

Table S1 Criteria of levels of dementia symptomatology in the Japanese LTCI system

Rank	Criteria	Examples of observable symptoms or behaviors
0	Independent	
I	Suffers from certain dementia symptoms, but daily living is almost fully independent in the domestic and social spheres.	
II	Manifests some symptoms/behaviors and communication difficulties that may hinder daily activities, but can be independent if someone takes care of them.	
II a	The above-mentioned conditions in II are observed while outside the domestic sphere.	Frequently gets lost on the street, or makes noticeable mistakes in matters that the person was previously able to handle, such as shopping, personal administrative tasks, or financial management.
II b	The abovementioned conditions in II are also observed in the domestic sphere.	Is unable to manage taking medication or stay alone at home due to an inability to answer the phone or the door.
III	Occasionally manifests communication difficulties or symptoms/behaviors that hinder daily activities, thus requiring care.	
III a	Manifests above-mentioned conditions described in III predominantly during the day.	Has difficulty or takes time to change clothes, take meals, defecate, or urinate; puts objects into the mouth, picks up and collects objects, is incontinent, makes loud and incoherent screams, carelessly handles fire, or engages in unhygienic acts or inappropriate sexual acts, etc.
III b	Manifests above-mentioned conditions described in III predominantly at night. Frequently manifests difficulties communicating	Same as rank IIIa.
IV	or symptoms/behaviors that hinder daily activities and constantly requires care.	Same as rank III.
M*	Manifests significant mental symptoms, problematic behaviors, or severe physical illnesses and requires specialized medical care.	Shows continued mental symptoms, such as delirium, delusions, and agitation, and manifests associated problematic behaviors, such as self-mutilation or harm to others.

*M=Medical

Table S2 Four categories of social support (including questionnaire items)

	Receive	Provide
Emotional social support	<p>(a) receiving support at the emotional level</p> <p>(Question: "Do you have someone who listens to your concerns and complaints? Circle all that apply. Options included family living together, separated children and relatives, acquaintance/friends/neighbors")</p>	<p>(b) providing support at the emotional level</p> <p>(Question: "Do you listen to someone's concerns or complaints? Circle all that apply. Options include family living together, separated children and relatives, acquaintances/friends/neighbors")</p>
Instrumental social support	<p>(c) receiving support at the instrumental level</p> <p>(Question: "Do you have someone who looks after you when you are sick and confined to bed for a few days? Circle all that apply. Options include family living together, separated children and relatives, acquaintance/friends/neighbors")</p>	<p>(d) providing support at the instrumental level</p> <p>(Question: "Do you look after someone when he/she is sick and confined to bed for a few days? Circle all that apply. Options include family living together, separated children and relatives, acquaintance/friends/neighbors")</p>

Table S3 Descriptive characteristics of the respondents (n = 11,032)

<i>Individual level variables</i>	n	%	Patients with Dementia [n = 1,776 (16.1%)]		Person-year	Incidence rate(IR) per 1000 person-years	
			n	%		IR	95% CI
Sex							
Male	5,405	49.0	746	13.8	41,871	17.8	[16.6, 19.1]
Female	5,627	51.0	1,030	18.3	45,362	22.7	[21.4, 24.1]
Age (years)							
65-69	4,065	36.9	207	5.1	35,143	5.9	[5.1, 6.7]
70-74	3,280	29.7	428	13.1	26,842	15.9	[14.5,17.5]
75-79	2,228	20.2	548	24.6	16,689	32.8	[30.2,35.7]
80-84	1,012	9.2	376	37.2	6,502	57.8	[52.3,64.0]
85+	447	4.1	217	48.6	2,057	105.5	[92.4,120.5]
Living alone							
No	9,959	90.3	1,558	15.6	79,038	19.7	[18.8,20.7]
Yes	1,073	9.7	218	20.3	8,194	26.6	[23.3,30.4]
Marital status							
Married	7,905	71.7	1,038	13.1	63,992	16.2	[15.3,17.2]
Widowed or divorced	2,745	24.9	658	24.0	20,274	32.5	[30.1,35.0]
Never married	190	1.7	41	21.6	1,453	28.2	[20.8,38.3]
Other/Missing	192	1.7	39	20.3	1,514	25.8	[18.8,35.3]
Education (years)							
≥13	455	4.1	171	37.6	3,004	56.9	[49.0,66.1]
10-12	6,002	54.4	963	16.0	47,576	20.2	[19.0,21.6]
6-9	3,341	30.3	470	14.1	26,908	17.5	[16.0,19.1]
<6	1,132	10.3	149	13.2	8,965	16.6	[14.2,19.5]
Other/Missing	102	0.9	23	22.6	780	29.5	[19.6,44.4]
Present illness							
No	2,906	26.3	354	12.2	24,074	14.7	[13.3,16.3]
Yes	7,679	69.6	1,348	17.6	59,636	22.6	[21.4,23.8]
Missing	447	4.1	74	16.6	3,523	21.0	[16.7,26.4]
GDS-15							

0-4	6,737	61.1	857	12.7	55,179	15.5	[14.5,16.6]
5-9	2,234	20.3	450	20.1	16,840	26.7	[24.4,29.3]
10-15	644	5.8	170	26.4	4,393	38.7	[33.3,45.0]
Missing	1,417	12.8	299	21.1	10,820	27.6	[24.7,31.0]
Smoking status							
Never	6,501	58.9	1,129	17.4	52,412	21.5	[20.3,22.8]
Former	2,757	25.0	367	13.3	21,375	17.2	[15.5,19.0]
Current	1,396	12.7	213	15.3	10,543	20.2	[17.7,23.1]
Missing	378	3.4	67	17.7	2,902	23.1	[18.2,29.3]
Alcohol consumption							
Non	7,094	64.3	1,268	17.9	55,456	22.9	[21.6,24.2]
Does not drink every_day	1,513	13.7	188	12.4	12,275	15.3	[13.3,17.7]
Drinks every_day \leq 35 g/day	1,769	16.0	233	13.2	14,247	16.4	[14.4,18.6]
Drinks every_day $>$ 35 g/day	495	4.5	49	9.9	4,032	12.2	[9.2,16.1]
Missing	161	1.5	38	23.6	1,222	31.1	[22.6,42.7]
Social supports							
Receiving emotional support							
No	1,089	9.9	208	19.1	8,161	25.5	[22.2,29.2]
Yes	9,943	90.1	1,568	15.8	79,071	19.8	[18.9,20.8]
Providing emotional support							
No	1,836	16.6	409	22.3	13,135	31.1	[28.3,34.3]
Yes	9,196	83.4	1,367	14.9	74,097	18.4	[17.5,19.5]
Receiving instrumental support							
No	868	7.9	112	18.1	4,849	23.1	[19.2,27.8]
Yes	10,164	92.1	1,664	16.0	82,384	20.2	[19.3,21.2]
Providing instrumental support							
No	619	5.6	250	28.8	6,044	41.4	[36.5,46.8]
Yes	10,413	94.4	1,526	15.0	81,189	18.8	[17.9,19.8]

Table S4 Results of multilevel survival analyses for onset of incident dementia (Full version of Table 3, including individual-level results)

	Model 1	Model 2 (1 year)	Model 3 (2 year)	Model 4 (3 year)
	n = 11,032	n=10,780	n = 10,440	n = 10,071
<i>Fixed effect</i>	HR (95% CI)	HR (95% CI)	HR (95% CI)	HR (95% CI)
<i>Community level variables</i>				
Rate of receiving emotional support*	0.96 (0.94-0.99)	0.97 (0.94-0.99)	0.97 (0.94-0.99)	0.97 (0.94-0.988)
Rate of providing emotional support*	0.99 (0.96-1.01)	0.99 (0.96-1.01)	0.98 (0.95-1.01)	0.98 (0.95-1.01)
Rate of receiving instrumental support*	1.01 (0.97-1.04)	1.01 (0.97-1.04)	1.01 (0.97-1.05)	1.01 (0.97-1.06)
Rate of providing instrumental support*	1.00 (0.97-1.03)	1.00 (0.97-1.02)	1.00 (0.97-1.03)	1.00 (0.97-1.04)
<i>Individual level variables</i>				
Social supports				
Receiving emotional support				
No	1.0 (reference)	1.0 (reference)	1.0 (reference)	1.0 (reference)
Yes	1.04 (0.88-1.22)	1.03 (0.87-1.22)	1.03 (0.87-1.23)	0.99 (0.83-1.19)
Providing emotional support				
No	1.0 (reference)	1.0 (reference)	1.0 (reference)	1.0 (reference)
Yes	0.83 (0.73-0.94)	0.88 (0.77-0.997)	0.91 (0.80-1.04)	0.91 (0.79-1.05)
Receiving instrumental support				
No	1.0 (reference)	1.0 (reference)	1.0 (reference)	1.0 (reference)
Yes	1.22 (0.99-1.51)	1.18 (0.95-1.47)	1.13 (0.90-1.42)	1.15 (0.91-1.47)
Providing instrumental support				
No	1.0 (reference)	1.0 (reference)	1.0 (reference)	1.0 (reference)
Yes	0.76 (0.66-0.89)	0.82 (0.70-0.96)	0.85 (0.72-1.01)	0.89 (0.74-1.07)
Sex				
Male	1.0 (reference)	1.0 (reference)	1.0 (reference)	1.0 (reference)
Female	1.01 (0.87-1.18)	1.03 (0.88-1.20)	1.06 (0.90-1.24)	1.08 (0.91-1.28)
Age (years)				
65-69	1.0 (reference)	1.0 (reference)	1.0 (reference)	1.0 (reference)
70-74	2.64 (2.23-3.12)	2.67 (2.25-3.16)	2.65 (2.22-3.16)	2.71 (2.26-3.25)
75-79	5.42 (4.60-6.38)	5.59 (4.73-6.61)	5.84 (4.93-6.93)	5.97 (5.00-7.13)
80-84	9.85 (8.24-11.78)	10.08 (8.40-12.10)	10.30 (8.53-12.43)	10.31 (8.46-12.56)

85+	19.01 (15.38-23.50)	19.32 (15.52-24.06)	19.32 (15.33-24.34)	18.64 (14.52-23.92)
Living alone				
No	1.0 (reference)	1.0 (reference)	1.0 (reference)	1.0 (reference)
Yes	0.94 (0.80-1.11)	0.94 (0.79-1.12)	0.98 (0.82-1.17)	1.03 (0.86-1.24)
Marital status				
Married	1.0 (reference)	1.0 (reference)	1.0 (reference)	1.0 (reference)
Widowed or divorced	1.09 (0.96-1.24)	1.09 (0.96-1.24)	1.06 (0.92-1.21)	1.00 (0.86-1.15)
Never married	1.28 (0.92-1.78)	1.22 (0.87-1.73)	1.24 (0.87-1.76)	1.25 (0.87-1.79)
Other/Missing	1.12 (0.80-1.56)	1.13 (0.80-1.58)	1.09 (0.77-1.56)	1.09 (0.76-1.57)
Education (years)				
≥ 13	1.0 (reference)	1.0 (reference)	1.0 (reference)	1.0 (reference)
10-12	0.89 (0.74-1.08)	0.89 (0.74-1.08)	0.89 (0.73-1.08)	0.92 (0.75-1.13)
6-9	0.96 (0.80-1.15)	0.95 (0.79-1.14)	0.95 (0.79-1.15)	0.96 (0.79-1.16)
<6	1.29 (1.02-1.63)	1.24 (0.97-1.57)	1.22 (0.95-1.57)	1.23 (0.95-1.61)
Other/Missing	0.89 (0.57-1.40)	0.82 (0.51-1.33)	0.80 (0.48-1.33)	0.86 (0.51-1.45)
Present illness				
No	1.0 (reference)	1.0 (reference)	1.0 (reference)	1.0 (reference)
Yes	1.15 (1.02-1.30)	1.13 (1.00-1.28)	1.13 (1.00-1.28)	1.10 (0.96-1.26)
Missing	0.96 (0.75-1.24)	0.98 (0.75-1.27)	0.99 (0.75-1.29)	1.01 (0.76-1.33)
GDS-15				
0-4	1.0 (reference)	1.0 (reference)	1.0 (reference)	1.0 (reference)
5-9	1.54 (1.37-1.73)	1.54 (1.37-1.74)	1.48 (1.31-1.68)	1.49 (1.30-1.69)
10-15	2.33 (1.96-2.77)	2.18 (1.82-2.62)	2.16 (1.79-2.62)	2.17 (1.78-2.66)
Missing	1.47 (1.28-1.68)	1.43 (1.25-1.64)	1.41 (1.22-1.63)	1.41 (1.22-1.64)
Smoking status				
Never	1.0 (reference)	1.0 (reference)	1.0 (reference)	1.0 (reference)
Former	0.99 (0.85-1.16)	1.00 (0.86-1.18)	0.99 (0.84-1.17)	1.02 (0.86-1.21)
Current	1.34 (1.12-1.60)	1.32 (1.10-1.59)	1.39 (1.15-1.68)	1.40 (1.15-1.71)
Missing	0.86 (0.65-1.15)	0.90 (0.67-1.20)	0.85 (0.63-1.15)	0.91 (0.67-1.24)
Alcohol consumption				
Non	1.0 (reference)	1.0 (reference)	1.0 (reference)	1.0 (reference)
Does not drink every_day	0.96 (0.82-1.13)	0.96 (0.81-1.13)	0.97 (0.82-1.15)	0.96 (0.80-1.15)

Drinks every_day \leq 35 g/day	0.98 (0.84- 1.15)	0.99 (0.84- 1.16)	1.02 (0.86- 1.20)	1.03 (0.87-1.22)
Drinks every_day $>$ 35 g/day	0.86 (0.64- 1.17)	0.90 (0.66- 1.21)	0.92 (0.68- 1.26)	0.91 (0.66-1.26)
Missing	1.14 (0.78- 1.66)	1.14 (0.78- 1.67)	1.24 (0.84- 1.83)	1.22 (0.82-1.83)
<i>Random effects</i>				
Community level variance (SE)	0.06 (0.05)	0.04 (0.06)	0.04 (0.07)	0.09 (0.04)

*HR for one point increment of community social support (range: 0-100)