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Promoting well-being in frail elderly people

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Old or frail: which tells us more ?



How to select elderly people who would profit from a geriatric intervention and how to make accurate treatment decisions are recurring problems in geriatrics.

Chronological age, though often used, seems not to be the best selection criterion. The concept of frailty can be used instead, which indicates a bundle of losses in resources. The predictive values of chronological age and frailty were investigated in a large community sample of people aged 65 years and older, randomly drawn from the register of six municipalities in the north of the Netherlands (45% of the original addressees). People's generative capacity for sustaining well-being - self-management abilities - was used as outcome measure.

The results show that, when using chronological age instead of frailty, both too many and too few people were selected. Moreover, frailty related more strongly (betas ranging from $-.25$ to $-.39$) to a decline in self-management abilities than did chronological age (betas ranging from $-.06$ to $-.14$). Chronological age added little to the explained variances of all outcomes once frailty had been included. Using frailty to select older people at risk for interventions may, therefore, be a large improvement compared to selecting people using chronological age.

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3.1 Introduction

Recurring problems in geriatrics are how to select those elderly people who could profit from geriatric interventions and how to make accurate treatment decisions. For those elderly people for whom neither 'care as usual' nor palliative care apply, and who could profit from medical or psychosocial preventive interventions leading to a higher quality of life, finding a good and quick selection criterion appears to be especially difficult. An age criterion is often used to select elderly people for these preventive interventions, or to decide whether a particular treatment should be carried out [1]. It has been found that elderly people are often excluded from, for instance, clinical trials [e.g., 2,3] and certain treatments [e.g., 4], or that they receive less appropriate and more conservative diagnostics and treatments [e.g., 5-7], because of their age. However, chronological age may not be the best selection criterion, because it is not the best predictor of adverse processes, or outcomes of interventions and treatments [see, e.g., 4,6,8-12]. People in need of treatment may be wrongly excluded when selected on the basis of age, whereas people who do not need an intervention may be wrongly included. Therefore, there is a need for a better selection criterion, a concept that tells us more about the process of *aging* – the process of loss in different domains of functioning, higher risk of chronic conditions, higher mortality risk, and the like. Chronological age is a proxy for various adverse processes. Frailty, the risk of adverse outcomes due to losses in different domains of functioning, relates directly to these adverse processes. Frailty can be seen as having lost resources in several domains of functioning, which leads to a declining reserve capacity for dealing with stressors. Most medical interventions focus on these resources, such as mobility loss or a specific disease, but they focus mostly on single resources. However, elderly people often experience loss of a bundle of resources, that is, they become frailer in a general sense.

It has been shown that even individual mortality risk, which can be seen as the ultimate outcome of age and frailty [13], can be better predicted by frailty than by chronological age [see, e.g., 14]. However, there has been no test of frailty versus chronological age with self-management abilities, a kind of coping skill, as outcome measure. The bundle of losses in resources constituting frailty was expected to lead to the loss of self-management abilities. Self-management abilities are the abilities needed by an elderly person to prevent the loss of resources, to manage the decline and loss of resources, and to sustain well-being [15]. These self-management abilities can be regarded as people's generative capacity for sustaining well-being to a great age. Arguably, they are even more important as an outcome measure of interventions than is mortality, because they may be a more relevant concept for older people's daily lives. The main aim of this study was to test whether frailty is a better predictor of adverse outcomes in elderly people (and thus a better selection criterion for interventions) than age, using these self-management abilities as the outcome measure.

3.2 Method

3.2.1 Participants

The participants were the same as in Study 2 of Chapter 2. The sample consisted of 1,338 community-dwelling elderly persons aged 65 years and older, randomly drawn from the registers of six municipalities in the north of the Netherlands. Many reasons for non-response were physical, which may have caused an under-representation of severely frail respondents. The average age was 74.2 ($SD = 6.59$), the oldest respondent being 98 years old.

3.2.2 Measures

Frailty was measured using the Groningen Frailty Indicator (GFI) [16], a short, easy-to-administer 15-item screening instrument to determine a person's level of frailty ($KR-20 = .71$). The GFI screens for the loss of functions and resources in 4 domains of functioning: physical (mobility functions, multiple health problems, physical fatigue, vision, hearing), cognitive (cognitive functioning), social (emotional isolation), and psychological (depressed mood and feelings of anxiety), and was found to be a one-dimensional concept. The GFI is shown in Appendix II. *Chronological Age* was measured as a continuous variable. *Self-Management Abilities* were measured using the Self-Management Ability Scale-30, which measures the level of Self-Management Ability (SMA), an index for 6 self-management abilities systematically linked to 5 dimensions of well-being (see Chapter 2).

3.3 Results and discussion

Firstly, we compared respondents selected using age (75 years and older) and respondents selected using level of frailty (a score of 4 or higher, which can be regarded as moderately frail according to a panel of geriatric experts [16]). The group of respondents selected using age was larger than the group selected using frailty, contained many people with only a low level of frailty, and had a significantly higher level of all self-management abilities, except for multifunctionality (Table 3-1). The group of respondents selected using frailty, however, also contained people younger than 75 years of age. This shows that frailty is a more suitable selection criterion than age when using self-management abilities as outcome measure.

Table 3-1. Characteristics of respondents selected by different criteria

Characteristic	Criterion: 75 years and older	Criterion: GFI 4 or higher	p^a
n	588	428	–
Mean frailty score	3.5	NA ^b	–
Range of frailty	0 – 13	NA	–
Percentage below frailty criterion	56 %	NA	–
Mean age	NA	76.2	–
Age range	NA	65 – 98	–
Percentage below age criterion	NA	42%	–
Mean (SE) overall SMA score	20.02 (.15)	19.17 (.16)	< .001
Mean (SE) 'Multifunctionality'	21.89 (.26)	21.37 (.29)	.187
Mean (SE) 'Variety'	17.86 (.19)	17.22 (.21)	.026
Mean (SE) 'Positive Frame'	19.48 (.18)	18.35 (.21)	< .001
Mean (SE) 'Investment'	19.44 (.16)	18.48 (.19)	< .001
Mean (SE) 'Self-Efficacy'	23.24 (.16)	22.24 (.17)	< .001
Mean (SE) 'Taking the Initiative'	18.00 (.17)	17.25 (.18)	.003

a. '–' indicates p value not computed.

b. NA indicates 'not applicable', because respondents have been selected using this variable.

Secondly, we carried out separate stepwise regression analyses using the self-management abilities and the overall index of SMA as the dependent variables, and frailty and chronological age as the predictors. The frailty scores and age were centered around their means to prevent negative effects of multicollinearity. Chronological age and frailty were significantly correlated ($r = .32, p < .001$).¹

Frailty was significantly, negatively related to overall SMA and all self-management abilities (Table 3-2). Chronological age was also negatively related to SMA and most self-management abilities, except for Positive Frame. However, as can be seen from the changes in explained variances, chronological age added little once frailty had been included for all outcomes.

1. This correlation indicates that there is a moderate relationship between age and frailty in the elderly population. However, the more *frail* elderly people are included in a sample, the smaller this correlation is (in the sample used to design the Self-Management Ability Scale, described in Chapter 2, the correlation was .14 ($p = .026$)). In a sample of people selected by their level of frailty, the relationship between age and frailty almost disappears (in the sample of the intervention study, described in Chapter 6, the correlation was .07 ($p = .483$)).

Table 3-2. Stepwise regression models predicting the different Self-Management Abilities and overall SMA

		SMA	Multi- functionality	Variety	Positive Frame
Variable		β (p)	β (p)	β (p)	β (p)
Step 1	Frailty	-.42 (< .001)	-.29 (< .001)	-.31 (< .001)	-.26 (< .001)
	Adj. R ²	.18	.09	.10	.07
Step 2	Frailty	-.39 (< .001)	-.25 (< .001)	-.28 (< .001)	–
	Age	-.11 (< .001)	-.14 (< .001)	-.09 (.003)	–
	Adj. R ²	.19	.10	.10	–
	R ² changed	.01	.02	.01	–
	Sig. F Change	< .001	< .001	.003	–
		Investment	Self-efficacy	Taking the initiative	
Variable		β (p)	β (p)	β (p)	
Step 1	Frailty	-.33 (< .001)	-.42 (< .001)	-.33 (< .001)	
	Adj. R ²	.11	.17	.11	
Step 2	Frailty	-.31 (< .001)	-.39 (< .001)	-.29 (< .001)	
	Age	-.06 (.027)	-.06 (.018)	-.12 (< .001)	
	Adj. R ²	.11	.18	.12	
	R ² changed	.00	.00	.01	
	Sig. F Change	.027	.018	< .001	

As expected, frailty was found to relate more strongly to a decline in self-management abilities than did chronological age. Therefore, using frailty to select older people at risk is an improvement compared to selecting people for interventions using chronological age, because it is likely to yield a more accurate selection. Because the instrument to measure frailty (the GFI) is a short-and-easy to use instrument, it seems a reasonable and manageable alternative for using chronological age as selection criterion for interventions.

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