Exploring the association between chronic diseases, comorbidity and multimorbidity and self-rated health in the older population.

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Introduction

Self-rated health (SRH) is of increasing interest as a health indicator in both health policy and research (Jylhä, 2009). Research has shown that it is a strong predictor of future health outcomes, including health care use, functional limitations, morbidity and mortality (Wolinsky et al., 1994; Idler & Benyamini, 1997; Mossey & Shapiro, 1982), even after adjusting for health indicators like self-reported medical conditions or medical records.

Chronic diseases are, among others, important predictors of self-rated health. Considering the high prevalence of chronic diseases in the older population, the current study investigated the relationship between chronic diseases and SRH. In order to comprehensively explore the associations between single chronic diseases, multiple chronic diseases and SRH, two empirical approaches, multimorbidity and comorbidity, were used. *Multimorbidity* was defined as the co-occurrence of two or more diseases, where there is no emphasis on the presence of a specific disease (van den Akker, Buntinx, Metsemakers, Roos & Knottnerus, 1998). *Comorbidity* on the other hand was defined as the presence of a condition together with a specific index disease (Feinstein, 1970). Both multimorbidity and comorbidity are associated with SRH (Hoeymans et al., 1999; Perrucio et al., 2005), however, how they are related to the effect of specific chronic diseases is unknown.

The following complementary research questions were addressed. (1) What is the impact of seven major chronic diseases on SRH? (2) In multimorbidity, is the effect of additional diseases on SRH cumulative or synergistic? (3) Does the impact of comorbidity on SRH differ between index diseases?

Methods

Cross-sectional data were used from 2,046 persons, aged 55-97, who participated in the Longitudinal Aging Study Amsterdam (LASA) (Deeg, Knipscheer & Van Tilburg, 1993). The presence of the

following frequently occurring chronic diseases or disease events was assessed: chronic non-specific lung disease (CNSLD), cardiac disease, peripheral atherosclerosis, stroke, diabetes mellitus, arthritis, and cancer. SRH was assessed with the question 'How is your health in general?' and included five response categories, ranging from 'very good' (1) to 'poor' (5). For statistical analysis, linear regression models were used, adjusted for age and sex.

Table 1 Results of regression analyses of self-rated health on specific chronic diseases

	Bivariate analyses	*Adjusted*[a]	*Only 1 disease (N=1104)*[b]
CNSLD	**0.54 (0.43-0.65)**	**0.37 (0.27-0.47)**	**0.40 (0.16-0.63)**
Cardiac disease	**0.51 (0.42-0.60)**	**0.38 (0.30-0.46)**	**0.36 (0.20-0.52)**
Per. atherosclerosis	**0.66 (0.52-0.80)**	**0.43 (0.31-0.56)**	0.23 (-0.18-0.63)
Diabetes	**0.46 (0.34-0.58)**	**0.41 (0.30-0.51)**	**0.51 (0.31-0.71)**
Stroke	**0.52 (0.37-0.67)**	**0.39 (0.26-0.53)**	**0.50 (0.20-0.81)**
Arthritis	**0.48 (0.40-0.55)**	**0.42 (0.35-0.49)**	**0.43 (0.33-0.53)**
Cancer	**0.30 (0.19-0.41)**	**0.26 (0.16-0.36)**	0.19 (0.00-0.37)
Other	**0.40 (0.31-0.49)**	**0.36 (0.28-0.44)**	**0.41 (0.26-0.55)**

All models are adjusted for age and sex.
[a,] Model is adjusted for all other diseases. Adjusted R^2= .27
[b] Model only includes persons with zero or one disease.
Bold coefficients/odds ratios are statistically significant at p<.05

Results

The mean age of the participants was 71.5 (SD 9.2), and 56.1% was female. Mean SRH was 2.4 (SD 0.9) and participants had an average of 1.6 chronic diseases. The impact of the different diseases on SRH was quite similar (Table 1). Cancer had a smaller unadjusted effect on SRH than all other diseases. When adjusting for comorbidity, regression coefficients attenuated, but, concluding from the confidence intervals, only in CNSLD, cardiac disease and peripheral atherosclerosis this was a significant change. In the adjusted model as well as in the model which includes only persons with one disease or no diseases cancer remained a significantly weaker predictor of SRH than other diseases.

Having one, two, three, four, or more diseases led to cumulative increases in SRH (i.e. worsening health) of 0.40 (95% CI: 0.31-0.49), 0.79 (0.69-.0.89), 1.14 (1.02-1.25), 1.35 (1.19-1.51) and 1.90 (1.65-2.14), respectively. This stable increase with each additional disease suggested that there is a cumulative effect of multiple diseases on SRH.

When comparing the coefficients of additional diseases between the index diseases, it was found that in most index diseases, the impact of additional diseases did not substantially differ between the groups without the index disease and with the index disease. Only for arthritis, this difference was significant (p=.084).

Discussion

This study showed in a representative sample of Dutch late middle-aged and older persons, that both the unadjusted and adjusted effects of different chronic diseases are quite similar. Thus, potential mediators of the association between chronic disease and SRH should be sought in factors that are common to all or most chronic diseases and not in factors that are disease specific. A similar impact of chronic diseases on SRH was also found for the adjusted analysis, which indicates that when multiple diseases are present, the effect of one condition is not altered by other conditions.

SRH was not so much sensitive to the type of disease but instead to the number of diseases present. Although it is not surprising that in older persons, having more diseases results in poorer SRH, in this study it was shown that each additional disease leads to the same increase in effect, indicating a cumulative effect of comorbidity. This confirms an earlier reported dose-response relationship between number of diseases and SRH (Hoeymans et al., 1999).

Other studies have shown that the number of additional diseases is associated with SRH in persons with specific diseases, like diabetes and heart diseases (Jimenez-Garcia et al., 2008; Chen et al., 1996). In this study, we combined those results and showed that the impact of comorbidity is quite comparable between index diseases.

Thus, although some studies have emphasized the need for studying specific diseases or disease combinations on health outcomes, in this study it is shown that multimorbidity in general is an important predictor of SRH. The results suggest that self-rated health is a good measure of complex health problems, as it is more sensitive to the number of diseases present than to which type of disease is present.

References

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