Patient Time Management System

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Abstract- A huge queue of patients is observed waiting outside a doctor's cabin. The waiting time of patients is due to several factors like- emergency cases that occur in the run time, patients taking time more than expected, etc. In India, there are two basic ways of taking an appointment with a doctor- one, making a telephonic appointment where they are informed about the estimate time of their appointment; two, patients directly visit the clinic and take an appointment. In both the ways, the above mention factors make the patients to wait. There are a few practitioners who have adopted systems to appoint flexible appointment timings to patients, which also informs them about any delay in their appointment time. But these systems take a lot of human (patient's) efforts to be informed about the delay. This paper presents a real time system that helps the practitioners to manage patients with the least number of patients waiting in the queue. As it is a real time system, it does not require a patient's efforts to be informed about any delays and also reduces the clinic-staff's efforts.

Keywords- *appointment with a doctor, delay in appointment, reduction of waiting time.*

I. Introduction

As per [1] *Medical Council of India (July 2016),* there are 9,88,922 registered allopathic doctors in India. According to [2] a 2018 survey by the *Physicians Foundation*, doctors on average see 20 patients a day. So to calculate, 9,88,922 doctors will see 19,778,440 patients in a day. Now, if so many patients are attended every day, it is important to make sure that there is an efficient system to management the appointment of patients. According to [3] a study made on 830 patients in 2012, it shows that on an average the wait time of patients outside a doctor's clinic is between 15.5mins – 39.71mins.

For instance let us consider that each patient waits for 20mins. So, 20 patients per day per doctor will wait for: 400mins and 19,778,440 patients will wait for 395,568,800mins per day.

Therefore, 6,592,813.33hr are wasted per day by patients waiting outside a doctor's clinic.

While visiting a doctor, a patient adopts any one of the two methods- he either makes a phone call to take an appointment or directly visits the clinic and takes an appointment. The selection of method completely depends on the mechanism adopted by the clinic/hospital. Sometimes, a patient who is visiting the clinic for the first time and is unaware of the procedure followed by the clinic, he directly makes an appointment by visiting there.

Different doctors with different specialisations, have a fixed duration of time that they use to see a patient. For example, a dentist on an average, spends 15mins to see one patient. This time is dependent on the doctor's specialization and the type of patients that visit him i.e. the complication with which patients mostly visit him. Let's consider two cases- Case 1: when a patient takes a telephonic appointment and Case 2: when a patient directly visits the clinic to take an appointment.

Case 1: Suppose there are 8 patients who have taken a telephonic appointment. Let the patients be represented as 'P'. So the first patient taking an appointment will be P1, second patient will be P2 and so on till P8. Consider that P1 is appointed 12:00pm as the appointment time and moving ahead, each patient is allotted time with an interval of 15mins. So P2 is allotted 12:15pm, P3->12:30pm, P4->12:45pm and so on till P8->1:45pm. Now when a doctor starts seeing the patients, consider that everything is going as per the given time but, P5 is a case which will take 30-45mins. In such a situation, all the appointments after P5 will be delayed by 15-30mins. This delay will go on increasing as patients see the doctor.

Case 2: Let us consider the same example as that of case 1, there are 8 patients and each patient is given the appointment time in the interval of 15mins. Now suppose that, after P3 a patient arrives who was unaware of the telephonic procedure, and if his case is urgent, he will be called for an appointment right after P3. Whatever time this patient may take, that will affect the wait time for the patients already in the queue.

This paper provides a simple yet effective solution to decrease the wait time of patients. This system does not focus on eliminating the problem, it focuses on minimizing the wait time. The system's mechanism is to inform the patients about any delay in the flow so that they do not have to wait outside the clinic.

II. Flow of the System

1. Allotting Appointment Time:

The patients will take a telephonic appointment. Depending on the time that the doctor takes to see a patient, the receptionist will allot the appointment time to the patients.

For example, if the clinic opens at 12:00pm and the doctor takes 15mins on an average to see a patient, the first patient will be given the appointment time as 12:00pm, second patient will be given 12:15pm and so on.

2. Making Entry In The System

The receptionist is supposed to make an entry in the system about each patient. If the patient is visiting the clinic for the first time (new patient), then the receptionist will enter 3 details about the patient- Name, Contact Number and Appointment time given. If the patient is someone who has visited the clinic before, then the receptionist will edit the appointment time only.

3. Entry and Exit

Whenever a patient goes in the doctor's cabin, the receptionist will just have to click a button called "In" and whenever a patient leaves the cabin, the receptionist will have to click on the button called "Out".

4. Send SMS

The system will be designed in such a way that if the 'out time' of the current patient in the doctor's cabin extends, then the SMS will be send to the other patients informing their number in the list, the no of patient currently being attended and the delay.

Name	Time		
P1	12:00	In	Out
P2	12:15	In	Out
P3	12:30	In	Out
P4	12:45	In	Out
P5	01:00	In	Out
P6	01:15	In	Out

Figure 1: Depicts the Front End of the System

Hello Mr.xyz, your number is: 10.
Currently patient no.3 is being attended. There's a delay by 30mins in your appointment.

Figure 2: Sample of the SMS to be sent on delay.

5. Update In The Table

Once the SMS is sent, the 'in' and 'out' time of the next patients in the list will be updated as per the delay.

III. Working Condition

As per the considered example, that the doctor takes approximately 15mins to see a patient, so if there is a delay due to any patient, SMS will be sent to the next patients in list.

Let's assume a patient who is supposed to come out of the cabin at 12:15pm but takes time longer than that, then the system will check and wait for 15mins, if the patient does not come out at 12:30pm, then the system will send SMS to the next patients in the list.

Practically, there will be at least one patient to arrive before the appointment time. To understand, if P2 was supposed to leave at 12:15pm and is delayed, P3 is obvious to come before the appointment time. Similarly, P4 might be on his/her way to the hospital. Hence, it is of no use to send SMS to these patients.

So, the system will send SMS to the next patients in the list, leaving 3 patients just after the current patient.

IV. Perks of the System

1. Management of Patients:

This system is simple yet effective in helping the hospital staff to manage the appointment of patients.

2. Decrease in Wait Time:

The system helps in decreasing the wait time of patients. The number of patients waiting will decrease which will reduce the overall waiting time of patients.

3. Elimination of Chaos:

As the number of patients waiting outside the doctor's cabin will reduce, there will be less chaos created.

Also, practitioners who have a small clinic and cannot afford many patients waiting, this system is best for them.

V.   Conclusions

The system is designed to reduce the waiting time. This system cannot eliminate the waiting time to zero but can reduce it to a very great extent.

There will be editing options available for the staff of the clinic operating the system. Editing options like, change in the contact number, change in the appointment time, whether to send SMS or not, will be available.

The details of the appointments can be viewed by the practitioner as well. Even the practitioner has the access to the system for making an entry of the appointment, SMS settings, etc.

VI.   Future Scope

This system can be extended to even maintain the other details of a patient. Details like past history which can help the practitioner to examine the patient even better. A patient who's visiting the same doctor for almost all problems, the doctor can have this history fed with him in the system, so that it is easy for him to analyse the current symptoms.

VII. References

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