

Hospitalists at Emergency Department Can Improve the Effectiveness of Pre-hospitalized Patients Care

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Abstract

Introduction: The hospitalists care model (HOS) was performed in the United States (US) since 1996, with good evidence in patients care, saved medical expenses, and improved patient satisfaction. It was applied to Taiwan since 2009 setting at wards with similar efficacy in care quality. The first implementation at emergency department (ED) in a medical center in southern Taiwan was undertaken since 2012 to care all the pre-hospitalized patients at ED.

Purpose: To observe weather this pivotal HOS model at ED worked functioning with good outcomes for patients care, shortened waiting time for hospitalization, reduced mortality, and increased patient satisfaction compared to previously.

Methods: A pilot approach with eight internal attending physicians as a team (Holistic Care Unit-HCU) at observation room nearby ED to care all patients for hospitalization referred by emergency physicians. Parameters were estimated including waiting time, mortality rate, and patient satisfaction, etc., with a proper statistical analysis used for significance.

Results: The waiting time for admission declined 17.3% ($p=0.017$), overstayed (> 48 hours at ED) declined from 7.83% to 4.91% ($p=0.087$) before and after HOS setting. The mortality rate decreased 50% with statistically significant ($p=0.008$) by 24-hour HCU care during pre-hospitalized period. The satisfaction (very satisfied, satisfied) to physician attitude, disease explanation, symptom relief and overall care quality using 5-point Likert scale was 99.1%, 92.8%, 92.0% and 95.3% respectively in total 427 subjects.

Conclusion: Our first-shot HOS model at ED improved patients care quality, lessened waiting time and mortality, and increased satisfaction. It is the creative experience at ED as similar outcome in care quality as at wards. Although it was the only one medical center database, it deserved further research to realize the evidence of improvement.

Keywords: Emergency department; Patients care

Introduction

There are approximate 1300 emergency physicians responsible for the emergency care of the 24 million people in Taiwan [1]. The increasing violent events at emergency department (ED) and work-related stress have greatly contributed to the shortage of emergent physicians [2]. It is convenient for Taiwan patients to visit ED, and allowed for low-cost payments by present healthcare insurance systems, therefore, the growing population had overloaded many hospitals and increased the burdens of healthcare personnel [3]. The tenuous relationships between patients and emergency physicians are frequently occurred due to no beds available for hospitalization and the prolonged boarding time to wards is one of the major causes [4]. These disputes often occurred when symptoms became worsened, or when the explanations did not meet the expectation of patients and families, especially in critically ill conditions.

The creative of care model of hospitalists (HOS) in the United States (US) since 1996 was established, it was wide-spreading to other countries quickly. The numbers of hospitalists in US were growing up to 50,000 physicians in past 20 years [5,6], and the advantages of HOS is not only rapid and effective dealing with patient problems in diagnosis and management, but also the therapeutic strategy, the diseases explanation, and the communication skill by holistic-trained attending physicians [7]. From the patient point-of-view, HOS provided shorter hospital stay, lower mortality rate, and improved quality care, not just by evidenced-based study in literature [8], but also by patient feelings themselves. Moreover, HOS could reduce the expenditure of care costs, and increased patient satisfaction from admission to discharge [9,10]. The impact of HOS in Taiwan was shifting the responsibility of patient

care from residents to attending physicians with integrated but not fragmented care. It was still in debate weather the present healthcare system (resident cared, attending supervised) was worse than that of HOS system (totally attending care) in Taiwan.

From the experiences in Taiwan (only 19 hospitals participated in Government proposals of HOS), the results were demonstrated to shorten admission days, improve patient satisfaction, and save admission expenditures [11]. And the HOS was setting at wards in all participants. In 2012, The HOS was implanted in Chi-Mei Medical Center (CMMC) in southern Taiwan by setting a Holistic Care Unit (HCU) at ED based on the demands of hospital, tried to reduce the burdens of emergency physicians, shorten the boarding time to wards, and decrease the complaints of overcrowded patients [12].

Material and Methods

Members of the HCU included eight medical sub-specialties with

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qualified board in neurology, gastroenterology, metabolism, cardiology, pulmonology, nephrology, and infectious diseases. The HCU team on-duty discussed with emergency physicians, night-duty physicians, and nursing staffs about the patient situations, ongoing events, and copying strategy by handover procedure every morning with all listing pre-hospitalized patients. The HCU team members devoted their specialties of knowledge or opinions for patients care, for instance, infectious physicians would suggest proper empiric antibiotics immediately for patients with severe trauma injury and sepsis, without any need for consultation. The neurologist of HCU evaluated the risk of stroke progression in ischemic stroke with t-PA or intra-arterial thrombolysis by share decision making (SDM) with patients and families soon. The cardiologist offered preventive management of arrhythmia in patients with acute myocardial infarction, and so on. All above actions or regimens were responded by emergency physicians in the past before setting HOS. Through the broad discussions and integrated cooperation of HCU and emergency physicians, the co-morbidities were treated earlier, and symptoms deterioration was prevented from real world experience [13].

CMMC is a 1250-bed available tertiary medical center serving 11,000 sufferers every month at ED with average 2,200 patients per month for hospitalization (Figure 1). The waiting time at ED on boarding was 6 to 96 hours in past years. HOS was setting at ED observation room with a 75-bed capacity for pre-hospitalization (excluded pediatric patients). Three sections were divided for eight holistic physicians care round within 24 hours, and 8 nursing specialists and 46 nursing staffs with 7 small stations for procedures and nursing. An 8-hour work-shifting was adopted in HCU team to care all pre-hospitalized patients. In day-time shift (08:00-16:00), three physicians should visit their accountable patients one by one and manage all co-morbidities or complaints. Consultations were only made for surgical intervention or devastating conditions of specific situations as rheumatic disease, or cancer therapy, etc. The night-shift (16:00-24:00) and midnight-shift (24:00-08:00) works were in-charged by two duty physicians of team members to deal with the problems left or new happenings. Unlike emergency physicians in the frontline, all HCU physicians at ED only cared pre-hospitalized patients waiting for beds to wards. Once if patient

conditions deteriorated, HCU can collaborate with ED physicians at frontline for resuscitation and waiting for intensive care unit (ICU). With this 24-hours caring system, the emergency physicians had less burdens and leaved-off, and HCU team took parts of responsibility for the safety and quality of pre-hospitalized patients. When the situations became stabilized during waiting period but no wards available, patients were allowed home by HCU physicians with given prescriptions. One case manager would follow-up the post-discharged conditions within 24 hours by telephone interview or home visit, and arranged outpatient clinic schedules back.

The data was collected from the computer system in CMMC. We compared the ratio of visitors and pre-hospitalized waiting patients at ED between periods. Student T test was used to compare the waiting time, overstayed (>48 hours), mortality rate in pre-hospitalized patients. SPSS 20.0 was used for statistical analysis. The significance level was set at 0.05 (two tails).

Results

This study enrolled data before and after HOS setting at ED (2011-8~2012-7 and 2015-8~2016-7) for comparison. The average waiting time in pre-hospitalization decreased from 17.06 hours to 15.33 hours (Figure 2), with statistical significance ($p=0.017$) and the ratio of overstayed period (>48 hours) declined from 7.83% to 4.91% ($p=0.087$). Mortality at ED during pre-hospitalization decreased from 0.08% to 0.04% with statistically significant (Figure 3a and 3b). The discharged subjects from HCU without admission were from 1.3% to 4.3% (not shown), with 2.8% in average. The case manager followed post-discharged patients within 24 hours, either by telephone interview or home visit, raised from 75.7% to 89.4% in comparative year (not shown). The ratio of outpatient follow-ups was from 62.5% to 90.0% (in Taiwan, the appointments for outpatient clinics are rare due to easily register).

The Questionnaires of satisfaction during pre-hospitalization at ED were conducted. A 5-point Likert scale for rating the degree of satisfaction was used (1=very satisfied, 2=satisfied, 3=neutral, 4=dissatisfied, 5=very dissatisfied). In a sample size of 427, 70% were

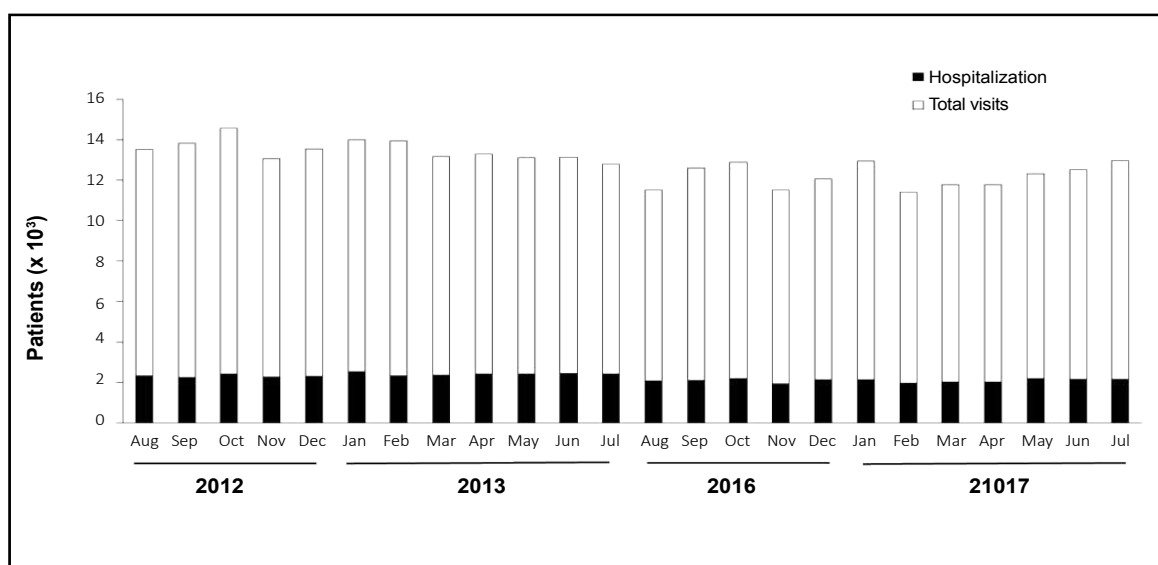


Figure 1: The ratio of patients with/without hospitalization waiting at ED per month.

first-ever visited to ED, and waited for admission. Satisfaction (very satisfied, satisfied) towards the physicians attitude, the explanation about diseases, the symptoms remission, and overall the care quality was

99.1%, 92.8%, 92.0%, and 95.3%, respectively (Figure 4). Dissatisfaction was towards the long waiting period (8%), narrowed waiting space (3.5%), and long waiting time for laboratory reports (1.2%).

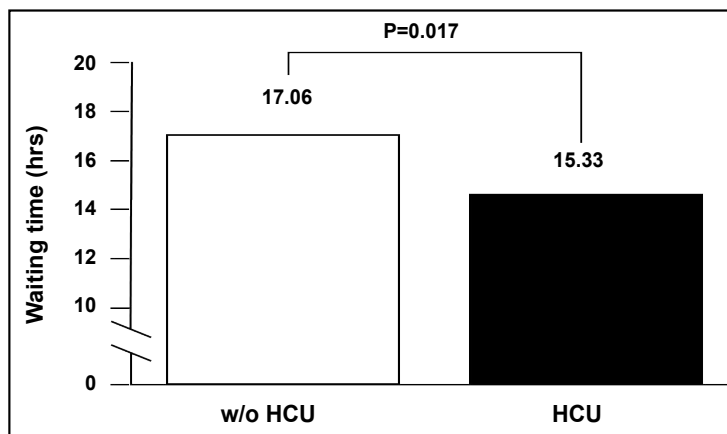


Figure 2: The ratio of waiting time before and after HOS setting at ED (T test $p < 0.05$) (2011-8~2012-7; 2015-8~2016-7).

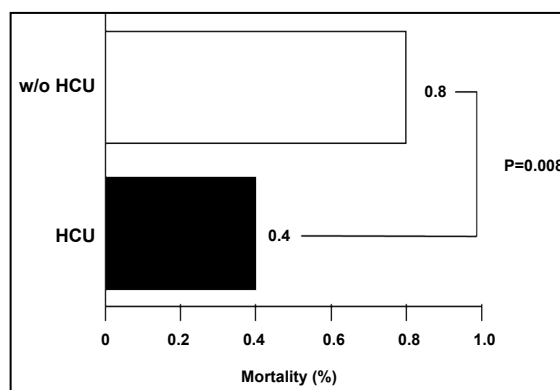
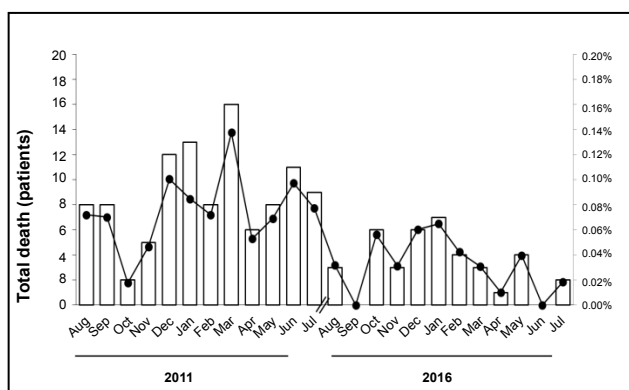


Figure 3a: The trend of mortality rate in patients between periods (2011-8~2012-7; 2015-8~2016-7).
 b: The mortality ratio before and after HOS setting at ED (T test $p < 0.01$).

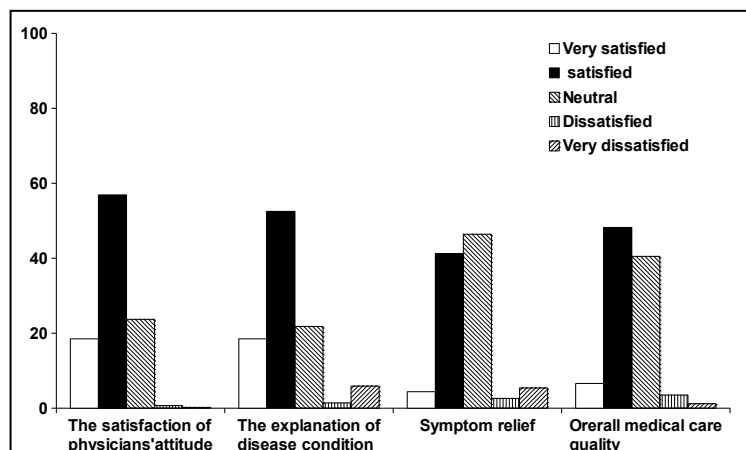


Figure 4: The satisfaction in physician attitude, disease explanation, symptom relief, and overall care quality using Questionnaire (2012-2013, N=427) after HOS implemented.

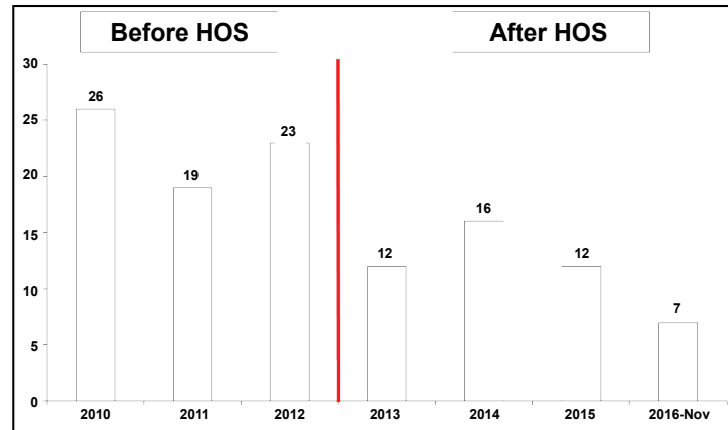


Figure 5: The legal events of malpractice before and after HOS (divided by redline).

Discussion

Our single center data revealed the benefits of HCU team in collaboration with emergency physicians to shorten the waiting time for hospitalization and overstay period, to reduce mortality rate in pre-hospitalized care, to raise patient satisfaction, and to increase the discharged rate, and post-discharged patients return to clinics. The total waiting time declined from 42496 hours to 40171 hours in separate year before and after setting HOS for patients care. (17.3% of time saved). In this medical center, 78% of pre-hospitalized patients from ED could admit to wards, and 95% of patients to ICU, within 24 hours, similar to other medical centers in Taiwan (totally 19 medical centers certified by Taiwan Ministry of Health and Welfare). The overstayed period (>48 hours) was declined but without statistically significant after HOS implementation. The least time for waiting hospitalization is important for patients not only feared of diseases in progression but also the noisy and narrowed space at ED. It was also the cause of disputes between families and hospital administration, especially when patients were in critical illness or waiting for ICU too long. The decline in mortality rate during pre-hospitalization indicated the good HCU physicians care. The frequent visits to patients, immediate effective management, no need for time-consuming consultations, prompt procedures to prevent diseases progression, and rapid copying strategy for symptoms relief or co-morbid control earned patients and families high satisfaction. In our analysis, the legal issue of malpractice was declined significantly eight months after HOS setting at ED [14]. The total legal events were down from 23 to 14, in following years (Figure 5). It indicated that the collaboration of HCU team members could effectively lessen the disagreements of patients and families in medical care, procedures, management, or diseases explanation.

A case manager increased the followed-up rate in post-discharged patients, from 75.7% to 89.4%, and increased the appointments return to outpatient clinics from 62.5% to 90%. This revealed patients after discharged still had good communication with HCU team that physicians could realize what happenings at home no matter by telephone interview or home visits. It is important in our Government policy for at-home healthcare especially in repeated infectious, multiple co-morbidities, and elderly patients. Through this vertical integrated connection, patients could have pipeline for inquiry and ask for medical help but not necessarily back to hospital simply for advisement or suggestion. However, all this effectiveness of post-discharged care and

returning rate was partly attributed to the aggressive and kind attitude, with excellent communicated skills of the case manager.

There are other additional advantages of HOS setting at ED [15]. First, unlikely the internal physicians at wards with full-time responsibility for patients, the working hours in HCU team are reasonable including 20 shift-works by 8 hours in each to avoid burnouts and share their family life. Second, by team resource management, the time-consuming consultation is prevented and increased the efficiency of decision making time to avoid redundant laboratory test or repeat examinations. Third, the interdisciplinary combined meetings held routinely every morning in 365 days at ED conference room, included emergency physicians, HCU team members, nursing staffs, nursing specialists, and case manager (sometimes with sub-specialists for specific cases), allowed for sharing medical knowledge, caring skills, treatment protocol, and update guidelines. Fourth, the discharged patients by permission from HCU without admit to wards (55~60 patients per month) saved medical cost about 100 thousand US dollars as 3 million new Taiwan dollars (NTD) per month. (For example as urinary sepsis or pneumonia admitted for 5 days, the care expenditures were around 10,000 NTD/day). Fifth, the HCU team can do whole-person care rather than organ-oriented management. It earned the priority for young doctors to choose HOS with more attractive training programs and rationale working hours. From the viewpoints of medical collaboration, HCU team played an important role of bridging care between ED and sub-specialists at wards.

There were some limitations warranted for breaking through. First, the complexity of diseases and patients numbers are difficult to predict, the resources of physicians were not easily arranged for. For example, the 75-bed capacity of HOS usually loaded for three physicians, in circumstance, insufficient doctors happened especially if pre-hospitalized patients over 90. Second, the HCU members were internal physicians, and the consultations were often made in trauma or surgical intervention. Third, the works overloaded were frequently encountered in battle-like ED environment. Fourth, the HOS setting at ED was a bridging care only, not a full responsibility till patient discharged. Fifth, there were no other data for comparisons due to no established this HOS care model at ED in Taiwan, or in other countries searching from literatures.

The development of the hospitalists system in Taiwan [16] poses challenges to the current healthcare system. From our experiences

and reports [17], the utility of HOS system is more flexible for medical personnel assignments especially reduce “burnouts” in physicians. The current model of the working cycle with 8-8-8 hours in divided 24 hours of shift-works satisfied HCU physicians, it differed from present healthcare system by residents in primary care and supervised by attending physicians during hospitalization of patients in Taiwan. This 24-hours total care by one resident and one attending physician at wards did not satisfy patients, even physicians themselves, compared to HOS system at ED. The implementation of “Nocturnalists system” was established in some countries [18], and will be the missions in our department with the hope of enriching care quality at midnight. We also have the perspectives that all our team members beyond their subspecialties will receive advanced well-trained holistic care skill for the good of patient care, from ED to wards to discharge, with collaboration with family doctors or primary care physicians. However, whether the HOS system can be extensively applied to all hospitals in Taiwan with taking medical costs, physician resources, care quality and patient satisfactions into accounts still need for observation in the future.

Conclusion

The hospitalists care model at ED is the pioneer experiment in Taiwan, linking emergency care and pre-hospitalized management. To our knowledge, it is the first trial in Taiwan. Since established HOS at wards were popular and well acceptable practice for patients care and saved expenditure, setting HOS at ED saved medical costs in our data by well-trained hospitalists who were transformed from medical subspecialists in our hospital. Our data showed 50-60 patients allowed for discharged per month, initially they were supposed for admission (exp., pneumonia or urinary tract infection, drugs-related conscious change, and E- imbalance, etc). The setting HOS at ED in our hospital also lessened leave-off of emergency physicians, and promising the care quality and patient safety by the collaboration with hospitalists. The overcrowded conditions at ED though continued existence, that patients reduced their anxiety mood by the cooperative care with both teams. Our data revealed declined in waiting time for admission, the mortality rate, and improved patient satisfaction. Though it is only one medical center data, it still deserved for references to many similar conditions of overcrowded patients at ED in hospitals.

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Conflict of Interest

The authors declare no conflicts of interest related to this study.

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