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Functional status and life satisfaction of patients with stable angina pectoris in Austria

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ABSTRACT

Objectives Although substantial progress in the treatment of stable angina pectoris (sAP) has been made, little is known about the functional status and quality of life (QoL) of patients in different healthcare systems.

Design and methods We undertook a survey using the Seattle Angina Questionnaire (SAQ) (five domains scored form 0—worst assessment to 100—best assessment) to assess symptoms, QoL (including limitation of activities), demographics, geographic distribution and individual disease data in patients with stable coronary artery disease in Austrian cardiology practices.

Results A total of 660 patients with sAP with a mean age of 69.2 years were included. SAQ scores were 67.5±24.4 for physical limitation, 65.5±26.6 for angina stability, 79.3±23.2 for angina frequency, 86.3±16.2 for treatment satisfaction and 63.7±24.2 for overall QoL. Multiple regression identified male gender, but also female gender, Eastern Austrian residence and high body mass index as predictive factors for SAQ scoring. A total of 35.6% of the patients reported at least one desirable activity that was limited through AP symptoms.

Conclusions Activity and QoL assessments are in accordance with published literature: The number and the diversity of desired activities indicate the need to focus on patient's individual activity level to improve symptom management.

INTRODUCTION

Coronary artery disease (CAD) is a primary cause of death and morbidity worldwide.[1] Recent interventional studies, such as COURAGE[2] or ORBITA,[3] fuel discussion on prognostic or symptomatic value of different treatment strategies in patients with stable angina pectoris (sAP). In Austria, about 600 000 patients suffer from CAD, about 230 000 have sAP,[4] which affects their functional status in daily life. Thus, optimisation of health-related quality of life (QoL) became a principal goal of treating patients with CAD.[5] Health-related QoL may be further affected by age, psychosocial issues, comorbidities or side effects of therapeutic interventions. QoL is also influenced by patients' understanding and expectations of their disease. However,

Strengths and limitations of this study

- ► A total of 660 stable angina pectoris (sAP) patients were included, covering all provinces and both rural and urban regions of Austria with relevant numbers, for example, enabling confirmation of an East–West gradient in cardiac disease identified by earlier studies.
- ► The study represents patients under different treatment strategies, including invasive and non-invasive therapies of different kinds.
- ► Use of the well-established Seattle Angina Questionnaire (SAQ) enabled comparison of recent studies from the UK and Australia with the results of LENA (cross-sectional study in Austria to evaluate the functional status of patients with sAP).
- ► SAQ results have been supplemented with an additional question on actual limitations in daily life due to AP, anchoring the SAQ figures with patient's everyday reality.
- ► The majority of patients answered the SAQ at their doctor's office, which can lead to a bias, especially in the area of SAQ treatment satisfaction.

little data are available on the functional status of sAP patients in Austria, leaving questions open that might be relevant for disease management. For example, in spite of exceedingly high healthcare expenditures of 10.3% of the gross domestic product,[6] it remains unknown how these expenditures translate into QoL for sAP patients in comparison with other countries. Furthermore, Stein *et al*[7] describe a gradient of increasing cardiovascular mortality from Switzerland over Western and Eastern Austria to Hungary, whereby it remains unclear if morbidity or QoL are equally affected.

The epidemiological study LENA aimed to characterise sAP patients in a cross-sectional evaluation and to assess their functional status based on the Seattle Angina Questionnaire (SAQ) domains[8] supplemented by information concerning specific desirable activities prevented by sAP to support clinical

decision making for Austrian physicians. Also, demographic and regional differences were assessed and the results are discussed from an international perspective. No predefined hypothesis was tested.

METHODS
Selection criteria
This observational survey assessed the functional status of patients with sAP at 70 sites in Austria from September to November 2017. This included general practitioners, specialists for internal medicine and outpatient clinics and represented all nine Austrian provinces and both urban and rural areas. Main inclusion criteria were (1) documented myocardial infarction>3 months ago, (2) coronary stenosis>50% by coronary arteriography, (3) chest pain with myocardial ischaemia and (4) coronary artery bypass grafting surgery or percutaneous coronary intervention>3 months ago. Patients were excluded in case of (1) hospitalisation for cardiovascular disease≤3 months ago, (2) planned revascularisation and (3) conditions hampering participation, including limited cooperation, limited legal capacity, serious non-cardiovascular diseases, other conditions reducing life expectancy and severe cardiovascular disease (cancer, drug abuse, advanced heart failure, severe valve disease, history of valve repair/replacement, etc).

Questionnaire
Eligible patients at the participating sites were offered to complete the SAQ[8 9], for which a validated German version is available,[10] with permission from CV Outcomes (Weston, Missouri, USA) without a predefined maximum number of participants. SAQ collects information concerning physical limitation, AP stability, angina frequency, treatment satisfaction and QoL and has been established as a valid tool to assess clinical outcomes in AP.[11] Both numbers of answers and summary scores were evaluated. The SAQ was supplemented by a specifically tailored question (online supplementary question for the SAQ) asking for activities which the subject would like to perform but could not because of angina symptoms. Six predefined answers ('Gardening', 'Taking a walk', 'Shopping', 'Meeting friends', 'Walking the dog' and 'Other') were offered; 'Other' could be specified as free text. These answers were classified as related to 'sports', 'work' (domestic and professional work could not be separated), 'sexuality', 'hobbies and social activities', 'general or unspecified' and 'not related to the question'. Some entries were assigned to several classes. Furthermore, age, height and weight for body mass index (BMI) calculation and past revascularisation procedures were recorded. Patients were not exposed to any procedures besides clinical routine. Filling of the questionnaire was not related to any specific diagnostic or therapeutic procedure; no data on drug exposure, effectiveness or safety were captured.

Data evaluation
Data were evaluated by descriptive statistics and summarised by minimum (min), median, maximum (max), arithmetic mean (μ), standard deviation (σ) and sample size (n) for metric data (not all shown here), and by number and frequency for categorical data. Subgroups were formed for gender, BMI (both <30 vs ≥30 kg/m^2 and <27.5 vs ≥27.5 kg/m^2, i.e., by current definitions of obesity and the median of the study population), age classes (<70, 70–80 and >80 years), treatment history (revascularisation), geographical region (Eastern vs Western Austria according to Stein *et al*[7]) and setting (urban vs rural with a population size of 15 000 as threshold). Patients were assigned by the location of the centres, not by home address. Subgroups are compared by difference of the arithmetic means (Δ). Following Weintraub *et al*,[12] clinically relevant differences between SAQ subgroups were defined by Δ≥8 on the physical-limitation scale (Part A), ≥25 on the angina-stability scale (Part B), ≥20 on the angina-frequency scale (Part C), ≥12 on the treatment-satisfaction scale (Part D) and ≥16 on the QoL scale (Part E). Differences<2 are referred to as 'negligible'. Age, gender, urban vs rural patient treatment, East–West doctors localisation, BMI and previous revascularisation procedures were analysed as potential SAQ subscale predictors (p<0.05) using stepwise least square multiple regression with the respective scores as dependent variables. Variables with p<0.05 were entered into the model, and with p>0.1 were removed. Missing data were not imputed. Due to the open design of the study, no measures to prevent bias were implemented.

Patient and public Inolvement
Patients were not involved in the study planning, conduction or definition of the research question. It is not planned to involve patients in the dissemination of the study.

RESULTS
Demography and disease characteristics
A total of 660 patients were enrolled by a total of 70 sites. Patients participated from all nine provinces of Austria, with 54.7% being treated at urban, and 45.3% at rural sites (table 1). Baseline characteristics are depicted in table 2. The patient population was predominantly male (70.3%) and elderly (69.2±10.7 years). Interestingly, 15.8% of the patients were over the age of 80 years (figure 1). With a mean BMI of 27.9±4.1 kg/m^2, overweight was common; 27.1% were obese (BMI>30 kg/m^2).

Seattle Angina Questionnaire
On the physical-limitation scale of SAQ (Part A), patients achieved a score of 67.5±24.4. Scores were clinically significantly higher in males (Δ=8.6). Patients aged>80 years achieved clinically significantly lower scores than those of 70–80 (Δ=17.1) and <70 years (Δ=23.1). Scores were insignificantly higher for Western Austria (Δ=6.4), with a more

Table 1 Geographic distribution

Province	Urban	Rural	Total
Vienna	140 (100.0%)	0 (0.0%)	140 (100.0%)
Lower Austria	47 (45.2%)	57 (54.8%)	104 (100.0%)
Burgenland	0 (0.0%)	22 (100.0%)	22 (100.0%)
Upper Austria	27 (32.1%)	57 (67.9%)	84 (100.0%)
Styria	51 (40.2%)	76 (59.8%)	127 (100.0%)
Carinthia	52 (69.3%)	23 (30.7%)	75 (100.0%)
Salzburg	8 (33.3%)	16 (66.7%)	24 (100.0%)
Tyrol	36 (56.3%)	28 (43.8%)	64 (100.0%)
Vorarlberg	0 (0.0%)	20 (100.0%)	20 (100.0%)
Total	361 (54.7%)	299 (45.3%)	660 (100.0%)

pronounced difference in females ($\Delta=6.7$) than in males ($\Delta=1.3$). Higher scores were also found in patients with BMI<27.5 kg/m^2 ($\Delta=5.1$) and <30 kg/m^2 ($\Delta=6.9$) and for patients with revascularisation ($\Delta=7.1$). No difference

Table 2 Demographic data, disease history and geographical location of the 660 participants

Demography and baseline data		
Age	Age (years)	69.2±10.7 (33–95)
	<70 years	295 (44.7%)
	70–80 years	272 (41.2%)
	>80 years	83 (12.6%)
	Unknown	10 (1.5%)
Sex (643 patients)	Males	452 (70.3%)
	Females	191 (29.7%)
Weight and height	Weight (kg)	82.2±14.3 (40–133)
	Height (cm)	171.4±8.7 (143–196)
	BMI (kg/m^2)	27.9±4.1 (16.4–48.3)
	BMI<30 kg/m^2	466 (70.6%)
	BMI≥30 kg/m^2	179 (27.1%)
	BMI<27.5 kg/m^2	325 (49.2%)
	BMI≥27.5 kg/m^2	320 (48.5%)
	Missing	15 (2.3%)
Disease history		
	PCI with stent	420 (63.6%)
	Bypass surgery	147 (22.3%)
	Myocardial infarction	304 (46.1%)
Subgroups		
Region	Eastern Austria	501 (75.9%)
	Western Austria	159 (24.1%)
Setting	Urban	361 (54.7%)
	Rural	299 (45.3%)

Metric values are shown by μ±σ (min–max) and categorical ones by number (%).
BMI, body mass index; PCI, percutaneous coronary intervention.

was found between urban and rural regions ($\Delta=1.3$). No or mild limitations were experienced by a majority for easy activities, such as dressing (87.9%), walking indoors (92.0%) and showering (90.0%).

In SAQ—AP-stability scale (Part B), the frequency of chest pain did not change over 4 weeks in 40.2% of the patients. Worsening was reported by 11.2%, and improvement by 48.6%. Due to the stable nature of the disease, these changes should be seen as the subjective viewpoint of the affected individuals and not necessarily related to clinical evidence. A mean score of 65.5±26.6 was achieved, with higher scores in males than in females ($\Delta=8.7$). In patients aged<70 years, scores were higher than in those of 70–80 ($\Delta=3.7$) or >80 years ($\Delta=5.0$). Differences between East and West were negligible ($\Delta=0.1$), as was the difference between rural and urban areas ($\Delta=0.1$) and between patients with and without previous revascularisation ($\Delta=0.0$). Higher scores were found in patients with BMI>27.5 kg/m^2 ($\Delta=2.8$) and <30 kg/m^2 ($\Delta=0.9$). All differences between subgroups were not clinically relevant.

In SAQ—angina-frequency scale (Part C), 43.8% reported less than one attack per week; with 38.9% experiencing no attacks during the last 4 weeks. More than four attacks per day were found in 2.9%. The mean score was 79.3±23.2, with higher scores for males ($\Delta=4.9$). In patients aged<70 years, scores were slightly higher than in those of 70–80 ($\Delta=0.7$) and >80 years ($\Delta=1.1$). Slightly higher scores were also found in Eastern Austria ($\Delta=2.4$). Differences between rural and urban regions ($\Delta=0.2$) and between patients with and without previous revascularisation ($\Delta=1.2$) were negligible. The same was true for patients with normal or increased BMI ($\Delta=0.8$ and 1.4, respectively). All differences were not clinically relevant. Figure 2 shows angina frequency itemised to the widely used classes 'daily', 'weekly', 'monthly' and 'never'.

SAQ—treatment-satisfaction scale (Part D) revealed complete or predominant satisfaction with the treatment for all items. Therefore, 88.8% were completely or highly convinced that everything possible was done for their treatment. Accordingly, 92.2% were completely or highly satisfied with the information provided concerning AP attacks, and 86.6% were completely or highly satisfied with the treatment they received. Patients were not or only little affected by the administration of AP medication in 86.5%; however, this category also includes patients without medication. The total score was 86.3±16.2, with higher scores for males ($\Delta=3.2$). Slightly higher scores were found in the East ($\Delta=2.3$), whereas differences between age classes ($\Delta<0.5$), rural and urban regions ($\Delta=1.2$) and patients with and without previous revascularisation ($\Delta=1.2$) were negligible, as for patients with normal or increased BMI ($\Delta=1.2$ and $\Delta=0.2$, respectively). All differences were not clinically relevant.

SAQ—QoL scale (Part E) revealed no or little reduced enjoyment of life in 54.8%, 53.0% were satisfied by their life in spite of AP attacks and 51.6% rarely or never contemplated the possibility of myocardial infarction or
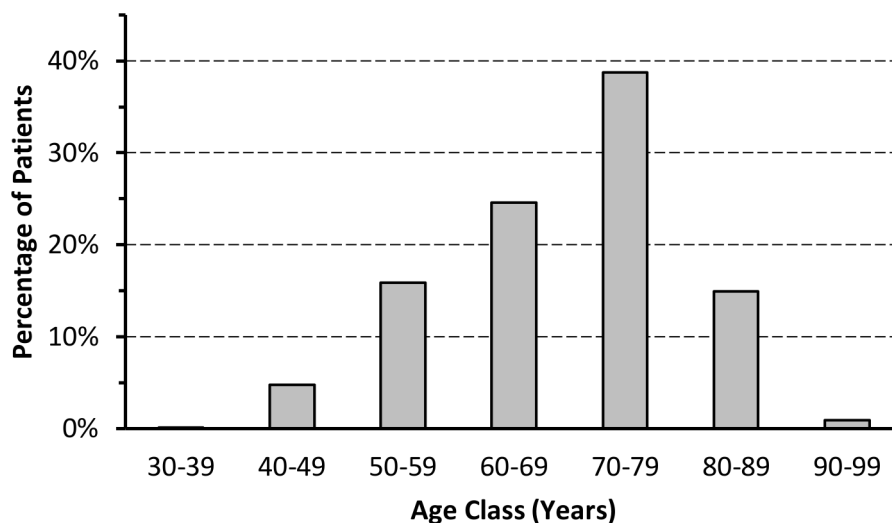
Figure 1 Age distribution (n=650).

death. The total score was 63.7±24.2, with higher scores for males (Δ=5.4) and in patients aged>80 years compared with those aged<70 (Δ=7.0) and 70–80 years (Δ=2.9). Between East and West and between rural and urban regions, the differences were negligible (both Δ=1.5), as for patients with or without previous revascularisation (Δ=1.9) and patients with BMI above or below 27.5 kg/m^2 (Δ=1.8). Patients with BMI<30 kg/m^2, however, achieved higher scores than those with values ≥30 kg/m^2 (Δ=5.7). All differences were not clinically relevant.

Table 3 specifies the SAQ results. In a multivariate regression model, predictors for higher SAQ ratings indicating better sAP health have been identified. Positive predictors were higher age for SAQ Part E (QoL) and doctor's office in the East part of Austria for SAQ Part C (angina frequency). Negative predictors were female gender for all SAQ subscales and higher age and higher BMI for SAQ Part A (physical activity). Urban vs rural offices and revascularisation did not allow for significant predictions (online supplementary table 1).

Desired activities

The study-specific question concerning desired activities was answered by 643 patients. Of these, 35.6% reported that they would like to perform any such activities, whereas 64.4% reported no inhibition of desired activities (table 4).

'Gardening' was desired by 118 patients (18.4% of the patients answering the supplementary question for the SAQ). 'Taking a walk' was desired by 65 patients (10.1%), 'Shopping' by 32 patients (5.0%), 'Meeting friends' by 29 patients (4.5%) and 'Walking the dog' by 23 patients (3.6%). 'Other' activities were mentioned 74 times (11.5%) and always specified in more detail. A total of 50 patients (67.6% of the patients desiring an activity) expressed a desire for sports. Activities ranged from tennis over diving to hunting, but most frequently (22 cases, 29.5%) referred to hiking. Four patients (5.4%) wished to engage in more strenuous sports, such as diving or mountaineering. Hobbies and social activities were
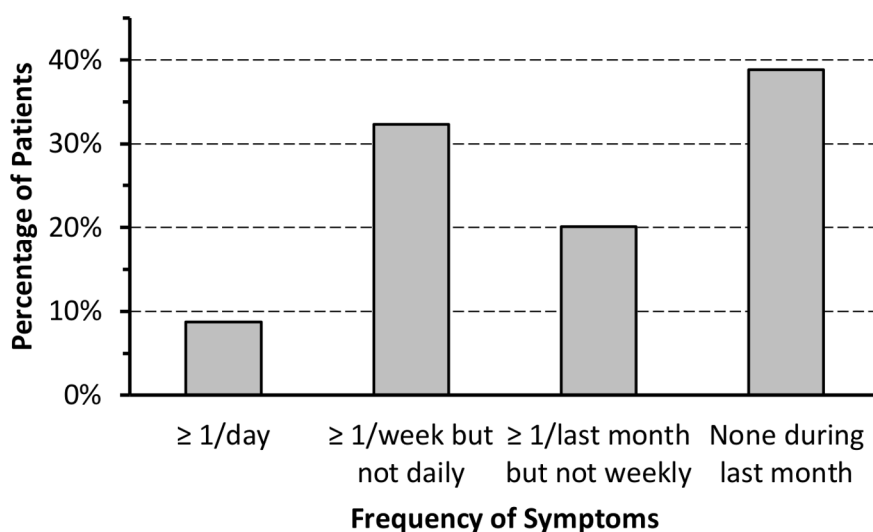

Figure 2 Frequency of chest pain, chest tightness or angina (n=650).

Table 3 SAQ scores (μ±σ) for the total population and the subgroups

Subgroup		Part A: exertional capacity	Part B: angina stability	Part C: angina frequency	Part D: treatment satisfaction	Part E: quality of life
Total		67.5±24.4	65.5±26.6	79.3±23.2	86.3±16.2	63.7±24.2
Gender	Male	70.0±24.0	67.8±26.3	80.9±23.0	87.1±16.0	65.3±24.3
	Female	61.4±23.8	59.2±26.3	76.0±22.8	83.9±16.9	59.9±23.5
Setting	Urban	67.8±24.7	64.8±27.4	79.4±23.3	86.6±16.0	64.4±24.3
	Rural	67.0±24.1	66.3±25.5	79.2±23.0	85.9±16.5	63.0±24.2
Location	West	72.3±23.2	68.1±25.5	77.6±23.8	84.6±16.1	62.6±23.7
	East/Central	65.9±24.9	64.6±26.9	79.9±23.0	86.9±16.3	64.1±24.4
Age	<70 years	72.6±22.5	67.5±27.3	79.8±23.1	86.2±16.0	61.3±24.8
	70–80 years	66.6±23.5	63.9±26.5	79.1±23.1	86.3±17.1	65.5±24.0
	>80 years	49.5±25.8	62.5±23.7	78.7±23.9	86.6±15.0	68.4±22.0
BMI	<30 kg/m^2	69.4±24.1	65.7±26.8	79.7±22.9	86.6±16.6	65.5±24.2
	≥30 kg/m^2	62.5±24.1	64.7±26.0	78.4±23.7	85.3±15.7	59.7±23.8
	<27.5 kg/m^2	70.0±24.1	64.1±27.0	79.0±23.3	86.1±17.5	64.8±24.2
	≥27.5 kg/m^2	65.0±24.2	66.8±26.0	79.8±23.0	86.4±15.1	63.0±24.3
Revascularisation	Yes	68.9±24.1	65.5±26.4	79.5±23.1	86.1±16.7	64.1±23.9
	No	61.8±24.6	65.5±27.3	78.6±23.6	87.2±14.5	62.3±25.4
No data	N (%)	23 (3.5%)	96 (14.5%)	2 (0.3%)	10 (1.5%)	17 (2.6%)

BMI, body mass index; SAQ, Seattle Angina Questionnaire.

mentioned by seven patients (9.5%). In 13 cases (17.6%), patients wished to engage in domestic or paid work. Two patients (2.7%) desired sexual activities. Thirteen patients (17.6%) expressed general dissatisfaction. Three answers (4.1%) were unrelated to the question.

DISCUSSION

This study provides, for the first time, a comprehensive assessment of the QoL in Austrian patients with sAP. In comparison with age and gender distribution, sAP patients in LENA match very well with AP patients of a large, ongoing, health observation study (www.lead-study.at), which is considered as representative for the Austria population. This accordance indicates that LENA succeeded to enrol a representative sample and allows for valid conclusions about the Austria sAP population. Our data underline that a considerable number of patients still experience substantial limitations in daily life activities in the setting of contemporary revascularisation strategies. The observed reductions in QoL assessed by the SAQ are also in line with the findings of the recent ORBITA trial.[3] SAQ scores were higher than in the TERISA trial[13] where participants were affected by concomitant diabetes as well. Disease activity was constant over time in 40.2%, as was to be expected in a stable disease. In the other patients, 'good days' were far more common (48.6%) over the last 4 weeks than 'bad days' (11.2%), possibly indicating successful disease management. However, 61.1% of the patients still experience symptoms, such as chest pain,

chest tightness or angina; thus, there is still ample room for improvement of the treatment. Treatment satisfaction was consistently high and recent worsening of AP was rare. Interestingly, no significant effect of revascularisation on treatment satisfaction or any other scale could be identified.

Comparison with a study from the UK showed higher QoL in Austrian patients[14]: British patients achieved clinically relevant lower physical limitation scores of 44.1–49.4 compared with 67.5 in Austria. For AP stability (58.3–60.7 vs 65.5) and frequency (74.1–77.0 vs 79.3), scores were lower in the UK as well. Concerning scores for treatment satisfaction (84.8–87.2 vs 86.3) and QoL (62.4–66.4 vs 63.7), however, the Austrian scores were higher than those of the control group in the UK study, but lower than those of the UK patients exposed to specifically trained staff. Treatment effectiveness is probably also superior to the UK situation, where physicians failed to diagnose, and therefore to treat, monthly or even weekly or daily angina symptoms, in 83% and 31%, respectively.[5] In Australia,[15] however, slightly lower scores were found for angina stability (63±26), but higher ones for physical limitation (70±27), angina frequency (84±23), treatment satisfaction (90±14) and QoL (70±24); none of these differences was clinically significant. However, the percentage of patients with daily (8.7% vs 7%) and of weekly but not daily angina symptoms (32.2% vs 22%) seems to be higher in Austria than in Australia.[15] These differences are in good accordance with rankings on general QoL (Austria: 18th,

Table 4 SAQ evaluation by number of respondents (percentages). Items of the English version of the questionnaire have been abbreviated

Part A		Severely limited	Moderately limited	Somewhat limited	A little limited	Not limited
	Dressing oneself	10 (1.6%)	24 (3.8%)	42 (6.7%)	117 (18.6%)	437 (69.4%)
	Walking indoors (level ground)	8 (1.3%)	13 (2.0%)	30 (4.7%)	68 (10.7%)	516 (81.3%)
	Showering	10 (1.6%)	16 (2.5%)	38 (5.9%)	85 (13.3%)	491 (76.7%)
	Climbing a hill or a flight of stairs without stopping	47 (7.4%)	90 (14.0%)	149 (23.2%)	172 (26.8%)	184 (28.7%)
	Gardening, vacuuming or carrying groceries	40 (6.3%)	83 (13.1%)	118 (18.7%)	161 (25.5%)	230 (36.4%)
	Walking more than a block at a brisk pace	64 (10.1%)	96 (15.0%)	115 (18.0%)	138 (21.6%)	226 (35.4%)
	Running or jogging	175 (27.6%)	104 (19.8%)	90 (17.1%)	99 (18.8%)	58 (11.0%)
	Lifting or moving heavy objects	119 (18.7%)	105 (18.3%)	99 (17.3%)	117 (20.4%)	133 (23.2%)
	Participating in strenuous sports	149 (23.5%)	112 (20.7%)	86 (15.9%)	119 (22.0%)	76 (14.0%)
Part B	Frequency of chest pain, chest tightness or angina … compared with 4 weeks before	Much more often 17 (3.0%)	Slightly more often 46 (8.2%)	About the same 227 (40.2%)	Slightly less often 119 (21.1%)	Much less often 155 (27.5%)
Part C		≥4 times/day	1–3 times/day	≥3 times/week	1–2 times/week	<1/week	Never (last 4 weeks)
	Frequency of chest pain, chest tightness or angina	19 (2.9%)	38 (5.8%)	88 (13.4%)	124 (18.9%)	132 (20.1%)	255 (38.9%)
	Frequency of nitroglycerine administration	5 (0.8%)	27 (4.2%)	28 (4.3%)	58 (9.0%)	97 (15.0%)	430 (66.7%)
Part D	How bothersome is the treatment?	Very bothersome 11 (1.7%)	Moderately bothersome 26 (4.0%)	Somewhat bothersome 51 (7.8%)	A little bothersome 118 (18.1%)	Not bothersome 446 (68.4%)
		Not at all	Mostly dissatisfied	Somewhat satisfied	Mostly satisfied	Highly satisfied
	Satisfaction that everything possible is done to treat AP	7 (1.1%)	15 (2.3%)	51 (7.9%)	215 (33.1%)	361 (55.6%)
	Satisfaction with the explanations about AP	5 (0.8%)	8 (1.2%)	37 (5.8%)	172 (26.8%)	420 (65.4%)
	Satisfaction with the treatment of AP attacks	2 (0.3%)	16 (2.5%)	67 (10.5%)	202 (31.8%)	349 (54.9%)
Part E	Interference of AP with enjoyment of life	Severely limited 25 (3.9%)	Moderately limited 90 (14.0%)	Slightly limited 175 (27.3%)	Barely limited 117 (18.2%)	Not limited 235 (36.6%)
	Satisfaction with a life with AP attacks	Not at all 69 (11.0%)	Mostly dissatisfied 86 (13.7%)	Somewhat satisfied 141 (22.4%)	Mostly satisfied 168 (26.7%)	Highly satisfied 166 (26.3%)
	Worries about a heart attack or sudden death?	Always 14 (2.2%)	Often 104 (16.0%)	Occasionally 196 (30.2%)	Rarely 213 (32.8%)	Never 122 (18.8%)

AP, angina pectoris; SAQ, Seattle Angina Questionnaire.

Australia: 4th[16]) and efficiency of healthcare systems (Austria: 32nd, Australia: 8th[17]) at the time of the study, but not with the already outdated world health ranking of the WHO (Austria: 8th, Australia: 18th[18]).

These results demonstrate an adequate quality of medical care in Austria with regard to the physical well-being, but also highlight room for improvement and the importance of responsiveness to the specific needs of sAP patients. This view is confirmed by a more detailed analysis of the SAQ questionnaire: Physical restrictions affected predominantly demanding activities, such as sports,

whereas most patients were capable of less strenuous everyday tasks. Reduced QoL was reported by approximately half of the patients, and the same percentage was negatively affected emotionally by impending infarction or death. Obviously, clinical symptoms and perceived QoL are not necessarily correlated[19]; an earlier study[20] found correlation factors≤0.2. Besides insufficient responsiveness of the clinical personnel, reasons probably include a high prevalence of depression in CAD patients.[21 22]

The assessment of unsatisfied needs might reveal additional reasons for reduced QoL. The most common

wishes seem to be related to limited mobility, especially recreational walking, but also including mountaineering or hunting. However, SAQ Part A shows that 48.2% of the patients experience moderate or severe restrictions concerning sports. Thus, the majority successfully copes with these restrictions. For gardening, the situation seems to be different; gardening was desired by 18.4% of the patients, compared with 19.5% who were severely or moderately limited concerning gardening. Restrictions concerning sexual activity were reported by two patients, not uncommon for patients with cardiovascular diseases.[23] These restrictions were reported spontaneously in the free-text fields, indicating an important burden.

SAQ scores are used predominantly to assess temporal changes[11] but proved suitable for subgroup analyses as well. Differences between urban and rural areas were negligible. A previously described East–West gradient with raising CAD mortality from Switzerland over Western and Eastern Austria to Hungary[7] was reflected in this study by borderline, not clinically significantly lower scores for physical limitation for Eastern Austria. Regression analysis additionally identified residency in the East as a predictor of higher angina frequency. A similar geographic trend was found for the USA with the most severe symptoms in the Mississippi valley.[24] An Australian study[15] found inexplicable differences in weekly angina frequency between sites but did not test for geographical trends. Thus, geography might be a significant but underestimated factor in understanding the epidemiology of cardiac diseases.

As expected, physical disability and disease activity were more pronounced in older patients. Surprisingly, these patients reported higher QoL, as already described by Breek et al.[19] Interestingly, QoL was consistently considerably lower in female patients. This finding is in line with recent findings (Italy, Germany, Spain and the UK[25]), and may reflect differences in treatment strategies as well as in disease phenotype and perception. Revascularisation coincided with higher physical limitation scores; however, the difference was clinically not relevant and even smaller for the other items of the questionnaire. These inconclusive results may be caused by the declining benefits of revascularisation over time.[12] However, these results do not contradict the hypothesis that revascularisation is not essential for optimal patient care.[2]

The study results must be interpreted in light of some important limitations. In order to keep the questionnaire as concise as possible, data on concurrent drug treatment, hospitalisations and disease burden, for example, by imaging, are missing. However, those can be expected to be following the guidelines as has been recently reported for the Austrian CAD population.[26] This might also explain why approximately 49% of LENA sAP patients do report some disease improvement over the last 4 weeks, including potential seasonal variations, health modifications or adaptations in the medication (SAQ Part B in table 4), or why some LENA patients (38.9%) rated not to have any typical angina symptoms over the last 4 weeks (SAQ Part C, table 4). It must be emphasised, however,

that this was the largest contemporary cohort of patients with sAP that has ever been evaluated in Austria. Because the questionnaire was distributed in doctor's offices and outpatient clinics, some bias on positive reporting cannot be excluded. On the other hand, the study included a wide spectrum of patients from all major regions in Austria. Finally, even if the participating sites were asked to include all patients with sAP, participation was completely voluntary. Bias towards positive responses is unlikely because QoL data are similar to published cohorts.

In conclusion, this study shows, for the first time, that a high level of treatment satisfaction can be provided all over Austria, enabling the patients to conduct daily tasks and preventing worsening. However, a considerable amount of patients experience significant limitations in QoL as has been shown by a large controlled intervention or perception study.[3] Therefore, treatment decisions should integrate specific QoL aspects. Possible treatment strategies could include a focus on anxiety and depression[22] but also on symptomatic therapies with a known effect on QoL.

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