A STUDY ON OUT-PATIENT SERVICES AND TIME MANAGEMENT AT FORTIS MALAR HOSPITAL, CHENNAI, INDIA.
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Abstract
The ultimate aim behind the study is to reconstruct the existing process in the department of outpatient, by measuring the parameter such as time. The assessment of this parameter is to analyze those processes which are functioning worst and that are most likely to be successfully reengineered, thereby helps the hospital in ensuring flawless functioning of OPD. Determination of waiting time cost of waiting time & its reduction, identification of Bottle necks. The study is used to analyze alternatives & arrive at solutions to many of all these problems. Data necessary to know – how often patients arrive? How long it take to serve them? The order in which patients are served? With all these data queuing problem can be solved. It is a comprehensive survey of research on scheduling of appointment in the out-patient department. The main goal of an effective appointment scheduling system is that it matches the demand with capacity, thereby enables the proper utilization of resources and also minimization of waiting time.

Keywords: Out-patient department, Waiting time, Queuing process and Appointment scheduling.

INTRODUCTION
A patient who is not hospitalized for 24 hours or more but who visits a hospital, clinic, or associated facility for diagnosis and treatment is known as an out-patient. This type of treatment is otherwise called as ambulatory care. An outpatient surgery is usually performed without having to be hospitalized or a stay overnight, the benefits of which includes cutting down the amount of medication and utilizing the doctor’s or surgeon’s time more efficiently. Patients requiring minor or intermediate procedures prefer outpatient surgery provided in a healthy state which includes cases like ear, nose and throat surgeries, ophthalmologic, limited urologic and procedures involving the extremities. Out-patient department is a division of the hospital which has standard scheduled hours, specific equipments and trained personnel with required strength. Its main aim is to give care for those patients who do not come under the category of in-patient while receiving health services. An OPD is the first point of contact and it is the shop window of hospital which makes or marks the hospital image. A good OPD service can reduce the load on in-patient services as it is a place for implementing preventive & promotive health activities.

SCOPE
The important scope of the research or study is to reduce the general problem of waiting time in an Out-patient department by focusing on various formulations and modeling considerations in addition to the use of comprehensive methodologies or research tools.

LITERATURE REVIEW
Robert B. Fetter and John D. Thompson attempted a study on, “Patients’ waiting time and doctors’ idle time in the outpatient setting” which says in-order to make outpatient care acceptable and efficient for the patients, it is necessary that the doctor’s idle time and patient’s waiting time should be well balanced.

JF Rockart and Paul B Hoffman framed a study on, “Physician and patient behavior under different scheduling systems in a hospital OPD” which reveals that a patient-arrival spacing dimension has greater impact in the field of scheduling of ambulatory patients which is divided into two dimensions namely pure block systems (where patients are told to arrive before the clinic starts / operates) and individual appointments system (where appointments are given at intervals which approximate the average physician service time).

Suresh Chand, Herbert Moskowitz, John b. Norris, Steve shade and Deanna r. Willis conducted a study on, “Improving patient flow at an outpatient clinic: study of sources of variability and improvement factors” which throws light on analyzing and improving patient flow at an outpatient clinic by identifying sources of variability and improvement factors through a structured process analysis and improvement approach.

Santibáñez, Vincent.Chow, John French, Martin L. Peterman and Scott Tyldeasley attempted a study on, “Reducing patient wait times and improving resource utilization at british columbia cancer agency’s ambulatory care unit through simulation” which has found that it’s through simulation that brings in simultaneous impact of resource allocation and utilization of resources on clinic overtime, patient wait time, operations and scheduling.

P.R.Harper and H.M.Gamlin conducted a study, “Reduced waiting times with improved appointment scheduling : a simulation modeling approach” which describes the development and use of a detailed simulation model of an Ear, Nose and Throat (ENT) outpatient department. The simulation allows various appointment schedules to be examined and their effects on the clinic evaluated. The model has been used to identify a number of critical factors that influence patient waiting times and the buildup of queues in the clinic. Alternative appointment schedules have been shown to drastically reduce patient waiting times, without the need for extra resources, and enable the department to move towards meeting the UK Government’s Patient’s Charter.

Edward.J. Rising, Robert Baron and Barry Averill attempted a
study on, “A systems Analysis of a University –Health –Service Outpatient Clinic” which presents a case study on the use of mathematical-computer models in developing operating policies for a university-health-service outpatient clinic. Based on results predicted by the models, actual policy changes were made in the system; the paper compares the subsequent real-world results with those predicted by the models. The comparison demonstrated the validity of the models, and significant improvements were realized in the changed system. An analysis of daily arrival patterns was used to schedule more appointment patients during periods of low walk-in demand in order to smooth the overall daily arrivals. A Monte Carlo simulation model showed the effects of alternative decision rules for scheduling appointment periods during the day to increase patient throughput and physician utilization.

RESEARCH METHODOLOGY

AREA OF RESEARCH
The survey was conducted in the OUT PATIENT CLINIC of FORTIS MALAR HOSPITAL.

RESEARCH DESIGN
The research design of this project is descriptive in nature or otherwise called as statistical research which explains or describes data and characteristics of the phenomenon or population being studied.

SOURCES OF DATA
The study is based on Primary data collection using observation method order to observe the total time of each patient. When the information is gathered by the investigators based on their direct observation it is known as the observation method. A researcher usually undertakes primary research only after gaining thorough knowledge into the issue by reviewing secondary data which includes direct observation, interviews and questionnaires.

PERIOD OF STUDY
The duration of the study was 1 month from 1st July to 31st July 2011.

SAMPLING TECHNIQUE
Convenience sampling technique was used. It is a non-probability sampling technique where subjects are normally selected based on their proximity and convenient accessibility to the researcher.

SAMPLING SIZE
Sample size taken for the study is 195.

STATISTICAL TOOLS
The statistical tools used in the study are CHI SQUARE TEST, PIE DIAGRAM AND FISH BONE DIAGRAM.
CHI-SQUARE TEST ANALYSIS
WAITING TIME OF PATIENTS IN CARDIOLOGY SECTION (MINUTES)

\[ \chi^2 = \frac{(O-E)^2}{E} \]

**CALCULATED VALUE**  
\[ \chi^2 = 49.38462 \]  
\[ \chi^2 = 7.815 \]

Assuming,

\[ H_0 = \text{There is no significant difference in relation to overall waiting time and waiting time expected} \]

\[ H_a = \text{There is significant difference in relation to overall waiting time and waiting time expected} \]

Here, \( H_a > H_0 \), calculated value is greater than table value hence \( H_0 \) is rejected.

Therefore, there is a significant difference in relation to overall waiting time and waiting time expected.

WAITING TIME OF PATIENTS IN DERMATOLOGY SECTION (MINUTES)

<table>
<thead>
<tr>
<th>OVERALL WAITING TIME</th>
<th>WAITING TIME EXPECTED</th>
<th>TOTAL WAITING TIME</th>
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<td>4</td>
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<tr>
<td>1</td>
<td>4</td>
<td>2.25</td>
</tr>
</tbody>
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\[ \chi^2 = \frac{(O-E)^2}{E} \]

**CALCULATED VALUE**  
\[ \chi^2 = 40.25 \]  
\[ \chi^2 = 21.026 \]

Assuming,

\[ H_0 = \text{There is no significant difference in relation to overall waiting time and waiting time expected} \]

\[ H_a = \text{There is significant difference in relation to overall waiting time and waiting time expected} \]

Here, \( H_a > H_0 \), calculated value is greater than table value hence \( H_0 \) is rejected.

Therefore, there is a significant difference in relation to overall waiting time and waiting time expected.

WAITING TIME OF PATIENTS IN GENERAL PHYSICIAN’S SECTION (MINUTES)

<table>
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\[ \chi^2 = \frac{(O-E)^2}{E} \]

**CALCULATED VALUE**  
\[ \chi^2 = 8.67 \]  
\[ \chi^2 = 9.488 \]

Assuming,

\[ H_0 = \text{There is no significant difference in relation to overall waiting time and waiting time expected} \]

\[ H_a = \text{There is significant difference in relation to overall waiting time and waiting time expected} \]

Here, \( H_a > H_0 \), table value is greater than calculated value hence \( H_0 \) is rejected.

Therefore, there is no significant difference in relation to overall waiting time and waiting time expected.
waiting time and waiting time expected.

**WAITING TIME OF PATIENTS IN E.N.T SECTION (IN MINUTES)**

<table>
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<tr>
<td>2</td>
<td>3</td>
<td>0.333333</td>
</tr>
</tbody>
</table>

\[ \chi^2 = \frac{(O-E)^2}{E} \]

CALCULATED VALUE  
\[ \chi^2 = 2 \]

TABLE VALUE  
\[ \chi^2 = 7.815 \]

Assuming,

\( H_0 \) = There is no significant difference in relation to overall waiting time and waiting time expected.

\( H_a \) = There is significant difference in relation to overall waiting time and waiting time expected.

Here, \( H_a > H_0 \), table value is greater than calculated value hence \( H_a \) is rejected.

Therefore, there is no significant difference in relation to overall waiting time and waiting time expected.

**WAITING TIME OF PATIENTS IN E.C.G. SECTION (IN MINUTES)**

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<th>OVERALL WAITING TIME</th>
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<tr>
<td>1</td>
<td>4.17</td>
<td>2.409808</td>
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</tbody>
</table>

\[ \chi^2 = \frac{(O-E)^2}{E} \]

CALCULATED VALUE  
\[ \chi^2 = 5.75 \]

TABLE VALUE  
\[ \chi^2 = 9.488 \]

Assuming,

\( H_0 \) = There is no significant difference in relation to overall waiting time and waiting time expected.

\( H_a \) = There is significant difference in relation to overall waiting time and waiting time expected.

Here, \( H_a > H_0 \), table value is greater than calculated value hence \( H_a \) is rejected.

Therefore, there is no significant difference in relation to overall waiting time and waiting time expected.

**WAITING TIME OF PATIENTS IN BLOOD INVESTIGATION SECTION (MINUTES)**

<table>
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<th>OVERALL WAITING TIME</th>
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<tr>
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</tbody>
</table>

\[ \chi^2 = \frac{(O-E)^2}{E} \]

CALCULATED VALUE  
\[ \chi^2 = 6.164 \]

TABLE VALUE  
\[ \chi^2 = 5.991 \]

Assuming,

\( H_0 \) = There is no significant difference in relation to overall waiting time and waiting time expected.

\( H_a \) = There is significant difference in relation to overall waiting time and waiting time expected.

Here, \( H_a > H_0 \), calculated value is greater than table value hence \( H_a \) is rejected.

Therefore, there is a significant difference in relation to overall waiting time and waiting time expected.

**WAITING TIME OF PATIENTS IN TREADMILL TEST SECTION (MINUTES)**

<table>
<thead>
<tr>
<th>OVERALL WAITING TIME</th>
<th>WAITING TIME EXPECTED</th>
<th>TOTAL WAITING TIME</th>
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<td>4</td>
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</tr>
<tr>
<td>2</td>
<td>1.6</td>
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</tr>
</tbody>
</table>

\[ \chi^2 = \frac{(O-E)^2}{E} \]

CALCULATED VALUE  
\[ \chi^2 = 27.54 \]

TABLE VALUE  
\[ \chi^2 = 11.070 \]

Assuming,

\( H_0 \) = There is no significant difference in relation to overall waiting time and waiting time expected.

\( H_a \) = There is significant difference in relation to overall waiting time and waiting time expected.

Here, \( H_a > H_0 \), calculated value is greater than table value hence \( H_a \) is rejected.

Therefore, there is a significant difference in relation to overall waiting time and waiting time expected.
MAJOR FINDINGS

1) FOR AVERAGE TIME SPENT BY PATIENTS IN THE CARDIOLOGY SECTION
2 minutes 24 seconds spent for registration, 15 minutes spent for waiting, 10 minutes 16 seconds spent for consultation, 2 minutes 36 seconds spent for billing, 29 minutes 36 seconds is the total time.

2) FOR AVERAGE TIME SPENT BY PATIENTS IN THE PAEDIATRICS SECTION
1 minute 48 seconds spent for registration, 44 minutes 17 seconds spent for waiting, 4 minutes 32 seconds spent for consultation, 2 minutes 27 seconds spent for billing, 51 minutes 6 seconds is the total time.

3) FOR AVERAGE TIME SPENT BY PATIENTS IN THE DERMATOLOGY SECTION
1 minute 24 seconds spent for registration, 19 minutes 47 seconds spent for waiting, 15 minutes 11 seconds spent for consultation, 2 minutes 28 seconds spent for billing, 37 minutes 29 seconds is the total time.

4) FOR AVERAGE TIME SPENT BY PATIENTS IN THE GENERAL PHYSICIAN’S SECTION
1 minute 56 seconds spent for registration, 26 minutes 29 seconds spent for waiting, 15 minutes 11 seconds spent for consultation, 2 minutes 23 seconds spent for billing, 35 minutes 44 seconds is the total time.

5) FOR AVERAGE TIME SPENT BY PATIENTS IN THE E.N.T SECTION
2 minutes 8 seconds spent for registration, 22 minutes 7 seconds spent for waiting, 7 minutes 8 seconds spent for consultation, 2 minutes for billing, 33 minutes 23 seconds is the total time.

6) FOR AVERAGE TIME SPENT BY PATIENTS IN THE E.C.G SECTION
1 minute 57 seconds spent for registration, 17 minutes 38 seconds spent for waiting, 9 minutes 52 seconds spent for consultation, 1 minute 33 seconds spent for billing, 30 minutes 21 seconds is the total time.

7) FOR AVERAGE TIME SPENT BY PATIENTS IN THE ECHO CARDIOGRAM SECTION
1 minute 5 seconds spent for registration, 10 minutes 15 seconds spent for waiting, 15 minutes 15 seconds spent for consultation, 2 minutes spent for billing, 28 minutes is the total time.

8) FOR AVERAGE TIME SPENT BY PATIENTS IN THE BLOOD INVESTIGATION
1 minute 41 seconds spent for registration, 5 minutes 16 seconds spent for waiting, 6 minutes 59 seconds spent for consultation, 2 minutes 16 seconds spent for billing, 14 minutes 53 seconds is the total time.

9) FOR AVERAGE TIME SPENT BY PATIENTS FOR THE TREADMILL TEST SECTION
2 minutes 24 seconds spent for registration, 15 minutes spent for waiting, 10 minutes 16 seconds spent for consultation, 2 minutes 36 seconds spent for billing, 29 minutes 36 seconds is the total time.

SUGGESTIONS

1) Additional clinical and non-clinical staff would help in reducing waiting time in consultation and diagnostic sections.

2) The OP timings may be changed depending upon the patient flow.

3) Doctors should spend the whole day in OPD.

4) The doctors should come on the stipulated time, so that the waiting time of patients can be reduced drastically.

5) There should be appointment system followed strictly, to avoid waiting time. Appointment systems either BLOCK or INDIVIDUAL appointments can be used.

6) Similarly, in OP waiting area amenities like Toys for the children and television programmes can be introduced in order to control patients and attenders in pediatrics and other sections in OP department.

7) Time for registration and billing can be reduced.

8) Blood test reports should be dispatched quickly.

9) The outpatient department can be expanded.

CONCLUSION

Waiting time is a common problem encountered in this hospital. So the management of FORTIS MALAR HOSPITAL wants to know the average waiting time and the suggestions to reduce waiting time. A study was conducted for a month on “waiting time of patients towards consultation and diagnostic procedures in OPD” to minimize waiting time as much as possible. The time bound nature of service is a critical management today, especially with customer becoming more time sensitive and more conscious of their personal time constraints and availability. The study reveals the waiting time in OPD is very high. The prolonged waiting time leads to patient dissatisfaction. It may affect the hospital’s reputation also, in the long run. The management and the hospital authorities should take necessary steps to reduce the waiting time in OPD.

References


2) JF Rockart and Paul B. Hoffman, “Physician and patient behavior under different scheduling systems in a hospital OPD” Medical Care, November/December 1969, Vol 7, No. 6.


