Outcomes and Predicting Factors of Mortality Among Newly Admitted Female Medical Inpatients

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Abstract

Outcomes and predicting factors of mortality were studied in a consecutive series of 190 female medical patients admitted with acute illness to the Department of Medicine. Most of the patients were admitted from the Emergency Department. Twenty seven patients (14.2%) died. Seventy per cent of the patients who died, died during the first week of hospitalisation. Nearly 10 per cent of the patients who did not die, stayed in the hospital for longer than 4 weeks. At the time of home discharge, 20 patients (12.3%) had a Barthel ADL Index score less than 12, 19 patients (11.7%) had urinary incontinence, 16 patients (9.8%) had faecal incontinence, and only 103 patients (63.2%) could walk independently. The elderly patients had a significantly higher disability level at the time of home discharge than the younger patients. Independent predicting factors of mortality among this population study were "history of acute confusion", "systolic blood pressure < 100", "hematocrit < 30 per cent", "platelet < 100,000", and "a low Chula Mental Test score". Implementation of auditing and quality assurance in every acute-care hospitals is recommended.

A high mortality rate and a long duration of hospitalisation among medical inpatients particularly elderly patients has been shown[1]. However, there is no study of outcomes other than mortality and the duration of stay among Thai medical inpatients. Many of the outcomes particularly disability and dependency status have to be considered in terms of quality of care. Moreover, early recognition of high risk patients may prevent unneccessary deaths. Therefore, we conducted a study which aimed to clarify the various outcomes and the predicting factors of mortality among female medical inpatients in a female medical ward of Chulalongkorn University Hospital.

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SUBJECTS AND METHOD

From July to September 1993, 190 consecutive patients newly admitted to a female medical ward of Chulalongkorn University Hospital were recruited. Route of admission, clinical data during the admission period, final diagnoses and outcome were collected. The history of care-givers during illness and working status before admission were also recorded. Barthel ADL Index[2,3] and Chula ADL Index[4] were used to assess functional ability 1 year before admission, 1 month before admission and before admission. Chula Mental Test[5] was used for cognitive function assessment and Glasgow Coma Scale[6] was used for conscious level assessment on the day of admission. Presentation of delirium during the first 48-hours of admission was assessed by using the DSM-3-R criteria[7]. Primary diagnosis of all 190 patients was obtained from the summary sheet of the department of medicine. The outcome of service was assessed (including mortality, duration of admission, new pressure sores which occurred during hospitalisation, and Barthel ADL Index before being discharged). Changes of Barthel ADL Index was calculated and used as outcomes. An increase of two points or more was classified as "better". Score between -1 and +1 was classified as "no change". Decrease of two points or more was classified as "worse".

The statistical significance of differences between the age groups were analysed using chi square test, student *t*-test or Mann Whitney-U test wherever they were appropriate. Factors associated with mortality were analysed. Those associates meeting a p-value of < 0.05 were entered into logistic regression model. The adjusted odds ratios and 95 percent confidence intervals[8,9] were produced as estimates of strength of association. The SPSS-PC programme was used for statistical analysis.

RESULTS

The mean age of the 190 female subjects and its standard deviation (SD) were 47.7 and 19.3 years respectively. Fifty eight of the subjects (30.5%) were elderly (aged 60 and over). Most of the patients (78.4%) were admitted from the emergency department. The percentage of patients admitted from the emergency department among the patients who died and those who didn't, were 88.9 per cent and 76.7 per cent respectively. There was no statistical difference in age and route of admission between those patients who died and those who didn't. The mean duration of admission and its SD of all 190 patients were 11.1 and 18.5 days respectively.

One hundred and three patients (54.2%) had a history of hospitalisation during the last two years. Fourteen patients (7.4%) reported that they had no care-giver. Forty-nine patients (25.8%) did not work. Nine patients (4.7%) had a history of dementia (all were elderly patients). According to

Table 1. Primary diagnosis of 190 female medical inpatients by discharge status.

	Patients who died (n = 27)	Patients who did not die (n = 163)
Infection	8	40
Infection with shock	5	2
Haematological malignancy	5	7
Other haematological diseases	2	10
Upper gastrointestinal bleeding	2	7
Other gastrointestinal diseases	1	3
Liver diseases	-	7
Myocardial infarction / unstable angina	-	9
Congestive heart failure from various causes	-	14
Other cardiac diseases	-	10
Acute complication of diabetes mellitus	-	7
Acute renal failure and other renal diseases	-	7
Adverse drug reactions	-	5
Intoxication	-	3
Others	4	32

DSM-3R criteria 13 patients (6.8%) were diagnosed as suffering from delirium. Eight of them were aged 60 and over. Thirty-two (16.8%) and 29 (15.3%) had urinary incontinence and faecal incontinence on admission respectively. Two patients (1.5%) had pressure sores prior to admission. Eight patients (4.2%) developed pressure sores during hospitalisation (at sacrum and hip areas), five of them were elderly. Primary diagnosis of the 190 patients is shown in Table 1.

Twenty seven patients (14.2%) died. Nine of them were elderly. The mean age and SD of the patients who died were 53.5 and 16.9 years respectively. Seventy per cent of those who died, died within the first week of hospitalisation. (Table 2)

One hundred and sixty three patients (85.8%) were discharged. Their mean age and SD were 47.7 and 19.3 years respectively. Mean duration of admission and its SD of the patients were discharged were 16.9 and 5.2 days respectively. Sixteen of them (9.8%) occupied beds for longer than four weeks. (Table 2) Among the patients who did not die, BAI score of 74 patients (45.4%) inclined during hospitalisation period. BAI score of 80 patients (49.1%) declined. On discharge 20 patients (12.3%) had a BAI score of less than 12. (Table 3) Nineteen (11.7%) and 16 (9.8%) subjects had urinary and faecal incontinence respectively. Nineteen patients (11.7%) were not mobile without help. Forty-one patients (25.1%) needed supervision on mobility indoors. Elderly patients had statistically higher rates of these disabilities than the younger patients. (Table 3)

Twenty two univariate factors of mortality among this population were identified. (Table 4) Among these univariate factors, 4 were history factors, 7 were physical examination factors, 1 was clinical syndrome assessment (delirium), 7 were functional assessment factors, and 3 were laboratory factors. From logistic regression analysis, a model was obtained which was composed of 5 multivariate factors. These factors were history of acute confusion, systolic blood pressure < 100, hematocrit < 30 per cent, platelet count < 100,000, and low CMT score on admission. Their odd ratios are shown in Table 5.

Table 2. Duration of hospitalisation of 190 female medical inpatients by discharge status.

	Patients who died number (%)	Patients who did not die number (%)
7 days or less	19 (70.4)	74 (45.4)
8 - 28 days	4 (14.8)	73 (44.8)
more than 28 days	4 (14.8)	16 (9.8)

Table 3. Outcomes of 132 female medical inpatients who were discharged home.

		Elderly patients (n = 49)	Young patients (n = 114)	All patients (n = 163)
BAI score less than 12* : number (%)		12 (24.5)	8 (7.0)	20 (12.3)
Change of Barthel ADL Index score : number (%)	better	23 (46.9)	51 (44.7)	74 (45.4)
	no change	23 (46.9)	57 (50.0)	80 (49.1)
	worse	3 (6.1)	6 (5.3)	9 (5.5)
Urinary incontinence** : number (%)		11 (22.4)	8 (7.0)	19 (11.7)
Faecal incontinence* : number (%)		10 (20.4)	6 (5.3)	16 (9.8)
Immobility* : number (%)	need help	10 (20.4)	9 (7.9)	19 (11.7)
	under supervision	18 (36.7)	23 (20.2)	41 (25.1)
	independent	21 (42.9)	82 (71.9)	103 (63.2)

* $p < 0.005$
** $p < 0.01$

Table 4. Univariate factors of mortality among 190 female medical inpatients.

	Patients who died		Patients who did not die	
History of acute confusion: number (%)*	7	(26.9)	8	(4.9)
Present history of fever: number (%)**	18	(69.2)	77	(47.2)
History of falls during the past month: number (%)**	3	(11.5)	2	(1.2)
History of presenting care-givers during illness: number (%)*	7	(25.9)	7	(4.3)
Systolic blood pressure < 100 mmHg: number (%)***	7	(25.9)	4	(2.5)
Diastolic blood pressure < 60 mmHg: number (%)****	4	(14.8)	3	(1.8)
Heart rate < 60 or > 100 beats/minute: number (%)**	11	(40.7)	31	(19.0)
Respiratory rate > 20 times/minutes: number (%)**	18	(66.7)	68	(41.7)
Evidence of sepsis: number (%)+	5	(20.0)	3	(1.8)
Evidence of urinary incontinence: number (%)***	15	(55.6)	17	(10.4)
Evidence of faecal incontinence: number (%)***	12	(44.4)	17	(10.4)
Diagnoses of delirium: number (%)+	7	(25.9)	6	(3.7)
Chula ADL Index score at 1 month before admission : mean score (SD)++	4.57	(3.1)	6.76	(2.9)
Chula ADL Index score before admission: mean score (SD)****	2.77	(2.9)	4.7	(3.3)
Barthel ADL Index score at 1 year before admission: mean score (SD)**	19.29	(1.3)	19.68	(1.2)
Barthel ADL Index score at 1 month before admission: mean score (SD)++	16.52	(4.1)	18.9	(2.7)
Barthel ADL Index score before admission: mean score (SD)***	6.09	(6.2)	14.17	(5.9)
Chula Mental Test score on admission: mean score (SD)***	7.14	(6.7)	15.3	(4.4)
Glasgow Coma Scale score on admission: mean score (SD)***	10.88	(4.9)	14.8	(1.2)
Haemoglobin < 10 mg/dl: number (%)**	16	(59.3)	61	(37.4)
Haematocrit < 30%: number (%)****	17	(63.0)	57	(35.0)
Platelet count < 100,000: number (%)*	11	(40.7)	33	(20.2)

* $p < 0.001$
** $p < 0.05$
*** $p < 0.0001$
**** $p < 0.01$
\+ $p < 0.0005$
++ $p < 0.005$

Table 5. Odd's ratios and 95 per cent confidence intervals of multivariate factors of mortality among 190 female medical inpatients.

	Odd's ratios	95% confidence intervals
History of acute confusion	6.3	1.0 - 39.0
Systolic blood pressure < 100 mmHg	11.1	1.2 - 97.6
Haematocrit < 30%	6.5	1.5 - 27.4
Platelet count < 100,000	14.6	2.9 - 73.6
Low Chula Mental Test score on admission	1.3	1.2 - 1.5

DISCUSSION

Most of the patients were admitted from the emergency department which suggested that most of the patients had rather severe illnesses. Therefore, it was not unexpected to find that most of the deaths occurred during the first week after admission.

An unexpectedly high percentage of long duration of admission, i.e. occupying a bed longer than 28 days, was found which might reflect directly on the quality of medical care or a bed-block phenomenon[10]. Although only 5.5 per cent of the subjects who did not die, had a declining BAI score during hospitalisation, a certain number of patients were dependent and needed continuing comprehensive care (including both social and medical-rehabilitative services). There was a need

for improving the quality of services in order to lessen functional problems of medical inpatients(11).

Compared with the patients who did not die, those who died had a substantial period of poor health status, suggested by low scores of BAI at 1 month and 1 year prior to admission and a low score of CAI at 1 month prior to admission. Finding that "having no care-giver during illness" was an univariate factor of mortality implied an association between low social status and mortality in this population.

"History of acute confusion" was an independent predicting factor of mortality rather than "diagnosis of delirium". This might be a result of its higher sensitivity for delirium when compared with using the DSM-3R criteria. Low cognitive function was also an independent factor of mortality as found in many reports(12-15). Low systolic blood pressure suggested the significance of abnormal cardiovascular function as a mortality risk. A systolic blood pressure of less than 100 mmHg is commonly found in shock patients. Low platelet count might be associated with sepsis, disseminated intravascular clot or haematological diseases such as leukemia. An association between low haematocrit and mortality might reflect a poor health status, a poor nutritional status or a loss of blood.

Factors associated with mortality may be viewed as severity indexes. Presentation of these factors in female medical inpatients should alert their physicians about clinical severity and a high chance of death. Thorough clinical assessment and proper management should be provided in order to prevent unnecessary death. The outcome of medical services should be monitored for not only the traditional outcomes, i.e. mortality rate and mean length of stay, but also the functional outcomes such as activities of daily living and the duration of hospitalisation(16). Dependency status at the time of discharge is essential for planning post-discharge services. During the economically-troubled period of the country, auditing and quality assurance must be implemented in every acute-care hospital in order to improve the way in which the limited resource of services is used.

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ผลการรักษาและปัจจัยของการเสียชีวิตในผู้ป่วยหญิงที่เข้ารับการรักษาทางอายุรกรรม

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ได้ทำการศึกษาผลการบริการและปัจจัยทำนายการเสียชีวิตในผู้ป่วยหญิงอายุรกรรมจำนวน 190 คนที่เข้ารับการรักษาในแผนกอายุรศาสตร์ ผู้ป่วยส่วนใหญ่รับเข้าพำนักในโรงพยาบาลจากแผนกฉุกเฉิน ผู้ป่วย 27 ราย (ร้อยละ 14.2) เสียชีวิต โดยร้อยละ 70 ของการเสียชีวิตเกิดขึ้นในสัปดาห์แรกของการเข้ารับการรักษา เกือบร้อยละ 10 ของผู้ป่วยที่ไม่เสียชีวิตพำนักในโรงพยาบาลเกิน 4 สัปดาห์ ในขณะที่จะส่งผู้ป่วยกลับบ้านพบว่าผู้ป่วย 20 คน (ร้อยละ 12.3) มีคะแนนดัชนีบาร์เธลน้อยกว่า 12, ผู้ป่วย 19 คน (ร้อยละ 11.7) มีปัญหากลั้นปัสสาวะไม่ได้, ผู้ป่วย 16 คน (ร้อยละ 9.8) มีปัญหากลั้นอุจจาระไม่ได้, และมีผู้ป่วยเพียง 103 คน (ร้อยละ 63.2) เท่านั้นที่เดินได้ด้วยตนเองอย่างอิสระ ผู้ป่วยสูงอายุมีระดับของภาวะทุพพลภาพสูงกว่าผู้ป่วยอายุน้อยอย่างมีนัยสำคัญ ปัจจัยทำนายการเสียชีวิตในผู้ป่วยที่ทำการศึกษาได้แก่ "ประวัติสับสนเฉียบพลัน" "ความดันซิสโตลีน้อยกว่า 100 ม.ม.ปรอท" "ฮีมาโตคริตน้อยกว่าร้อยละ 30", "เกร็ดเลือดน้อยกว่า 100,000", และ "มีคะแนนแบบทดสอบสภาพจิตจุฬาต่ำ" ผู้วิจัยแนะนำให้มีการดำเนินการ "ตรวจสอบ" และ "ประกันคุณภาพ" ของการบริการในโรงพยาบาลเฉียบพลันทุกแห่ง

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