

1 **Article Categories: original articles**

2 **Medical Expenditure and satisfaction of family between hospice care and general care**
3 **in terminal cancer patients in Taiwan**

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16 *Short running title: Medical Expenditure and family satisfaction in hospice care*

17 **Disclosure of Conflicts of Interest**

18 I certify that all my affiliations with or financial involvement in, within the past 5 years and
19 foreseeable future, any organization or entity with a financial interest in or financial conflict

1 with the subject matter or materials discussed in the manuscript are completely disclosed.

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1 **ABSTRACT**

2 **Background/Purpose:** As the increasing number of terminal cancer patients, several care
3 models had been adopted to provide better care quality as well as less medical expenditure.
4 This study assessed the inpatient medical expenditure and family satisfaction between
5 hospice ward (HW) and general ward (GW) in terminal cancer patients in Taiwan.

6 **Methods:** Terminal cancer patients who were admitted and died during the same admission
7 period in a tertiary care hospital were collected from Jan. 2003 to Dec. 2005 in Taiwan. These
8 patients were allocated into three groups, including inpatient care in HW alone, inpatient care
9 in GW alone, and inpatient care in mixed group (initially in GW, then transferred to HW).
10 Inpatient medical expenditure and family satisfaction were assessed among groups.

11 **Results:** A total of 1942 patients were recruited and allocated into GW (n=1511), mixed
12 (n=139), and HW (n=292) groups. The average medical expenditures either per person or per
13 inpatient day were lower in the HW group than GW or mixed groups. Subjects who had ever
14 been admitted to the intensive care unit or received cardio-pulmonary resuscitation in the GW
15 or mixed groups spent more on medical care than the HW group. Daily medical expenditure
16 in the HW group was also much lower than the GW and mixed group based on length of stay
17 and cancer type. The family satisfaction score was significantly higher in the mixed and/or
18 HW group than the GW group.

19 **Conclusion:** In terminal cancer patients, hospice care may improve family satisfaction while

1 reducing medical expenditure in Taiwan.

2 **Keywords:** hospice care, general care, expenditure, satisfaction, Taiwan

3

1 **Introduction**

2 The global incidence of cancer has risen dramatically in past decades (1). In Taiwan,
3 cancer deaths have also sharply increased and become the leading cause of death since 1982
4 (2). In 2007 alone, 40,306 (28.9 % of total deaths) Taiwanese died of cancer (2). Although
5 many new medical technologies and anti-cancer medications have been developed to fight
6 cancers, most of cancer patients are incurable, and clinical signs and symptoms worsen in
7 terminal stages (3). Although survival prediction in early stages of cancer is difficult, accurate
8 predictions are possible in later stages (4). Palliative care can effectively alleviate more than
9 ten symptoms from which terminal patients suffer (3, 5, 6). In 1967, Dr. Saunders in the
10 United Kingdom established modern hospice palliative medicine, which provided holistic
11 care for terminal patients. The goals of hospice palliative care were to improve the quality of
12 life and offer dignity of death in both terminal patients and their families. Many studies had
13 demonstrated that hospice palliative care is one of the best care models for terminal patients
14 (5, 6). In Taiwan, hospice palliative care was introduced in 1990 and the use of this care
15 model has rapidly increased (7). The benefit of hospice palliative care for terminal patients
16 had been shown by many studies. For example, Miceli et al. reported that terminal patients
17 receiving hospice care had higher family satisfaction than did usual care (8). Pyenson and
18 colleagues also showed that terminal patients who received hospice care had longer time until
19 death time than those who received non-hospice care (9).

1 Medical expenditures for terminal patients during the end-of-life period are vast (10). Barnato
2 et al. determined that 30% of medical expenditures are spent by 5% of beneficiaries who die
3 within the year (11). Other researchers have also shown that terminal patients spend more on
4 medical care and have longer inpatient stays before death (12, 13). Spector et al. reported that
5 medical expenditures increase markedly near time of death in terminal patients (13). Hospice
6 palliative care has demonstrated reduced medical expenditures in terminally ill patients
7 compared to usual care (7, 9, 14-16). For example, Pyenson et al. reported that mean and
8 median Medicare expenditures were lower for patients enrolled in hospice care than
9 non-hospice care (9). The lower medical expenditure was not associated with shorter survival
10 time, but appeared to be related to a longer mean time until death (9). A study conducted by
11 Lo in Taiwan also showed that hospice care had less medical expenditure than usual care in
12 terminal patients (7). The rate of hospice utilization during the last year of life increased
13 rapidly from 5.5% to 15.4% between 2000 and 2004 in Taiwan. These terminal cancer
14 patients were enrolled into hospice care close to death (median time till death time ranged
15 from 14 to 47 days) (17). An important question to ask is whether families of end-of-life
16 patients are satisfied with this emerging method of care, despite the associated reduction in
17 medical expenditure. Few studies had analyzed medical expenditures and family satisfaction
18 simultaneously when comparing hospice care and general care. In this study, we assessed the
19 medical expenditures and family satisfaction among different care models in terminal cancer

- 1 patients in a tertiary medical center which provided both acute care and hospice care in
- 2 Taiwan.

1 **Subjects and Methods**

2 *Participants and Characterizations*

3 Terminal cancer patients who were admitted to a tertiary medical center located in
4 mid-Taiwan and who died during this hospitalization period at the same center were included
5 from the beginning of 2003 to the end of 2005. These subjects were allocated into three
6 groups: (1) General ward (GW) group: admitted to general ward and received general care till
7 death; (2) Hospice ward (HW) group: admitted to hospice ward in the beginning and received
8 hospice palliative care till death; (3) Mixed ward (mixed) group: admitted to general ward in
9 the beginning and were transferred to hospice ward in the same hospitalized period, then died
10 in the hospice ward. Death coding and diagnosis of cancer for all subjects were performed at
11 the same medical center. There were 1511, 292,139 subjects in GW, HW, and mixed groups,
12 respectively.

13 *Medical Expenditure analyses*

14 Actual medical expenditures were obtained from the same medical center. These medical
15 expenditures were divided into 16 subgroups according to the national insurance of Taiwan,
16 including fees for diagnosis, laboratory, X-ray, therapeutic procedures, rehabilitation, special
17 materials, psychiatric treatment, injection services, drugs, dispensing services, ward, tube
18 feeding, surgery, anesthesia, hemodialysis, and blood/plasma. For comparison, we re-grouped
19 these 16 fees into 6 domains: (1) Diagnosis fees, (2) Laboratory/X-ray fees, (3) Therapeutic

1 fees (therapeutic procedures, rehabilitation, special materials, psychiatric treatment, injection
2 services), (4) Drug fees (drugs, dispensing services), (5) Ward fees (ward, tube feeding), (6)
3 Others (surgery, hemodialysis, blood/plasma). All medical expenditures are presented in US
4 dollars.

5 *Questionnaires for family satisfaction*

6 Few measurement scales have been developed for the satisfaction of family caregivers in
7 terminal cancer patients. We could not find a family satisfaction questionnaire translated and
8 appropriate to Chinese culture. Therefore, a group of researchers in the fields of hospice
9 palliative medicine, nursing, and health behavior participated in the work of a review of
10 relevant literature and compiled 40 questions assessing family satisfaction. In brief, we
11 designed the questionnaire from two major fields, one from three domains: physiological,
12 psycho-social, and spiritual aspects; the other from knowledge, attitude, and skill. Also, we
13 added the equipment of the ward and overall domain into the original questionnaire. Five
14 experts, including a medical doctor, social worker, senior nurse, project manager, and
15 chaplain in the field of hospice palliative medicine, were asked to comment twice on the
16 content of initial pool items and rate the clarity, concreteness, centrality and importance of
17 each item using a 5-point rating scale (e.g. 1=not important, 5=very important). The content
18 validity index (CVI) of each item was calculated based on the experts' ratings and items were
19 considered adequate if agreement was 80% or greater between experts. A similar CVI has

1 been used in many studies (18).

2 Based on the results of the content validation, 30 items were retained from the initial item
3 pool using a 5-point scale: 1 (strongly dissatisfied), 2 (dissatisfied), 3 (neither satisfied nor
4 dissatisfied), 4 (satisfied), and 5 (strongly satisfied). The final composition of the
5 questionnaire was as follows: physiological (6 items), psycho-social (8 items), and spiritual
6 domain (8 items). Another classified method was as follows: knowledge (8 items), attitude (6
7 items), and skill (8 items). The equipment and overall domains had 3 and 5 items,
8 respectively. The rating scores were summated by sub-scales. The higher the score on a
9 sub-scale, the better the rating of family satisfaction. A total of 1942 families were invited to
10 fill out the questionnaires, and 332 families returned completed questionnaires. The overall
11 response rate was 17.1%. The response rate among GW, mixed, and HW groups was 219
12 (14.5%), 31 (22.3%), and 82 (28.1%), respectively. Reasons for non-response to our
13 questionnaire included refusal (n=279, 14.4%), incorrect contact information (wrong
14 telephone number and/or address; n=489, 25.2%), no answer on phone call attempts during 3
15 different periods (in the morning, in the afternoon, and at night; n=483, 24.9%), families lost
16 the questionnaire and were sent another but failed to reply within 3 months (n=332, 17.1%),
17 and emotional disturbance (grief-related or otherwise; n=27, 1.4%).

18 *Statistical analysis*

19 Descriptive statistics were used to characterize the demographic, medical expenditure, and

1 family satisfaction data. The data are presented as means and SD unless otherwise indicated.
2 Chi-square test was used to test significant differences for categorical data among three care
3 groups. Student's t test and analysis of variance (ANOVA) were used to test significant
4 differences for continuous data on contrasting groups. Post Hoc comparisons between groups
5 were done using the Scheffe test. All statistical tests were 2-sided at the 0.05 significance
6 level. These statistical analyses were performed using the PC version of SPSS statistical
7 software (13th version, SPSS Inc., Chicago, IL, USA).

8 Ethics approval was obtained from the Institutional Review Board of the China Medical
9 University Hospital.

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1 **Results**

2 A total of 1,942 patients were recruited and allocated into GW (n=1,511, men=991), mixed
3 (n=139; men=80), and HW (n=292; men=173) groups, respectively. The mean age was 61.0,
4 60.5, and 61.6 years old among GW, mixed, and HW groups. The length of stay (admission
5 duration until death time) was 17.4, 25.2, and 10.1 days among GW, mixed, and HW groups,
6 respectively. Liver cancer (19.5%), lung cancer (17.5%), oral/pharyngeal cancer (10.2%),
7 hematological malignancy (8.3%), and colon-rectal cancer (7.7%) were the top five cancer
8 types among these groups. The total average expenditures in each inpatient day were 284,
9 135, and 102 US dollars among GW, mixed, and HW groups, respectively (Table 1). The
10 average total expenditure per person was 4,602, 3,496, and 1,092 US dollars among GW,
11 mixed, and HW groups, respectively (Table 1). The average medical expenditure per person
12 and per inpatient day was lowest in the HW group compared to the mixed and GW groups,
13 and a similar relationship was found for almost all expenditure subgroups (Table 1). We
14 further divided HW, mixed, and GW into subgroups that identified whether they were
15 admitted to intensive care unit (ICU) or not (admitted to ICU in GW and mixed group:
16 GW-ICU (+) and mixed-ICU (+); not admitted to ICU in GW and mixed group: GW-ICU (-)
17 and mixed-ICU (-); all subjects in HW group weren't admitted to ICU) and received
18 cardiopulmonary resuscitation (CPR) or not (received CPR in GW group: GW-CPR (+); not
19 received CPR in GW group: GW-CPR (-); subjects in both mixed and HW group did not

1 receive CPR). We found that subjects in the GW-ICU (+) had the highest average daily
2 medical expenditures. The HW group had lowest average daily medical expenditures, even
3 when compared to GW-ICU (-) and mixed-ICU (-) subgroups. The average daily medical
4 expenditures were 509 US dollars in GW-ICU (+), 232 US dollars in GW-ICU (-), 156 US
5 dollars in mixed-ICU (+), 134 US dollars in mixed-ICU (-), and 102 US dollars in the HW
6 group. Total medical expenditures for each inpatient day were 647 US dollars in GW-CPR
7 (+), 261 US dollars in GW-CPR (-), 135 US dollars in the mixed group, and 102 US dollars
8 in the HW group. Subjects in the HW group still had lower daily average medical
9 expenditures than other subgroups. Since previous studies found that medical expenditures
10 increase markedly near time of death in terminal patients, we further analyzed average daily
11 medical expenditures according to the length of stay in table 2. We found that the HW group
12 had the lowest average daily medical expenditures for each length of stay (Table 2). In table 3,
13 we showed average daily medical expenditures according to cancer types. The HW group had
14 lower mean daily total expenditures than the other groups; however, no further
15 between-group differences were found within specific diagnoses such as brain cancer, gastric
16 cancer, intestinal cancer, colon/rectal/intestinal cancer, hematological malignancy, renal
17 cancer, prostate cancer, and original unknown cancer (Table 3). In table 4, family satisfaction
18 is presented across groups in different domains. We found that subjects who had ever
19 received hospice palliative care (mixed and HW groups) had higher family satisfaction (grand

1 total) than subjects in the GW group. The overall (30 items) score of family satisfaction was
2 62.9%, 89.1%, and 90.7% among GW, mixed, and HW groups, respectively (Table 4). The
3 mixed and HW groups had a higher mean satisfaction score than the GW group in all
4 domains (Table 4). There were no statistical differences between scores of the mixed and HW
5 groups within each domain or for the grand total family satisfaction score.

1 **Discussion**

2 The results of this study demonstrate that patients who rely solely on hospice palliative
3 care spend substantially less than general ward patients or than those who transition from
4 general ward to hospice care. The marked differences in medical expenditures between
5 hospice and general ward care extended to most cancer types. In addition to the fiscal
6 differences between these end-of-life treatment options, family of patients who had received
7 any form of hospice palliative care report higher satisfaction than family of patients in
8 general hospital wards.

9 Hospice care saved 182 US dollars in medical expenditures per inpatient day by
10 comparison to general ward care. Compared with the medical expenditure in the HW group,
11 terminal cancer patients who had ever been admitted to ICU in the GW group spent an extra
12 407 US dollars per average inpatient day. Each patient in the HW group saved 545 US dollars
13 per inpatient day than those who had received CPR treatment in the GW group. Previous
14 studies have reported that medical expenditures increase more rapidly as death approaches,
15 and that hospice care could save more on medical expenditures than general care (7, 14). In
16 this study, we found that the largest savings of average daily medical expenditures between
17 general care and hospice care appeared in subjects who died within 3 days after admission.
18 The saved medical expenditure in each inpatient day was 301 US dollars (Table 2). In
19 agreement with previous studies, our results demonstrate that the average daily medical

1 expenditures increased while death was approaching (Table 2). In the GW group, patients
2 who died within 3 days after admission (< 3 days) spent 112 US dollars more per day than
3 those who died over 28 days after admission (≥ 28 days). However, patients in the HW group
4 who died within 3 days after admission (< 3 days) had the least average daily medical
5 expenditures. One possible reason for this difference may be that in contrast to the GW group,
6 obvious dying signs in the HW patients precluded aggressive treatments to sustain life (such
7 as CPR etc.). Rather, medical faculty focused more aggressively on increasing quality of life
8 and dignity of death for patients and families during this period. Because family satisfaction
9 was higher in the HW and mixed group than GW group, it is reasonable to propose that
10 hospice palliative care is a more appropriate care model than usual care during this period.

11 Previous studies have shown that hospice care provided high levels of family satisfaction
12 (19-21). For example, Miceli and colleagues reported higher family satisfaction under
13 hospice care than under the care of a personal physician (8). In agreement with Miceli's study,
14 we also found that patients who had ever received hospice care (either mixed or HW group)
15 had higher family satisfaction than patients who received general care. In the HW model in
16 Taiwan and in most other countries, care is provided by a well-trained team which includes
17 hospice palliative specialists, nurses, social workers, chaplains, volunteers, and other workers.
18 Most of terminal cancer patients were transferred to a hospice ward from original oncologists
19 or anti-cancer physicians whose primary responsibility was to cure cancer. Our results

1 demonstrate that continuity of care from the original anti-cancer team is not the major factor
2 influencing good family satisfaction. Moreover, the well-trained hospice team was a key
3 point of satisfaction for both family and patients.

4 That family satisfaction did not differ between the mixed and HW groups, yet still was
5 greater than the GW group, could suggest that either full or partial reliance on hospice
6 palliative care may be beneficial compared to general ward care. Hospice palliative care is
7 likely not the only factor explaining the differences in family satisfaction between the mixed
8 and HW groups, however. For example, the goal of aggressiveness of care may differ
9 between groups, especially if a do-not-resuscitate order exists. The understood goals of
10 medical therapy are to prolong life, increase quality of life, and respect dignity of patients.
11 For the treatment of terminal cancer patients, the goals lean more toward the latter two in
12 hospice palliative care than usual care, but are targeted no less aggressively. The potential
13 effects of these and other confounding variables may explain some of the differences between
14 the three groups studied, and merit further work in this area.

15 There are some limitations to this study. First, the response rate in family satisfaction
16 questionnaire was low, and may reduce the applicability of the findings. One possible
17 explanation for this lack of response might be the inherently difficult timing of the
18 questionnaire for the family (at time of death and during the grieving process). Second, the
19 admission period of this study only focused on the last admission before death, not medical

1 expenditures for the entire terminal stage. Within the duration of last admission, however,
2 average daily medical expenditure was lowest in the HW group, regardless of length of stay.
3 Third, the family satisfaction questionnaire was only assessed for content validity (not
4 predictive, concurrent, construct, or incremental validity) before being used in the study.
5 However, a previous study demonstrated that content validity was a reliable way to design a
6 questionnaire for use in clinical studies (16). Until further validation is completed on this
7 questionnaire, we rely solely on the opinion of our expert panel to determine the ability of
8 this questionnaire to reflect the thinking of these terminal patients' families. Finally, although
9 the recall bias associated with questionnaire-based research cannot be ruled out in this study,
10 the timing of questionnaire administration was not different between groups and thus would
11 not be expected to affect the study outcomes.

12 In summary, we demonstrated that hospice care not only saved medical expenditures but
13 was associated with higher family satisfaction than general care. The enrollment of hospice
14 care for terminal cancer patients should be encouraged in order to increase family satisfaction
15 and reduce medical expenditure in Taiwan and in other countries.

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18

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

| | General group (N=1511) | Mixed group (N=139) | Hospice group (N=292) | <i>p</i> value |
|---|---------------------------|------------------------|--------------------------|-------------------|
| Gender | | | | |
| Male (N,%) | 991 (65.6%) | 80 (57.6%) | 173 (59.2%) | 0.030 |
| Age (years) | 61.0±16.3 | 60.5±14.9 | 61.6±14.8 | 0.757 |
| Length of stay (days) | 17.4±14.8 | 25.2±15.6 | 10.1±10.2 | <0.001 |
| Average expenditure per person/ average expenditure per day | | | | |
| 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 | 923±608 | 336±383 | <0.001 |
| | /63±51 | /36±12 | /29±6 | / <0.001 |
| Others | 557±1261 | 256±558 | 27±87 | <0.001 |
| | /40±137 | /9±17 | /3±9 | / <0.001 |
| Grand Total | 4602±5997 | 3496±2819 | 1092±1401 | <0.001 |
| | /284±465 | /135±55 | /102±122 | / <0.001 |

- 1 *: ANOVA test was used for comparing mean values of continuous variables between groups;
- 2 Medical expenditure unit: presented in US dollars.

1 **Table 2.** The average daily medical expenditure among groups based on length of stay

| Length of stay (days) | General group (N=1511) | Mixed group (N=139) | Hospice group (N=292) | <i>p</i> value* | <i>p</i> value [§] | <i>p</i> value [#] | <i>p</i> value [≠] |
|-----------------------|---------------------------|------------------------|--------------------------|-----------------|-----------------------------|-----------------------------|-----------------------------|
| <3 days | 376±995 (N=225) | 0 (N=0) | 75±29 (N=83) | 0.006 | -. | <0.001 | -. |
| ≥3 days | 268±281 (N=1286) | 135±55 (N=139) | 113±141 (N=209) | <0.001 | 0.435 | <0.001 | <0.001 |
| <7 days | 333±772 (N=484) | 118±31 (N=8) | 98±168 (N=146) | 0.001 | 0.936 | <0.001 | 0.373 |
| ≥7 days | 260±189 (N=1027) | 136±56 (N=131) | 106±37 (N=146) | <0.001 | 0.143 | <0.001 | <0.001 |
| <14 days | 304±613 (N=802) | 118±40 (N=34) | 100±139 (N=219) | <0.001 | 0.856 | <0.001 | 0.049 |
| ≥14 days | 260±185 (N=709) | 140±58 (N=105) | 108±41 (N=73) | <0.001 | 0.204 | <0.001 | <0.001 |
| <28 days | 288±507 | 134±57 | 101±126 | <0.001 | 0.544 | <0.001 | 0.002 |

| | | | | | | | |
|----------------|---------------|--------------|--------------|--------|-------|--------|--------|
| | (N=1220) | (N=91) | (N=271) | | | | |
| ≥ 28 days | 264 \pm 206 | 136 \pm 51 | 113 \pm 53 | <0.001 | 0.638 | <0.001 | <0.001 |
| | (N=291) | (N=48) | (N=21) | | | | |

1 *: ANOVA test was used for comparing mean values of continuous variables between groups;

2 §: Post Hoc comparison between hospice group and mixed group using LSD test

3 #: Post Hoc comparison between hospice group and general group using LSD test

4 ≠: Post Hoc comparison between mixed group and general group using LSD test

5

1 **Table 3.** The average daily medical expenditure among groups based on different cancer types

| Cancer type | General group (n=1511) | Mixed group (n=139) | Hospice group (n=292) | <i>p</i> value* | <i>p</i> value [§] | <i>p</i> value [#] | <i>p</i> value [‡] |
|---|---------------------------|------------------------|--------------------------|--------------------|--------------------------------|--------------------------------|--------------------------------|
| Oral/pharyngeal 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 |
| Colon/rectal/ 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 |

1 ※: ANOVA test was used for comparing mean values of continuous variables between groups;

2 §: Post Hoc comparison between hospice group and mixed group using LSD test

3 #: Post Hoc comparison between hospice group and general group using LSD test

4 ≠: Post Hoc comparison between mixed group and general group using LSD test

5

1 **Table 4.** Analysis of family satisfaction according to different domains

| Groups (N) and response rate (%) | General group (N=219; 14.5%) | Mixed group (N=31; 22.3%) | Hospice group (N=82; 28.1%) | <i>p</i> value* | <i>p</i> value [§] | <i>p</i> value [#] | <i>p</i> value [≠] |
|---------------------------------------|---------------------------------|------------------------------|--------------------------------|-------------------|-----------------------------|-----------------------------|-----------------------------|
| 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 | 62.9 %/ | 89.1 %/ | 90.7 %/ | <0.001/ | 0.447/ | <0.001/ | <0.001/ |
| (30 items) | 3.57±0.20 | 4.25±0.15 | 4.31±0.10 | <0.001 | 0.114 | <0.001 | <0.001 |

- 1 * : Present with percentage: the percentage for families who answered “satisfied” and “strongly
2 satisfied” (scale \geq 4; a 5-point scale ranging from 1: strongly dissatisfied to 5: strongly
3 satisfied).
- 4 †: Present with mean \pm SD (a 5-point scale ranging from 1: strongly dissatisfied to 5: strongly
5 satisfied).
- 6 ※: Chi-square test for categorical data; ANOVA test was used for comparing mean values of
7 continuous variables between groups;
- 8 §: Chi-square test and Post Hoc comparison between hospice group and mixed group using
9 LSD test
- 10 #: Chi-square test and Post Hoc comparison between hospice group and general group using
11 LSD test
- 12 ‡: Chi-square test and Post Hoc comparison between mixed group and general group using
13 LSD test