

# Inadequate health literacy and more hospitalisation among frail older adults in Hong Kong

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## ABSTRACT

**Background.** Older adults with inadequate health literacy (IHL) have difficulty to understand health information, adhere to a treatment regimen, and implement self-care. This study aimed to assess the prevalence and contributing factors of IHL in community-dwelling older adults in Hong Kong and to describe the relationship between IHL and different health outcomes.

**Method.** This was a secondary data analysis using a large cohort of community-dwelling Chinese older adults who applied for subsidised long-term care services in Hong Kong in 2012. IHL was measured using the Rapid Estimate of Inadequate Health Literacy (REIHL). Socio-demographic factors and health outcomes (frequency of falls, hospitalisation, and use of an emergency service in the last 90 days) were assessed. Chi-square test and t-test were used to analyse the bivariate relationship between IHL and contributing factors, as well as health outcomes. Linear regression models were used to assess the effect of IHL on health outcomes.

**Results.** A total of 4589 older adults were included; 50% were married and 44% were male. 62.11% of respondents had IHL: more were female than male (74.01% vs. 46.9%,  $p < 0.001$ ) and more were unmarried than married (69.02% vs. 55.45%,  $p < 0.001$ ). 64.39% of the older adults who lived alone had IHL. IHL was associated with frequency of falls ( $p < 0.05$ ). After controlling for gender, marital status, and living arrangement, older adults with IHL were more likely to be hospitalised ( $\beta = 0.1044$ ,  $p < 0.001$ ).

**Conclusion.** The prevalence of IHL was high among community-dwelling frail older adults in Hong Kong. Those who were female, unmarried, and live alone were more likely to have IHL. They should be the target group for any health literacy enhancement programme. Older adults with IHL seem to be at risk of hospitalisation. The challenge is how to support these community-dwelling older adults and maintain good health.

**Key words:** Accidental Falls; Aged; Health literacy; Hospitalization

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## BACKGROUND

Inadequate health literacy (IHL) has been a concern in public health. According to the United States Department of Health and Human Services, health literacy is defined as the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions.<sup>1</sup> Health literacy is more than the ability to read and write or the educational level. It affects many facets of communication in health care settings and chronic illness management. Individuals with IHL are considered at risk because they have difficulty in understanding the risks related to diseases and symptoms reporting.<sup>2</sup> Evidence has also shown that those with IHL have difficulty to comprehend educational materials, and make more medication errors and have a higher mortality rate than those with adequate health literacy.<sup>3</sup> Those with IHL are also less likely to receive preventive services such as mammography screening.<sup>2</sup>

In Hong Kong, knowledge about health literacy and its impact on health is limited. This study aimed to assess the prevalence and contributing factors of IHL in community-dwelling older adults in Hong Kong and to describe the relationship between IHL and different health outcomes.

## METHODS

This was a secondary data analysis using a large cohort of community-dwelling Chinese older adults who applied for subsidised long-term care services in Hong Kong in 2012 and underwent assessment using the Hong Kong version of the Minimum Data Set-Home Care by trained assessors. The assessment drew on multiple sources and included direct questioning of care recipients and primary family caregivers, observation of care recipients in their home environment, and a review of secondary documents such as medical records, if available.<sup>4</sup> Older adults who lived in an institution, were hearing impaired, or had severe cognitive impairment (scored  $\geq 5$  on Cognitive Performance Scale<sup>5</sup>) were excluded.

IHL was measured using the Rapid Estimate of Inadequate Health Literacy (REIHL) questionnaire; possible score ranged from 0 to 23, with 10 as the cut-off point.<sup>6</sup> Those with a REIHL score  $>10$  were considered to have IHL. Frequency of fall,

hospitalisation, and use of an emergency service in the last 90 days from the time of the assessment were recorded, as were socio-demographic factors such as age, gender, marital and living arrangement.

Chi-square test and t-test were used to analyse the bivariate relationship between IHL and contributing factors, as well as health outcomes. Controlling the covariates, the effects of IHL on falls, hospitalisation, and use of emergency service were assessed by linear regression models.

## RESULTS

A total of 4589 subjects were included; 50% were married and 44% were male. The mean score of REIHL was 12.08 (standard deviation, 4.3). 2850 (62.11%) subjects had IHL, more were female than male (74.01% vs. 46.90%,  $p<0.001$ ) and more were unmarried than married (69.02% vs. 55.45%,  $p<0.001$ ). Those who lived alone, with a spouse, or with others differed significantly in health literacy ( $p<0.001$ , **TABLE 1**). Those with or without home care services or with maid service did not differ significantly in health literacy.

IHL was associated with frequency of falls ( $p<0.05$ ). Controlling gender, marital status, and living arrangement, older adults with IHL were more likely to be hospitalised (beta=0.1044,  $p<0.001$ ). IHL had no significant effect on the frequency of the use of emergency service or frequency of falls in the past 90 days (**TABLE 2**).

## DISCUSSION

IHL is prevalent among community-dwelling older adults in Hong Kong (62.11%), and is much higher than in the United States ( $>30\%$ ),<sup>7,8</sup> Taiwan (53.2%),<sup>9</sup> and Korea (41.7%).<sup>10</sup> In Hong Kong, those who were female, unmarried, or lived alone were more likely to have IHL, and should be the target population for any health literacy enhancement programme and care support. Older adults with IHL were more likely to be hospitalised. This finding echoes that of other studies: patients with IHL spent substantially higher amounts on their overall care,<sup>11</sup> inpatient care,<sup>11,12</sup> and hospital-based care.<sup>13</sup> Supporting individuals with IHL by providing community-based care is essential, as this may reduce unnecessary hospitalisation and health costs.

**TABLE 1**  
**Association between health literacy and demographic variables**

Variable	No. of subjects	Health literacy (Rapid Estimate of Inadequate Health Literacy score)				
		Overall mean±SD score	p Value	No. (%) of subjects		p Value
				Adequate (≤10)	Inadequate (>10)	
Total	4589	12.08±4.3		1739 (37.89)	2850 (62.11)	
Gender			<0.001			<0.001
Male	2015	10.45±4.05		1070 (53.1)	945 (46.9)	
Female	2574	13.36±4.05		669 (25.99)	1905 (74.01)	
Married			<0.001			<0.001
No	2250	12.87±4.16		697 (30.98)	1553 (69.02)	
Yes	2339	11.33±4.3		1042 (44.55)	1297 (55.45)	
Living arrangement			<0.001			<0.001
Live alone	1025	12.28±4.22		365 (35.61)	660 (64.39)	
Live with spouse	875	11.25±4.24		401 (45.83)	474 (54.17)	
Live with others	2689	12.28±4.32		973 (36.18)	1716 (63.82)	
Supporting service			0.1537			0.4158
Without home care services	2638	12.02±4.29		1015 (38.48)	1623 (61.52)	
With home care services	1257	12.07±4.28		476 (37.87)	781 (62.13)	
With employed maid	694	12.37±4.36		248 (35.73)	446 (64.27)	

**TABLE 2**  
**Effect of health literacy on frequency of hospitalisation, use of emergency services, and falls\***

Variable	Hospitalisation		Emergency services		Falls	
	Beta	p Value	Beta	p Value	Beta	p Value
Gender		<0.001		<0.05		<0.001
Male	0.1820		0.0422		0.1202	
Female	0		0		0	
Married		>0.05		>0.05		>0.05
No	-0.028		0.0326		-0.0182	
Yes	0		0		0	
Who lived with		>0.05		>0.05		>0.05
Alone	0.0012		0.0124		0.0235	
Spouse only	-0.0158		-0.0012		-0.0074	
Others	0		0		0	
Health literacy		<0.001		>0.05		>0.05
Adequate literacy	0		0		0	
Inadequate literacy	0.1044		-0.0134		-0.0465	

\* Regressions adjusted for gender, marital status, and living arrangement

Assessing older adults' health literacy is important and has an impact on subsequent care and health promotion. An accumulating body of evidence shows that physician gestalt is an inaccurate estimate of health literacy, and physicians incline to overestimate patients' health literacy.<sup>14</sup> Although

REIHL is a tool for estimating health literacy, it can be applied in the clinical settings due to its precision. In view of the large number of individuals with IHL in Hong Kong, it is a challenge for clinicians to maintain and promote good health in Chinese older adults.

## REFERENCES

1. United States Department of Health and Human Services, Office of Disease Prevention and Health Promotion. *Healthy People 2010*. Available from: <http://www.health.gov/healthypeople>. Accessed 2 Sept 2015.
2. Berkman ND, Sheridan SL, Donahue KE, Halpern DJ, Crotty K. Low health literacy and health outcomes: an updated systematic review. *Ann Intern Med* 2011;155:97-107.
3. Bauer AM, Schillinger D, Parker MM, et al. Health literacy and antidepressant medication adherence among adults with diabetes: the diabetes study of Northern California (DISTANCE). *J Gen Intern Med* 2013;28:1181-7.
4. Lou VW, Chui EW, Leung AY, et al. Factors affecting long-term care use in Hong Kong. *Hong Kong Med J* 2011;17(3 Suppl 3):8-12.
5. Morris JN, Fries BE, Mehr DR, et al. MDS Cognitive Performance Scale. *J Gerontol* 1994;49:M174-82.
6. Leung IS, Leung AY, Chau PH. Risk estimate of inadequate health literacy (REIHL) for community-dwelling Chinese older adults. Proceedings of the 10th International Symposium on Healthy Aging. Hong Kong: 7-8 March 2015. Available from: <http://hub.hku.hk/handle/10722/215787>. Accessed 2 February 2016.
7. Baker DW, Wolf MS, Feinglass J, Thompson JA, Gazmararian JA, Huang J. Health literacy and mortality among elderly persons. *Arch Intern Med* 2007;167:1503-9.
8. Wolf MS, Gazmararian JA, Baker DW. Health literacy and health risk behaviors among older adults. *Am J Prev Med* 2007;32:19-24.
9. Lee SY, Tsai TI, Tsai YW, Kuo KN. Health literacy, health status, and healthcare utilization of Taiwanese adults: results from a national survey. *BMC Public Health* 2010;10:614.
10. Kim SH. Health literacy and functional health status in Korean older adults. *J Clin Nurs* 2009;18:2337-43.
11. Howard DH, Gazmararian J, Parker RM. The impact of low health literacy on the medical costs of Medicare managed care enrollees. *Am J Med* 2005;118:371-7.
12. Weiss BD, Palmer R. Relationship between health care costs and very low literacy skills in a medically needy and indigent Medicaid population. *J Am Board Fam Pract* 2004;17:44-7.
13. Sanders LM, Thompson VT, Wilkinson JD. Caregiver health literacy and the use of child health services. *Pediatrics* 2007;119:e86-92.
14. Kelly PA, Haidet P. Physician overestimation of patient literacy: a potential source of health care disparities. *Patient Educ Couns* 2007;66:119-22.