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FACTORS ASSOCIATED WITH PLACE OF DEATH FOR ELDERLY JAPANESE-AMERICAN MEN: THE HONOLULU HEART PROGRAM AND HONOLULU-ASIA AGING STUDY

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Abstract

Place of death is an indicator of health service utilization at the end of life and differs by cause of death. Asian Americans may have a higher percentage of hospital deaths than Caucasian Americans, yet reasons for this finding are unclear. This study examined distribution of place of death and the associations between place and cause of death among elderly Japanese-American men in a longitudinal cohort, the Honolulu Heart Program and Honolulu-Asia Aging Study. Data collected between 1991 and 1999 on 1352 men aged 73–99 years at death were analyzed for associations between cause-of-death characteristics and hospital, home, or nursing home location of death. Fifty-nine percent of men died in hospitals, 23% died at home, and 18% died in nursing homes. Of the dementia-related deaths, 43% occurred in hospitals (versus 16% in a national study), 37% occurred in nursing homes (versus 67% in a national study), and 20% occurred at home. Of the stroke deaths, 53% occurred in hospitals, 40% were in nursing homes, and 7% occurred at home. Of the cancer deaths, 53% occurred in hospitals, 34% occurred at home, and 13% were in nursing homes. Traditional family obligation to care for elders at home and inability to access care for dementia may account for the increased rate of hospital death and lower rate of nursing home deaths in this cohort. Attitudes of Japanese-American elders and their families regarding place of care at the end of life, particularly in the setting of dementia, merit future study.

INTRODUCTION

The place where a person dies may reflect a series of medical, social, cultural, and financial decisions made at the end of life. An indicator of health services use at the end of life, place of death may also be an important quality indicator in end-of-life care.¹ Identifying place of death and factors associated with place of death provides a foundation for working to meet elderly patients' care needs. Asian Americans have had an increased likelihood of hospital

death compared to Caucasian Americans in two previous studies.^{2, 3} Both studies examined low-income elderly patients, one in the context of hospice use in California,² the other in nursing home residents nationally.³ However, the designation Asian American is heterogeneous, and values, level of education, and socioeconomic status vary widely among individual Asian American groups.

Japanese Americans are one of the largest groups of elderly Asian Americans, and Japanese Americans in Hawaii are more likely to be U.S.-born and have a higher socio-economic status than some more recent Asian immigrants.⁴ A study of preferences for place of death among Japanese Americans in Hawaii found that a majority preferred to die at home,⁵ yet no studies have examined actual place of death in this population.

Cause of death has been associated with place of death in previous studies. Dementia-related deaths are associated with an increased likelihood of nursing home death,⁶ and cancer-related deaths are associated with an increased likelihood of home death.⁷ Yet these relationships may differ in Japanese Americans due to cultural responses to dementia,⁸ and familial obligation and duty to care for elders.^{9, 10}

In order to describe the distribution of place of death and the relationship between place and cause of death among Japanese Americans, this study analyzed these outcomes among men in the longitudinal cohort study, the Honolulu Heart Program and Honolulu-Asia Aging Study. The hypothesis was that the rate of hospital deaths would be lower in this cohort than in prior studies of Asian Americans. The study also sought to determine whether the relationships between dementia, stroke, or cancer, and place of death would be different from previous national studies,^{6, 7, 11} an important step towards understanding the care needs of Japanese-American elders and their families.

METHODS

The Honolulu Heart Program/ Honolulu-Asia Aging Study

The Honolulu Heart Program (HHP) is a population-based, longitudinal study of cardiovascular disease in 8006 Japanese-American men (recruited from 9877 men with valid contact information) who were born between 1900 and 1919 and lived on the island of Oahu, Hawaii, in 1965.^{12, 13} Approximately 12% of the participants were born in Japan and 88% were born in the United States. The cohort underwent 6 examinations between 1965 and 1999. During the fourth examination (1991–1993), the Honolulu-Asia Aging Study (HAAS) was initiated to study dementia and other diseases of aging,¹⁴ and 3741 men aged 71 to 93 years, 80% of the surviving members of the original cohort, were examined.¹⁵ Data were collected using in-person examinations and interviews, telephone interviews, and committee review of medical records and death certificates in the death surveillance component of the program. Information on mortality from all causes was determined by the HHP Morbidity and Mortality Committee based on review of all available medical records. At the 1991–1993 examination, five out of 8006 men (<0.01%) could not be traced for vital status.¹⁶

Study Sample

The study sample of 1352 Japanese-American men consisted of cohort participants who completed the fourth HHP-HAAS examination between 1991 and 1993, and who died prior to 1999. No participants were excluded. Data on participants collected in the fourth (1991–1993), fifth (1993–1995), and sixth (1997–1999) HHP-HAAS examinations were used for these analyses. The HHP-HAAS were approved by the Institutional Review Board of Kuakini Medical Center, with written informed consent obtained from all study participants or family representatives if participants were unable to provide consent. These analyses of

existing data were approved by the Kuakini and University of Hawaii Institutional Review Boards.

Outcome

Place of death was the outcome variable examined. For multivariable analyses, place of death was defined as hospital, home, or nursing home. Hospital deaths included deaths in the emergency room (ER), those pronounced dead on arrival (DOA), and hospice and skilled nursing facility-status beds located in hospitals, because these were felt to reflect a decision to hospitalize the elder, rather than provide care at home or in a nursing home. Home deaths included deaths in care homes, private family homes of nursing assistants or nurses who provide 24-hour care for elders with dependencies in activities of daily living.

Covariates

The deaths in this longitudinal study occurred between 1991 and 1999. In the existing dataset, cause of death was divided into seven categories: cancer, coronary heart disease (CHD), stroke, dementia, respiratory, other causes, or unknown cause of death, based on a team review of all available medical records. CHD was defined as underlying cause of death with International Classification of Diseases (ICD) codes, and included acute myocardial infarction, angina pectoris, and all forms of ischemic heart disease. This is a narrower definition than the ICD categories used in some other studies,^{7, 17} and is not inclusive of all deaths of cardiac etiology.

Analyses were adjusted for covariates based on review of the literature on factors associated with place of death in the United States.^{17–20} The following individual demographic characteristics were included: age at death, total years of education, religion, income level, and more than one type of insurance. The following social characteristics were included: marital status, whether or not the individual supported other people financially, and whether the individual was living with relatives (defined as spouse, children or other relatives). The following functional characteristics were included: cognitive function measured by the Cognitive Abilities Screening Instrument (CASI) score;¹⁴ hand grip strength, a measure of upper body function associated with disability;²¹ timed 10-foot walk speed, a measure of lower body function associated with disability,²² and dependence in one or more activities of daily living (ADL) by self- or proxy-report. In this study, grip strength and walking times were used as functional measures for analyses, and correlated with self- or proxy-reported ADL dependence (data not shown).

Some variables from this longitudinal dataset included in analyses were measured at each of the three examinations, and the measure from the last examination prior to death was selected to capture the individual's status closest to death. These variables included: living with relatives (or not), CASI score, handgrip strength, and timed ten-foot walk, and self- or proxy-reported ADL dependence. A variable was created to control for time between last examination and death. The rest of the variables were measured or obtained during the fourth examination (1991–1993).

Statistical Analyses

Chi-square analyses were performed to compare cause of death by the three places of death (hospital, home, nursing home). For logistic regression analyses, two-level independent variables were created for non-parametrically distributed variables using the median of the sample for each variable as the dividing point, with several exceptions. Marital status was married (79% of subjects) versus unmarried for any reason, education was less than 12 years versus greater than or equal to 12 years, religion was Buddhist (68% of subjects) versus all other types, and the validated cut-off for CASI score (scores less than 74) was used for

cognitive impairment.¹⁴ Variables with p values of >0.1 on bivariate analyses (data not shown) were not included in multivariable analyses. Analyses were adjusted for time between last examination and death. Age and all causes of death were forced into the multivariable logistic regression model, with CHD serving as reference for cause of death. CHD was chosen as the reference because the distribution and larger size of the group provided the best comparison across the places of death. The subset of variables in the final model were selected using a backward elimination procedure with p value <0.1 for retention. Separate logistic regression models were fit comparing hospital to home as the place of death, hospital to nursing home, and nursing home to home. All statistical analyses were performed using SAS 9.1 (SAS Institute, Inc., Cary, NC).

RESULTS

Place of Death and Individual Characteristics

The majority of deaths occurred in hospitals (59.2%), with 22.6% of deaths at home, and 18.2% of deaths in nursing homes. The characteristics of the sample population are listed in Table 1.

Table 2 shows cause of death and place of death. Hospitals were the place of death for 79.0% of CHD deaths, 53.1% of cancer deaths, 43.1% of dementia deaths and 52.7% of stroke deaths. Nursing homes were the place of death for 40.0% of stroke deaths and 36.7% of dementia deaths. Compared to younger men, higher percentages of men older than the median age of 83.6 years died in nursing homes from cancer (20% versus 8%), dementia (41% versus 26%), and stroke (44% versus 37%). There was no difference between age groups in hospital deaths from CHD (data not shown).

Factors Associated with Place of Death

Table 3 shows the adjusted regression analyses of causes of death associated with place of death after backward elimination of variables with p values >0.1 . In the models with CHD as the reference, after adjusting for age of death, marital status, social support, function, cognition, and time from last examination, dementia-related death was associated with a decreased likelihood of hospital versus nursing home death. Stroke-related death was strongly associated with a decreased likelihood of hospital versus nursing home death and an increased likelihood of nursing home versus home death. Cancer and unknown causes of death were associated with decreased likelihoods of hospital versus home death.

DISCUSSION

This study is the first the authors are aware of to examine the relationships between cause and place of death in Japanese Americans. There are several key findings.

First, 59% of the men died in hospitals, 23% died at home and 18% died in nursing homes. Studies of data from the 1990s which used similar definitions to this study provided interesting contrasts.^{2, 7, 17} In California, 57% of Asians died in hospitals, versus 33% of whites.² Nationally, place of death also varied by ethnicity: more minorities died in hospitals and at home, while more Caucasians died in nursing homes.¹⁷ In this study, the percentage of home deaths was similar to Caucasians (23% versus 24%). However, the percentage of hospital deaths was higher than Caucasians (59% versus 50%), while the percentage of nursing home deaths was lower (18% versus 26%).¹⁷ Interestingly, rates of hospital death for African Americans and Latino Americans were 65% to 70% in previous studies, while rates of nursing home death for these ethnicities were 11% to 16%.^{7, 17} The similar percentages of nursing home deaths among non-Caucasian ethnicities, including this Japanese-American cohort, might indicate that ethnicity is a marker for access to care, and

that these populations have decreased access to nursing home care. An alternative explanation, however, might be that these populations preferred care at home rather than in nursing homes. A previous study of preferences for place of death found that the majority of Japanese respondents in Hawaii preferred a home death.⁵

In this study, 37% of dementia-related deaths occurred in nursing homes, compared to 67% of dementia-related deaths which occurred in nursing homes nationally.^{6, 17} Hospital deaths accounted for 43% of dementia-related deaths in this study, compared to 16% nationally.^{6, 17} When the cohort was stratified by age (results not shown), the differences between this study and the U.S. literature were also striking. Of the men in the cohort older than the median age of 83.6 years, 38% of dementia-related deaths occurred in hospitals compared to 14% of those aged ≥ 85 years nationally. Among men older than 83.6 years, fewer dementia-related deaths occurred in nursing homes (41% versus 70% of those aged ≥ 85 years nationally) but more occurred at home (29% versus 11% nationally).⁶ The national study also noted that among persons aged 65 and older in Hawaii, less than 30% of the dementia-related deaths occurred in hospitals,⁶ which is lower than the 43% seen in this study, suggesting that this study's findings are not simply reflective of Hawaii's geographic factors. It has previously been reported that dementia among Japanese-American men may escape early detection because the men avoided going to the doctor, and their typical daily activities tended to mask cognitive deficits,⁸ and families waited until a crisis occurred to seek help.^{10, 23} The careful measurement of cognitive function as part of the prospective study may have resulted in higher detection of cognitive impairment than in U.S. national studies, however, for these analyses, dementia as the underlying cause of death was used, decreasing this effect. Thus, this rate of hospital dementia-related deaths may reflect provision of care at home until a time of crisis and decreased seeking of nursing home care for dementia, consistent with the traditional Japanese value of filial piety, a familial obligation and duty to care for elders.^{9, 10} This is in contrast to a Washington study of Japanese American elders who were more likely to intend to use nursing home care for themselves in case of dementia than Caucasians (53% vs 38%), who were more likely to use paid home care. However, actual place of death was not analyzed in that study.²⁴

Stroke-related deaths were strongly associated with nursing home, versus hospital or home, place of death, and surprisingly, this association was stronger than for dementia-related deaths. The relationship between stroke-related death and nursing home versus hospital death has not been well-examined in previous studies. One study found no significant association,⁷ and another demonstrated a weaker association than this study.³

Although cancer-related deaths were strongly associated with home versus hospital place of death, 53% of cancer-related deaths still occurred in the hospital. Interestingly, in this and in previous HHP-HAAS studies, there were almost twice as many deaths due to cancer than CHD,²⁵ in contrast to the rest of the U.S. population.^{7, 17} Home hospice utilization information was not available for this study, but there is relatively low utilization of hospice services in this population, with reluctance to forgo the option of life-prolonging therapies and agree to the Medicare hospice benefit.⁵ This is consistent with a recent study's findings of lower rates of hospice use among Asian Americans and Pacific Islanders compared to whites.²⁶

Strengths and Limitations

The strengths of this study include the use of data from a well-established population cohort and the focus on the place of death in a population that has not been well-studied in end-of-life care. This study compared all 3 places of death, rather than hospital versus "other," which equates home and nursing home deaths. The limitations of this study include the difficulty in generalizing the findings to other populations, the lack of female participants in

the cohort, as well as the inability to determine causal relationships in an observational study. Additionally, the Honolulu Heart Program was not designed to evaluate end of life issues, and quality of end-of-life care, subject preferences, advance directives, and hospice utilization information were not available. However, this large population cohort provides the unique opportunity to carefully examine high-quality measures of clinical and socio-economic factors in the context of end-of-life care.

Recommendations for Research and Practice

Future directions for research include comparing areas with high Japanese-American acceptance of nursing home or hospice care with places with lower acceptance of these services. Qualitative studies of attitudes and values of Japanese-American and other ethnic populations regarding nursing home care and place of care at the end of life would provide valuable insights into the differences in the distribution of place of death. Additional examination of place of death among other ethnic groups in Hawaii is needed to clarify the role of geographic versus other factors affecting place of death. Additional study is also needed to identify barriers to nursing home care utilization for non-Caucasian ethnicities, in order to improve access to care for elderly patients with dementia and other advanced illnesses. In practice, increased awareness of Hawaii's higher rate of hospital death and low rate of nursing home death may stimulate discussion regarding health care utilization at the end of life.

CONCLUSION

The Japanese-American men in this cohort had a higher rate of hospital death and lower rate of nursing home death than Caucasian Americans nationally. Dementia deaths in this study were more likely to occur in nursing homes compared to CHD deaths, yet the percentage of nursing home dementia deaths was almost one-half the U.S. national percentage, while the percentage of hospital dementia deaths was twice the U.S. national percentage. Traditional family obligation to care for elders at home and inability to access care for dementia may account for the increased rate of hospital death and lower rate of nursing home deaths in this cohort. Compared to CHD deaths, stroke-related deaths were associated with an increased likelihood of nursing home versus hospital death, and cancer-related deaths were associated with an increased likelihood of home versus hospital death, yet the highest percentages of both stroke-related and cancer-related deaths still occurred in hospitals. Further study is needed to examine attitudes of caregivers regarding place of care at the end of life for Japanese-Americans with dementia.

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Table 1

Patient Characteristics

Patient Characteristics	Entire Sample N=1352
Demographic	
Mean age at death [*]	84.4 years
Mean years of education	10.1 years
Married	899 (78.6%)
Buddhist [†]	860 (63.6%)
Income ≥\$20000/year	470 (45.8%)
>1 type insurance	933 (92.6%)
Social	
Support others financially	884 (78.4%)
Residence at home [‡]	1250 (92.5%)
Residence in nursing home [§]	101 (7.5%)
Living with relatives	978 (82.3%)
Functional	
ADL dependent ^{**}	453 (33.7%)
Mean CASI score ^{††}	68.0

Patient Characteristics	Entire Sample N=1352
Mean Handgrip strength	24.7 kg
Faster 10-Ft Walk Time	5.8 seconds
Mean Time from last exam to death	2.1 years ^{‡‡}
Cause of Death	
Cancer	337 (24.9%)
CHD ^{§§}	181 (13.4%)
Stroke	150 (11.1%)
Dementia	109 (8.1%)
Respiratory	54 (4.0%)
Other cause	320 (23.7%)
Unknown cause	201 (14.9%)
Year of Death	
1991–1993	204 (15.1%)
1994–1996	576 (42.6%)
1997–1999	572 (42.3%)

^{*} Range: 72.6–99.2 years, median 83.6 years.

[†] Compared to all other religions reported.

[‡] Subject's, families' or carehome residence at the last exam prior to death.

[§] At the last exam prior to death.

** Self- or proxy- report of dependence for 1 or more ADL's (walk in home, feed self, bed-chair transfer, toilet, bathe, dress) at last exam prior to death

Some percentages do not add up to 100 due to missing data.

^{††} Cognitive Abilities Screening Instrument score measured at last exam prior to death (<74 indicates cognitive impairment).

^{‡‡} Range of time between last examination and death days to 8.3 years.

^{§§} Coronary Heart Disease was defined as underlying cause of death with ICD codes, and included acute myocardial infarction, other acute and subacute forms of ischemic heart disease, chronic ischemic heart disease, angina pectoris, and asymptomatic ischemic heart disease.

Table 2

Distribution of Place of Death by Cause of Death.

Patient Characteristics	Hospital Death N=800 (59.2%)	Home Death N=306 (22.6%)	NH Death N=246 (18.2%)	P value
Cause of Death				
Cancer	179 (53.1)	115 (34.1)	43 (12.8)	<0.0001
CHD	143 (79.0)	20 (11.1)	18 (9.9)	<0.0001
Stroke	79 (52.7)	11 (7.3)	60 (40.0)	<0.0001
Dementia	47 (43.1)	22 (20.2)	40 (36.7)	<0.0001

Table 3

Adjusted Likelihood of Place of Death by Cause of Death. ***

Cause of Death	Hospital vs. Home OR (95% CI)	P value	Hospital vs. NH OR (95% CI)	P value	NH vs. Home OR (95% CI)	P value
CHD (reference)	1.00 (reference)		1.00 (reference)		1.00 (reference)	
Cancer	0.22 (0.12–0.39)	<.001	0.63 (0.32–1.23)	.2	0.46 (0.21–1.01)	.05
Stroke	1.06 (0.44–2.53)	.9	0.21 (0.11–0.42)	<.001	5.94 (2.25–15.69)	<.001
Dementia	0.50 (0.22–1.13)	.1	0.40 (0.18–0.88)	.02	1.92 (0.74–5.00)	.2
Respiratory	0.61 (0.23–1.65)	.3	0.98 (0.30–3.14)	.9	1.13 (0.31–4.15)	.9
Other cause	1.02 (0.53–1.96)	.9	1.09 (0.56–2.15)	.8	1.38 (0.59–3.25)	.5
Unknown cause	0.18 (0.10–0.33)	<.001	0.81 (0.37–1.78)	.6	0.23 (0.10–0.55)	.001

Backward elimination procedure used P value <0.1 for retention, adjusting for age at death, cognitive impairment, the functional measures hand grip strength and timed walk speed, and time in years between last examination of participant and death. Time, age at death and all causes of death were forced into this model.