ORIGINAL ARTICLE

The validity and reliability of the Turkish version of the Seattle Angina Questionnaire

Seattle Anjina Anketi'nin Türkçe formunun geçerlilik ve güvenilirliği

 Mehmet Tuncay Duruöz, M.D.,[1] **Canan Şanal Toprak, M.D.,**[2]
 Fırat Ulutatar, M.D.,[3] **Anwar Suhaimi, M.D.,**[4] **Mehmet Ağırbaşlı, M.D.**[5]

[1]Department of Physical Medicine and Rehabilitation, Division of Rheumatology, Marmara University
School of Medicine, İstanbul, Turkey; [2]Department of Physical Medicine and Rehabilitation, Marmara University School of
Medicine, İstanbul, Turkey; [3]Department of Physical Medicine and Rehabilitation, Division of Pain Medicine, Çukurova University
School of Medicine, İstanbul, Turkey; [4]Department of Rehabilitation Medicine, University of Malaya, Kuala Lumpur, Malaysia;
[5]Department of Cardiology, İstanbul Medeniyet University School of Medicine, İstanbul, Turkey

ABSTRACT

Objective: The purpose of this study was to assess the validity and reliability of a Turkish version of the Seattle Angina Questionnaire (SAQ) in patients with coronary heart disease (CHD) and angina.

Methods: The SAQ was translated from English to Turkish using the back-translation method. It contains 19 questions scored from 1 to either 5 or 6 in 5 domains (physical limitation, angina stability, angina frequency, disease perception, and treatment satisfaction). Cronbach's alpha coefficient was used to evaluate internal consistency. Spearman's rank correlation coefficient was calculated to assess the construct validity. Convergent validity was examined using correlations between the SAQ and the MacNew Heart Disease Health-related Quality of Life Questionnaire (MacNew) and the Nottingham Health Profile. Divergent validity was evaluated using correlations between the SAQ and age, body mass index (BMI), gender, and the marital status of patients. A value of p<0.05 was considered statistically significant.

Results: Sixty-seven patients were enrolled in the study. The mean age of the study patients was 58.7 years (SD: 10.2). Cronbach's alpha scores of the SAQ, ranging in value from 0.715 to 0.910, demonstrated that this scale is reliable. All of the SAQ scales had a significant correlation with all of the MacNew scales, which indicated that the scale has convergent validity. Insignificant correlations with age, BMI, gender, and marital status illustrated the good divergent validity of the scale.

Conclusion: The Turkish version of the SAQ is a valid and reliable instrument. It is a useful and practical tool to evaluate patients with angina and CHD.

ÖZET

Amaç: Seattle Anjina Anketi'nin (SAA) Türkçe versiyonunun koroner arter hastalığı (KAH) ve anjinası olan hastalarda geçerlilik ve güvenilirliğini değerlendirmektir.

Yöntemler: SAA çeviri-geri çeviri yöntemi ile İngilizce'den Türkçe'ye çevrildi. Anket 19 sorudan oluştu. Sorular 1 ile 5–6 arası puanlanmaktadır ve 5 alan değerlendirilmektedir (fiziksel limitasyon, anjinal stabilite, anjina sıklığı, hasta algısı ve hasta memnuniyeti). Güvenilirliğin değerlendirilmesi için iç tutarlılık (Cronbach alfa) değerlendirilmiştir. Yapı geçerliliğinin değerlendirilmesinde Spearman korelasyon katsayısı kullanılmıştır. Benzer ölçek geçerliliği değerlendirilmesinde SAA ile Nottingham Sağlık Profili ve MacNew kalp hastalığı yaşam kalitesi (MacNew) anketleri arasındaki ilişki değerlendirilmiştir. Ayırt edici geçerlilik değerlendirilmesinde SAA ile hastaların yaş, vücut kitle indeksi (VKİ), cinsiyet ve medeni hali arasındaki ilişkiye bakılmıştır. P<0.05 anlamlı olarak kabul edildi.

Bulgular: Kardiyoloji kliniğinde anjiyografi uygulanan 67 hasta çalışmaya alındı. Hastaların ortalama yaşı 58.7 (SS: 10.2) idi. SAA'nın alt gruplarının Cronbach alfa değerleri 0.715 ile 0.910 arasında değişmekte olup iyi düzeyde güvenilirliği göstermektedir. SAA'nın tüm alt grupları MacNew anketinin tüm alt grupları ile anlamlı düzeyde korele saptanmış olup benzer ölçek geçerliliğini göstermektedir. Yaş, VKİ, cinsiyet ve medeni hali düzeyi ile korelasyon saptanmamış olup bu da ayırt edici geçerliliğin göstergesidir.

Sonuç: Seattle Anjina Anketi Türk popülasyonunda iyi geçerlilik ve güvenilirlik düzeyine sahiptir; anjina ve KAH tanılı hastalarda kullanışlı ve pratik bir ankettir.

Coronary heart disease (CHD) has a significant impact on Turkish morbidity, premature mortality, and disability, accounting for approximately 61,000 deaths in 2016.[1] Advancements in medical care and surgical treatments in Turkey, as well as a reduction in major cardiovascular risk factors, have led to a decreasing CHD mortality rate since the 1990s.[2]

Angina pectoris is a common warning sign of the presence of CHD in many individuals. One study found that 1 in 10 individuals complaining of angina experienced a myocardial infarction (MI) within a year of reporting the angina.[3] Hemingway et al.[4] studied more than 110,000 individuals 45–85 years of age and found that the presence of angina indicated a similar (or increased) risk of death in women relative to men. Quality of life (QOL) is also known to be adversely affected by angina. A previous study of patients with stable angina demonstrated that the presence of angina pectoris was associated with increased risk for all-cause hospitalizations, poorer QOL, and depression in patients.[5] Angina's effect is further correlated with a higher incidence of sexual dysfunction.[6] An increase in angina episodes has also been linked to declining physical function and a decreased social role.[7]

There are many instruments available to quantify angina and its impact on the health-related QOL (HRQOL) and functional status. Generic assessment instruments assess a wide range of life aspects, provide a summary of overall health, and allow comparison between different clinical entities.[8] Disease-specific instruments have also been developed for use with angina populations to address specific impairments; these are more sensitive to changes in the progress of the disease than generic assessments.[9-13]

Disease-specific instruments are suitable for use in both intervention trials and clinical care, provided they are used in a population for which they are validated. The Seattle Angina Questionnaire (SAQ) is an example of a disease-specific HRQOL tool. It is one of the most widely used self-administered HRQOL measurements in angina populations. It assesses the effect of angina on 5 domains: physical limitation, angina stability, angina frequency, disease perception, and treatment satisfaction.[14,15] The MacNew Heart Disease Heart-related Quality of Life Questionnaire (MacNew) focuses on the patient's perception of physical, emotional, and social HRQOL domains.[16,17] The Turkish version of the MacNew has been validated,[18]

but as yet, a Turkish version of the SAQ has not been validated. The purpose of this study was to assess the validity of a Turkish version of the SAQ in patients with angiographically documented CHD and angina.

Abbreviations:

BMI	Body mass index
CHD	Coronary heart disease
HRQOL	Health-related quality of life
MacNew	MacNew Heart Disease Health-related Quality of Life Questionnaire
MI	Myocardial infarction
MID	Minimal important difference
NHP	Nottingham Health Profile
QOL	Quality of life
SAQ	Seattle Angina Questionnaire

METHODS

An observational, cross-sectional, single-center cohort study of patients with angina who underwent angiographic screening for CHD and possible percutaneous coronary intervention was carried out in a routine clinical practice setting between January and July of 2015 at the Marmara University School of Medicine. Approval of this study was granted by the Marmara University School of Medicine medical ethics committee. Patients who agreed to participate in the study provided written, informed consent and were over the age of 18. Those with a cognitive impairment that would interfere with completing the questionnaire or with uncontrolled psychiatric or systemic conditions were excluded from the study. Sociodemographic data were collected prior to the angiography. Several self-administered questionnaires were administered prior to the angiographic procedure: two disease-specific HRQOL questionnaires for heart disease, the SAQ and the MacNew scales, and the Nottingham Health Profile (NHP), which is a generic HRQOL questionnaire. Following angiography, treatment decisions were made by the attending cardiologist.

Translation process for the SAQ

The SAQ was translated from English (original) to Turkish using the back-translation method. First, the English version was independently translated into Turkish by 2 translators. Subsequently, 2 other translators who had not seen the original version of the SAQ independently completed back-translations from Turkish to English. A committee of 3 physicians compared the back-translations with the original version and decided on a Turkish version for each scale. The Turkish versions were then discussed with a lay group (6 participants) to identify a possible need for cross-cultural adaptations. For example, 1 question was modi-

fied from "walking more than one block" to "to walk from one street to the next street," to make the question more understandable to the Turkish population. The subsequent version of the Turkish SAQ was shown to 5 cardiac patients to assess the face validity, and a final version of the Turkish SAQ scale was established.

Instruments

The original self-administered SAQ was developed in English and has been validated in patients with angina. [14] The SAQ was designed to quantify the frequency of angina and its impacts over the prior 4 weeks. It contains 19 questions scored from 1 (severe limitation) to either 5 or 6 (no limitation) in 5 domains (physical limitation, angina stability, angina frequency, disease perception, and treatment satisfaction). The scores for each SAQ scale are converted to a result in a range of 0–100, with a change score of 8–10 suggested as the minimal important difference (MID).[14]

The self-administered MacNew questionnaire is based on an instrument originally created in English using a focus group approach for patients with MI. The modified MacNew, which assesses how a patient's feelings and activities are affected experientially by CHD, has been shown to be valid, reliable, and responsive, and has been used in patients with MI and angina; reference norms are available for both diagnostic groups.[19] The MacNew assesses the prior 2 weeks and contains 27 items that are scored from 1–7 (poor-high). The items are associated with the domains (physical, psychological, social, and symptoms) suggested for inclusion in HRQOL instruments, all of which have been supported by factor analysis.[16,17] The MacNew provides a physical limitation scale with 14 items, an emotional function scale with 14 items, and a social function scale with 13 items. It includes 7 questions about symptoms (e.g., angina, shortness of breath, feeling worn out or restless, dizziness, aching legs), and has a global HRQOL score, which is calculated using all of the scored items. Evidence suggests that a change score of 0.5 points is the MID.[19]

The NHP, a generic QOL measurement, includes 6 domains: energy, sleep, pain, emotional reactions, social isolation, and physical mobility. Each question is answered yes or no, and the highest possible total score for each domain is 100. Higher scores signify a lower HRQOL. The NHP has been validated for the Turkish population.[20]

Statistical analysis

IBM SPSS Statistics for Windows, Version 22.0 (IBM Corp., Armonk, NY, USA) software was used for the statistical analysis. The data were analyzed using descriptive statistical methods (mean, SD, median, frequency, range). A normal distribution of the data was assessed with the Kolmogorov-Smirnov test. The Mann-Whitney U test was used for comparisons of quantitative data. Cronbach's alpha coefficient was used to evaluate internal consistency, and a value of >0.70 was considered acceptable for reliability. Spearman's rank correlation coefficient was calculated to assess the construct validity of the parameters. Convergent validity was evaluated with correlations between the SAQ, the MacNew, and the NHP scales. Divergent validity was assessed based on correlations between the SAQ and the age, BMI, gender, and the marital status of each patient. A value of $p < 0.05$ was considered statistically significant.

RESULTS

Sixty-seven patients were enrolled in the study. The mean age of the patients was 58.7 years (SD: 10.2), and 59.7% of the patients were male. The demographics and clinical data of the patients are summarized in Table 1. Patients completed and understood the items of the scale easily, and no items were removed from the scale.

Reliability

The internal consistency statistics (Cronbach's alpha coefficients) for the physical limitation, angina frequency, treatment satisfaction, and disease perception domains of the SAQ were 0.910, 0.738, 0.715, and 0.801, respectively. This signifies that the SAQ is a reliable scale. Item-to-total statistics, including Cronbach's alpha if item deleted, suggested that removing items would not improve the internal consistency of the subscales. The internal consistency of angina stability was not measured because this subscale consists of only a single question.

Validity

All of the SAQ scales had significant correlations with all of the MacNew scales, which shows that the scale has convergent validity. Insignificant or poor correlations with age, BMI, gender, and marital status indicate good divergent validity. These findings demonstrate

Table 1. Demographic and clinical data of patients (n=67)

	Minimum–Maximum	Median	n	%	Mean±Standard deviation
Age (years)	34.0–87.0	57.0			58.7±10.2
Gender					
Female			27	40.3	
Male			40	59.7	
Body mass index	18–45	29.6			29.8±4.41
Education					
Primary School (5 years)			45	67.2	
Middle school (8 years total)			9	13.4	
High school			8	11.9	
University			1	1.5	
Postgraduate			4	6.0	
Angina					
Typical			48	71.6	
Atypical			19	28.4	
Comorbidities					
None			9	13.4	
Coronary heart disease			56	83.5	
Valvular disease			2	3.0	
Hypertension			23	34.3	
Diabetes			6	9.0	
Hypertension+diabetes			19	28.4	
Other			2	3.0	
Smoking					
No			21	31.3	
Current			25	37.4	
Past			21	31.3	
Alcohol use					
No			45	67.2	
Current			9	13.4	
Past			13	19.4	

that the SAQ has good construct validity (Table 2). The good correlations between all of the SAQ scales and 4 of the NHP scales also suggest that the validity of the Turkish SAQ scale is good (Table 3).

DISCUSSION

The purpose of this study was to assess the validity of a Turkish translation of a trusted HRQOL questionnaire for patients in treatment for CHD and angina. Outcomes following treatment for CHD include mortality and relief of symptoms, especially relief of angina. While this may be a point of interest to the medical practitioner and policymakers, there is a growing appreciation for the patients' own appraisal of their health status as an outcome of CHD treatment effectiveness.[8]

Suffering from angina is associated with a decreased QOL. Depression is commonly detected with chronic angina and can also lead to an increased perception of poor QOL, impaired functional status, and increased cardiovascular morbidity and mortality, even with relatively mild angina.[15,20]

Table 2. Analysis of the construct validity of the Seattle Angina Questionnaire

Convergent validity		MacNew questionnaire			
		Global	Physical	Emotional	Social
Seattle Angina Questionnaire					
Physical limitation	r	0.512	0.510	0.427	0.416
	p	0.000	0.000	0.000	0.001
Angina stability	r	0.364	0.381	0.298	0.372
	p	0.003	0.002	0.015	0.002
Angina frequency	r	0.419	0.502	0.327	0.443
	p	0.001	0.000	0.007	0.000
Treatment satisfaction	r	0.502	0.567	0.353	0.548
	p	0.000	0.000	0.004	0.000
Disease perception	r	0.490	0.534	0.386	0.379
	p	0.000	0.000	0.003	0.002
Divergent validity		Age	BMI	Gender	Marital status
Seattle Angina Questionnaire					
Physical limitation	r	-0.106	-0.270	0.344	-0.128
	p	0.392	0.027	0.004	0.301
Angina stability	r	-0.065	-0.096	0.161	-0.103
	p	0.599	0.437	0.193	0.407
Angina frequency	r	-0.095	0.002	0.139	-0.064
	p	0.445	0.984	0.262	0.606
Treatment satisfaction	r	0.099	-0.195	0.147	-0.063
	p	0.426	0.114	0.234	0.615
Disease perception	r	0.255	-0.208	0.195	-0.033
	p	0.037	0.091	0.113	0.793
Spearman correlation.					

The symptom burden is also predictive of mortality in this population, adding importance to its utility in risk stratification.[22–24] An equally important outcome to therapeutic intervention is patient satisfaction with symptom relief and QOL, especially if weighed from a social point of view. Providers can achieve a favorable outcome of this sort by integrating clinical decision-making with HRQOL endpoints, to evaluate the congruency of the treatment provided with the patient's perceived QOL. HRQOL measurements that involve multiple domains, such as physical, psychological, and social well-being, are important for assessing the patient's baseline, to determine effective, individual treatment methods and follow-up on the efficacy of the treatments and interventions.[25] Using validated and standardized HRQOL measurements also provides high-quality data and promotes consistency and meaningful comparisons among studies.[26]

HRQOL measurements are divided into 2 types: disease-specific and generic measurements. Disease-specific measurements evaluate the patient's QOL using questions about symptoms, impairments, and disabilities related to a particular disease. Therefore, they are more sensitive for detecting small changes relevant to the disease process.[27]

To the best of our knowledge, there are only a limited number of scales validated in Turkish to measure the disease-specific QOL in angina populations. Consequently, we aimed to evaluate the validity and reliability of the SAQ for a Turkish population.

Cronbach's alpha reliability coefficient was used to assess the internal consistency and reliability of the

Table 3. Comparison of the Seattle Angina Questionnaire and the Nottingham Health Profile

		Nottingham Health Profile					
		Pain	Physical activity	Fatigue	Sleep	Social isolation	Emotional reaction
Seattle Angina Questionnaire							
Physical limitation	r	-0.393	-0.596	-0.274	-0.502	-0.025	-0.222
	p	0.001	0.000	0.026	0.000	0.844	0.071
Angina stability	r	-0.212	-0.294	-0.260	-0.265	-0.096	-0.257
	p	0.085	0.016	0.035	0.030	0.440	0.036
Angina frequency	r	-0.443	-0.318	-0.246	-0.245	0.092	-0.231
	p	0.000	0.009	0.046	0.046	0.457	0.060
Treatment satisfaction	r	-0.381	-0.279	-0.349	-0.190	-0.099	-0.186
	p	0.001	0.023	0.004	0.124	0.426	0.132
Disease perception	r	-0.247	-0.333	-0.452	-0.328	-0.202	-0.337
	p	0.044	0.006	0.000	0.007	0.101	0.005

Spearman correlation.

Turkish SAQ. The resulting cores, ranging in value from 0.715 to 0.910, demonstrated that this scale is reliable. This score range is similar to the results of the original SAQ instrument, as well as the results of the UK and German versions of the scale.[14,17,29]

The correlations between the SAQ and other QOL scales were assessed for convergent validity, and all of the SAQ scales were found to be significantly correlated with all of the MacNew scales. Since both of the scales are disease-specific QOL measurements, this finding was expected. The significant relationship between the 2 scales also showed that the SAQ has a good construct validity. While almost all of the SAQ scales were significantly correlated with the pain, physical activity, fatigue, and sleep scales of the NHP, only disease perception and angina stability were correlated with the emotional reaction scale of the NHP, and no correlation was found between any of the SAQ scales and the social isolation scale of the NHP. No correlation between these scales is not crucial for convergent validity because the NHP is a generic questionnaire and is not specific to angina pectoris, and because the SAQ scales were correlated with the social and emotional scales of the MacNew questionnaire. Disease-specific questionnaires are more sensitive for measuring the patient's well-being related to the symptoms of the disease. Thus, a stronger relationship was expected between the SAQ and the MacNew than the relationship between the SAQ and the NHP. A strong relationship between the SAQ and the MacNew was also seen in a previous study.[29]

This study has some limitations. It was designed to investigate the internal consistency and validity of a Turkish version of the SAQ. Test-retest reliability and responsiveness were not evaluated. Further studies are required to investigate test-retest reliability, responsiveness, and sensitivity to changes in the disease process. Secondly, a priori analysis was not performed to determine the sample size since there is no widely accepted calculation formula or absolute rules for the sample size required to validate a questionnaire. However, although the sample size was acceptable to show the validity and reliability of the Turkish SAQ scale, a study with a larger sample size would be valuable.

Conclusion

The Turkish SAQ is a valid and reliable instrument to evaluate Turkish patients suffering from angina. It is a useful and practical tool for the assessment of angina management in clinical practice, and can also be of benefit to further research.

Peer-review: Externally peer-reviewed.

Conflict-of-interest: None.

Authorship contributions: Concept: M.T.D.; Design: M.T.D., C.S.T., F.U.; Supervision: M.T.D., M.A.A.; Materials: C.S.T., F.U., M.A.A; Data: C.S.T., F.U.; Analysis: C.S.T., A.S.; Literature search: C.S.T., A.S.; Writing: C.S.T., A.S.; Critical revision: M.T.D., M.A.A.

REFERENCES

1. Balbay Y, Gagnon-Arpin I, Malhan S, Öksüz ME, Sutherland G, Dobrescu A, et al. Modeling the burden of cardiovascular disease in Turkey. Anatol J Cardiol 2018;20:235.

2. Unal B. Explaining the decline in coronary heart disease mortality in Turkey between 1995 and 2008. BMC Public Health 2013;13:1135. [CrossRef]

3. Gandhi M, Lampe FC, Wood DA. Incidence, clinical characteristics, and short-term prognosis of angina pectoris. Br Heart J 1995;73:193–8. [CrossRef]

4. Hemingway H, McCallum A, Shipley H, Manderbacka K, Martikainen P. Incidence and prognostic implications of stable angina pectoris among women and men. JAMA 2006;295:1404–11. [CrossRef]

5. Parikh KS, Coles A, Schulte PJ, Kraus WE, Fleg JL, Keteyian SJ, et al. Relation of angina pectoris to outcomes, quality of life, and response to exercise training in patients with chronic heart failure (from HF-ACTION). Am J Cardiol 2016;118:1211–6. [CrossRef]

6. Wandell PE, Brorsson B. Assessing sexual functioning in patients with chronic disorders by using a generic health-related quality of life questionnaire. Qual Life Res 2000;9:1081–92.

7. Brorsson B, Bernstein SJ, Brook RH, Werko L. Quality of life of patients with chronic stable angina before and four years after coronary revascularization compared with a normal population. Heart 2002;87:140–5. [CrossRef]

8. Preedy VR, Watson RR. Handbook of disease burdens and quality of life measures. New York: Springer-Verlag; 2010.

9. Dempster M. Assessing quality of life in cardiac rehabilitation: Choosing an appropriate tool. British Journal of Cardiac Nursing 2011;6:335–40. [CrossRef]

10. Alonso J, Permanyer-Miralda G, Cascant P, Brotons C, Prieto L, Soler-Soler J. Measuring functional status of chronic coronary patients. Reliability, validity and responsiveness to clinical change of the reduced version of the Duke Activity Status Index (DASI). Eur Heart J 1997;18:414–9. [CrossRef]

11. Dougherty CM, Dewhurst T, Nichol WP, Spertus J. Comparison of three quality of life instruments in stable angina pectoris: Seattle Angina Questionnaire, Short Form Health Survey (SF-36), and Quality of Life Index-Cardiac Version III J Clin Epidemiol 1998;51:569–75. [CrossRef]

12. Lerner DJ, Amick BC 3rd, Malspeis S, Rogers WH, Gomes DR, Salem DN. The Angina-related Limitations at Work Questionnaire. Qual Life Res 1998;7:23–32. [CrossRef]

13. Thompson DR, Yu C-M. Quality of life in patients with coronary heart disease-I: Assessment tools. Health and quality of life outcomes 2003;1:42. [CrossRef]

14. Spertus JA, Winder JA, Dewhurst TA, Deyo RA, Prodzinski J, McDonnell M, et al. Development and evaluation of the Seattle Angina Questionnaire: a new functional status measure for coronary artery disease. J Am Coll Cardiol 1995;25:333–41.

15. Peterson E. The burden of angina pectoris and its complications [corrected]. Clin Cardiol 2007;30:I10–5. [CrossRef]

16. Lim LL, Valenti LA, Knapp JC, Dobson AJ, Plotnikoff R, Higginbotham N, et al. A self-administered quality of life questionnaire after acute myocardial infarction. J Clin Epidemiol 1993;46:1249–56. [CrossRef]

17. Valenti L, Lim L, Heller RF, Knapp J. An improved questionnaire for assessing quality of life after acute myocardial infarction. Qual Life Res 1996;5:151–61. [CrossRef]

18. Daskapan A, Höfer S, Oldridge N, Alkan N, Muderrisoglu H, Tuzun EH. The validity and reliability of the Turkish version of the MacNew Heart Disease Questionnaire in patients with angina. J Eval Clin Pract 2008;14:209–13. [CrossRef]

19. Dixon T, Lim LL, Oldridge NT. The MacNew health-related quality of life instrument: Reference data for users. Qual Life Research 2002;11:173–83. [CrossRef]

20. Kücükdeveci AA, McKenna SP, Kutlay S, Gürsel Y, Whalley D, Arasil T. The development and psychometric assessment of the Turkish version of the Nottingham Health Profile. International journal of rehabilitation research. Internationale Zeitschrift fur Rehabilitationsforschung. Revue Internationale de Recherches de Readaptation 2000;23:31-8. [CrossRef]

21. Richards SH, Anderson L, Jenkinson CE, Whalley B, Rees K, Davies P, et al. Psychological interventions for coronary heart disease: Cochrane systematic review and meta-analysis. Eur J Prev Cardiol 2018;25:247–59. [CrossRef]

22. Mozaffarian D, Bryson CL, Spertus JA, McDonell MB, Fihn SD. Anginal symptoms consistently predict total mortality among outpatients with coronary artery disease. Am Heart J 2003;146:1015–22. [CrossRef]

23. Spertus JA, Jones P, McDonell M, Fan V, Fihn SD. Health Status Predicts Long-Term Outcome in Outpatients With Coronary Disease. Circulation 2002;106:43–9. [CrossRef]

24. Berecki-Gisolf J, Humphreyes-Reid L, Wilson A, Dobson A. Angina symptoms are associated with mortality in older women with ischemic heart disease. Circulation 2009;123:2330–6. [CrossRef]

25. Le J, Dorstyn DS, Mpfou E, Prior E, Tully PJ. Health-related quality of life in coronary heart disease: a systematic review and meta-analysis mapped against the international classification of functioning, disability and health. Qual Life Res 2018;27:2491–503. [CrossRef]

26. Saczynski JS, McManus DD, Goldberg RJ. Commonly used data-collection approaches in clinical research. Am J Med 2013;126:946–50. [CrossRef]

27. Andresen EM, Meyers AR. Health-related quality of life out-comes measures. Arch Phys Med Rehabil 2000;81:S30–S45.

28. Garratt AM, Hutchinson A, Russell I. The UK version of the Seattle Angina Questionnaire (SAQ-UK): reliability, validity and responsiveness. J Clin Epidemiol 2001;54:907–15.

29. Höfer S, Benzer W, Schüßler G, Von Steinbüchel N, Oldridge N. Health-related quality of life in patients with coronary artery disease treated for angina: validity and reliability of German translations of two specific questionnaires. Qual Life Res 2003;12:199–212. [CrossRef]