

A Time Motion Study of Healthcare Delivery System at General OPD of Rural Hospital of West Bengal

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ABSTRACT

BACKGROUND: Outpatient Department (OPD) congestion and long waiting time in OPD is an important challenge for hospital administration.

OBJECTIVE: A time motion study was conducted in OPD of Domjur Rural Hospital on around forty patients by simple observation technique to find out the time spent in various service delivery sections and the overall satisfaction of patients regarding total time spent in OPD.

METHODS: Data obtained by simple observation technique and patient interview.

RESULTS: Average waiting time in various sections was observed and statistically analyzed. Study revealed maximum time is spent by a patient in waiting outside OPD for consultation but time for consultation is very less. Interview of patients were also conducted regarding their satisfaction and suggestions were provided to hospital management for implementation of newer techniques in order to reduce OPD congestion.

Keywords: time-motion, healthcare delivery system, patient satisfaction, Rural Hospital

INTRODUCTION

Nothing in this world is more important than time. A time and motion study is a business efficiency system that was developed by combination of the time study work of Frederick Winslow Taylor with motion study work of Frank B. Gilbreth and Lillian Gilbreth. [1,4] It is a major portion of scientific management. [3]

The two techniques became integrated and refined into a widely accepted method applicable to the improvement and up-gradation of working systems. The objective of a time motion study is to assess average time for a job by simple observation and recording of time being devoted to each task. Time motion studies are thus used for performance evaluation and planning purposes. [7] Outpatient Department (OPD) congestion and long waiting time in OPD is an important challenge for hospital administration. Outpatient department of any government hospital is a very important place as it provides various services to different types of patients. OPD is considered as the doorway to hospital services and a patient's impression of the hospital first begins at the OPD. Good Impression increases patient's sensitivity towards the hospital and therefore it is important to ensure that OPD services provide an excellent experience for patients. A Time Motion Study was carried out in Domjur Rural Hospital because records revealed that during the last two decades, the number of patients seeking OPD services in Domjur hospital has increased many folds, but the facilities, infrastructure and manpower in the OPD have not escalated at the same rate. Domjur Rural Hospital is a 40 bedded hospital providing mainly medicine, gynaecology, emergency and OPD services. There are currently 6 medical officers including BMOH without any specialists in Domjur Hospital. Daily

OPD patients are around 120. One Medical Officer and a intern by rotation looks after general OPD consultation. Study shows that the number of service providers below a certain threshold level gives rise to infinite queue and if it is above threshold level waiting time and queue is lower. [2] A study conducted in tertiary centre in India shows that appointment of primary care physicians for screening of patients reduces congestion and waiting time. [5] Congestion of OPD also varies according to nature of speciality of hospital. [6] Huge number of patients in the OPD with limited manpower and resource in Domjur Rural Hospital, create chaos, congestion, queuing as well as the chance of mismanagement. OPD thus requires an in-depth study of its services for its efficient management and function. It is therefore crucial that a simple time and motion study of an OPD system with appropriate inexpensive interventions and suggestions can travel a long way to make hospital services better and more efficient.

OBJECTIVES

General

To assess the time spent in different service delivery points in OPD of Domjur Rural Hospital to reduce OPD congestion.

Specific

1. To assess the average time spent in different service delivery points in OPD of Domjur Rural Hospital.
2. To assess the patient satisfaction regarding the time spent by him in OPD and the quality of service delivery.
3. To identify the shortcomings, if any, at various sections leading to such congestion and queue and to suggest various methods of decreasing congestion in OPD.

MATERIALS AND METHODS

The study carried out was an institution based observational descriptive study with cross-sectional design at Domjur Rural Hospital, district Howrah, West Bengal which is the rural field practice area of Community Medicine Department of Calcutta National Medical College and

Hospital. Total study period was 2 months out of which data collection was 1 month. In this present study 2 types of activities were carried out. First one was mainly to observe and note down the exact time at which a particular patient reached a particular counter, with the help of stop watch. The study subject was totally unaware of the staff assigned to note down the time at the particular counter. In the second step the same patient was interviewed with a predesigned pretested schedule. Prior consent for study was obtained from BMOH and ethical clearance was obtained from institutional ethics committee of Calcutta National Medical College and Hospital. Pretesting revealed that 5 proformas can be filled up each day as study of 1 patient takes more than a hour. Going twice weekly on Monday and Thursday the sample size for the study is estimated to be 40. Taking non respondents into account the ultimate study sample size was 50. Medical Interns were informed regarding study procedures, trained and were assigned at various service delivery points to note down the time of entry and exit. Patients who arrived at registration counter within 9 am and 2 pm were selected by systematic random sampling. On an average around 120 patients attend OPD daily. The first patient was selected among first 10 patients attending registration counter by lottery method and then every 24th patient was selected and provided with a token number at the entrance. They were requested to show the token to all counters they attend and come to the registration counter at the end. Interview of patients were conducted and socio-demographic data collected along with patient satisfaction data during exit. Data was compiled and analyzed by Microsoft Office Excel 2007 software and SPSS software.

RESULTS

Patient Demography - 35% of Patients were in the age group of 20-40 years of age, while 40% were of 50-60 years of age and 15% above 60 years. As per the sex ratio of

subjects is concerned, 40 % were male, while rest 60% were female. Among study patients 15% were illiterate, 40% primary school passed and the rest middle school

passed. Majority of patients belonged to lower class and lower middle class according to modified BG Prasad socio-economic scale 2017.

Table1. Showing Waiting Time of Patients in Registration Counter (in hrs)

SL NO	ARRIVAL TIME	EXIT TIME	TIME SPENT	SL NO	ARRIVAL TIME	EXIT TIME	TIME SPENT
1	09:11:21	09:22:45	00:11:24	21	09:29:00	09:42:45	00:13:45
2	09:12:21	09:25:54	00:13:33	22	09:41:24	09:45:38	00:04:14
3	09:14:21	09:26:43	00:12:22	23	09:42:57	09:45:38	00:02:41
4	09:33:39	09:48:12	00:14:33	24	10:01:33	10:10:39	00:09:06
5	09:35:12	09:38:03	00:02:51	25	09:30:33	09:36:34	00:06:01
6	09:52:15	10:12:08	00:19:53	26	09:46:03	09:54:07	00:08:04
7	09:47:36	09:54:55	00:07:19	27	09:38:18	09:39:59	00:01:41
8	09:53:48	09:55:39	00:01:51	28	09:47:36	09:49:45	00:02:09
9	09:38:18	09:45:13	00:06:55	29	09:41:24	09:52:49	00:11:25
10	09:56:54	10:09:40	00:12:46	30	09:50:42	10:06:51	00:16:09
11	09:44:30	09:52:19	00:07:49	31	09:36:25	09:50:30	00:14:05
12	09:50:42	10:14:23	00:23:41	32	09:38:25	09:46	00:08:10
13	09:32:06	09:50:23	00:18:17	33	09:45:36	09:55:15	00:09:39
14	09:58:27	10:12:14	00:13:47	34	09:28:45	09:40:14	00:11:29
15	09:27:27	09:38:26	00:10:59	35	09:32:20	09:41:13	00:08:53
16	09:39:51	09:40	00:00:56	36	09:38:45	09:47:23	00:08:38
17	09:36:45	09:45:46	00:09:01	37	09:50:30	10:12:23	00:21:53
18	09:55:21	10:23:22	00:28:01	38	09:58:17	10:08:00	00:09:43
19	09:49:09	10:07:15	00:18:06	39	09:13:25	09:26:08	00:12:43
20	10:00:00	10:08:28	00:08:28	40	09:10:30	09:17:15	00:06:45

Mean Waiting Time in Registration Counter= 0:10:45 SD =+/- 0:06:10

Registration: In this study, mean registration time was calculated as 10 min 45 sec ±6 min 10 sec. Experience in registration area was very good by 40% , good by 35%, poor by 15% and 10% told it was satisfactory. It was normal according to 40% people slow for 30% patients and very slow for 15%. There is scope of improvement as quite a number of beneficiaries are still unsatisfied by waiting in queue for registration.

Table 2. Showing Waiting Time of Patients in OPD(hrs)

SL NO	ARRIVAL TIME	ENTRY IN OPD	TIME SPENT	SL NO	ARRIVAL TIME	ENTRY IN OPD	TIME SPENT
1	09:23:05	10:38:36	01:15:31	21	09:45:57	10:57:02	01:11:05
2	09:26:34	10:47:41	01:21:07	22	09:47:49	11:08:43	01:20:54
3	09:28:01	10:40:28	01:12:27	23	09:47:38	11:06:29	01:18:51
4	09:50:03	11:09:03	01:19:00	24	10:11:00	11:18:28	01:07:28
5	09:39:45	10:56:33	01:16:48	25	09:38:32	10:18:23	00:39:51
6	10:14:19	11:25:43	01:11:24	26	09:55:09	10:46:03	00:50:54
7	09:55:59	11:20:41	01:24:42	27	09:41:21	10:36:12	00:54:51
8	09:57:23	11:31:33	01:34:10	28	09:51:37	11:26:02	01:34:25
9	09:47:10	10:57:27	01:10:17	29	09:55:51	10:54:23	00:58:32
10	10:11:02	11:42:57	01:31:55	30	10:08:29	11:27:39	01:19:10
11	09:53:45	11:25:39	01:31:54	31	09:53:34	11:15:23	01:21:49
12	10:16:04	11:50:36	01:34:32	32	09:49:07	11:06:13	01:17:06
13	09:51:37	11:09:02	01:17:25	33	09:57:08	11:18:36	01:21:28
14	10:13:55	11:38:43	01:24:48	34	09:43:25	10:40:08	00:56:43
15	09:39:00	10:56:13	01:17:13	35	09:45:02	10:50:30	01:05:28
16	09:41:49	11:08:34	01:26:45	36	09:50:31	11:00:25	01:09:54
17	09:46:39	11:24:37	01:37:58	37	10:15:30	11:05:32	00:50:02
18	10:24:59	11:45:32	01:20:33	38	10:09:26	11:15:09	01:05:43
19	10:08:37	11:26:03	01:17:26	39	09:30:06	10:20:16	00:50:10
20	10:09:04	11:38:35	01:29:31	40	09:19:35	10:40:12	01:20:37

Mean Waiting Time in OPD = 1:15:15 SD =+/- 0:13:49

OPD: Mean Waiting time in OPD area for their turns, is very high, i.e. 1 Hour, 15 min, 15 sec ± 13 min 49 sec. 65% of patient told that OPD was running slow and very slow, while 75% people notified that patient turnover rate was slow or very slow. According to 17.% people, it was observed that doctor was giving sufficient time to patients, while 37% admitted that this time was less. In this real time study, average consultation time was observed 3 min 46sec ± 1 min 27 sec.

Table 3. Showing Consultation Time in OPD(hrs)

SL NO	ENTRY TIME	EXIT TIME	TIME SPENT	SL NO	ENTRY TIME	EXIT TIME	TIME SPENT
1	10:38:36	10:40:32	00:01:56	21	10:57:02	11:03:25	00:06:23
2	10:47:41	10:48:25	00:00:44	22	11:08:43	11:15:06	00:06:23
3	10:40:28	10:44:19	00:03:51	23	11:06:29	11:09:38	00:03:09
4	11:09:03	11:13:24	00:04:21	24	11:18:28	11:23:49	00:05:21
5	10:56:33	10:59:21	00:02:48	25	10:18:23	10:23:47	00:05:24
6	11:25:43	11:28:27	00:02:44	26	10:46:03	10:50:32	00:04:29
7	11:20:41	11:25:02	00:04:21	27	10:36:12	10:40:35	00:04:23
8	11:31:33	11:32:59	00:01:26	28	11:26:02	11:29:00	00:02:58
9	10:57:27	11:02:41	00:05:14	29	10:54:23	10:59:03	00:04:40
10	11:42:57	11:46:45	00:03:48	30	11:27:39	11:30:03	00:02:24
11	11:25:39	11:28:34	00:02:55	31	11:15:23	11:17:47	00:02:24
12	11:50:36	11:54:15	00:03:39	32	11:06:13	11:11:33	00:05:20
13	11:09:02	11:15:19	00:06:17	33	11:18:36	11:22:29	00:03:53
14	11:38:43	11:40:28	00:01:45	34	10:40:08	10:45:28	00:05:20
15	10:56:13	10:58:28	00:02:15	35	10:50:30	10:51:26	00:00:56
16	11:08:34	11:13:54	00:05:20	36	11:00:25	11:04:18	00:03:53
17	11:24:37	11:27:56	00:03:19	37	11:05:32	11:07:55	00:02:23
18	11:45:32	11:48:32	00:03:00	38	11:15:09	11:19:03	00:03:54
19	11:26:03	11:29:52	00:03:49	39	10:20:16	10:24:08	00:03:52
20	11:38:35	11:42:53	00:04:18	40	10:40:12	10:45:32	00:05:20

Mean Consultation Time in OPD =0:03:46 SD = +/-0:01:27

Table 4. Showing Waiting Time of Patients in Pathology Lab(hrs)

SL NO	ARRIVAL	CALL SAMPLING	FOR	TIME TAKEN	SL NO	ARRIVAL	CALL SAMPLING	FOR	TIME TAKEN
1	10:46:29	10:56:27		00:09:58	21	11:05:59	11:30:38		00:24:39
2					22				
3	10:51:28	11:12:57		00:21:29	23				
4					24				
5	11:04:51	11:20:28		00:15:37	25	10:32:58	10:35:31		00:02:33
6					26	10:54:29	11:13:47		00:19:18
7					27	10:43:24	10:50:39		00:07:15
8					28				
9	11:06:11	11:14:29		00:08:18	29	11:02:37	11:22:28		00:19:51
10					30				
11					31				
12					32				
13					33	11:25:29	11:44:47		00:19:18
14					34				
15	11:01:41	11:25:26		00:23:45	35	10:54:26	11:01:54		00:07:28
16					36				
17					37				
18					38				
19					39				
20					40				

Mean Waiting Time = 0:14:57 SD = +/- 0:07:28

Table 5. Showing Waiting Time of Patients in Pharmacy(hrs)

SL NO	ARRIVAL	EXIT	TIME SPENT	SL NO	ARRIVAL	EXIT	TIME SPENT
1	10:59:27	11:04:31	00:05:04	21	11:32:38	11:45:42	00:13:04
2	10:50:31	11:02:23	00:11:52	22	11:17:06	11:26:06	00:09:00
3	11:15:27	11:32:58	00:17:31	23	11:12:38	11:18:46	00:06:08
4	11:15:24	11:27:16	00:11:52	24	11:26:51	11:41:57	00:15:06
5	11:22:28	11:41:37	00:19:09	25	10:38:31	10:46:36	00:08:05
6	11:31:27	11:36:02	00:04:35	26	11:15:47	11:22:49	00:07:02
7	11:28:05	11:39:57	00:11:52	27	10:53:39	10:59:39	00:06:00
8	11:34:59	11:43:38	00:08:39	28	11:31:02	11:40:54	00:09:52
9	11:17:29	11:30:39	00:13:10	29	11:25:32	11:40:32	00:15:00
10	11:05:13	11:17:05	00:11:52	30	11:32:13	11:42:15	00:10:02
11	11:30:34	11:35:38	00:05:04	31	11:19:47	11:27:50	00:08:03
12	11:56:18	12:08:10	00:11:52	32	11:14:02	11:26:09	00:12:07
13	11:17:19	11:29:11	00:11:52	33	11:46:47	11:52:59	00:06:12
14	11:42:31	11:47:06	00:04:35	34	10:48:30	10:59:52	00:11:22
15	11:27:26	11:46:35	00:19:09	35	11:04:02	11:14:02	00:10:00
16	11:16:54	11:25:33	00:08:39	36	11:07:18	11:15:22	00:08:04
17	11:30:12	11:42:04	00:11:52	37	11:10:11	11:19:22	00:09:11
18	11:50:32	11:55:07	00:04:35	38	11:22:16	11:35:19	00:13:03
19	11:31:52	11:40:38	00:08:46	39	10:27:09	10:32:09	00:05:00
20	11:45:03	11:58:13	00:13:10	40	10:47:09	11:07:09	00:20:00

Mean Waiting Time = 0:10:26 SD = +/- 0:04:09

Pathology Lab: 12 patients were advised pathological investigations by consulting doctor. Here, mean waiting time was observed to be between 14 min 57 sec \pm 7 min 28 sec. and according to 41% patients, less time consumed in lab.

Pharmacy: Average time consumed at pharmacy counter was 10 min 26 sec \pm 4 min 9 sec. and according to 40% patients, less time consumed in taking medicine from counter. More than 50% patients admitted that less time was given to them by pharmacist to tell about dosage, preparation and administration of allopathic drugs.

2. Patient Interview

	very poor	poor	satisfactory	good	Very good
Q.1 What was your experience in queue at Registration counter?"		6(15%)	4(10%)	14(35%)	16(40%)
Q.2 According to you pace of registration queue was ?	Fast 4(10%)	normal 16(40%)	slow 12(30%)	Very slow 6(15%)	Unbearable 2(5%)
Q.3. Time taken in registration Counter according to you was?	Very quick 4(10%)	normal 15(37.5%)	slow 13(32.5%)	Very slow 7(17.5%)	Unbearable 1(2.5%)
Q. 4 What was your opinion regarding time taken during waiting in OPD	quick	normal 7(17.5%)	slow 12(30%)	Very slow 14(35%)	Unbearable 7(17.5%)
Q. 5 How was the turn of OPD consultation according to you?	quick 1(2.5%)	normal 7(17.5%)	slow 16(40%)	Very slow 14(35%)	Unbearable 2(5%)
Q. 6 According to you, how much time for consultation has been provided to you by the doctor?	Very less 5(12.5%)	less 10(25%)	normal 15(37.5%)	sufficient 7(17.5%)	More than sufficient 3(7.5%)
Q. 7 Time spent at pharmacy counter was	Very less 6(15%)	less 10(25%)	normal 12(30%)	much 8(20%)	Very much 4(10%)
Q. 8 How much time was given by Pharmacist to explain dose and method of drug intake,	Very less 6(15%)	less 15(37.5%)	normal 15(37.5%)	sufficient 4(10%)	More than sufficient
Q.9. if any pathological investigation was advised to you by consulting doctor, what was your opinion regarding waiting time in lab ?	Very less 2(16.7%)	less 3(25%)	normal 5(41.6%)	much 2(16.7%)	Very much
Q. 10.What was your overall experience in hospital in terms of waiting time at various counters since your arrival	Very poor	Poor 15(37.5%)	Good 18(45%)	Very good 5(12.5%)	Excellent 2(5%)

SHORTCOMINGS AT VARIOUS SERVICE DELIVERY POINTS

SERVICE DELIVERY POINTS	SHORTCOMINGS IDENTIFIED
REGISTRATION DESK	Manpower is less. Just one person does the registration process. He also does not attend on time. There is no separate desks for new and old patients Old and new patients are enrolled in same register.
GENERAL OPD	The number of doctors is very less compared to the number of OPD patients (1 MBBS doctor and 1 Intern). Number of nursing staff is also very few (1 sister). Doctors do not attend on time. There is just 1 room for OPD. There is less sufficient space for patients waiting outside OPD. There is also no patient waiting area or room.
PHARMACY	Manpower is less. Just 1 pharmacist is present.

DISCUSSION

In the past time motion studies were carried out in manufacturing industries to develop pay scales with the thought that money is the sole motivation for work. But in modern times these studies are effective for performance evaluation of various systems, planning, problem identification and creating solutions. The OPD is the first point of interaction between community and healthcare facilities. But the main problems

hospitals of developing countries face while running OPDs are lack of infrastructure and manpower, congestion and long queues. The major finding of this study is that a lot of time is spent for waiting outside OPD. This is mainly as a result of bottleneck created due to less number of doctors and nurses in OPD and also less number of OPD rooms. The doctors also do not attend on time leading to a long queue outside OPD. However the shortcomings identified earlier

needs to be overcome in order to improve quality of service. Perhaps this study will help in the initiation of further in-depth analysis of the bottle-necks related to this particular system of healthcare delivery.

Manna N et al [4] in their study found that mean time was maximum at registration counter while in our study maximum time is spent in waiting outside OPD room. Ravichandran et al [6] found that maximum time is spent in patient examination and consultation while in our study maximum time is spent in waiting outside OPD room. Anand TR et al [3] found that maximum time is spent outside OPD room leading to overcrowding similar to our study

RECOMMENDATIONS

A. Registration

1. Need of HELP DESK - Establishment of Help Desk outside Outdoor building will be a great help for the people, who are helpless and confused about the exact direction of different counters.

2. More efficient use of Signage -

Signage of Domjur Rural hospital block is very old. As there are new additions and deletions of services in hospital, new and better signage will definitely help new patients. This will reduce congestion like situation in corridor.

3. Space Management-Shifting of Registration counter -

Space in front of registration counter is very small. Due to this small space, there is heavy congestion in morning time. If registration counter can be shifted to some other suitable place, it will be a great relief to patients and will also reduce congestions in corridors

4. Online or Mobile app for Registration -

Hospital may also start an online channel for OPD appointments. This will reduce congestion in OPD and waiting time of patients.

B. OPD

1. Display system

Token display system should be used for queue management in OPD. A central

waiting area must be built with a large size plasma TV to be used to display all OPDs status. Display system of availability of doctors and medicines should be there in reception

2. Proper time slot for entertaining Medical Representatives- Time slot should be declared and displayed for this purpose.

3. Arrangement of proper facility for examination- Examination facility should be present inside the OPD itself and one attendant may be used to assist doctor. This will reduce the unnecessary absence of doctor from OPD. There must be separate room for examination of female patients with proper privacy.

4. Sitting arrangement & arrangement of tea, coffee, newspaper, magazine, television etc in OPD waiting area -Sitting arrangement in OPD waiting area is very less as compare to the rush present in OPD. Proper arrangement for patients will definitely please and satisfy them specially during summer.

5. Specialist OPD & Evening OPD – Specialist OPDs and Evening OPDs will reduce OPD congestion by diverting specific types of patients toward a particular area at a particular time.

6. More Doctor to Patient ratio in OPD – More manpower is essential including doctors nurses paramedical persons to reduce congestion in OPD.

7. Separate provisions for checking the vitals – separate rooms for monitoring of BP, weight, pulse by paramedical staffs decreases the consultation time and patient waiting time.

8. Separate time slot for Staff Members

9. Separate OPD rooms for old and new patients

C. Pathology Lab

1. Waiting time in pathology lab for sampling is very less. This is good but we can again improve it by improving early report delivery. This can be achieved by adopting mobile SMS service, Whatsapp, website, mobile application etc.

2. Report delivery in printed form will be appreciated by patients

D. Pharmacy

1. Token Display system: Manpower in pharmacy needs to be increased.

Introduction of tele-pharmacy may also be taken into account.

CONCLUSIONS

Time-motion study carried out to reduce the OPD congestion in Domjur Rural Hospital, has surfaced certain crucial areas which the hospital management needs to look into. Adherence to appointments, waiting time for registration and doctor consultation, sitting arrangements for patients at reception with fans, availability of drinking water and toilet facilities, manpower, infrastructure need to be improved for satisfying the patients and visitors who come for the diagnosis and treatment. The responsibility lies on the BMOH for making the sojourn of patients in the hospital healthy and pleasurable.

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