

# Social activities and loneliness as predictors of frailty in older people

## Introduction

The **Integral Conceptual Model of Frailty (ICMF)**<sup>1,2</sup> describes Frailty as a state of pre-incapacity resulting from losses in one or more domains of human functioning (physical, psychological and social) that increases the risk of health adverse outcomes. In this model, frailty is predicted by determinants of life course, illness and decline in physiological reserve.

Due to the existence of different frailty models and operational definitions,<sup>3-6</sup> the role that the social dimension and the criteria that compose it plays within frailty is still not consensual. A study about social criteria of frailty showed that indicators related to loneliness and frequency of social activities engagement could be considered as components or predictors of an increased state of vulnerability.<sup>7</sup>

The correct identification of the different social criteria and the role that they have with frailty will certainly help in structuring a more comprehensive frailty model and help in the identification of the most vulnerable elderly groups<sup>8,9</sup>.

## Aim

To analyze the predictive validity of social activities engagement and loneliness on frail status according to the ICMF.

## Methodology

**Study design and participants:** a non-probabilistic sample of 193 community-dwelling adults aged 65 years and over was recruited in 2016 and followed for three years.

**Measurements:** survey composed by part A (determinants of life course) and B (Frailty) of the Tilburg Frailty Indicator<sup>10</sup> and two questions about loneliness and frequency of social activities engagement<sup>7</sup>.

**Data collection:** day care centers, community social centers, universities of the third age and in the participants' households.

**Statistical analysis:** at baseline, Qui-Squared tests were performed and for the longitudinal analyses bivariate correlations using the Phi coefficient and sequential multiple hierarchical logistic regression analyses in two steps; a p-value <0.05 was considered as statistically significant.

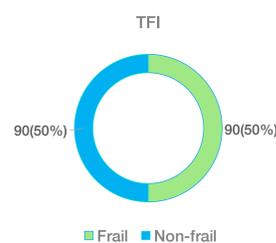
## Results

At baseline, most participants were women (67.8%), 47.2% were aged over 75 years old, 49.4% were unmarried, and 63.9% reported having two or more diseases and/or chronic disorders (Table 1). Loneliness ( $X^2=17,457$ ;  $p<0,001$ ) and social activities engagement ( $X^2=8,322$ ;  $p=0,004$ ) were found to be significantly associated with frailty status. Within the group of participants classified as frail ( $n=90$  (50%); Graphic 1), 67.8%( $n=61$ ) reported missing people around them (Graphic 2) and 35.6%( $n=32$ ) reported a decrease in social activities engagement (Graphic 3).

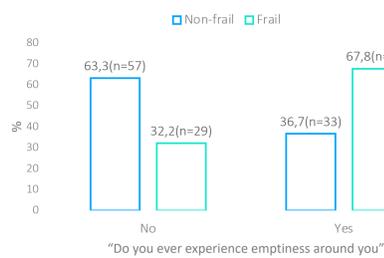
Table 1: Characteristics of the participants in 2016 (n=180).

Determinants of life course (TFI Part A)	n(%)
Sex (Women)	122(67,8)
Age (>75 years)	85(47,2)
Education (0-2 years)	34(18,9)
Marital status (unmarried)	89 (49,4)
Household income (<501€)	79(43,9)
Lifestyle self-assessment (unhealthy)	49(27,2)
Self-reported comorbidity	115(63,9)
Death of a loved one	52(28,9)
Serious illness in a loved one	61(33,9)

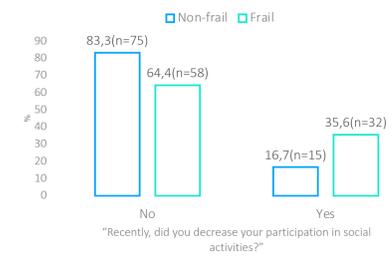
Graphic 1: Frailty prevalence



Graphic 2: Loneliness vs. Frailty.



Graphic 3: Decrease in social activities vs. Frailty



The decrease in social activities showed positive significant correlations in 2016 and 2017, and loneliness correlations between  $\phi=0.273$  and  $\phi=0.329$  with the frailty status in 2016 and one, two and three years later. There was no consistent pattern of increase or decrease in strength of the correlation over time. (Table 2)

Table 2: Correlations between determinants of life course, loneliness and social activities engagement at baseline (2016) with the frailty status in 2016 and one, two and three years later.

Social factors	TFI <sup>a</sup>			
	2016	2017	2018	2019
Decrease of social activities	0,215**	0,203**	0,112	0,118
Loneliness	0,311****	0,329***	0,258**	0,273**

<sup>a</sup>Phi coefficient; \*p<0.05; \*\*p<0.01; \*\*\*p<0.001

Table 3: Cross-sectional and longitudinal effects of the determinants of life course, loneliness and social activities engagement assessed in 2016 on frailty in 2016 and one, two and three years later.

	Tilburg Frailty Indicator			
	2016	2017	2018	2019
	OR[95% IC]	OR[95% IC]	OR[95% IC]	OR[95% IC]
<b>Determinants</b>				
$X^2(9)$	83,387***	72,830***	66,356***	77,477***
Nagelkerke R <sup>2</sup>	0,494	0,481	0,455	0,527
<b>Social factors</b>				
Decrease of social activities	2,967[1,246-7,067]*	4,026[1,576-10,286]**	1,727[0,733-4,068]	1,769[0,709-4,419]
Loneliness	4,163[1,570-11,037]**	4,109[1,453-11,619]**	1,528[0,595-3,926]	1,534[0,554-4,249]
$X^2(2)$	13,282**	13,896**	2,025	1,847
$X^2(11)$	96,669***	86,726***	68,381***	79,324***
Nagelkerke R <sup>2</sup>	0,554	0,551	0,466	0,537
$\Delta$ Nagelkerke R <sup>2</sup>	0,060	0,070	0,011	0,010

\*p<0.05; \*\*p<0.01; \*\*\*p<0.001

Social activities engagement and loneliness introduced in the second step increased the prediction and the explained variance ( $\Delta X^2$  and  $\Delta$ Nagelkerke R<sup>2</sup> values) of frailty status transversely (2016) and one year later, after controlling for the determinants.

Those who reported: a) going out less frequently compared with last year always presented higher odds of frailty in 2016 (OR=2.967, IC95%:1.246-7.067,  $p=0.014$ ) and increasing a year later (OR=4.026, IC95%:1.576-10.286); b) feeling lonely had higher odds of frailty in 2016 (OR=4.163, IC95%:1.570-11.037,  $p=0.004$ ) and in one year later (OR=4.109, IC95%:1.453-11.619,  $p=0.008$ ). (Table 3)

## Conclusions

Loneliness and social activities engagement may have a determinant role in predicting frailty and should not be neglected in prevention and intervention programs by health and social care professionals. As frailty is a dynamic state, the different associations found in this study may also be due to the changeable nature of the items of the TFI and, consequently, of the transition between the frail and non-frail status. However, the positioning of the social criteria as predictors of frailty will always depend on the assumed conceptual model of frailty and having different roles. Further studies should analyse the relationship between these social criteria and the different items and dimensions of the TFI.

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