ABSTRACT

Objective  Hospice care could improve the quality of life among advanced HIV patients during end-of-life (EOL) treatment. However, providing hospice care services for people living with HIV (PLWH) is challenging due to HIV-related stigma. This nationwide cohort study aims to determine the utilisation of hospice care services among PLWH and HIV-negative individuals during EOL treatment.

Design  A retrospective cohort study.

Setting  From 2000 to 2018, we identified adult PLWH from the Taiwan centres for disease control HIV Surveillance System. Individuals who had positive HIV-1 western blots were regarded as HIV-infected. Age-matched and sex-matched controls without HIV infection were selected from the Taiwan National Health Insurance Research Database for comparison. All PLWH and controls were followed until death or 31 December 2018.

Participants  32,647 PLWH and 326,470 HIV-negative controls were analysed.

Primary outcome measures  Utilisation of hospice care services during the last year of life among PLWH and HIV-negative individuals.

Results  A total of 20,413 subjects died during the 3,434,699 person-years of follow-up. Of the deceased patients, 2,139 (10.5%) utilised hospice care services during their last year of life, including 328 (5.76%) PLWH and 1,811 (12.30%) controls. Adjusting for demographics and comorbidities, PLWH were less likely to receive hospice care services during the last year of life, compared with HIV-negative individuals (adjusted OR: 0.66; 95% CI: 0.57 to 0.75).

Conclusions  PLWH had significantly lower utilisation of hospice care services during the last year of life. Our results suggest that future hospice care programmes should particularly target PLWH to increase the optimal utilisation of hospice care services during EOL treatment.

INTRODUCTION

Hospice care has been recommended for patients with life-limiting diseases. Previous studies showed that hospice care was associated with good quality of end-of-life (EOL) treatment among patients with life-limiting diseases. The WHO estimated that 40 million patients with life-limiting diseases need palliative care. However, over 85% of these patients do not receive this care during their EOL treatment.

The advent of highly active antiretroviral therapy (HAART) has significantly improved the survival among people living with HIV (PLWH). However, many PLWH in the HAART era still progress to advanced AIDS. Hospice care among advanced HIV patients could relieve pain and improve their quality of life during EOL treatment. However, providing hospice care services for PLWH is challenging due to HIV-related stigma. A previous survey about attitudes towards hospice care among PLWH reported that hospice services were perceived to provide essential relief from pain and symptoms during the EOL treatment. However, fear of stigma and concerns regarding the disclosure of their AIDS diagnosis were major barriers for PLWH when participating in hospice care.
Hospice care is associated with improving PLWH’s well-being during their EOL treatment and has been recommended for PLWH with a limited life expectancy. However, studies determining the utilisation of hospice care services among PLWH are limited. A retrospective cohort study involving 367 HIV patients hospitalised in a large urban hospital in the USA found that 28% of PLWH died during that hospitalisation, but only 6% received a palliative care consultation, and 6% were enrolled in hospice. Another retrospective study using the US Medicare database showed that 24.6% of terminal patients with HIV received hospice care during EOL treatment.

Understanding the utilisation of hospice care services in PLWH during EOL treatment could guide the comprehensive HIV care programme. Therefore, this nationwide population-based cohort study aims to determine the utilisation of hospice care services among PLWH and HIV-negative individuals during their EOL treatment from 2000 to 2018.

METHODS

Data source and study patients

This population-based cohort study identified adult PLWH from the Taiwan Centres for Disease Control (CDC) HIV Surveillance System between 2000 and 2018. In Taiwan, hospital institutes are required to report all new HIV cases to the Taiwan CDC within 24 hours of diagnosis. Individuals who had positive HIV-1 western blots or PCR analysis results were regarded as HIV-infected. In Taiwan, HAART has been offered free-of-charge to all HIV-infected individuals since 1997.

This cohort study linked the Taiwan National Health Insurance Research Database to the Taiwan CDC HIV Surveillance Database. The control group was selected from the Taiwan National Health Insurance Research Database and included those who had never been reported to the Taiwan CDC as HIV-infected cases. The control group was matched for age, sex and date of enrolment (±7 days). Ten controls were randomly selected for each HIV patient. All HIV patients and controls were followed until death or up to 31 December 2018. The death events among HIV patients and controls were verified using the death certificate database of Taiwan. To compare the utilisation of hospice care services between patients who were HIV-infected and HIV-negative during their last year of life, this study only included deceased PLWH and controls in the analysis.

This study was approved by the Institutional Review Board of Taipei City Hospital (no. TCHIRB-10709107-W). All methods in this study were performed in accordance with relevant guidelines and regulations, and the informed consents for study patients were waived in this report.

Outcome variable

The outcome was the utilisation of hospice care services during the last year of life among PLWH and the control group. This study used the Taiwan National Health Insurance Research Database to determine the utilisation of hospice care services during the last year of life between the two groups. Hospice care services consisted of hospice inpatient care, hospice home care and hospice-shared care.

Main explanatory variable

The main explanatory variable was HIV infection. HIV-infected individuals were defined as those with positive HIV-1 western blot or PCR analysis results.

Control variables

The control variables included sociodemographic characteristics and comorbidities. Sociodemographic factors included age, sex, income level and urbanisation. The income level in study patients was calculated from their average monthly income and grouped into three levels: (1) low-income level, defined as an amount lower than the US$640 per month (New Taiwan Dollars (NTD) $19 200); (2) moderate-income level, defined as an amount between the US$1332 and 640 per month (<40 000 NTD to 19 201) and (3) high-income level, defined as an amount more than the US$1333 per month (40 000 NTD). Urbanisation was classified as urban, suburban or rural areas. The comorbidities were defined as the presence of an appropriate International Classification of Diseases, Ninth and Tenth Revision, Clinical Modification (ICD-9-CM and ICD-10-CM) code, including cancer, diabetes, chronic kidney disease, congestive heart failure, coronary heart disease, liver cirrhosis, chronic obstructive pulmonary disease, dementia and cerebrovascular disease (online supplemental table 1). The comorbidities in study patients were defined as the condition occurred in an inpatient setting or in three or more outpatient visits.

Patient and public involvement

No patient involved in the development of the research question, study design, outcome measures and conduct of the study.

Statistical analysis

Continuous data in study patients were presented as the mean (SD), and a two-sample t-test was used to compare groups. We then analysed categorical data using the Pearson χ² test wherever appropriate.

The crude associations of HIV infection and other covariates with the outcome (utilisation of hospice care services during the last year of life) were estimated by computing the ORs and corresponding 95% CIs. We then performed a multivariate logistic regression to assess the association between HIV infection and the utilisation of hospice care services, after adjusting for the sociodemographic factors and comorbidities. Thus, we defined a variable with p<0.05 as a significant factor affecting this association. Adjusted ORs (AOR) with 95% CI indicated the strength and direction of these associations.
We conducted subgroup and sensitivity analyses to examine the robustness of the main findings after stratifying patients by age and sex. We performed all data management and analyses using the SAS V.9.4 statistical software package (SAS Institute, Cary, NC, USA).

RESULTS

Patient selection

A total of 32,647 adult HIV-infected individuals were reported to the Taiwan CDC from 2000 to 2018. Another 32,670 age-matched and sex-matched patients without HIV infection were randomly selected for the control group (table 1). During the 34,346,999 person-years of follow-up, 20,413 patients died, including 5,691 (17.43%) of the PLWH and 14,722 (4.51%) of the control group.

Characteristics of deceased patients by HIV status

Table 2 shows the characteristics of deceased patients with and without HIV infection. In comparison to HIV-negative individuals, PLWH were more likely to be younger (39.5 vs 44.7 years) and female. Moreover, PLWH had lower proportion of comorbidities than control group. During the study follow-up period, 2,139 patients utilised hospice care services during their last year of life, including 328 (5.76%) PLWH and 1,811 (12.30%) HIV-negative individuals.

Factors associated with utilisation of hospice care services during the end-of-life treatment in deceased patients

Table 3 shows the univariate and multivariate analyses of factors associated with the utilisation of hospice care services during the last year of life (AOR: 0.66; 95% CI: 0.57 to 0.75; table 2). Moreover, age ≥65 years and men were associated with a lower utilisation of hospice care service during the last year of life. Factors associated with higher utilisation of hospice care services included intermediate and high-income levels and the comorbidities of cancer and COPD.

Subgroup analysis for the association between HIV infection and utilisation of hospice care services

Table 4 shows the results of subgroup analysis for the association between HIV infection and utilisation of hospice care services after stratifying study patients by age and sex. HIV infection was associated with a lower utilisation of hospice care services during the last year of life among male patients and those aged 15–64.

DISCUSSION

The present study is the largest cohort study on the utilisation of hospice care services among PLWH and HIV-negative individuals during their EOL treatment. The results indicate that PLWH had a significantly lower utilisation of hospice care services during EOL treatment compared with age-matched and sex-matched HIV-negative individuals.

Our study showed robust associations between HIV infection and utilisation of hospice care services after stratifying patients by age and sex. HIV infection is associated with a lower likelihood of receiving hospice care services among male patients and those aged 15–64 years. Hospice care could improve PLWH’s quality of life during their EOL treatment. However, there are limited studies evaluating the utilisation of hospice care services among PLWH. A retrospective cohort study including 367 HIV patients hospitalised in a large urban safety-net
hospital showed that 28% of the patients died during such hospitalisation. However, only 6% of the patients were enrolled in hospice. Another retrospective study involving 1375 HIV patients in the US found that 24.6% of terminal Medicare patients with HIV received hospice care during EOL treatment. Our study followed up 32,647 HIV patients and found that 5.76% of PLWH received hospice care services during their EOL treatment. While comparing with HIV-negative individuals, PLWH had a significantly lower utilisation of hospice care services during the last year of life. The findings of our study suggest that hospice care is underutilised among PLWH and it is imperative to increase optimal hospice care services among PLWH during EOL treatment.

This study showed that PLWH had a 34% lower likelihood of receiving hospice care services during EOL treatment as compared with HIV-negative individuals. HIV-related stigma and professionals’ lack of experience in treating advanced HIV may explain for the lower utilisation of hospice care services in PLWH towards the EOL. HIV-related stigma remains prevalent in society, which would cause the PLWH’s unwillingness to disclose their HIV status. Since the process of participating in hospice care services involves a discussion regarding EOL treatment’s preferences among PLWH, patients’ family and healthcare providers, HIV-related stigma and PLWH’s disclosure concern of their HIV status would lead to the lower likelihood of them agreeing with having an EOL discussion with physicians. A qualitative study in Uganda showed that HIV patients’ fear of such a stigma and their concern regarding the disclosure of their AIDS diagnosis were the major hurdles when participating in hospice care. Since hospice care is associated with the relief of pain and good quality of care among patients nearing death, it is imperative to provide hospice care services for PLWH during EOL treatment.

Table 2  Characteristics of deceased patients by HIV status

| Characteristics                        | No. (%) of subjects* | P value |
|----------------------------------------|----------------------|---------|
| **Deceased patients with HIV, n=5691** |                      |         |
| Demographics                           |                      |         |
| Age, years                             | 39.27±12.74          | 44.73±15.30 | <0.001 |
| 18–64                                  | 5410 (95.06)         | 12765 (86.71) | <0.001 |
| ≥65                                    | 281 (4.94)           | 1957 (13.29) |         |
| Sex                                    |                      | <0.001  |
| Female                                 | 433 (7.61)           | 633 (4.30)  |         |
| Male                                   | 5258 (92.39)         | 14089 (95.70) |         |
| Income level                           |                      | <0.001  |
| Low                                    | 2112 (37.11)         | 4540 (30.84) |         |
| Intermediate                           | 2619 (46.02)         | 6740 (45.78) |         |
| High                                   | 960 (16.87)          | 3442 (23.38) |         |
| Urbanisation                           | <0.001               |         |
| Rural                                  | 491 (8.63)           | 1601 (10.87) |         |
| Suburban                               | 3228 (56.72)         | 9289 (63.10) |         |
| Urban                                  | 1972 (34.65)         | 3832 (26.03) |         |
| Comorbidity                            |                      |         |
| Cancer                                 | 1149 (20.19)         | 5076 (34.48) | <0.001 |
| Diabetes                               | 881 (15.48)          | 3857 (26.20) | <0.001 |
| Chronic kidney disease                 | 754 (13.25)          | 2814 (19.11) | <0.001 |
| Congestive heart failure               | 381 (6.69)           | 1822 (12.38) | <0.001 |
| Coronary heart disease                 | 691 (12.14)          | 3132 (21.27) | <0.001 |
| Liver cirrhosis                        | 751 (13.20)          | 2652 (18.01) | <0.001 |
| COPD                                   | 1212 (21.30)         | 3546 (24.09) | <0.001 |
| Dementia                               | 65 (1.14)            | 546 (3.71)  | <0.001  |
| Cerebrovascular disease                | 678 (11.91)          | 3114 (21.15) | <0.001  |
| Utilisation of hospice care services   |                      |         |
| during the last year of life           | 328 (5.76)           | 1811 (12.30) | <0.001  |

*Unless stated otherwise.
COPD, chronic obstructive pulmonary disease.
Professionals’ lack of experience in treating advanced HIV patients needing palliative care may also explain for the lower utilisation of hospice care services among PLWH towards the EOL. The provision of hospice care services among PLWH is complex, which looks into whether the patients should continue treatment with antiretroviral drugs and whether the patients should request the concealment of their HIV status from their families. Although there are no guidelines in informing clinicians on when to stop HAART among advanced HIV patients enrolling in hospice care, the side effects and pill burden of antiretroviral drugs may decrease the PLWH’s quality of life during EOL treatment. The decision to discontinue antiretroviral therapy for advanced HIV patients receiving hospice care should be considered through a comprehensive discussion with patients and their families.

### Table 3  Univariate and multivariate analysis of factors associated with utilisation of hospice care services during the last year of life among deceased patients

| Variables                        | Number of patients (N) | Utilisation of hospice care services† N (%) | Univariate OR (95% CI) | Multivariate analysis AOR (95% CI) |
|----------------------------------|------------------------|---------------------------------------------|------------------------|-----------------------------------|
| HIV infection                    |                        |                                             |                        |                                   |
| No                               | 14722                  | 1811 (12.30)                                | 1                      | 0.44 (0.39 to 0.49)*** 0.66 (0.57 to 0.75)*** |
| Yes                              | 5691                   | 328 (5.76)                                  | 0.70 (0.59 to 0.84)*** | 0.66 (0.54 to 0.81)***         |
| Demographics                     |                        |                                             |                        |                                   |
| Age, years                       |                        |                                             |                        |                                   |
| 18–64                            | 18175                  | 1921 (10.57)                                | 1                      | 0.91 (0.79 to 1.06) 0.59 (0.49 to 0.70)*** |
| ≥65                              | 2238                   | 218 (9.74)                                  |                         |                                   |
| Sex                              |                        |                                             |                        |                                   |
| Female                           | 1066                   | 150 (14.07)                                 | 1                      | 1.00 (0.88 to 1.13)            |
| Male                             | 19347                  | 1989 (10.28)                                | 0.70 (0.59 to 0.84)*** | 0.66 (0.54 to 0.81)***         |
| Income level                     |                        |                                             |                        |                                   |
| Low                              | 6652                   | 359 (5.40)                                  | 1                      | 1.00 (0.88 to 1.13)            |
| Intermediate                     | 9359                   | 1086 (11.60)                                | 2.30 (2.03 to 2.60)*** | 1.96 (1.72 to 2.25)***         |
| High                             | 4402                   | 694 (15.77)                                 | 3.28 (2.87 to 3.75)*** | 2.21 (1.90 to 2.57)***         |
| Urbanisation                     |                        |                                             |                        |                                   |
| Rural                            | 2092                   | 209 (9.99)                                  | 1                      | 1.00 (0.88 to 1.13)            |
| Suburban                         | 12317                  | 1305 (10.43)                                | 1.05 (0.90 to 1.22)    | 0.97 (0.82 to 1.16)            |
| Urban                            | 5804                   | 625 (10.77)                                 | 1.09 (0.92 to 1.28)    | 0.95 (0.79 to 1.15)            |
| Comorbidity                      |                        |                                             |                        |                                   |
| Cancer                           | 6225                   | 1905 (30.60)                                | 26.30 (22.86 to 30.25)*** | 24.48 (21.23 to 28.24)***     |
| Diabetes                         | 4738                   | 551 (11.63)                                 | 1.17 (1.05 to 1.29)**  | 1.05 (0.93 to 1.19)            |
| Chronic kidney disease           | 3568                   | 401 (11.24)                                 | 1.10 (0.98 to 1.24)    | 0.97 (0.84 to 1.11)            |
| Congestive heart failure         | 2203                   | 192 (8.72)                                  | 0.80 (0.68 to 0.93)**  | 0.99 (0.81 to 1.20)            |
| Coronary heart disease           | 3823                   | 438 (11.46)                                 | 1.13 (1.01 to 1.27)*   | 1.02 (0.89 to 1.18)            |
| Liver cirrhosis                  | 3403                   | 491 (14.43)                                 | 1.57 (1.41 to 1.75)*** | 0.97 (0.86 to 1.10)            |
| COPD                             | 4758                   | 606 (12.74)                                 | 1.35 (1.22 to 1.49)*** | 1.15 (1.02 to 1.29)*           |
| Dementia                         | 611                    | 49 (8.02)                                   | 0.74 (0.55 to 0.99)*   | 0.92 (0.65 to 1.30)            |
| Cerebrovascular disease          | 3792                   | 329 (8.68)                                  | 0.78 (0.69 to 0.88)*** | 0.87 (0.75 to 1.00)            |

*P<0.05; **p<0.01; ***p<0.001.
†During the last year of life.
AOR, adjusted OR; COPD, chronic obstructive pulmonary disease.

### Table 4  Sensitivity analysis for the associations between HIV infection and utilisation of hospice care services after adjusting for patient characteristics

| Study subgroups          | Utilisation of hospice care services AOR (95% CI)* | P value |
|--------------------------|---------------------------------------------------|---------|
| All patients (n=20413)   | 0.66 (0.57 to 0.75)                               | <0.001  |
| Aged 15–64 (n=18175)    | 0.66 (0.57 to 0.76)                               | <0.001  |
| Aged≥65 (n=2238)        | 0.74 (0.43 to 1.26)                               | 0.271   |
| Male patients (n=19347)  | 0.66 (0.57 to 0.76)                               | <0.001  |
| Female patients (n=1066) | 0.80 (0.48 to 1.31)                               | 0.372   |

*During the last year of life.
AOR, adjusted OR.
their families. Healthcare providers may not be familiar with these issues regarding the timing to discontinue HAART and concealment of HIV infection from their families among PLWH needing hospice care. As such, this would cause the professionals’ lower likelihood of providing hospice care services for advanced HIV patients. A previous nationwide hospital survey in Japan showed that 11.2% of healthcare providers at palliative care units were not willing to provide EOL care for PLWH due to lack of knowledge and experience in treating advanced HIV patients nearing death. Since hospice and palliative care services are associated with improvements in quality of life among patients towards the EOL, it is important to provide hospice care service for PLWH during EOL treatment.

This nationwide cohort study has several strengths. First, this study is the largest cohort study to compare the utilisation of hospice care services in PLWH and HIV-negative individuals during EOL care. Our research design included strict HIV diagnostic criteria, which improves the validity of the main findings. Moreover, this nationwide cohort study followed up all PLWH and controls with referral bias being minimised because all medical care is covered by the Taiwan National Health Insurance. Furthermore, the study’s large sample size was sufficiently powered to detect the real, even subtle, difference between PLWH and controls.

The study nevertheless has two limitations. First, individuals’ religion that may be associated with their decision on receiving hospice care services was not collected in the National Health Insurance Research Database. Second, since almost all our patients were Taiwanese, the external validity of our findings may be a concern. Therefore, future studies are needed to verify our results in other non-Asian ethnic groups.

CONCLUSION
This population-based cohort study showed that only 5.76% of PLWH received hospice care services during EOL treatment. Compared with HIV-negative individuals, PLWH had a significantly lower utilisation of hospice care services during EOL treatment. As hospice care service could relieve pain and improve patients’ spiritual well-being during EOL care, future hospice care programmes should particularly target PLWH to increase the optimal utilisation of hospice care services during EOL treatment.

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