



International Journal of Gerontology

journal homepage: <http://www.sgecm.org.tw/ijge/>



Original Article

Effect of Social Support on Changes in Instrumental Activities of Daily Living in Older Adults: A National Population-based Longitudinal Study

Hsiao-Chiao Wang^{a,b}, Chi-Rong Li^c, Chyi Lo^{a,b}, Chia-Yi Chiao^d, Chiu-Yueh Hsiao^e,
Hua-Shan Wu^{d,f}, Meng-Chih Lee^{g,h,i,j}, Wen-Chun Liao^{a,b,d*}

^a School and Graduate Institute of Nursing, China Medical University, Taichung, Taiwan, ^b Department of Nursing, China Medical University Hospital, Taichung, Taiwan, ^c Department of Teaching and Research, Taichung Hospital, Ministry of Health and Welfare, Taiwan, ^d Department of Nursing, Asia University, Taichung, Taiwan, ^e School of Nursing, College of Medicine, Chang Gung University, Taoyuan, Taiwan, ^f Department of Medical Research, China Medical University Hospital, China Medical University, Taichung, Taiwan, ^g Institute of Medicine, Chung Shan Medical University, Taichung, Taiwan, ^h Institute of Population Health Sciences, National Health Research Institutes, Miaoli, Taiwan, ⁱ College of Management, Chaoyang University of Technology, Taichung, Taiwan, ^j School of Public Health, National Defense Medical College, Taipei, Taiwan

ARTICLE INFO

Accepted 11 June 2018

Keywords:

social support,
social participation,
instrumental activities of daily living,
older adults,
population-based longitudinal study

SUMMARY

Background: Performance of instrumental activities of daily living (IADL) is important to active aging. Different types of social support may play roles in the process of performing IADLs. This study investigated effect of social support on changes of IADL function in older adults over a 10-year period.

Methods: The Taiwan Longitudinal Study in Aging (TLSA) database from 1996 to 2007 was used. IADL disability was defined as difficulties in either grocery shopping or using telephones as a dichotomous variable. A total of 1742 older adults (60–70 years) without IADL disability in 1996 were included. Receiving instrumental (ISS) and emotional social support (ESS), giving ISS and ESS to others, being a member of any association, or engaging in volunteering were assessed.

Results: Among these elders in 1996, 85% received ISS and ESS, and 10.8% provided ISS to others. Only 5% engaged in volunteering, and 44.9% were a member of an association. The GEE model showed that receiving ESS decreased the risk of IADL disability; giving ISS and being a member of an association were associated with a lower probability of IADL disability after adjustment for personal characteristics, comorbidities, physical performance, cognition and depression.

Conclusions: Receiving emotional support, giving instrumental support to others, and engaging in memberships have protective effects on IADL disability. These results demonstrate the needs of supporting systems and resources that older adults can provide for themselves.

Copyright © 2019, Taiwan Society of Geriatric Emergency & Critical Care Medicine.

1. Introduction

Quality of life is an important issue as people age. Functional independence is one of the indispensable abilities that the elderly attempt to maintain for a better quality of life. The performance of instrumental activities of daily living (IADL) is an important component of achieving successful and active aging.¹ The goal of care for the aging is to help them maintain independence for as long as possible during their lifetime.² Losing ability to perform IADL function is associated with multiple factors, including age, gender, education,² physical performance,³ chronic conditions,⁴ and psychosocial factors.⁵ Although greater educational attainment and increased usage of assistive technologies have contributed to the decline of late-life disability,⁶ further delay of the onset of functional disability is still the

major concern as people continue to live longer. Social factors, such as social networks and social support, may regulate the onset and progression of disability.

Social support is conceptualized as help from interpersonal social network⁷ with varied definition and measurement. It may cover emotional, instrumental, appraisal, and informational dimensions⁷ and involved both given and received support.^{8,9} Instrumental and emotional support,¹⁰ but not the size of their network,¹¹ is suggested to be the most influential support and may play roles in the process of performing IADLs. Current interests emerged is that providing social support may be more beneficial than receiving social support.^{12,13} Currently relation between social support and disability is inconsistency in cross-sectional research,^{14,15} and limited longitudinal evidence.¹⁶ The purpose of this study was to (1) investigate the progress of IADL disability through the years 1996–2007 in Taiwan's older adults aged 60–70 years and to (2) examine the associations of social support in 1996's status and dynamic experiences during 1999–2007 on the changes of IADL function in Taiwan's community dwelling older adults over a 10-year period. Covariate factors suggested from literature including personal characteristics,² physi-

* Corresponding author. 91, Hsueh-Shih Rd., Taichung, 404, Taiwan.

E-mail addresses: hawang@mail.cmu.edu.tw (H.-C. Wang), crli1212@gmail.com (C.-R. Li), chyilo@mail.cmu.edu.tw (C. Lo), joy831@asia.edu.tw (C.-Y. Chiao), koalhsiao@gmail.com (C.-Y. Hsiao), huashan@asia.edu.tw (H.-S. Wu), mcl@taic.moh.gov.tw (M.-C. Lee), wcl@mail.cmu.edu.tw (W.-C. Liao).

cal performance,³ chronic comorbidities,⁴ cognition and depression⁵ were adjusted in this study.

2. Materials and methods

2.1. Study design and data collection

This study used data from The Taiwan Longitudinal Study on Aging (TLISA) in 1996, 1999, 2003, and 2007. Details of sampling design and field operations have been reported previously.^{2,17} Only those aged 60–70 years old in 1996 with IADL capabilities were included in this study (Fig. 1). All personally identifiable information in TLISA is encrypted for patient protection. This study was exempted from the Institutional Review Board of Chung Shan Medical University.

2.2. Measures

2.2.1. Instrumental activities of daily living (IADL) disability

IADL disability in this study was assessed primarily by two IADLs: shopping and telephoning. Shopping is the most affected limitation in the elderly.¹⁸ The other best predictors are “food preparation,” “laundry,” “medication use,” “travelling via car or public transportation,” “ability to use telephone,” and “ability to handle finances”.¹⁸ In Taiwan’s society, preparing food and laundry are usually performed by females; travelling via car or public transportation is usually organized by males. It is not necessary for every elderly person to take medication. Making phone calls is important to communication in Taiwan’s society. Since differential item functioning is more helpful than a total score of functioning to compare disabilities across groups or countries,¹⁹ IADL disability in this study was defined as reported difficulty with either going shopping or using telephones independently in any survey year.

2.2.2. Social support and social participation

Tardy’s⁹ social support models were used to guide the social support concept in this study. Social support was categorized by two dimensions: receiving and giving social support; and two aspects: instrumental (ISS) and emotional social support (ESS). Receiving ISS was estimated by one item “When you sick, can you rely on your family or relatives/friends for assistance? Receiving ESS was estimated by two items “If any family or relatives/friends can listen to you when you need?” and “If any family or relatives/friends can care for you?” A response of “always,” to “sometimes,” for the above items was scored as receiving support, respectively.

Giving ISS was estimated by three items “Do you help take care of your grandchildren or someone’s children?” “Do you assist anyone in activities of daily living?” “Do you do chores for someone not live with you?” Giving ESS was estimated by three items “Do your family or relatives/friends criticize you?” “Will your family seek your opinions when making decision?” and “Is it useful for your caring for your family or relatives/friends?” A “yes” response to these items was scored as giving support, respectively.

Social participation was estimated by “Whether you are engaged in volunteering or activities with associations or memberships?” Activities include church, accomplishment groups, community service ... etc. A “yes” response in any activities was scored as active in social participation.

2.2.3. Demographic and co-morbidities

Participant characteristics including age, gender, years of education, and marital status were obtained in 1996. Co-morbidities were obtained in 1996 and 1999–2007 by asking respondents if they had

cardiovascular disease, diabetes, stroke, or any type of cancer.

2.2.4. Covariates

Physical functioning was obtained in each survey year by asking respondents if they had any impairment of vision (including wearing glasses), hearing (including wearing hearing aids), and mobility for walking 200–300 m. Cognition was screened by the nine-item Short Portable Mental Status Questionnaire (SPMSQ),²⁰ and depression was assessed by the Center for Epidemiological Studies Depression Scale 10 items (CESD-10).²¹ A lower SPMSQ score (<6 for 65–74 years of age and <5 for 74 years and older)²² indicates poor cognition. A higher CESD-10 score (>8)²³ indicates severe depression states.

2.3. Statistical analysis

Descriptive statistics and logistic regression was used to describe and examine the longitudinal and cross-sectional effects of social support on the dichotomous outcome of IADL function with the generalized estimating equation (GEE) approach of unstructured correlation structure. All analyses were performed using the statistical software SAS version 9.2 (SAS Institute Inc., Cary, NC) with a significance of p -value < .05.

3. Results

Table 1 shows characteristics of the sample and the distribution of their physical performance, cognition, and depression in 1996. The trend of older adults with normal IADL function from 1996 to 2007 gradually decreased (Table 2). More women were disabled, but more men died in the follow-ups. The trend in receiving ISS and ESS increased mildly for both men and women and reached the peak at 2007, while 70–80 years of age. The trend of providing ISS and ESS reached its peak in 1999, while 63–73 years of age, a period of just retired from work.

The association of older adults’ social support in 1996 on their subsequent IADL function in 1999–2007 (Table 3, model 1) and the correlation of their social support with IADL function during 1999–2007 (Table 3, model 2) were examined. After adjusting for covariates, those who received ESS in 1996 had a decreased risk of IADL disability in 1999–2007 (Model 1). Providing ISS and ESS, and engaging in volunteering and memberships, were associated with a lower risk of IADL disability (Model 2). No time interaction existed among each social support variables in 1996 or during 1999–2007 for IADL disability ($0.370 < p < 0.860$). After considering the 1996 status and dynamic changes during 1999–2007 together (Model 3), older adults who continued to receive ESS in 1996 and during 1999–2007 and who engaged in memberships during 1999–2007 had a lower risk of IADL disability in 1999–2007 (Model Final).

4. Discussion

Our results show a gradually decreased trend of older adults with normal IADL function in 10 years. The ratio of disabled elders of 4.5%–21.3% from 1999 to 2007 was low compared to other countries (13.5–42.1%),^{24–26} because this was a group of older adults with good IADL function between 60 and 70 years of age. Due to improving education and technology, the trends in functional disability for Taiwan’ elderly are declining.² However, after 10 years of follow-ups, more women became disabled but more men died as they aged. Women have a longer life expectancy but also experience longer disabled years. Longevity does not guarantee a good quality of life.

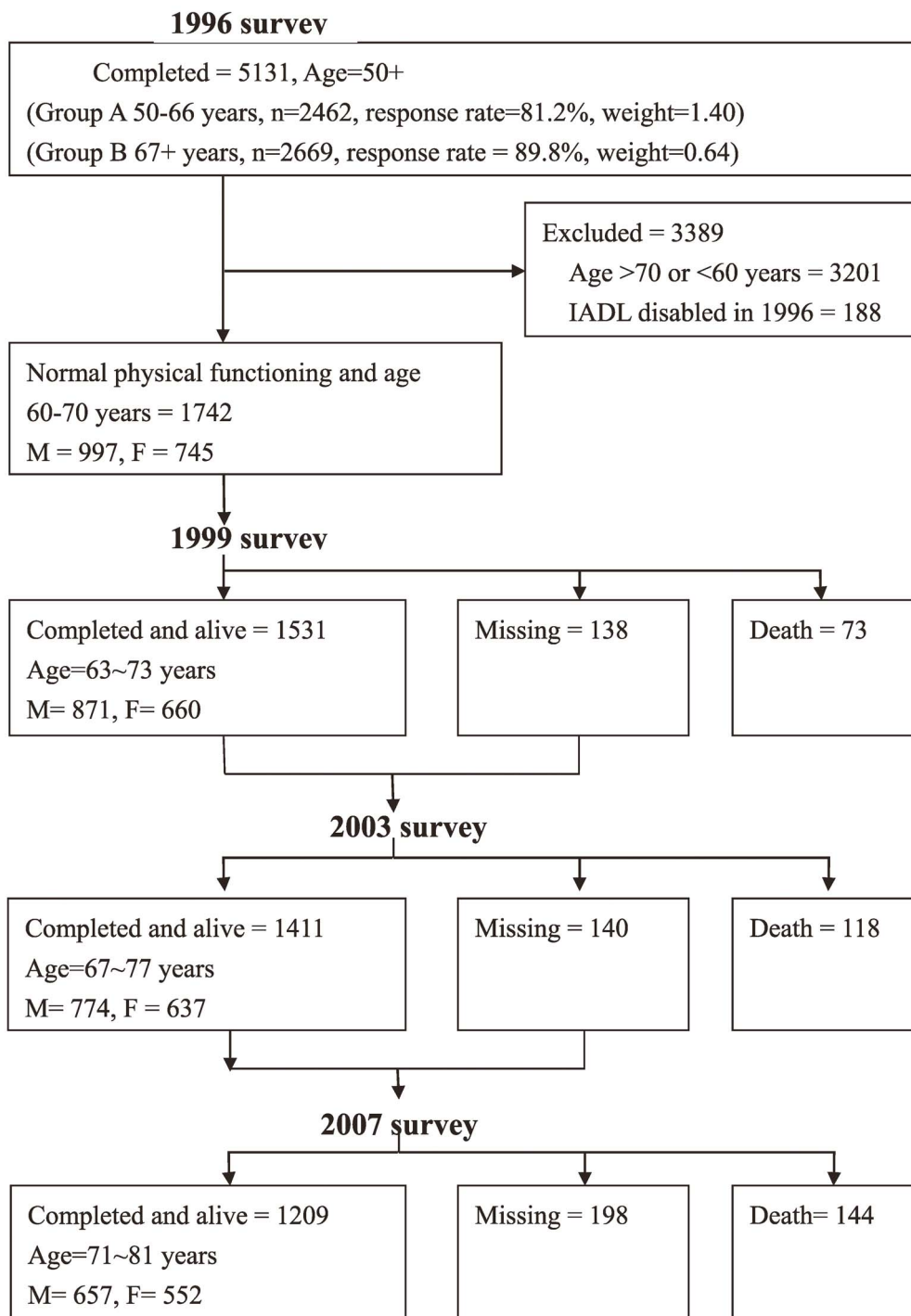


Figure 1. Flow diagram of the cohort sample and follow-ups.

After adjusting for known covariates, providing social support to others such as providing care and engaging in volunteering or memberships can decrease the risk of IADL disability. Though result may be different by using different definition and measures,¹¹ these results were similar to a cohort study that providing social support to others reduced mortality.¹² Older adults are capable of being a resource for others. In contrast, receiving emotional social support is as important to have a lower risk of IADL disability during later lives. This result supports a protective effect of emotional social support on disability. A supporting program from caring agencies or institutions may be cost effective. Older adults maintain their active lifestyle as the extension of their middle age, especial keep contact with

friends and relatives and get emotional support with each other no matter their gender, education, physical functioning, and comorbidities.

Many studies view social support as a resource that people receive by formal groups or informal relationships.²⁷ However, the demand for care-giving is increasing but the pool of family caregivers is declining due to reduced fertility rates and offsprings.²⁸ Our results suggest the potential care-giving roles that older adults themselves can provide. Except for receiving support from others, older adult can be a resource to provide support to others.¹² They can be care recipients and caregivers as well. Results from this study emphasize the importance of social participation and providing social support

Table 1
Demographic characteristics and distribution of physical, cognition, and mental functions in 1996 in males and females (N = 1742).

	Male		Female		χ^2 ^b	p-value
	n ^a /mean	%/SD	n ^a /mean	%/SD		
Gender	997	57.2	745	42.8		
Age in 1996 (years)	65.0	3.2	64.3	3.1	21.80	< 0.001
60–64	444	44.5	416	55.8		
65–70	553	55.5	329	44.2	25.77	< 0.001
Marital Status in 1996 ^c						
Married	780	78.2	502	67.3		
Single	215	21.6	241	32.3		
Education					248.61	< 0.001
Illiterate	131	13.1	304	40.8		
1–6 years	490	49.1	325	43.6		
7–17 years	335	33.6	84	11.3		
Cohabitation (yes) ^d	877	88.0	694	93.2	12.98	< 0.001
Comorbidities						
Heart diseases	140	14.0	107	14.4	0.05	0.823
Diabetes	103	10.3	85	11.4	0.56	0.455
Stroke	33	3.3	4	0.5	15.66	< 0.001
Cancer	15	1.5	4	0.5	3.66	0.056
Any one of the above	249	25.0	174	23.3	0.54	0.464
Physical function						
Vision impaired	108	10.8	135	18.1	18.86	< 0.001
Hearing impaired	94	9.4	69	9.3	0.01	0.906
Mobility impaired	41	4.1	46	6.2	3.82	0.065
Cognition Impaired	150	15.6	151	20.8	7.49	0.006
Depressed	40	4.2	49	6.8	5.66	0.017

^a Due to missing values, the numbers for some variables may not add up to 1742.

^b Chi-square test to compare between male and female.

^c Marital status: "Single" = widowed, separated, divorced, or single.

^d Cohabitation: yes = live with spouse, children, relatives or friends.

Table 2
Distribution of IADL function and social support in males and females in each waves.

	1996		1999		2003		2007	
	n	%	n	%	n	%	n	%
Male								
IADL function								
Normal	997	100.0	826	82.9	710	75.1	571	66.7
Disabled			45	4.5	64	6.8	86	10.0
Dead			52	5.2	89	9.4	95	11.1
Missing			74	7.4	82	8.7	104	12.2
Social support								
Receiving ISS ^a	848	85.1	763	90.9	674	90.4	581	94.5
Receiving ESS ^b	806	86.0	693	84.7	621	85.1	532	87.2
Giving ISS ^a	83	8.3	199	22.9	140	18.1	108	16.4
Giving ESS ^b	854	88.9	768	91.3	663	89.5	563	91.2
Volunteering (yes)	54	5.5	88	10.1	55	7.1	48	7.3
Membership (yes)	523	52.5	533	61.5	401	51.8	342	52.0
Female								
IADL function								
Normal	745	100.0	595	79.9	530	73.2	404	58.1
Disabled			65	8.7	107	14.8	148	21.3
Dead			21	2.8	29	4.0	49	7.1
Missing			64	8.6	58	8.0	94	13.5
Social support								
Receiving ISS ^a	667	89.5	612	95.0	565	93.1	499	95.0
Receiving ESS ^b	595	84.3	552	86.7	533	87.5	457	87.7
Giving ISS ^a	118	15.8	212	32.0	131	20.6	116	20.5
Giving ESS ^b	651	89.2	594	91.7	525	85.5	444	83.6
Volunteering (yes)	37	5.1	41	6.2	50	7.8	46	8.2
Membership (yes)	268	38.5	314	47.4	251	39.4	216	38.3

^a ISS: instrumental social support.

^b ESS: emotional social support.

Table 3
Effects of social support in 1996 and during 1999–2007 on IADL impairment in 1999–2007.

	Crude univariate analyses			Multivariate model 1			Multivariate model 2			Multivariate model Final		
	OR	95% CI	p-value	OR	95% CI	p-value	OR	95% CI	p-value	OR	95% CI	p-value
Social support												
Social support in 1996												
Received ISS (yes)	0.868	0.576–1.306	0.496	0.95	0.601–1.5	0.928						
Received ESS (yes)	0.617	0.454–0.838	0.002	0.694	0.491–0.982	0.039				0.632	0.447–0.894	0.009
Giving ISS (yes)	0.999	0.691–1.445	0.998	0.871	0.587–1.293	0.707						
Giving ESS (yes)	0.603	0.423–0.86	0.005	1.088	0.723–1.636	0.39						
Volunteering (yes)	0.617	0.338–1.127	0.116	0.71	0.377–1.338	0.267						
Membership (yes)	0.815	0.638–1.039	0.099	1.023	0.792–1.32	0.825						
Social support 1999–2007												
Received ESS (yes)	1.131	0.744–1.72	0.564				1.413	0.748–2.667	0.286			
Received ISS (yes)	1.045	0.756–1.444	0.79				1.542	0.968–2.455	0.068			
Giving ISS (yes)	0.529	0.389–0.719	< .001				0.622	0.427–0.905	0.013	0.599	0.398–0.902	0.014
Giving ESS (yes)	0.319	0.144–0.704	0.005				0.4	0.152–1.056	0.064			
Volunteering (yes)	0.255	0.144–0.454	< .001				0.436	0.202–0.943	0.035	0.424	0.178–1.013	0.053
Membership (yes)	0.556	0.447–0.691	< .001				0.703	0.543–0.911	0.008	0.704	0.539–0.92	0.01
Covariates												
Time												
2007 vs 1999				4.14	3.222–5.319	< 0.001				< .001		< 0.001
2003 vs 1999				1.939	1.524–2.466	< 0.001	3.468	2.523–4.768	< .001	3.704	2.659–5.159	< 0.001
Age@96				1.123	1.077–1.17	< 0.001	1.95	1.423–2.672	< .001	2.054	1.478–2.856	< 0.001
Gender (Female vs Male)				1.123	1.077–1.17	< 0.001	1.079	1.034–1.127	0.001	1.079	1.031–1.129	0.001
Education				1.532	1.164–2.017	0.002	1.749	1.312–2.332	< .001	1.675	1.238–2.266	0.001
13–17 yrs vs none						< 0.001						< 0.001
7–12 yrs vs none				0.204	0.103–0.402	< 0.001	0.365	0.183–0.728	0.004	0.391	0.193–0.792	0.009
1–6 yrs vs none				0.31	0.2–0.481	< 0.001	0.359	0.232–0.558	< .001	0.414	0.259–0.661	< 0.001
Impaired Physical Function @96				0.496	0.373–0.659	< 0.001	0.467	0.347–0.628	< .001	0.474	0.346–0.648	< 0.001
Depression @96 (yes)				1.43	1.057–1.933	0.02				1.172	0.847–1.622	0.338
Comorbidities @96 (yes)				0.698	0.372–1.308	0.261				0.628	0.309–1.276	0.199
Integrated Cognition @96 (good)				2.298	1.755–3.01	< 0.001				1.372	0.982–1.918	0.064
Cohabitation @96 (no)				0.594	0.443–0.796	< 0.001				0.865	0.621–1.206	0.392
Impaired Physical Function @99-07				1.184	0.761–1.841	0.455				1.371	0.752–2.501	0.303
Depression @99-07 (yes)							4.521	3.345–6.109	< .001	4.549	3.3–6.269	< 0.001
Comorbidities @99-07 (yes)							2.627	1.784–3.868	< .001	2.485	1.659–3.724	< 0.001
Integrated Cognition @99-07 (good)							1.827	1.414–2.361	< .001	1.751	1.303–2.352	< 0.001
Cohabitation @99-07 (no)							0.467	0.36–0.606	< .001	0.521	0.394–0.69	< 0.001
							0.572	0.339–0.964	0.036	0.479	0.26–0.881	0.018

Note: Results are from GEE analyses. Significant associations ($p < .05$) are marked with bold. Crude univariate analyses were adjusted for time effect (data not showed here) but did not consider the interaction time effect because of not significant ($0.370 < p < 0.860$). Multivariate model 1: Social support in 1996 on IADL disability during 1999–2007, adjusted by age, gender, education (elementary, high school, and college), and physical functioning (any impairment in hearing, vision, and mobility), comorbidities, depression, and cognition at 1996. Multivariate model 2: Social support during 1999–2007 on IADL disability during 1999–2007, adjusted by the same covariates in 1996 and during 1999–2007. Multivariate model final: Combined effects of significant social support in 1996 and during 1999–2007 on IADL disability during 1999–2007, adjusted by the same covariates in 1996 and during 1999–2007.

to others. Older adults can be good resources to their society that we cannot and should not ignore.

The strength of this study is to use a national survey data with high response rates and regular follow-ups. All related personal characteristics and covariates were well controlled for long term effects in this study. This longitudinal study provides not only for an examination of correlational effect but also a trend between social support and IADL function. Limitation of this study includes self-reported data and the natural aging process of death data in each wave. Status such as current sign and symptoms, medication which may facilitate aging process were not controlled in this study. Activities such as use of conventional alternative medicine or other regimens which may have impact on aging were not controlled either. Moreover, due to the assumption of GEE estimations, death data are not manageable and should be excluded from analysis. Therefore, older adults aged 60–70 years of age were selected for this study to avoid too many deaths after 10 years, allowing for a proper estimation using the GEE method.

Social support and social participation are essential components in our life. This longitudinal study demonstrates the importance of social support in maintaining IADL function in older adults, even those with diseases or any dysfunctions. Receiving emotional support, giving instrumental social support to others, and engaging in memberships have protective effects on IADL disability. This result reveals the demands of an informal care system and the potential resources older adults can provide. However, only 10% of older adults provide social support to others, and less than 50% of older adults engaged in memberships, especially women. How and what strategies can be made to improve the opportunity of social participation in older adults should be further studied.

Conflicts of interest

All authors declare no potential financial and non-financial conflicts of interest.

Acknowledgments

We thank the participants and staff in the TLSA for their cooperation and assistance.

Appendix A. Supplementary data

Supplementary data related to this article can be found at <https://doi.org/10.1016/j.ijge.2018.06.004>.

References

- Rowe JW, Kahn RL. Successful aging. *Gerontologist*. 1997;37(4):433–440.
- Martin LG, Zimmer Z, Hurng BS. Trends in late-life disability in Taiwan, 1989–2007: the roles of education, environment, and technology. *Popul Stud (Camb)*. 2011;65(3):289–304.
- Hirsch CH, Buzkova P, Robbins JA, et al. Predicting late-life disability and death by the rate of decline in physical performance measures. *Age Ageing*. 2012;41(2):155–161.
- Freedman VA, Schoeni RF, Martin LG, et al. Chronic conditions and the decline in late-life disability. *Demography*. 2007;44(3):459–477.
- Eisele M, Zimmermann T, Kohler M, et al. Influence of social support on cognitive change and mortality in old age: results from the prospective multicentre cohort study AgeCoDe. *BMC Geriatr*. 2012;12:9.
- Schoeni RF, Freedman VA, Martin LG. Why is late-life disability declining? *Milbank Q*. 2008;86(1):47–89.
- House JS. *Work, Stress and Social Support*. Addison Wesley; 1981.
- Kahn RL, Antonucci TC. Convoys over the lifecycle: attachment, roles and social support. In: Baltes PB, Brim O, eds. *Life Span Development and Behavior*. New York: Academic Press; 1980:253–286.
- Tardy CH. Social support measurement. *Am J Community Psychol*. 1985;13(2):187–202.
- Reblin M, Uchino BN. Social and emotional support and its implication for health. *Curr Opin Psychiatry*. 2008;21(2):201–205.
- McLaughlin D, Leung J, Pachana N, et al. Social support and subsequent disability: it is not the size of your network that counts. *Age Ageing*. 2012;41(5):674–677.
- Brown SL, Nesse RM, Vinokur AD, et al. Providing social support may be more beneficial than receiving it: results from a prospective study of mortality. *Psychol Sci*. 2003;14(4):320–327.
- McGee HM, Molloy G, O'Hanlon A, et al. Older people—recipients but also providers of informal care: an analysis among community samples in the Republic of Ireland and Northern Ireland. *Health Soc Care Community*. 2008;16(5):548–553.
- Croezen S, Picavet HS, Haveman-Nies A, et al. Do positive or negative experiences of social support relate to current and future health? Results from the Doetinchem Cohort Study. *BMC Publ Health*. 2012;12:65.
- Hewitt B, Turrell G, Giskes K. Marital loss, mental health and the role of perceived social support: findings from six waves of an Australian population based panel study. *J Epidemiol Community Health*. 2012;66(4):308–314.
- Liao CC, Yeh CJ, Lee SH, et al. Providing instrumental social support is more beneficial to reduce mortality risk among the elderly with low educational level in Taiwan: a 12-year follow-up national longitudinal study. *J Nutr Health Aging*. 2015;19(4):447–453.
- Bureau of Health Promotion. Department of Health, Taiwan: 2007 *Taiwan longitudinal study on aging survey report*. *Taiwan Aging Study Series*. 2014;11.
- Roehrig B, Hoeffken K, Pientka L, et al. How many and which items of activities of daily living (ADL) and instrumental activities of daily living (IADL) are necessary for screening. *Crit Rev Oncol Hematol*. 2007;62(2):164–171.
- Chan KS, Kasper JD, Brandt J, et al. Measurement equivalence in ADL and IADL difficulty across international surveys of aging: findings from the HRS, SHARE, and ELSA. *J Gerontol B Psychol Sci Soc Sci*. 2012;67(1):121–132.
- Pfeiffer E. A short portable mental status questionnaire for the assessment of organic brain deficit in elderly patients. *J Am Geriatr Soc*. 1975;23(10):433–441.
- Kohout FJ, Berkman LF, Evans DA, et al. Two shorter forms of the CES-D (Center for Epidemiological Studies Depression) depression symptoms index. *J Aging Health*. 1993;5(2):179–193.
- Yen YC, Rebok GW, Gallo JJ, et al. Depressive symptoms impair everyday problem-solving ability through cognitive abilities in late life. *Am J Geriatr Psychiatry*. 2011;19(2):142–150.
- Hsu HC. Gender disparity of successful aging in Taiwan. *Women Health*. 2005;42(1):1–21.
- Ofstedal MB, Zimmer Z, Hermalin AI, et al. Short-term trends in functional limitation and disability among older Asians: a comparison of five Asian settings. *J Cross Cult Gerontol*. 2007;22(3):243–261.
- Peres K, Helmer C, Letenneur L, et al. Ten-year change in disability prevalence and related factors in two generations of French elderly community dwellers: data from the PAQUID study. *Aging Clin Exp Res*. 2005;17(3):229–235.
- Lin SF, Beck AN, Finch BK, et al. Trends in US older adult disability: exploring age, period, and cohort effects. *Am J Public Health*. 2012;102(11):2157–2163.
- Uchino BN, Carlisle M, Birmingham W, et al. Social support and the reactivity hypothesis: conceptual issues in examining the efficacy of received support during acute psychological stress. *Biol Psychol*. 2011;86(2):137–142.
- Roth DL, Fredman L, Haley WE. Informal caregiving and its impact on health: a reappraisal from population-based studies. *Gerontologist*. 2015;55(2):309–319.