Impact of enforcing the Labour Ordinance, with 1-in-7-day off for hospital doctors, on weekend hospital discharge rate

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Abstract

Background After enforcing the Labour Ordinance, hospital doctors must have 1 day off-work every week. In this study, we aimed to evaluate its impact on the discharge pattern from an acute medical hospital.

Methods We undertook a hospital-based ecologic study with before–after design using the clinical management database of patient discharge records of all acute medical wards in a hospital from January to March 2002 (1 year before new system) and from January to March 2004 (1 year after restricted weekend service). The main outcome measures were the daily discharge rates for the two periods. The odds of being discharged on a Saturday were estimated by multivariate analyses.

Results The number of patient discharge on a Saturday was substantially lower in 2004 as compared to 2002 (47.5 ± 8.5 per Saturday versus 70.5 ± 11.1 per Saturday, respectively, p < 0.001). A statistically significant decreased trend was noted in the weekend discharge rate in 2002 and 2004 (Poisson p-value for change in discharge rate, p < 0.001). On the other hand, the number of patient discharges on weekdays did not differ between the two periods. Consistently fewer patients were being discharged on Sundays and Mondays as compared to the rest of the week days in both periods. Compared with study period 2002, patients hospitalized in 2004 (with limited weekend service) had significantly lower multivariate-adjusted odds of being discharged on a Saturday (odds ratio of 0.70; 95 per cent confidence interval 0.72–0.89, p < 0.0001).

Conclusions Length of hospital stay is influenced by the health care system delivery apart from clinical factors. Restricted weekend services in an acute medical hospital setting substantially lengthen the hospital stay, and might therefore entail a major financial burden.

Keywords: discharge, ecologic study, hospitalization, labour ordinance, length of stay, weekend

Introduction

Strategies to minimize delays in hospital discharge have become a key element in the context of cost pressure on our health care systems. Reductions in services on the weekend, nonetheless, are the norms nowadays in most hospital settings owing to implicit decisions made primarily for staffing constraints and labour requirement. Although prior research suggested the potential consequences of reductions in weekend service on the quality of in-hospital patient care, information about its effects on patient discharge rates is limited. We examined recent trends in acute medical ward discharge rates from a university hospital before and after enforcing the Labour Ordinance, according to which hospital doctors must have 1 day off-work every week.

Methods

In a university hospital with over 300 acute medical beds in Hong Kong, prior to the implementation of the Labour Ordinance in early 2003, medical ward rounds were conducted by the incharge doctors on Saturdays, and by a rotating list of doctors on Sundays (with around one half of the full manpower). After the implementation of the Ordinance, ward rounds on both Saturdays and Sundays were conducted by doctors on the rotating list.

In this before–after ecologic study, we investigated whether the introduction of the Labour Ordinance has had an impact on the discharge patterns in hospitalized patients. From the clinical management database, we retrieved and analysed patient discharge records of all acute medical wards in the hospital from January to March 2002 (i.e. 1 year before the implementation) and from January to March 2004 (i.e. 1 year after the new policy). We calculated and compared the daily discharge rates for the two periods. Patient discharges against medical advice and transferral to acute hospitals were excluded. Multivariate analyses were used to identify factors associated with the odds of being discharged on a Saturday.

Dichotomous and continuous variables were compared using the Fisher exact test, unpaired Student’s t-test or the Mann-Whitney U-test, as appropriate. Generalized linear models (logistic regression for dichotomous outcomes and Poisson regression
for count outcomes) were used to estimate the effect of mandating restricted working hours on discharge pattern. The results for dichotomous outcomes were presented as odds ratios (OR; ratio of odds of the outcome of being discharged on weekend) with estimated 95 per cent confidence intervals (CI). Statistical analyses were performed using SPSS software version 11.5 and NCSS 2001 software package.

**Results**

There were 5769 and 6149 patient discharges in the review periods of 2002 and 2004, respectively (Table 1). Patients’ average length of hospital stay increased by 11% from 3.6 ± 4.9 days in 2002 to 4.0 ± 5.2 days in 2004 ($p<0.001$). As shown in Fig. 1, the number of patient discharges on a Saturday was substantially lower in 2004 as compared to 2002 (47.5 ± 8.5 per Saturday versus 70.5 ± 11.1 per Saturday, respectively, $p<0.001$). There was a statistically significant decrease in the trend of weekend discharge rate in 2002 (15.6 per cent) and 2004 (12.9 per cent; Poisson $p$-value for change in discharge rate, $p<0.001$). A similar pattern was noted after excluding those planned discharges to convalescent hospitals. On the other hand, the number of patient discharge on weekdays did not differ between the two periods. We chose to use aggregate data of weekday discharges because the number of patients being discharged within individual days on weekdays was homogenously distributed. We also noted consistently less patient discharge on Sundays and Mondays as compared to the rest of the weekdays in both periods.

We further studied the multivariate-adjusted odds ratio of patients being discharged on a Saturday during the study period. Multivariate analysis using a logistic regression model was used to examine predictors for patient discharge on a Saturday with the model constructed from variables stepwise selection for relevant variables, including baseline demographic characteristics, length of stay, discharge destination and the period of hospitalization. Table 2 shows the multivariate-adjusted odds ratios of being discharged on a Saturday. Patients hospitalized after the limited weekend service had significantly decreased odds of being discharged on a Saturday (odds ratio of 0.70; 95 per cent confidence interval 0.72–0.89, $p<0.0001$).

**Discussion**

Limited medical staffing on weekends in an acute medical hospital setting can contribute to discharge delays and unnecessary bed occupancy. From our observation, patients were less often – by almost one-third – discharged on a Saturday with the implementation of restricted weekend service.

Intuitively, the lower rate of discharge at weekends after reduction in manpower cannot be explained on clinical grounds alone. We ascribed the phenomenon, as observed previously in geriatric patients, acute myocardial infarction or stroke patients, to the fact that medical staff is either unavailable to make or reluctant to implement discharge decisions during weekends under the new system of reduced staffing. The fall in patient discharge rates on Monday, again, is related to the discontinuation of care over the weekend; physicians tend to delay discharge of newly acquainted or unfamiliar patients at the beginning of the working days each week.

Whilst these phenomenon are observed within a single unit, our findings deserve attention because limited weekend medical

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**Table 1** Characteristics of patient discharges in the two study periods

<table>
<thead>
<tr>
<th>Period</th>
<th>2002</th>
<th>2004</th>
<th>$p$-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>61.9 ± 17.8</td>
<td>62.6 ± 17.3</td>
<td>0.03</td>
</tr>
<tr>
<td>Male:female</td>
<td>2355:3434</td>
<td>2542:3607</td>
<td>0.47</td>
</tr>
<tr>
<td>Length of stay (days)</td>
<td>3.6 ± 4.9</td>
<td>4.0 ± 5.2</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

**Figure 1** Impact of weekend service on number of patient discharges from medical wards

**Table 2** Multivariate-adjusted odds ratios for patients being discharged on a Saturday

<table>
<thead>
<tr>
<th></th>
<th>Adjusted odds ratio (95% CI)</th>
<th>$p$-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (per 10 years older)</td>
<td>0.93 (0.91–0.96)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Hospitalized after limited weekend service (2004 period)</td>
<td>0.70 (0.72–0.89)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Male gender</td>
<td>0.98 (0.88–1.09)</td>
<td>0.69</td>
</tr>
<tr>
<td>Patient destination (convalescent hospital versus direct discharge home)</td>
<td>1.06 (0.90–1.24)</td>
<td>0.51</td>
</tr>
<tr>
<td>Length of stay (per 1 day increment)</td>
<td>1.00 (0.99–1.02)</td>
<td>0.45</td>
</tr>
</tbody>
</table>
staffing are commonly reported across multiple disciplines, within and outside medical departments, locally and worldwide alike.5–7 An important downside of our study is our inability to control for potential confounders that might have influenced the patients’ length of stay, given the lack of individual patient data, such as case-mix change and diagnosis. We attempted to minimize the intervening effect of severe acute respiratory syndrome (SARS) by excluding the period of SARS in our analysis. This could have otherwise confounded the impact of restricted working hours in our hospital where the epidemic started in Hong Kong. Nonetheless, we could not exclude the possibility that longer length of stay in 2004 being the aftermath of the SARS epidemic, during which our hospital authority was being questioned on the observation period of patients with febrile illness.

A mandatory weekend full-scale workforce might not be realistic in every institution, and needs to be balanced with the incremental cost of extra weekend day staffing.8 From a practical viewpoint, alternative means for expediting patient discharge on the weekend should be further explored or else patient discharge could be delayed by up to 3 days, taking into account the general reluctance of physicians to discharge patients on Mondays.

References