



ISSN: 0975-833X

Available online at <http://www.journalcra.com>

INTERNATIONAL JOURNAL  
OF CURRENT RESEARCH

International Journal of Current Research  
Vol. 13, Issue, 12, pp. 19995-19999, December, 2021

DOI: <https://doi.org/10.24941/ijcr.42715.12.2021>

## RESEARCH ARTICLE

### A STUDY ON EFFECTIVENESS OF ONLINE INDENTATION OF MEDICINES IN REDUCING THE MEDICATION TURNAROUND TIME IN TERTIARY CARE INSTITUTE

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#### ARTICLE INFO

##### Article History:

Received 17<sup>th</sup> September, 2021

Received in revised form

28<sup>th</sup> October, 2021

Accepted 10<sup>th</sup> November, 2021

Published online 29<sup>th</sup> December, 2021

##### Keywords:

Online Indentation, Turnaround Time, Healthcare quality.

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#### ABSTRACT

**Background:** Timely supply of drugs in time to the inpatients is a good indicator to determine the healthcare quality. The time between the doctor prescribing medicines and delivering the drugs to the concerned nursing unit is the turnaround time. The process of drugs being delivered from central stores to nursing units involves personnel from various departments who need coordination among them to deliver the medicines in time. Reduction in Turnaround time of medication will reduce morbidity and mortality and improve the healthcare quality. **Aim:** To compare the Turnaround time of medication to patients with online indenting of drugs. **Methodology:** It is a prospective comparative study between manual and online indenting of drugs. It was conducted for a period of 2 months in August and September 2021. Sample of 252 medical indents were studied. The data collection form was designed and validated based on the process of indenting of drugs from the wards and ICUs and the observations were noted down. The collected data was analyzed using MS Excel and SPSS Software. **Results:** Total number of medical indents studied was 252. The average Turnaround time observed in manual indenting of medicines from wards is 1hr 18 mins and from ICUs is 41mins. The average Turnaround time observed in Online indenting of medicines from wards is 51mins (p value-0.017) and ICUs is 34mins (P value-0.026). **Conclusion:** The online indentation of drugs reduces the cumbersome process of paperwork and saves a lot of time which reduces the morbidity, mortality and improves healthcare quality.

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Citation: Dr. Vennela Penumur, Dr. Krishna Reddy, K.V., Dr. Rajiv and Dr. Rao, J.N. "A study on effectiveness of online indentation of medicines in reducing the medication Turnaround time in tertiary care institute", 2021. International Journal of Current Research, 13, (12), 19995-19999.

## INTRODUCTION

Timely supply of drugs in time to the inpatients is a good indicator to determine the healthcare quality. The time between the doctor prescribing medicines and delivering the drugs to the concerned nursing unit is the turnaround time. The process of drugs being delivered from central stores to nursing units involves personnel from various departments who need coordination among them to deliver the medicines in time. Reduction in Turnaround time (TAT) of medication will reduce morbidity and mortality and improve the healthcare quality. A potential benefit of health application software in inpatient settings is decreased medication turnaround time.

Medication turnaround time is the total time from composition of an order by the prescriber, through verification and processing in the pharmacy, to administration of the medication to the patient (Wietholter, 2009) TAT is one of the metrics used to evaluate operating system scheduling algorithms. Moreover, time-to-first dose can be broken down into two key phases: the time from when the order was composed to the time that pharmacy verifies the order and the time from pharmacy verification to the time the medication was delivered (Mekhhjian, 2002). Many advocate that electronic processes for medication ordering and pharmacy verification and dispensing are more efficient than paper based systems because they may be: (1) instantly delivered to the pharmacy as opposed to manually written by the physician, delivered to the appropriate department by the clerk, transcribed to the

medication administration record (MAR) by the nurse, and processed by the pharmacy; (2) easier to read as compared to copies of providers' handwriting; (3) more complete because of required fields; and/or (4) more legible to the pharmacist, reducing the need for clarification phone calls to the provider (Lehman, 2001). Studies also found a statistically significant 70% reduction in their medication turn-around time. More specifically, they found that their medication turn-around times were reduced by roughly 64% (Mekhjian, 2002; Lehman, 2001). This reduction in order-processing time improves patient care by shortening the interval between physician prescribing and medication availability and may allow pharmacists to explore opportunities for enhanced clinical activities that will further positively impact patient care (John wietholter *et al.*, 2009)

**AIM:** To decrease the Turn around time of medication to patients with online indenting of drugs.

## METHODOLOGY

It is a prospective comparative study between manual and online indenting of drugs. It was conducted for a period of 2 months in August and September 2021. Sample of 252 medical indents were studied. The data collection form was designed and validated based on the process of indenting of drugs from the wards and ICUs and the observations were noted down. The collected data was analyzed using MS Excel and SPSS Software.

## REVIEW OF LITERATURE

Diksha Shroff et al conducted a study on turnaround time of online indentation of medicines in a tertiary care hospital. According to their study, the average TAT of wards on the first floor is 101.5 minutes, from the second floor is 93minutes and the third floor is 77.5minutes. It is observed that though they have adopted technology, there are issues and still a delay. This study acts as an additional layer to the various other delays that are occurring in the pharmacy. Patient safety is ensured when every step of the process, from choosing the most appropriate medication, to writing the prescription, to dispensing the medication is optimized to prevent delays in therapy and medication errors (Diksha Shroff, 2009). Asma Begum et al studied on Analysis of drugs and non-drugs indents for turnaround time and shortage received in in-patients pharmacy from various departments in a tertiary care hospital. According to their study, The average medication turnaround time (TAT) of a general ward was 2 hours 18mins and critical wards were found to be 1 hour 10 minutes respectively. The total general indents followed was 330, 98(29%) of indents were delayed, indent took more than standard TAT and 240(71%) indents took 2 hours or less time. Everyone within the circle of care, first has to ensure patient safety in every step of process from the initial step of selecting the appropriate medication to prescribe, to dispensing the medication is improved to prevent delays in therapy and medication errors (Asma Begum, 2017). Saleh Binobaid et. al conducted research on Using an integrated information system to reduce interruptions and the number of non-relevant contacts in the inpatient pharmacy at tertiary hospital. In this study, issues of safety in the pharmacy were highlighted because medication safety is a major concern. The link between medication errors and different types of interruptions

was studied; however, there were no general agreements about the extent of their association. Telephone interruptions during medication handling are considered a significant factor causing medication error, as well increasing workload and TAT. On a regular basis, the inpatient pharmacy receives a large number of telephone call inquiries about the status of prescriptions. Processing high prescription volumes in an atmosphere where interruptions are the norm can lead to medication errors. The developed communication software may represent a possible solution to enhance communication among the pharmacy, nursing and other healthcare professionals (Saleh Binobaid, 2017). Vijay Pratap Raghuvanshi et.al studied on medication Turnaround time in hospital pharmacy department. According to their study, The average total time taken to deliver medicines against the indents was observed to be 1 hour and 06 minutes. The average TAT for packing the indent once it is sent to the system by the nursing staff was found to be 09 minutes. The average TAT for taking the packing slip in the store for collection of medicines was 11 minutes. That means the print out stays on the printer for 11 minutes. Average TAT for collecting the drugs as observed as 16 minutes. Average TAT for exit of drugs from the pharmacy store was found to be 27 minutes. It is alarming to see that even after the drugs are collected and ready to be dispatched, it takes 27 minutes for the drugs from the store. The results of this research study have organizational applications. On an organizational level, the results of this study can be used to build and strengthen internal administration and /or Nursing, physician support (Vijay Pratap Raghuvansh, 2013). Heather Neville et.al studied Decreasing Medication Turnaround Time with Digital Scanning Technology in a Canadian Health Region. According to their study, Implementation of DST in 2 tertiary care hospitals was associated with a 50-min decrease in phase 1 medication turn- around time and an improvement of 42 min in phase 1 turn- around time for first doses of antibiotics. These results suggest the need for interprofessional education to review policies on medication turnaround time and to reinforce the rationale for minimum standard turnaround times for critical medications, including antibiotics (Heather Neville, 2014).

HAGOP S. MEKHJIAN et al studied on Immediate Benefits Realized Following Implementation of Physician Order Entry at an Academic Medical Center. According to their study, Statistically significant reductions were seen following the implementation of POE for medication turn-around times (64 percent, from 5:28 hr to 1:51 hr;  $p < 0.001$ ), radiology procedure completion times (43 percent, from 7:37 hr to 4:21 hr;  $p < 0.05$ ), and laboratory result reporting times (25 percent, from 31:3 min to 23:4 min;  $p = 0.001$ ). In addition, POE combined with eMAR eliminated all physician and nursing transcription errors. There were 43 and 26 percent improvements in order countersignature by physicians in OSUH and James, respectively. Severity-adjusted length of stay decreased in OSUH (pre-POE, 3.91 days; post-POE, 3.71 days;  $p = 0.002$ ), but not significantly in James (pre-POE, 3.68 days; post-POE, 3.61 days;  $p = 0.356$ ). Although total cost per admission decreased significantly in selected services, it did not change significantly across either institution (OSUH: pre-POE, \$5,697; post-POE, \$5,661;  $p = 0.687$ ; James: pre-POE, \$6,427; post-POE, \$6,518;  $p = 0.502$ ) (HAGOP, 2002). SAMIR SIKRI et. al conducted research on Effect of a remote order scanning system on processing medication orders. According to their study, there was significant reduction in the mean time spent by pharmacists to process and verify a

medication order set as well as a reduction in the overall variability of orders by 35%(40.59+\_ 56.63mins before the ROSS, 26.58+\_37.50 minutes after the ROSS, p< 0.01) (SAMIR SIKRI, 2011).

## RESULTS

Total number of medical indents studied was 252. The ward and ICU are selected which are in the same floor and near by to observe the time taken to get the medicines from medical stores to the nursing units. The average TAT observed in manual indenting of medicines from wards is 1hr 18 mins and from ICUs is 41mins. The average TAT observed in Online indenting of medicines from wards is 51mins (p value- 0.017) and ICUs is 34mins(P value-0.026)

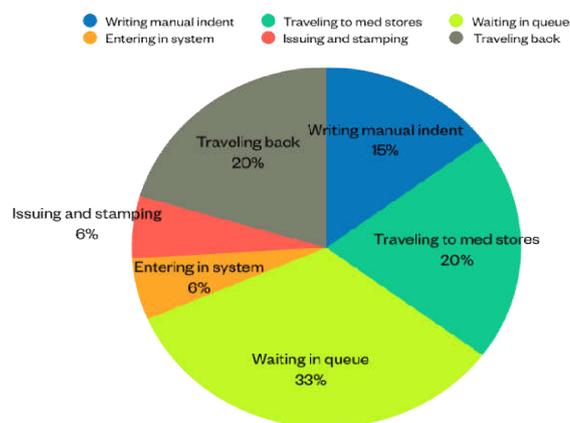


Fig. 1. Distribution of time in Manual indenting in ICUs

Table 1. Comparison of turnaround time of manual and online indenting system in ICUs

Steps of Manual indent	Observed average TAT of manual indents of ICU	Steps of Online indent	Observed average TAT of Online indents of ICU	P-value
writing indent in patient's Case sheet	8mins(as they keep most of drugs in ICU standby)	Enters the list of drugs in system and raise the request to medical stores	5mins	0.0013
Travelling from ward to Medical stores	11mins	Travelling from ward to Medical stores	11mins	
Waiting in queue to handover case sheet to stores person	18 mins (ICUs are given priority)	No much waiting as the store person calls once he keeps medicines ready after receiving online request	5mins	0.0041
Store person enters the medicines in system	3mins	No entering in system as he already receives list of medicines in online request		0.0023
Gives the medicines in the list and stamps issued on case sheet	3mins	Gives the list of medicines and there is no stamping	2mins	0.0312
Takes the medicines and travel back to the concerned ward	11mins	Takes the medicines and travel back to the concerned ward	11mins	
	51mins		34mins	0.0264

Table 2. Comparison of turnaround time of Manual indenting and Online indenting in wards

Steps of Manual indent	Observed average TAT of manual indents of ward	Steps of Online indent	Observed average TAT of Online indents of ward	p value
writing indent in patient's Case sheet	15mins	Enters the list of drugs in system and raise the request to medical stores	7mins	0.0034
Travelling from ward to Medical stores	11mins	Travelling from ward to Medical stores	11mins	
Waiting in queue to handover case sheet to stores person	30mins	No much waiting as the store person calls once he keeps medicines ready after receiving online request	10mins	0.0012
Store person enters the medicines in system	8mins	No entering in system as he already receives list of medicines in online request		
Gives the medicines in the list and stamps issued on case sheet	3mins	Gives the list of medicines and there is no stamping	2mins	0.0312
Takes the medicines and travel back to the concerned ward	11mins	Takes the medicines and travel back to the concerned ward	11mins	
	1hr 18mins		41mins	0.017

## DISCUSSION

The observed average TAT of my study in manual indenting is 1hr 18 mins which is comparatively less when compared to the observed average TAT in Asma begum et.al study (Asma Begum *et al.*, 2017) is 2 hours 18mims and in ICU is 1 hour 10mins and The average total time taken to deliver medicines against the indents was observed to be 1 hour and 06 minutes in vijay Pratap et.al study (Vijay Pratap Raghuvansh, 2013).

According to Heather Neville et.al study (Heather Neville *et al.*, 2014), the median total turnaround time was 5 h, 15 min before DST (Digital scanning technology) implementation and 5 h after DST implementation where there was 15mins difference whereas in my study, before implementation of online indentation, the average TAT in wards is 78mins and after implementation of online indenting is 51mins and there is difference of 27 mins which is more when compared to Heather Neville et.al study. The difference observed in ICU before and after implementation of online indentation is 7 mins which is less than Heather Neville et.al study.

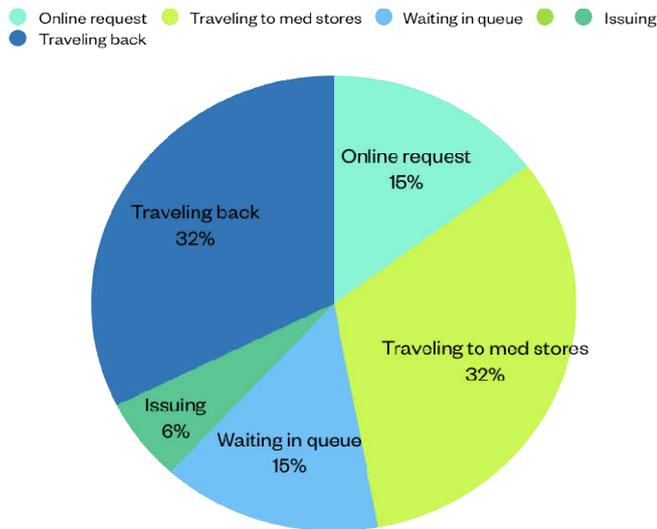


Fig 2. Distribution of time in online indentation in ICUs

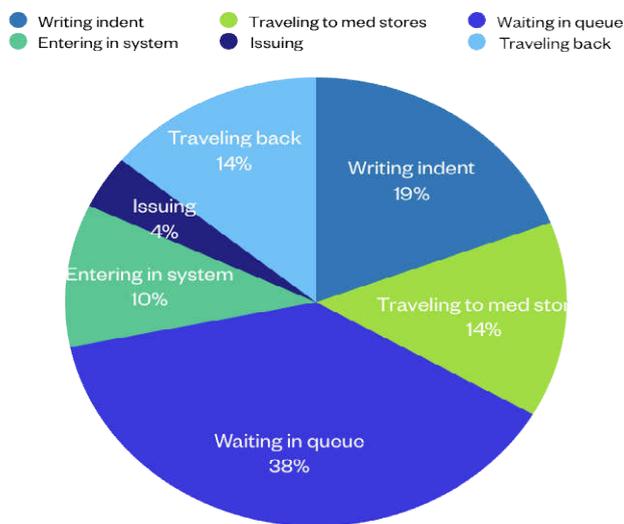


Fig 3. Distribution of time in manual indenting in wards

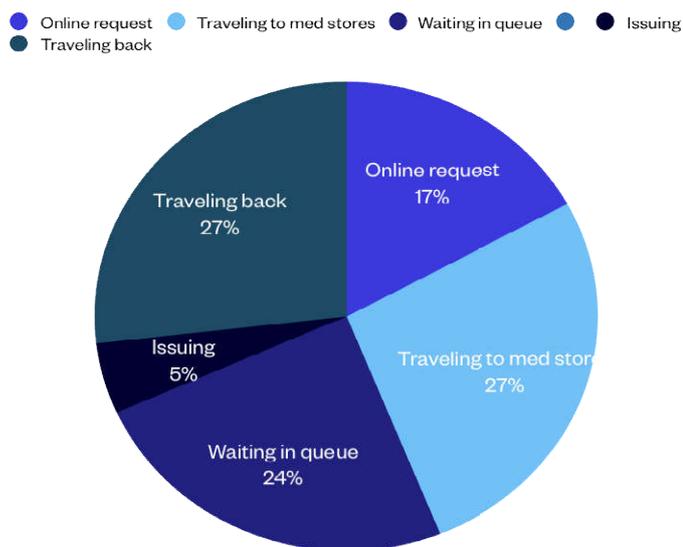


Fig 4. Distribution of time in Online indenting in ICUs

The time that an order was received by the pharmacy to the time it was verified by a pharmacist was reduced from 31 minutes before CPOE (computerized prescriber order entry) implementation to 3 minutes after CPOE implementation

( $p < 0.0001$ ) according to Jon Wietholter et.al study (John wietholter *et al.*, 2009). The difference of time observed is 28 mins which is near to my study.

## CONCLUSION

The online indentation of drugs reduces the cumbersome process of paperwork and saves a lot of time which reduces the morbidity, mortality, reduction of medication errors and improves healthcare quality. However, the conservative nursing staff find it difficult in an online indenting system who are poor at technical skill for requesting medicines online. The encouragement of training about online indentation saves potential time where that time can be allocated to the patient's care.

## RECOMMENDATION

There can be implementation of techniques of computerized prescriber order entry and Digital scanning technology for reducing medication turnaround time. The training on online indenting should be given to all the nursing staff which makes them familiar and also reduces paperwork.

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