Work Study on Start and Termination Procedure Done by Dialysis Technicians in a Tertiary Care Hospital in India

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ABSTRACT

With increase in cases of kidney problems and the scarcity of donors dialysis has emerged as an extremely busy department with almost 100% occupancy. This has also lead to increased load on the technicians. So the method of WORK STUDY was employed to study the process of dialysis done by technicians in a dialysis unit.

Keywords: Start, termination, technicians, nurse, dialysis, dialyser, a solution, b solution, tubing.

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INTRODUCTION:

Work Study is the systematic examination of the methods of carrying out activities such as to improve the effective use of resources and to set up standards of performance for the activities carried out. .Unorganized and unsafe DIALYSIS practices have not only caused death and other complications but also leads to inefficiency and longer process time. This study is aimed at understanding the existing DIALYSIS practices and improving so that efficiency can be brought along with more safety.

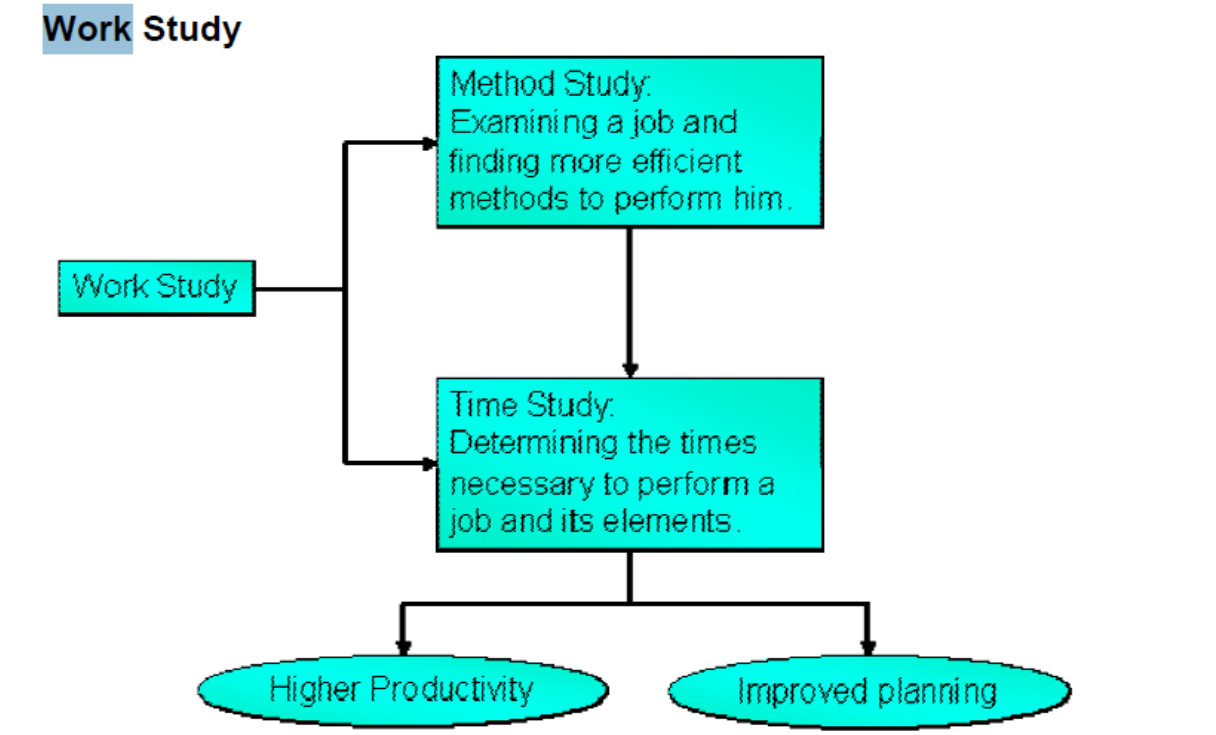

Figure 1 work study
Source-secondary (textilelearner.blogspot.com)

REVIEW OF LITERATURE

F. Ikbal, A.K. Jaiswal

The authors in their paper titled " work study of nurses with reference to safe injection practices in a deluxe room unit of corporate hospital in Hyderabad " uses the work study design towards objectives of method study of injection practices by nurses, undertake work measurement of injection practices by nurses and finally to develop standard work-study for nurses with reference to safe injection practices.

Bamisaiye A, Abodunde M B, Ransome-Kuti O

The authors in their study " a simple work-sampling system for use in hospitals and health centres in the developing world" uses method of work sampling with respect to healthcare staff and helps to bring out unproductive time ,idle time and provides better alternative for doing the same work more efficiently.

OBJECTIVE AND SCOPE OF STUDY

In our study we have under taken method study of dialysis practices by technicians along with the measurement of these practices ,we have also developed standard work-study for technicians with respect to most efficient dialysis practices.

RESEARCH METHODOLOGY

Method

Observation method

Sampling Size

Sample size is 23 procedures.

Source and Tool Of Data Collection

Primary Data Collection: Observation of technicians

Selection of Person To Be Observed

In our study, list of the entire members of staff involved in the delivery of services was compiled. Codes were assigned to each technician for identification based on their names.

DISCUSSION AND FINDINGS

Steps Followed In Work Study

There are eight basic steps in work study, some of which are common to both method study (MS) and work measurement (WM)

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

For mentioned work-study of dialysis technicians with respect to efficient start and termination of dialysis practices, AKD unit of a tertiary hospital is selected.

Step 1: Select

In this step identified topic is selected i.e. work-study of dialysis technicians with respect to efficient start and termination of dialysis practices, AKD unit of a tertiary hospital is selected.

Step 2: Record

The current activities involved in both start and termination procedure of dialysis have been recorded. The fact has been recorded in form of flow chart as follows:

Activities during start of dialysis procedure that are done by the technicians in chronological order are-

TABLE I

Activities during start if dialysis procedures that are done by the technicians in chronological order are

S. No.	Activity during start
1	Patient name checked in register
2	dialyser and tubing brought
3	replacing A solution and B solution
4	dialyser attached to machine
5	dialyser and tubing arranged in machine
6	dialyser rinsed with dialysing fluid
7	dialyser hit with scalpel
8	dialyser checked
9	Technician waiting for nurse(nurse need to complete the canulation process)
10	rinse arterial line with normal saline
11	rinse heparin line with normal saline
12	rinse venous line with normal saline
13	drain off bubbles from the tubing
14	check patient notes for data like weight etc
15	put data into machine
16	recirculate the tubings
17	sterilise tubings and hand it to nurse
18	replace saline with blood in the tubings
19	machine is started

TABLE II

Activities during termination of dialysis procedure that are done by the technicians in chronological order are

S. No.	Activity during termination
1	write in patient register
2	switch off the pump
3	arterial line disconnected
4	normal saline connected to drain off the blood from tubings
5	hitting dialyser to remove left over blood
6	turn upside down the dialyser
7	clam dialyser continuously to create pressure for removing blood and clot
8	machine is disconnected from dialyser
9	machine put on auto clean mode
10	machine put for self test
11	disconnect blood tubings from dialyser
12	dialyser and tubing taken to the cleaning room
13	dialyser cleaned with ro water
14	dialyser put on reprocessing machine
15	tubings cleaned with hot water
16	tubings cleaned with sodium hypochloride
17	tubings cleaned with hydrogen peroxide and peroxyacetic acid solution
18	tubings stored on the specific box

Process Flow Chart

The study can be carried out by preparing process chart, which is a chart to record a process in a compact manner, as a means of understanding and improving it.

The process chart explains systematically the series of actions done during the work process and also gives the information graphically.

The process chart is prepared based on certain number of symbols i.e. Operation. Transportation, Inspection,

Delay and Storage: Sometimes few /activities may be combined also.

Operation: An operation represents the real work that is carried out, mainly the time spent on treatment to patient directly.

Transportation: The staff moves certain object or moving one place to another place, except when the movement is not part of the operation and inspection.

Inspection: Inspection means a person examining the work accuracy or checking the materials required or checking and comparing with a standard as quantity or quality.

Delay: There may be some gap between activities or before performing the next action some delay due to various reasons.

Storage: Storage occurs when the activity is stopped and it is not performed.

Symbols for Activities

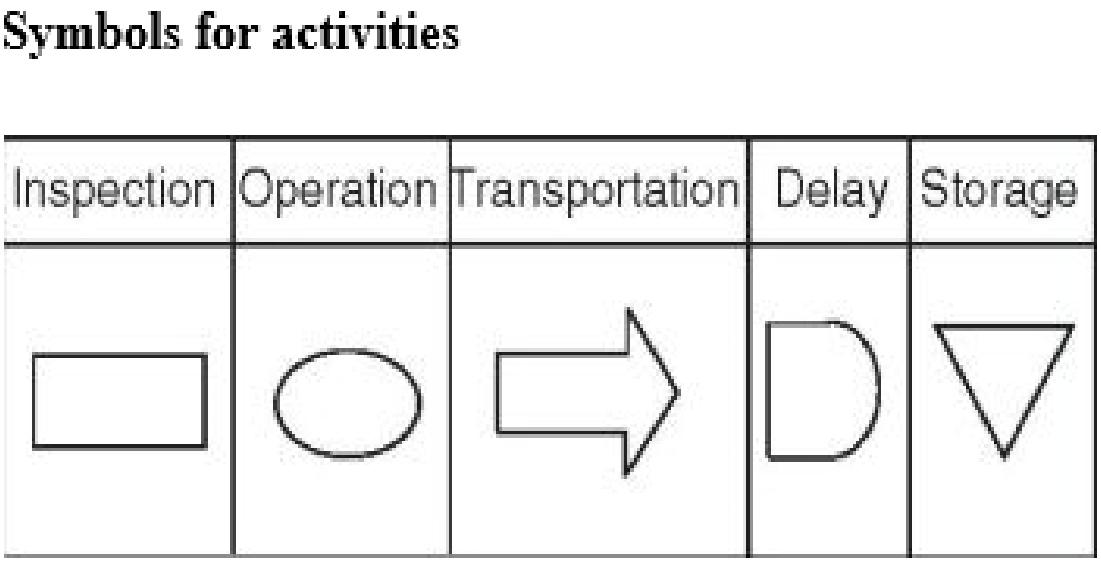

Figure 2 symbols assigned for different activities

Source -secondary

s.no	activity	inspection	operation	transport	delay	storage
1	Patient name checked in register					
2	dialyser and tubing brought					
3	replacing A solution and B solution					
4	dialyser attached to machine					
5	dialyser and tubing arranged in machine					
6	dialyser rinsed with dialysing fluid					
7	dialyser hit with scalpel					
8	dialyser checked					
9	Technician waiting for nurse(nurse need to complete the canulation process)					
10	rinse arterial line with normal saline					
11	rinse heparin line with normal saline					
12	rinse venous line with normal saline					
13	drain off bubbles from the tubing					
14	check patient notes for data like weight etc					
15	put data into machine					
16	recirculate the tubings					
17	sterilise tubings and hand it to nurse					
18	replace saline with blood in the tubings					
19	machine is started					

Figure 3 process flow chart of start procedure in dialysis for above maintained activities

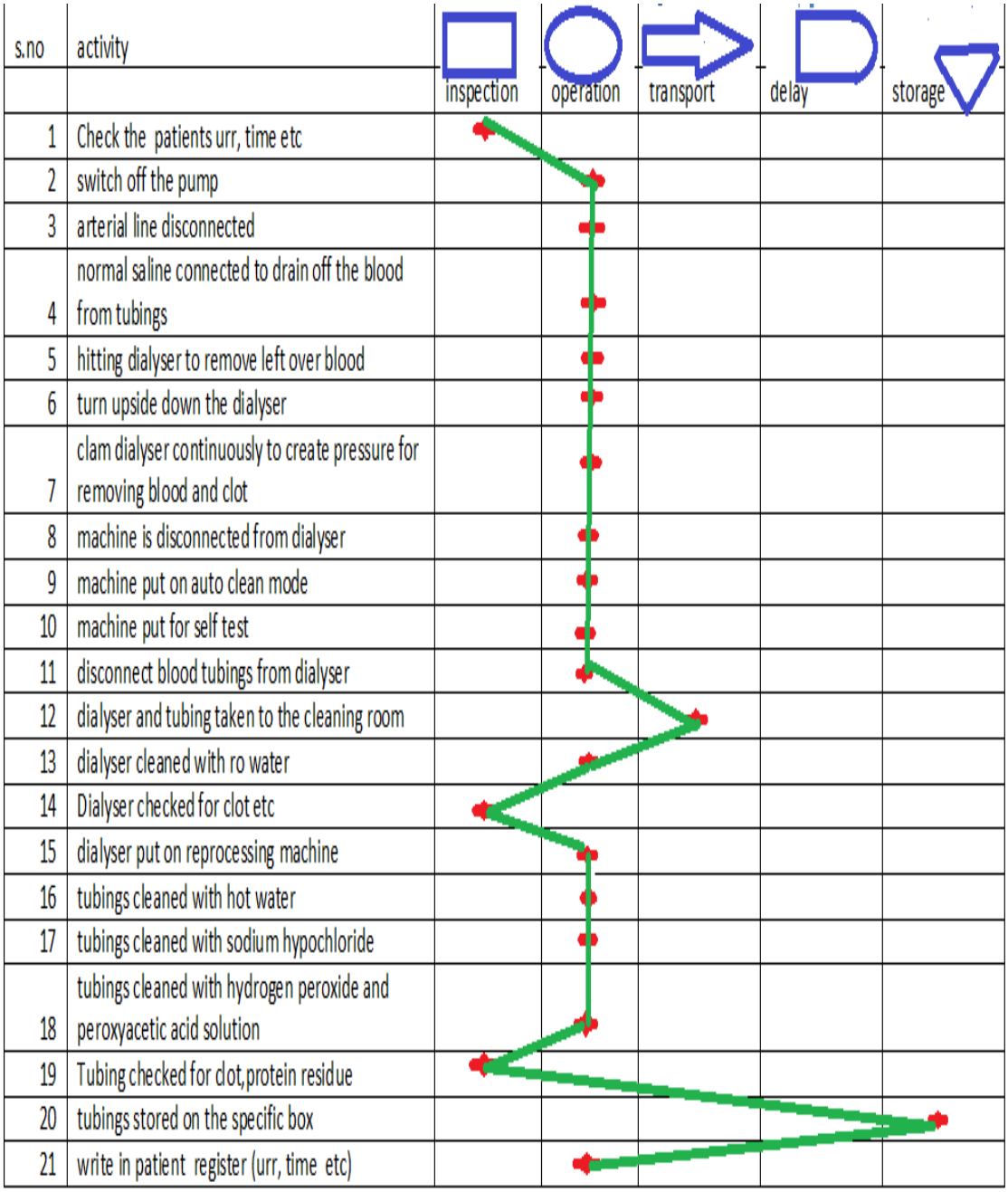

Figure 4 -process flow chart of termination procedure in dialysis for above maintained activities

Following Was Observed

Out of 23 observations 10 events of start and 10 events of termination procedure of dialysis by the technicians were observed. The following was observed:

1. Scope of delay is possible only during start procedure due to delay caused by nurse .
2. Out of 20 procedures

- 10 are start procedures
- 10 are termination procedures

3. All sub procedures in a particular start or termination are done by one technician
4. Adequate hygine was maintained during both start and termination procedures.
5. Procedures of sterilisation followed properly .
6. All technicians wore double gloves.
7. No case of any complication.
8. 1 case of machine not working adequately was observed. Machine was promptly replaced by another machine from icu.
9. On few occasions the tubing with the dialyser was not stored in the assigned racks.

On few occasions the patient file was not filled by the technicians.

Step 3 Examine

In the entire process of **START** of dialysis the technician has done following activities.

1. Inspection: technician has done 3 activities of inspection.
2. Operation: technician has done 14 activities of operation.
3. Transportation: technician has has moved 1 time.
4. Delay: nurse has caused delay 1 time.
5. Storage: No activity.

In the entire process of **TERMINATION** of dialysis the technician has done following activities.

1. Inspection: technician has done 3 activities of inspection.
2. Operation: technician has done 16 activities of operation.
3. Transportation: technician has moved 1 time.
4. Delay: no activity
5. Storage: technician has done 1 storage activity.

Step 4- Develop

It was found that the only instance of delay was found in start procedure. On the issue of hygiene it was found to be good.

So a new scheme of steps of procedures to be followed while doing the start procedure is suggested-

TABLE III

Activities during termination of dialysis procedure that are done by the technicians in chronological order

s.no	Activity
1	Check if nurse has started the procedure. if yes then go to next step
2	Patient name checked in register
3	dialyser and tubing brought
4	replacing A solution and B solution
5	rranged in machine
6	dialyser rinsed with dialysing fluid
7	dialyser hit with scalpel
8	dialyser checked
9	rinse arterial line with normal saline
10	rinse heparin line with normal saline
11	rinse venous line with normal saline
12	drain off bubbles from the tubing
13	put data into machine,
14	recirculate the tubings
15	sterilise tubings handed to nurse
16	replace saline with blood in the tubings
17	machine is started

Source-primary

Step 5 Measures

In this step time taken for existing work has been recorded.

TABLE IV

Time taken for start procedure

s.no	Activity	Time taken
1	Patient name checked in register	30 sec
2	dialyser and tubing brought	2 min
3	replacing A solution and B solution	1 min
4	dialyser attached to machine	1 min
5	dialyser and tubing arranged in machine	1 min
6	dialyser rinsed with dialysing fluid	1 min 30 sec
7	dialyser hit with scalpel	1 min
8	dialyser checked	1 min
9	Technician waiting for nurse(nurse need to complete the canulation process)	3 min

10	rinse arterial line with normal saline	1 min
11	rinse heparin line with normal saline	1 min
12	rinse venous line with normal saline	1 min
13	drain off bubbles from the tubing	1 min 30sec
14	check patient notes for data like weight etc	1 min
15	put data into machine	1 min
16	recirculate the tubings	1 min
17	sterilise tubings and hand it to nurse	30 sec
18	replace saline with blood in the tubings	1 min
19	machine is started	30 min
	Total	21 min

TABLE V

Termination procedure

s.no	Activity	Time taken
1	Check the patients urr, time etc	1min
2	switch off the pump	30 sec
3	arterial line disconnected	30 sec
4	normal saline connected to drain off the blood from tubings	1 min
5	hitting dialyser to remove left over blood	1 min 30sec
6	turn upside down the dialyser	30 sec
7	clam dialyser continuously to create pressure for removing blood and clot	1 min 30sec
8	machine is disconnected from dialyser	1min
9	machine put on auto clean mode	30sec
10	machine put for self test	30sec
11	disconnect blood tubings from dialyser	1 min
12	dialyser and tubing taken to the cleaning room	2 min
13	dialyser cleaned with ro water	3 min
14	Dialyser checked for clot	1 min
15	dialyser put on reprocessing machine	30 sec
16	tubings cleaned with hot water	1min
17	tubings cleaned with sodium hypochloride	1 min
18	tubings cleaned with hydrogen peroxide and peroxyacetic acid solution	1 min
19	Tubings checked for clot	1 min
20	tubings stored on the specific box	30 sec
21	Write in patients register	1 min

Total	22 min

STEP 6. Define

Here we will calculate the time taken in the new method of start procedure.

TABLE VI

Time taken in each sub step of start procedure

s.no	Start activity	Time
1	check if nurse has started the procedure. if yes then go to next step	30 sec
2	Patient name checked in register	30 sec
3	dialyser and tubing brought	2min
4	replacing A solution and B solution	1 min
5	dialyser attached , tubing arranged in machine	1 min
6	dialyser rinsed with dialysing fluid	1 min 30 sec
7	dialyser hit with scalpel	1 min
8	dialyser checked	1 min
9	rinse arterial line with normal saline	1 min
10	rinse heparin line with normal saline	1 min
11	rinse venous line with normal saline	1 min
12	drain off bubbles from the tubing	1 min 30 sec
13	put data into machine,	1 min
14	recirculate the tubings	1 min
15	sterilise tubings handed to nurse	30sec
16	replace saline with blood in the tubings	1 min
17	machine is started	1 min
	total	17 min 30 sec

S.NO	ACTIVITY	TIME
1.	check if nurse has started the procedure. if yes go to next step	30 sec
2.	Patient name checked in register	30 sec
3.	dialyser and tubing brought	2min
4.	replacing A solution and B solution	1 min
5.	dialyser attached , tubing arranged in machine	1 min
6.	dialyser rinsed with dialysing fluid	1 min 30 sec
7.	dialyser hit with scalpel	1 min
8.	dialyser checked	1 min
9.	rinse arterial line with normal saline	1 min
10.	rinse heparin line with normal saline	1 min
11.	rinse venous line with normal saline	1 min
12.	drain off bubbles from the tubing	1 min 30 sec
13.	put data into machine,	1 min
14.	recirculate the tubings	1 min
15.	sterilise tubings handed to nurse	30sec
16.	replace saline with blood in the tubings	1 min
17.	machine is started	1 min

Figure 5 Process flow chart for new method with respect to start of dialysis procedure is as follows

Source-primary

Total time taken to start the procedure of dialysis by a technician is 17min 30sec

Inspection 3 activities has taken time of 2 min.

Operation 13 activities has taken time of 13 min 30 sec.

Transportation 1 activities has taken 2 minutes.

Step 7 Install

Above new method for start of dialysis procedure if installed successfully will lead to following changes-

- Inspection changes
- Process (operational) changes
- Transportation changes
- Infrastructure changes

1. Inspection changes:

- Careful checking of patient details.
- Careful checking of clots ,air bubbles etc

2. Process (operational) changes:

- Process of start to be started only if nurse has also arrived thus saving time.
- carful filling of the patient details.

3. Transportation changes:

- no change in transportation process

4. Infrastructure changes:

- No change.

Observations

- Total time for start of procedure has been reduced by 3min 30 sec.
- Better coordination between nure and technicians
- Better recording of records by technicians.

Step 8 Maintain

Above new method of safe injection administration can be maintained by supervising the process frequently asst manager of AKD.

CONCLUSION

The new method of start procedure (that was developed using work study method) if adequately implemented will bring more efficiency in the technicians work. It will also help in making their work more systematic and at the same time will bring better quality and safety into the procedure. So the need is towards proper implementation of the new procedure .better implementation can be achieved with proper and adequate supervision of the asst manager. But this should not be the end. We need to further analyse the current procedures after a while (6 months) and look towards making it even better as quality is a continuous process and must be continuously strived for.

Once hospital staff have seen the effective results of application of which have helped them to solve some of their difficulties they will better react to the introduction of work study.

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