



## ICU ROTATION OF HOUSE OFFICERS; DOES IT MAKE ANY DIFFERENCE?

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### ABSTRACT

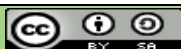
**INTRODUCTION:** An emerging subspecialty with promising prospects is critical care medicine. **OBJECTIVES:** After 15 days of posting in the Medical ICU, House Officers' of critical care medicine were asked to evaluate their subjective improvement and interest in the field. Study design: Cross-sectional descriptive study **PLACE AND DURATION:** From December 2015 to May 2016, Civil Hospital Karachi's medical intensive care unit. **METHODS AND MATERIALS:** The house officers were required to complete a pre-designed questionnaire to assess the subjective improvement in their knowledge of critical care medicine, basic mechanical ventilation, and commonly performed ICU procedures after 15 days of posting in the Medical ICU. Additionally, they provided feedback on the ICU rotation's duration and format in the questionnaire. Additionally, they were asked about the growing interest in critical care. **RESULTS:** Hundred and six house officers of Medical ICU participated in the study. 95.3% respondents concurred that ICU rotation improved their knowledge about mechanical ventilation while 90.6% acknowledged an improvement in their knowledge of critical care medicine. 69.8% house officers felt that 15 days are inadequate for ICU posting and suggested that ICU rotation should be extended to one month. Finally 62.3% interns admitted that their interest in the field of Critical Care Medicine has increased and 32.1% expressed interest to pursue Critical Care as their field of specialization. **CONCLUSION:** Rotation of House officers in Medical ICU improved their critical care knowledge and skills and positively influenced their attitude towards critical care medicine as a specialty. **KEYWORDS:** Pakistan, Intensive Care Unit, Critical Care, Knowledge.

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## INTRODUCTION

An emerging subspecialty with promising prospects is critical care medicine. Due to the fact that critical care is largely an undeveloped specialty, even developed nations face a shortage of doctors with adequate training in this area.<sup>1,2</sup> In Pakistan, the shortage is even worse. After finishing their housework, many doctors do not even know the fundamentals of CPR.<sup>3, 4</sup> The Medical ICU at Civil Hospital Karachi is a 14 bedded unit equipped with twelve Hamilton C2 ventilators. The unit has its own ECG, X-ray, Echocardiography and Ultrasound Machines and Arterial Blood Gas Analyzer. It is headed by a Professor of Medicine, supplemented by two Assistant Professors. Daily faculty rounds and case or topical presentations by the interns and postgraduates form a part of the teaching schedule. During the course of their House Job in Medicine, officers are assigned an optional rotation of fifteen days in the Medical ICU. Eight to ten interns make up each batch. Every fourth day, they must conduct a 24-hour call in the ICU. All Civil Hospital Karachi house officers are not required to rotate through the ICU; As a result, even after completing their house jobs, many doctors still lack basic critical care knowledge<sup>5</sup>. When they start their professional careers, these untrained doctors frequently also have to manage critically ill and mechanically ventilated patients. As a result, they will be better equipped to care for critically ill patients if they have prior experience managing such patients during their internship. The purpose of this cross-sectional survey was to determine the benefit of Medical ICU rotation for the house officers. ICU rotation may also be helpful in developing interest in critical care as a subspecialty because many recent graduates are unfamiliar with this branch of medicine.<sup>6, 7</sup> Our primary goal was to show that our interns had improved in their knowledge of critical care medicine, basic mechanical ventilation, and other ICU skills, and that they had developed an interest in critical care medicine after spending 15 days in the medical ICU. We also looked at how happy they were with the job description, how long they were posted, and how they learned in the Medical ICU. This is probably the nation's first study of its kind, and it will contribute to the formulation of recommendations regarding the placement of House Officers in the Medical ICU. Additionally, it will provide feedback to the ICU faculty in order

to develop curriculum that is more efficient for teaching and training.

## MATERIAL AND METHODS

From December 2015 to May 2016, a prospective observational study was carried out in the 14-bed Medical ICU at Civil Hospital Karachi. The Dow University of Health Sciences Institutional Review Board provided prior approval for the research. The study included all house officers who were stationed in the Medical ICU during the study period. The study did not include interns who spent less than 15 days in the ICU or who attended less than 80% of the Medical ICU. The house officers were asked to complete a pre-designed questionnaire at the end of their 15 days in the Medical ICU to see how much they had learned about critical care medicine, basic mechanical ventilation, commonly performed ICU procedures, and managing acute medical emergencies. In addition, they provided feedback on the unit's academic activities and working environment, as well as the duration and format of the ICU rotation, in the questionnaire. After the ICU posting, they were also asked about the growing interest in critical care. SPSS 16.0 was used to perform the statistical analysis. The majority of responses being categorical variables, frequencies and percentages were used to summarize the data.

## RESULTS

Hundred and six house officers of the Medical ICU participated in the study. Out of a total number of 3922 values 15 were missing. Table 1 shows the basic statistics of their background experience. Most of the house officers did ICU rotation in the 2<sup>nd</sup> quarter of their house job. 84% of the participants did not have any previous experience of working in an ICU or being involved in the management of patients on mechanical ventilation.

95.3% respondents concurred that ICU rotation improved their knowledge about mechanical ventilation while 90.6% and 77.4% respondents acknowledged an improvement in their knowledge of critical care and management of medical emergencies respectively. 59.4% respondents admitted that after ICU rotation they would be able to set initial ventilator settings for

a critically ill patient. 54.7% interns also learnt new measures of infection control and prevention in the medical ICU. (Table 2)

A number of house officers observed and assisted procedures like Endotracheal Intubation, CVP line insertion and chest intubation for the first time during their posting in Medical ICU. A few of them even had the opportunity to perform these procedures under supervision. (Table 3)

Regarding feedback about the job description and working environment in the Medical ICU, 65.1% house officers found the workload in the ICU to be easier than their work in the wards while 14.1% found it more difficult and 20.8% said it was the same as in the ward. 68.9% respondents found the overall working environment to be more relaxed than in the wards while 18.9% found it to be more stressful and 12.3% found it to be the same. 82.1% interns were satisfied with the duty schedule. As far as

teaching is concerned 72.6% interns were satisfied with the academic activities of the unit. The major sources of their learning were ICU Residents 29.2%, Post-graduate trainees 18.9% and Faculty members 25.5%. A significant number (22.6%) admitted that they acquired most ICU knowledge from the ICU technicians. (Table4) Responding to questions about the duration and utility of ICU rotation 69.8% house officers felt that 15 days are inadequate for ICU posting. 66.1% suggested that ICU rotation should be extended to one month while 7.5% opted for a duration of two months. Overall 94.3% respondents found the ICU rotation to be useful to them and 87.7% recommended that ICU rotation should be made mandatory for all House Officers working in the hospital. (Table 5) Finally at the end of their ICU rotation 62.3% interns admitted that their interest in the field of Critical Care Medicine has increased and 32.1% expressed interest to pursue Critical Care as their field of specialization. (Table 6)

**Table 1.** Baseline Experience

	House Job Status				Previous ICU Experience		Previous exposure to Ventilator	
	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	Yes	No	Yes	No
<b>No. of participants</b>	20	41	31	14	17	89	17	89
<b>Percentage</b>	18.9 %	38.7 %	29.2 %	13.2 %	16 %	84 %	16 %	84 %

**Table 2.** Response to questions related to improvement in knowledge. Values denote percentage (absolute number) of respondents.

	Improved	Didn't Improve
<b>Knowledge of Mechanical Ventilation</b>	95.3% (101)	4.7 % (05)
<b>Knowledge of Critical Care*</b>	90.6 % (96)	8.5 % (09)
<b>Knowledge of Medical Emergencies*</b>	77.4 % (82)	21.7 % (23)
<b>Ability to set basic ventilator settings*</b>	59.4 % (63)	39.6 % (42)
<b>Knowledge of Infection Control**</b>	54.7 % (58)	43.4 % (46)

\*1 value missing \*\*2 values missing

**Table 3.** Response to questions related to Procedural Knowledge Acquired. Values denote percentage (absolute number) of respondents

Procedure	Level of Competence*		
	Observed	Assisted	Performed
<b>I.V. Cannulation</b>	9.4% (10)	5.7 % (06)	6.6 % (07)

<b>CVP line insertion</b>	50 % (53)	29.2 % (31)	22.6 % (24)
<b>Endotracheal intubation</b>	46.2 % (49)	31.1 % (33)	17.9 % (19)
<b>Chest intubation</b>	9.4 % (10)	2.8 % (03)	0.9 % (01)
<b>Non-invasive ventilation</b>	26.4 % (28)	17 % (18)	5.7 % (06)
<b>Others</b>	2.8% (03)	10.4 % (11)	11.3 % (12)

\*observed, assisted or performed for the first time in their life

**Table 4.** Feedback about Job description and academic activities

		Percentage (number) of respondents
<b>Workload in the ICU as compared to Medical Ward</b>	Easier	65.1 % (69)
	More difficult	14.1 % (15)
	Same	20.8 % (22)
<b>Working environment in the ICU as compared to Medical Ward</b>	More relaxed	68.9 % (73)
	More stressful	18.9 % (20)
	Same	12.3 % (13)
<b>Satisfied with the duty schedule*</b>	Yes	82.1 % (87)
	No	17 % (18)
<b>Satisfied with the teaching schedule*</b>	Yes	72.6 % (77)
	No	26.4 % (28)
<b>Most knowledge acquired from*</b>	Faculty members	25.5 % (27)
	ICU Residents	29.2 % (31)
	Post-graduate trainees	18.9 % (20)
	ICU Technicians	22.6 % (24)
	Nurses	2.8 % (03)

\*1 value missing

**Table 5.** Feedback about duration and utility of ICU rotation

		Percentage (number) of respondents
Usefulness of ICU rotation	Useful	94.3 % (100)
	Not useful	5.7 % (06)
Mandatory ICU rotation for all House Officers*	Yes	87.7 % (93)
	No	11.3 % (12)
Is 15 days rotation adequate	Yes	30.2 % (32)
	No	69.8 % (74)
Suggested duration of ICU rotation	15 days	26.4 % (28)
	One month	66.1 % (70)
	Two months	7.5 % (08)

\*1 value missing

**Table 6.** Response to questions related to development of interest in Critical Care. Values denote percentage (absolute number) of respondents.

		Percentage (number) of respondents
Did MICU rotation increase your Interest in Critical Care Medicine	Yes	62.3 % (66)
	No	37.7 % (40)
Would you like to pursue post-graduation in Critical Care Medicine*	Yes	32.1 % (34)
	No	63.2 % (67)

\*5 values missing

## DISCUSSION

The primary objective of this study was to determine the advantages of a rotation of house

officers in the Medical ICU. The results of this study demonstrate a significant subjective improvement in the interns' knowledge of critical care and emergency medicine after ICU rotation. Critical care is barely covered in undergraduate medical education.<sup>8</sup> Even after completion of their internship many doctors lack the core knowledge of critical care and emergency medicine.<sup>3, 9</sup> Our study substantiates that ICU rotation during house job is a convenient, timely and effective measure to overcome this deficiency. Afzalimoghaddam M et al. found in a study of the impact of emergency medicine rotation that a four-week emergency medicine rotation increases medical interns' knowledge of emergency medicine.<sup>10</sup>

Most house officers did their ICU rotation during the 2<sup>nd</sup> quarter of their house job. But the stage of house job did not seem to affect their performance or response to the questionnaire. In their study Butt A et al found no significant difference in mortality among patients looked after by new or experienced house physicians.<sup>11</sup> This suggests that the intern's overall performance and learning basically depends on the academic and working environment of the unit.

More than 90% of the interns acknowledged that Medical ICU rotation enhanced their knowledge of critical care medicine and mechanical ventilation. In teaching hospitals, medical interns are frequently the first responders to in-hospital cardiac arrests. In the Medical ICU, interns have the opportunity to gain firsthand knowledge of the management of patients who require both invasive and non-invasive ventilation. As a result, it is essential for them to be able to identify a patient who requires intubation and ventilation as well as to have a working knowledge of the fundamental principles of intubation and mechanical ventilation.<sup>12, 13</sup> They learn about mechanical ventilation's warning signs and how to start it. Linda van Deventer<sup>4</sup> found in a survey she conducted at a 562-bed hospital in South Africa that more than two thirds of medical officers were unable to correctly identify indications for endotracheal intubation, and 97.7% were unable to select the appropriate settings for the initial ventilator. After only 15 days rotation in Medical ICU more than half of our house officers were able to decide basic ventilator settings for a patient requiring mechanical ventilation. If we can teach these skills to all our house officers it will be a significant achievement.

House job is also prime time to learn certain basic procedures like peripheral and central venous cannulation, lumbar puncture, airway management and endotracheal intubation etc. The first step in resuscitating a patient is skilled airway management<sup>14</sup>. Endotracheal intubation has a significant impact on CPR outcomes.<sup>15</sup> Learning these procedures is also important for the interns because subsequently during their residencies they frequently have to perform these procedures independently while doing calls. Upto half of the house officers posted in the Medical ICU had not even seen endotracheal intubation or CVP line insertion earlier. These procedures are rarely performed in the Medical wards. In the Medical ICU interns not only get to see these procedures but can also perform them under supervision. About 20% of the house officers had the opportunity to actually perform CVP line insertion and endotracheal intubation themselves. Had the duration of their posting been longer, more of them could have performed these procedures.

Hassan M et al.<sup>16</sup> found that the majority of house officers at Karachi's Civil Hospital and Jinnah Postgraduate Medical Centre were experiencing high levels of stress in a cross-sectional survey. On the contrary majority of the house officers expressed their satisfaction with the duty schedule in the Medical ICU and found the workload in the ICU to be easier and the working environment to be more relaxed as compared to that in the Medical wards. This is probably because of a more comfortable and hygienic environment of the Medical ICU and because of the fact that while in ICU, interns do not have to attend hectic OPDs, nor do they have to attend calls from the ER when on-call. They only have to focus on patients who have been admitted to the intensive care unit, and their seniors always keep an eye on them. Rubina Kazmi et al.<sup>17</sup> came to the conclusion that there is an inverse relationship between job stress and job performance in a study that looked into the effect of job stress on the performance of house officers on the job. Owing to the low levels of stress we found majority of our house officers to be very efficient in their work.

Although the duration of their posting was too short to learn critical care medicine, 75.3% of the respondents were satisfied with the teaching in the unit. In their comments many of the house officers stressed the need of more detailed lectures on different aspects of mechanical ventilation. The

major sources of their learning were the residents and post graduates of the unit. This highlights the fact that one's immediate seniors are the best source of clinical learning. In the Medical ICU we strive to establish a healthy working relationship between the doctors and paramedical staff as it is a recognized fact that nurse-physician collaboration is significantly related to the quality of patient care.<sup>18</sup> Perhaps for this reason many interns admitted that the most important source of their learning in the Medical ICU were the ICU technicians.

Overall 94.3% house officers found the Medical ICU rotation beneficial and majority suggested that ICU rotation should be extended to one month and made mandatory for all the house officers of the hospital. The authors strongly agree to this notion as we feel that if given more time we can implement a more elaborate teaching and training program for the interns. As stated in the beginning, critical care medicine faces a dearth of properly trained doctors. We need to increase the awareness of this specialty among fresh graduates and try to develop their interest in this field. A number of studies support the positive influence of internship in a particular specialty on the attitude of interns towards that specialty.<sup>19, 20</sup> Similarly the current study clearly demonstrates that Medical ICU rotation significantly increased the interns' interest in critical care medicine and many of them expressed their intent to pursue critical care as their area of specialization. Although their interests and choices may change with time, but exposure to Medical ICU during house job may be the fundamental step towards the development of critical care medicine as a specialty in our country. It will ultimately serve the goal of enhancing the quality of care provided to the critically ill patients and improve their chances of survival.

## CONCLUSION

This study provides evidence that rotation of House officers in the Medical ICU improved their critical care skills and positively influenced their attitude towards critical care medicine as a specialty. The authors believe that fifteen days is insufficient for ICU posting. We strongly recommend that all the house officers must rotate in Medical ICU for at least one month to get the maximum benefit from their ICU rotation.

## LIMITATIONS

Due to the short duration of house officers' posting and the shortage of residents in Medical ICU, we couldn't administer a pre-test and post-test to the interns. It would have given us an objective assessment of the benefits of ICU rotation and further strengthened our observations. Second, although the long-term effects of the rotation may differ, we have only examined the short-term effects.

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**Conflicts of interest:** The authors declare that there is no conflict of interest in this study.

## REFERENCES

1. Angus DC, Kelly MA, Schmitz RJ, White A, Popovich J. Current and projected workforce requirements for care of the critically ill and patients with pulmonary disease: can we meet the requirements of an aging population? *JAMA* 2000 Dec 6; 284(21):2762-70. doi: <http://dx.doi.org/10.1001/jama.284.21.2762>
2. Groeger JS, Strosberg MA, Halpern NA, Raphaely RC, Kaye WE, Guntupalli KK, et al. Descriptive analysis of critical care units in the United States. *Crit Care Med* 1992; 20:846-863. doi: <http://dx.doi.org/10.1097/00003246-199302000-00022>
3. Okonta KE, Okoh BA. Basic cardiopulmonary resuscitation knowledge of house-officers in a tertiary institution: factors determining accuracy. *Pan Afr Med J*. 2014 Jul 8;18:209. doi: <http://dx.doi.org/10.11604/pamj.2014.18.209.3654>
4. Linda van Deventer. Intubation and mechanical ventilation: knowledge of medical officers at a South African secondary hospital. *South African Family Practice* 2014; 56;3: 182-185. DOI: 10.1080/20786204.2014.936667
5. Shahida Rasheed, Anum Saeed, Noor Yazdanie. Awareness and ethical views regarding life support among doctors working in tertiary care facilities of Karachi, Pakistan. *J Pak Med Assoc* Jul 2012; 62(7):690-3.
6. Aslam M, Ali A, Taj T, Badar N, Mirza W, Ammar A, et al. Specialty choices of medical students and house officers in

- Karachi, Pakistan. *East Mediterr Health J.* 2011 Jan; 17(1):74-9.
7. Okonta KE, Akpayak IC, Amusan EO, Ekpe EE, Adamu YB, Ocheli EO. Multi-center survey of House officers' choice of Medical specialties in Nigeria: preferences and determining factors. *Pan Afr Med J.* 2015 Apr 8; 20:338. doi: <http://dx.doi.org/10.11604/pamj.2015.20.338.4113>
  8. Fessler HE. Undergraduate medical education in critical care. *Crit Care Med.* 2012 Nov; 40(11):3065-9. doi: 10.1097/CCM.0b013e31826ab360
  9. Santen SA, Rademacher N, Heron SL, Khandelwal S, Hauff S, Hopson L. How competent are emergency medicine interns for level 1 milestones: who is responsible? *Acad Emerg Med.* 2013 Jul; 20(7):736-9. doi:10.1111/acem.12162.
  10. Afzalimoghaddam M, Hoseinidavarani H, Hossein-nejad H. Evaluating the impact of emergency medicine education on medical interns' knowledge scores. *Eur J Emerg Med.* 2011 Oct; 18(5):257-60. doi: 10.1097/MEJ.0b013e328344fe05.
  11. Butt A, Masud F, Piracha S. Should the new doctors be blamed for in hospital mortality? *Ann King Edward Med Uni Jul - Sep 2010;* 16(3):157-61.
  12. Orebaugh SL. Initiation of mechanical ventilation in the emergency department. *Am J Emerg Med.* 1996; 14(1):59-69. doi: 10.1016/S0735-6757(96)90018-2
  13. Makwana HD, Suthar NN, Gajjar MP, Thakor AV. Developing competency in interns for endotracheal intubation: An educational article. *Int J Appl Basic Med Res.* 2016 Jul-Sep; 6(3):201-4. doi: 10.4103/2229-516X.186964.
  14. Rodricks MB, Deutschman CS. Emergent airway management: indications and methods in the face of confounding conditions. *Crit Care Clin.* 2000;16(3):389-409. doi: [http://dx.doi.org/10.1016/S0749-0704\(05\)70119-6](http://dx.doi.org/10.1016/S0749-0704(05)70119-6)
  15. Balk RA. The technique of orotracheal intubation. *Journal of Critical Illness.* 1997; 12:316.
  16. Hassan M, Hussain T, Ahmed SM, Fraz TR, Rehmat Z. Perceived stress and stressors among house officers. *Indian J Occup Environ Med.* 2014 Sep-Dec; 18(3): 145-149. doi: <http://dx.doi.org/10.4103/0019-5278.146914>
  17. Rubina Kazmi, Shehla Amjad, Delawar Khan. Occupational stress and its effect on job performance a case study of medical house officers of district Abbottabad. *J Ayub Med Coll Jul – Sep 2008;* 20(3):135-9.
  18. Christine Boev, Yinglin Xia. Nurse-Physician Collaboration and Hospital-Acquired Infections in Critical Care. *Critical Care Nurse.* 2015; 35[2]:66-72). doi: <http://dx.doi.org/10.4037/ccn2015809>
  19. Fauzia Anis Khan, Fauzia Nasim Minai, Shahla Siddiqui. Anaesthesia as a career choice in a developing country; effect of clinical clerkship. *J Pak Med Assoc Nov 2011;*61(11):1052-6
  20. Neves FB, Vieira PS, Cravo EA, Portugal T da S, Almeida MF, Brasil IS et al . Reasons related to the choice of critical care medicine as a specialty by medical residents. *Rev. Bras. Ter. intensiva.* 2009 June; 21(2): 135-140. doi: <http://dx.doi.org/10.1590/S0103-507X2009000200004>