

Medical Expenditure and Family Satisfaction Between Hospice and General Care in Terminal Cancer Patients in Taiwan

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Background/Purpose: As the number of terminal cancer patients increases, several care models have been adopted to provide better care quality and reduce medical expenditure. This study compared inpatient medical expenditure and family satisfaction in a hospice ward (HW) and general ward (GW) for terminal cancer patients in Taiwan.

Methods: We enrolled terminal cancer patients who were admitted and died during the same admission period in a tertiary care hospital in Taiwan from January 2003 to December 2005. These patients were allocated into three groups: inpatient care in HW alone; inpatient care in GW alone; and inpatient care in mixed group (initially in GW, then transferred to HW). Inpatient medical expenditure and family satisfaction were compared between the three groups.

Results: A total of 1942 patients were recruited and allocated into HW ($n=292$), GW ($n=1511$) and mixed ($n=139$) groups. The average medical expenditure per person or per inpatient day was lower in the HW than the GW or mixed group. Subjects who had ever been admitted to the intensive care unit or received cardiopulmonary resuscitation in the GW or mixed groups required more expenditure on medical care than that in the HW group. Daily medical expenditure in the HW group also was much lower than that in the GW and mixed groups, based on length of stay and cancer type. The family satisfaction score was significantly higher in the mixed and/or HW group than the GW group.

Conclusion: For terminal cancer patients, hospice care can improve family satisfaction while reducing medical expenditure in Taiwan. [*J Formos Med Assoc* 2009;108(10):794–802]

Key Words: family, general care, health expenditures, hospices, satisfaction, Taiwan

The global incidence of cancer has risen dramatically in recent decades.¹ In Taiwan, cancer deaths have also increased sharply, and cancer has become the leading cause of death since 1982.² In 2007 alone, 40,306 (28.9% of total deaths) people in Taiwan died of cancer.² Although many new medical technologies and anticancer medications have been developed, most cancer patients

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are incurable, and clinical signs and symptoms worsen in the terminal stages.³ Although survival prediction in early stages of cancer is difficult, accurate predictions are possible in later stages.⁴ Palliative care can alleviate more than 10 symptoms from which terminal patients suffer.^{3,5,6} In 1967, Cicely Saunders established modern hospice palliative medicine in the United Kingdom, which provided holistic care for terminal patients. The goals of hospice palliative care are to improve the quality of life and offer death with dignity for terminal patients and their families. Many studies have demonstrated that hospice palliative care is one of the best care models for terminal patients.^{5,6} In Taiwan, hospice palliative care was introduced in 1990 and the use of this care model has increased rapidly.⁷ For example, Miceli and Mylod reported that terminal patients who received hospice care have greater family satisfaction than those who received usual care.⁸ Pyenson et al showed that terminal patients who receive hospice care have a longer time until death than those who receive non-hospice care.⁹

Medical expenditure for terminal patients during the end-of-life period is vast.¹⁰ Barnato et al determined that 30% of medical expenditure is spent by 5% of beneficiaries who die within a year.¹¹ Other researchers have shown that terminal patients incur greater expenditure on medical care and have longer inpatient stays before death compared to patients in stable condition.^{12,13} Spector and Mor reported that medical expenditure increases markedly near the time of death in terminal patients.¹³ Hospice palliative care has demonstrated reduced medical expenditure in terminally ill patients compared with that of usual care.^{7,9,14-16} For example, Pyenson et al reported that mean and median Medicare expenditure is lower for patients enrolled in hospice than in non-hospice care.⁹ The lower medical expenditure is not associated with shorter survival time, but appears to be related to a longer mean time until death.⁹ A study conducted by Lo in Taiwan showed that hospice care incurs less medical expenditure than usual care in terminal patients.⁷ The rate of hospice utilization during the last year of life has

increased rapidly from 5.5% to 15.4% between 2000 and 2004 in Taiwan. These terminal cancer patients were enrolled into hospice care close to death (median time till death ranged from 14 to 47 days).¹⁷

An important question to ask is whether families of end-of-life patients are satisfied with this emerging method of care, despite the associated reduction in medical expenditure. Few studies have analyzed medical expenditure and family satisfaction simultaneously when comparing hospice and general care. In this study, we assessed medical expenditure and family satisfaction with different care models for terminal cancer patients in a tertiary medical center in Taiwan, which provided acute and hospice care.

Subjects and Methods

Participants and characterization

Terminal cancer patients who were admitted to a tertiary medical center located in central Taiwan, from January 2003 to December 2005, and who died during this hospitalization period at the same center were included. These subjects were allocated into three groups: (1) general ward (GW) group, who were admitted to a GW and received general care until death; (2) hospice ward (HW) group, who were admitted to an HW at the outset and received hospice palliative care until death; (3) mixed ward (mixed) group, who were admitted to a GW to begin with and were transferred to an HW in the same hospitalization period, and died in the HW. Death coding and diagnosis of cancer for all subjects were performed at the same medical center. There were 1511, 292 and 139 subjects in the GW, HW and mixed groups, respectively. Ethical approval was obtained from the Institutional Review Board of China Medical University Hospital.

Medical expenditure analyses

Actual medical expenditure was obtained from the same medical center. Expenditure was divided into 16 subgroups according to the national

insurance of Taiwan, which included fees for diagnosis, laboratory services, X-rays, therapeutic procedures, rehabilitation, special materials, psychiatric treatment, injection services, drugs, dispensing services, wards, tube feeding, surgery, anesthesia, hemodialysis, and blood/plasma analysis. For comparison, we regrouped these 16 fees into six domains: (1) diagnosis fees; (2) laboratory/X-ray fees; (3) therapeutic fees (therapeutic procedures, rehabilitation, special materials, psychiatric treatment, and injection services); (4) drug fees (drugs and dispensing services); (5) ward fees (wards and tube feeding); and (6) others (surgery, hemodialysis, and blood/plasma analysis). All medical expenditure is presented in US dollars.

Questionnaires for family satisfaction

Few measurement scales have been developed for determining the satisfaction of family caregivers of terminal cancer patients. We could not find a family satisfaction questionnaire that had been translated and that was appropriate to Chinese culture. Therefore, a group of researchers in the fields of hospice palliative medicine, nursing, and health behavior reviewed the relevant literature and compiled 40 questions that assessed family satisfaction. We designed the questionnaire from two major fields, one from three domains: physiological, psychosocial, and spiritual aspects; the other from knowledge, attitude, and skill. Also, we added the equipment of the ward and overall domain into the original questionnaire. Five experts, including a medical doctor, social worker, senior nurse, project manager, and chaplain in the field of hospice palliative medicine were asked to comment twice on the content of initial pool items and rate the clarity, concreteness, centrality and importance of each item using a 5-point rating scale (1 = not important, 5 = very important). The content validity index (CVI) of each item was calculated based on the experts' ratings, and items were considered adequate if agreement was $\geq 80\%$ between experts. A similar CVI has been used in many previous studies.¹⁸

Based on the results of the content validation, 30 items were retained from the initial item pool using a 5-point scale: 1 (strongly dissatisfied); 2 (dissatisfied); 3 (neither satisfied nor dissatisfied); 4 (satisfied); and 5 (strongly satisfied). The final composition of the questionnaire was as follows: physiological (6 items); psychosocial (8 items); and spiritual (8 items). Another classification method was as follows: knowledge (8 items); attitude (6 items); and skill (8 items). The equipment and overall domains had three and five items, respectively. The rating scores were summated by subscales. The higher the score on a subscale, the better the rating of family satisfaction. A total of 1942 families were invited to fill out the questionnaires, and 332 returned completed questionnaires. The overall response rate was 17.1%. The response rate among the GW, mixed and HW groups was 219 (14.5%), 31 (22.3%) and 82 (28.1%), respectively. Reasons for non-response to our questionnaire included: refusal ($n=279$, 14.4%); incorrect contact information (wrong telephone number and/or address; $n=489$, 25.2%); no answer to attempted telephone calls during three different periods (morning, afternoon and night; $n=483$, 24.9%); families lost the questionnaire and were sent another but failed to reply within 3 months ($n=332$, 17.1%); and emotional disturbance (grief-related or otherwise; $n=27$, 1.4%).

Statistical analysis

Descriptive statistics were used to characterize the demographic, medical expenditure, and family satisfaction data. The data are presented as means and standard deviation unless otherwise indicated. The χ^2 test was used to test significant differences for categorical data among the three care groups. Student's *t* test and analysis of variance were used to test significant differences for continuous data in contrasting groups. *Post hoc* comparisons between groups were done using Scheffé's test. All statistical tests were two-sided at the 0.05 significance level. These statistical analyses were performed using SPSS version 13 (SPSS Inc., Chicago, IL, USA).

Results

A total of 1942 patients were recruited and allocated into the GW ($n=1511$, 991 men), mixed ($n=139$, 80 men), and HW ($n=292$, 173 men) groups. The mean age was 61.0, 60.5 and 61.6 years, and the length of stay (from admission until death) was 17.4, 25.2 and 10.1 days in the GW, mixed and HW groups, respectively. Liver cancer (19.5%), lung cancer (17.5%), oropharyngeal cancer (10.2%), hematological malignancy (8.3%), and colorectal cancer (7.7%) were the top five cancer types among these groups. The total average expenditure for each inpatient day was US\$284, US\$135 and US\$102, and the average total expenditure per person was US\$4602, US\$3496 and US\$1092 in the GW, mixed and HW groups, respectively (Table 1). The average medical expenditure per person and per inpatient day was lowest in the HW group compared with the mixed and GW groups, and a similar relationship was found for almost all expenditure subgroups (Table 1).

The mixed and GW groups were divided into subgroups that identified whether or not they were admitted to the intensive care unit (ICU).

None of the subjects in the HW group were admitted to the ICU. The GW group was divided into two subgroups depending on whether or not they received cardiopulmonary resuscitation (CPR). None of the subjects in the mixed and HW groups received CPR. We found that subjects in the GW-ICU(+) subgroup had the highest average daily medical expenditure. The HW group had the lowest average daily medical expenditure, even when compared with the GW-ICU(-) and mixed-ICU(-) subgroups. The average daily medical expenditure was US\$509 in the GW-ICU(+), US\$232 in the GW-ICU(-), US\$156 in the mixed-ICU(+) and US\$134 in the mixed-ICU(-) subgroups, and US\$102 in the HW group. Total medical expenditure for each inpatient day was US\$647 in the GW-CPR(+) and US\$261 in the GW-CPR(-) subgroups, and US\$135 in the mixed and US\$102 in the HW groups. Subjects in the HW group still had lower daily average medical expenditure than in the other subgroups.

Previous studies have found that medical expenditure increases markedly near the time of death in terminal patients. Therefore, we analyzed average daily medical expenditure according to

Table 1. Basic data and average medical expenditure per person or per inpatient day among groups*†

	GW group ($n=1511$)	Mixed group ($n=139$)	HW group ($n=292$)	<i>p</i>
Male	991 (65.6)	80 (57.6)	173 (59.2)	0.030
Age (yr)	61.0±16.3	60.5±14.9	61.6±14.8	0.757
Length of stay (d)	17.4±14.8	25.2±15.6	10.1±10.2	<0.001
Average expenditure per person/average expenditure per day (US\$)				
Diagnosis fees	210±182/13±5	247±146/10±1	93±93/9±17	<0.001/<0.001
Laboratory/X-ray fees	591±853/45±331	445±544/17±15	60±83/6±8	<0.001/0.083
Therapeutic fees	745±939/50±56	429±421/17±11	129±165/13±9	<0.001/<0.001
Drug fees	1501±2876/81±114	1202±1438/45±34	302±734/31±120	<0.001/<0.001
Ward fees	1084±1269/63±51	923±608/36±12	336±383/29±6	<0.001/<0.001
Others	557±1261/40±137	256±558/9±17	27±87/3±9	<0.001/<0.001
Grand total	4602±5997/284±465	3496±2819/135±55	1092±1401/102±122	<0.001/<0.001

*Data presented as *n* (%) or mean±standard deviation; †analysis of variance was used for comparing mean values of continuous variables between groups. GW=general ward; HW=hospice ward.

the length of stay (Table 2). We found that the HW group had the lowest average daily medical expenditure for each length of stay.

Table 3 shows average daily medical expenditure according to cancer type. The HW group had lower mean daily total expenditure than in the other groups; however, no further between-group differences were found for specific diagnoses such as brain cancer, gastric cancer, intestinal cancer, colorectal and intestinal cancer, hematological malignancy, renal cancer, prostate cancer, and cancer of unknown origin.

Table 4 presents family satisfaction across the groups in different domains. We found that subjects who had ever received hospice palliative care (mixed and HW groups) had higher family satisfaction than subjects in the GW group. The overall score (30 items) of family satisfaction was 62.9%, 89.1% and 90.7% in the GW, mixed and HW groups, respectively. The mixed and HW groups had a higher mean satisfaction score than

the GW group in all domains. There were no statistically significant differences between scores for the mixed and HW groups within each domain, or for the grand total family satisfaction score.

Discussion

The results of this study demonstrate that patients who rely solely on hospice palliative care incur substantially less expenditure than do GW patients or those who transition from the GW to hospice care. The marked differences in medical expenditure between HW and GW care extended to most cancer types. In addition to the fiscal differences between these end-of-life treatment options, the family of patients who had received any form of hospice palliative care reported greater satisfaction than that of patients in GWs.

Hospice care saved US\$182 in medical expenditure per inpatient day by comparison with

Table 2. Average daily medical expenditure among groups based on length of stay

Length of stay (d)	GW group (n = 1511)	Mixed group (n = 139)	HW group (n = 292)	p^*	p^\dagger	p^\ddagger	p^\S
< 3	376 ± 995 (n = 225)	0 (n = 0)	75 ± 29 (n = 83)	0.006	–	< 0.001	–
≥ 3	268 ± 281 (n = 1286)	135 ± 55 (n = 139)	113 ± 141 (n = 209)	< 0.001	0.435	< 0.001	< 0.001
< 7	333 ± 772 (n = 484)	118 ± 31 (n = 8)	98 ± 168 (n = 146)	0.001	0.936	< 0.001	0.373
≥ 7	260 ± 189 (n = 1027)	136 ± 56 (n = 131)	106 ± 37 (n = 146)	< 0.001	0.143	< 0.001	< 0.001
< 14	304 ± 613 (n = 802)	118 ± 40 (n = 34)	100 ± 139 (n = 219)	< 0.001	0.856	< 0.001	0.049
≥ 14	260 ± 185 (n = 709)	140 ± 58 (n = 105)	108 ± 41 (n = 73)	< 0.001	0.204	< 0.001	< 0.001
< 28	288 ± 507 (n = 1220)	134 ± 57 (n = 91)	101 ± 126 (n = 271)	< 0.001	0.544	< 0.001	0.002
≥ 28	264 ± 206 (n = 291)	136 ± 51 (n = 48)	113 ± 53 (n = 21)	< 0.001	0.638	< 0.001	< 0.001

*Analysis of variance was used for comparing mean values of continuous variables between groups; † post hoc comparison between HW and mixed groups using the least significant difference (LSD) test; ‡ post hoc comparison between HW and GW groups using the LSD test; § post hoc comparison between mixed and GW groups using the LSD test. GW = general ward; HW = hospice ward.

Table 3. Average daily medical expenditure among groups based on different cancer types

Cancer type	GW group (n = 1511)	Mixed group (n = 139)	HW group (n = 292)	p*	p [†]	p [‡]	p [§]
Oropharyngeal cancer	233 ± 136 (n = 154)	147 ± 22 (n = 7)	103 ± 32 (n = 38)	<0.001	0.385	<0.001	0.067
Esophageal/gastric cancer	275 ± 319 (n = 132)	150 ± 57 (n = 16)	91 ± 32 (n = 34)	0.001	0.475	0.001	0.086
Liver cancer	281 ± 466 (n = 306)	128 ± 52 (n = 28)	128 ± 300 (n = 45)	0.026	0.999	0.027	0.074
Lung cancer	218 ± 155 (n = 280)	111 ± 28 (n = 16)	96 ± 33 (n = 43)	<0.001	0.715	<0.001	0.004
Pancreatic/gallbladder cancer	212 ± 135 (n = 80)	128 ± 38 (n = 16)	107 ± 40 (n = 19)	<0.001	0.586	0.001	0.009
Colorectal and intestinal cancer	385 ± 1375 (n = 104)	144 ± 66 (n = 25)	93 ± 33 (n = 35)	0.313	0.858	0.176	0.327
Hematological cancer (leukemia/ multiple myeloma)	435 ± 348 (n = 156)	228 ± 146 (n = 3)	153 ± 121 (n = 3)	0.228	0.791	0.162	0.303
Urinary bladder/renal/ prostate cancer	247 ± 145 (n = 46)	117 ± 36 (n = 6)	93 ± 30 (n = 13)	<0.001	0.699	<0.001	0.019
Breast cancer	265 ± 271 (n = 69)	90 ± 25 (n = 7)	88 ± 35 (n = 22)	0.004	0.987	0.002	0.059
Ovarian/cervical/ endometrial cancer	268 ± 164 (n = 39)	146 ± 35 (n = 13)	93 ± 32 (n = 25)	<0.001	0.202	<0.001	0.002
Other cancers	306 ± 237 (n = 145)	173 ± 130 (n = 2)	109 ± 43 (n = 15)	0.005	0.708	0.002	0.410

*Analysis of variance was used for comparing mean values of continuous variables between groups; [†]post hoc comparison between HW and mixed groups using the least significant difference (LSD) test; [‡]post hoc comparison between HW and GW groups using the LSD test; [§]post hoc comparison between mixed and GW groups using the LSD test. GW = general ward; HW = hospice ward.

general care. Compared with medical expenditure in the HW group, terminal cancer patients in the GW-ICU(+) subgroup incurred an average extra US\$407 per inpatient day. Each patient in the HW group saved US\$545 per inpatient day compared with those in the GW-CPR(+) subgroup. Previous studies have reported that medical expenditure increases more rapidly as death approaches, and that hospice care can save more than general care.^{7,14} We found that the largest savings in average daily medical expenditure between general and hospice care were in subjects who died within 3 days of admission. The medical expenditure saved for each inpatient day was US\$301 (Table 2). In agreement with previous studies, our results demonstrate that the average daily medical expenditure increases as death approaches (Table 2). In the GW group, patients

who died within 3 days of admission incurred additional costs of US\$112 per day compared with those who died at 28 or more days after admission. However, patients in the HW group who died within 3 days of admission had the lowest average daily medical expenditure. One possible reason for this difference is that, in contrast to the GW group, obvious signs of dying in the HW patients precluded aggressive treatment to sustain life (such as CPR). Rather, medical care was focused more aggressively on increasing quality of life and dignity of death for patients and families during this period. Family satisfaction was greater in the HW and mixed group than the GW group, therefore, it is reasonable to propose that hospice palliative care is a more appropriate care model than usual care during this period.

Table 4. Analysis of family satisfaction according to different domains

Groups (n) and response rate (%)	GW group* (n=219; 14.5%)	Mixed group* (n=31; 22.3%)	HW group* (n=82; 28.1%)	p [†]	p [‡]	p [§]	p
Physiology (6 items)	74.9/3.76±0.07	95.7/4.33±0.06	94.5/4.39±0.04	<0.001/ <0.001	0.593/ 0.138	<0.001/ <0.001	<0.001/ <0.001
Psychosocial (8 items)	60.1/3.50±0.10	81.4/4.06±0.12	87.7/4.24±0.10	<0.001/ <0.001	0.098/ 0.002	<0.001/ <0.001	<0.001/ <0.001
Spirituality (8 items)	54.6/3.43±0.22	89.2/4.30±0.10	89.8/4.35±0.05	<0.001/ <0.001	0.855/ 0.458	<0.001/ <0.001	<0.001/ <0.001
Knowledge (8 items)	62.5/3.51±0.25	88.6/4.23±0.14	89.7/4.32±0.09	<0.001/ <0.001	0.813/ 0.332	<0.001/ <0.001	<0.001/ <0.001
Attitude (6 items)	65.1/3.60±0.18	91.4/4.26±0.14	91.9/4.34±0.04	<0.001/ <0.001	0.860/ 0.282	<0.001/ <0.001	<0.001/ <0.001
Skill (8 items)	59.5/3.54±0.15	85.3/4.18±0.19	89.7/4.30±0.13	<0.001/ <0.001	0.344/ 0.133	<0.001/ <0.001	<0.001/ <0.001
Equipment (3 items)	64.4/3.62±0.38	89.7/4.26±0.15	87.8/4.23±0.17	0.110/ 0.037	0.869/ 0.878	0.062/ 0.021	0.078/ 0.026
Overall (5 items)	65.0/3.67±0.10	93.0/4.37±0.10	94.2/4.29±0.07	<0.001/ <0.001	0.667/ 0.306	<0.001/ <0.001	<0.001/ <0.001
Grand total (30 items)	62.9/3.57±0.20	89.1/4.25±0.15	90.7/4.31±0.10	<0.001/ <0.001	0.447/ 0.114	<0.001/ <0.001	<0.001/ <0.001

*Data presented as percentage of families who answered "satisfied" and "strongly satisfied" (≥ 4 on a 5-point scale ranging from 1: strongly dissatisfied to 5: strongly satisfied) or mean \pm standard deviation (5-point scale ranging from 1: strongly dissatisfied to 5: strongly satisfied); [†] χ^2 test for categorical data and analysis of variance were used for comparing mean values of continuous variables between groups; [‡] χ^2 test and post hoc comparison between hospice ward (HW) group and mixed group using the least significant difference (LSD) test; [§] χ^2 test and post hoc comparison between HW and general ward (GW) groups using the LSD test; ^{||} χ^2 test and post hoc comparison between mixed and GW groups using the LSD test. GW=general ward; HW=hospice ward.

Previous studies have shown that hospice care provides high levels of family satisfaction.^{19–21} For example, Miceli and Mylod reported greater family satisfaction under hospice care than under the care of a personal physician.⁸ In agreement with that study, we also found that patients who had ever received hospice care (either mixed or HW group) had greater family satisfaction than patients who received general care. In the HW model in Taiwan and in most other countries, care is provided by a well-trained team that includes hospice palliative specialists, nurses, social workers, chaplains, volunteers, and other workers. Most terminal cancer patients were transferred to a hospice ward by oncologists or anticancer physicians whose primary responsibility was to cure cancer. Our results demonstrated that continuity of care from the original anticancer team was not the major factor that influences family satisfaction. Moreover, the well-trained

hospice team was a key point of satisfaction for family and patients.

That family satisfaction did not differ between the mixed and HW groups, yet still was greater than that in the GW group, suggests that full or partial reliance on hospice palliative care is beneficial compared with GW care. However, hospice palliative care was likely not the only factor that explained the differences in family satisfaction between the mixed and HW groups. For example, aggressiveness of care might differ between groups, especially if a do-not-resuscitate order exists. The understood goals of medical therapy are to prolong life, increase quality of life, and respect dignity of patients. For the treatment of terminal cancer patients, the goals lean more toward the latter two in hospice palliative care than in usual care, but are targeted no less aggressively. The potential effects of these and other confounding variables could explain some

of the differences between the three groups studied, and further work in this area is merited.

There are some limitations to our study. First, the response rate in the family satisfaction questionnaire was low, which could reduce the applicability of the findings. One possible explanation for this lack of response might have been the inherently difficult timing of the questionnaire for the family (at time of death and during the grieving process). Second, the admission period of this study only focused on the final admission before death, and not on medical expenditure for the entire terminal stage. Within the duration of the final admission, however, average daily medical expenditure was lowest in the HW group, regardless of length of stay. Third, the family satisfaction questionnaire was assessed only for content validity (not predictive, concurrent, construct, or incremental validity) before being used in the study. However, a previous study has demonstrated that content validity is a reliable way to design a questionnaire for use in clinical studies.¹⁶ Until further validation is completed on this questionnaire, we rely solely on the opinion of our expert panel to determine the ability of this questionnaire to reflect the thinking of the terminal patients' families. Finally, although the recall bias associated with questionnaire-based research cannot be ruled out in this study, the timing of questionnaire administration did not differ between the groups and thus would not have been expected to affect the study outcomes.

In summary, we demonstrated that hospice care not only saved medical expenditure, but was associated with greater family satisfaction than was general care. The use of hospice care for terminal cancer patients should be encouraged to increase family satisfaction and reduce medical expenditure in Taiwan and other countries.

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