

Should the New Doctors be Blamed for in – Hospital Mortality?

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Background: This is a common apprehension that in – hospital mortality increases when a batch of new house officers starts working. We have analyzed whether there is a statistically significant increase in death rate in the last working month of the outgoing house officers as compared to first working month of the new batch.

Objective: The objective of this study was to see the difference in hospital mortality among patients followed by new and experienced house physicians.

Methodology: A retrospective study was conducted in the medical unit 4, a 60 bedded unit in Services Hospital Lahore, which is a tertiary care teaching hospital. Two groups were made comprising of senior house physicians and number of deaths during their last working month and new house physicians and the number of deaths among patients during their first working month.

Result: According to P value of Mantel - Haenszel (p – value = 0.682), it is clearly shown that death rate is statistically same in first and last month of house job. The crude odd's ratio of years 2004, 2005 and 2007 was however higher in the last month of house job as compared to 2006 and 2008 where risk of mortality was higher in first month of house–job as OR is greater than 1. All the Odd's Ratios from 2004 to 2008 give insignificant differences in risk of mortality.

Conclusion: We found no significant difference in in-hospital mortality among patients looked after by new or experienced house physicians.

Key Words: House physician, in-hospital mortality, turn – over, supervised training, death rate.

INTRODUCTION

Nearly all the teaching hospitals deal with the consequences of hiring new doctors, who are about to commence their training. Turn – over is an exogenous phenomenon, part of the training system of doctors, not only in Pakistan but also in USA¹ and England.² In Pakistan, this turn – over takes place every six months, starting when the fresh doctors newly graduate from their medical schools. Previously due attention was not being paid to the consequences of such a turn-over on performance of hospital-delivered patient care.³⁻⁵ A study was undertaken in July 2005 examining the impact of turn – over of house staff in July in teaching hospitals all over America, and monthly trends were compared in terms of length of stay and mortality to that of non – teaching hospitals, where no such turn – over takes place.⁶ Similarly in England, where the turn – over takes place in first week of August, studies were conducted for the same issue.^{1,2}

No such study to examine the effect of this turn – over of trainee doctors has been done in Pakistan up till now. We have conducted a large study comprising of over 4000 patients. Data collected includes number of admissions and death rates, obtained from hospital administrative database and from the computerized information system of the unit. The fact that the study has been conducted in a single unit eliminates variations in hospital training and working, thus making it statistically significant. Other studies outside Pakistan which have been conducted on similar pattern show statistically significant difference in mortality. But

they have included either different units from one hospital or different hospitals from one region.⁷⁻¹¹

We have examined whether there is a higher death rate in the first working month of new batch of house physicians as compared to last working months of outgoing batch of house physicians, considering that the later have been trained by then. The data was collected from routine administrative database for 5 years (2004 to 2008) for both the batches of new doctors per year. A yearly rising or declining trend in death rate was also examined.

We studied the magnitude of the impact of the trained batch leaving with the simultaneous entry of new untrained staff of a similar number. The study would reflect on the working of teaching hospitals, their performance, the level of supervision and training provided by them. It would help the senior residents and policy makers of unit and hospital administration to take measures which could ensure the reduction of negative effects of turn-over of house physicians, if any. It will also help in standardization of patient care on part of hospitals.

Objectives

The objective of this study was to see the difference in hospital mortality among patients followed by new and experienced house physicians.

Material and Methods

Study design: A retrospective study design was used.

Settings: Services Hospital Lahore is a 1300 bedded teaching hospital which has five indoor medical units. The data has been collected from computerized record of the hospital administrative database, of a single medical unit which has 60 beds. Routinely collected administrative data can be used to predict risk of death in hospitals.¹³

Duration: Data in this study was taken from 2004 – 2008.

Methodology: The dataset included number of admissions, patients discharged, those who left against medical advice, expiries and sex distribution of patients admitted. However, sex distribution in patients expired was not available. Data on primary diagnosis was also not available. Although the causes of deaths were available, but they were not included in the study. Two groups were made, each comprising of the number of deaths in patients admitted in the last month of house job, and compared to the first month of house job. All patients who were admitted during the first and the last month were included and all those who died in hospital within the same periods were counted as number of deaths. From 2004 – 2007 the first month of house job were February and August while the last month of house job were January and July. But in the year 2008 the first months of

house job were February, May and November while the last months of house job were January, April and October.

Statistical Analysis: Chi-square test, Mantel Haenszel and Odds ratio for death rates were calculated and compared for the two groups. Adjustment for age, sex, diagnosis, co-morbidity and socioeconomic factors were not made.

Results

In 2004 the total admissions in the first and last months of house jobs were 636 in which 292 patients died in the first and 344 patients died in the last month of house jobs. The mortality rate in the start and end of months was in-significant ($p - value = 0.753$). In 2005 among 706 admissions the mortality rate was 51 in each first and last months of house job. The expiry rate was statistically same in 2005 i.e. ($p - value = 0.975$). In 2006, 51 and 58 patients expired in the first and last month of house job respectively with $p - value = 0.55$. Sixty nine and sixty five patients were expire in the first and last months of 2007 respectively with insignificant ($p - value = 0.939$). The highest statistics of mortalities were reported in 2008 107 vs. 111 in first and last months of house job, but the significance value remains

the same in both groups i.e. 0.502. According to the p-value of Mantel – Haenszel ($p - value = 0.682$) it is clearly shown that the mortality rates over different years is statistically same in the first and last month of house job (Table 1).

The crude odds ratio of death for the years 2004, 2005 and 2007 was higher in the last month of house job as the OR is lesser than 1 while in 2006 and 2008 the risk of mortality in the first month was higher as the odds ratio is greater than 1. Moreover all the odds ratios (from 2004 – 2008) give the insignificance difference in the risk of mortalities (Table 2).

Discussion

In this study of 4306 emergency and out – patient department admissions during 2004 to 2008, we found that there was no significant Odds of death for patients admitted to department of medicine, whether in the first month of recruitment of new house physicians or the last working month of the previous house

Table 1: Comparison of Mortality Rate in emergency admission on the First Month and the Last Month of Hose Job in the Year 2004 – 2008.

		Discharged / LAMA	Expired	Total (Admission)	Chi-Square	p-value
2004	First Month	240	52	292	0.099	0.753
	Last Month	286	58	344		
		526	110	636		
2005	First Month	301	51	352	0.001	0.975
	Last Month	303	51	354		
		604	102	706		
2006	First Month	285	51	336	0.357	0.55
	Last Month	286	58	344		
		571	109	680		
2007	First Month	361	69	430	0.006	0.939
	Last Month	345	65	410		
		706	134	840		
2008	First Month	632	107	739	0.451	0.502
	Last Month	594	111	705		
		1226	218	1444		

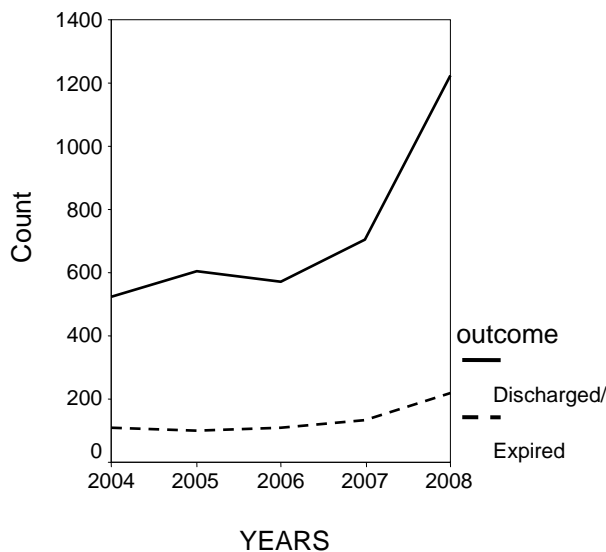
Mantel – Haenszel: $p - value = 0.682$ (in-significant)

physicians.

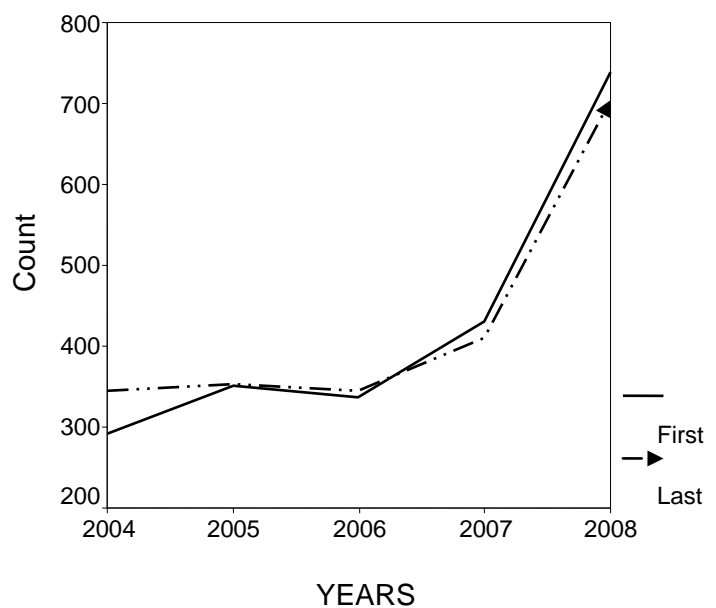
House job represents the first independent but supervised clinical experience of doctors who have recently graduated from their respective institutions. The turn – over takes place every six months, and every fresh graduate is required to complete a clinical experience of one year, preferably in two different specialties before he is permanently registered with the Pakistan Medical and Dental Council. We have tried to assess the impact of this turn – over between experienced house physicians with the new ones on patient care. We found that there was no statistically significant difference in Odds Ratio of death rate among patients taken care of by these two groups of doctors.

Table 2: Comparison of Odds of Mortality Rate in emergency admission on the First Month and the Last Month of House Job in the Year 2004 – 2008.

		Discharged / LAMA	Expired	Total (Admission)	OR	95% CI
2004	First Month	240	52	292	0.936	(0.62 – 1.41)
	Last Month	286	58	344		
		526	110	636		
2005	First Month	301	51	352	0.993	(0.653 – 1.51)
	Last Month	303	51	354		
		604	102	706		
2006	First Month	285	51	336	1.133	(0.752 – 1.708)
	Last Month	286	58	344		
		571	109	680		
2007	First Month	361	69	430	0.986	(0.681 – 1.426)
	Last Month	345	65	410		
		706	134	840		
2008	First Month	632	107	739	1.104	(0.872 – 1.472)
	Last Month	594	111	705		
		1226	218	1444		



Graph 1: Comparison Mortality rate in different years.



Graph 2: Comparison of Mortality rate in first and last months of House Job.

Shuhaiber et al¹³ studied the effect of the duration of patient training of cardiothoracic surgical residents on the patient

mortality during the period of 11 years, from 1996 to 2006. He found increased in-hospital mortality after complex cardiac operations but not after coronary artery bypass grafting procedures. It might be that those operations that involve more skill and experienced surgical hand, are affected more by the turnover than others. Jen MH et al² assessed the effect of the change-over of doctors during the week following the first Wednesday of August to the last week of July. This is the time when change in house staff takes place in England and the new doctors start their jobs. A small but significant 6% higher Odds of death for all patients and 8% higher odds of death for medical patients was found in the first week of working of new doctors. However there was no statistically significant difference between the two weeks for surgical patients and for patients with neoplasm. The data was collected from 175 different acute hospitals under NHS. Barry WA et al¹⁰ studied the effect of inexperienced staff early in training when the academic year starts in July in USA on patient outcome in ICU units and found no evidence to support the July Effect. Most studies on “July Phenomenon”⁶ have not shown statistically significant higher mortality risk.⁸⁻¹⁰

We restricted our analysis to a single medical unit of a tertiary care teaching hospital in Lahore. Admitted patients who are subjected to similar in-hospital schedule have more similarities in outcome as compared to different hospitals, or for that matter even different units dealing with same speciality in the same teaching hospital. Better supervised teaching schedules and work shifts can have a significant role in reducing the negative effects of turn-over on performance.

These impacts of change-over are also buffered by the fact that the senior residents (post – graduate trainees) do not simultaneously exit the department. They complete a 4 year training period in their respective institutions and units, and depart at a roughly continuous manner. The endogenous turn-over on individual basis for personal priorities is negligible both in house officers and senior residents, as it is preferable to complete training with a single consultant.

The turn – over effect becomes significant and increases proportionately to the degree to which a hospital relies upon its house staff for patient care (as measured by number of hospital beds per resident).⁶ The number of beds allotted to a new house physician remains almost same in every batch in a single unit, as the number of slots for recruitment as well as the number of beds remains fixed. Another factor to be considered in high stress professions is employee burn out, sleep deprivation fatigue and enforced, un-natural circadian cycles.¹⁴ Initially the employ skill increases but as time passes, burn – out begins and “effort decrease” declines much faster than increase in skill improvement. The relationship between tenure and performance follows an inverted U shaped curve.⁶ Fatigue in the doctors especially among those who have no prior exposure to such working hours affects patient safety.^{15,16} The division of house physicians in batches and their working in shifts compensates for

the effect. Moreover, a reasonable period of one month was taken for follow up so that the working could be uniformly assessed and all batches had equal opportunity to work both in wards and emergency.

Nafsi T et al¹⁷ suggests a week’s follow up to best capture errors caused by failure of training or inadequate supervision. Lu TC et al¹⁸ monitored deaths within 24 hours as early mortality in emergency department.

In our analysis, there is no overall meaningful difference between the experienced or new house physicians in terms of death rates. The turn – over has a minimal affect where conditions are standardized in terms of supervision, teaching and work schedules. An additional effect found was, crude odds ratio of death for years 2004, 2005 and 2007 was higher in last month of house job and lesser in 2006 and 2008, where the risk of mortality was higher in first month. This signifies that in a given hospital, there may be a higher supervision group in one year and a low supervision group in the following year. Age, sex, co-morbidity, differences in diagnosis and seasonal effects could not be assessed due to the limited data available.

The study emphasises the need for systematic analysis of the implications of six monthly turn-over of new doctors. Equally important is that, the policy makers, and hospital administration should ensure standardization of training and supervision, so that best possible patient care is given while transferring clinical experience to the new doctors. Atul G⁴ suggests that senior residents should therefore, attempt to migrate potential harm through supervision and graduated training. The need for senior supervision during times of turn – over cannot be over emphasized.

Conclusion

We have found that there is no statistically significant difference in death rate of patients treated by new or previously trained house physicians. The minimal effect of change-over could be due to standardization in terms of supervision, training and work schedules. The change-over of junior staffs in hospitals has its potential implications as evidenced by studies undertaken from different hospitals worldwide. So the policy makers should standardize conditions for their working. We suggest that other such factors that could affect the turnover period and working of junior untrained staff should be looked into, to ensure more patient satisfaction and quality care.

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