

Assessment of Quality of Life in Patients with Chest Pain and Normal Coronary Arteriogram (Syndrome X) Using a Specific Questionnaire

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Summary

Background: Prognosis in patients with syndrome X (chest pain and normal coronary arteriograms) is good; however, persistent chest pain and functional disability are common in these patients. Accurate assessment of quality of life may be useful for patient management.

Aim: The quality of life status in patients with syndrome X was assessed using a specific questionnaire. This questionnaire was developed and validated for the assessment of quality of life in patients with typical chest pain despite normal coronary arteriograms.

Methods: Ninety consecutive patients were invited to complete both the questionnaire (on two occasions within 2 weeks) and a standardized angina diary. Fully completed questionnaires were received from 66 (73%) patients (mean age 58 ± 8 years, 55 women).

Results: Answers were scored according to a grading system where higher scores indicate worse quality of life. We observed that total scores increased with severity of angina (Canadian Class I, 38 ± 16 , II: 93 ± 29 , III–IV, 119 ± 23 ; $p < 0.001$) and correlated with both the number and the severity of chest pain episodes ($r = 0.50$ – 0.66 ; $p < 0.001$). In patients

who remained clinically stable ($n = 37$) during the 2-week assessment, test-retest analysis showed no score differences (87 ± 30 vs. 81 ± 30 ; $p = 0.1$), while total score increased in patients ($n = 24$) whose symptoms worsened (108 ± 31 vs. 116 ± 31 ; $p < 0.02$) and was reduced in those ($n = 5$) whose symptoms improved (55 ± 37 vs. 39 ± 28 ; $p < 0.04$).

Conclusion: Our study shows that quality of life is significantly impaired in patients with syndrome X and that the specific questionnaire used for assessment is a reliable and sensitive tool for the evaluation of quality of life in patients with chest pain and normal coronary arteriograms.

Key words: quality of life, chest pain, normal coronary arteriograms, questionnaire, angina, syndrome X

Introduction

Patients with typical chest pain, positive response to exercise testing, and angiographically normal coronary arteries (syndrome X)¹ have good long-term prognosis regarding survival, but morbidity in this group is not negligible.^{2–4} Many patients remain symptomatic despite reassurance, with significant limitations in their daily life activities usually due to persistent chest pain. Functional disability affects approximately 75% of patients with syndrome X, and the majority of these patients usually receive treatment with multiple drug combinations.^{4,5} Thus, this apparently benign condition appears to affect quality of life adversely.⁶ Characteristics of syndrome X include a female predominance, typical and atypical features of chest pain, high prevalence of psychological disorders, and recurrent hospital admissions.⁴ The rational assessment of patients with syndrome X may require not only the quantification of chest pain episodes but a more comprehensive evaluation of quality of life. Specific questionnaires for the assessment of the quality of life of patients with syndrome X would thus be desirable. We have assessed physical, emotional, and social dysfunction in patients with syndrome X using a newly designed and validated disease-specific quality of life questionnaire.

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Methods

Patients

Using a specific questionnaire, we performed a cross-sectional evaluation of quality of life in 90 patients with syndrome X, who regularly attend the chest pain outpatient clinic at St George's Hospital, London. Syndrome X was defined as typical chest pain and positive response to exercise testing, as well as angiographically normal coronary arteries.⁴ All patients who were clinically stable during the month prior to study entry were considered eligible for study. All patients had been reassured about the benign nature of their condition and were asked to continue taking their usual medication. The large majority were receiving antianginal medications and a small proportion (< 20%) were also taking imipramine 50 mg at night. Patients with cognitive or language problems, major psychiatric disorders or receiving psychiatric treatment, or with other chronic or acute life-threatening concurrent diseases were not included.

Study Protocol

Patients were assessed for 2 weeks and were asked during this period to complete a quality of life questionnaire on Day 1 (at study entry) and on Day 14. During this 2-week period, patients were also asked to complete a standardized angina diary where temporal onset, number of angina episodes per day, average duration of episodes, magnitude of chest pain (from 0: no pain to 10: maximal pain ever suffered), associated symptoms, and response to sublingual nitrates were recorded. Changes in the patients' clinical status during the 2-week period were recorded and annotated. The degree of angina experienced by the patients at study entry was classified according to the Canadian Cardiovascular Society Functional Classification.⁷

Quality of Life Questionnaire: Item Selection

A "draft" questionnaire was prepared, including a set of questions which cover features of daily life, emotional or social characteristics of syndrome X patients, and questions that reflect the occurrence of changes in quality of life following worsening or improvement of symptoms or changes in the condition as a result of therapeutic interventions. We selected questions from generic and previously validated questionnaires designed to evaluate quality of life in patients with chronic diseases. Seven questions were extracted from the Psychological General Well-Being Index (PGWB) to capture the impact of the disease in the psychological profile.⁸ Twenty-six other questions were also extracted from previously validated questionnaires for the assessment of quality of life in patients with angina pectoris: 16 from the Angina Pectoris Quality of Life Questionnaire (APQLQ)⁹ and 10 from the Spanish Quality of Life Questionnaire.¹⁰ Twenty-nine new questions relevant to patients with syndrome X were specially designed, focusing on specific characteristics of this

group of patients who, despite their relatively typical chest pain, differ in many aspects from patients with angina pectoris due to coronary artery disease. Questions were therefore designed by taking into account how patients with syndrome X perceive their clinical condition and the way this appears to impair their lifestyle. To generate new items, we interviewed both cardiologists and nurses who deal mainly with this patient population. In addition, the observations carried out in a recent study to assess the effect of imipramine on quality of life of patients with syndrome X were also used to identify questions relevant to this patient population.¹¹ Thus, the draft questionnaire contained 62 questions which comprehensively covered domains that are usually affected by chronic diseases, angina pectoris, and syndrome X.

A scoring system based on a 6-graded Likert scale was used for all questions, as it allows detection of relatively fine gradations of change.¹²

Testing Measurement Properties of the Questionnaire

The 62 items selected for the draft questionnaire were tested to ensure that they fulfilled well established psychometric criteria as previously reported in the literature.^{9, 13-16} We tested the questionnaire performance both as a discriminative and evaluative instrument.¹³ A discriminative instrument is designed to discriminate between people at a single point in time, while an evaluative instrument is designed to measure the magnitude of longitudinal change in an individual or group.

Questionnaire: final version and validation: The content of the final version of the questionnaire resulted from eliminating those items that either did not contribute with additional information or were unresponsive to clinical changes. Internal consistency measurements were carried out using Cronbach's alpha, which allows the selection of groups of items which maximize the precision of the instrument to measure a given construct.¹⁷ This coefficient has an alpha maximum value of 1, where values above 0.7 ensure an adequate internal consistency. The internal consistency was also examined by calculating the Spearman rank order correlation between each item and the overall score. A total score was obtained for every patient, in which higher scores indicate worse quality of life.

Categories or scales grouping and scores: The total score provides a measurement of patients' overall quality of life. However, since quality of life is a multidimensional concept, the items can be grouped in different scales or categories covering the main domains that encompass quality of life. We arbitrarily used nine of the categories that better represent the quality of life domains which were affected in our patients, choosing those categories from previous questionnaires. A correlation matrix of the individual items was used to allocate those items that were highly correlated in the pre-established categories.

To calculate the score for each scale or category, we added up scores achieved on the individual items and then divided them by the number of items of the scale.

Determination of validity, reliability and responsiveness: Validity refers to the extent to which the instrument measures

what it is supposed to measure. Because there is no standard of reference for comparison, the so-called "construct validity," an accepted notion, was used.^{8,9,13-16} According to this concept, an instrument is valid if score changes directly relate to changes in clinical or physiologic measures in a predictable fashion. For the purpose of the study, we hypothesized that quality of life would correlate with both the severity and frequency of angina episodes, as assessed by the Canadian Classification and the patient's angina diary. The greater the symptomatic impairment, the worse the quality of life.

Reliability or reproducibility refers to whether the recorded scores show consistency over time, after two or more serial administrations, in a group of subjects whose clinical status remained stable. Test-retest analysis should demonstrate that observations on each individual remain unchanged over time, with small within-subject variation, in stable patients.

Responsiveness refers to the ability of the questionnaire to detect clinically significant changes in quality of life over time. Test-retest analysis should demonstrate statistically significant changes in the score of patients whose functional status improves or deteriorates. Further details on these procedures were described elsewhere.¹³⁻¹⁸

Statistics

Patients with missing data in the quality of life questionnaire were excluded from analysis. Data are expressed as mean value \pm 1 standard deviation. Spearman rank test was used for correlations. Two-tailed Student's *t*-test, Kruskal-Wallis test, and Wilcoxon test were used as appropriate.

Results

Patient Characteristics

Of the 90 patients invited to take part in the study, 74 (83%) returned a completed questionnaire. Eight patients (12%) left items unanswered, which precluded analysis. Thus, 66 (73%) patients (mean age 58 ± 8 years, 55 women) whose questionnaires were complete constituted the study group. Table I

TABLE I Years from onset of chest pain condition and Canadian Cardiovascular Society Classification in 66 patients with syndrome X

Duration of disease (n = 66)	Frequency	(%)
< 3 Years	20	(30)
3-8 Years	31	(47)
> 8 Years	15	(23)
Canadian Cardiovascular Society Classification (n = 63)		
Class I	5	(8)
Class II	38	(60)
Class III	17	(27)
Class IV	3	(5)

shows patient distribution according to the Canadian Cardiovascular Society Classification for chest pain and duration of the disease. Angina diaries were available for analysis in 56 of the study patients (84%). The majority of patients were symptomatic during the 2-week study period: 31 (47%) required sublingual nitroglycerin (GTN) to control their symptoms (16.9 ± 26.4 doses in 2 weeks) and 24 (36%) reported worsening of their symptoms compared with study entry. Only two patients were completely asymptomatic during the study period. The characteristics of the chest pain episodes in the 56 patients are presented in Table II.

Internal Consistency Analysis

After calculation of the Crombach's alpha coefficient for all items of the questionnaire, six questions with results < 0.70 were eliminated. Idiosyncratic questions ($n = 4$) related to smoking habits and work had to be suppressed because of the amount of missing data in patients that could not answer these questions. Another seven questions were eliminated because of a weak correlation ($r < 0.30$) with the total score. After this item reduction phase, a final version of the questionnaire containing 45 questions was used for clinical validation and further statistical analysis. The internal consistency of the overall total score was $\alpha = 0.92$. The remaining 45 individual items were grouped in nine scales or categories that comprehensively covered quality of life, using the correlation matrix as a base. Those items with higher correlation were allocated to the categories that represented the same domain. Table III shows the correlation coefficients for the different categories and the total score. Most categories showed a high correlation with the total score ($0.57-0.87$; $p < 0.001$). The medications scale had the lowest correlation with the total score ($r = 0.44$; $p < 0.001$), whereas chest pain and general health scales showed an excellent correlation with total score ($r = 0.87-0.74$; $p < 0.001$). The scales that correlated better were those of chest pain and pain perception ($r = 0.73$; $p < 0.001$), and chest pain and physical exertion ($r = 0.69$; $p < 0.001$).

Clinical Validation

When quality of life total scores were classified according to the Canadian Cardiovascular Society Classification, it be-

TABLE II Characteristics of chest pain episodes (n = 56)

Number of episodes in 2 weeks	Patients	(%)
< 5 Episodes	10	(18)
5-15 Episodes	31	(55)
> 15 Episodes	15	(27)
Pain level of chest pain episodes (from 0: no pain-10: maximal pain)		
< 2.4	14	(25)
2.4-4.7	26	(46)
> 4.7	16	(24)

TABLE III Correlation matrix of the categories of the Questionnaire for Quality of Life Syndrome X (n = 66)

	Alertness and vitality	Chest pain	Emotional function	General health	Medications	Pain perception	Physical exertion	Sleep disturbances	Social function	Total score
Alertness and vitality	1	0.42	0.34	0.35	0.30	0.30	0.38	0.45	0.47	0.57
Chest pain		1	0.41	0.68	0.35	0.73	0.69	0.58	0.45	0.87
Emotional function			1	0.39	0.33	0.30	0.30	0.40	0.57	0.67
General health				1	0.41	0.63	0.64	0.46	0.46	0.76
Medications					1	0.34	0.32	0.36	0.30	0.44
Pain perception						1	0.65	0.41	0.42	0.73
Physical exertion							1	0.42	0.38	0.71
Sleep disturbances								1	0.33	0.66
Social function									1	0.69
Total score										1

came apparent that the greater the severity of the angina, the higher was the score (Table IV). Overall, quality of life was better in patients who were in class I than in those in class II. Patients in class III-IV had the lowest quality of life (Table IV). The distribution of the scores for the different scales according to the Canadian Cardiovascular Society Classification showed a similar relationship. Significant differences were

TABLE IV Global quality score and angina class as assessed by the Canadian Cardiovascular Society Classification (n = 63)

	No. of patients	Quality of Life Score		CI
		Mean	SD	
Class I	5	36.2	13.7	19.1-53.2
Class II	38	87.6	28.4	78.3-97
Class III-IV	20	119.4	23.6	108.3-130.4

Kruskal-Wallis difference between groups ($p < 0.0001$).

Abbreviations: CI = confidence interval, SD = standard deviation.

TABLE V Scales scores according to the Canadian Cardiovascular Society Classification (n = 63)

	Class I	Class II	Class III-IV	p Value
Alertness and vitality	1.7 ± 1.1	2.1 ± 0.8	2.7 ± 0.9	0.03
Chest pain	0.65 ± 0.3	1.8 ± 1	2.5 ± 0.5	0.0002
Emotional function	0.7 ± 0.5	1.6 ± 0.9	2.6 ± 1	0.0003
General health	1 ± 0.5	2.4 ± 0.8	3.1 ± 0.8	0.0001
Medications	1.9 ± 1.7	1.6 ± 1.6	2 ± 1	NS
Pain perception	0.2 ± 0.18	1.4 ± 1	2.4 ± 0.9	0.0001
Physical exertion	0.8 ± 0.6	3 ± 0.8	3.6 ± 0.6	0.0001
Sleep disturbances	0.8 ± 0.6	2.6 ± 1.5	2.5 ± 1.2	NS ^a
Social function	0.12 ± 0.2	0.79 ± 0.6	1.6 ± 0.9	0.0001

Mean ± standard deviation.

p = Kruskal-Wallis difference between groups.

^aNS = $p < 0.001$ for Class II and Class III-IV versus Class I (not significant).

found in the scales of chest pain, pain perception, physical exertion, general health, and social function (Table V). There were no significant differences between Canadian Class and categories of medications and sleep (Table V).

A significant correlation was found between total score and the number of chest pain episodes in the 2 weeks ($r = 0.56$; $p = 0.0001$), the magnitude of pain during chest pain episodes ($r = 0.53$; $p = 0.0001$) and GTN consumption during that time ($r = 0.42$; $p = 0.01$) (Table VI). Similarly, moderate to strong correlations were found between the scales scores and the angina diary results, especially for the scales of chest pain, pain perception, general health, and physical exertion. The alertness and vitality, emotional function, and medication scales had a weaker correlation with the angina diary results (Table VI).

The ability of the questionnaire to identify patients with less frequent or less severe chest pain attacks was tested con-

TABLE VI Correlation between the quality of life scales scores and the angina diary results in 56 patients with syndrome X

	Attack (No./week)		Magnitude of chest pain		GTN consumption	
	r	p Value	r	p Value	r	p Value
Alertness and vitality	0.22	0.1	0.34	0.01	-0.07	0.6
Chest pain	0.61	0.0001	0.54	0.0001	0.41	0.02
Emotional function	0.31	0.02	0.18	0.1	0.19	0.2
General health	0.62	0.0001	0.6	0.0001	0.56	0.001
Medications	0.14	0.2	0.18	0.17	-0.05	0.7
Pain perception	0.54	0.0001	0.42	0.001	0.36	0.04
Physical exercise	0.57	0.0001	0.57	0.0001	0.32	0.07
Sleep disturbances	0.23	0.08	0.39	0.003	-0.09	0.4
Social function	0.37	0.004	0.39	0.002	0.27	0.1
Total score	0.56	0.0001	0.53	0.0001	0.42	0.01

Abbreviation: GTN = nitroglycerin.

TABLE VII Specific quality of life questionnaire scores and angina attack rate and magnitude of chest pain level

Attack rate/week	<3	3-7	>7	p Value
Total score	71 ± 42	84 ± 28	122 ± 24	0.004
Chest pain level	<2.5	2.5-4.7	>4.7	0.0006
Total score	61 ± 33	96 ± 30	113 ± 25	0.0006

Mean ± standard deviation.

p = Kruskal-Wallis difference between groups.

sidering the percentiles 25, 25-75, and 75 for both measures (Table VII). Quality of life total scores were increasingly higher in patients with more frequent attacks or more severe chest pain episodes. Differences among the three groups were statistically significant and showed the ability of the questionnaire to discriminate among groups of patients with different clinical status.

Reliability and Responsiveness

The validation of the questionnaire was tested using the test-retest procedure. In patients who remained clinically stable (n = 37), there were no statistical differences in total scores (Day 1: 87 ± 30 vs. Day 14: 81 ± 30; NS) between the questionnaire performed on Day 1 and that completed on Day 14 (Table VIII). Conversely, in patients whose symptoms worsened (n=24), total score increased (Day 1: 108 ± 31 vs. Day 14: 116 ± 31; p < 0.02). Finally, in patients whose symptoms improved (n = 5), total score was significantly reduced (Day 1: 55 ± 37 vs. Day 14: 39 ± 28; p < 0.04) (Table VIII).

When these three groups were compared, all quality of life profiles were significantly better for patients whose clinical status improved than for those who remained stable. Quality of life was significantly better in patients who remained stable than in those whose symptoms worsened during follow-up (Table IX). There were no differences between groups regarding possible confounding factors like age, gender, or duration of disease. There were no treatment changes during the study period.

Discussion

Between 10 and 30% of patients with typical anginal chest pain are found to have normal coronary arteriograms.^{2,19} Studies have shown that patients with normal coronary angiograms have favorable long-term prognosis, as survival is not adversely affected by the condition and cardiac mortality occurs at a similar rate in the overall population.^{2-4,20} However, considerable morbidity and disability persist in many patients despite reassurance. A sizeable proportion of patients remains significantly symptomatic with important limitations in their daily activities, usually due to persistent chest pain. Functional disability affects approximately 75% of patients with syndrome X. The majority of patients require multiple drug combina-

TABLE VIII Test-retest analysis for determination of reliability and responsiveness of the questionnaire

	No. of patients	Pre	Post	p Value
Stable	37	87 ± 30	81 ± 30	0.11
Worsening	24	108 ± 31	116 ± 31	0.02
Improved	5	55 ± 37	39 ± 28	0.04

Mean ± standard deviation.

p = Wilcoxon test.

Abbreviations: Pre = Day 1 questionnaire scores, Post = Day 14 questionnaire scores.

tions to control their symptoms, and further hospital admissions and investigations are usually needed.^{3-5,20-22}

As defined by Testa *et al.*¹⁶ quality of life assessment measures changes in physical, functional, mental, and social health in order to evaluate the human and financial cost and benefits of new programs and interventions. Assessment of their impact is usually based on relatively objective data, such as the physician's reports of symptoms, angina diaries, or exercise test results. However, these objective measures are often poor indicators of the patient's physical and emotional well-being, and hardly reflect the capacity to function in day-to-day activity.⁹ For better understanding of the full impact of a disease on an individual's lifestyle, we need more subjective measurements than those based on laboratory tests.²³ Thus, given the complexity of the problem, assessment of patients with syndrome X requires not only the quantification of chest pain episodes and the response to exercise testing, but a more comprehensive evaluation of the different domains which may be affected by the disease. Moreover, the administration of a quality of life questionnaire helps the patient to consider many facets of life that can be affected by the disease and enables the clinician to identify areas of special interest for treatment.

TABLE IX Comparison of the quality of life score between patients who remained stable and those who improved or worsened. Responsiveness analysis.

	Stable	Worsened	Improved	p Value
Alertness				
and vitality	1.9 ± 0.9	2.6 ± 0.9	1.2 ± 0.7	0.003
Chest pain	1.7 ± 0.8	2.5 ± 0.9	0.8 ± 0.9	0.0009
Emotional function	1.7 ± 0.9	2.6 ± 1.1	0.5 ± 0.2	0.0001
General health	2.1 ± 0.6	3.1 ± 0.9	1.2 ± 0.8	0.0001
Medications	1.5 ± 1.5	2.2 ± 1.4	0.5 ± 0.5	0.03
Pain perception	1.3 ± 1.0	2.1 ± 1.0	0.5 ± 0.7	0.001
Physical exertion	2.8 ± 1.1	3.5 ± 0.9	1.6 ± 1.1	0.001
Sleep disturbances	2.2 ± 1.2	2.7 ± 1.2	1.0 ± 1.3	0.01
Social function	0.7 ± 0.8	1.4 ± 1	0.17 ± 0.3	0.0007
Total score	81 ± 30	116 ± 31	39 ± 28	0.0001

Mean ± standard deviation.

p = Kruskal-Wallis difference between groups.

By using specific self-administered questionnaires, it is the patient him/herself rather than the managing physician, who rates the functional impairment in different areas. This is important, as the perspectives of patient and physician can be quite different. These issues are particularly relevant if one considers that effective treatment of the so-called syndrome X should be aimed principally at improving quality of life and well being.^{6, 24, 25} According to recent studies, interventions that are able to reduce chest pain in these patients are likely to have a positive impact on quality of life.¹¹

Rationale for a Specific Quality of Life Questionnaire in Syndrome X

Several generic questionnaires have been validated for the assessment of quality of life in a wide variety of health states, conditions, and diseases.^{8, 25, 26} These are most useful in conducting general surveys during research on health and when making comparisons between disease states, but they lack specificity and sensitivity to detect subtle, albeit important, changes. Hence, the need for disease-specific quality of life questionnaires is well recognized.^{15, 25} There are few disease-specific quality of life questionnaires for use in angina pectoris that deliberately focus on domains that are most relevant to this condition.^{9, 10, 27} Despite the fact that patients with syndrome X have angina-like chest pain, these patients differ from patients with coronary artery disease in many respects. Characteristics of this syndrome include a female predominance, atypical features of chest pain, abnormal pain perception, high prevalence of psychological disorders, and recurrent hospital admissions, as well as lack of specific treatment in most instances.^{4, 5, 20, 24, 28, 29} There are several validated questionnaires aimed at assessing the impact of angina pectoris on quality of life; however, many characteristic features of patients with syndrome X are not adequately covered by them. A specific questionnaire for the assessment of quality of life in this group of patients seemed desirable. The new questionnaire thus included a comprehensive pool of questions that covered the most relevant and specific quality of life's domains in patients with syndrome X. We took advantage of the expertise in our institution for management of these patients to produce a focused and specific questionnaire to capture the effects of syndrome X on the patients' quality of life. This newly validated disease-specific quality of life questionnaire to assess physical, emotional, and social dysfunction in patients with syndrome X appears to be a reliable tool for patient characterization and management.

Quality of Life Questionnaire

We have validated a self-administered quality of life questionnaire specific for patients with syndrome X following accepted procedures. Although there is still no standard of reference for quality of life, the clinical validity was demonstrated by confirming the hypothesis as to which degree of symptomatic impairment determined quality of life deteriora-

tion in patients with syndrome X. The proposed questionnaire has clinical validity, reliability, and responsiveness, as tested by the fact that patients with more frequent or severe angina episodes had the highest score indicating poorer quality of life. Conversely, patients who experienced no change in symptoms over time or those whose symptoms had improved had lower scores.

This study demonstrates that quality of life is impaired in patients with syndrome X. Most patients remained symptomatic during the study and the severity and frequency of chest pain were the main determinants of their functional disability and quality of life impairment. Our results indicate that overall quality of life and most of its different domains are clearly affected by the condition. The domains which showed higher impairment were those of chest pain, pain perception, physical exertion, general health, and social function. Although they were also impaired, alertness, vitality, and emotional function were less affected.

The validated questionnaire provides a quantitative measure of both the overall impairment of quality of life and the alteration of its different domains. Thus, the specific questionnaire will not only help physicians to assess quality of life status for individual patients but will also allow comparison of quality of life among patients. Moreover, the specific questionnaire will be helpful in assessing the quality of life changes which may develop over time, as well as the effect of different therapeutic interventions. In addition to improvement of patient management, the specific questionnaire may reduce healthcare costs. The questionnaire will be particularly useful in assessing the effects of interventions in clinical trials which so far rely on nonspecific, mainly quantitative measurement or measurements. Decisions regarding individual patient management are best made after detailed discussion of specific points with the patient.

It was beyond the scope of this study to evaluate the effects of treatments or medications on quality of life. Further evaluation of the questionnaire in long-term controlled randomized clinical trials would be desirable to provide additional evidence that support its routine application in trials and practice.

Persistent chest pain appears to be particularly important in its effects on quality of life. This is consistent with previous studies that showed abnormal cardiac and extracardiac pain perception in patients with syndrome X.^{24, 29, 30} The quality of life questionnaire provides a comprehensive evaluation of the domains affected by chest pain.

Conclusions

Quality of life is significantly impaired in patients with syndrome X. Chest pain and altered pain perception seem to be critical for the deterioration of quality of life observed in patients with syndrome X. The *Quality of Life Questionnaire for Syndrome X* is a clinically valid, reliable, and sensitive self-administered questionnaire useful for the evaluation of quality of life in these patients.

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Appendix

Quality of life questionnaire for patients with syndrome X: Instructions about completion of the questionnaire, Cronbach's alpha for every category, and questions precedence.

These questions concern how your heart problem may have affected you over the last month. The items below describe different ways some people are affected. If an item does not apply to you, then circle 0 and go on to the next item. If an item does apply to you, then circle the number rating that best describes how much were you affected by your heart problem **DURING THE LAST FOUR WEEKS [from 1 (very little) to 5 (very much)]**.

General Health ($\alpha = 0.89$)

1. How much has your heart problem affected your daily activities? † 0 1 2 3 4 5
2. How much has your heart problem affected your activities at home and at work? ¶ 0 1 2 3 4 5
3. To what extent did your heart trouble limit your leisure activities (e.g., sports, hobbies)? † 0 1 2 3 4 5
4. How much has your heart problem affected your sexual activities? † 0 1 2 3 4 5
5. To what extent were you aware of things happening within your body? ¶ 0 1 2 3 4 5
6. To what extent did palpitations (heart pounding) affect you? ¶ 0 1 2 3 4 5

Physical Exertion ($\alpha = 0.89$)

7. How much has your heart problem affected your physical capacity? † 0 1 2 3 4 5
8. To what extent did your heart problem make you feel short of breath? ¶ 0 1 2 3 4 5
9. How well were you able to walk up or down a flight of stairs? ¶ 0 1 2 3 4 5
10. Did you avoid physically demanding activities because of your heart trouble? † 0 1 2 3 4 5
11. To what extent was your fatigue related to your chest pain? ¶ 0 1 2 3 4 5

Pain Perception/Bodily Pain ($\alpha = 0.88$)

12. To what extent were you troubled by headache or migraine? ¶ 0 1 2 3 4 5
13. Have you felt unbearable pain? ¶ 0 1 2 3 4 5
14. Did you get pain when bending? ¶ 0 1 2 3 4 5

Impact of Angina on Daily Life/Chest Pain Impact ($\alpha = 0.92$)

15. Have you been troubled by chest pain? † 0 1 2 3 4 5

16. Have you been concerned about the origin of your chest pain or heart disturbances? ¶ 0 1 2 3 4 5
17. Have you been troubled by chest pain at night? ¶ 0 1 2 3 4 5
18. Have you been troubled by chest pain at rest? ¶ 0 1 2 3 4 5
19. Did you have to visit the casualty department or call to your doctor because of chest pain? ¶ 0 1 2 3 4 5
20. To what extent did your chest pain make you feel anxious or afraid? ¶ 0 1 2 3 4 5
21. To what extent did anxiety or stress make your chest pain worse? ¶ 0 1 2 3 4 5
22. Were you afraid of having chest pain in public? ¶ 0 1 2 3 4 5
23. Did you get chest pain when using your arms (e.g., washing up, hanging out washing)? ¶ 0 1 2 3 4 5

Sleep Disturbances ($\alpha = 0.84$)

24. How often did you have trouble falling asleep at night? † 0 1 2 3 4 5
25. How often did you wake up, two or more times at night? † 0 1 2 3 4 5
26. To what extent was your sleep disturbed? ¶ 0 1 2 3 4 5

Alertness and Vitality ($\alpha = 0.83$)

27. Did you have difficulties in concentrating? † ... 0 1 2 3 4 5
28. Did you have difficulties remembering things, names, etc.? # 0 1 2 3 4 5
29. How much energy or vitality did you have or feel? ‡ 0 1 2 3 4 5
30. Did you feel weak or tired? † 0 1 2 3 4 5

Medications ($\alpha = 0.91$)

31. To what extent have you been bothered by the side effects of medications? ¶ 0 1 2 3 4 5
32. Have you been concerned about having to take too many medications? # 0 1 2 3 4 5

Social Functioning ($\alpha = 0.87$)

33. To what extent was your work affected by your symptoms? ¶ 0 1 2 3 4 5
34. Did you feel useless? ¶ 0 1 2 3 4 5
35. Did you feel that you were a burden to your family? # 0 1 2 3 4 5
36. Did you feel there is nobody you are close to? ¶ 0 1 2 3 4 5
37. To what extent have your relationships with other people been affected? # 0 1 2 3 4 5

Emotional Functioning ($\alpha = 0.84$)

38. Did you lose your temper easily? † 0 1 2 3 4 5
39. Did your heart problem make you feel a loss of self-control in your life? ¶ 0 1 2 3 4 5
40. To what extent are you worried about the future? ¶ 0 1 2 3 4 5
41. Have you been or felt you were under strain, stress or pressure? ‡ 0 1 2 3 4 5
42. To what extent did you feel depressed or pessimistic? † 0 1 2 3 4 5

43. Have you been bothered by nervousness or anxiety?
 † 0 1 2 3 4 5
44. Have you been concerned, worried or had any fears about
 your health? ‡ 0 1 2 3 4 5
45. Did you panic or feel acutely anxious when you had chest
 pain? ¶ 0 1 2 3 4 5
- ¶ - New Questions
 ‡ - Psychological General Well-Being Questionnaire
 † - Angina Pectoris Quality of Life Questionnaire
 # - Spanish Quality of Life Questionnaire

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