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Original Research Paper

## AWARENESS OF POINT OF CARE TESTING (POCT) AMONG JUNIOR RESIDENTS OF MEDICAL COLLEGE

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### ABSTRACT

Assessment of knowledge about Point of Care Testing (POCT) among junior residents is very important since the majority of patients admitted in the hospital have underlying disorders which could lead to adverse clinical outcomes if not managed immediately. The main objectives are to evaluate the awareness and the knowledge related to applications of POCT among junior residents of medical college. This was a cross sectional study with questionnaire survey which includes sample size of 100 junior residents and they were provided with a list of questions aimed at evaluating their knowledge about POCT. The questions were grouped under different headings to elicit the response of POCT. The sum of correct answers was taken to classify the respondents. The junior doctors who responded correctly for up to 5 questions were assigned level 1 (poor), from 6 to 9: level 2 (average), from 10 to 14: level 3 (good), while those who marked correct answers to more than 14 questions were assigned level 4 (excellent). These findings pose the question of whether it is time for a rethink of the current approach to POCT education among junior residents.

**Keywords:** Biosensor, Cross sectional, Health care, Turnaround time.

### INTRODUCTION

Point of care testing (POCT) is a rapidly growing component of health care services which include intensive care units, surgical wards, emergency wards and pediatric units in monitoring both acute and chronically ill patients.<sup>1</sup> POCT is a disruptive solution since it permits the rapid delivery of laboratory information at the point of need, using small amounts of sample, and most typically with no need for blood centrifugation. Other terms of POCT include “bed side<sup>2</sup>,” “near patient,” “physician’s office,” “extralaboratory<sup>3</sup>,” testing. The majorities of POCT analyzers were in vitro devices and performed their analysis on whole blood, serum, urine, plasma and saliva samples.<sup>4</sup> Clinically, POCT is most frequently used to measure glucose<sup>5</sup>, ketone bodies<sup>6</sup>, CK-MB, Myoglobin, Troponin-T<sup>7</sup> and various antigens and

antibodies, including Chlamydia, group A streptococci, Helicobacter pylori<sup>8</sup>, infectious mononucleosis and Human Immunodeficiency virus. Laboratory testing places a substantial economic burden on the healthcare system, may be inconvenient for some patients and leaves a large number of patient’s undiagnosed.<sup>9,10</sup> It should be further emphasized that the availability of rapid results is only effective when this is associated with a better clinical decision-making as speculated by Pecoraro *et al.*<sup>11</sup> The implementation of POCT should also generate tangible changes in clinical pathways and alleviate patient management in the clinics or outside the hospitals, so that the availability of faster laboratory results can translate into more efficient diagnosis or treatment.<sup>12</sup> As recently highlighted

by Ferrante di Ruffano *et al.*<sup>13</sup>, POCT will change health outcomes requires a thoughtful assessment, as part of a broader management strategy. The young medicos should also be acquired knowledge about the concept of total quality of diagnostic testing include appropriate quality control and assurance management, so that they can offer systematic checks. Advantages of POCT are simple to use, robust in terms of usage, producing results concordant with the central laboratory and that it is being safely operated by medical officers. The more quickly these data can be provided to the clinicians, the more likely they are to have an impact on the patient's care. The most important thing is that no need for the samples to collect and sent to a clinical laboratory during busy hours of Outpatient/Inpatient, because it can be processed in the whole blood and urine. Errors in POCT are relatively common due to insufficient training of personnel outside the clinical laboratory. The main drawback was that the documentation of all aspects of a POCT service of the junior residents has been a major issue for many years. It is the responsibility to keep an accurate record of the test request, the result and the action taken as an absolute minimum. Assessment of knowledge among Junior Residents (JRs) is very important since the majority of patients admitted in the hospital have underlying disorders which could lead to adverse clinical outcomes if not managed immediately.

## OBJECTIVE

To evaluate the awareness and the knowledge related to applications of POCT among junior residents of medical college.

## METHODS

This was a cross-sectional, questionnaire-based survey conducted in a tertiary care teaching hospital after getting approval from the Institutional Ethics Committee. The respondents were junior residents who completed their under graduation in various medical colleges. 100 junior residents were included in this study. They were explained about the nature and purpose of the study, and necessary consent was obtained from each individual. They were provided with a list of

questions aimed at evaluating their knowledge about POCT. The study instrument was a self-developed, pre-validated, semi-structured questionnaire which includes nineteen questions. The period of study was between July to September 2013. The Inclusion Criteria were junior residents of both sexes working in 4 medical colleges (25 in each medical college). The Exclusion criteria were junior residents those who were not willing to participate. The following information was obtained: abbreviation of POCT, applications, places to be used, advantages, analytical principles, reporting time, impact on turnaround time, handling of results and documentation of reports. The participants were given approximately 30 minutes to complete the questionnaire. Data were expressed as counts and percentages. Data was analyzed using Statistical Package for the Social Sciences 17 software.

## RESULTS

All the participants answered all the 19 questions and all of them were included for analysis. Of the 100 % JRs, 68% were men and 32% women. Mean age of the respondents was  $26.32 \pm 1.066$  years. Mean years of experience of the JR were three. It was observed that 94 % of the respondents were aware of abbreviation of POCT and 57% knew that it was a qualitative and quantitative test. 17 % answered correctly for other names of POCT. Only 23 % of the junior medical officers knew the places where POCT to be used. 59 % answered correctly about the tests can be done using POCT (table 1). The study shows that 66 % of the medicos were aware that POCT reduces the turnaround time (TAT). 46 % of the JRs knew the design which includes simple strip test/dipstick test and it is also used in chemical analyzer; 44 % answered correctly for the analytical principle of POCT. 74 % were well aware of samples to be used in POCT. 42 % knows the usage of POCT (table 2). This observation revealed that 51 % were well aware of report maximum time. 48 % answered correctly regarding the purpose and knowledge about POCT. 70 % answered that documentation of the results and Quality Control must be recorded. 46 % were well aware of the action to be taken after

the results. 50 % answered correctly regarding the multiple applications of single strip. 33 % answered correctly regarding the handling of results after POCT (table 3). When analyzed the questionnaire it was found that 42 % of the JR knew the enzyme involved in glucometer. 22 % answered correctly that POCT can be used to diagnose infections like Chlamydia etc. 11% of JRs were exposed to POCT during their college days; 75 % of JRs not even knew about the POCT in their college days; 14 % of the respondents did not offer any comments (table 4).

## DISCUSSION

The questions were grouped under different headings to elicit the response of POCT. The sum of correct answers was taken to classify the respondents. The junior doctors who responded correctly for up to 5 questions were assigned level 1 (poor), from 6 to 9: level 2 (average), from 10 to 14: level 3 (good), while those who marked correct answers to more than 14 questions were assigned level 4 (excellent) by using ordinal scale (table 5). According to Nichols JH<sup>1</sup>, Managing POCT requires dedicated resources, policies, and multidisciplinary commitment and cooperation to ensure the highest quality diagnostic services. In modern medicine knowledge regarding POCT is considered to be more essential for diagnosis and treatment monitoring. Evidences show that the time taken to carry out the test is much less. If the laboratory Turnaround Time exceeds 25% of the decision time, then POCT will be required.<sup>14</sup> These systems are often small enough to be portable, further enhancing the possibility of bringing tests to the patient. It can be used in primary care settings like health centers, workplace clinic and physician's office. POCT also serve as an excellent tool of investigation in the secondary and tertiary care centers, which include emergency room, admission unit, ambulatory diagnostic and treatment center, operating room and intensive care unit. Unhappiness with Turnaround Time remains a problem today. If the JRs were well aware of the POCT technique, it can minimize the delay that occurred during sample collection and transport of the sample to the clinical lab. The routine tedious

procedure require more time for the patient's registration and entering the sample into a complex testing facility. Medical professionals should hence acknowledge that this technology represents a unique opportunity for guidance with and governance of the entire testing process, not only within but also outside the traditional laboratory.

## CONCLUSION

The present questionnaire has the potential to measure the knowledge, attitude and practices of junior doctors about the applications of this miniature biosensor. As there are no prior studies in evaluating knowledge related to handling of POCT among junior residents, this study is pointing towards the need of providing additional training to utilize POCT towards patient management. This study concluded that inconsistency and deficiencies in the knowledge and methodology pattern of POCT among junior residents of medical college needs to be improved by conducting awareness activities. Junior doctors may be exposed to the applications and the need for documenting the results of POCT. These findings pose the question of whether it is time for a rethink of the current approach to POCT education which favors the promotion of awareness on POCT rather than routine laboratory techniques in emergency situations.

## LIMITATION

The study is limited to a single center.

## SUMMARY

This study was, therefore, aimed at investigating the knowledge and attitude of junior residents about POCT reporting in a tertiary care teaching hospital and to suggest possible ways of improving POCT reporting. This is the right time to start the seminars/workshop regarding POCT among undergraduates, especially during the CRRI period of the doctors.

## SUGGESTIONS

It is optimal to design curriculum on POCT and introduce this in the training program of compulsory rotatory resident internship (CRRI) in medical and nursing college.

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**Table 1: Knowledge on POCT**

Questions	Correct	Incorrect	No response
Abbreviation of POCT	94	6	Nil
POCT-qualitative and quantitative test	57	43	Nil
Other terms used to describe POCT	17	83	Nil
Environments where POCT might be employed	23	77	Nil
Parameters which can be measured by POCT	59	41	Nil

**Table 2: Purpose of POCT**

Questions	Correct	Incorrect	No response
Advantage of POCT	66	34	Nil
Designs being used at POCT	46	54	Nil
Analytical Principles of POCT	44	56	Nil
Samples used to detect POCT, all are except	74	26	Nil
How many times POCT can be used	42	58	Nil

**Table 3: Results of POCT**

Questions	Correct	Incorrect	No response
Approximate timing of the report of POCT	51	49	Nil
What is the purpose of POCT	48	52	Nil
What documentation is needed to accompany a patient result	70	30	Nil
How the result of POCT handled	46	54	Nil
Different concentration of same analyte such as hemoglobin and glucose can be measured	50	50	Nil

**Table 4: Use of POCT**

Questions	Correct	Incorrect	No response
Glucose meters use, which enzyme	42	58	Nil
POCT is used to detect infectious antigens like Chlamydia, infectious mononucleosis by immunoassay method	22	78	Nil

**Table 5:** Grading on knowledge of POCT

Grading	Number of JRs
Excellent	10
Good	20
Average	60
Poor	10

## OPTIONAL SECTIONS

PROFROMA

SI NO:

Name (OPTIONAL): Age/Sex:

Qualification

Department Experience

Questionnaire survey

Tick the appropriate answer

## 1. Abbreviation of POCT

- a. Patient of control testing
- b. Point of care testing
- c. Patient of care testing
- d. Point of control testing

## 2. POCT

- a. Qualitative test
- b. Quantitative test
- c. Both
- d. None of the above

## 3. Other terms used to describe POCT

- 1. Bed side test
- 2. Physician's office test
- 3. Extra laboratory test
- 4. Ancillary test
- a. 1 & 2 are correct
- b. 1 & 3 & 4 are correct
- c. 1 & 2 & 3 are correct
- d. All are correct

## 4. Environments where point of care testing might be employed

- 1. Health centers, Physicians' office, Outpatient clinic
- 2. Emergency room, Admission's unit
- 3. Operating room, Intensive care unit, wards, Ambulance
- 4. Home
- a. 1,2, 3 are correct
- b. 2 & 3 are correct
- c. 1, 2,3 & 4 are correct
- d. 1& 2 are correct

## 5. A test used to measure

- a. pH, Electrolytes & blood gases
- b. Glucose, Ketone bodies & HbA1C
- c. Cardiac markers
- d. All of the above

## 6. Advantages of POCT

- a. Reduced turnaround time
- b. Increased turnaround time
- c. Tests done in colorimeter
- d. From single strip multiple tests can be done

## 7. Designs being used at POCT are

- a. Simple dipstick or strip tests
- b. Chemical analyzers
- c. Both
- d. None of the above

## 8. Analytical Principles of POCT

- a. Enzymatic conversion
- b. Antibody recognition
- c. Both
- d. None of the above

## 9. Samples used to detect POCT, all are true except

- a. Whole blood
- b. Saliva
- c. Urine
- d. Endometrial tissue

## 10. POCT used

- a. Only once
- b. Multiple use
- c. Two times use
- d. All are correct

## 11. Within how many minutes the report of POCT will be made available?

- a. Within 15 minutes
- b. Within 60 minutes
- c. Any time convenient
- d. All the above

## 12. What is the purpose of POCT?

- a. Diagnose a disease or adjust therapy
- b. To screen for disease
- c. both
- d. None of the above

## 13. What documentation is needed to accompany a patient result?

- a. The date, time, signature of operator
- b. The action taken should be recorded along with the results.
- c. Both
- d. None of the above

## 14. How the results of POCT are handled?

- a. Alert Ranges shall carry a comment.
- b. All POCT results that are above or below the reference range are repeated.
- c. Alert values are reported to the patient's physician for determination of actions to be taken.
- d. All of the above
- e. Option c alone is correct

15. Different concentrations of the same analyte such as hemoglobin and glucose can be measured
  - a. The above said statement is true
  - b. The above said statement is false
16. Glucose meters use, which enzyme
  - a. Glucose oxidase / hexokinase
  - b. Glyceraldehyde 3-phosphate dehydrogenase
  - c. Amylase
  - d. None of the above
17. POCT is used to detect infectious antigens like Chlamydia, Infectious mononucleosis by immunoassay method.
  - a. The above statement is true
  - b. The above statement is false.
18. Have you ever been exposed to knowledge about POCT during your college days?
  - a. Yes
  - b. No
  - c. No comments
19. Any other comments do you like to state on POCT?

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