

Original Article

Living Will Interest and Preferred End-of-life Care and Death Locations among Japanese Adults 50 and over: A Population-based Survey

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The main purpose of this study was to determine the relationships between Japanese individuals' interest in living wills and their preferred end-of-life care and death locations. Questionnaires were mailed to 1,000 individuals aged ≥ 50 to measure these 2 factors. We examined the associations between the respondents' characteristics and their preferred care and death locations by using multinomial logistic regression models. The response rate was 74%. Home was the most frequently preferred place for end-of-life care (64%), and a palliative care unit (PCU) was the most commonly preferred place to die (51%). Living will interest was associated with a preference for care (odds ratio [OR] 4.74, 95% confidence interval [CI] 1.95-12.1) and death (OR 2.75, 95% CI 1.70-4.47) in a PCU rather than a hospital, but it was not associated with the choice between receiving care or dying at home instead of a hospital. We must consider why Japanese people think home death is impracticable. The Japanese palliative care system should be expanded to meet patients' end-of-life needs, and this includes not only facilitating home care but also increasing access to PCU care.

Key words: advance healthcare directive, living will, end-of-life care, palliative care unit, place of death

In Japan, the population of people over 75 is expected to double between 2005 and 2030 [1]. As the population ages, increased resources will be needed to provide end-of-life care and give individuals a choice as to where they want to die. Between 1980 and 2009, the proportion of Japanese hospital deaths increased from 52.1% to 78.4%, and the proportion of hospital deaths for cancer patients increased from 80.0% to 89% [Ministry of Health, Labour and

Welfare of Japan. Vital Statistics. Volume 1, 5-21. Available from <<http://www.e-stat.go.jp/SG1/estat/ListE.do?lid=000001108739>> (June 28, 2014, date last accessed)]. The paucity of end-of-life and death locations for aged and terminally ill patients is of major concern to both medical professionals and family members [1].

Dying in a preferred place is important for achieving a good death for both the patient and his/her family [2]. A 2008 survey conducted by Japan's

Received May 28, 2014; accepted August 20, 2014.

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Conflict of Interest Disclosures: No potential conflict of interest relevant to this article was reported.

Ministry of Health, Labour and Welfare (MHLW) found that 64% of all individuals would prefer to receive end-of-life care and to die at home, if physical and social conditions allow; however, only 11% thought dying at home was possible [Ministry of Health, Labour and Welfare of Japan. Round-table conference about the end-of-life care, the result of a "survey of end-of-life care". Available from <<http://www.mhlw.go.jp/bunya/iryuu/zaitaku/dl/07.pdf>> (June 28, 2014, date last accessed) [in Japanese]]. In fact, the home death rate in Japan decreased from 38% to 12% between 1980 and 2009 [Ministry of Health, Labour and Welfare of Japan. Vital Statistics. Volume 1, 5-21. Available from <<http://www.e-stat.go.jp/SG1/estat/ListE.do?lid=000001108739>> (June 28, 2014, date last accessed)]. Japanese healthcare professionals and facilities must therefore plan ahead to better care for the increasing aging and terminally ill populations.

To improve end-of-life care in Japan, in 1991 the MHLW started to provide institutional palliative care services via palliative care units (PCUs), which are covered by National Medical Insurance. Most Japanese PCUs are part of a general hospital, but as the aged population increases, so does the need for home palliative care. Specialized home care support clinics have operated in Japan since 2006 [3, 4]. These clinics support home-based care tailored to the needs of patients and their families in cooperation with hospitals, other clinics, PCUs, and home-visiting services by employing physicians, nurses, helpers, pharmacists, volunteers, and clergy [3]. Moreover, these specialized clinics obtain additional funding for supporting terminally ill patients and facilitating home deaths. This system was expected to increase the proportion of terminally ill patients who choose to die at home [4], but the rate of home deaths is not increasing [Ministry of Health, Labour and Welfare of Japan. Vital Statistics. Volume 1, 5-21. Available from <<http://www.e-stat.go.jp/SG1/estat/ListE.do?lid=000001108739>> (June 28, 2014, date last accessed)].

In countries such as the U.S. and Canada, increasing proportions of patients with terminal illnesses are dying at home. In the U.S., the proportion of home death increased from 17% to 22% between 1980 and 1998 [5]. In Canada, home deaths constituted 20% of all deaths in 1994 and 25% in 2004 [6]. The proportion of Japanese patients who die at home (*e.g.*,

12% in 2009 [Ministry of Health, Labour and Welfare of Japan. Vital Statistics. Volume 1, 5-21. Available from <<http://www.e-stat.go.jp/SG1/estat/ListE.do?lid=000001108739>> (June 28, 2014, date last accessed)]) is lower than that of Western countries [5-7], and this proportion has not increased significantly in recent years [Ministry of Health, Labour and Welfare of Japan. Vital Statistics. Volume 1, 5-21. Available from <<http://www.e-stat.go.jp/SG1/estat/ListE.do?lid=000001108739>> (June 28, 2014, date last accessed)] [6-9].

Advance healthcare directives (ADs) are written documents concerning patients' preferences for life-sustaining treatment (*i.e.*, living wills) and/or the appointment of a durable power of attorney to make health care decisions [10]. The proportion of Japanese patients who have ADs is lower than that of Western patients. Resnic *et al.* [11] reported that in 2007-2008, 29.4% of home health patients in the U.S. had ADs. Pollack *et al.* [12] reported that 34% of the general population over 18 years old in Maryland had ADs. In Hawaii, 62% of the general population over 65 years old had living wills in 1999 [13]. However, Matsui [14] reported that 0.6% of the general population in Japan in 2003 had living wills. Miyata *et al.* [15] reported that only 2.6% of the population in Japan in 2004 aged 40 to 65 had written treatment preferences. As for severely ill patients, Dow *et al.* [16] reported that 41% of cancer inpatients and 89.9% of home hospice patients in U.S. had ADs, whereas Tokuda *et al.* [17] found that none of the 61 Japanese terminal illness patients questioned in his study had an AD.

The absence of an AD may lead to unwanted aggressive care after the patient has lost the ability to make decisions, resulting in a poorer quality of life for the patient and increased caregiver bereavement difficulties [18]. ADs and living wills have also been reported to decrease the proportions of patients who die in hospitals [19, 20]. As Japanese patients with terminal illnesses are less likely to have ADs and are more likely to die in hospitals compared to Western patients, we hypothesized that Japanese individuals interested in considering end-of-life care options by obtaining an AD would be more likely to prefer care and death at home. To our knowledge, these relationships have not been previously studied with a Japanese population. We believe that the term "living will" is

more familiar in Japan than the term “advance health directives,” and therefore we investigated the relationships between Japanese adults’ interest in obtaining a living will and their end-of-life care and death location preferences. We also investigated the relationships between other patient characteristics and the patients’ preferred places of care and death.

Subjects and Methods

Respondents. Questionnaires were sent to 1,000 individuals representing a cross-sectional population sample of Okayama, Japan (population 700,000) who were selected according to a two-stage stratified random sampling procedure. We randomly selected 50 of the city’s 134 voting areas and then randomly selected 20 individuals aged ≥ 50 years from the voter lists of each of these areas. We first mailed a postcard describing the study to each selected individual in November 2010, and we mailed the questionnaire 1 week later. The subjects were asked to return the questionnaire in an unmarked envelope enclosed within a numbered, postage-paid envelope. Individuals who did not wish to participate in the study were asked to return the questionnaire unanswered after marking it as “not participating”. Reminder postcards were sent after 2 and 4 weeks to all subjects who had not yet returned a questionnaire. The questionnaires were collected until the end of January 2011.

The study protocol was approved by the Institutional Review Board of Okayama University, and the study followed the principles of the Declaration of Helsinki.

Questionnaire. We developed the questionnaire and assessed its content validity. The feasibility and face validity of the questionnaire were tested with 25 healthy volunteers. The volunteers were presented with a brief scenario describing a terminally ill patient with a life expectancy of 6 months or less. Three questions were adopted from a previous MHLW survey to enable comparisons with their data. These questions assessed: (1) whether the participants would want to know their prognosis if they had such an illness, (2) where they would prefer to receive end-of-life care, and (3) whether they thought it would be possible to die at home.

The questionnaire’s respondents chose from among the following for care and death locations: (1) care and death at home, (2) care at home with admission to a

palliative care unit (PCU) if necessary, (3) care at home with hospital admission if necessary, (4) care and death in a PCU, (5) care and death in a nursing home, (6) care and death in a hospital, and (7) care and death in a cancer center that provided aggressive treatment. The respondents who did not believe in the possibility of dying at home, or who thought doing so would burden their family too much, were asked about the sort of support they would need to make death at home possible. They answered according to the following choices (multiple answers were allowed): visiting home doctors available 24 h per day, visiting home nurses available 24 h per day, visiting home helpers, the availability of family members to provide care, paid time off for family, access to urgent hospitalization, access to urgent medical advice, availability of a comfortable place to live, access to free home palliative care, and ‘other’ support.

The questionnaire also asked about the respondent’s age, sex, number of family members at home, number of relatives outside the home, level of education achieved, personal and family experience with health-care work, and hospitalization or bereavement experience within the past 5 years. The respondents were asked whether they knew about living wills, whether they had an interest in obtaining a living will, whether they would like to appoint a surrogate decision maker, whether they were interested in organ donation, whether they thought home or hospital care would result in better pain relief or a longer life, and how likely they believed it would be for them to receive home visits from an available physician or nurse.

Statistical analysis. We identified the factors significantly associated with specific places of care and death (home, hospital, PCU, nursing home, or cancer center) by conducting univariate analyses using chi-squared tests. Factors with a p -value of < 0.05 on the univariate analyses were entered into a multinomial logistic regression analysis to identify factors independently associated with preferred places of care and death. We calculated the odds ratios (ORs) and 95% confidence intervals (CIs) for preferred places of care/death either at home or in a PCU, compared with hospitals. Nursing homes and cancer centers were not included in this analysis because the number of subjects who preferred these for care and death was very low. The significance threshold was 0.05 (two-tailed). All analyses were performed using JMP Pro

10.0.2 (SAS Institute, Cary, NC, USA).

Results

Of the 1,000 individuals selected, we included data from 743 (74%); 21 questionnaires were returned by the post office due to a change of address, 31 individuals did not wish to participate, and 205 did not return their questionnaires. Table 1 shows the subjects' background characteristics. Table 2 shows their preferred care and death locations and makes comparisons with the MHLW survey [Ministry of Health, Labour and Welfare of Japan. Round-table conference about the end-of-life care, the result of a "survey of end-of-life care". Available from <<http://www.mhlw.go.jp/bunya/iryuu/zaitaku/dl/07.pdf>> (June 28, 2014, date last accessed) [in Japanese]]. Home was the preferred place of care for 475 subjects (64%), but it was the preferred place of death for only 73 subjects (10%). The hospital was the preferred place of care for 65 subjects (9%) and the preferred place of death for 208 subjects (28%). The PCU was the preferred place of care for 118 subjects (16%) and the preferred place of death for 377 subjects (51%). Only 6% of subjects thought it would be possible to die at home (Table 3).

The answers to the questions taken from the MHLW survey were similar to the original MHLW results (Tables 2 and 3). The respondents who did not believe it would be possible or were not sure whether they would be able to die at home (682 subjects) indicated that the following factors might facilitate death at home: access to urgent hospitalization if their conditions deteriorated (50%), availability of family members to provide care (42%), and visiting home doctors available 24 h per day (39%; data not shown). Tables 4 and 5 show the results of the univariate analyses concerning the relationships between the respondents' background characteristics and their preferred places of care and death.

Table 6 shows the results of the multinomial logistic regression analysis we performed to determine the factors independently associated with preferred care and death locations. Interest in a living will was significantly associated with a preference for care (OR 4.74, 95% CI 1.95–12.1) and death (OR 2.75, 95% CI 1.70–4.47) in a PCU rather than in a hospital, but it was not significantly associated with the choice

between receiving care and dying at home or in a hospital. A desire to know one's prognosis and an interest in organ donation were also associated with a preference for death in a PCU rather than a hospital.

The respondents who believed they would obtain better pain relief in a hospital preferred hospitals as

Table 1 The respondents' background characteristics (n = 743)

Characteristics	n	%
Sex (male, %)	348	47
Age		
50s	202	27
60s	282	38
70s	157	21
80s	82	11
90s and over	11	1
Number of family members at home		
1	104	14
2	274	37
3	165	22
4	112	15
5	34	5
6	25	3
7	10	1
8	2	0.2
9	1	0.1
Level of education		
Junior high school or primary school	111	15
High school	361	49
2-year school or vocational school	117	16
University or postgraduate school	142	19
Experience with healthcare work		
Personal experience	38	5
Experienced family member	78	10
No healthcare staff in family	608	82
Experience of hospitalization		
Personally hospitalized	193	26
Family member hospitalized ^a	288	39
Other relative hospitalized ^b	323	44
Friend hospitalized	168	17
None	103	14
Experience of bereavement		
Family ^a	162	22
Relative ^b	434	53
Friend	151	20
None	141	19

^aFamily members living at home. ^bFamily members not living at home.

Entry where total is less than 100% indicates non-responders.

Table 2 Preferred places of care and death during a terminal illness with a life expectancy of less than 6 months

Place of care	Place of death	n	(%)	(%) ^a
Home	Home	73	10	11
	PCU, if necessary	259	35	30
	Hospital, if necessary	143	19	23
PCU	PCU	118	16	18
Hospital	Hospital	65	9	9
Nursing home	Nursing home	7	1	1
Cancer center	Cancer center	27	4	3
Other	Other	10	1	1
Not sure	Don't know	33	4	4
No answer or invalid answer	No answer or invalid answer	8	1	1

^a2008 data reported by the Japanese Ministry of Health, Labour and Welfare (n = 2,527) [Ministry of Health, Labour and Welfare of Japan. Round-table conference about the end-of-life care, the result of a "survey of end-of-life care". Available from <<http://www.mhlw.go.jp/bunya/iryuu/zaitaku/dl/07.pdf>> (June 28, 2014, date last accessed) [in Japanese]]. PCU, palliative care unit.

Table 3 The respondents' answers to "Do you think it would be possible for you to die at home?"

	n	(%)	(%) ^a
Yes	43	6	6
No	491	66	66
Not sure	191	26	26
No answer or invalid answer	18	1	2

^a2008 data reported by the Japanese Ministry of Health, Labour and Welfare (n = 2,527) [Ministry of Health, Labour and Welfare of Japan. Round-table conference about the end-of-life care, the result of a "survey of end-of-life care". Available from <<http://www.mhlw.go.jp/bunya/iryuu/zaitaku/dl/07.pdf>> (June 28, 2014, date last accessed) [in Japanese]].

places of care, while those who thought they would be more comfortable at home preferred it as their place of care. Nevertheless, there was no significant difference found regarding the preferred place of death. Participants who believed they would live longer if receiving care in a hospital preferred it as the place of death.

Prior experiences with the hospitalization of relatives and higher education levels were associated with a preference for care at home rather than in a hospital and for death in a PCU rather than a hospital. The perceived availability of home nurses was also associated with a preference for care and death in a hospital rather than in a PCU. Age ≥ 70 years was associated with a preference for care in a hospital rather than at home or in a PCU.

Discussion

This study revealed that among a population of Japanese adults aged ≥ 50 , the interest in obtaining a living will was related to the respondents' preferences regarding end-of-life care and death. Interest in living wills and organ donation were significantly associated with a preference for care and death in a PCU rather than a hospital. Previous research found that the completion of ADs was associated with a willingness to donate organs [21], and that ADs (*i.e.*, living wills) decreased the proportion of patients who died in hospitals [19, 20]. However, our results did not confirm our hypothesis that interest in a living will would be associated with a preference for care and death at home as opposed to a hospital. In addition, the respondents seem to be concerned that urgent hospitalization might be needed in the event of serious physical deterioration, and they appeared to believe that dying in a hospital would put less stress on the family members who support the patient. This may be because most Japanese individuals believe that dying at home is not possible; thus, those with an interest in obtaining a living will or in organ donation choose death in a PCU instead of at home.

Our results indicate that past experiences influence care choices. Education, experience with the hospitalization of a relative, and the perceived ability to get better pain relief and to live longer in a hospital than at home all influenced the respondents' preferences. The majority of the respondents (60%) thought receiving care would be most comfortable at home, and

Table 4 Results of univariate analyses comparing background characteristics to the preferred place of care

Characteristics	Total (n = 692)	Home (n = 475)	Hospital (n = 65)	PCU (n = 118)	Cancer center (n = 27)	Nursing home (n = 7)	p-value
Sex							0.6863
Male	337 (49)	234 (50)	30 (46)	55 (47)	16 (59)	2 (33)	
Female	351 (51)	238 (50)	35 (54)	63 (53)	11 (41)	4 (67)	
Age							0.0022
< 69 years	455 (66)	329 (70)	30 (46)	73 (62)	20 (74)	3 (50)	
≥ 70 years	233 (34)	143 (30)	35 (54)	45 (38)	7 (26)	3 (50)	
Number of family members at home							0.0042
1	95 (14)	51 (11)	12 (19)	27 (24)	3 (11)	2 (29)	
2 or more	585 (86)	417 (89)	52 (81)	87 (76)	24 (89)	5 (71)	
Level of education							0.0077
≤ 12 years	439 (64)	286 (61)	54 (84)	76 (66)	18 (67)	5 (71)	
> 12 years	243 (36)	183 (39)	10 (16)	39 (34)	9 (33)	2 (29)	
Experience with healthcare work							0.3301
Personal experience	34 (5)	28 (6)	1 (2)	3 (3)	1 (4)	1 (17)	
Experienced family member	72 (11)	56 (12)	5 (8)	10 (9)	1 (4)	0 (0)	
No healthcare staff in family	569 (84)	386 (82)	54 (90)	100 (89)	24 (92)	5 (83)	
Experience with hospitalization							0.6940
Personally hospitalized	174 (25)	119 (25)	15 (23)	32 (28)	5 (19)	3 (43)	
Family member hospitalized ^a	269 (39)	179 (38)	25 (39)	49 (42)	14 (52)	2 (29)	0.5810
Other relative hospitalized ^a	306 (45)	224 (48)	17 (27)	56 (48)	6 (22)	3 (43)	0.0031
Friend hospitalized	120 (17)	91 (19)	5 (8)	19 (16)	4 (15)	1 (14)	0.2382
Experience of bereavement							0.0080
Family member ^a	150 (22)	106 (22)	9 (14)	22 (19)	8 (30)	5 (71)	0.4225
Other relative ^a	414 (60)	292 (61)	35 (54)	71 (60)	13 (48)	3 (43)	0.3937
Friend	144 (21)	107 (23)	8 (12)	23 (20)	5 (19)	1 (14)	0.0384
None	128 (19)	74 (16)	19 (29)	28 (24)	6 (22)	1 (14)	0.0091
Desire to know prognosis							0.4405
Yes	552 (80)	381 (80)	46 (72)	98 (83)	24 (89)	3 (43)	
No	57 (8)	32 (7)	12 (19)	10 (9)	1 (4)	2 (29)	
Not sure	82 (12)	62 (13)	6 (9)	10 (9)	2 (7)	2 (29)	
Availability of home physicians							0.0469
Yes	156 (24)	109 (25)	15 (25)	23 (22)	6 (22)	3 (43)	
No	206 (32)	135 (31)	16 (27)	45 (42)	9 (33)	1 (14)	
Not sure	279 (44)	196 (45)	29 (48)	39 (37)	12 (44)	3 (43)	
Availability of home nurses							0.0004
Yes	133 (20)	96 (21)	13 (21)	19 (16)	4 (15)	1 (14)	
No	207 (31)	135 (29)	15 (24)	51 (44)	5 (19)	1 (14)	
Not sure	338 (50)	234 (50)	34 (55)	47 (40)	18 (67)	5 (71)	
Place associated with longest life							<0.0001
Hospital	301 (44)	187 (40)	39 (63)	51 (43)	20 (74)	4 (57)	
Same for hospital and home	84 (12)	58 (12)	7 (11)	16 (14)	2 (7)	1 (14)	
Home	107 (16)	92 (20)	3 (5)	9 (8)	2 (7)	1 (14)	
Not sure	191 (28)	132 (28)	13 (21)	42 (36)	3 (11)	1 (14)	
Place with best pain relief							<0.0001
Hospital	452 (66)	274 (58)	52 (85)	97 (82)	24 (89)	5 (83)	
Same for hospital and home	93 (14)	77 (16)	6 (10)	8 (7)	1 (4)	1 (17)	
Home	65 (10)	58 (12)	1 (2)	5 (4)	1 (4)	0 (0)	
Not sure	71 (10)	60 (13)	2 (3)	8 (7)	1 (4)	0 (0)	
Place that is most comfortable							<0.0001
Hospital	140 (21)	53 (11)	26 (42)	47 (40)	10 (37)	4 (57)	
Same for hospital and home	45 (7)	25 (5)	6 (10)	12 (10)	1 (4)	1 (14)	
Home	411 (60)	338 (72)	18 (29)	43 (37)	11 (41)	1 (14)	
Not sure	87 (13)	54 (12)	12 (19)	15 (13)	5 (19)	1 (14)	
Knowledge about advance directives							0.3944
Yes	138 (20)	96 (20)	9 (15)	29 (25)	3 (11)	1 (17)	
No	548 (80)	377 (80)	53 (85)	89 (75)	24 (89)	5 (83)	
Interested in an advance directive ^c							<0.0001
Yes	523 (77)	367 (79)	35 (56)	100 (85)	16 (59)	5 (83)	
No	156 (23)	99 (21)	27 (44)	18 (15)	11 (41)	1 (17)	
Interested in a surrogate decision maker							0.4351
Yes	428 (64)	291 (64)	37 (58)	79 (68)	18 (67)	3 (50)	
No	69 (10)	45 (10)	6 (9)	16 (14)	1 (4)	1 (17)	
Not sure	171 (26)	119 (26)	21 (33)	21 (18)	8 (30)	2 (33)	
Interested in being an organ donor							0.2611
Yes	245 (37)	170 (38)	17 (27)	47 (43)	9 (35)	2 (40)	
No	184 (28)	131 (29)	15 (24)	28 (25)	7 (27)	3 (60)	
Not sure	204 (31)	137 (30)	28 (44)	29 (26)	10 (38)	0 (0)	
Cannot donate	23 (4)	14 (3)	3 (5)	6 (5)	0 (0)	0 (0)	

Values are presented as n (%). ^aFamily members living at home. ^bFamily members not living at home. ^cIncludes 9 respondents who already had an advance directive. PCU: palliative care unit.

Of the 743 respondents, we examined the answers of the 692 respondents who did respond to the question regarding their preferred place of care and death.

Table 5 Results of the univariate analyses comparing background characteristics to the preferred place of death

Characteristics	Total (n = 692)	Home (n = 73)	Hospital (n = 208)	PCU (n = 377)	Cancer center (n = 27)	Nursing home (n = 7)	p-value
Sex							0.1258
Male	337 (49)	40 (56)	111 (53)	168 (45)	16 (59)	2 (33)	
Female	351 (51)	2 (44)	97 (47)	207 (55)	11 (41)	4 (67)	
Age							0.0549
< 69 years	455 (66)	44 (61)	124 (60)	264 (70)	20 (74)	3 (50)	
≥ 70 years	233 (34)	28 (39)	84 (40)	111 (30)	7 (26)	3 (50)	
Number of family members at home							0.5735
1	95 (14)	13 (18)	29 (14)	48 (13)	3 (11)	2 (29)	
2 or more	585 (86)	58 (82)	174 (86)	324 (87)	24 (89)	5 (71)	
Level of education							0.0031
≤ 12 years	439 (64)	40 (57)	154 (75)	222 (60)	18 (67)	5 (71)	
> 12 years	243 (39)	30 (43)	51 (25)	151 (40)	9 (33)	2 (29)	
Experience with healthcare work							0.8020
Personal experience	34 (5)	4 (6)	9 (5)	19 (5)	1 (4)	1 (17)	
Experienced family member	72 (11)	7 (10)	20 (10)	44 (12)	1 (4)	0 (0)	
Non-healthcare staff in family	569 (84)	60 (85)	171 (86)	309 (83)	24 (92)	5 (83)	
Experience of hospitalization							0.7186
Personally hospitalized	174 (25)	18 (26)	50 (24)	98 (26)	5 (19)	3 (43)	
Family member hospitalized ^a	269 (39)	19 (26)	75 (36)	159 (42)	14 (52)	2 (29)	0.0454
Other relative hospitalized ^a	306 (45)	33 (46)	75 (36)	189 (50)	6 (22)	3 (43)	0.0027
Friend hospitalized	120 (18)	11 (15)	31 (15)	73 (20)	4 (15)	1 (14)	0.6815
Experience of bereavement							0.0170
Family ^a	150 (22)	15 (21)	39 (19)	83 (22)	8 (30)	5 (71)	0.3597
Other relative ^a	414 (60)	48 (66)	119 (57)	231 (61)	13 (48)	3 (43)	0.7986
Friend	144 (21)	12 (16)	42 (20)	84 (22)	5 (19)	1 (14)	0.2272
None	128 (19)	9 (12)	48 (23)	64 (17)	6 (22)	1 (14)	0.0063
Desire to know prognosis							0.1381
Yes	552 (80)	55 (75)	153 (74)	317 (84)	24 (89)	3 (43)	
No	57 (8)	9 (12)	26 (13)	19 (5)	1 (4)	2 (29)	
Not sure	82 (12)	9 (12)	28 (14)	41 (11)	2 (7)	2 (29)	
Availability of home physicians							0.0279
Yes	156 (24)	20 (29)	57 (30)	70 (20)	6 (22)	3 (43)	
No	206 (32)	17 (24)	52 (27)	127 (37)	9 (33)	1 (14)	
Not sure	279 (44)	33 (47)	83 (43)	148 (43)	12 (44)	3 (43)	
Availability of home nurses							0.0002
Yes	133 (20)	15 (21)	52 (26)	61 (16)	4 (15)	1 (14)	
No	207 (31)	20 (28)	48 (24)	133 (36)	5 (19)	1 (14)	
Not sure	338 (50)	36 (51)	101 (50)	178 (48)	18 (67)	5 (71)	
Place associated with longest life							0.0121
Hospital	301 (44)	20 (28)	109 (53)	148 (40)	20 (74)	4 (57)	
Same for hospital and home	84 (12)	5 (7)	22 (11)	54 (15)	2 (7)	1 (14)	
Home	107 (16)	19 (26)	21 (10)	64 (17)	2 (7)	1 (14)	
Not sure	191 (28)	28 (39)	52 (25)	107 (29)	3 (11)	1 (14)	
Place with best pain relief							0.0041
Hospital	452 (66)	38 (54)	149 (74)	236 (63)	24 (89)	5 (83)	
Same for hospital and home	93 (14)	10 (14)	27 (13)	54 (14)	1 (4)	1 (17)	
Home	65 (10)	12 (17)	9 (4)	43 (11)	1 (4)	0 (0)	
Not sure	71 (10)	11 (15)	17 (8)	42 (11)	1 (4)	0 (0)	
Place that is most comfortable							0.0552
Hospital	140 (21)	7 (10)	45 (22)	74 (20)	10 (37)	4 (57)	
Same for hospital and home	45 (7)	4 (6)	17 (8)	22 (6)	1 (4)	1 (14)	
Home	411 (60)	55 (76)	108 (53)	236 (63)	11 (41)	1 (14)	
Not sure	87 (13)	6 (8)	33 (16)	42 (11)	5 (19)	1 (14)	
Knowledge about advance directives							<0.0001
Yes	138 (20)	15 (21)	29 (14)	90 (24)	3 (11)	1 (17)	
No	548 (80)	58 (80)	175 (86)	286 (76)	24 (89)	5 (83)	
Interested in an advance directive ^c							0.0128
Yes	523 (77)	53 (74)	126 (63)	323 (86)	16 (59)	5 (83)	
No	156 (23)	19 (26)	74 (37)	51 (14)	11 (41)	1 (17)	
Interested in a surrogate decision maker							0.0016
Yes	428 (64)	44 (63)	113 (55)	250 (69)	18 (67)	3 (50)	
No	69 (10)	7 (10)	19 (9)	41 (11)	1 (4)	1 (17)	
Not sure	171 (26)	19 (27)	72 (35)	70 (19)	8 (30)	2 (33)	
Interested in being an organ donor							
Yes	245 (37)	25 (37)	57 (29)	152 (42)	9 (35)	2 (40)	
No	184 (28)	26 (38)	50 (25)	98 (27)	7 (27)	3 (60)	
Not sure	204 (31)	15 (22)	87 (44)	92 (26)	10 (38)	0 (0)	
Cannot donate	23 (4)	2 (3)	5 (3)	16 (4)	0 (0)	0 (0)	

Values are presented as n (%). ^aFamily members living at home. ^bFamily members not living at home. ^cIncludes nine respondents who already had an advance directive.

Table 6 Results of the multinomial logistic regression analyses of the relationships between background characteristics and the preferred places of care and death

Variable	Place of care		Place of death	
	Home (vs. hospital)	PCU (vs. hospital)	Home (vs. hospital)	PCU (vs. hospital)
	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
Interested in an advance directive ^a				
Yes (vs. no)	2.00 (0.97–4.12)	4.74 (1.95–12.1)***	1.45 (0.66–3.28)	2.75 (1.70–4.47) ***
Age				
≥ 70 years (vs. < 69 years)	0.47 (0.24–0.94)*	0.41 (0.18–0.92)*	Not applicable	Not applicable
Family hospitalized				
Yes (vs. no)	Not applicable	Not applicable	0.51 (0.22–1.12)	1.55 (0.98–2.46)
Relative hospitalized				
Yes (vs. no)	2.12 (1.04–4.48)*	1.99 (0.87–4.69)	1.33 (0.63–2.84)	1.65 (1.09–2.51)*
Family bereavement				
Yes (vs. no)	Not applicable	Not applicable	1.33 (0.51–3.36)	0.96 (0.56–1.66)
Interested in surrogate decision maker				
Yes (vs. no)	Not applicable	Not applicable	1.15 (0.37–3.85)	1.31 (0.65–2.55)
Not sure (vs. no)	Not applicable	Not applicable	1.38 (0.42–4.90)	0.93 (0.44–1.93)
Desire to know prognosis				
Yes (vs. no)	2.56 (0.90–6.97)	2.36 (0.73–7.83)	1.04 (0.36–3.20)	2.32 (1.12–4.85)*
Not sure (vs. no)	3.52 (0.90–15.1)	1.78 (0.33–10.4)	0.81 (0.20–3.38)	1.58 (0.64–3.96)
Availability of home nurses				
Yes (vs. no)	0.77 (0.29–2.09)	0.30 (0.09–0.99)*	0.55 (0.19–1.49)	0.39 (0.21–0.70)**
Not sure (vs. no)	0.69 (0.31–1.48)	0.30 (0.11–0.72)**	0.68 (0.29–1.62)	0.61 (0.38–0.99)*
Level of education				
> 12 years (vs. ≤ 12 years)	3.21 (1.46–7.75)**	2.39 (0.93–6.66)	2.30 (1.09–4.91)*	2.01 (1.28–3.19)**
Place of best pain relief				
Hospital (vs. not sure)	0.15 (0.01–0.85)*	0.39 (0.01–3.26)	0.68 (0.24–2.04)	0.83 (0.39–1.72)
Home (vs. not sure)	0.40 (0.01–11.5)	0.89 (0.02–35.4)	1.82 (0.42–8.20)	1.67 (0.59–4.92)
Hospital = Home (vs. not sure)	0.29 (0.01–2.56)	0.43 (0.01–6.19)	0.58 (0.13–2.42)	1.36 (0.55–3.35)
Place of most comfort				
Hospital (vs. not sure)	0.53 (0.19–1.41)	2.83 (0.83–10.3)	1.69 (0.40–7.97)	1.46 (0.71–3.01)
Home (vs. not sure)	3.73 (1.34–10.1)*	2.17 (0.61–7.87)	3.25 (0.97–13.4)	1.51 (0.79–2.88)
Hospital = Home (vs. not sure)	1.27 (0.33–5.20)	1.97 (0.36–11.2)	2.87 (0.44–17.6)	0.92 (0.35–2.43)
Place of longest life				
Hospital (vs. not sure)	0.69 (0.29–1.58)	0.47 (0.16–1.25)	0.27 (0.11–0.63)**	0.61 (0.36–1.03)
Home (vs. not sure)	2.47 (0.50–18.7)	0.50 (0.06–5.46)	1.37 (0.48–3.91)	1.01 (0.47–2.22)
Home = Hospital (vs. not sure)	0.60 (0.18–2.05)	0.76 (0.18–3.24)	0.17 (0.03–0.66)**	1.11 (0.54–2.34)
Interested in being an organ donor				
Yes (vs. not sure)	Not applicable	Not applicable	1.87 (0.77–4.63)	1.73 (1.07–2.82)*
No (vs. not sure)	Not applicable	Not applicable	2.14 (0.89–5.23)	1.33 (0.79–2.26)

^aIncludes 9 respondents who already had an advance directive. * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

this opinion was associated with a preference for home care. However, 66% of the respondents believed they would receive the most efficacious pain relief in the hospital, and 44% thought they would live longer in a hospital. Similar to the findings of a previous Japanese study [22], our respondents who believed home nursing care was unavailable were more likely to prefer care in a PCU.

Our finding that the older individuals generally preferred hospital care to home care is also consistent with previous research [23]. Those who prefer the hospital as a place of care and death are unfamiliar with the circumstances surrounding home care services because Japan's hospitals are so accessible [24]. In the present study, 44% of the respondents were not sure of home physician availability, and 50% were not sure about home nurse availability. In an earlier Japanese study, participants who were unfamiliar with home care nursing or unsure about insurance coverage for 24-h availability of home doctors and nurses chose hospital deaths over home deaths [22]. Therefore, it is important to inform the Japanese public about the limited availability of hospital care and to educate them about the expansion of available home care.

The MHLW reported their latest survey regarding end of life care in 2014 [Ministry of Health, Labour and Welfare of Japan. The result of a "survey of end-of-life care". Available from <<http://www.mhlw.go.jp/file/04-Houdouhappyou-10802000-Iseikyoku-Shidouka/0000042775.pdf>> (June 28, 2014, date last accessed) [in Japanese]]. The percentage of participants who had already written their living wills was 3.4%, which represents only a slight increase compared to previous reports [14, 15] and with our result (1.4%; data not shown). The MHLW survey also asked about the respondents' preferred place of living in their final life stages. As one scenario stated, "they have terminal cancer, but they feel no pain and can have meals well, and their consciousness and judgments are clear". For that scenario, the percentage of the respondents who reported a preference for home care was 71.7%, that for the care facility was 8.2%, and that for a medical facility was 19.0%.

Another scenario was presented as follows: "breathing and having a meal is getting difficult. They will gradually or suddenly die". The preference for home care in this case was 37.4%, whereas that for a care facility was 13.7%, and that for a medical facil-

ity was 47.3%. It is worth noting that the preference for a care facility was increased compared to our study and the previous MHLW survey.

The Japanese government established its Act on the Securement of a Stable Supply of Elderly Persons' Housing in 2001, and it was revised in 2011. The Japanese government has promised to provide support for the elderly to receive appropriate care services and housing. This result suggests that individuals who think dying in their own house is impossible and prefer a medical facility [25] as their place of death may prefer elderly housing with provided supportive services. This situation is similar in other countries [26]. The improvement of care facilities and elderly housing with available supportive services will be of great importance in Japan in the near future.

In addition, we should investigate patients' quality of life and physical and psychological comfort in home palliative care and in hospital care situations in order to inform them of their best options. This issue deserves further attention because it remains unclear whether such education and encouragement regarding living wills will significantly increase the demand for home-based end-of-life care and death. Further research should also be conducted to assess the differences in quality of life between patients who receive home care and those who receive hospital or PCU care.

This study was limited in its selection of respondents from only one region of Japan. Moreover, this study did not target patients with terminal diagnoses. Preferences regarding end-of-life care and death may change as death approaches. Future research should address this critical population.

In conclusion, among Japanese older adults, the interest in obtaining a living will is associated with a preference for end-of-life care and death in a PCU rather than a hospital. Encouraging greater interest in living wills might decrease the rate of hospital deaths and increase the rate of PCU deaths, but it should not have any effect on home deaths. Our findings also imply that most Japanese adults are unfamiliar with home care and believe that dying at home is impossible, which may influence their preferences for PCUs as optimal death locations. Given that the number of terminally ill patients in Japan is expected to increase in the coming years, the Japanese palliative care system should be expanded to meet patients'

end-of-life needs, and this includes not only facilitating home care but also increasing access to PCU care and elderly housing with supportive services.

Acknowledgments. We thank Ms. Miku Tanigawa for her help in collecting the questionnaire data. This work was supported by the Sasakawa Memorial Health Foundation.

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