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A QUALITY IMPROVEMENT PROJECT ON THE DOCUMENTATION OF ROUTINE POINT OF CARE ULTRASOUND IN EMERGENCY DEPARTMENT OF A TERTIARY CARE TEACHING HOSPITAL IN NORTHERN INDIA

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Abstract

Introduction: Emergency Department is one of the busiest departments in a hospital. Documentation is often missed during the busy shifts which can lead to minor or major issues later, even medicolegally. Point of Care Ultrasound (POCUS) is a routine bedside screening ultrasound done in ED by the residents/consultants. POCUS has become a major aspect of Emergency Medicine (EM) and is included in the postgraduate training curriculum in India as well as abroad. Royal College of Emergency Medicine (RCEM), one of the pioneer organizations has implemented POCUS in the teaching curriculum of EM.

INTRODUCTION

The problem: The RCEM has introduced POCUS in the academic curriculum for EM in 2010[1]. Since then, it has gained popularity widely across the world. Emergency physicians do POCUS as a bedside screening tool in quick assessment of the patient. This helps in the initial treatment and stabilization in ED. POCUS is been used in all critical areas now for patient care. There are several standard formats for the documentation of POCUS, but there is no guidelines setup in India for the same. The RCEM has emphasized on the documentation and reporting of POCUS as per the Royal College of Radiologists (RCR) format which must contain patient details, time, date, indication, findings and stamp of the doctor performing the scan [2]. In European countries, this format is been used. It includes patient details, indication, findings, conclusion, signature and date. The American College of Emergency Physicians (ACEP) has published a standard reporting guidelines for emergency sonography in ED in 2018, which is quite detailed. It also includes the standard format of patient demographics, indication, views, findings, interpretation and quality assurance [3]. Utilization of POCUS in emergency is on the rise now since most of the hospitals and medical colleges have established a functioning ED.

There are several indications of using POCUS. Lung ultrasound for patients with respiratory distress, focused echocardiography for diagnosing and treating any cardiac pathology, fluid management in shock patients, screening of various conditions like Deep Vein Thrombosis (DVT), Pulmonary Embolism (PE), aortic dissection and aneurysms, raised intracranial tension, Extended Focused Abdominal Sonography in Trauma (E-FAST), and many other. There are several studies been done on the same in ED [4]. Various protocols are also existing, on which how these scans have to be done. But there is no existing protocol or format on how it has to be documented. Ultrasound has higher sensitivity in diagnosing most of the acute

conditions in ED. It is less time consuming too. Although it is operator depended, the scan is easier to perform. X-rays or other imaging modalities are time consuming, need patient to be shifted to the radiology room and usually patients in ED are unstable and difficult to be shifted. Hence the use of POCUS, which is cost-effective and has higher diagnostic yield, is very important in acute management of the patient in ED.

Along with the importance in utilization of POCUS, the documentation too is equally important. Most of the times, due to the busy nature of working shifts, documentation is neglected or improper. This can lead to serious lapse in patient safety too, especially critical cases and during handover of the cases to Intensive Care Units (ICU). The initial presentation and POCUS findings need to be documented to substantiate the treatment given in ED.

We all know the importance of documentation especially in ED and critical areas of hospital. There are no studies conducted in India regarding this aspect. Also, there is no set format or guidelines for a uniform format of documenting POCUS. Literature review revealed that there exists a format put forward by RCEM and RCR together and another one by the American College of Emergency Physicians (ACEP).

The format or various parameters in accordance with the format from RCEM and RCR includes:

1. Details of the patient
2. Indication
3. Findings
4. Conclusion
5. Signature
6. Date

There is no similar format validated in India. Hence this Quality Improvement Project (QIP) was done to assess the existing problem and improve it.

POCUS is performed in ED by the emergency physicians, senior residents and junior residents who are undergoing postgraduate residency training in EM. It is used as an adjunct to primary survey to identify any life-threatening cause as well as an aid in resuscitation. It is a rapid, easy and inexpensive tool with a great impact on clinical outcome. For these various reasons, POCUS is incorporated into the academic curriculum of postgraduate residency program in UK [1]. The National Board of Examinations, an academic council in India, has also incorporated the same in the postgraduate training in EM. Though it is been used widely, the documentation is seldom missed or incomplete. Documentation is important to justify the treatment given in ED in accordance with the findings and also will ensure a clear picture to the subsequent treating doctors. Improper documentation can affect patient safety as well as during handover it becomes difficult. Many a times, notes which are not documented means it was not done. A study in 2008 in United States found that an average of only 1.70 scans were done per shift and only 56.4% were documented as per format. The study suggested to incorporate electronic medical records for easier documentation [6].

Literature search revealed that very few studies exist on this problem and hardly any study from India. The studies put forward implementing a proforma/format for

documentation of POCUS. A study was conducted by Aziz et al, published in 2020, proved that QI studies aid in improving the quality of documentation in ED [7].

METHODOLOGY

This QI project was conducted in the ED of a tertiary care medical college hospital in North India. The doctors and staff work in six-hour shifts in day and twelve-hour in nights. Each shift is manned by two senior resident doctors, two postgraduate trainees and eight nursing staff, with consultant cover in the day and on call at night. The average number of patients coming to ED is 80-100 per day.

Aims and Objectives:

1. To implement POCUS in resuscitation of all patients in red zone, preferably more than 80%.
2. To document atleast 80% of the POCUS scans done in the Red zone.
3. To have a complete documentation with all the six parameters in at least 80% of the documented scans.

Patients of all age group, who were triaged as 'Red' and moved to the 'Red zone' of ED was included in the study, from November 1st till February 28th (4 months). The patients who were in yellow and green zones were excluded.

The study was divided into three phases, pre-intervention, intervention and post-intervention. Pre-intervention phase was from November 01 2023 to 15th November 2023. During this period, the pre-existing documentation and number of scans documented were collected by the ED consultant and office assistant. Analysis of the data was done using fishbone analysis and process flowchart (Figure 1).

The existing problem was identified and it was decided to officially form a POCUS QI team comprising nine members. The intervention phase was from November 21st till January 26th, where all the interventions taken were tested with the help of PDSA cycles.

Post-intervention phase was from February 1st till 28th. The data was collected and compliance of documentation was checked for one month following the intervention phase.

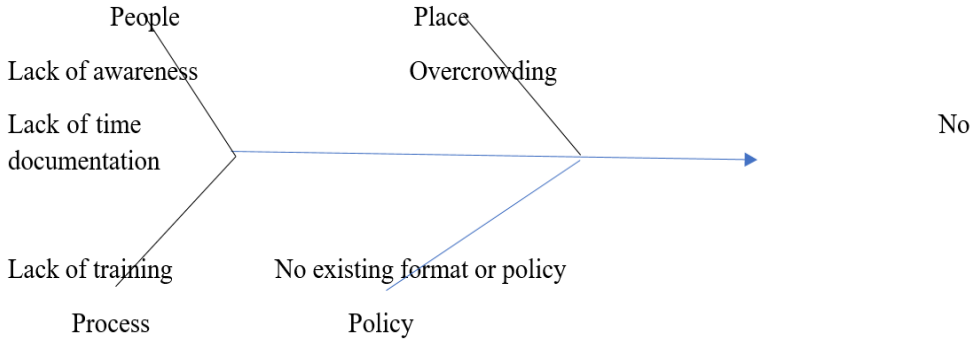

Figure 1: Fish bone analysis of the improper documentation in ED

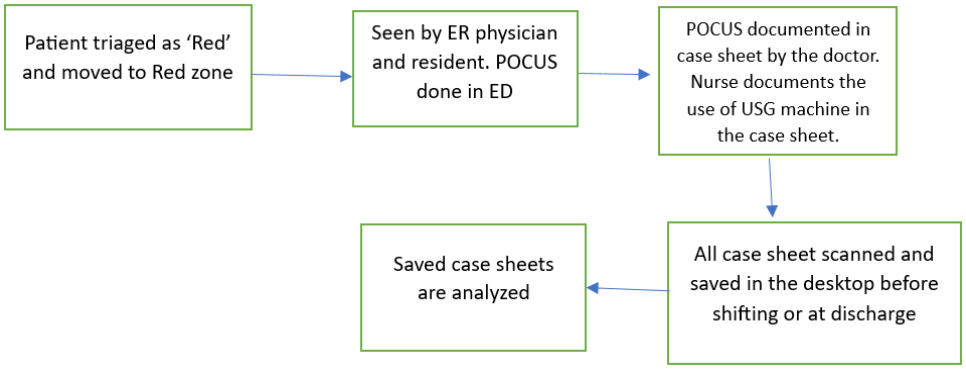

Figure 2: Illustration of workflow in documentation of POCUS in ED:

Pre-intervention phase:

In the pre-intervention phase, 180 case sheets of red zone patients were observed, with an average of 12 per day. Whenever a scan is performed in ED, it will be logged in the nursing notes. It was observed that POCUS was used in 128(71%) patients in red zone, as per the nursing notes, but only 98(54.4%) patients in the red zone had the documentation in the notes. The emergency assessment notes will be scanned in the emergency desktop before transfer or discharge. The notes were further analyzed for the six parameters.

The following was noted in the documentation (Figure 3):

Patient details 52(53.1%)

Indication 22(22.4%)

Findings in 98(100%)

Conclusion 50(51%)

Signature in 88 (89.8 %)

Date in 15 (15.3%).

The elements 'Findings' and 'Signature' had the maximum compliance hence they were taken as realistic targets for improvement. The SMART aim of our study was to achieve atleast 80% compliance in documentation of all parameters by 4 months.

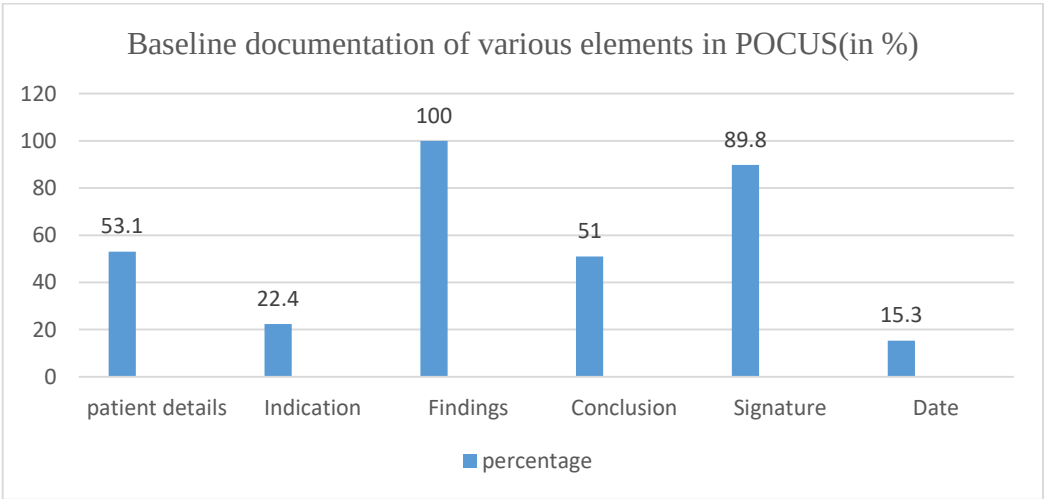

Figure 3: Baseline documentation of various elements in POCUS

Intervention phase:

1. Formation of a POCUS QI team:

The WHO Point of Care Quality Improvement model was implemented [8]. A POCUS QI team was formed comprising of nine members. One ED consultant, 3 senior residents, two final year postgraduate trainees, two nursing supervisors of ER and one office assistant. All the doctors had underwent certificate training in POCUS. The team met every Mondays and Fridays. Patients were not included in any stage of the study.

The aim of this team formation was to observe the routine practice, engage in training and awareness regarding documentation and collect data during intervention and post intervention phases. The study was under the guidance of ED consultant. Data collection and analysis was done by the trainees and office assistant while teaching and training was done by the senior resident doctors.

2. PDSA-1: Introduction of a format for documentation of POCUS

The first PDSA cycle was from November 21st to December 4th. The QI team met on November 21st to plan and do the first step. During the pre-intervention phase, it was observed that there was no guidance to doctors regarding how the documentation needs to be done. Hence the QI team decided to make a proforma including the format of documentation. A format was introduced for the documentation of POCUS, based on the RCEM and RCR guidelines. The team approved of the decision as it was easier, sustainable and uniform. The format was sent to the internal quality committee for approval. Since it is an investigation report, it may be subjected to further retrieval which can be a problem later. A proper documentation report of US needs the signature of a certified radiologist/ physician with PNDT registration, as per the existing rules. Hence, a disclaimer was mentioned below the format saying that this cannot be used for any medicolegal purposes and the documentation shall not be given to the patient. The printouts of format were pasted in the Red zone and doctors duty room. **(Supplementary material 1).** The case sheets of patients will be scanned and saved in the ER desktop before shifting to other areas or at discharge. These saved copies were checked daily morning by the QI team.

3. PDSA cycle 2: Onsite training and awareness among all doctors regarding importance of POCUS and proper documentation (December 9th-22nd)

A circular was issued to the whole ER team regarding the new format. It was circulated in the common group and copy pasted on the notice board and duty rooms. The QI team took the initiative to conduct short discussion and training on the format and documentation every Mondays and Fridays. During these sessions, the feedback of staff and the difficulties they were facing was discussed. Random case sheets were brought in and discussion was done on the documentation, for better understanding. It was noticed that many proformas were incomplete. Patient details and seal of the doctor was missing in majority ones. Frequent training and reiteration of the same was done to reduce the non-compliance.

4. PDSA cycle 3: (December 26th to January 8th) Checklist during handover

Another feedback received during the cycles were that patients coming during the shift changeover times were neglected in terms of documentation. During handover, there is a register maintained, in which the patient details along with disposition and other relevant points are mentioned, as a checklist. Hence it was decided by the team to

include POCUS in the checklist along with the existing ones, and during the handover, the senior doctor ensures that POCUS is done and documented for all the patients. This minimized the gap.

5. PDSA cycle 4: (January 13th to 26th) Introduction of a register for POCUS

The QI team found that POCUS was still not used for some patients in the Red zone. It was partly due to busy shifts and less doctors at times. It was decided that the Team Leader of every shift will ensure the same and it should be documented in a register. A register was made which included patient details, indication and name of the doctor performing the scan. Daily morning the ER consultant checked the register and corroborated with the patient register maintained in the ER. This helped in minimizing the gap of not implementing POCUS as an adjunct in primary survey. The register was checked and countersigned by the ER consultant daily morning. The QI team attended daily handovers to notice the compliance and reinforced the same.

Post intervention phase extended from February 1-28th. A total of 176 patients visited the Red zone of which POCUS was used for 162 patients. Out of the 162, 150 scans were documented.

RESULTS

Data was collected throughout the study period in pre-intervention phase, 4 PDSA cycles and post intervention phase.

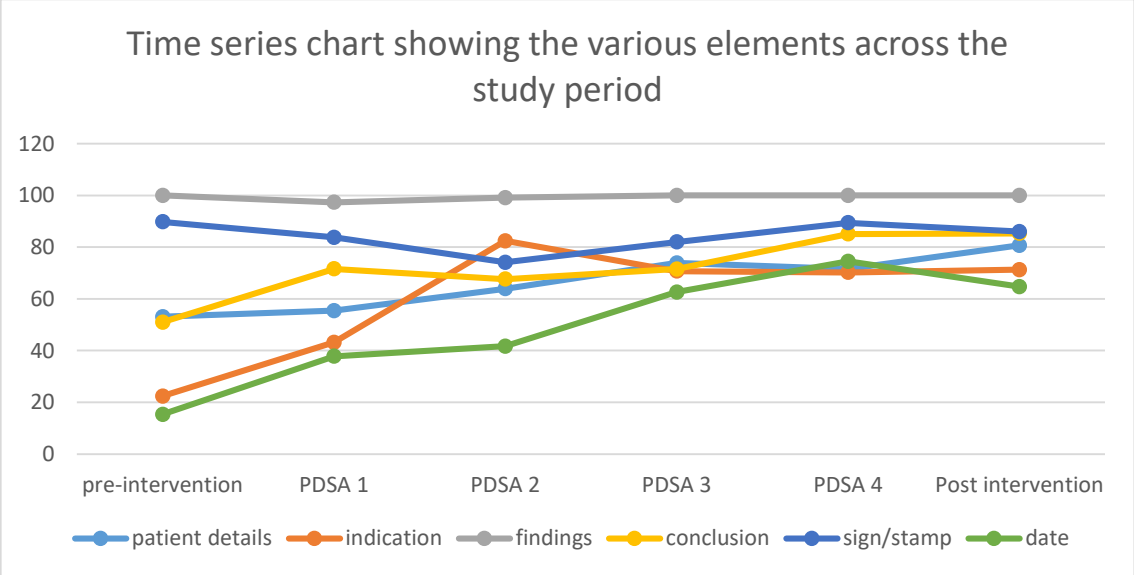

Figure 4: Time series chart showing the various elements across the study period

A total of 1012 patients were received in the red zone during the entire study period. Out of this, POCUS was done for 804 patients, but only 694 were documented in the case sheets. A time series chart showing the various elements across the study period is shown in figure 4.

In the pre-intervention phase, out of the 180 patients in the red zone, POCUS was done in 128 patients (71%) and same was documented in 98 patients (54%).

All the parameters of the documentation improved during the QIP with the 'findings' showed consistent compliance of almost 100%.

In the PDSA cycle 1, 'findings' and 'signature' had compliance of more than 80% which was similar to the baseline data. After the implementation of the format, a general idea about the same was passed on to all doctors which reflected in the subsequent cycles.

'Patient details' had less compliance because the initial page of case sheet contains the same data. Still, it was reinforced to everyone that the format too should have the patient details. The QI team strictly monitored during the handovers. The compliance improved from 53.1% to 80.7% by the end of 16 weeks.

Another common feedback received was regarding the parameter 'indication'. The doctors were of the opinion that there was no need for a separate column to write indication since it was done as part of the evaluation. The QI team strictly reinforced that all the parameters have to be mentioned for uniformity. During the study, the compliance in its documentation improved from 22.4% to 71.3%. Though we could not achieve the target 80%, it was a remarkable improvement.

Table 1: Data showing the compliance of various elements in documentation

	Patient details Number (%)	Indication Number (%)	Findings Number (%)	Conclusion Number (%)	Signature Number (%)	Date Number (%)
Pre-intervention	53.1	22.4	100	51	89.8	15.3
PDSA-1	41(55.4)	32(43.2)	72(97.3)	53(71.6)	62(83.8)	28(37.8)
PDSA-2	69(63.9)	89(82.4)	107(99.1)	73(67.6)	80(74.1)	45(41.7)
PDSA-3	91(73.9)	87(70.7)	123(100)	88(71.5)	101(82)	77(62.6)
PDSA-4	101(71.6)	99(70.2)	141(100)	120(85.1)	126(89.4)	105(74.5)
Post-intervention	121(80.7)	107(71.3)	150(100)	128(85.3)	129(86)	97(64.7)

In the PDSA cycle-2 148 patients were in Red zone of which POCUS was done for 121 patients and documented for 108 patients. 82% of the resuscitation in Red zone utilized POCUS. This was one of our SMART aims. 89% of the scans done were documented as per the format.

In PDSA cycle-3, out of the total 169 patients in red zone, POCUS was utilized in 138 cases and documented in 123 cases. The percentage was 82% and 89% respectively.

In PDSA cycle-4, the compliance was very well maintained. Out of the total 177 patients in red zone, POCUS was done for 152 cases and documented for 141 patients. The percentages were 86% and 93% respectively.

The post intervention phase extended for a period of one month in February. Regular meetings and debriefing were conducted. Data was collected by the QI team and were periodically analyzed. Out of the total 176 patients, POCUS was done in 152 cases and documented in 150 cases, (92% and 93% respectively).

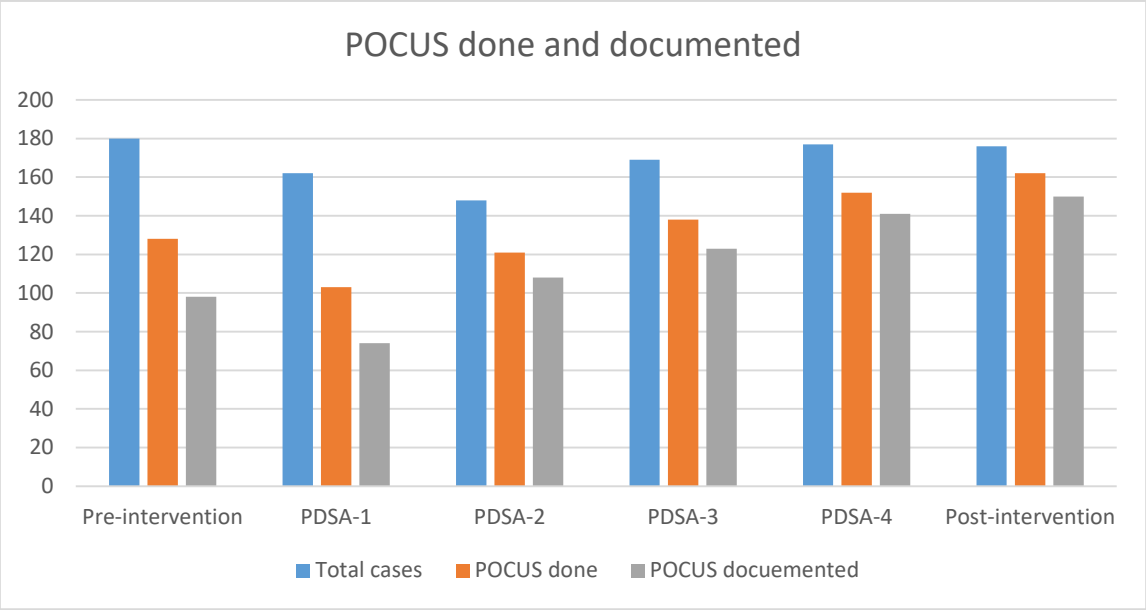

Figure 5: Pocus done and documented across the study period

'Patient details' showed an increase in compliance from 53.1% to 80.7% by the end of 4 months. Similarly, 'Indications', 'Findings', 'Conclusion', Signature' and 'Date showed increase in compliance from 22.4 %

	Pre-intervention	PDSA-1	PDSA-2	PDSA-3	PDSA-4	Post-intervention
Patient details	53.1	55.4	63.9	73.9	71.6	80.7
Indication	22.4	43.2	82.4	70.7	70.2	71.3
Findings	100	97.3	99.1	100	100	100
Conclusion	51	71.6	67.7	71.5	85.1	85.3
Signature	89.8	83.8	74.1	82	89.4	86
Date	15.3	37.8	41.7	62.6	74.5	64.7

The aim of achieving 80% compliance in all elements of documentation was fulfilled except for the elements 'Indication' and 'Date'. Patient details, indication and conclusion showed a tremendous increase in compliance over the 16 weeks. Hence, the SMART aim of achieving 80% compliance in documentation of all parameters was not completely fulfilled. One of the limitations of this study was the time period. This study was completed over a span of 4 months. Subsequent monitoring and regular trainings are required to maintain the compliance. Another drawback is regarding the involvement if only 'red' category cases in the study. It was decided that POCUS is mostly utilized for sick cases hence we included only the red zone cases in the study. Further expanind into yellow and green zones would have been cumbersome. Many times, due to the busy shifts, the doctors were not able to document the study even though they had used POCUS. The strength of this study was the incorporation of a major format of documentation and streamlining the process. Also, this QI study included senior as well as junior doctors and representation from the nursing team, which contributed to ensuring the compliance. Al the staff require frequent monitoring, training and regular positive reinforcements to maintain the SMART aim. New staff who will be joining needs to be trained. Hence it was decided that all the QI projects conducted in the department will be discussed and trained in monthly orientation meeting of the department. The attendance and photos of all sessions shall be logged into the desktop for further use.

CONCLUSION

This QI study helped us to implement a uniform format in documentation of POCUS. As the implementation of routine POCUS is increasing in day-to-day practice, it was a very important study in our department. We identified that the main barriers were lack of time, manpower and training. The interventions taken are sustainable and requires no extra manpower.

Patient and Public Involvement

No patients or the public were involved in any part of the study.

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Annexure

Supplementary material 1:

POINT OF CARE ULTRASOUND (POCUS) DOCUMENTATION

Patient Name:
Age:
Gender:
UHID no:

Indication:	
Findings:	**Protocol: RUSH/E-FAST/FALLS/SESAME/Others**
Conclusion:	

Date:

Time:

Name of the ER physician:

Signature/seal

'This document cannot be used for any medicolegal purposes'