Design and validity of a frailty instrument based on a pre-existing dataset. .

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Introduction

Frailty is a dynamic process in which there is a reduction in physical, psychological, and social functions. Frailty is not an inevitable part of ageing, but it is important to identify those at risk due to increased likelihood of declining health, reduced quality of life and hospitalisation. This study aims to describe the development and validation of an instrument to assess frailty using an existing dataset.

Methodology

For the instrument's design, a search was done in the literature on conceptual models of frailty syndrome in a multidimensional way. The conceptual model of Gobbens et al. because it featured how life course determinants influence frailty development. The study used data collected as part of the Crossroad II study (XRoadsII). The XRoadsII is a cross-sectional study conducted at a community level in rural Victoria, Australia. Items from the XRoadsII study aligned with domains that assess frailty identified in the literature (n=15) were use in the construction of the instrument. Data on the selected items, derived from 490 participants, were subjected to exploratory factor analysis to assess psychometric properties. Four working hypotheses, aligned with the process of frailty (namely: age, educational level, sex, and self-perception of health), were tested using Kruskal-Wallis or Mann Whitney tests.

Results

A total of two factors were identified (physical health and psychosocial health) using factor analysis, which explained 59.2% of the total variance. Internal reliability indicated a Ordinal alpha = 0.95 for the physical health dimension, and an alpha=0.97 for psychosocial health dimension. The overall mean on the frailty score was 4.02 (2.25 s. d).

Factor loadings and eigenvalues from the exploratory factorial analysis.

Item selected	Factor	
	Physical-health related	Psychosocial Functioning
1.Mobility	**0.729**	0.254
2.Selfcare	**0.613**	0.276
3.Usual activities	**0.683**	0.312
4.Vigorous activities	**0.834**	0.141
5.Moderate activities	**0.862**	0.182
6.Eye problems	**0.632**	- 0.148
7.Hearing loss	**0.466**	-0.231
8.Weight perception	0.207	0.170
9.Polypharmacy	**0.624**	-0.004
10.Cognition	**0.372**	0.003
11.Have little interest or pleasure doing things	0.270	**0.809**
12.Feel depressed	0.169	**0.980**
13.Feel nervous	-0.006	**0.742**
14.Feel sad	0.128	**0.776**
15.Social participation	-0.017	0.217
Proportion of variance	0.408	0.164
% Of variance	42.236	17.054

Construct validity of total score based on known groups.

Variables	n	Mean rank	p-value
Total	490		
Age			
>30	31	164.29	
30-39	57	163.97	
40-49	44	201.77	< 0.001
50-59	94	240.72	
60-69	121	251.13	
70 +	139	302.22	
Sex			0.854
Male	218	244.20	
Female	272	246.54	
Education			
Some secondary	153	294.53	
Secondary complete	47	242.39	< 0.001
Trades	109	259.41	
Tertiary	135	177.44	
Other	46	252.38	
Self-perception general health			
Excellent	74	135.26	
Very good	165	194.07	
Good	157	283.80	< 0.001
Fair	75	345.59	
Poor	19	409.95	

Conclusions

A frailty instrument was developed following theoretical model and frameworks around human frailty, with two dimensions; physical-health and psychosocial-health. Data from a sample of rural Australians were used to test the instrument psychometric properties. The developed instrument demonstrated adequate reliability, and initial construct validity.

References

World Health Organisation: Ageing: Healthy ageing and functional ability; 26 Oct 2020.
Gobbens RJ, et al. In search of an integral conceptual definition of frailty: opinions of experts. Journal of the American Medical Directors Association. 2010 Jun 1;11(5):338-43.
Glenister KM, Bourke L, Bolitho L, et al. Longitudinal study of health, disease and access to care in rural Victoria: the Crossroads-II study: methods. BMC Public Health 2018;18:670.

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Biography

I am currently a PhD student at the University of Melbourne, Australia. In my PhD, I'm exploring the association between oral health and frailty in older adults. To analyse this association in rural populations, I have been working on secondary data analysis of a project carried out in the regional area of Victoria in Australia. This study contemplates the results of a first stage of the research project, in which it is visualised that fragility can be evaluated exploratory with an existing database.