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Application of Value-Added Management Practice to Improve Admission Process in Healthcare Centers: A Case Study

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Abstract: The essence of value engineering technique involves the critical analysis of the functions of a product/process over all of its stages and producing a creative and innovative way to achieve the function at the lowest cost. Value added management practice (VAMP) is a very efficient technique to identify and remove/improve unnecessary and inefficient processes in order to optimize both time and cost of production stages. The aim of the present paper is to develop a model to improve the admission process in hospitals using the steps of value-added management practice and its concepts. The KIMS Hospital in Bangalore (Karnataka, India) was selected to perform the case study. A Value engineering team was formed with medical professionals and the current admission process of a hospital was studied in detail and all the involved processes were drawn as a model using Lucid Chart software. A brainstorming session was conducted to identify the unnecessary and inefficient processes and to formulate creative and innovative ideas to remove/improve those processes. Simulation technique was used to record the performance of the current admission process and the improved admission process. Comparing the results, it was revealed that about 40 minutes will be saved if innovative and creative ideas are applied on the current admission procedure. Thus, it is concluded that value added management practice is an efficient method to improve the performance of services in the healthcare system.

Keywords: Value Added Management Practice (VAMP), Value Engineering, Function Analysis, Process Improvement, Admission Process, Healthcare

1. Introduction

1.1. Value Engineering

Value Engineering is a function oriented, systematic team approach, which involves the critical assessment of a product, system or service to achieve their essential functions at the lowest life cycle cost consistent with required performance, reliability, quality and safety.

1.2. Objectives

The objectives of value engineering are as follows:

(a) To find and improve on value mismatches in products, services and capital projects.
(b) To segregate the necessary and unnecessary functions.
(c) To define the vital functions.
(d) To find and improve low performing functions by developing alternative means to achieve the necessary functions at a lower cost.

1.3. Scope of Value Engineering

(a) Identify and remove unnecessary costs.
(b) Ensure required functions/project scope.
(c) Improve decision making.
(d) Enhance understanding of total project.

(e) Encourage cross-discipline communications.
(f) Challenge paradigms.

1.4. Reason for Selection of Project

Service healthcare sectors such as hospitals are public agencies that have complicated business processes. These organisations aim to increase function by developing effective service models and a cost-controlled structure. Therefore, they need to implement new management techniques to improve their services. Thus, Value added management practice (VAMP) has been selected to increase the quality of services and reduce the cost and time for the clients in health care center.

1.5. Vision

The aim of this research paper is to eliminate costly and time-wasting procedure involved in admission process at the health care centers and suggest solution to improve the current situation through value added management practice (VAMP). The main objectives of the paper are:

(a) Optimizing the current admission process.
(b) Reducing time taken for current admission process.
(c) Increasing patient satisfaction.

2. Methodology Definition

In this section Value Engineering methodology such as pre-study and value study which is used for improving the admission process is described in detail.

2.1. Information Phase

Admission process is a vital role in healthcare centers for patient care thus it has been selected for carrying out the study and receiving management coordination to gather relevant data and required documents on the current admission process. Admission process has been depicted using Lucid Chart software followed by identifying the deficiency in the current admission process. In this section the time of each function and the total time of the process was calculated by simulation.

A value engineering team was formed consisting of experts involved in healthcare system. The team members have experience and knowledge on hospital's procedures and offered effective suggestions for improving the admission process.

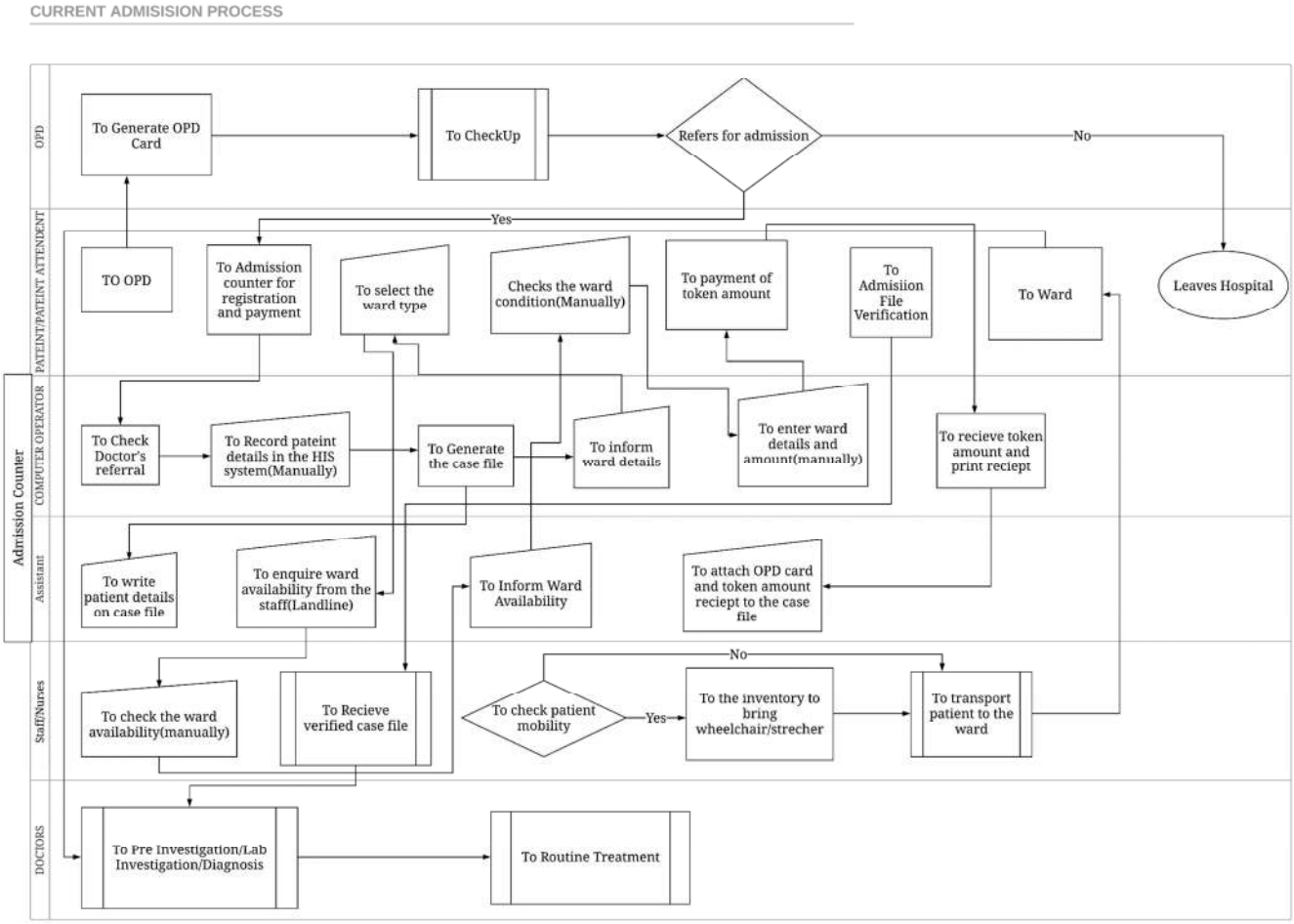

Figure 1. *Current Admission Process.*

Admission process starts with the doctor's approval and referral for the patient to get admitted. After referral the patient details are registered in the HIS system at admission section followed by manual checking of available wards, selection of the desired ward in person and the token amount payment for admission. Admission case file is generated after receiving the token amount, case file is verified at the staff section for processing transfer of patient to the ward. The mobility of the patient is checked, and stretcher/wheel chair is arranged accordingly followed by the transfer of patient to the ward. Thus, the admission of the patient is completed. Figure 1. Current Admission Process shows the current process model drawn by Lucid Chart software.

From Figure 1. Current Admission Process, unnecessary procedures and time-consuming steps can be observed in *Table* 1. Function of Process Component. A discussion was conducted with the value engineering team members to identify the functions which need to be improved. The effective solutions were taken into consideration and were used in the creative phase.

As a result of the discussion, following ideas were considered for improving and changing the inefficient functions:

(a) A system to interconnect OPD, Admission section and the staff section.
(b) Reducing que time for admission.
(c) A solution for fast recording of patient details.
(d) Improvement in monitoring ward availability.
(e) Fast verification of the case file.
(f) Transferring patient to the ward effectively.
(g) Making sure doctor is present on time after patient transfer to the ward.

which some of the most inefficient procedures are as follows:

(a) Delay caused due to lack of an integrated system between departments.
(b) Delay caused by manual registration of patient details in HIS system.
(c) Delay caused by inefficient ward management system.
(d) Time wasted to acquire the required stretcher/wheelchair

2.2. Function Phase

In this step all the functions related to the admission process including OPD, Patient/Patient Attendant, Admission Counter Staff, Staff/Nurse and Doctor are shown in

Table 1. *Function of Process Component.*

FUNCTION	EXPLAINATION	AVERAGE TIME (min)
OPD	Generate OPD Cards.	2
	To Check Up the patient.	-
	Refers for admission.	2
Patient or Patient attendant	Goes to OPD for OPD Card/Admission Referral.	3
	Goes to the admission counter for admission process.	3
	Gives patient details for admission.	3
	Inquires ward type.	2
	Check and selects the ward.	15
	Token amount payment.	2
	Gets admission file verified.	5
	Goes to the staff/nurses for patient movement into the ward.	10
Admission Counter staff	Check Doctor's referral.	1
	Record patient details in the HIS system.	5
	Generates case file.	1
	Write patient details on the case file.	1
	Tells the ward details.	2
	Checks ward availability from staff. (landline)	15
	Inform patient regarding ward availability.	1
	Enters ward details and amount on system.	1
	Receives token amount.	2
	Prints token amount receipt.	1
	Attaches OPD Card and token amount receipt to the case file.	2
Staff/Nurse	Checks the availability of wards.	15
	Receive verified case file.	6
	Check the mobility of the patient.	1
	Arrange wheelchair/stretcher if required.	5
	Transport patient to the ward.	10
Doctor	Starts Pre-investigation/ Lab investigation/Diagnosis.	-
	Performs routine treatment.	-

2.3. Creative Phase

In this step team members used brainstorming technique to formulate new ideas for improving the functions which were drawn out through the discussion in functional phase. The ideas are tabulated in Table 2: Suggested Ideas for function of process component.

2.4. Evaluation Phase

In this stage, multiple ideas were brought in front of the team members after the brainstorming session to check the feasibility of the ideas for the next phase. A summary of selected ideas includes the following:

(a) Employing new staff in sectors related to the process.
(b) Training staff to use HIS system effectively.
(c) To cut down Patient/Patient attendant travel time.
(d) Coordination between the departments involved.
(e) To reduce que time at admission counter.
(f) Registering patient details electronically.
(g) Training staff to use ward management system.
(h) To cut down patient wait time in the ward after admission.
(i) Eliminate manual work as much as possible.
(j) Implement ward management system.

We can't use all of these ideas, so we must pay attention to the goals of value engineering that try to omit unnecessary costs and activities. Hence by using value added management process we must choose ideas that are more valuable and also consider the current conditions of hospitals where they could be used. In the next step better ideas will be developed.

2.5. Development Phase

In this stage we consider hospital conditions and evaluation criteria and select the ideas which are more practical for implementation and can be used in healthcare centers to improve admission process. These development ideas include the following:

(a) To develop an integrated system between the OPD and admission section.
(b) To register patient details electronically.
(c) Not sending the case file through patient attendant for verification.
(d) Auto verification of case file electronically.
(e) Not sending the staff to manually check on the wards.
(f) To develop ward management system for regular updates on ward availability.
(g) To station stretcher and wheelchair close to the department.
(h) To notify doctor electronically after patient transfer to the ward.

By implementing an integrated system between the OPD and admission section there is a reduction in the time required for registering of patient details in the HIS system and it further results to cut down the que time at admission section as the patient just needs to finalize the ward and make the token amount payment. If ward management system is implemented, then there is no need for the staff to check manually on the wards and reporting to the admission section thus saving valuable time for the patient attendant. Through electronic file verification the patient can be prepared for transfer to the ward prematurely without the need for patient attendant to return to the OPD from Admission section. E-notification to the doctor after the patient is transferred to the ward cuts down the wait time for the pre-investigation

Table 2. *Suggested Ideas for function of process component.*

Function	Idea's Explanation
OPD	Prepare OPD Cards electronically through Government ID.
	Record patient details from the Government ID.
	Implement integrated system between OPD and Admission Section.
	Send patient details and admission referral to admission section electronically.
Admission Section	Train staff to use the HIS system effectively.
	Hire multiple counter staff to reduce que times and increase efficiency.
	Receive the patient details from OPD through the integrated system.
	Implementing ward management system to keep track of wards.
	Use display panel to display ward, patient and payment details.
	Print and attach patient details and token amount receipt to the case file.
	Send admission confirmation to staff section electronically.
Staff/Nurse Department	Train staff to use ward management system effectively.
	Update the availability of wards on ward management system regularly.
	Receive admission notifications from admission section electronically.
	Stationing stretcher/wheelchair close to the department.
	Sending E-Notification to doctor after patient's transfer.
Doctors	Attends to the patient as soon as E-Notification is received.

2.6. Presentation Phase

After the development of ideas, a new flow process was created according to it. The Process after improvement is shown in Figure 2: Admission Process after Improvement.

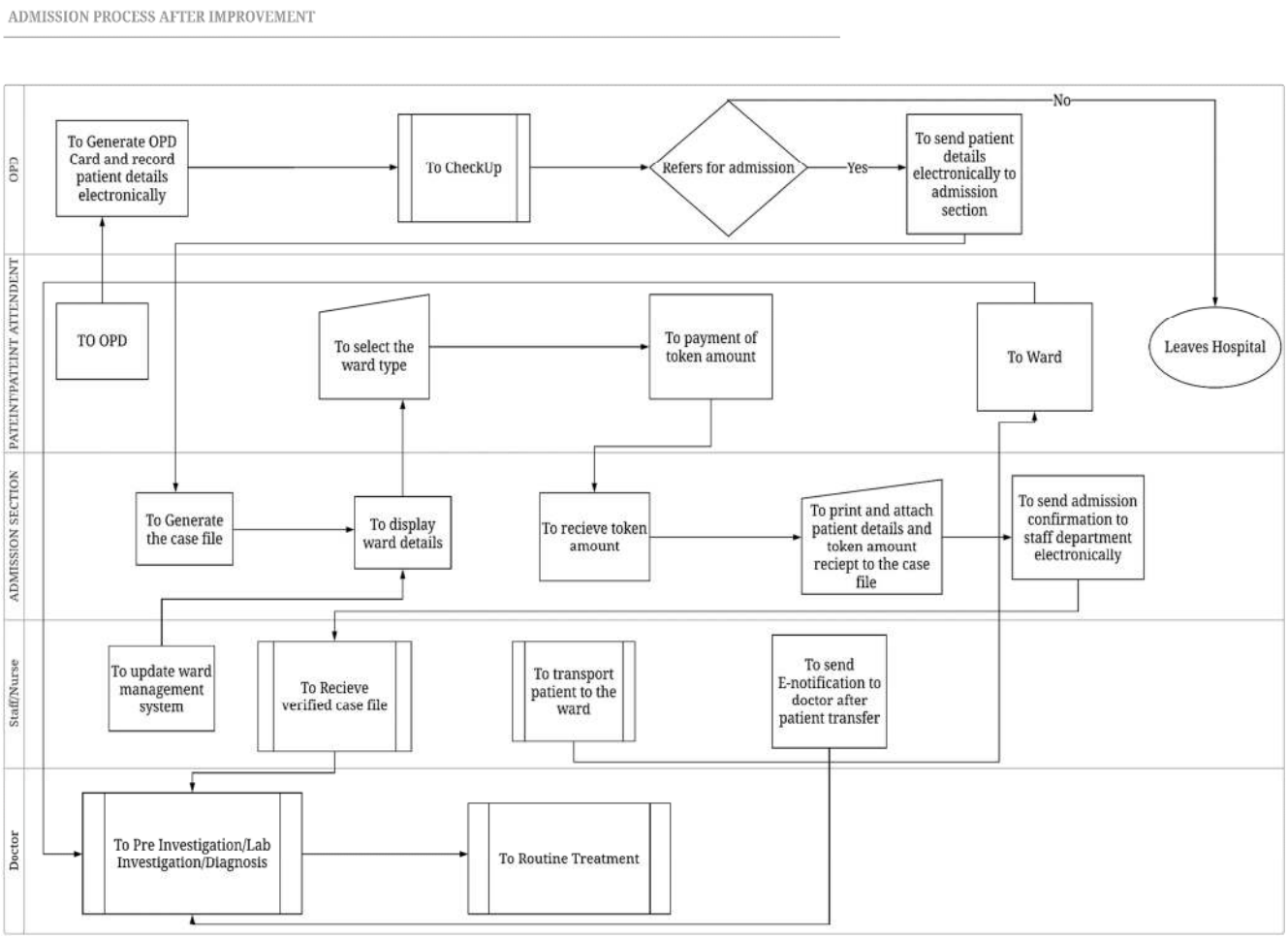

Figure 2. *Admission Process after Improvement.*

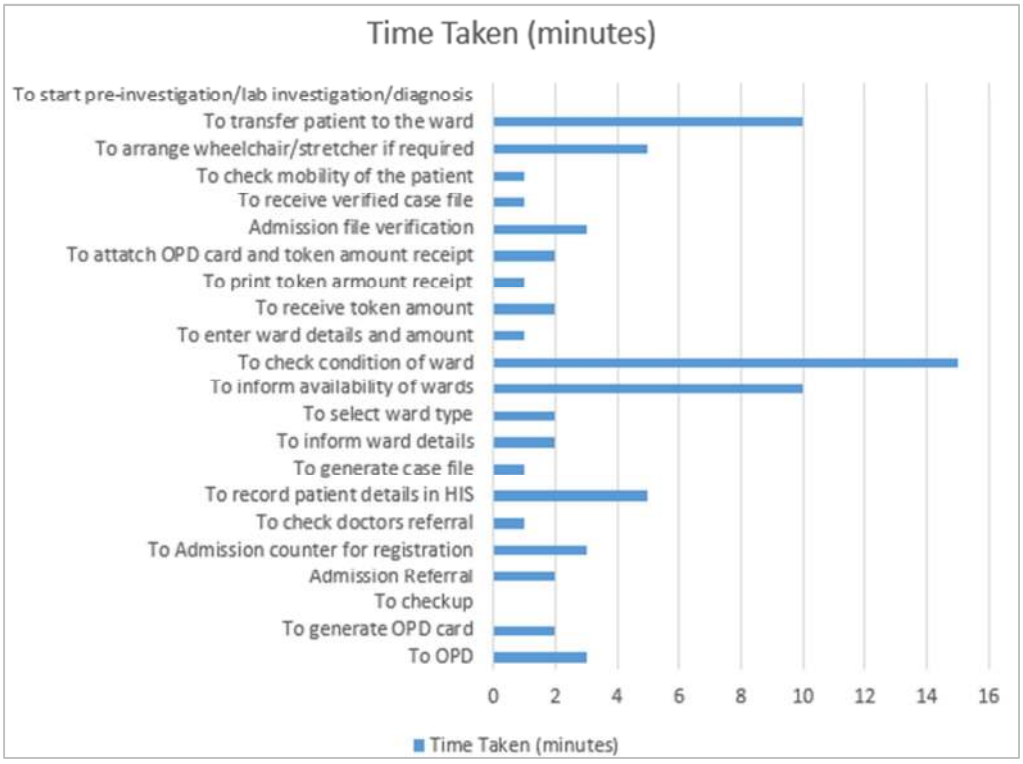

Figure 3. *Time diagram for current admission process.*

According to the new ideas, while improving the process the core functions of the hospital staff were not changed but the methods used to perform a function were changed to increase the efficiency and reduce time required for it. For example, when performing the function of generating patient admission case file there were several manual and ineffective methods used such as asking the patient attendant for the patient details and entering those details manually into the HIS system, however the idea of using government id to generate the patient details was proposed by the value engineering team, the patient would be asked for the Government ID during the generation of OPD card and the patient details would be automatically filled with the help of the id after which the OPD would electronically transfer the patient details to the admission section so that only the ward selection and payment of token amount would be left by the time the patient attendant reaches the admission section for admission. By computerizing the above process of generating admission case file it was possible to remove the assistant who performs manual work and place him in another empty counter to increase efficiency and reduce the que time.

The time diagram for current admission process is shown in Figure 3: Time diagram for current admission process.

The time diagram for improved admission process is shown in Figure 4: Time diagram for admission process after improvement.

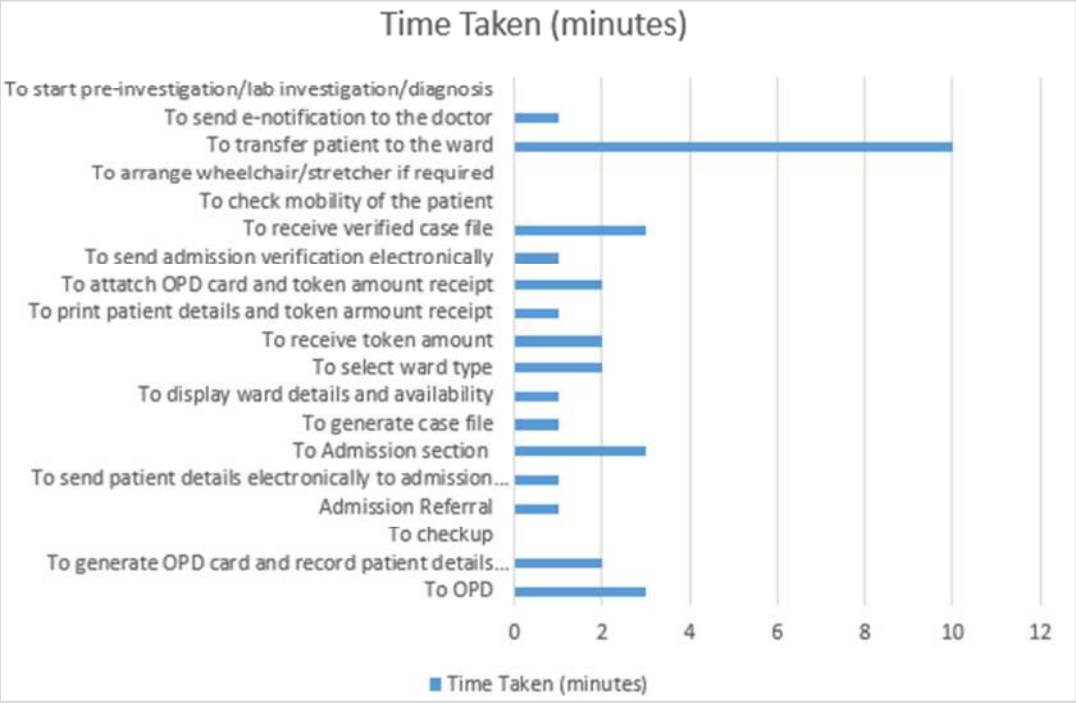

Figure 4. *Time diagram for admission process after improvement.*

The total time required for the admission of a patient into the hospital under the current process was found to be 1 hour and 12 minutes and the total time required for the admission of a patient into the hospital after improvement was estimated to be 32 minutes. Thus, it was estimated that 40 minutes were saved after the use of value-added management practice (VAMP) to improve the current admission process. The time comparison table for key functions is given below in Table *3*: Comparison of time for key process functions before and after improvement.

Table 3. *Comparison of time for key process functions before and after improvement.*

Function (activity)	Before Improvement (minutes)	After Improvement (minutes)
To complete OPD documentation process	7	5
To complete admission documentation process	11	6
To complete ward allocation process	28	2
To generate case file	6	3
To transfer the patient into the ward	20	16

3. Key Points on Implementation

The reasons for implementing this research study is explained below and the key points are segregated in terms of value proposition, cost analysis and relationship. It has been represented through a canvas model.

(a) The patient satisfaction is achieved by providing a timely and effective service for admission.

(b) Valuable time is saved for the patient/patient attendant and staff by eliminating the obsolete and complex methods used in admission process and implementing

creative solutions.

(c) Productivity of the healthcare center is improved by efficient utilisation of the resources and work force.

(d) The operational cost for the healthcare center is reduced by eliminating the redundant steps involved in the admission process.

(e) Increase of patient admission rate by reducing long queue times.

(f) Reduce unnecessary patient/patient attendant movement.

(g) Service quality is improved for health care centers.

(h) Amount of time required per admission is reduced.

4. Conclusion

The service-based sectors such as hospitals are public agencies that have complex and inefficient procedures. Thus, it becomes necessary to decrease the time wasted on unnecessarily complex procedures and improve the overall process regarding the admission of a patient into the hospital to increase efficiency as well as customer satisfaction. To achieve this, we used management techniques such as Value Engineering and Value-added management practice which was used extensively in service-based industries.

The aim of this study is to improve the current admission process used in healthcare centers by using Value added management practice (VAMP). The performance of the current admission process was compared with the improved admission process and it was found that by focusing on eliminating unnecessary procedures and improving the current process by adopting new and creative methods resulted in the improvement of service quality and customer satisfaction as well as saving precious time for the patient/patient attendant. For future studies it is suggested for the researcher to focus on the procedures the patient/patient attendant must follow once the patient is admitted and till the patient is approved for discharged.

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