

Healthcare inequalities in emergency visits and hospitalisation at the end of life: a study of 395 019 public hospital records

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ABSTRACT

Objectives To investigate whether there were any socioeconomic disparities in utilisation of hospital care services during end of life in Hong Kong.

Methods Secondary data analyses were conducted using frequency of the accident and emergency (A&E) department visits and hospital admissions during the last year of life in all public hospitals from 2004 to 2014 in Hong Kong. A total of 1 237 044 A&E records from 357 853 patients, and 1 878 982 admission records from 375 506 patients were identified for analyses. In total, 395 019 unique deceased patients were identified from both datasets.

Results Regression analyses showed that comprehensive social security assistance (CSSA) recipients used A&E services 1.29 times more than the non-recipients. Being either a CSSA recipient or an elderly home resident was more likely to be admitted to hospitals and stayed longer. Elderly home residents tended to stay longer than those from the community in the earlier months during the last year of life regardless of CSSA status; however, non-elderly home residents surpassed the residents in the duration of stay at hospitals towards the later months of the last year of life. There were also significant differences in hospital utilisation across various districts of residence.

Conclusions People of lower socioeconomic position tend to have higher emergency visits and hospitalisation during their last year of life in Hong Kong, implying the presence of health inequality during end of life. However, due to Hong Kong's largely pro-rich primary care system, the predominantly public A&E and inpatient services may inadvertently act as a mitigator of such health inequalities.

Key messages

What was already known?

- ▶ Previous research found health disparities in health care among end-of-life patients.
- ▶ These studies were from the West.

What are the new findings?

- ▶ People of lower socioeconomic position tend to have higher emergency visits and hospitalisation during last year of life.
- ▶ Inequalities in provision of hospital EOL care may exist geographically.

What is their significance?

- ▶ a. Clinical: N/A
- ▶ b. Research: Health inequality exists during end of life despite presence of a public healthcare sector.

INTRODUCTION

Access to and utilisation of healthcare are measures of health inequalities in many societies. In Hong Kong, where primary care is predominantly provided by the private sector,¹ lower socioeconomic position has been observed to be associated with poorer access to and quality of primary care.^{2–5} On the other hand, hospital care in Hong Kong is predominantly provided by the public sector.¹ There are geographical variations in the attendance at accident and emergency (A&E) departments as well as hospital admissions.⁶ However, it is uncertain whether these variations are consequences of differential socioeconomic positions, or mismatching of hospital services between needs and provision among different districts in Hong Kong.^{7,8} Given the rapidly ageing population and medical advancement in Hong Kong, demand for good quality end-of-life (EOL) care is

also increasing, and many gaps and issues in terms of EOL care that should be targeted for further improvements have been identified.^{9,10} However, it is uncertain whether inequalities extend to the use of services at the EOL. Therefore, it is pertinent to determine whether health inequalities as a result of socioeconomic position exist for EOL care, with a view to possible mitigation of any social gradients through policy formulations.

One common indicator of quality EOL care is the frequency of hospital admissions and emergency visits of EOL patients during their last year of life.^{11,12} Previous research have looked into health disparities in hospital admission,¹³ emergency visits^{14–16} and hospital deaths^{17–24} among EOL patients; nevertheless, many of these studies were from the West and little is known about health disparities of patients in the context of Asian countries. To our knowledge, only a few studies in Asia^{25,26} have looked into hospital admissions and emergency visits of EOL patients, and none has examined the socioeconomic disparity of EOL care.

Currently, over 90% of deaths occurred in hospitals, especially public hospitals, in Hong Kong, as supposed to 48.5% in the UK.^{27–29} This is partly a result of a wide array of issues²⁹ including sociocultural factors, lack of institutional support, policy and legal gaps, as well as the absence of structured medico-social support for dying at home in spite of the preference by a large proportion of the population³⁰ and pilot projects promoting community palliative care for those living at home or in long-term residential care homes.³¹ Thus, EOL care services are essentially provided by the Hospital Authority, the statutory body that manages all public hospitals in Hong Kong. It has been found in Hong Kong that use of hospital services increases in the last years of life irrespective of age, and it is a function of proximity to death.⁶ Therefore, given that the majority of EOL care and deaths occurs in hospitals, we aimed to investigate whether there were any socioeconomic disparities in utilisation of hospital care services during EOL in Hong Kong.

METHODS

Study design

To examine whether there were any socioeconomic disparities in terms of utilisation of hospital care during EOL in Hong Kong, we conducted secondary data analyses using frequency of the A&E department attendance and the hospital admissions records during the last year of life in all public hospitals from 2004 to 2014.

Data collection

Data request was made to the Hospital Authority, the statutory body that manages all public hospitals in Hong Kong, to obtain the records of A&E visits and hospital admissions from 2004 to 2014 for patients who were Hong Kong residents and were aged 45 or above at the time of consultation.

In total, there were 10 990 081 records of 2 338 555 patients in the A&E dataset, and 10 014 999 records of 1 754 647 patients in the hospital admission dataset, since some patients have multiple A&E visits and admissions. In order to extract the records for patients during their last year of life, the discharge status variable was used to identify patients who had a death record (ie, 'death' being indicated as the discharge status) in both datasets. As a result, 44 082 and 352 193 deceased patients were identified from the A&E and hospital admission data, respectively. However, a closer examination of the data revealed that there were duplicated death records in both datasets (ie, the same patient had 'death' in the discharge status of both the hospital admission and A&E datasets), when the same patient could only be discharged as a 'death' case in either the A&E or the hospital wards. After removing the erroneous records, 43 628 and 351 391 deceased patients remained, giving a total of 2 678 645 and 3 951 800 in the two datasets, respectively. In total, there were 395 019 unique deceased patients identified from both datasets. Nevertheless, these 395 019 patients could have had A&E visits, hospital admission or both during their last year of life. So finally, using their records during their last year of life, a total of 1 237 044 A&E records from 357 853 patients, and 1 878 982 hospital admission records from 375 506 patients, were identified for analyses.

Measurements

Both datasets for A&E visits and hospital admissions and contain the age at the time of consultation (with three decimal places), sex, indicator for receiving comprehensive social security assistance (CSSA), and discharge status of the patients. In addition, the hospital admission dataset contains the district of residence (18 districts as classified by the District Council), indicator for being elderly home resident and length of stay (in days).

The CSSA scheme was used as a proxy indicator of socioeconomic position in this study. In Hong Kong, CSSA provides a safety net for those who are unable to support themselves financially, and recipients are required to pass both an income and asset test. Rates of financial support are variable depending on the needs of the applicants. In addition to the means-test, eligible applicants must be Hong Kong residents for no less than 1 year. The number (and proportion) of CSSA recipients in the population has steadily declined from 542 017 (8.0%) in 2004 to 381 307 (5.3%) in 2014.^{32,33} This is the sole indicator available from the Hospital Authority records that can be used to directly proxy socioeconomic position of the patients.

Data analysis

For both hospital admissions and A&E visits, the total number of records by CSSA status was plotted against the time until death for each of the socioeconomic

categories to examine the differential patterns in terms of hospital utilisation. In addition, generalised linear models were used to investigate the associations of sociodemographic covariables with the total number of records and total length of stay for the hospital admissions, as well as with the total number of records for the A&E visits. In both hospital admissions and A&E visits, negative binomial regression with log-link was employed to model the count data with overdispersion.

All data processing and analyses were performed in R, using a computer located within the academic institution vicinity which, for the purpose of ensuring data security, was disconnected from any network and had a disabled Universal Serial Bus (USB) port.

RESULTS

Sample characteristics

Tables 1a and 1b respectively, present the sociodemographic characteristics of the A&E and hospital admission data. For the variables that were present in both datasets, their corresponding percentage distributions were highly comparable. 55.2% (n=197 569), 33.4% (n=119 695) and 51.7% (n=185 003) were men, CSSA recipients, and over 80 years old when they died in the A&E dataset, while 55.1% (n=206 914), 34.4% (n=129 314) and 51.1% (n=192 031) of the deceased patients were men, CSSA recipients and over 80 years old when they died in the hospital admission dataset. With regards to the variables that were only present in the hospital admission dataset, 28.3% (n=106 218) of the deceased patients were elderly home residents, and the distribution of the district of residence was similar to that of the entire Hong Kong population. In terms of CSSA status, CSSA recipients were also more likely to be 80 years old or above and women in the A&E dataset. Likewise, CSSA recipients were more likely to be 80 years old or above, women, and elderly home residents than their non-recipient counterparts in the hospital admission dataset.

Accident and emergency visits

Figure 1 shows that among the A&E visitors, CSSA recipients consistently had more visits throughout the last year of life. However, the shapes of the trajectories for both CSSA recipients and non-recipients were almost identical, showing that the utilisation patterns of A&E services were similar across the two groups despite differential utilisation level.

Table 2 summarises the results of the regression analysis on the total number of A&E visits. After controlling for other covariables, the analysis showed that among these A&E visitors, CSSA recipients were 1.29 times more likely to have visits throughout the last year of life than non-recipients.

Hospital admissions

Figure 2 illustrates the patterns of hospital admissions throughout the last year of life by CSSA status

and residential status at elderly home. It shows that without being adjusted for other covariables, the number of hospital admissions was the highest among CSSA recipients not from elderly home until the very last 2 months prior to death when it was slightly taken over by the CSSA recipients from elderly home. As in the case of A&E visits, the highly comparable shapes of the various trajectories showed that the utilisation patterns of inpatient services were similar across the groups.

Figure 3 shows the average number of days stayed in hospital during the last year of life by CSSA status and residential status at elderly home. We found that in the earlier months during the last year of life (ie, farther away from the time of death), elderly home residents tended to stay longer than those from the community, regardless of CSSA status; however, towards the later months during the last year of life (ie, closer to the time of death), non-elderly home residents surpassed the residents in terms of duration of stay at hospitals. Again, the patterns of the trajectories were similar across the groups.

Figure 4 shows that the discrepancy in the total number of hospital admissions across different districts was particularly noticeable in the last 3 months of life. Nonetheless, the patterns of hospital admissions were relatively consistent across different districts.

Tables 3 and 4 summarise the results of the regression analyses on the total number and total length of stay of hospital admissions. After controlling for other covariables, the analyses yielded similar results regarding the interaction effect of CSSA and elderly home residential status. For both response variables, the adjusted incidence rate ratios (aIRRs) of the interaction effect were lower than 1, whereas that of the main effects were greater than 1. More specifically, using the patients who were neither CSSA recipients nor elderly home residents as reference, those who were CSSA recipients but not elderly home residents were 1.111 times more likely to be admitted to the hospital and stayed in the hospital for 1.171 more days; those who were elderly home residents but not CSSA recipients were 1.188 times more likely to be admitted to the hospital and stayed in the hospital for 1.228 more days and those who were both CSSA recipients and elderly home residents were $(1.111 \times 1.188 \times 0.927)$ 1.224 times more likely to be admitted to the hospital and stayed in the hospital for $(1.171 \times 1.228 \times 0.806)$ 1.159 more days. In other words, while both of the CSSA status and the elderly home resident status predicted a higher hospital utilisation rate, being both a CSSA recipient and an elderly home resident did not necessarily amount to a greater hospital utilisation than being a CSSA recipient or an elderly home resident alone.

Consistent with figure 4, tables 3 and 4 show that the hospital utilisation in terms of number of admission and length of stay were significantly different across various districts of residence. For instance,

Original research

Table 1a Sample characteristics of the A&E data

Sociodemographic variables	Total (n=357 853), n (%)	CSSA recipients (n=119 695), n (%)	Non-CSSA recipients (n=238 158), n (%)
Age of death, years			
40–49	7957 (2.2)	1548 (1.3)	6409 (2.7)
50–59	29 598 (8.3)	5717 (4.8)	23 881 (10.0)
60–69	43 067 (12.0)	10 244 (8.6)	32 823 (13.8)
70–79	92 228 (25.8)	27 151 (22.7)	65 077 (27.3)
80+	185 003 (51.7)	75 035 (62.7)	109 968 (46.2)
Sex			
Male	197 569 (55.2)	61 640 (51.5)	135 929 (57.1)
Female	160 284 (44.8)	58 055 (48.5)	102 229 (42.9)

A&E, accident & emergency; CSSA, comprehensive social security allowance.

Table 1b Sample characteristics of the hospital admission data

Sociodemographic variables	Total (n=375 506), n (%)	CSSA recipients (n=129 314), n (%)	Non-CSSA recipients (n=246 192), n (%)
Age of death, years			
40–49	8191 (2.2)	1745 (1.3)	6446 (2.6)
50–59	30 681 (8.2)	6222 (4.8)	24 459 (9.9)
60–69	45 942 (12.2)	11 226 (8.7)	34 716 (14.1)
70–79	98 661 (26.3)	29 652 (22.9)	69 009 (28.0)
80+	192 031 (51.1)	80 469 (62.2)	111 562 (45.3)
Sex			
Male	206 914 (55.1)	66 819 (51.7)	140 095 (56.9)
Female	168 592 (44.9)	62 495 (48.3)	106 097 (43.1)
Elderly home resident			
No	269 288 (71.7)	54 184 (41.9)	215 104 (87.4)
Yes	106 218 (28.3)	75 130 (58.1)	31 088 (12.6)
District of residence			
Central and Western	12 507 (3.3)	2951 (2.3)	9556 (3.9)
Eastern	32 518 (8.7)	7763 (6.0)	24 755 (10.1)
Islands	4513 (1.2)	1398 (1.1)	3115 (1.3)
Kowloon City	26 218 (7.0)	9799 (7.6)	16 419 (6.7)
Kwai Tsing	30 437 (8.1)	11 554 (8.9)	18 883 (7.7)
Kwun Tong	36 827 (9.8)	13 327 (10.3)	23 500 (9.5)
North	15 396 (4.1)	6580 (5.1)	8816 (3.6)
Others	1750 (0.5)	301 (0.2)	1449 (0.6)
Sai Kung	13 650 (3.6)	3183 (2.5)	10 467 (4.3)
Sham Shui Po	26 974 (7.2)	11 477 (8.9)	15 497 (6.3)
Sha Tin	25 809 (6.9)	6717 (5.2)	19 092 (7.8)
Southern	16 845 (4.5)	5529 (4.3)	11 316 (4.6)
Tai Po	15 083 (4.0)	6050 (4.7)	9033 (3.7)
Tsuen Wan	16 188 (4.3)	5924 (4.6)	10 264 (4.2)
Tuen Mun	22 085 (5.9)	9019 (7.0)	13 066 (5.3)
Wan Chai	7907 (2.1)	1774 (1.4)	6133 (2.5)
Wong Tai Sin	30 410 (8.1)	9840 (7.6)	20 570 (8.4)
Yau Tsim Mong	16 468 (4.4)	5400 (4.2)	11 068 (4.5)
Yuen Long	23 921 (6.4)	10 728 (8.3)	13 193 (5.4)

CSSA, comprehensive social security allowance.

deceased patients from the Southern district were admitted to the hospital most frequently and stayed in the hospital for the longest period during the last year

of life, whereas those from the Tsuen Wan and Yuen Long districts had the lowest admission and length of stay.

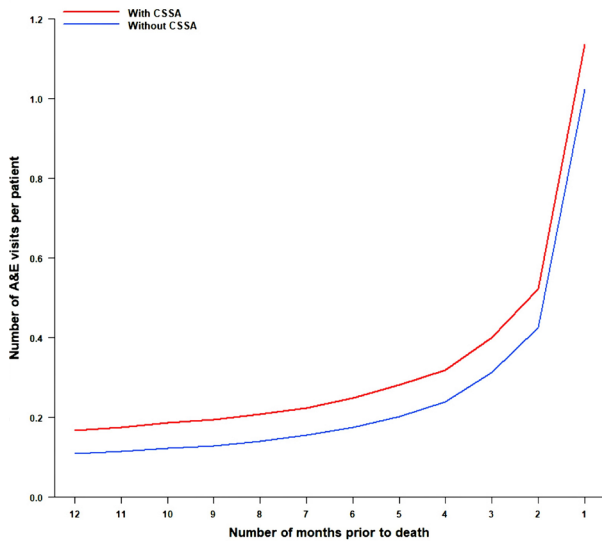


Figure 1 Average number of A&E visits during the last year of life, by CSSA status (n=357 853). A&E, accident & emergency; CSSA, comprehensive social security allowance.

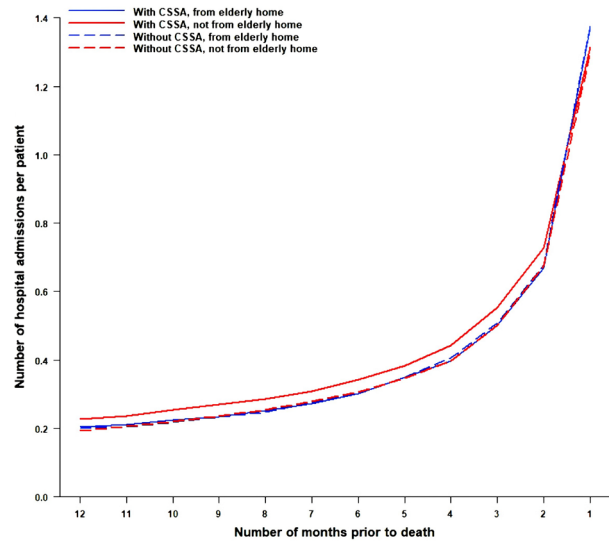


Figure 2 Average number of hospital admissions during the last year of life, by CSSA status and residential status at elderly home (n=375 506). CSSA, comprehensive social security allowance.

DISCUSSION

Our findings showed that among the EOL patients who died at the hospitals, lower socioeconomic position (represented by recipient of CSSA) was generally associated with increased A&E visits and hospital admission. However, it is debatable as to whether these findings can be taken to implicate that hospital care during the last year of life is pro-poor in Hong Kong, especially when ample evidence from around the world has indicated that increased A&E visits and hospital admissions may be reflective of poor quality of EOL care in the community.^{34–36} Literature in socioeconomic disparities of EOL care generally found that people with lower socioeconomic position were more likely to possess lower health literacy level^{37–39} and encounter difficulties in accessing general health-care services and information,^{39 40} which could lead to higher tendencies to have preferences for more

aggressive treatments,^{18 41} underuse hospice care^{42 43} and die in hospitals rather than at home.^{17 22} They were also less likely to receive specialist palliative care^{17 18} and participate in advance care planning.⁴⁴ Nevertheless, our datasets are limited in that only CSSA status was available to be used as a proxy for socioeconomic position, and only data on A&E visits and hospital admissions (number and length of stay) were available. Therefore, our study represents a preliminary exploration in the context of Hong Kong.

Table 2 Negative-binomial regression analysis on the total number of A&E visits during the last year of life (n=357 853)

Independent variables	aIRR	95% CI	P value
Age of death, years	1.002	1.002 to 1.002	<0.001
Year of death	1.020	1.019 to 1.021	<0.001
Sex			
Male (reference group)	1		
Female	0.960	0.955 to 0.965	<0.001
CSSA recipient			
No (reference group)	1		
Yes	1.289	1.280 to 1.293	<0.001

A&E, accident & emergency; aIRR, adjusted incidence rate ratio; CSSA, comprehensive social security allowance.

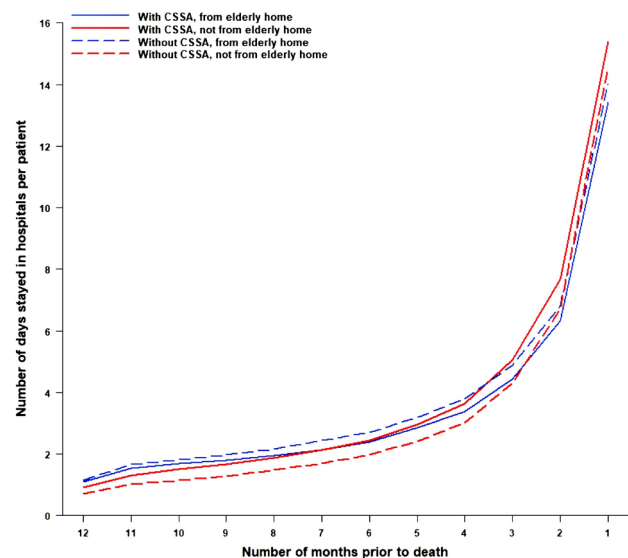


Figure 3 Average number of days stayed in hospital during the last year of life, by CSSA status and residential status at elderly home (n=375 506). CSSA, comprehensive social security allowance.

It does not examine the quality of EOL care, but is focused on the utilisation of hospital services. We recognise that use of hospital services may not necessarily equate with quality of care, and it is possible that social gradients exist in the quality of EOL care. Moreover, given that majority (about 90%) of the inpatient care was provided by the public healthcare sector in Hong Kong,⁴⁵ and that the major route of admission to public hospital was through the A&E Department, the higher risk of A&E visits and hospital admissions among the CSSA recipients may actually imply that people of lower socioeconomic position might have worse health status and therefore would have greater utilisation of the hospital and A&E services. In other words, the greater utilisation of hospital care may reflect greater inequality in terms of health status, and therefore health needs, but not necessarily the absence of healthcare inequality per se, especially hospital care only represents one, although important, part of the whole EOL care system in Hong Kong, which comprises multifaceted care services provided by both the social and healthcare sectors.²⁹

In terms of social care in the community, while approximately 7% of the overall older population resided in elderly homes in Hong Kong,⁴⁶ this figure rose to 28.3% during their last year of life as shown in this study. Since availability of places as well as quality of service provided by these care homes would affect hospital care utilisation figures, good EOL care may reduce the use of hospital services and avoidable hospitalisation. In fact, our findings showed that the elderly care home residents tended to have shorter

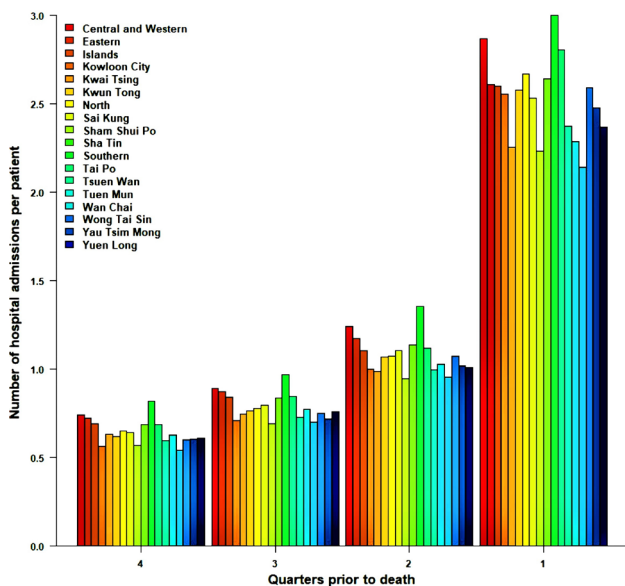


Figure 4 Average number of hospital admissions during the last year of life, grouped by district of residence (n=375 506). Note: first quarter prior to death=1–3 months prior to death; second quarter=4–6 months prior to death; third quarter=7–9 months prior to death and fourth quarter=10–12 months prior to death.

Table 3 Negative-binomial regression analysis on the total number of hospital admissions during the last year of life (n=375 506)

Independent variables	aIRR	95% CI	P value
Age of death, years	0.985	0.985 to 0.985	<0.001
Year of death	1.034	1.033 to 1.035	<0.001
Sex			
Male (reference group)	1		
Female	0.988	0.982 to 0.993	<0.001
CSSA recipient			
No (reference group)	1		
Yes	1.111	1.102 to 1.120	<0.001
Elderly home resident			
No (reference group)	1		
Yes	1.188	1.176 to 1.200	<0.001
CSSA×Elderly home	0.927	0.915 to 0.940	<0.001
District of residence			
Central and Western (reference group)	1		
Eastern	0.925	0.910 to 0.940	<0.001
Islands	0.870	0.847 to 0.894	<0.001
Kowloon City	0.834	0.819 to 0.848	<0.001
Kwai Tsing	0.752	0.739 to 0.765	<0.001
Kwun Tong	0.844	0.830 to 0.858	<0.001
North	0.850	0.834 to 0.866	<0.001
Others	0.307	0.292 to 0.322	<0.001
Sai Kung	0.841	0.825 to 0.858	<0.001
Sham Shui Po	0.748	0.735 to 0.761	<0.001
Sha Tin	0.884	0.869 to 0.900	<0.001
Southern	1.047	1.028 to 1.067	<0.001
Tai Po	0.909	0.892 to 0.926	<0.001
Tsuen Wan	0.785	0.770 to 0.800	<0.001
Tuen Mun	0.757	0.743 to 0.770	<0.001
Wan Chai	0.771	0.754 to 0.789	<0.001
Wong Tai Sin	0.860	0.846 to 0.875	<0.001
Yau Tsim Mong	0.820	0.805 to 0.836	<0.001
Yuen Long	0.771	0.757 to 0.784	<0.001

aIRR, adjusted incidence rate ratio; CSSA, comprehensive social security allowance.

length of stay at the hospitals closer to the time of death. Residential care homes for the elderly in Hong Kong are supported by community geriatric outreach teams from the Hospital Authority, as well as visiting medical officers from the private sector, and there is a movement towards providing improved quality of care in recent years emphasising on the training for care staff to identify suitable residents and/or their family to initiate EOL care discussions, including advance care planning, and to arrange coordinated admission from these care homes to different Hospital Authority departments including the A&E and inpatient departments. Nevertheless, there are district variations in such support, as well as variations in the operations of the elderly homes. This may explain the interaction effects observed between CSSA status, elderly home

Table 4 Negative-binomial regression analysis on the total length of stay (days) of hospital admissions during the last year of life (n=375 506)

Independent variables	aIRR	95% CI	P value
Age of death, years	0.994	0.994 to 0.994	<0.001
Year of death	1.009	1.008 to 1.010	<0.001
Sex			
Male (reference group)	1		
Female	0.992	0.986 to 0.999	0.020
CSSA recipient			
No (reference group)	1		
Yes	1.171	1.160 to 1.181	<0.001
Elderly home resident			
No (reference group)	1		
Yes	1.228	1.213 to 1.243	<0.001
CSSA×Elderly home	0.806	0.793 to 0.819	<0.001
District of residence			
Central and Western (reference group)	1		
Eastern	0.891	0.873 to 0.909	<0.001
Islands	0.883	0.854 to 0.913	<0.001
Kowloon City	0.899	0.880 to 0.918	<0.001
Kwai Tsing	0.810	0.793 to 0.826	<0.001
Kwun Tong	0.901	0.883 to 0.919	<0.001
North	0.803	0.785 to 0.822	<0.001
Others	0.428	0.407 to 0.449	<0.001
Sai Kung	0.963	0.940 to 0.986	0.002
Sham Shui Po	0.840	0.823 to 0.857	<0.001
Sha Tin	0.953	0.934 to 0.973	<0.001
Southern	1.029	1.006 to 1.053	0.012
Tai Po	0.841	0.822 to 0.861	<0.001
Tsuen Wan	0.788	0.770 to 0.806	<0.001
Tuen Mun	0.802	0.785 to 0.820	<0.001
Wan Chai	0.841	0.818 to 0.865	<0.001
Wong Tai Sin	0.947	0.928 to 0.966	<0.001
Yau Tsim Mong	0.954	0.933 to 0.976	<0.001
Yuen Long	0.783	0.767 to 0.800	<0.001

aIRR, adjusted incidence rate ratio; CSSA, comprehensive social security allowance.

residential status, and the district of residence in our findings.

On the other hand, the unique situation given rise by the dual-track public–private healthcare system makes the Hong Kong scenario more complicated and warrants further interpretations. In Hong Kong, the public–private split in outpatient care, and therefore primary care, is about 30:70,⁴⁷ and private clinics tend to be located in more convenient places than the public ones. In the public sector, primary care is mainly provided by general outpatient clinics, from which services are heavily subsidised by the government and co-paid for by individual patients at a nominal rate of approximately US\$6. On the other hand, charges vastly vary in the private sector and tend to cost at least five times more than the public sector

at median net consultation fee of around US\$32 per visit.⁴⁸ As a result of the disproportionate market share and charges between the two sectors, primary care in Hong Kong is commonly regarded as pro-rich,² and up to 8.4% of the general population did not seek medical care due to lack of financial means,⁴⁹ despite the government's overarching healthcare policy that 'no one should be denied adequate medical treatment due to lack of means'.⁵⁰ Therefore, due to the smaller number of public outpatient clinics and that any person can be easily transported by the ambulance to the A&E department of public hospitals, which is an emergency phone call away, there is a phenomenon in Hong Kong that many people, especially the ones in lower socioeconomic position and older age, would use A&E department as their de facto primary care contact point. A local study in 2009 on the A&E departments showed that up to 55.6% of older persons were triaged to the semi-urgent or non-urgent categories, while up to 81.18% of younger adults were triaged to the semi-urgent or non-urgent categories.⁵¹ With that as the contextual background of this study, the increased hospital admission and A&E visits by the CSSA recipients may also suggest that the hospital system may have mitigated some of the inequalities in the primary care system.

Moreover, utilisation of hospital services during the last year of life varies among different districts, such that inequalities in provision of hospital services for EOL care may exist. After all, hospital admissions are only a proxy indicator, and without information on the actual hospital care provided or the actual need for care, it is difficult to determine the quality of care the patient is receiving. As such, further analysis in the future is required to determine whether this represents true inequalities in hospital service provisions, or whether the figures merely represent variation in supply without affecting the quality of care.

Limitations

There are caveats to our study. First, our data is hospital-based; in other words, we do not have data of people who did not appear in the public healthcare system. Nevertheless, as mentioned earlier, over 90% of deaths occurred in the public hospitals in Hong Kong, making our study findings representative of people who died during the study period. Second, as we have alluded to in our discussion above, data that could be helpful to our study were not available in our datasets; these include but are not limited to other socioeconomic position variables, quality of care and the patients' health status, health conditions and/or reasons for admissions or A&E visits. Third, our elderly home residential status was limited in that it could not tell when the patients moved into the elderly home, and therefore could not account for cases where patients moved into the elderly home within the last

year of life. We could only assume that a static status for each of the patients.

CONCLUSION

Our study represents an initial attempt to examine inequalities in terms of hospital care during EOL in Hong Kong. While people on social security tends to have higher emergency visits and hospitalisation during their last year of life in Hong Kong, the finding itself may reflect the presence of health inequality during end of life as good EOL care may deter over-utilisation of hospital care and avoidable admission. On the other hand, due to Hong Kong's largely pro-rich primary care system, the predominantly public A&E and inpatient services may inadvertently act as a mitigator of such health inequalities. Our study calls for further and more detailed examination of the socioeconomic inequalities in the quality of EOL care and quality of life during EOL in the overall efforts to mitigate health inequalities.

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