# A time-motion study and patient satisfaction in the fever clinic of a Government Medical College and Hospital in India

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## ABSTRACT

**Background:** During the recent pandemic, the number of patients with influenza-like symptoms had considerably increased in fever clinics of hospitals leading to queuing and increased patient dissatisfaction. **Aims and Objectives:** A time-motion study was therefore designed to evaluate the time taken at different service delivery points in the fever clinic and patient satisfaction regarding service delivery time. **Materials and Methods:** An institutional cross-sectional observational study was conducted at the fever clinic of Midnapore Medical College and Hospital for 1 month. A total of 200 patients were selected by systematic random sampling from the fever clinic outdoors and their movement was recorded and satisfaction assessed. **Results:** Most patients visited the clinic during the start of the week and in the first half of the day. The total mean time required from entry to exit was 9089 s ± 143.0. The maximum time was spent waiting time in the fever clinic entry queue followed by that at the pharmacy. The minimum time required was at the nursing table followed by a doctor's consultation. The maximum meantime for movement between two stations was between station 5 (laboratory investigation station) and station 6 (pharmacy), that is, 1144 s ± 183.6. The majority of the study population was not satisfied with the time management in the fever clinic whereas only 18.0% of the participants were fully satisfied. **Conclusion:** Identifying the loopholes and formulating an effective time management strategy can help deliver better patient care as well as boost patient satisfaction.

**Key words:** Fever clinic; Time motion; Patient satisfaction

## INTRODUCTION

The purpose of a time-motion study in health care is to assess the time taken in different service delivery points in hospital settings and to find out the patient perception regarding the total time spent in getting the necessary services from the different departments.[1] The outpatient department (OPD) in a hospital is recognized as the window to health-care service provided to the patients. The health-care facilities provided by the hospital at the OPD influence the patients and their accompanying persons. This builds an impression of the hospital and its management. Queuing and long patient waiting times are common scenarios in most hospitals in different countries.

Disruption of hospital workflow, improper access to health care, and patient dissatisfaction may arise from the above difficulties.[2]

Since the outbreak of the COVID-19 pandemic, the number of patients with influenza-like symptoms attending the hospital has increased manyfolds. Specialized OPD called "fever clinics" had been set up for such patients in different health-care facilities in West Bengal. Systematic performance evaluation of these clinics is thus necessary for their efficient management and function.

### Aims and objectives

This time-motion study was undertaken with the objective to know the time taken in different service delivery stations

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in the fever clinics, as well as to know the satisfaction level of beneficiaries regarding the total time spent in the fever clinics to avail of the services. Few such studies have been done in the outdoor department of hospitals. However, studies in fever clinics during the COVID-19 pandemic were rare. The findings of this study may illustrate the complex hospital work environment and suggest opportunities to improve the efficiency of outdoor/fever clinics during pandemic situations.

## MATERIALS AND METHODS

An institutional cross-sectional observational study was conducted at the fever clinic of Midnapore Medical College and Hospital (MMCH) for 1 month (May 2022). The study population consisted of persons aged 18 years and above and attending the fever clinic of MMCH with fever and related illnesses. The purpose of the study was explained beforehand to the study subjects and their informed consent was taken. A total of 200 patients were selected by systematic random sampling method (every alternate fever patient fulfilling inclusion criteria was selected). Severely ill patients and patients not willing to participate in the study were excluded. Ethical clearance was obtained from the Institutional Ethics Committee of MMCH (IEC/2022/32 dated April 21, 2022) before the initiation of the study. Pre-synchronized stopwatches, observation sheets, pre-designed and pre-tested semi-structured questionnaires were used as data collection tools. The movement of every patient selected for the study was assessed from the ticket counter at the fever clinic to the exit point (Figure 1). Both time spent at different stations for necessary services and time taken for movement between stations were recorded separately.

The service time was recorded at the following individual stations:
- Station 1: Ticket counter (at the OPD main building ground floor)
- Station 2: Fever clinic OPD room entry queue (located on 1st floor)
- Station 3: Doctor's table (time recorded for consultation) (located on 1st floor)
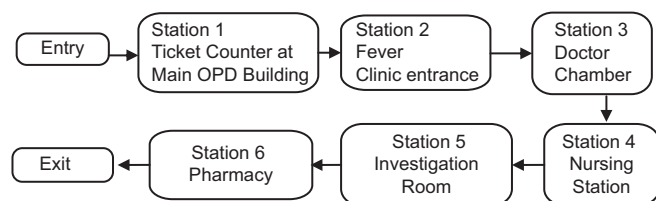- Station 4: Nursing table (patients receive medicine slips+advice) (located on 1st floor)



**Figure 1:** Study of movement of patients in the fever clinic of the hospital

- Station 5: Laboratory investigation room (located on 1st floor)
- Station 6: Pharmacy (located in a separate building).

During the exit, the satisfaction of the patients regarding the overall time taken for the service delivery at different stations was assessed by a pre-designed pre-tested self-administered questionnaire based on a 3-point Likert scale (0-poorly satisfied, 1-somewhat satisfied, and 2-satisfied) consisting of six questions related to satisfaction level about service delivery time at each station. The mean score of each patient was calculated as well as the total sample mean. Z score of individual patients was calculated and was arranged in descending order. Respondents belonging to the upper one-third Z score range were considered satisfied, those belonging to the middle one-third score range were considered moderately satisfied and those belonging to the lower one-third Z score range were considered unsatisfied with the services.

Data were entered and analyzed with the help of MS Excel 2008 and Epi info version 7.1 and results were tabulated in the form of tables. Univariate analysis was presented as frequencies and proportions and bivariate analysis was done considering a $P \leq 0.05$ as statistically significant.

## RESULTS

Table 1 enlists the sociodemographic characteristics of the study population. Out of the total study population, 56.0% were male; the younger population (<30 years of age) was about 58.0%. First-time registration/new patients were about 62.0%. The maximum patient load was noticed

| Table 1: The sociodemographic characteristics of the study population (n=200) | |
|---|---|
| Sociodemographic variables | Frequency (%) |
| Gender | |
| Male | 112 (56.0) |
| Female | 88 (44.0) |
| Age | |
| <30 years | 116 (58.0) |
| 30–50 years | 48 (24.0) |
| >50 years | 36 (18.0) |
| Category of registration | |
| Old | 76 (38.0) |
| New | 124 (62.0) |
| Day of visit | |
| Monday | 60 (30.0) |
| Tuesday | 40 (20.0) |
| Wednesday | 32 (16.0) |
| Thursday | 16 (8.0) |
| Friday | 20 (10.0) |
| Saturday | 32 (16.0) |
| Time of visit | |
| 1st half (10.00a.m–12 p.m) | 129 (64.5) |
| 2nd half (12.00p.m–2.00 p.m) | 71 (35.5) |

on Mondays, Tuesdays, and weekends (Saturdays). The majority of patients preferred to visit the fever clinic during the first half of the clinic (64.5%) than in the second half.

Table 2 shows the time spent by the patients in different service delivery stations in the fever clinic. For registration at the ticket counter at the OPD main building, the mean time taken was 983 s±25.2. The mean time taken at the fever clinic room entry queue was 3132 s±76.6. After entering the OPD room, the mean time taken for a doctor's consultation was 207 s±14.4. At the nursing station, the mean time taken was 61s±3.6. The time taken in the laboratory investigation station was 867 s±36.0. The pharmacy (station 6), was situated in another building and the mean time taken for medicine delivery was 1519 s±50.4. Maximum time was required at the fever clinic entry queue (waiting time for entry) followed by at the pharmacy. The minimum time required was at the nursing table followed by a doctor's consultation.

Table 3 shows the time taken for reaching from one station to another or between two stations. The mean time taken to reach the fever clinic's OPD entry queue (located on the 1st floor) from the OPD ticket counter on the ground floor of the building was 686 s±36.0. The time required to reach the doctor's table from the OPD room entrance was 62.0 s±7.2. The time needed to reach the nurse's table from the doctor's table was 33.0 s±6.1. The mean time taken to move to the laboratory investigation station from the nurse's table was recorded as 623 s±33.6. The mean time required to reach the pharmacy from the laboratory investigation room was 1144 s±183.6. Thus, the maximum mean time spent between two stations was between station 5 (laboratory investigation station) and station 6 (pharmacy) while the minimum time required was between station 3 (Doctor's table) and station 4 (nurse's table). The total mean time taken from entry to the ticket counter to final exit from the clinic was 9089s±143.0 (service delivery time in different stations + time taken for reaching one station to the next station).

Table 4 shows the satisfaction level of the study population based on the total time taken for service delivery at different stations of the fever clinic. More than 50% of the study population were not satisfied with the service delivery time. Only 18.0% of the participants were satisfied with service delivery time.

The majority (51.0%) of the study population was not satisfied with the time management in the fever clinic while only 18.0% of the participants were fully satisfied. On bivariate analysis, a significant association was found between age groups, type of registration, day of visit in the week, and time of visit in a day with the level of satisfaction based on the total time taken for the OPD service delivery at different stations (Table 5). Males were more dissatisfied (53.6%) than females (47.7%). Younger age group patients were more significantly dissatisfied (66.1%) than the older patients, while new patients coming to the OPD were also significantly dissatisfied with time management. Satisfaction was also less for the patients visiting the clinic during the first 2 days of the week as well as on weekends. Only 11.6 % of the study population attending OPD in the first half was fully satisfied with time management.

## DISCUSSION

The OPD is an important point of contact between the health-care facility and the community. Often the problems in OPD faced by the patients are long waiting times, long queues, timings of services rendered that remain unknown to patients, insufficient staff, etc.

In our study, male participants were more in number (56.0%), and the younger population was more. Patient load was more on Mondays as well as in the first half of the clinic which was similar to a study by Singh and Jain.[3]

The waiting time varies in different countries, as well as from institution to institution within the country. A Canadian study stated that in 90% of visits to emergency departments, the time taken from initial triage to the medical consultation was much longer than the recommended response time.[4] A national study of

**Table 2: Service delivery time in different stations**

| Stations | Mean time taken by the patients in different stations (in seconds±SD) | % of total activity time in service stations |
|---|---|---|
| Station 1 | 983±25.2 | 14.5 |
| Station 2 | 3132±76.6 | 46.3 |
| Station 3 | 207±14.4 | 3.06 |
| Station 4 | 61±3.6 | 0.9 |
| Station 5 | 867±36.0 | 12.8 |
| Station 6 | 1519±50.4 | 22.4 |

**Table 3: Time taken by patients to travel between stations (in seconds)**

| Station | Station 1- Station 2 | Station 2- Station 3 | Station 3- Station 4 | Station 4- Station 5 | Station 5- Station 6 |
|---|---|---|---|---|---|
| Mean | 686 | 62 | 33 | 623 | 1144 |
| SD | 36.0 | 7.2 | 6.1 | 33.6 | 183.6 |

Malaysian public hospitals showed that the average patient waiting time was more than the average doctor consultation time.[5] A time-motion study in New Delhi showed that cataract operations can be increased if operation theatre time is utilized optimally.[6]

The OPD problems were further aggravated by the pandemic when we had to deal with a huge number of fever patients attending the fever clinic OPD. It has been documented in other time motion studies that by allotting time for individual subcomponents, suitable measures can be implemented to complete the activity in less time.[7] In the present study, maximum service delivery time was required at the fever clinic OPD entry queue (3132 s±76.6) which was 46.3% of the total service delivery time, followed by that at the pharmacy which was 1519s±50.4. The minimum time required was at the nursing table (61s±3.6) followed by at the doctor's consultation (207s±14.4). This may have been due to the sudden rise in the number of fever patients amid the pandemic than the usual patient flow, inadequate number of staff, and insufficient numbers of rooms allotted to run the fever clinic. Another study by Lowalekar and Ravichandran found that maximum time was spent on patient examination and consultation,[8] while in our study maximum time was spent in the fever clinic OPD queue. Manna et al.,[9] in their study found that the mean time was maximum at the registration counter while in another study by Sengupta et al.,[10] maximum time was spent waiting outside the OPD queue. The total mean time taken from entry to exit in our study was 9089 s±143.0 which was almost the same as that taken in a study by Afzal,[11] but much more than that in a study by Rahim et al.[12]

According to the district-level hospital standard operating guidelines for OPD, the waiting time for OPD ticket collection was 1 min, whereas the waiting time was 2–3 min for medicine dispensation, and the time for the laboratory investigation was 10 min.[13] The waiting time in our study was longer in comparison to the above standards. Increased waiting time at OPD increases patient dissatisfaction; hence patient satisfaction assessment can help in performance evaluation of health-care units. A similar study carried out in 2017 found a higher level of satisfaction regarding the waiting time in OPD but that was before the recent pandemic.[14] Long waiting times outside the fever clinic room, pharmacy, and laboratory investigation were the difficulties faced by maximum patients. Apart from these, it was very difficult to manage a huge number of patients as there was only one room for consultation with two doctors and one staff nurse present at the nursing station. Laboratory services were available from 9:15 am to 2:00 pm of which most of the patients were not aware. The pharmacy was situated in a separate building a little far from the main OPD building with a narrow counter to receive medicines and staff shortage which may have caused long queues and waiting. A few of the recommendations from our study were to increase the

**Table 4: The satisfaction levels based on the total time taken for service delivery at different stations (n=200)**

| Satisfaction level | Frequency (%) |
|---|---|
| Satisfied | 36 (18.0) |
| Average satisfaction | 62 (31.0) |
| Not satisfied | 102 (51.0) |

**Table 5: Bivariate analysis between sociodemographic factors and level of satisfaction based on the total time taken for service delivery**

| Socio-demographic variables | Satisfied (%) | Average satisfaction (%) | Not satisfied(%) | P-value |
|---|---|---|---|---|
| Gender | | | | |
| Male (n=112) | 24 (21.4) | 28 (25.0) | 60 (53.6%) | 0.84 |
| Female (n=88) | 12 (13.6) | 34 (38.7) | 42 (47.7) | ($\chi^2$=4.9) |
| Age | | | | |
| <30 years (n=112) | 19 (16.95) | 19 (16.95) | 74 (66.1) | <0.00001 |
| 30–50 years (n=48) | 10 (20.8) | 21 (43.8) | 17 (35.4) | ($\chi^2$=28.9) |
| >50 years (n=40) | 07 (17.5) | 22 (55.0) | 11 (27.5) | |
| Type of registration | | | | |
| Old (n=76) | 24 (31.6) | 20 (26.3) | 32 (42.1) | 0.00047 |
| New (n=124) | 12 (9.7) | 42 (33.9) | 70 (56.4) | ($\chi^2$=15.3) |
| Day of visit | | | | |
| Monday (n=60) | 06 (10.0) | 10 (16.7) | 44 (73.3) | 0.0005 |
| Tuesday (n=40) | 07 (17.5) | 12 (30.0) | 21 (52.5) | ($\chi^2$=31.58) |
| Wednesday (n=32) | 10 (31.25) | 12 (37.5) | 10 (31.25) | |
| Thursday (n=16) | 06 (37.5) | 05 (31.25) | 05 (31.25) | |
| Friday (n=20) | 05 (25.0) | 10 (50.0) | 05 (25.0) | |
| Saturday (n=32) | 02 (6.3) | 13 (40.6) | 17 (53.1) | |
| Time of visit | | | | |
| 1st half (10.00a.m–12 p.m) (n=129) | 15 (11.6) | 36 (27.9) | 78 (60.5) | 0.0004 |
| 2nd half (12.00p.m–2.00p.m) (n=71) | 21 (29.6) | 26 (36.6) | 24 (33.8) | ($\chi^2$=15.7) |

p-value<0.05 is statistically significant

number of OPD ticket windows, more efficient use of signage, increase the number of staff in each station, better space management as well as the shift of pharmacy to the same building for better time management.

### Limitations of the study

Among the limitations of the study, the Hawthorne effect or observer bias,[15] may have been present as the study participants could have been more aware of their action as it was being monitored in the OPD.

## CONCLUSION

Effective time management can help deliver better patient care to more patients. Using time efficiently is the key not only to running the hospital smoothly but also to boosting the patient perception of the healthcare delivery system. The present study was conducted to study the service delivery time at the fever clinic OPDs in the pandemic situation when the clinic was flooded with fever patients waiting for health-care services. The study represents one of the few studies carried out in fever clinic OPDs in this pandemic era in a country like India. The study can perhaps provide a fruitful baseline for the near future amid pandemic, endemic, or epidemic situations. The quality and efficiency of fever clinics can be improved if constraints of the system are identified and rectified.

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