“TO STUDY THE WORKFLOW OF THE DIALYSIS DEPARTMENT AND COMPARE THE CHANGES AFTER IMPLEMENTATION OF APPOINTMENT SCHEDULE”

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Content

INTRODUCTION

- With the escalation in NCDs, burden of CKDs in India is also increasing.
    - Among with the diabetes and hypertension account for 40-60% cause of CKD.
    - The case fatality rate has doubled, from 0.59 million in 1990 to 1.18 million in 2016. (1)
    - The number of patients on chronic dialysis in India at about 175,000, giving a prevalence of 129 per million population. (2) (2018 estimate)
    - A systematic review estimated that about two-thirds of all patients with kidney failure died without receiving dialysis in 2010. (3)
- Dialysis is a medical procedure required by patients with chronic kidney disorder, in which waste and toxins which gets accumulated in the blood removed using an external machine that performs the filtering function.
    - Carried out 2-3 days a week
    - Each session - 4-5 hours.
- The OPD of Nephrology at hospitals, caters to the healthcare needs of the patients who require dialysis with the help of highly qualified & experienced doctors, nurses, paramedical staff, technical staff and state-of-the-art haemodialysis machines.
- It is known that the waiting times at these centers are long and patients had to wait during their visit that results in overcrowding in the waiting area, which often gives rise to patient dissatisfaction or increase risk to patients' health.

- In Indian hospitals, generally, the proper appointment time for dialysis is not given to the patients, instead patients are treated in first come first serve basis, which results in long waiting times, overcrowding, hence patient dissatisfaction.
- The average patient coming for dialysis, spends
  - 15 hours per week on dialysis procedure (waiting time + treatment time)
  - 65 hours monthly
  - 780 hours on dialysis annually,
  - Equivalent to 1 month (32.5 days) of every year tethered to the dialysis procedure.
  - In this, on average 1 hour is spent in the waiting area, which if with some intervention is reduced to 20 minutes can save one-week (5 to days) patient's time.
- Long waiting time in hospitals remains the most significant problem faced by our health care system, it may give poor overall impression of the setting and is a significant component of patient
- Understanding the most important factors impacting overall satisfaction can help health care administrators and providers improve patient care.
- Therefore, a suitable system should be designed with the assistance of technology and taskforce to minimize the trouble to patients waiting for dialysis and to maximize the effectiveness and efficiency of resources and capacity.
- Reducing delays and making sure that receive right care at right time will have a significant beneficial effect on the quality of care and with this reduction in waiting time for dialysis would not only improve the patient satisfaction but also reduce the health risk for patients.

RESEARCH GAP

Most of the studies done for assessing the satisfaction of the patients by the operations department of the hospital overlook dialysis day-care services. Patients coming to the dialysis center of the hospital must wait for hours for their turn.

Considering that the waiting time is an important factor in patient satisfaction. The study was carried out with the purpose to compare the pre & post-intervention changes in overall waiting time from the arrival of the patient to the start of the treatment.

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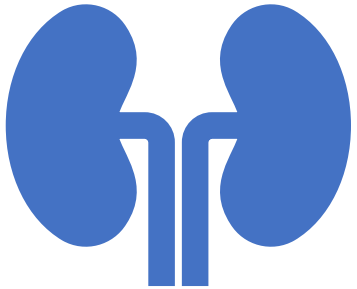
RESEARCH QUESTIONS

- Does changes in patient scheduling affect the length of waiting time for the patients coming for hemodialysis at the hospital?

- Does patient scheduling in the hemodialysis service centers presents challenges in operations management?

OBJECTIVES



To understand the workflow of the dialysis department in order to minimize the maximum waiting time for patients to start the dialysis session.

To quantify the effectiveness of change in patients scheduling on overall waiting time from arrival to start of treatment.

REVIEW OF LITERATURE

S.No.	Authors (year)	Study Design	Objective	Key Findings
1.	Door ZH, Dr. Mukhtar HF	Cross-sectional descriptive study	The research was conducted at a selected dialysis unit to evaluate the satisfaction of patients with care.	The majority of the respondents (86.9%) were rated high nurses' willingness and flexibility in meeting their needs and nurses helping to understand and solve their problems rated low (52.7%). The analysis shows that residence, gender and occupation were red overall satisfaction scores ($p<0.05$) and income
2.	Batra R, Deswal BS	Cross-sectional study	The study was conducted to explore prime causes of length of time for medical treatment in OPD and also to provide the best strategy which can improve the appointment system to maximize the effectiveness and efficiency of resource and capacity.	It was observed that with the change in the appointment system for physicians by applying 'doctor on call' system, idle time for doctors has reduced, however patient waiting time has increase as a result.
3.	Jamalizadeh Z, Meshkani F, Naami A	Questionnaire-based survey study	The study was carried out in Iranian hospitals to determine the factor of most importance which can influence patients' satisfaction.	The factor of most importance which can influence patients' satisfaction are the management and organizational issues, followed by issues connected with physicians, nurses and employees and patients expect the officials of hospitals to reduce waiting time for their services.

4.	Turner ME, Kher KK, Reilly KM,	Cross-sectional questionnaire-based study	The objective of the study was to reduce costs and to improve the quality of care in a paediatric dialysis unit by implementing Continuous Quality Improvement Program.	After the Continuous Quality Improvement Program in paediatric peritoneal dialysis unit, it was observed that there is a significant reduction in clinic visit time by 44%. Also decrease in average waiting time and improvement in waiting time has been observed.
5.	Chuang HF, Chan SJ, Lin YC	Questionnaire-based survey study	The study was conducted with the aim to reduce the waiting time length for patients undergoing peritoneal dialysis (PD)	After the implementation of computerized appointment system, designated arrival times, rearrange the waiting areas and integrated the pre-visit preparation process, the patient waiting time had shortened and satisfaction score has significantly improved.
6.	Davis D, Pineda R, Waller A, Winthrop K	Cross- sectional study	The study was conducted to present substitute designs and suggestions which could be used in treatment delays reduction in the hemodialysis process.	It was found that the main reason of delays exists within the process including the water treatment system, tubing system, the dialyzer, and the needle attachment process.
7.	Nappo RW, Ross EA	Descriptive cross-sectional study	The study was carried out with the objective to optimize schedules for every dialysis process step by incorporating timing and workflow to design a new schedule, rather than the whole-shift blocks at baseline.	It was observed that the principles of Queuing theorem can be adopted to optimise haemodialysis scheduling that can improve facility efficiency, minimises the long wait time dissatisfier, and is associated with improved URRs with more patients reaching target clearance thresholds.

8.	Yu B and Wijesekera D.	Descriptive study	The study aimed to create a workflow model of a functional diaysis center using an open-source software for the EMR components and workflow management system.	A properly enforced workflow system which complies with local or national standards and policies can improve the quality of care provided to dialysis patients, also provide flexibility that caregivers need to continue treatment
9.	Hingwala J, Tangri N, Rigatto C, Komenda P	Secondary	To was aimed to review quality improvement concepts and operations research that could provide clinician administrators to improve both efficiency and quality in facility based hemodialysis units	It was found that by creating scorecards and by correct utilization and application of process mapping techniques and LEAN principles, the delivery of haemodialysis care has improved.
10.	Dr. Iqbal MZ, Dr. Aamir M, Dr. Abbas S.	Descriptive cross-sectional study	Objective of this study was to determine the patient waiting time and to study the satisfaction level of patients on examination by doctor.	It was observed that patient satisfaction decrease with as the waiting time increases and majority of the Patients are satisfied with the behaviour of the doctors and services available at the OPD.

11.	Matthias Keil	Descriptive cross-sectional study	The aim of the study was to identify the benefits of introducing a treatment monitoring system into a dialysis ward for users and patients and to analyse the workflow steps that are to be optimized and automated.	Introducing a treatment monitoring system reduces the number of manually performed steps directly influencing the treatment (e.g. calculations and setting the dialysis device). This reduces the risk of treatment errors and leads to more confidence of caretakers. The documentation quality is improved, leading to better data security and higher confidence of the nursing personnel.
12.	Ke Li Yew	Questionnaire-based survey study	This study aimed at documenting the impact of wait times at the waiting room and on the treatment chair, technical skills and interpersonal skills, and the environment on patient satisfaction in infusion center and dialysis center,	The study found that majority of the patients rated their visit to the infusion center and dialysis centers exceeded their expectations or it was what they expected, that could be credited to many factors including

METHODOLOGY

Study design: This project consists of real time data collected by direct observation method (longitudinal study). The time study was performed on patients who were there for treatment of dialysis department.

Study population: Patients attending Out-patient Department of Nephrology for Dialysis

Study site: The study was conducted in a NABH accredited, 300 bedded multispecialty, tertiary care hospital situated in the metropolitan urban area having population of 12.7 lakhs.

Sample size: 20 patients, the data collected from excel was filtered to find patients whose data was recorded continuously for 4-5 days in 2 weeks.

Sampling technique: Convenient sampling

Inclusion Criteria:

- All age and both sex of patients with regular visit of 2-3 visit a week for dialysis are considered.
- Only Ambulatory-care or OPD patients are considered for the study.

Exclusion Criteria:

- Irregular patients for dialysis are excluded from the study.
- IPD patients are excluded from the study

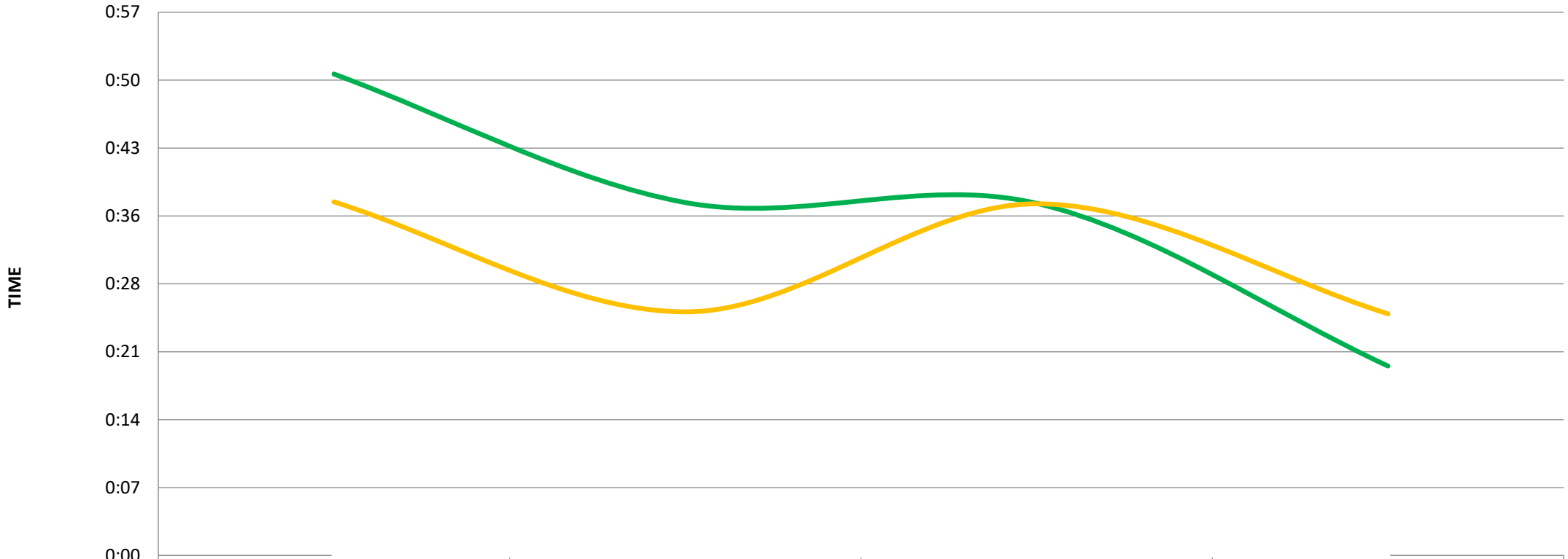
Data collection tool: Tracker sheet were used to note down the duration in times for the appointment, token, arrival and in time for patients. The times were noted as and when patients were arriving at the hospital and respectively their movements and time were noted down.

Study duration: 15 day**Data analysis:** The collected data were entered into Microsoft Excel and analysed using various graphs.

RESULT & DISCUSSION

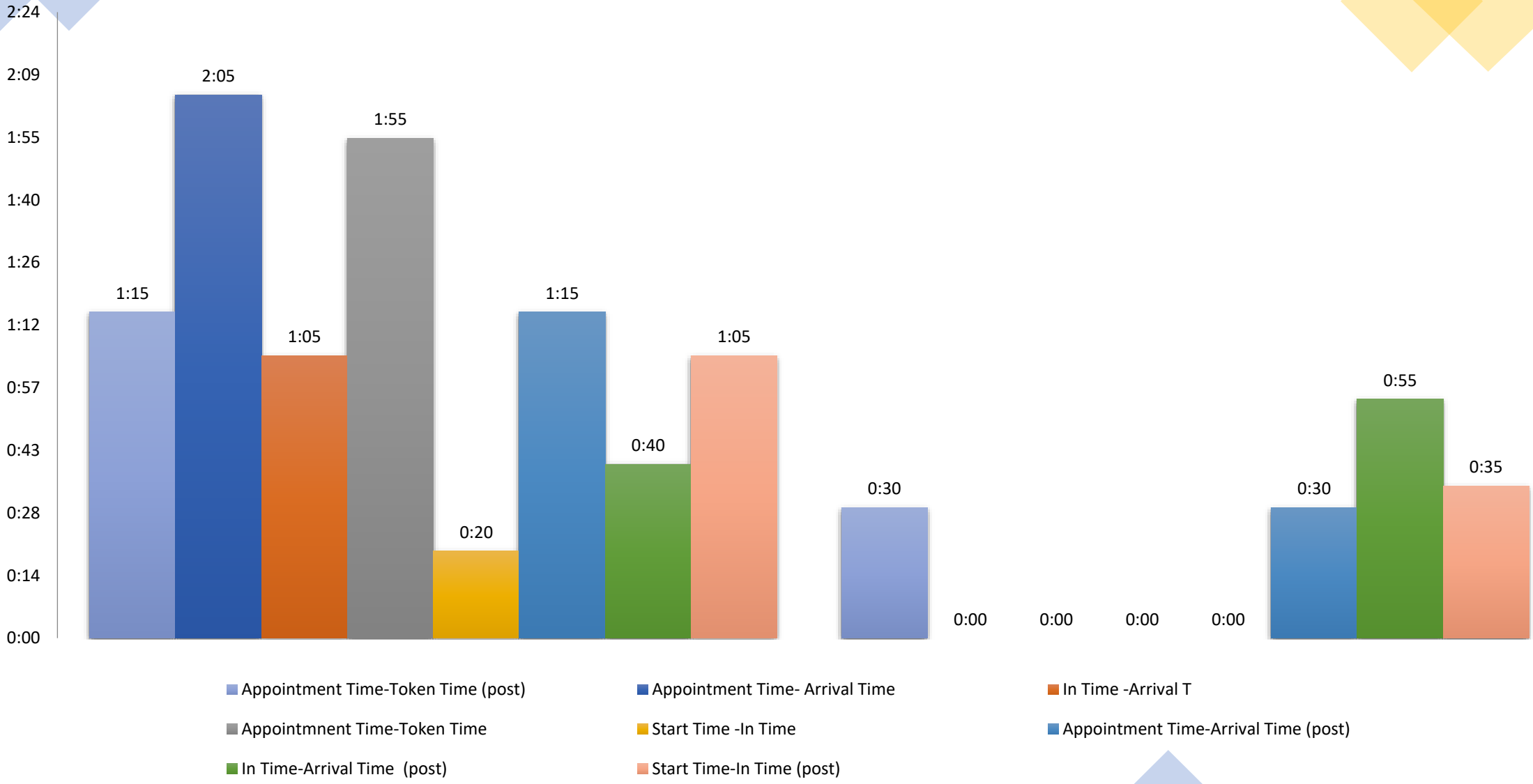
RESULT

AVERAGE TIME FOR DIALYSIS PROCESS (PRE IMPLEMENTATION VS POST IMPLEMENTATION)

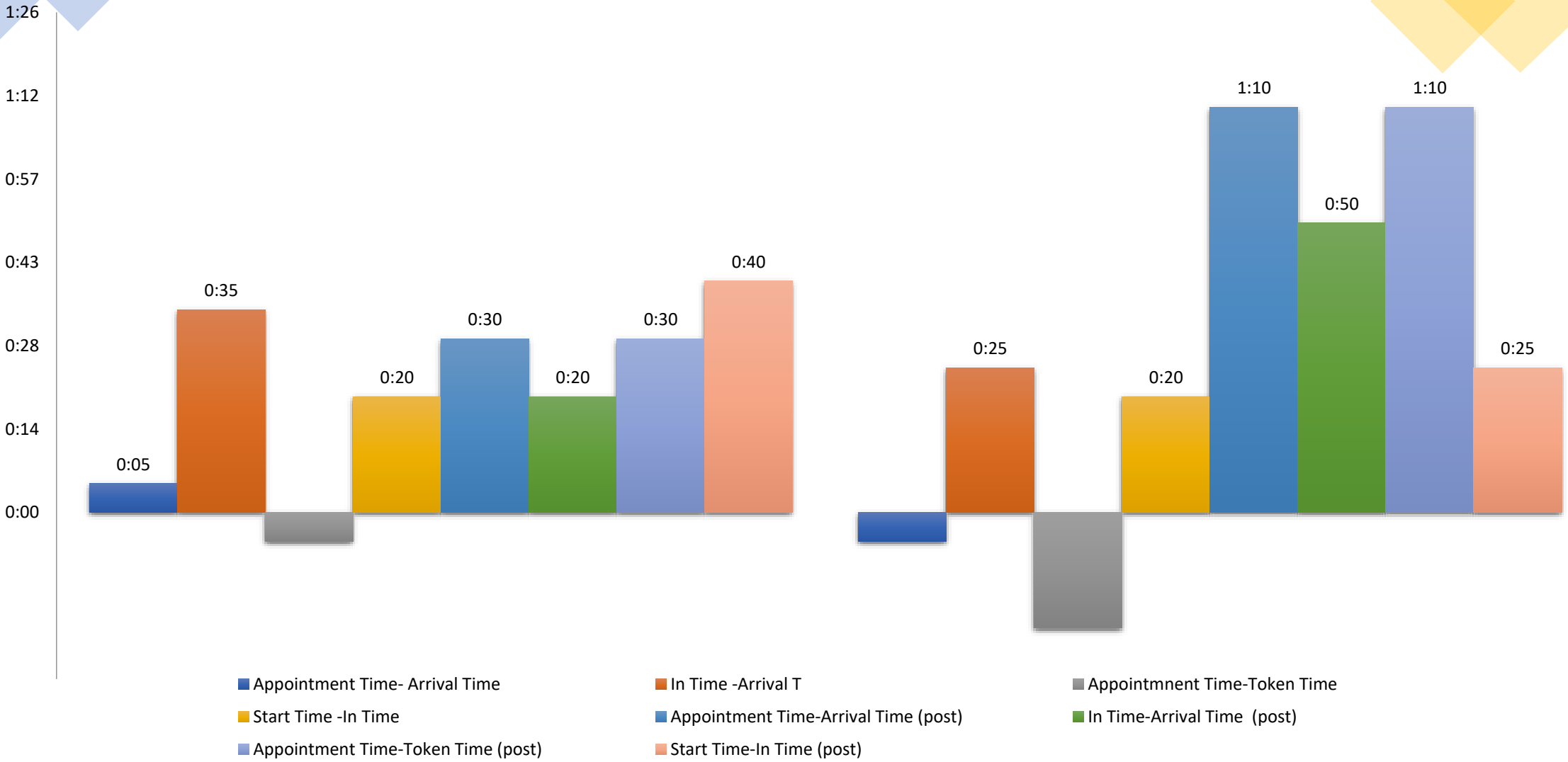


	Appointment Time- Arrival Time	In Time -Arrival T	Appointmnent Time-Token Time	Start Time -In Time
patient avg(pre)	0:51	0:37	0:37	0:20
	0	0	0	0
patient avg(post)	0:37	0:25	0:37	0:25

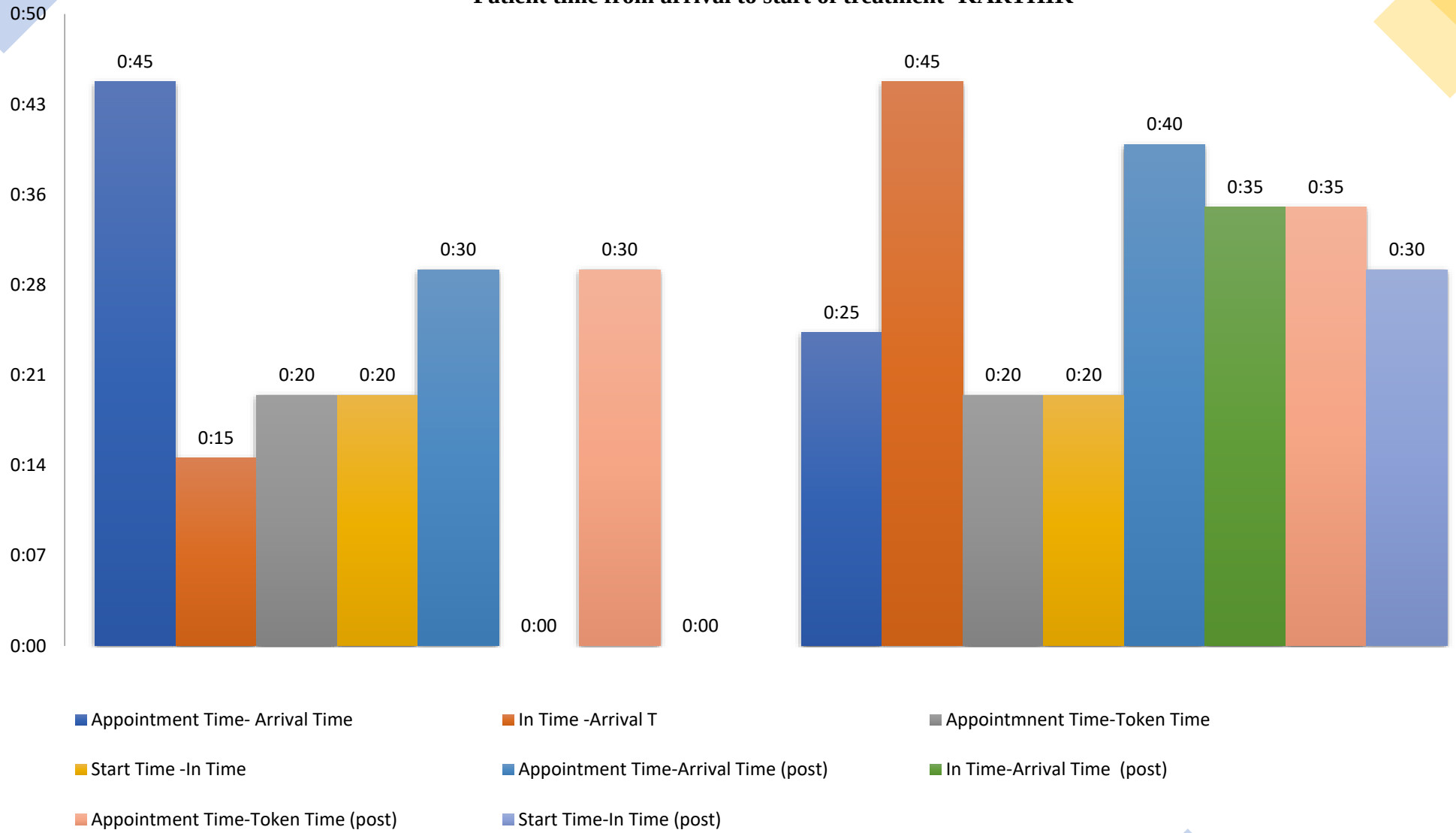
Patient time from arrival to start of treatment - PRATUL



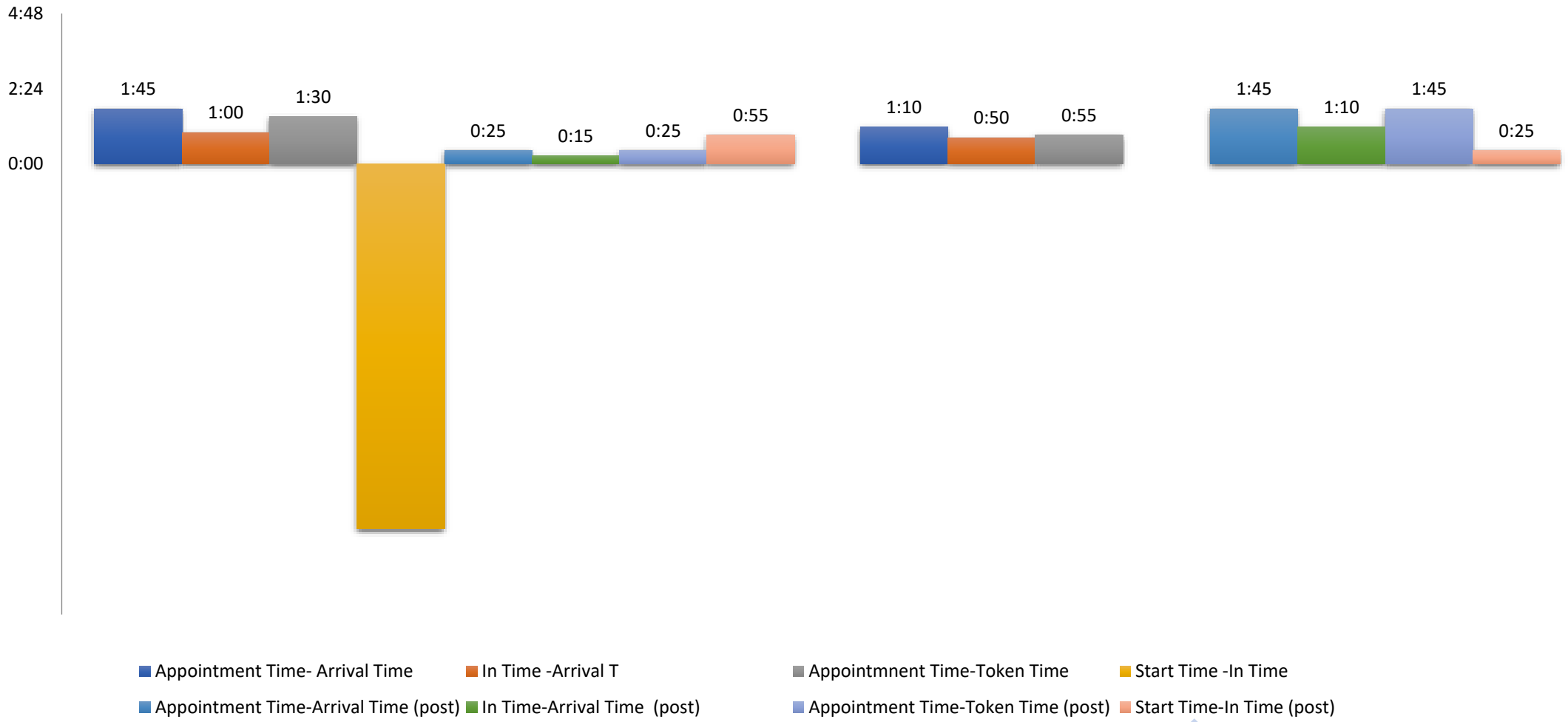
Patient time from arrival to start of treatment- ANJANA S.



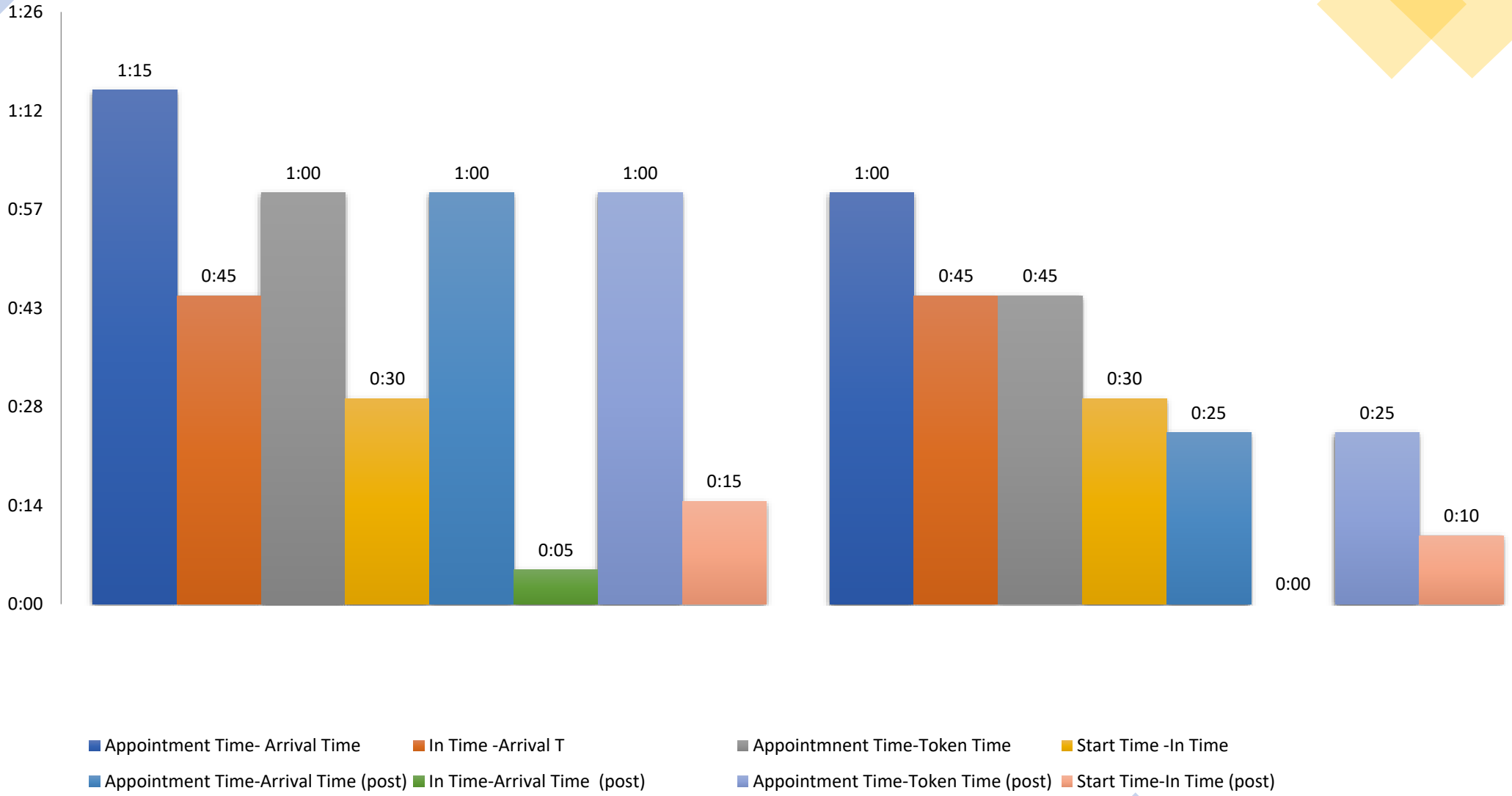
Patient time from arrival to start of treatment- KARTHIK



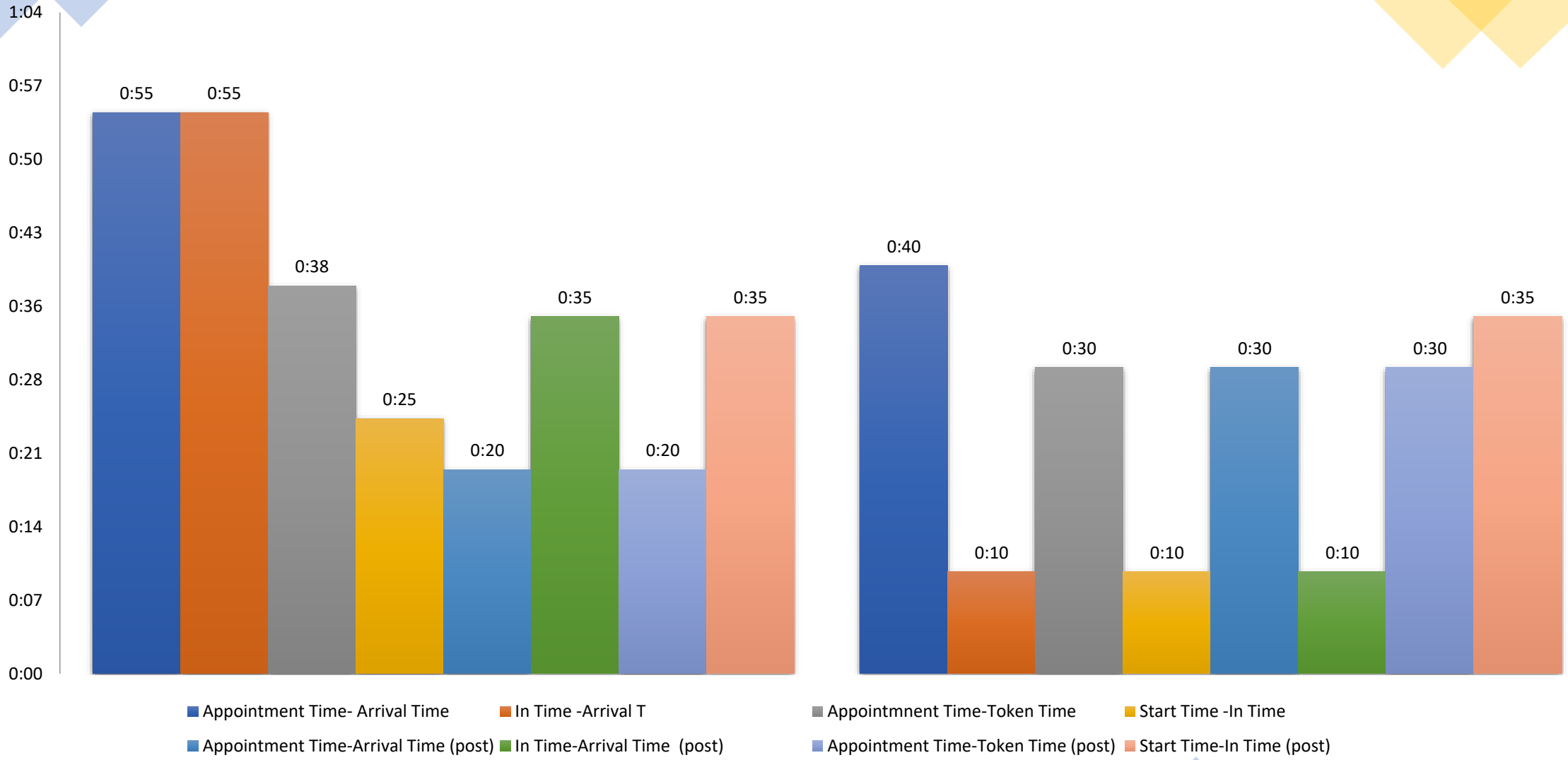
Patient time from arrival to start of treatment- DAMODAR



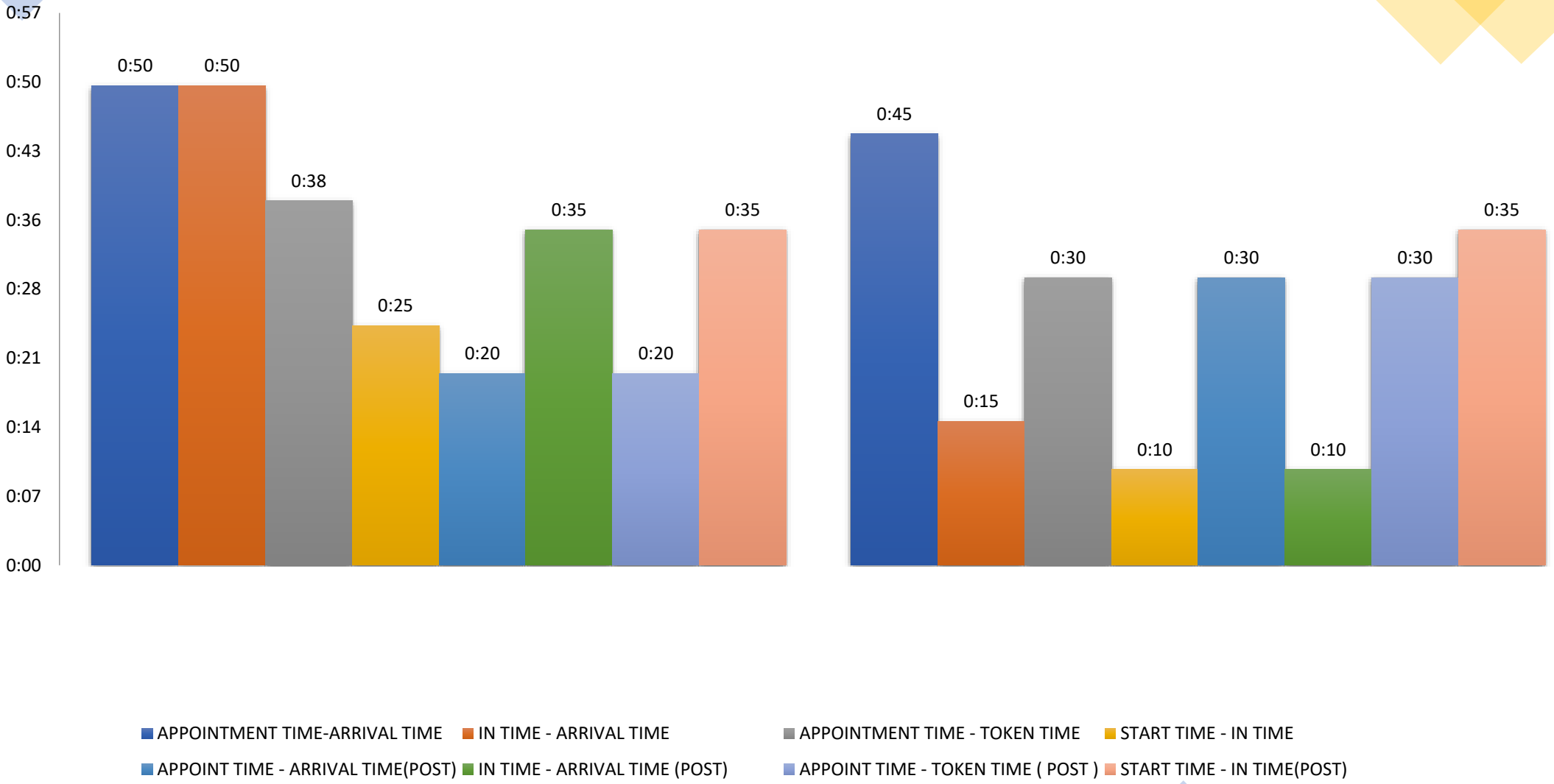
Patient time from arrival to start of treatment- JAGDEESH M.



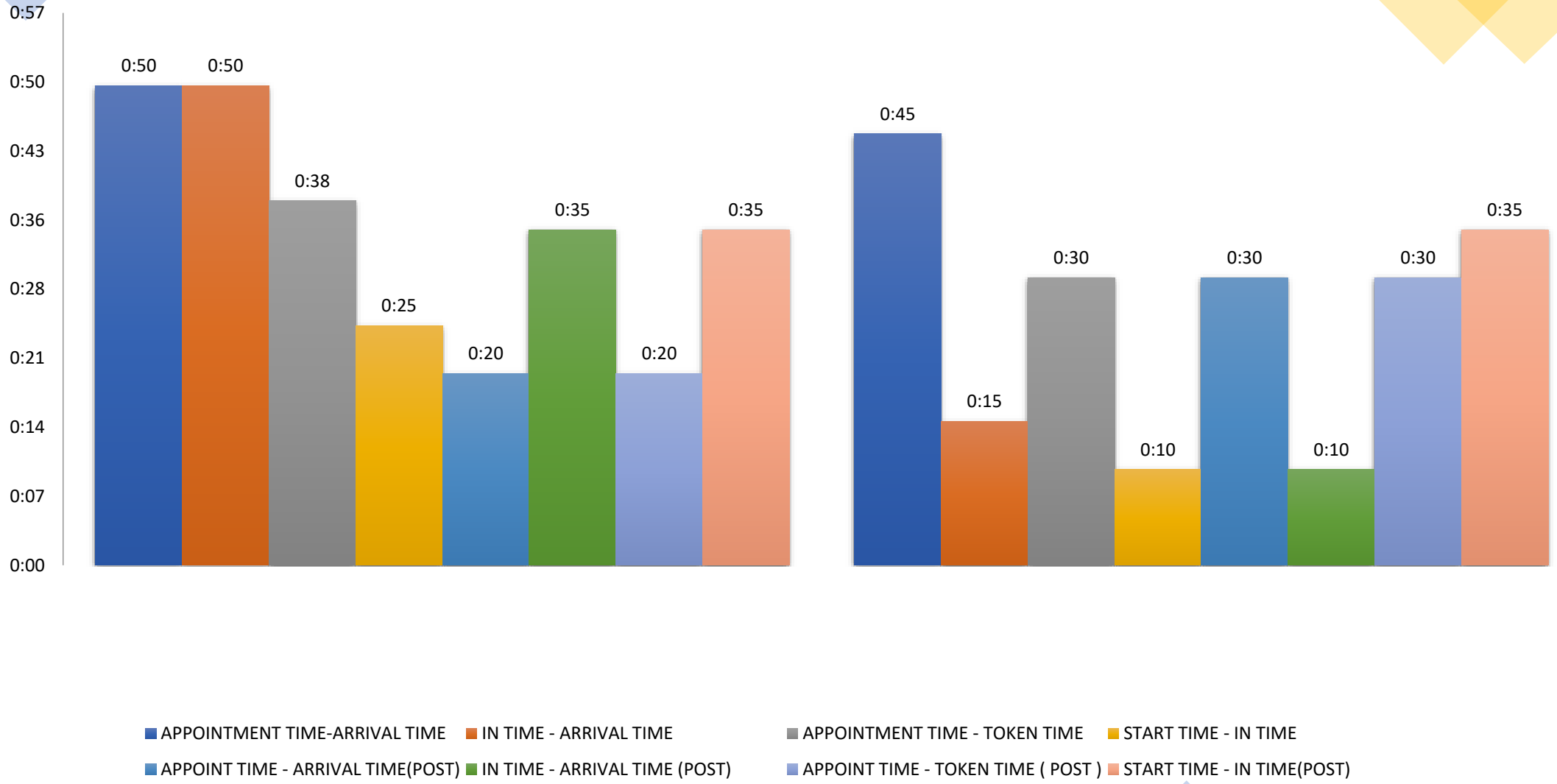
Patient time from arrival to start of treatment - KAMLA



Patient time from arrival to start of treatment- NUTAN T.

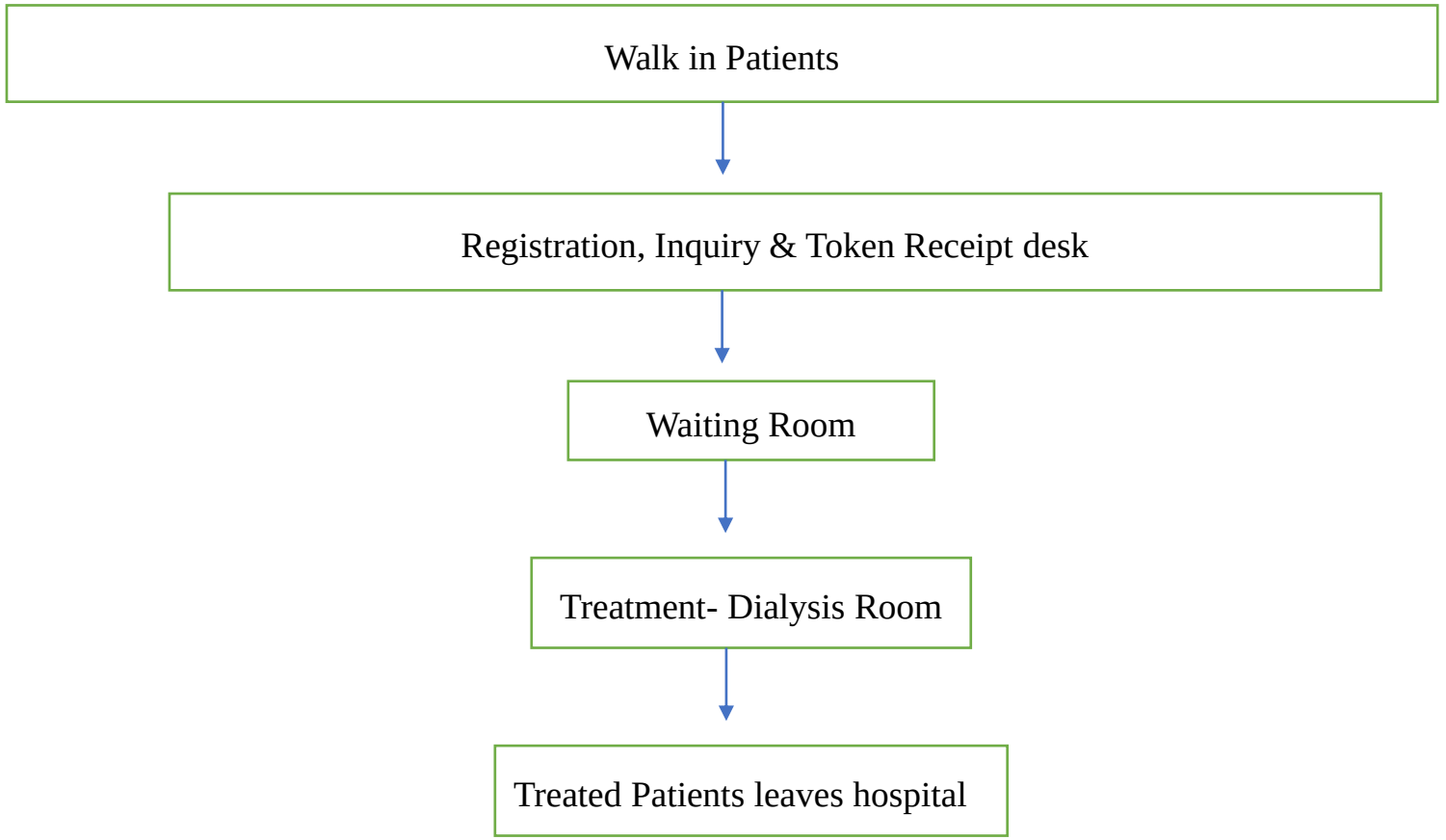


Patient time from arrival to start of treatment- SHARDA K.



DISCUSSION

- Getting dialysis does take a lot of time due to which many patients do not follow dialysis routine strictly due to the number of hours and number of times the person has to visit the dialysis department.
- That is why the patient education is very necessary for patients undergoing dialysis treatment as they lack of conviction maintaining regime and often skip alternate sessions due to the mental stress of travel for the treatment.
- It was highlighted in a study on Building Dialysis Workflows into EMRs done in 2013 by Yu B and Wijesekera D. that when the workflow system is properly enforced and that is in compliance with the local and national standards and policies like NABH standards, SOPs can improve the quality of care provided to dialysis patients, also provide flexibility that caregivers need to continue treatment
- The whole workflow times observed in the hospital is divided in 4, that includes;
    - **Appointment time** that is given to the patients by the hospital staff based on the availability of services or doctors.
    - **Arrival Time** is when the patient arrives at the hospital for the treatment.
    - **Token time** is the time when the token is obtained from the registration desk.
    - **In-time** refers to the time of entering in the dialysis room for treatment.
- The schedule of treatment which was followed in the department was **first come first serve based on the appointment time slot**.
- The gap between patient's **arrival time and the treatment time** found to be the main cause behind increasing the overall waiting time.
- So, with the aim to reduce the gap between arrival time and in-time, it was decided to introduce an **appointment system for patient scheduling** in which the treatment schedule would be changed from first come basis to appointment.
- This seemed to be a difficult task as all the patients needed to be educated first and the relatives and the patients were given throughand detailed instructions to follow time and the importance of coming on time.



Flow Chart of Outpatient visiting a for dialysis in Hospital

- Before the intervention, the **in-time to arrival-time** observed pre implementation was an average of **37 minutes**, which had come down to **25 minutes** after the introduction of appointment system, which inferred that the patient education and appointment system had an effect on the waiting time of patient.
- The **appointment time to arrival time** was recorded to be **51 minutes** pre intervention of schedule that had come down to **37 minutes** post intervention, which inferred that the patient education and appointment system had an effect on the waiting time of patient.
- Similar result was observed in a **2008** study by **Chuang HF, Chan SJ, Lin YC** on their **project to reduce waiting time during peritoneal dialysis visit's**, in which computerized appointment system was implemented which resulted in shortened patient waiting time and improved satisfaction score.
- The change in scheduling time from first come first serve basis to appointment basis has brought down waiting time considerably.
- The patients were aware of coming on time and maintaining proper schedule of treatment and patient were observed to be **visually satisfied.**
- Similar observation has been found by a **2018** study done in Iranian hospitals by **Dr. Iqbal MZ, Dr. Aamir M to determine the factor that can influence patients' satisfaction** that the management and organizational issues, followed by issues connected with physicians, nurses and employees and patients expect the officials of hospitals to reduce waiting time for their services.
- Confirmation on this aspect can be done by a recent **2020** study by **Ke Li Yew on Impact of Wait Times, Perception of Care and Environment on Patient Satisfaction at Infusion Centers and Dialysis Centers**, concluded that one of the reasons for shorter wait times and perceived wait times at the dialysis centers is due to having scheduled appointments. This further suggests that having appointments might aid in the management of patient flow for centers. Wait times can be reduced significantly with scheduled appointments to improve patient satisfaction and there is a significant impact of Technical Skills, Interpersonal Skills & Environment on Patient Satisfaction

- As stated in a **2019** cross-sectional descriptive study done by **Door ZH, Dr. Mukhtar HF** in a cross-sectional descriptive study on '**The Satisfactionof Patients on Maintenance Hemodialysis Concerning the Provided Nursing Care in Hemodialysis Units**' that the willingness and flexibility showed by nurses and staff in meeting patient's needs improves patient satisfaction.
- Similarly, in the hospital, as a result of flexibility and cordialness showed by the staff, the relationship between patients and the staff improved as they responded positively to the new schedule system patient as they responded positively to the new schedule system.
- This made the transition from earlier form of scheduling to the new appointment-based scheduling system very smooth. The patients and relatives used to abide by the instructions the staff were giving.
- This impacted the **morale and motivation** of patients to come on time and come at the appointed time.
- This in turn had an effect on **bed turnover**, that can have significantly detrimental impact on hospitals, patients, and healthcare staff. Thus, improving the healthcare services.

CONCLUSION

The patients coming to the dialysis department are vulnerable and their time is precious. After keenly observing the workflow in the department, it was found that the patients have to spend long waiting hours from arrival to entry into the dialysis department was a major factor of dissatisfaction of for the patients as the service was given on a first come first serve basis.

To resolve this, the new schedule was set according to time given by technician and nurses and the relationship between the staff and patients was noted to be on a positive side. This made the transition from earlier form of scheduling to the new appointment-based scheduling system smooth.

The importance of scheduling of treatments were explained to the patients by the nurses and technicians, this caused the patients to follow the treatment on their own. In the process to do so, staff has faced few minor challenges while educating patients and their relatives such as patients' resistance to understand which eventually overcame by the determination of the staff.

As the week progressed, the arrival-time to in-time have reduced by 12 minutes and appointment time to arrival time to has come down to 14 minutes.

The patients started coming half an hour before their dialysis schedule. The patients were visually satisfied that within half an hour of coming to the hospital their dialysis treatment was started. Waiting time of the patient of the had reduced, which encouraged the patients to take a positive approach towards treatment.

So, it is concluded that introducing an appointment system for patient scheduling reduces the length of waiting time for the patients coming for haemodialysis at the hospital and the appointment and arrival time is strongest independent modifiable risk factor for waiting time.

Dialysis being a continuous care system as opposed to a one-time activity, the most critical factor for offering enhanced patient care is patient satisfaction by improving their overall experience and by managing subsequent patient visits.

RECOMMENDATIONS

- The department will have to adjust to the new computerized appointment scheduling system of the patients. The time taken from arrival to entry will came down futher.
- There could be better planned tasks and help from housekeeping department who are formally educated. These housekeeping staff could be trained to clean and prepare the dialyzer for the next patients.
- There would be no addition of staff, but the existing internship candidates could assist the technician in priming the dialyzer. This could help with the quality of dialyzer and could increase durability of dialyzer.
- Additionally, the workflow of the medical and paramedical should be concentrated to reduce errors.
- The area of preparation of dialyzer seemed to be of old model, since the department has been running for a long time. Hence there is a requirement to renovate and upgrade the process of preparation of dialyzer in the department. This would increase the quality of dialysis being done in the department.
- The patient attendant waits in the waiting area without any hassle, providing a proper lounge with facilities for the attendants could boost the morale of the patients.
- Increasing flexibility within a system is vital to improving capacity and efficiency.

ANNEXURE

	PRE-INTERVENTION				POST-INTERVENTION			
Patient name	Appointment Time- Arrival Time	Appointment Time-Token Time	In Time -Arrival Time	Start Time -In Time	Appointment Time-Arrival Time	Appointment Time-Token Time	In Time-Arrival Time	Start Time-In Time
Pratul Rai	1:55	1:40	0:45	0:40	0:10	0:10	0:40	0:10
	-0.01	-0.021	-0.006	0:00	0	0	0	0
Anjana Sharma	0:30	0:15	1:00	0:30	0:15	0:15	0:30	0:25
	0:00	-0.01	0:30	0:40	0:00	0:00	0:00	0:00
Karthik	0:05	-0.003	0:35	0:20	0:30	0:30	0:20	0:40
	-0.003	-0.014	0:25	0:20	1:10	1:10	0:50	0:25
Damodar	0:45	0:30	0:15	0:20	0:30	0:30	0:00	0:00
	0:25	0:10	0:45	0:20	0:40	0:35	0:35	0:30
Jagdeesh M.	2:05	1:55	1:05	0:20	1:15	1:15	0:40	1:05
	0:00	0:00	0:00	0:00	0:30	0:30	0:55	0:35
Kamla	1:45	1:30	1:00	0:20	0:25	0:25	0:15	0:55
	1:10	0:55	0:50	-0.486	1:45	1:45	1:10	0:25
Nutan T.	1:00	0:45	0:30	0:20	1:00	1:00	0:20	0:20
	0:45	0:30	0:35	0:10	0	0	0	0
Sharda K.	1:15	1:00	0:45	0:30	1:00	1:00	0:05	0:15
	1:00	0:45	0:45	0:30	0:25	0:25	0:00	0:10
Manorama	0:50	0:35	0:38	0:27	1:00	1:00	0:30	0:30
	1:45	1:30	0:55	0:15	1:00	1:00	0:40	0:45
Prakash T	1:25	1:10	0:45	0:30	1:00	1:00	0:30	0:25
	0:55	0:40	0:55	0:20	0:45	0:45	0:50	0:20
Sita	0:55	0:38	0:55	0:25	0:20	0:20	0:35	0:35
	0:40	0:30	0:10	0:10	0:30	0:30	0:10	0:35
Ranu	0:50	0:38	0:50	0:25	0:20	0:20	0:35	0:35
	0:45	0:30	0:15	0:10	0:30	0:30	0:10	0:35

THANK YOU!