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ORIGINAL ARTICLE

Low back pain and health-related quality of life in community-dwelling older adults

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Abstract
Purpose Investigation of self-reported of low back pain (LBP) over the last month and associated health-related quality of life (HRQoL) in a sample of a community-dwelling population aged ≥65.
Methods Cross-sectional study including older adults selected randomly from population records. Data were collected within a sample stratified by age and sex. Physical and psychological healths were investigated using a standardized definition of LBP and the EuroQoL-5D for HRQoL. Analyses were first conducted on the entire sample ($N = 3042$) and subsequently considering the subsample who reported LBP and a paired sample drawn from the pool of LBP-free respondents.
Results 889 (29 %) respondents reported LBP within the past month, present 'most days' or 'every day' in 52 % and limiting activities in the same proportion. Average pain score was 4.6 (SD 2.2; 0–10 scale). Age was associated with pain frequency and duration, with younger groups more often reporting pain 'some days' and 'dating back <3 months'. Results of regression analyses showed that individuals suffering from LBP had significantly more problems than LBP non-sufferers on all EQ-5D subscales, except self-care: pain/discomfort (OR 5.33; 95 % CI [4.19–6.79]), mobility (OR 2.66; 95 % CI [2.04–3.46]), usual activities (OR 1.92; 95 % CI [1.42–2.60]), anxiety/depression (OR 1.59; 95 % CI [1.23–2.04]) and self-care (OR 1.29; 95 % CI [0.84–1.98]).
Conclusion LBP appears to be a more permanent condition in the older groups. LBP may be a part of the definition of a subgroup of elderly at risk of becoming frail in relation with higher levels of functional limitations, psychological difficulties and social restrictions, hence globally impaired HRQoL.

Keywords Low back pain · Health-related quality of life · Older adults · Community dwelling

Introduction

Over the last decades, industrialized countries have witnessed a drastic demographic aging. With a high burden of chronic diseases in the elderly population, health-related indicators are of central concern, and the importance of health-related quality of life (HRQoL) is increasingly acknowledged [1, 2]. Epidemiological studies emphasize the burden of pain in western countries with an estimated 50 % of community-dwelling older adults reporting chronic pain [3, 4], with pain affecting particularly the lower back [5]. The Global Burden of Disease Study reported that among 306 conditions [6], back pain (low back and neck) ranked highest in terms of disability and fourth in terms of overall burden, i.e. disability-adjusted life years (DALYs). More, prevalence and burden increase with age, with a peak around 80 years of age [7]. Surveys

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point to high estimates with as much as 25 % of those over 70 suffering from back pain on a monthly basis, however, with no specific attention to the epidemiology of LBP in seniors [8, 9]. Further, findings report that older people experience less frequent benign back pain, but rather a higher prevalence of episodes which are severe or disabling [10].

Data on the burden of disease of LBP as well as studies on substantial low back pain (LBP) prevalence in older adults [9, 11–14] and associated difficulties in functional health point to LBP as a possible indicator of functional decline that would impact negatively on the HRQol of older individuals [9, 23]. In this context, questions on the diversity of life and health conditions during the course of aging need to be considered. Health-related indicators are thus of major importance, since they are related to frailty status [1] and ultimately mortality [2]. While previous reports reveal that HRQoL tends to decline with age and affect primary functional health [15], data are lacking about how LBP affects HRQoL in older populations.

Hence, the purpose of this study was to investigate self-reported LBP over the last month and the effect of the presence or absence of LBP on HRQoL in a community-dwelling population aged 65 and above.

Methods

Participants

This study was part of a program assessing physical and psychological health, social relations, and economical wealth in a representative sample of the Swiss population aged 65 and above and living in the community [16]. The survey was conducted in five Swiss cantons: two French-speaking ones, Geneva and Wallis, two German-speaking ones, Bern and Basel, and the only Italian-speaking one, i.e. Ticino. These regions were selected on the basis of the following: the representativeness of the linguistic and urban/rural areas; and the regions' potential to capture the effects of different social policy systems, regarding the elderly in the Swiss federal state. The target sample consisted of 3'600 individuals. The (theoretical) sample was randomly selected in the cantonal and national population records. Moreover, the sample was stratified by age (65–69, 70–74, 75–79, 80–84, 85–89, 90 and above) and sex, for a total of 720 respondents in each canton. The final sample consisted in 3073 individuals. The study was conducted between 2011 and 2013.

All respondents were cognitively able to give their written informed consent for participation and to answer the questionnaire as verified by trained interviewers. The protocol was approved by the ethical committees of the each canton involved in the study.

Procedure

Data were collected using a face-to-face interview conducted by trained interviewers using the Computer Assisted Personal Interview (CAPI) method and self-administered questionnaires, in which the Standardized Back Pain Definition [17], a scale assessing LBP for use in prevalence studies was included. This short 5-item questionnaire investigates 'site and symptoms', including the presence of 'sciatica' (pain running down the leg and/or down the knee), as well as 'frequency', 'duration' (chronic corresponds to the categories 'less than 3 months with no pain', and 'between 3 and 7 months'; recurrent LBP covers 'between 7 months and 3 years' with no pain; and acute LBP to 'more than 3 years' with no pain which are the four categories used in the Standardized Back Pain Definition to assess duration) and 'severity' (activity limitations during at least 1 day) of LBP. As for duration, categories include acute, recurrent and chronic LBP. A Numerical Rating Scale (NRS) (from 0='no pain' to 10='worst pain') records pain severity. Respondents are asked to answer each item as it applied to them "in the past 4 weeks".

For the assessment of HRQol, we used the EQ-5D [18] a well-known, psychometrically and clinically sound instrument entailing 5 subscales assessing 'mobility', 'self-care', 'usual activities', 'pain/discomfort' and 'anxiety/depression', each quoted into three categories ('no', 'moderate', or 'extreme' problem). EQ-5D also assesses self-perceived overall health, recorded on a NRS (from 0 = 'worst imaginable health state' to 100 = 'best imaginable health state'). Respondents are asked to answer each item as it applies to them "today". The EQ-5D has been applied worldwide [19], yielding opportunities of developing single indexes derived from inter-regional pooled data, as it is the case for the health utility index (HUI) proposed by Greiner et al. [20]. The Greiner Health Utility Index (HUI) provides an estimate of overall health status based on the responses to the first five items of the EQ-5D whereas the NRS provides a self-evaluation score. The interest of using both the HUI and the NRS offers a two way estimation of global HRQoL, one which is standardized, the HUI, thus allowing for between study comparisons, and another one which is dependent on the sample. For comparison purposes with other available data in Switzerland [15, 21], the three modalities of responses in the five 3-point items of the EQ-5D were reduced into 2-point scales ("no problem", "moderate or severe problem").

Data analyses

The data from the Standardized Back Pain Definition [17] and from the EQ-5D [18], were first analyzed using descriptive procedures. Analyses estimating the effect of LBP on HRQoL were conducted using regression procedures allowing controlling for age, sex, linguistic area, educational level coded as a 3-level variable considering primary (elementary and inferior secondary), secondary (superior secondary and apprenticeships) and higher education (college and university), and comorbidities. These comorbidities were assessed with the Geriatric Index of Comorbidity (GIC) [22]. Fifteen clinical conditions (ischemic or organic heart diseases, primary arrhythmias, heart diseases with a non-ischemic or nonorganic origin, hypertension, stroke, peripheral vascular diseases, diabetes mellitus, anemia, gastrointestinal diseases, hepatobiliary diseases, renal diseases, respiratory diseases, parkinsonism and nonvascular neurologic diseases, musculoskeletal disorders, and malignancies) were considered. The total number of chronic conditions (ranging from 0 to 15) was stratified into four levels: 0–2, 3 and 4, 5 and 6, and 7 or more as recommended for this instrument [22].

For comparison purposes, a paired sample was drawn from the pool of respondents without LBP, and matched by age, sex and linguistic area to the LBP sufferers. Such a matching sample method is of interest when it comes to ensure comparability across samples in terms of potential confounding variables that are age, sex and origin. Random paired sampling was performed with the FUZZY tool implemented in SPSS (IBM Corporation) and resulted in an exact pair-match on age, sex and linguistic area for each of the LBP sufferers in the non-sufferer group. Comparison between LBP sufferers/paired non-sufferers were first conducted with descriptive statistics on each of the EQ-5D variables, and subsequently with multivariate repeated measure regressions, entering the LBP groups as predictor or independent variables, as well as age, sex, linguistic area, education and comorbidities [15], and HRQoL dimensions as outcomes. Logistic binomial regressions were used for binary dependant variables (Mobility, Self-Care, Usual Activities, Pain/Discomfort and Anxiety/Depression), and linear regressions were applied for continuous outcome variables (NRS and HUI). The repeated measure regression choice was a consequence of the matching, the latter procedure rationale is to control for confounding, namely to minimize the effects of the matching variables on the outcomes. "This is especially relevant when there is a substantial difference in the occurrence of possible confounders between cases and controls" [23]. In both linear and logistic regression models we used the Stata software option vce(cluster id) which "specifies that the standard errors allow for intragroup correlation, relaxing the usual requirement that the observations be independent" [24]. As non-sufferers were paired for age, sex and region, we had to take into account this pairing into the model, each matched set of observation being considered as a cluster.

Results

The characteristics of the total sample according to the stratification by age, sex and linguistic area are reported in Table 1. A total of 3042 (99 %) respondents provided a valid response on the item investigating self-reported LBP over the last month, with 889 (29 %) (Table 1). A paired sample of $N = 889$ was drawn from the pool of 2'153 respondents without LBP. This random paired sampling resulted in an exact pair-match on age, sex and linguistic area for each of the 889 LBP sufferers in the non-sufferer group.

Table 1 also shows that overall self-reported LBP over the last month above 65 years of age nearly reached 30 %; however, the overall self-reported LBP increased in women after 75–79 years while it remained stable in men, except for the 90+. When considering the whole sample, the overall self-reported LBP was 10 % higher in women than in men; this difference ranged from 2 % to almost 30 % according to the age group: small differences between women and men are about 2 % (e.g. in the 65–69 or the 75–79 Italian-speaking age groups), it can reach nearly 30 % rather than 22 % (e.g. the 85–89 German-speaking age group, see Table 1). It was also higher in the French- and German-speaking areas as compared to the Italian one, after 75–79 years.

LBP was present 'most days' or 'every day' in 47.3 % of the 889 individuals reporting LBP and limited their activities in the same proportion (49.7 %; Table 2). Time with no LBP dated back <3 years in 19.8 %, revealing long-lasting pain in the majority of the sufferers. Nearly a third of the group (31.6 %) reported pain running down the legs and 20.3 % pain down the knees, thus suggesting sciatica. Mean pain score was 4.6 (SD = 2.2) on a 0–10 scale.

The results showed that LBP was significantly associated with impaired scores on all EQ-5D subscales as compared to the LBP-free sample, except for Self-Care. For the Pain/Discomfort subscale, nearly 80 % (607 out of 885) of the LBP sample reported problems 'today' whereas only about 40 % (354 out 884) of the control sample reported problems (Table 3) This effect was highly significant ($p < 0.001$) (Tables 5, 6, 7). HRQoL in the LBP sample was mainly affected in the dimensions of Mobility and, to a lesser extent, Anxiety/Depression and Usual Activities; Self-Care was only marginally affected

Table 1 Study of the impact of low back pain on quality of life in Switzerland (2011–2013); number (total sample) and percent (with self-reported LBP) by for the six age groups, women and men and the three linguistic areas

N	French		German		Italian		Total		Total
	Women	Men	Women	Men	Women	Men	Women	Men	
65–69	116	113	117	126	48	45	281	284	565
70–74	110	113	122	125	60	70	292	308	600
75–79	107	114	115	118	52	58	274	290	564
80–84	87	98	105	107	46	43	238	248	486
85–89	78	86	97	105	42	51	217	242	459
90+	52	63	74	98	37	44	163	205	368
Total	550	587	630	679	285	311	1465	1577	3042
% with LBP									
65–69	29.3	22.1	29.1	18.3	25.00	26.7	28.5	21.1	24.8
70–74	32.7	25.7	36.1	31.2	33.3	22.9	34.3	27.3	30.7
75–79	32.7	23.7	33.9	21.2	30.8	32.8	32.9	24.5	28.6
80–84	39.1	29.6	41.0	20.6	32.6	9.3	38.7	22.2	30.3
85–89	30.8	25.6	49.5	21.0	33.3	23.5	39.6	23.1	30.9
90+	40.4	22.2	37.8	36.7	24.3	15.9	35.6	27.8	31.3
Total	33. 5	24.9	37.5	24.6	30.2	22.5	34.5	24.3	29.2

(Tables 3, 5, 6, 7). The results are similar for both sexes with only one difference: a stronger and significant age effect for Pain/Discomfort among women, whereas there is no age effect for male.

Self-evaluation of current health status on the EQ-5D NRS and health utility values estimated by the Greiner HUI were significantly lower in individuals reporting LBP (mean = 69 vs. 77, $p < 0.001$ and mean = 71 vs. 83,) (Table 4). This effect was highly significant ($p < 0.001$) (Table 8).

Altogether, results from regression analyses showed that individuals with LBP had significantly more problems than their non-sufferer peers on all EQ-5D subscales, except Self-Care: Pain/Discomfort (OR 5.33; 95 % CI [4.19–6.79]), Mobility (OR 2.66; 95 % CI [2.04–3.46]), Usual Activities (OR 1.92; 95 % CI [1.42–2.60]), Anxiety/Depression (OR 1.59; 95 % CI [1.23–2.04]) (Tables 4, 5, 6, 7, 8). Self-evaluation of current health status on the EQ-5D NRS and health utility values estimated by the Greiner index were significantly affected in individuals reporting LBP ($B = -4.93$; $p < 0.001$ and $B = -9.14$; $p < 0.001$) (Table 8).

Discussion

Our results show that nearly 30 % of community-dwelling individuals aged 65 and above report LBP in the preceding month and that LBP highly impacts HRQoL. In the majority of LBP sufferers, pain was long-lasting, with episodes of persistent pain and limitations in daily activity. Self-reported LBP increased after the age of 75. The comparison between individuals reporting LBP and paired pain-free controls indicated that older adults with LBP reported significantly impaired scores on all dimensions of HRQoL but one as well as a significantly lower self-rated overall health. Since we controlled for the effect of sociodemographic variables and comorbidities, the results ascertain that individuals with LBP experienced a significantly higher burden of disease than their peer non-sufferers, and that, irrespective of other factors known to account for HRQoL decline. The results point to LBP as a sensitive indicator of functional decline.

The findings of the present study are consistent with studies reporting substantial LBP prevalence in older adults [9, 11–14] and associated difficulties in general and functional health. Similar results were found in another nationwide survey investigating neck and LBP in community-dwelling adults in Spain and including a large cohort of individuals aged 70 years or more [25, 26]. Specifically, our results parallel those of a study conducted in conditions resembling ours (i.e. a cohort of male and female individuals aged 65 and over, community-dwelling, some healthy and others suffering from different diseases) that showed that respondents who reported LBP also reported difficulties in performing everyday activities [12]. These results also parallel those of Rudy et al. [27] who demonstrated that chronic LBP impacts on functionally independent older adults, as compared to age and sex matched pain-free controls. However, impairment in HRQoL was

Table 2 Study of the impact of low back pain on quality of life in Switzerland (2011–2013); distribution of the Standardized Back Pain Definition items among respondents, and corresponding mean (and standard deviation) and median (and interquartile intervals) pain values on a Numerical Rating Scale (0–10)

	N	%	Numerical Rating Scale Values		
			Mean	Median	Interquartile interval
Back pain over the past 4 weeks	3042	100.00			
Yes	866	28.5	4.6	5	[3–6]
No	2153	70.8			
Missing	23	0.8			
Limit activity during at least 1 day					
Yes	442	49.7	4.5	5	[3–6]
No	408	45.9	4.6	5	[3–6]
Missing	39	4.4			
Pain running down the legs					
Yes	281	31.6	5.2	5	[4–7]
No	570	64.1	4.2	4	[3–5]
Missing	38	4.3			
Pain running down the knees					
Yes	180	20.3	5.3	5	[4–7]
No	659	74.1	4.3	4	[3–6]
Missing	50	5.6			
Pain frequency					
Some days	432	48.6	4.0	4	[3–5]
Most of the days	160	18.0	5.1	5	[4–6]
Every day	260	29.3	5.2	5	[4–7]
Missing	37	4.2			
Time with no pain					
Less than 3 months	176	19.8	4.2	4	[3–5.75]
Between 3 and 7 months	69	7.8	4.3	4	[2.5–6]
Between 7 months and 3 years	112	12.6	4.6	4	[3–6]
More than 3 years	448	50.4	4.8	5	[3–6]
Missing	84	9.5			

Table 3 Study of the impact of low back pain on quality of life in Switzerland (2011–2013); descriptive statistics of EQ-5D scores for low back pain (LBP) sufferers and matched non-sufferers (No-LBP)

	Mobility		Self-care		Usual activities		Pain/discomfort		Anxiety/depression	
	No-LBP	LBP	No-LBP	LBP	No-LBP	LBP	No-LBP	LBP	No-LBP	LBP
No problems	665	475	779	721	730	620	496	166	683	577
Problems	157	339	50	82	91	193	332	644	141	228
Total	822	814	829	803	821	813	828	810	824	805

mainly characterized by moderate problems as reported elsewhere [15], thus indicating that LBP may be associated with difficulties in performing everyday activities but not with incapacity to perform them [9, 28]. These results parallel those of a survey conducted in Sweden that has shown that even though about half of a randomly selected sample of men aged 69–81 years living in the community experienced LBP but morbidity was low, with more than two-thirds of the individual having no limitations in the activities of daily living [29]. Conversely, our results also point to deteriorated HRQoL scores and lower self-rated health status in those respondents with LBP, a profile that parallels the results of Danish population-based studies [9, 30]. Altogether, these results suggest that LBP may be a key feature of a progressive disablement process in aging. In line with previous findings on older independent community-dwelling adults [27], the results demonstrate that LBP is associated with diminished mobility, usual

Table 4 Study of the impact of low back pain on quality of life in Switzerland (2011–2013); descriptive statistics for the two global health indices estimated from the EQ-5D health-related quality of life scale in low back pain (LBP) sufferers and matched non-sufferers (No-LBP)

	Nurmerical Rating Scale		Health Utility Index	
	No-LBP	LBP	No-LBP	LBP
N	828	814	790	775
Mean	77.41	68.72	83.45	71.23
SD	20.18	20.42	16.74	17.97

activities, anxiety/depression and several features of common functional health indicators, even in the youngest old sample. Further, the link between functional loss and frailty is well documented and recognized [1, 31]. Together, these pieces of evidence suggest that LBP sufferers are at higher risks of functional decline than their peer non-sufferers. Recent reviews have stressed that older adults with chronic musculoskeletal pain have more functional problems than those without pain and that fear of activity could contribute to functional decline [32, 33]. LBP is a sensitive indicator of functional decline in so far as LBP affects basic daily

Table 5 Study of the impact of low back pain on quality of life in Switzerland (2011–2013); summary of repeated logistic regressions for each of the five dimensions of the EQ-5D health-related quality of life scale

	Mobility			Self-care		
	N	OR	95 % CI	*N*	OR	95 % [LCI–UCI]
Group [LBP absent or present]						
No-LBP	822	–	–	829	–	–
LBP	814	2.66	[2.04–3.46]	803	1.29	[0.84–1.98]
Age-group [according to initial stratification]						
65–69 years	263	–	–	265	–	–
70–74 years	340	1.17	[0.69–1.99]	342	1.97	[0.52–7.47]
75–79 years	294	1.68	[0.99–2.82]	292	2.62	[0.72–9.50]
80–84 years	267	3.63	[2.21–5.96]	267	5.47	[1.61–18.60]
85–89 years	261	5.96	[3.59–9.88]	259	10.15	[3.07–33.56]
90+ years	211	11.95	[7.00–20.37]	207	36.83	[11.38–119.21]
Sex						
Female	931	–	–	937	–	–
Male	705	0.88	[0.67–1.15]	695	0.71	[0.46–1.10]
Region						
French	597	–	–	591	–	–
German	749	0.96	[0.73–1.27]	751	0.52	[0.33–0.81]
Italian	290	0.96	[0.66–1.40]	290	0.84	[0.48–1.47]
Education						
Low (elementary and inferior secondary)	448	–	–	442	–	–
Medium (superior secondary and apprenticeships	858	1.21	[0.88–1.65]	861	1.42	[0.81–2.49]
High (college and university)	330	1.70	[1.17–2.49]	329	1.59	[0.86–2.95]
Comorbidities						
0–2 diseases	927	–	–	926	–	–
3–4 diseases	488	2.92	[2.20–3.88]	489	2.83	[1.72–4.65]
5–6 diseases	154	6.52	[4.30–9.89]	150	3.69	[1.94–7.01]
7 or more diseases	67	11.26	[6.03–21.01]	67	12.89	[6.11–27.18]
Model χ^2	334.18			190.19		
p value	<.001			<.001		
Pseudo R^2	0.25			0.25		
N	1636			1632		

OR odd ratios, *LCI* lower value of the 95 % confidence interval, *UCI* upper value of the 95 % confidence interval

Table 6 Study of the impact of low back pain on quality of life in Switzerland (2011–2013); summary of conditional logistic regressions for each of the five dimensions of the EQ-5D health-related quality of life scale

	Usual activities			Pain/discomfort		
	N	OR	95 % CI	N	OR	95 % [LCI–UCI]
Group[LBP absent or present]						
No-LBP	821	–	–	828	–	–
LBP	813	1.92	[1.42–2.60]	810	5.33	[4.19–6.79]
Age-group [according to initial stratification]						
65–69 years	265	–	–	266	–	–
70–74 years	341	1.06	[0.58–1.95]	341	1.19	[0.83–1.69]
75–79 years	293	1.46	[0.81–2.61]	290	1.43	[0.99–2.08]
80–84 years	269	2.03	[1.17–3.54]	269	1.72	[1.14–2.60]
85–89 years	257	2.84	[1.63–4.96]	260	1.34	[0.88–2.04]
90 + years	209	8.76	[4.88–15.71]	212	1.86	[1.23–2.81]
Gender						
Female	939	–	–	939	–	–
Male	695	0.58	[0.42–0.80]	699	0.61	[0.48–0.77]
Region						
French	592	–	–	598	–	–
German	753	0.72	[0.52–1.01]	749	0.44	[0.34–0.57]
Italian	289	0.69	[0.45–1.06]	291	0.78	[0.56–1.10]
Education						
Low (elementary and inferior secondary)	445	–	–	445	–	–
Medium (superior secondary and apprenticeships	861	1.00	[0.69–1.46]	860	0.96	[0.73–1.26]
High (college and university)	328	1.28	[0.84–1.95]	333	1.23	[0.87–1.75]
Comorbidities						
0–2 diseases	929	–	–	928	–	–
3–4 diseases	484	2.58	[1.83–3.64]	489	2.46	[1.89–3.19]
5–6 diseases	153	5.81	[3.68–9.17]	154	4.37	[2.61–7.33]
7 or more diseases	68	8.73	[4.87–15.65]	67	4.90	[2.24–10.68]
Model χ^2	237.12			311.85		
p value	<.001			<.001		
Pseudo R^2	0.19			0.20		
N	1634			1638		

OR odd ratios, *LCI* lower value of the 95 % confidence interval, *UCI* upper value of the 95 % confidence interval; a higher OR means a higher probability of moderate or severe problem in each subdimension

activities such those assessed by the EQ-5D, first 3 items: in particular LBP affects Mobility, and Usual Activities. Much in the same line, a cross-sectional survey investigating the association between activity, knee pain, LBP, and HRQoL in older Japanese adults has shown that engaging in exercise, including lifestyle activity, has a positive effect on general health as well as on HRQoL [34]. Loss of mobility is a known predictor of independence loss due to functional decline [35]. Yet, a longitudinal cohort study would be necessary to assess this hypothesis.

Our results are also in line with studies pointing to older people experiencing or reporting less frequent benign or mild LBP, but enduring a higher prevalence of severe or disabling painful episodes. More, the frequency of severe LBP increases with age [10]. Various hypotheses have been proposed to account for the decline of benign pain with age, i.e. cognitive impairment, depression, decreased pain perception and increased tolerance to pain [8]. Others have suggested the presence of a recall bias, acceptance of pain as 'natural' in old age, and/or underestimation of pain compared with more serious health problems that occur in the same timeframe, or, else that older people experience less pain because they tend to perform less physical efforts and are less likely to be affected by work-related stress [11].

Table 7 Study of the impact of low back pain on quality of life in Switzerland (2011–2013); summary of repeated logistic regressions for each of the five dimensions of the EQ-5D health-related quality of life scale

	Anxiety/depression		
	N	OR	95 % [LCI–UCI]
Group[LBP absent or present]			
No-LBP	824	–	–
LBP	805	1.59	[1.23–2.04]
Age-group [according to initial stratification]			
65–69 years	264	–	–
70–74 years	338	0.77	[0.51–1.16]
75–79 years	291	0.74	[0.49–1.13]
80–84 years	263	0.70	[0.45–1.09]
85–89 years	260	0.84	[0.54–1.31]
90+ years	213	0.83	[0.52–1.32]
Sex			
Female	929	–	–
Male	700	0.52	[0.39–0.68]
Region			
French	594	–	–
German	746	0.67	[0.50–0.88]
Italian	289	1.35	[0.96–1.88]
Education			
Low (elementary and inferior secondary)	446	–	–
Medium (superior secondary and apprenticeships	852	1.24	[0.90–1.69]
High (college and university)	331	1.61	[1.12–2.33]
Comorbidities			
0–2 diseases	924	–	–
3–4 diseases	488	1.71	[1.28–2.27]
5–6 diseases	150	2.67	[1.78–3.99]
7 or more diseases	67	3.11	[1.84–5.23]
Model χ^2	127.98		
p value	<.001		
Pseudo R^2	0.079		
N	1629		

OR odd ratios, *LCI* lower value of the 95 % confidence interval, *UCI* upper value of the 95 % confidence interval; a higher OR means a higher probability of moderate or severe problem in each subdimension

Lowsky et al. [36] investigated the strength of the link between chronological age and health decline; they point to the line between middle and old age as becoming increasingly blurred. The results of their study showed that a substantial proportion of individuals in each age group reported their health as excellent or very good, with 42 % among those aged 65–69, and falling gradually to 28 % among those aged 85 and older. Similarly, nearly one-third (32 %) of the oldest age group had not been diagnosed with any of five major chronic diseases (cancer, diabetes, heart disease, lung disease, stroke), this ratio being of nearly 50 % in the 65–69 years old group. Additionally, a third of the 65–69-year-old group (and 16 % of the oldest age group) were labeled as 'perfect EQ-5D score', i.e., they reported no pain/discomfort, anxiety/depression, and no problems with mobility, self-care, or usual activities. Similar findings were reported by Luthy et al. [15]. These results stress the significant variability on HRQoL among older individuals and lead the authors to conclude that age is an imprecise predictor of health status, and functional status alone is an imprecise predictor of HRQoL. This is of interest in light of the importance of comorbidity, frailty and disability as three major health problems affecting older adults [1]. The various combinations of these three conditions in older adults stress the existence of heterogeneity of health transitions, from those individuals who enjoy optimal health persistently to those who cope well with comorbidity, and to those with comorbidity deteriorated to frailty, functional losses and disability or death [37]. Starting from the evidence provided in this study

Table 8 Study of the impact of low back pain on quality of life in Switzerland (2011–2013); summary of repeated linear regression for two global health indices estimated from the EQ-5D health-related quality of life scale

	Numerical Rating Scale			Greiner Health Utility Index		
	N	[a]B Coef	95 % CI	N	[a]B Coef	95 % CI
Group[LBP absent or present]						
No-LBP	828	–	–	790	–	–
LBP	814	−4.93	[−6.83 to 3.04]	775	−9.14	[−10.76 to 7.53]
Age-group [according to initial stratification]						
65–69	265	–	–	256	–	–
70–74	343	−0.47	[−3.42 to 2.49]	327	−0.62	[−2.93 to 1.69]
75–79	296	−0.45	[−3.52 to 2.63]	278	−1.36	[−3.75 to 1.03]
80–84	268	−3.53	[−6.76 to 0.29]	255	−3.31	[−5.76 to 0.86]
85–89	260	−6.30	[−10.02 to 2.58]	249	−5.24	[−8.00 to 2.48]
90+	210	−3.98	[−7.58 to 0.39]	200	−11.42	[−14.82 to 8.02]
Sex						
Female	939	–	–	897	–	–
Male	703	1.39	[−0.48 to 3.26]	668	4.56	[2.97 to 6.15]
Region						
French	598	–	–	566	–	–
German	754	1.12	[−0.87 to 3.10]	718	3.21	[1.49 to 4.93]
Italian	290	1.28	[−1.35 to 3.91]	281	0.44	[−1.78 to 2.65]
Education						
Low (elementary and inferior secondary)	448	–	–	426	–	–
Medium (superior secondary and apprenticeships	863	−1.45	[−3.57 to 0.66]	824	−1.29	[−3.03 to 0.44]
High (college and university)	331	−5.01	[−7.96 to 2.06]	315	−3.83	[−6.30 to 1.36]
Comorbidities						
0–2 diseases	931	–	–	892	–	–
3–4 diseases	492	−9.29	[−11.42–7.17]	464	−7.78	[−9.62 to 5.94]
5–6 diseases	151	−17.42	[−21.24–13.61]	145	−14.41	[−17.49 to 11.34]
7 or more diseases	68	−21.70	[−8.40 to 0.00]	64	−18.36	[−7.52 to 0.00]
F	23.76			44.75		
p value	<.001			<.001		
R^2	0.18			0.29		
N	1642			1565		

[a] *B* beta value estimated by robust linear regressions for continuous variables

regarding the impact of LBP on HRQoL, a further step might be to investigate the effect of the qualitative aspects of pain (duration, type of symptoms, severity, and frequency) on HRQoL. This would indeed allow for a further analysis of the effect of LBP on HRQoL and contribute to support the causation underlying the statistical associations.

Study strengths and limitations

The participants of this national survey were 65 or older, randomly selected from the cantonal population registries of the three linguistic regions of Switzerland, also covering both urban and rural areas. The sample thus included a large cohort of male and female elderly individuals, community-dwelling, some healthy and others suffering from different diseases. As our sample was recruited from the general population and not from healthcare settings, the results were not subjected to biases related to differences in access to health care or treatment seeking behaviors [38].

This study also has limitations that need to be acknowledged. The sampling was limited to individuals living in the community and thus tended to exclude people who had severe problems. Another drawback of the study lies in its cross-sectional design which does not allow for any extrapolation on LBP and on HRQoL changes over

time. We observed different number of missing data on quality of life assessment. If we were to conduct the analyses in a list wise basis, the sample would then be reduced to 755 participants with LBP having non missing data on all pain information and HRQoL items, we favored a larger sample to limit the biases associated with such a sample restriction. Finally the coefficient of determination of the models are relatively small, which make them not suitable for individual prediction but they remain useful to describe and quantify the observed association.

Conclusion

LBP appears to be less of a recurrent intermittent problem in the older groups but seems to be a more permanent condition. LBP may be part of the definition of a subgroup of elderly at risk to become frail in relation with higher levels of functional limitations, psychological difficulties and social restrictions.

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Compliance with ethical standards

Conflict of interest None.

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