details*

Total beds	Patients Shifts	Patients shift timings	Staff shift timings	Total staff in each shift
12	Morning	7:00 AM-11:00 PM	7:00 AM-3:00 PM	5 staff
12	Afternoon	11:30 AM-3:30 PM	11:00 AM-7:00 PM	2 staff
12	Evening	4:00 PM-8: PM	1:00 PM-8:00 PM	4 staff

5.10Suggestions

As per the redesigned process the following changes were made which if implemented should lead to the smooth functioning and to enhance the quality of the process in the Dialysis unit.

- Patient's vitals should be checked and recorded prior to the dialysis and every half/one hourly during dialysis.
- If any treatment is to be provided to the patient as per his/her condition, it should be recorded in the case sheet. This will be the only way for the doctor to prove that the treatment was carried out properly. Moreover, it will also be of immense help in analyzing the treatment results, and to plan treatment protocols.
- The Role of In-charge
  - The monthly roster for staff should be prepared by the in-charge. In particular, it is very important to efficiently utilise time and effort, to evenly balance the workload among people and to attempt to satisfy personnel preferences. A high quality roster can lead to a more contented and thus more effective workforce and as per the roster, each day, two staff should be permitted to take leave (as per the designed schedule).
  - He should direct the activities of the nurses and supportive staff, prepare work schedules, maintain inventories of medicines and supplies, in addition to all these duties; he should simultaneously perform his regular nursing tasks.
  - He should hold the responsibility of staff shift timing.
  - The responsibility of holding the keys of the stored inventory should be taken over by him so as to prevent the losses by theft.
  - Duties should be delegated by him to both the nurses and supportive staff. Effective delegation is increasingly important because delegation is a key to effective time management. Delegation of work will build trust and increase responsibility among employees.
  - He should delegate the work among nurses on the basis of their experience and qualification as it reduces the fatigue of one person, reduces overall negativity, and enhances morale in a fashion similar to teamwork. Organizing the work load in an equal and efficient fashion is another method to demonstrate teamwork.
  - The duties should be assigned by him to the nurses and technician on the basis of Nurse: Patient ratio as it leads to improved patient care, an enhanced quality of life for patients, and nurses will be able to more safely practice the profession to which they have dedicated their lives.
  - In short, In-charge must take ownership for all unit activities and in his absence he should assign all his duties to the senior most staff.
- The dialyzers should be carried for washing in the containers so as to prevent the blood spillage on the floor and there by the infections.
- The fourth shift has been removed due to very low patient occupancy and it has been compensated by adding one more shift on Sundays, as per redesigned schedule there are total three shifts on Sundays.
- The nursing station should be cleared off the unnecessary things such as old registers, case sheets of all the shifts etc. so as to accommodate the required

6. Conclusion

It is a well-known fact that a reasonable standard of renal replacement therapy is expensive and only a few can afford it. A developing country like ours has to consider this aspect seriously and cut down the costs, focus on re-designing the process to meet the new challenges of a reformed healthcare system in order to make renal replacement therapy available to general population. BPR will help to bring innovations in hospital design and work processes, to enhance the recruitment and retention of staff, increase the efficiency of care delivery and to improve the quality of clinical care and patient safety.

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