

Prevalence of Frailty in Chinese Older People: A Cross-Cultural Study

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Objectives:

This study aimed to compare the prevalence of frailty across three Chinese populations (Hong Kong, Taiwan urban and Taiwan rural areas). The ratio of frailty index (FI) to life expectancy at birth (LE) and contributing factors to disparities in frailty across the three study populations were also examined.

Table 1 Prevalence of frailty and weighted mean of FI/LE in different area by age and sex

	Prevalence of frailty ¹ , n (%)			Mean (sd) of FI/LE ratio		
	Hong Kong	Taiwan urban	Taiwan rural	Hong Kong	Taiwan urban	Taiwan rural
Men						
65-74	70 (6.43)	53 (18.66) ²	88 (21.89) ²	0.15 (0.09)	0.19 (0.16) ³	0.20 (0.17) ³
75-84	102 (14.05)	48 (25.26) ²	83 (31.00) ²	0.20 (0.13)	0.24 (0.17) ³	0.25 (0.17) ³
85+	39 (20.93)	17 (36.96) ²	32 (46.38) ²	0.24 (0.24)	0.32 (0.17) ³	0.31 (0.20) ³
Total	211 (10.54)	118 (22.69) ²	203 (27.51) ²	0.17 (0.11)	0.23 (0.16) ³	0.23 (0.17) ³
Women						
65-74	134 (14.86)	69 (35.03) ²	124 (40.52) ²	0.19 (0.09)	0.27 (0.17) ³	0.26 (0.17) ³
75-84	219 (28.75)	97 (57.74) ²	146 (55.73) ²	0.25 (0.13)	0.35 (0.16) ³	0.34 (0.17) ³
85+	99 (29.31)	33 (44.59) ²	35 (61.32) ²	0.26 (0.29)	0.35 (0.19) ³	0.36 (0.14) ³
Total	452 (22.59)	199 (45.33) ²	335 (49.7) ²	0.23 (0.11)	0.32 (0.17) ³	0.31 (0.17) ³
Both sexes						
65-74	204 (10.25)	122 (25.36) ²	212 (29.94) ²	0.17 (0.09)	0.23 (0.17) ³	0.23 (0.18) ³
75-84	322 (21.58)	145 (40.50) ²	229 (43.29) ²	0.22 (0.13)	0.30 (0.18) ³	0.30 (0.18) ³
85+	138 (26.33)	50 (41.67) ²	97 (55.43) ²	0.25 (0.27)	0.35 (0.18) ³	0.35 (0.17) ³
Total	663 (16.57)	317 (33.06) ²	538 (38.10) ²	0.20 (0.12)	0.27 (0.18) ³	0.27 (0.18) ³

¹Frailty is defined as the frailty index calculated from multiple deficits ≥ 0.25
²p-value < 0.05, comparing Taiwan rural with Hong Kong
³p-value < 0.05, comparing Taiwan rural with Taiwan urban
⁴p-value < 0.05, comparing Hong Kong with Taiwan urban

Table 2 Multiple logistic regression of frailty in Hong Kong, Taiwan urban and Taiwan rural (men)

	Crude OR (95% CI)			Adjusted OR (95% CI)		
	Hong Kong	Taiwan urban	Taiwan rural	Hong Kong	Taiwan urban	Taiwan rural
Age						
65-74	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
75-84	2.38 (1.73, 3.28)	1.45 (0.93, 2.26)	1.62 (1.14, 2.30)	2.05 (1.48, 2.84)	1.36 (0.86, 2.14)	1.63 (1.14, 2.33)
85+	3.86 (2.51, 5.92)	2.55 (1.31, 4.94)	3.04 (1.79, 5.16)	3.18 (2.04, 4.96)	2.25 (1.14, 4.44)	2.71 (1.58, 4.65)
Low education	1.50 (1.10, 2.04)	1.27 (0.84, 1.92)	1.52 (1.01, 2.29)	1.35 (0.98, 1.86)	1.20 (0.78, 1.83)	1.38 (0.91, 2.11)
Smoking	1.31 (0.96, 1.79)	1.19 (0.76, 1.86)	0.96 (0.65, 1.40)	1.15 (0.83, 1.59)	1.27 (0.80, 2.02)	0.96 (0.65, 1.43)
Current alcohol use	0.50 (0.33, 0.76)	0.48 (0.27, 0.83)	0.67 (0.46, 0.97)	0.57 (0.37, 0.88)	0.48 (0.27, 0.86)	0.73 (0.49, 1.08)
Insufficient exercise	1.48 (1.11, 1.97)	1.56 (1.03, 2.37)	1.96 (1.41, 2.72)	1.47 (1.10, 1.98)	1.49 (0.97, 2.28)	1.87 (1.33, 2.61)
Living alone	2.85 (1.82, 4.48)	1.00 (0.47, 2.15) ¹	1.23 (0.77, 1.97) ¹	2.32 (1.45, 3.71)	0.96 (0.44, 2.12)	1.21 (0.75, 1.96)
AUC				0.647	0.617	0.622

¹p-value < 0.05, comparing Taiwan rural with Hong Kong
²p-value < 0.05, comparing Taiwan rural with Taiwan urban
³p-value < 0.05, comparing Hong Kong with Taiwan urban

Methods:

Data were derived from two population-based studies, the MrOs and MsOs (Hong Kong) studies (n=4,000) and the Taiwan Longitudinal Study on Aging (n=2,392). Community-dwelling people aged 65 years and older were invited to respond to a structured questionnaire. Frailty was defined as an index calculated from multiple deficits covering medical and drug histories, physical and cognitive functioning, psychological well-being, and geriatric syndromes. Frailty was defined as the index ≥ 0.25 . The ratio of FI to LE was used as an indicator of compression of morbidity.

Results:

Frailty was more prevalent in Taiwan urban (33.1%) and Taiwan rural (38.1%) cohorts compared to Hong Kong (16.6%, p<0.05). The prevalence of frailty increased with age and approximately doubled for every 10 years until around age 85, and was higher in women (22.6%-49.7%) than in men (10.5%-27.5%, p<0.05). The ratios of FI/LE were also higher in Taiwan urban and Taiwan rural cohorts (both 0.27) compared to Hong Kong (0.20, p<0.05). Multivariate analyses revealed that older (85+), women, and insufficient exercise were common risk factors for frailty across the three cohorts. Alcohol use was inversely associated with frailty in both Hong Kong and Taiwan urban populations but not in Taiwan rural. Living alone was significantly associated with frailty in Hong Kong men but not in women or Taiwan people. For all three cohorts, older age and female gender constitute the highest attributable factor while current alcohol use was associated with a lower risk of frailty.

Table 3 Multiple logistic regression of frailty in Hong Kong, Taiwan urban and Taiwan rural (women)

	Crude OR (95% CI)			Adjusted OR (95% CI)		
	Hong Kong	Taiwan urban	Taiwan rural	Hong Kong	Taiwan urban	Taiwan rural
Age						
65-74	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
75-84	2.31 (1.82, 2.94)	2.54 (1.66, 3.88)	1.84 (1.32, 2.58)	2.38 (1.86, 3.06)	2.66 (1.69, 4.18)	1.88 (1.33, 2.66)
85+	2.38 (1.76, 3.20)	1.46 (0.84, 2.51)	2.31 (1.47, 3.62)	2.30 (1.69, 3.12)	1.14 (0.64, 2.02) ¹	2.27 (1.42, 3.63)
Low education	1.28 (0.94, 1.74)	1.99 (1.16, 3.40)	1.34 (0.65, 2.73)	1.18 (0.86, 1.62)	2.25 (1.26, 4.01)	0.96 (0.45, 2.05)
Smoking	1.58 (1.17, 2.12)	1.91 (0.88, 4.15)	0.89 (0.43, 1.85)	1.35 (0.99, 1.83)	2.35 (0.95, 5.85)	0.87 (0.40, 1.90)
Current alcohol use	0.19 (0.05, 0.79)	0.32 (0.13, 0.79)	1.02 (0.45, 2.30) ²	0.22 (0.05, 0.92)	0.31 (0.11, 0.89)	1.43 (0.60, 3.39) ³
Insufficient exercise	1.51 (1.22, 1.88)	2.69 (1.82, 3.97) ³	2.77 (2.03, 3.79) ³	1.55 (1.24, 1.94)	2.72 (1.80, 4.12) ³	2.74 (1.99, 3.78) ³
Living alone	0.79 (0.60, 1.04)	0.70 (0.37, 1.30)	0.88 (0.56, 1.39)	0.66 (0.50, 0.87)	0.72 (0.36, 1.42)	0.87 (0.54, 1.41)
AUC				0.629	0.695 ¹	0.663

¹p-value < 0.05, comparing Taiwan rural with Hong Kong
²p-value < 0.05, comparing Taiwan rural with Taiwan urban
³p-value < 0.05, comparing Hong Kong with Taiwan urban

Table 4 Attributable fraction for frailty in Hong Kong, Taiwan urban and Taiwan rural (both sexes)

	Attributable fraction (%)		
	Hong Kong	Taiwan urban	Taiwan rural
Women	58.85%	58.51%	52.61%
Age			
65-74	Ref.	Ref.	Ref.
75-84	54.95%	47.92%	42.86%
85+	61.54%	31.97% ²	57.98%
Low education	18.7%	34.21%	20.63%
Smoking	20.63%	27.54%	-5.26%
Current alcohol use	-100%	-127.27%	-21.95% ²
Insufficient exercise	33.77%	50.74%	56.33% ¹
Living alone	-13.64%	-29.87%	1.96%

¹p-value < 0.05, comparing Taiwan rural with Hong Kong
²p-value < 0.05, comparing Taiwan rural with Taiwan urban
³p-value < 0.05, comparing Hong Kong with Taiwan urban

Conclusion:

Frailty was more prevalent in Taiwan compared to Hong Kong. The risk of frailty was increased in older, women, and in those with insufficient exercise. This comparison provides better understanding of levels in the health of older people and provides useful data to inform government policies.

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