BMJ Open

Chronic symptoms in a representative sample of community-dwelling older people: a cross-sectional study in Switzerland

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ABSTRACT

Objectives: The burden of multiple diagnoses is well documented in older people, but less is known about chronic symptoms, many of which are even not brought to medical attention. This study aimed to determine the prevalence of chronic symptoms, their relationships with disability in basic activities of daily living (BADL) and quality of life (QoL), and their public health impact.

Design: A large cross-sectional population-based study.

Setting: Community in 2 regions of French-speaking Switzerland.

Participants: Community-dwelling older adults aged 68 years and older in 2011 (N=5300).

Outcomes: Disability in BADL defined as difficulty or help needed with any of dressing, bathing, eating, getting in/out of bed or an arm chair, and using the toilet. Overall QoL dichotomised as favourable (ie, excellent or very good) or unfavourable (ie, good, fair or poor). Disturbance by any of the following 14 chronic symptoms for at least 6 months: joint pain, back pain, chest pain, dyspnoea, persistent cough, swollen legs, memory gaps, difficulty concentrating, difficulty making decisions, dizziness/vertigo, skin problems, stomach/intestine problems, urinary incontinence and impaired sexual life.

Results: Only 17.1% of participants did not report being disturbed by any of these chronic symptoms. Weighted prevalence ranged from 3.1% (chest pain) to 47.7% (joint pain). Most chronic symptoms were significantly associated with disability in BADL or unfavourable QoL, with substantial gender differences. The number of chronic symptoms was significantly associated with disability in BADL and unfavourable QoL, with gradients suggesting dose–response relationships. Joint pain and back pain had the highest population attributable fractions.

Conclusions: Chronic symptoms are highly prevalent in older people, and are associated with disability in BADL and unfavourable QoL, particularly when multiple chronic symptoms co-occur. Owing to their high public health impact, musculoskeletal chronic symptoms represent good targets for preventive interventions.

Strengths and limitations of this study

- This study is based on a representative sample of community-dwelling older men and women.
- Data from the Lausanne cohort 65+ (Lc65+) cohort study allowed adjusting for a substantial number of potential confounders.
- In addition to 14 chronic symptoms assessed in the present study, others may have been considered, such as headache, tiredness, impaired hearing/sight and sleeping problems.
- Each chronic symptom was recorded as present or absent, without attempting to assess severity.
- The study's cross-sectional design precludes any causal inference.

INTRODUCTION

Symptoms account for over half of all outpatient visits,[1] even though many individuals who suffer from symptoms do not consult. This phenomenon has been referred to as the 'symptom iceberg'.[2] The visible part represents the proportion of symptoms known to the general practitioner, whereas the submerged part encompasses symptoms which are not brought to medical attention. Faced with the complexity of the whole human body, biomedical research has favoured objective over subjective outcomes, and has therefore largely focused on medical diagnoses rather than on symptoms. However, a comprehensive overview of a patient's symptomatology is certainly meaningful when trying to fully understand his or her burden.[3]

Most studies on symptom prevalence have been conducted in a clinical setting. Not only did a limited number of population-based studies investigated this issue, many of these focused on middle-aged adults[4–8] or even exclusively on middle-aged women.[9 10] Similarly, many studies on older people focused on a single symptom such as back

pain,[11] neuropsychiatric,[12] anxiety[13] or urinary[14] symptoms. Furthermore, the few studies that considered multiple symptoms enrolled only small samples,[15–17] or older persons with severe comorbidities[18] or advanced chronic diseases.[19] As a result, little is known about symptom burden in community-dwelling older people.

Common symptoms generally relapse within a few weeks, but a quarter persist over time and often require more comprehensive management.[1] Also, there is strong evidence that the prevalence of chronic conditions substantially increases with age, and that multimorbidity—the coexistence of multiple chronic conditions—is associated with poor functional status, quality of life (QoL) and health outcomes.[20] Such associations have also been found when considering symptoms not reported to the physician, although more scarcely. In a cross-sectional study including older adults with high rates of comorbid diagnoses, symptoms correlated with mobility function at least as strongly as—if not more strongly than—a list of diseases did.[18] Nevertheless, the epidemiology of chronic symptoms still needs to be investigated in more details in older people. From a public health perspective, a better understanding of the prevalence of chronic symptoms would help healthcare policies to focus on chronic symptoms that strongly affect functional status and QoL.

This study sought to determine the prevalence of chronic symptoms in older men and women, their associations with disability in basic activities of daily living (BADL) and QoL, and their public health impact.

METHODS
Study design and population
This cross-sectional study used data from the population-based Lausanne cohort 65+ study (Lc65+)[21] and two additional, stratified, random samples selected from population lists in the cantons of Vaud and Geneva.[22] The pooled data set comprising 5300 community-dwelling adults aged 68 years and older is representative of older people in two French-speaking Swiss regions. Persons living in institutions or unable to respond by themselves due to significant cognitive impairment or advanced dementia were excluded. More details on participants' enrolment can be found elsewhere.[22] In brief, data were collected by means of a postal questionnaire in 2011 with a response rate of 71.2% (5300 out of 7443 eligible participants). The response rate was higher in participants from the Lc65+ cohort (95%) than in those from the stratified random samples (60%). This difference most likely reflects the motivation and adherence of Lc65+ participants who have been followed yearly since 2004. Small differences were observed according to sex, age and canton.[22]

Measures
Chronic symptoms
Respondents were asked whether they had been disturbed by any of the following 14 chronic symptoms for at least 6 months: joint pain, back pain, chest pain (on exertion), dyspnoea, persistent cough, swollen legs, memory gaps (affecting daily life), difficulty concentrating, difficulty making decisions (in daily life), dizziness or vertigo, skin problems (eg, eczema, psoriasis), stomach/intestine problems (including diarrhoea and constipation), urinary incontinence and impaired sexual life (due to pain, decreased sex drive, erectile dysfunction, etc). This list of chronic symptoms was adapted from the methodology of the Survey of Health, Aging, and retirement in Europe (SHARE).[23] Owing to very high bivariate associations between memory gaps, difficulty concentrating and difficulty making decisions (see online supplementary table S1), they were grouped into 'mental impairments', defined as the presence of any of these three symptoms.

Disability in BADL
Disability in BADL was assessed using five items of the Katz Index.[24] Although little evidence has been published on the psychometric properties of the Katz Index, it is one of the most frequently used tools to assess disability in older people.[25] Participants indicated whether they had had difficulty dressing, bathing, eating, getting in/out of bed or an arm chair, and using the toilet over the past 4 weeks. Continence was not included, as in the large majority of studies incorporating the Katz Index.[26] Response choices were 'no difficulty', 'difficulty but no help' or 'received help'. Disability in BADL was dichotomised as 'yes' (ie, participants reporting 'difficulty but no help' and those reporting 'received help' with one or more of the five BADL) or 'no' (ie, participants reporting 'no difficulty' in all five BADL).

Quality of life
Overall QoL was assessed with a single item: 'How do you rate your current QoL?' Answers ranged from 'excellent' to 'very good', 'good', 'fair' and 'poor'. Corresponding response choices in the French version of the SF-36 were used.[27] A single global rating of QoL is a valid and sensible measure, as far as the purpose to assess QoL—in the broad sense—is concerned.[28] It may even be preferable to multidimensional scales,[29] which are more appropriate for a detailed QoL assessment. Unfavourable QoL was defined as an answer other than 'excellent' and 'very good' (ie, good, fair or poor). In a recent study,[30] applying different cut-offs on the excellent-to-poor scale so as to define favourable QoL resulted in important changes in the type as well as in the number of significant QoL determinants. Dichotomising QoL as being at least very good (ie, excellent/very good vs good/fair/poor) was the only model that yielded significant determinants in every health, economic and social dimensions. Therefore, this cut-off appears to best reflect the multidimensional nature of QoL.

Covariates
At the stage of study sampling and recruitment, the Residents' Registration Office provided information

about residents' age, gender, canton of residence and commune of residence. The latter was used to determine whether or not participants were living in the main city of the canton of Vaud (Lausanne) or the canton of Geneva (Geneva). Additional information was gathered by means of a postal questionnaire that provided information about living arrangement (alone; with others), Swiss citizenship, ever having children, highest level of education achieved ('basic compulsory' (International Standard Classification of Education (ISCED[31]) level 0–2); 'apprenticeship' (ISCED level 3); 'post-compulsory' (ISCED level 4–8)), financial difficulties (defined as answering 'yes' to the question 'Are you sometimes struggling to make ends meet?'), and the presence of depressive symptoms. The latter was defined as answering 'yes' to either of the two following questions of the Primary Care Evaluation of Mental Disorders Procedure: 'During the past month, have you often been bothered by (1) feeling down, depressed or hopeless? (2) little interest or pleasure in doing things?' As compared with a standardised interview, these two questions had a sensitivity of 96% and a specificity of 57% in diagnosing depression.[32] Education and financial difficulties served as indicators of the socioeconomic status.

Statistical analysis

All analyses were stratified by gender because of the expected differences in QoL and in the prevalence of disability and chronic conditions between women and men.[33 34] Sampling weights were used to account for unequal selection probabilities and response.

The association between chronic symptoms and disability in BADL was assessed using multiple logistic regression analyses, which were conducted separately for each chronic symptom. Models were adjusted for covariates (model 1), and additionally for the number of other chronic symptoms (model 2). The association between each chronic symptom and unfavourable QoL was also assessed using models 1 and 2. A third model was additionally adjusted for disability in BADL to assess the association between each chronic symptom and unfavourable QoL over and above the contribution of disability in BADL (model 3). Multiple logistic regression models were also used to assess the association between the number of chronic symptoms and both disability in BADL and unfavourable QoL (model 1 only). Dose–response relationship was assessed by entering the number of chronic symptoms into model 1 as a continuous variable. All models were rerun by combining women and men to test interactions between gender and chronic symptoms.

To estimate the proportion of disability in BADL or unfavourable QoL that may be hypothetically reduced by the elimination of each chronic symptoms, population-attributable fraction (PAF) was calculated using the user-written command 'punaf' in Stata.[35] After fitting a logistic regression (model 2), this command follows the method recommended by Greenland and Drescher[36] for cohort and cross-sectional studies to calculate the PAF and its 95% CI.

Since missing values were likely to be missing at random, they were imputed using multiple imputations with chained equations.[37] Fifty imputation data sets were created. PAF was calculated using complete-case analysis, because the 'punaf' command does not support multiple imputations. Analyses were conducted using Stata V.14.0 software (StataCorp, College Station, Texas, USA). Significance was set at p<0.05.

RESULTS

Socioeconomic and demographic characteristics

Table 1 shows the characteristics of participants. Compared with men, women were older, were more often living in a main city, and reported higher rates of Swiss citizenship, 'alone' living arrangement and 'no' children status, a lower level of education, a higher rate of depressive symptoms, and a less favourable QoL (all p≤0.001). There was no significant gender difference in the canton of residence, financial difficulties and disability in BADL.

Prevalence of chronic symptoms

Most pairwise associations between chronic symptoms were significant (see online supplementary table S1). In other words, participants reporting a given chronic symptom were more likely to report almost any other chronic symptom. As indicated in table 2, joint pain was the most prevalent chronic symptom in women (51.5%) and men (42.5%). At the other end of the spectrum, the prevalence of chest pain was only around 3% regardless of gender. Four chronic symptoms (ie, mental impairments, skin problems, persistent cough and chest pain) did not display any significant gender difference. In contrast, impaired sexual life was dramatically more prevalent in men (33.9%) than in women (4.5%). All seven remaining chronic symptoms (ie, joint pain, back pain, stomach/intestine problems, urinary incontinence, dyspnoea, swollen legs and dizziness/vertigo) were more prevalent in women than in men. This translated in a higher proportion of women than men with 3, 4 or ≥5 chronic symptoms (p=0.002).

Associations between chronic symptoms and disability in BADL

Table 3 indicates the gender-specific associations between chronic symptoms and disability in BADL. In model 1—adjusted for socioeconomic and demographic characteristics—all chronic symptoms were significantly associated with disability in BADL, except impaired sexual life in women, and impaired sexual life, skin problems and persistent cough in men. These associations were attenuated in model 2, further adjusted for the number of other chronic symptoms. Several chronic symptoms remained significantly associated with

Table 1 Characteristics of study participants (weighted percentages)

	Total sample (n=5300)	Women (n=2781)	Men (n=2519)	p Value*
Age (n=5300)				
68–72 years	32.6%	30.7%	35.1%	0.001
73–77 years	24.9%	23.7%	26.4%	
78–99 years	42.6%	45.6%	38.5%	
Canton of residence (n=5300)				
Geneva	41.5%	41.9%	41.0%	0.641
Vaud	58.5%	58.1%	59.0%	
Main city (n=5300)				
No	71.4%	69.3%	74.3%	0.001
Yes	28.6%	30.7%	25.7%	
Swiss citizenship (n=5230)				
No	13.4%	11.4%	16.1%	<0.001
Yes	86.6%	88.6%	83.9%	
Living arrangement (n=5228)				
Alone	37.6%	52.7%	17.0%	<0.001
With others	62.4%	47.3%	83.0%	
Ever having children (n=5232)				
No	15.2%	17.5%	11.9%	<0.001
Yes	84.8%	82.5%	88.1%	
Education (n=5203)				
Basic compulsory	24.9%	31.6%	15.7%	<0.001
Apprenticeship	35.5%	33.9%	37.7%	
Postcompulsory	39.6%	34.5%	46.7%	
Financial difficulties (n=4795)				
No	85.9%	84.8%	87.5%	0.059
Yes	14.1%	15.8%	12.5%	
Depressive symptoms (n=5160)				
No	73.2%	68.8%	79.1%	<0.001
Yes	26.8%	31.2%	20.9%	
Disability in BADL (n=5202)				
No	73.9%	72.6%	75.6%	0.100
Yes	26.1%	27.4%	24.4%	
Quality of life (n=4847)				
Favourable	49.5%	46.7%	53.4%	<0.001
Unfavourable	50.5%	53.3%	46.6%	

*Logistic regression.
BADL, basic activities of daily living.

disability in BADL in both genders (ie, joint pain, back pain, urinary incontinence and swollen legs), or only in women (ie, dizziness/vertigo (OR=1.7; p=0.019) and skin problems (OR=2.8; p<0.001)) or men (ie, mental impairments (OR=1.7; p=0.003)). In women and men, the number of chronic symptoms was significantly associated with disability in BADL. When the number of chronic symptoms was entered into model 1 as a continuous variable (not indicated in table 3), the positive dose–response relationship between the number of chronic symptoms and disability in BADL was confirmed in women (OR=1.57; p<0.001) and men (OR=1.43; p<0.001). The interaction between gender and skin problems was significant in model 1 (p=0.001) and model 2 (p<0.001), thereby indicating a significant association between skin problems and disability in BADL restricted to women. All other interactions between gender and chronic symptoms were not significant.

Associations between chronic symptoms and unfavourable QoL

As indicated in table 4 (model 1), half of chronic symptoms were significantly associated with unfavourable QoL in women (ie, joint pain, back pain, stomach/intestine problems, dyspnoea, swollen legs and skin problems). In men, all but two chronic symptoms (impaired sexual life and skin problems) were significantly associated with unfavourable QoL. After adjusting for the number of other chronic symptoms (model 2), all associations were attenuated. Two chronic symptoms in women (ie, joint pain and back pain) and five chronic symptoms in men (ie, joint pain, mental impairments, dyspnoea, persistent cough and chest pain) remained significantly associated with unfavourable QoL. Further adjustment for disability in BADL (model 3) only slightly changed the associations obtained in model 2. In women and men, the number of chronic symptoms was significantly associated with unfavourable QoL. Entering

Table 2 Weighted prevalence of chronic symptoms

	Total sample (n=5191)	Women (n=2737)	Men (n=2454)	p Value*
Joint pain	47.7% (45.7% to 49.7%)	51.5% (48.6% to 54.3%)	42.5% (39.9% to 45.1%)	<0.001
Back pain	34.7% (32.8% to 36.5%)	38.2% (35.4% to 40.9%)	29.8% (27.4% to 32.2%)	<0.001
Stomach/intestine problems	22.1% (20.5% to 23.8%)	26.3% (23.8% to 28.9%)	16.4% (14.4% to 18.3%)	<0.001
Mental impairments	18.3% (16.7% to 19.9%)	19.0% (16.8% to 21.3%)	17.3% (15.3% to 19.3%)	0.288
Urinary incontinence	17.4% (15.8% to 19.0%)	21.4% (19.0% to 23.8%)	11.9% (10.2% to 13.7%)	<0.001
Impaired sexual life	16.9% (15.6% to 18.1%)	4.5% (3.4% to 5.6%)	33.9% (31.4% to 36.3%)	<0.001
Dyspnoea	16.9% (15.4% to 18.5%)	18.4% (16.2% to 20.7%)	14.9% (13.0% to 16.8%)	0.022
Swollen legs	13.4% (12.0% to 14.7%)	14.8% (12.8% to 16.9%)	11.3% (9.6% to 13.0%)	0.010
Dizziness/vertigo	10.3% (9.0% to 11.6%)	12.2% (10.2% to 14.1%)	7.7% (6.3% to 9.1%)	<0.001
Skin problems	9.8% (8.6% to 11.0%)	9.3% (7.6% to 11.0%)	10.5% (8.9% to 12.2%)	0.285
Persistent cough	4.6% (3.8% to 5.4%)	5.0% (3.8% to 6.1%)	4.1% (3.0% to 5.1%)	0.285
Chest pain	3.1% (2.3% to 3.8%)	3.3% (2.2% to 4.4%)	2.7% (1.9% to 3.6%)	0.459
Number of chronic symptoms				
0	17.1% (15.7% to 18.6%)	15.9% (13.9% to 17.8%)	18.9% (16.8% to 21.0%)	0.002
1	24.9% (23.2% to 26.6%)	24.1% (21.7% to 26.5%)	26.0% (23.7% to 28.3%)	
2	22.0% (20.3% to 23.6%)	21.9% (19.5% to 24.2%)	22.1% (19.9% to 24.4%)	
3	16.8% (15.3% to 18.4%)	17.6% (15.4% to 19.8%)	15.8% (13.8% to 17.7%)	
4	9.3% (8.2% to 10.5%)	9.8% (8.1% to 11.5%)	8.7% (7.2% to 10.2%)	
≥5	9.8% (8.6% to 11.1%)	10.8% (8.9% to 12.7%)	8.5% (7.0% to 10.0%)	

Data are weighted prevalence (95% CIs).
*Logistic regression.

Table 3 Associations between chronic symptoms and disability in BADL (ORs)

	Women (n=2318)		Men (n=2132)	
Chronic symptoms	**Model 1†**	**Model 2†**	**Model 1†**	**Model 2†**
Joint pain	1.8***	1.4*	2.4***	2.1***
Back pain	2.2***	1.7**	2.3***	2.0***
Stomach/intestine problems	1.5*	1.1	1.7**	1.3
Mental impairments	1.9**	1.5	2.0***	1.7**
Urinary incontinence	2.2***	1.8**	2.5***	1.9**
Impaired sexual life	1.5	1.2	1.0	0.9
Dyspnoea	2.0***	1.4	1.9***	1.4
Swollen legs	3.0***	2.2***	2.5***	1.7*
Dizziness/vertigo	2.4***	1.7*	1.8*	1.2
Skin problems	3.2***	2.8***	1.0	0.8
Persistent cough	1.8*	1.2	1.3	0.9
Chest pain	2.9**	1.7	2.0*	1.1
Number of chronic symptoms				
0	Ref		Ref	
1	2.0*		4.3***	
2	2.6**		9.0***	
3	3.9***		10.1***	
4	4.8***		12.3***	
≥5	20.1***		18.0***	

*p<0.05; **p<0.01; ***p<0.001.
†Logistic regression; model 1: adjusted for age, canton of residence, main city, Swiss citizenship, living arrangement, children, education, financial difficulties and depressive symptoms; model 2: adjusted for covariates in model 1 and the number of other chronic symptoms.
BADL, basic activities of daily living.

the number of chronic symptoms into model 1 as a continuous variable (not indicated in table 4) confirmed the positive dose–response relationship between the number of chronic symptoms and unfavourable QoL in women (OR=1.32; p<0.001) and men (OR=1.30; p<0.001). The interaction between gender and persistent cough was significant in model 1 (p=0.033), model 2 (p=0.021) and model 3 (p=0.018), thereby indicating a significant association between persistent cough and unfavourable QoL restricted to men. All other interactions between gender and chronic symptoms were not significant.

Table 4 Associations between chronic symptoms and unfavourable QoL (ORs)

Chronic symptoms	Women (n=2144)			Men (n=1973)		
	Model 1†	Model 2†	Model 3†	Model 1†	Model 2†	Model 3†
Joint pain	1.8***	1.5**	1.5**	1.5**	1.3*	1.2
Back pain	1.9***	1.7***	1.6**	1.4*	1.2	1.1
Stomach/intestine problems	1.5*	1.3	1.2	1.5*	1.2	1.2
Mental impairments	1.2	1.0	0.9	1.9**	1.6*	1.5*
Urinary incontinence	1.3	1.0	1.0	1.7*	1.4	1.3
Impaired sexual life	1.3	1.1	1.1	1.2	1.0	1.0
Dyspnoea	1.6*	1.3	1.3	2.0***	1.7**	1.6*
Swollen legs	2.0**	1.5	1.4	1.6*	1.2	1.1
Dizziness/vertigo	1.6	1.2	1.1	1.8*	1.4	1.3
Skin problems	1.7*	1.5	1.3	1.0	0.9	0.9
Persistent cough	1.4	1.1	1.1	3.5***	3.0**	3.1**
Chest pain	1.8	1.3	1.2	5.4**	3.9**	4.2**
Number of chronic symptoms						
0	Ref			Ref		
1	1.4			1.5*		
2	2.4***			1.7**		
3	3.3***			2.4***		
4	2.9***			2.8***		
≥5	5.7***			5.0***		

*p<0.05; **p<0.01; ***p<0.001.
†Logistic regression; model 1: adjusted for age, canton of residence, main city, Swiss citizenship, living arrangement, children, education, financial difficulties and depressive symptoms; model 2: adjusted for covariates in model 1 and the number of other chronic symptoms; model 3: adjusted for covariates in model 2 and disability in basic activities of daily living.
QoL, quality of life.
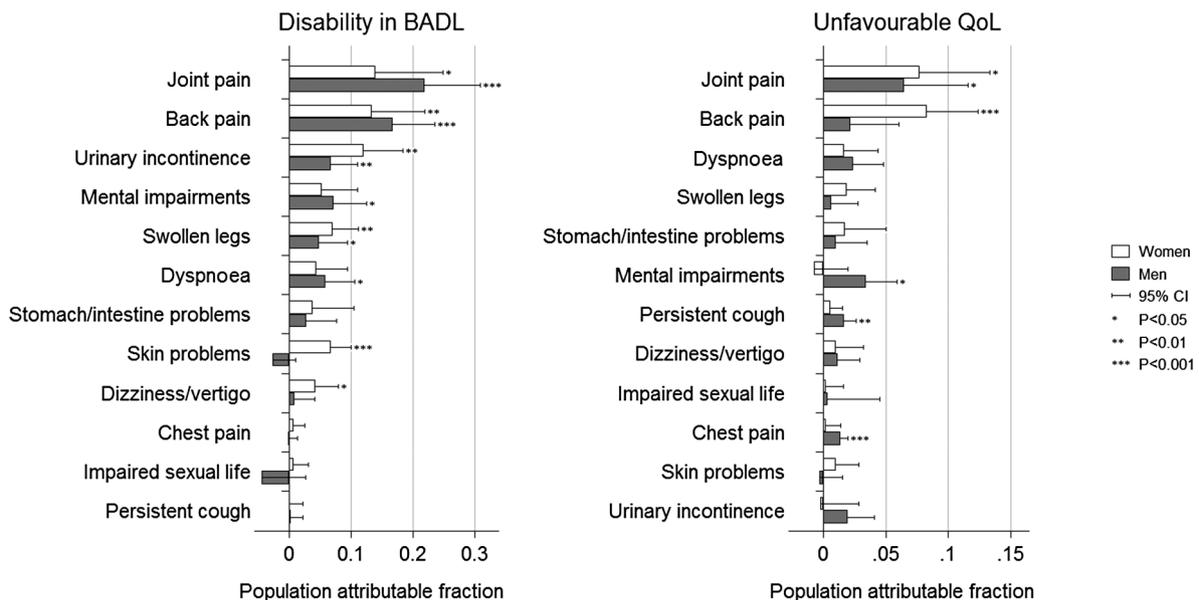
Figure 1 Population attributable fraction of disability in BADL or unfavourable QoL for chronic symptoms in women and men. BADL, basic activities of daily living; QoL, quality of life.

Population attributable fraction

Figure 1 presents chronic symptoms in the order of their contribution to disability in BADL and unfavourable QoL in the total sample. Regarding disability in BADL, the PAF was significant in half of chronic symptoms, although these were not the same in women and men. In both genders, however, joint pain and back pain were the main contributors to disability in BADL. Regarding unfavourable QoL, the most important contributors in women were also joint pain (7.7%; p=0.012) and back pain (8.3%; p<0.001), whereas the top two factors in men were joint pain (6.5%; p=0.019) and mental impairments (3.4%; p=0.012). Specifically in men, a small but statistically significant proportion of

unfavourable QoL may be hypothetically reduced by the elimination of persistent cough (1.7%; p=0.001) and chest pain (1.4%; p<0.001).

DISCUSSION
Main findings
In this representative sample of community-dwelling older people, less than one person out of five did not report any chronic symptom and more than half reported multiple chronic symptoms. This observation is largely compatible with the increasingly high frequency of multimorbidity that characterises older age.[20] From a public health perspective, musculoskeletal symptoms (ie, joint pain and back pain) were the most burdensome chronic symptoms due to their high prevalence and their significant interference with BADL and QoL. Substantial gender differences were observed in the prevalence of chronic symptoms, as well as their associations with, and contribution to disability in BADL and unfavourable QoL.

Prevalence of chronic symptoms
Women reported a higher number of chronic symptoms than men did. This confirms and extends the gender difference reported in previous studies that did not focus solely on chronic symptoms.[4 5 7 8 38] In contrast, Hellström et al[39] did not report any gender difference in the number of symptoms. In their study, Ladwig et al[7] suggest that the gender gap may be mediated by a lower socioeconomic status and higher levels of chronic distress in women. The present study pointed to another striking gender difference, that is, the prevalence of impaired sexual life, which was the second most frequently reported chronic symptom in men, but the second least frequently reported one in women. Interestingly, while none of the aforementioned studies assessed impaired sexual life, data from the English Longitudinal Study of Ageing recently indicated that the percentage of individuals aged 70 or above who reported concerns about, or dissatisfaction with, their overall sex life was around 20% in men but only 5% in women.[40]

In the present study, joint pain was the most prevalent chronic symptom in both genders. Back pain ranked second in women and third in men. This is consistent with previous population-based studies reporting musculoskeletal symptoms as the most prevalent symptoms[38 39] or among the most prevalent symptoms[4 5 8] in older adults.

Associations between chronic symptoms and disability in BADL
Importantly, the present study indicates that the accumulation of several chronic symptoms is associated with disability in BADL. Once the number of other chronic symptoms has been accounted for, several chronic symptoms (ie, stomach/intestine problems, dyspnoea, and chest pain in women and men) lose their association with disability in BADL. Since the majority of participants (58%) reported multiple chronic symptoms, these findings question the single-disease approach that still prevails in many healthcare systems. As Barnett et al[20] underlined in the context of multimorbidity, a comprehensive, patient-centred approach would promote a more efficient coordination of care.

Interestingly, the associations between each chronic symptom and disability in BADL were generally consistent across gender. Nevertheless, skin problems showed the strongest association with disability in BADL in women, whereas this association was not significant in men, despite a similar prevalence of the symptom. Yet it is not clear whether this difference is due to a higher severity of skin problems in women, divergent types of skin diseases in women and men,[41] or gender-specific interference of skin problems with daily life.

Associations between chronic symptoms and unfavourable QoL
Persistent cough and chest pain were strongly associated with unfavourable QoL in men, whereas these associations were not significant in women. While the interaction between gender and persistent cough was significant, the lack of a significant interaction between gender and chest pain may be due to the low prevalence of chest pain and the resulting lack of statistical power. In a previous population-based study,[42] chronic persistent cough was also associated with impairments in health-related QoL, even though older women and men were not analysed separately. Similarly, QoL was found to be worse among patients with chest pain compared with healthy controls,[43] with significant gender differences in the clinical characteristics of chest pain.[44] However, this issue has not been specifically addressed in older people. The present study points to gender-specific associations between cardiopulmonary symptoms (ie, persistent cough and chest pain) and QoL in older women and men. Possible explanations include gender differences in coping strategies, and clinical characteristics (including severity) of cardiopulmonary symptoms. For instance, Robb et al[45] reported gender differences in coping with functional disability in older married couples. Whereas neuroticism was negatively associated with subjective well-being in husbands and wives, extraversion and social support were linked to subjective well-being only in husbands.

Population attributable fraction
The contribution of chronic symptoms to disability in BADL was about twice as high as that to unfavourable QoL. The multidimensional nature of QoL, which encompasses health as well as factors not directly related to health (eg, material resources, feeling of safety, close entourage), may account for that contrast.[22] Musculoskeletal chronic symptoms were the strongest contributors to disability in BADL. Indeed, interventions

targeting prevention of joint pain may reduce disability in BADL by up to 14% in women and 22% in men, and interventions targeting prevention of back pain may reduce disability in BADL by up to 13% in women and 17% in men. Furthermore, musculoskeletal chronic symptoms strongly contributed to unfavourable QoL, particularly in women. In contrast, preventing chest pain or persistent cough would reduce unfavourable QoL by up to merely 2% in men only. Despite their high interference with daily life at the patient level, chest pain and persistent cough are not in the front line of preventive actions expecting a huge public health impact.

Strengths and limitations of the study

This study is based on a representative sample of community-dwelling older men and women. Furthermore, data from the Lc65+ allowed to adjusting for a substantial number of potential confounders. The present study also has some limitations. First, it focused on 14 chronic symptoms, whereas other studies have considered other ones, such as headache, tiredness, impaired hearing/sight and sleeping problems.[18 19 39] Second, each chronic symptom was recorded as present or absent, without attempting to assess severity. Finally, the study's cross-sectional design precludes any causal inference.

CONCLUSION

In older people, multiple chronic symptoms are the rule rather than the exception. Musculoskeletal chronic symptoms account for a large proportion of the whole chronic symptom iceberg. Owing to their high prevalence and their significant associations with disability and QoL, joint pain and back pain are good targets for preventive interventions seeking to reduce the burden of age-related disability and impairment in QoL.

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