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ORIGINAL ARTICLE

EQ-5D studies in cardiovascular diseases in eight Central and Eastern European countries: a systematic review of the literature

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Abstract

Background: The measurement of health-related quality of life (HRQoL) by validated generic instruments, such as EQ-5D, has become an increasingly important tool for the assessment of health care in a wide range of diagnoses.

Aim: We aimed to systematically review EQ-5D literature on cardiovascular diseases in eight Central and Eastern European (CEE) countries.

Methods: A structured literature search was conducted in MEDLINE, EMBASE, Web of Science, CINAHL, PsycINFO, Cochrane Library, and the EuroQol website up to November 2016. Original cardiovascular-related studies that reported EQ-5D results were included.

Results: Of the 36 papers, 17 reported EQ-5D index scores. Most studies were performed in Poland (n = 24, 67%). The most common diagnosis regarding the number of publications and population size was ischaemic heart disease (n = 13, N = 6394), followed by atrial fibrillation (n = 4, N = 1052). The average EQ-5D index scores ranged from 0.61 to 0.88 and from 0.66 to 0.95 for patients before and after cardiac procedure/surgery, respectively (including angioplasty, coronary artery bypass grafting, ablation, surgical correction of septal defects, transcatheter aortic valve implantation [TAVI]). In all studies baseline scores were lower than the repeated assessments after the procedure, with the most substantial improvement of 0.24 in high-risk elderly patients after TAVI. Studies which did not assess invasive treatment reported mean EQ-5D index scores ranging from 0.18 to 0.80.

Conclusions: The number of cardiovascular-related studies reporting HRQoL using EQ-5D has consistently increased in CEE countries over the past decade and is outstanding compared with other clinical fields. The EQ-5D index and EQ VAS scores varied based on the disease severity, patient characteristics, and treatment protocol.

Key words: health-related quality of life, EQ-5D, cardiovascular diseases, ischaemic heart disease, Central and Eastern Europe

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INTRODUCTION

Cardiovascular diseases (CVDs) are still the leading cause of mortality in Europe. However, advances in prevention and management have led to a steady decrease in CVD deaths since the beginning of the 21st century [1, 2]. Also, because people are living longer than ever before, the traditional approach to patient assessment has changed recently. The focus on clinical outcomes has shifted to include patient-reported outcomes, and now assessment of health-related quality of life (HRQoL) is being considered increasingly important in health care [3].

Health-related quality of life measurement in CVD may be assessed using validated CVD-specific instruments such as the Seattle Angina Questionnaire (SAQ), Minnesota Living with Heart Failure questionnaire (MLHF), and Patient Perception of Arrhythmia Questionnaire (PPAQ) [4–6]. Alternatively, generic HRQoL measures such as Medical Outcomes Study Short Form-36 (SF-36) or EQ-5D may be used [7, 8]. Generic HRQoL measures are advantageous because they enable a comparison of HRQoL with the age- and gender-matched general population and also across different diseases, and even different disease areas. Among the instruments for CVD that are currently used, the EQ-5D (together with SF-36) is one of the most frequently applied due to its briefness, the simplicity of administration, and availability of population norms. Moreover, it has the capacity to generate outcomes that reflect the societal preference (also called 'utilities') for the specific health states. The utilities are used to calculate Quality-Adjusted Life Years (QALY) in health economic analyses.

In 2010, Dyer et al. [9] published a systematic review on the use of EQ-5D in studies of CVD. The review was not country-specific, and what is more, due to the increasing number of published studies on the EQ-5D in the past seven years, there is need for an update [10]. The objective of this study was to systematically review studies on the use of the EQ-5D in CVD, performed in eight Central and Eastern European (CEE) countries.

METHODS

EQ-5D

The EQ-5D is a generic instrument for the measurement of HRQoL that consists of two parts: the EQ-5D descriptive system and the EQ-5D visual analogue scale (EQ VAS) [7, 11]. The former focuses on patient self-evaluation of five dimensions: mobility (MO), self-care (SC), usual activities (UA), pain/discomfort (PD), and anxiety/depression (AD). In the original version of the instrument, each dimension has three response categories (EQ-5D-3L), indicating no problems, some problems, and severe problems, leading to 243 possible health states. Recently, the EuroQol Group has introduced a new five-level version of the EQ-5D (EQ-5D-5L), with 3125 possible health states [12]. For each health state defined by the EQ-5D an index score can be assigned (health state utility value [HSUV]), which represents societal preferences for that state. The national sets of utility values have been developed by asking members of the general population to consider health states described by the EQ-5D and to value those states using direct methods such as time trade-off, EQ VAS, discrete choice experiment, or a combination thereof. The utility score is typically anchored by 1 (perfect health), and 0 (dead), with some health states considered worse than dead (< 0).

The second component of the EQ-5D is a vertical 20-cm visual analogue scale (EQ VAS) used for patient self-rating of the current health state from 0 (worst imaginable) to 100 (best imaginable). The use of EQ-5D is supported by the wide availability of national general population norms (for the descriptive system, EQ VAS, and HSUVs) and national value sets (so-called tariffs). In the analysed group of countries, published population norms were available for Hungary [13], Poland [14, 15], and Slovenia [16] and country-specific value sets for Poland [17] and Slovenia.

Data collection and assessment

The present study is based on a systematic review of EQ-5D studies in CEE countries between 2000 and 2015 [10] and focuses specifically on diseases of the circulatory system (ICD-10, Chapter IX: I00-I99) [18]. We have updated the systematic search for the period between July 2015 and November 2016, applying the same methodology. In brief, MEDLINE via PubMed, EMBASE, Web of Science, CINAHL, PsycINFO, the Cochrane Library, and the EuroQol website were searched using the combination of the following terms: (euroqol OR euro qol OR eq 5d OR eq5d OR eq-5d) AND (Austria* OR Bulgaria* OR Hungar* OR Czech OR Poland OR Polish OR Romania* OR Slovak* OR Sloven*). In addition, the authors have conducted a hand-search for papers that were published in journals not indexed in electronic databases. Only full-text published papers were included in the analysis.

All original research articles that met the following criteria were included in the review: (i) full-text articles; (ii) studies involving patients with diseases of the circulatory system; (iii) study population originating from Austria, Bulgaria, Czech Republic, Hungary, Poland, Romania, Slovakia, or Slovenia; and (iv) articles reporting EQ-5D index, EQ VAS, or percentage dimension scores. Exclusion criteria included: (i) lack of country-level outcomes from the CEE country in multi-country studies; and (ii) reporting results from a study sample already included in the review. There were no language restrictions.

A Microsoft Excel spreadsheet was developed to facilitate data extraction, which included study methodology, patient characteristics, information about cardiovascular interventions, version of the EQ-5D questionnaire, applied value sets, and EQ-5D results. Only data on patients with CVD were extracted if the study sample consisted of mixed populations.

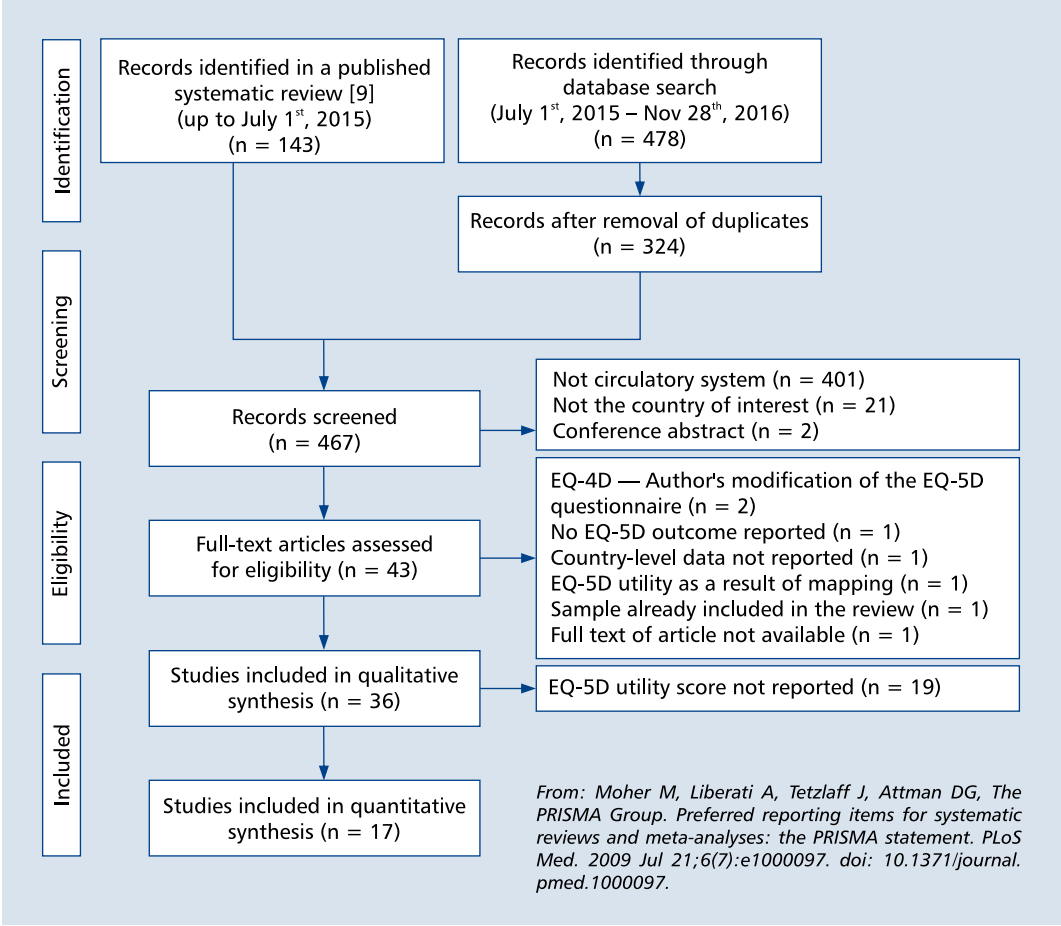

Figure 1. PRISMA diagram — studies identified through systematic review. For more information — visit: www.prisma-statement.org

Data analysis

EQ-5D index scores that were not reported using the appropriate scale (i.e. using a 0–100 scale, instead of being anchored by 0 [dead] and 1 [full heath]) were transformed. Missing standard deviations (SDs) were estimated from confidence intervals. If data variability was not statistically expressed, SDs were input from studies with the closest possible match regarding subgroup and sample size.

Based on our findings, the following subgroups were developed for the EQ-5D index scores analysis: (1) transcatheter aortic valve implantation (TAVI) — transfemoral (TF) or transapical (TA), (2) coronary artery bypass grafting (CABG) or angioplasty: angioplasty also reported as percutaneous transluminal coronary angioplasty (PTCA) or percutaneous transluminal balloon angioplasty (PTBA), (3) ablation: radiofrequency or catheter, (4) surgical correction of ventricular septal defect (VSD) or ostium secundum atrial septal defect (ASD II), and (5) non-invasive treatment. The results of the review are presented in two major groups: cardiac procedure/surgery (subgroups 1–4) and non-invasive treatment (subgroup 5).

RESULTS

Included publications

The results of the selection process and reasons for exclusion are detailed in a Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) chart (Fig. 1). From the 143 previously published primary studies on EQ-5D in CEE countries identified in our general systematic review [10], 30 papers were focused on conditions of the circulatory system, of which 27 met the predefined inclusion criteria. The update of the systematic search resulted in the identification of 324 additional articles, of which nine fulfilled the selection criteria. A total of 36 publications were included in the qualitative synthesis. There was one case in which two different study designs, i.e. cross-sectional [19] and prospective [20], referred to the partially shared stroke cohort. As exclusion of any of the above-mentioned papers would have resulted in the loss of relevant information, both papers were included in this review. It is important to underline that these issues were taken into account in the summary of the main cohort characteristics, to avoid double counting. Two

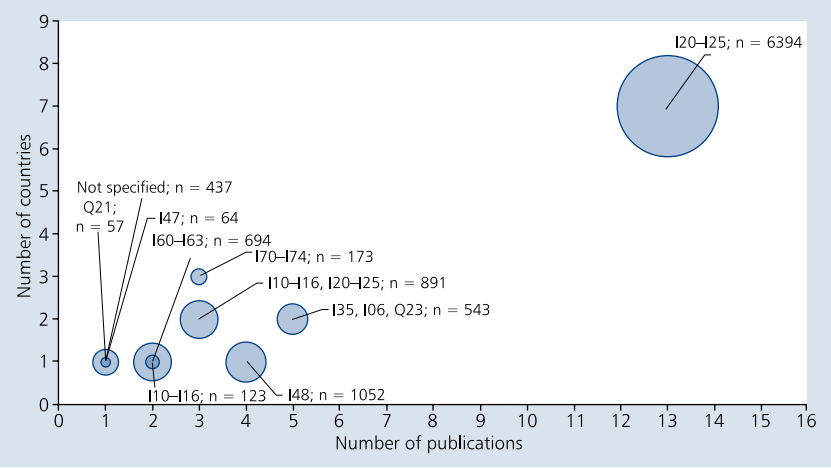

Figure 2. Most common diagnoses among the studies. The sizes of bubbles refer to the total number of patients of studies in a given diagnosis

of the included articles were large, multi-country studies on coronary heart disease involving five and six CEE countries, respectively [21, 22].

Representation of different countries

Overall, 45 reports on country-level EQ-5D scores were obtained. The majority of studies were performed in Poland (n = 24, 53%) [19–42], followed by Czech Republic (n = 8) [21, 22, 43–48], and Slovenia (n = 5) [21, 22, 49–51]. We also identified two studies from Bulgaria [21, 22], Hungary [22, 52], and Romania [21, 22] and single studies from Austria [53] and Slovakia [54]. The total sample size of all included studies was 10,314, with Poland (38%) and Czech Republic (34%) representing the majority.

Characteristics of included studies

The most common diagnoses in terms of number of publications and population sizes were ischaemic heart disease (IHD; n = 13, N = 6394) followed by atrial fibrillation (n = 4, N = 1052) (Fig. 2). The oldest paper included in this review was published in 2005. Since then the number of articles per year has steadily increased, as observed in the past three years, during which 50% of the included papers were published. The majority of studies were prospective cohort (n = 15, 42%) or cross-sectional (n = 11, 31%), three analysed data from patient-registries (8%), two were randomised controlled studies, and five (14%) followed other study designs (Table 1). Almost all of them were performed as an on-site survey (n = 32, 89%). From 31 (86%) studies with specified EQ-5D version, 30 used EQ-5D-3L and three used EQ-5D-5L [19, 20, 21], including two studies that employed both questionnaires at the same time [19, 20]. Out of five studies without instrument specification [24, 34, 37, 40, 54], two reported EQ-5D index scores [37, 40]. EQ-5D index scores were calculated in 47% (n = 17) of the included studies, and they were based on Polish (n = 6) [19, 20, 25, 26, 30, 42], English (n = 4) [21, 22, 26, 52], European (n = 4) [43–45, 48], or Slovenian tariffs (n = 1) [51] (**Supplementary Table 1 — see journal website**). Three papers did not report the details of the value sets used for EQ-5D index calculation [37, 40, 47]. Regarding the two other outcomes, EQ VAS results were reported in 31 (86%) articles and the percentage of responses across the five health-dimensions (health profile) was reported in 19 (53%). Complete reporting of EQ-5D results was presented in only five (14%) papers [20, 26, 30, 51, 52]. Only the EQ VAS results reported in papers along with EQ-5D index results were presented graphically in this review (Fig. 3; **Supplementary Figures 1 and 2 — see journal website**). In other cases, the smallest and the highest values of EQ VAS were reported numerically in the text of this review. All EQ VAS results are available on request.

Improvement of HRQoL across types of CVD

Studies assessing HRQoL before cardiac procedure/surgery reported mean (SD) EQ-5D index scores ranging from 0.61 (0.3) to 0.88 (0.13) (**Supplementary Fig. 1 — see journal website**) and EQ VAS scores ranging from 37.5 (17.5) to 74.5 (16.4). The lowest EQ-5D index scores were reported in high-risk elderly patients with symptomatic severe aortic stenosis, who were not eligible for surgical treatment and in whom TAVI was the only therapeutic option [42].

Studies assessing HRQoL after cardiac procedure/surgery reported mean EQ-5D index scores ranging from 0.66 (0.16) to 0.95 (0.16) (Fig. 3) and EQ VAS scores ranging from 50 (12.5) to 89 (12.5). Within all studies, average baseline scores prior to the procedure were lower than the results obtained afterwards. The greatest improvement in mean HRQoL measured by the EQ-5D index score was in the population

Table 1. Description of studies that have used the EQ-5D as an outcome measure in patients with cardiovascular diseases

Author, year, reference number	Country	Study design	Population	Surgery/procedure	n*	Men (%)	Mean age (SD)	EQ-5D type of outcome
HYPERTENSIVE DISEASES (I10–I16)								
Bartczak, 2016 [36]	Poland	Case series	Patients diagnosed with primary hypertension	NA	10	NR	48.2	V
Skowron, 2008 [35]	Poland	Cross-sectional	Ambulatory patients with hypertension or hypertension with diabetes type 2	NA	113	41%	Only distribution	D, V
ISCHAEMIC HEART DISEASES (I20–I25)								
Deskur-Śmielecka, 2009 [24]	Poland	Non-RCT	Patients 2–3 weeks after an ACS	PCI	70	74%	57 (9.4)	V
de Smedt, 2013 [22]	Bulgaria, Czech Republic, Hungary, Poland, Romania, Slovenia	Cross-sectional	Patients hospitalised for MI	PCI	2786	70%	63.3 (9.4)	I, V
de Smedt, 2015 [21]	Bulgaria, Czech Republic, Poland, Romania, Slovenia	Cross-sectional	≥ 18-year-old patients, six months to three years after their coronary event	NA	1629	76%	64	I, V
Höfer, 2009 [53]	Austria	Prospective cohort	Patients after MI who underwent inpatient cardiac rehabilitation	CABG and PCI	351	66%	60.9 (12.5)	D, V
Jegier, 2009 [27]	Poland	Non-RCT	Patients who were no longer than two weeks after MI	CABG and PCI	562	83%	56.7 (8.9)	D, V
Kaleta, 2005 [28]	Poland	Cross-sectional	Men with CAD after MI	NA	87	100%	58.1 (4.7)	D, V
Kołtowski, 2014 [30]	Poland	RCT	Patients with acute STEMI	PCI	103	NR	NR	D, I, V
Kołtowski, 2011 [32]	Poland	Prospective cohort	CABG patients	CABG	86	69%	63.3 (8.9)	D, V
Puto, 2007 [33]	Poland	Prospective cohort	Patients over 80 years old suffering from MI	NA	81	41%	84.7	V
Salabura, 2005 [34]	Poland	Prospective cohort	Patients after the first MI	PTCA	40	100%	52.5	V
Sobczak, 2016 [38]	Poland	Retrospective cohort	Patients with angiographically documented IHD	NA	98	71%	58 (7.1)	D, V
Tušek-Bunc, 2016 [51]	Slovenia	Cross-sectional	Patients with CHD	NA	423	65%	68 (10.8)	D, I, V
Zając, 2016 [40]	Poland	Prospective cohort	Patients with stable angina	Pci	78	79%	70.4 (8.7)	I, V

→

Table 1 (cont.). Description of studies that have used the EQ-5D as an outcome measure in patients with cardiovascular diseases

Author, year, reference number	Country	Study design	Population	Surgery/procedure	n*	Men (%)	Mean age (SD)	EQ-5D type of outcome
HYPERTENSIVE DISEASES AND ISCHAEMIC HEART DISEASES (I10–I16 AND I20–I25)								
Borowiak, 2006 [23]	Poland	Cross-sectional	Elderly patients (above the age of 65) with CVD	NA	200	33%	74.3 (6.1)	D, V
Kwaśniewska, 2005 [31]	Poland	Cross-sectional	> 17-year-old patients with risk factors of CVD	NA	431	48%	54.3 (7.4)	D, V
Prevolnik Rupel, 2005 [50]	Slovenia	Cross-sectional	Patients with CVD taking part in rehabilitation	NA	260	37%	64.5	D, V
AORTIC STENOSIS (I35, I06, Q23)								
Kala, 2013 [46]	Czech Republic	Prospective cohort	Elderly patients with symptomatic severe AS	TAVI and SAVR	45	31%	82.0 (4.5)	D, V
Kleczyński, 2014 [29]	Poland	Prospective cohort	Elderly high-risk patients with symptomatic severe AS	TAVI	40	33%	NR	D, V
Kleczyński, 2016 [41]	Poland	Registry	Elderly high-risk patients with symptomatic severe AS	TAVI	101	40%	NR	D, V
Stańska, 2016 [42]	Poland	Registry	Elderly high-risk patients with symptomatic severe AS, not eligible for surgical treatment	TAVI	184	36%	84	D, I
Tokarek, 2016 [39]	Poland	Retrospective cohort	Patients with symptomatic severe AS	TAVI	173	51%	NR	D
CARDIAC ARRHYTHMIA (I47–I48)								
Bulkova, 2014 [43]	Czech Republic	Prospective cohort	Patients with PAF or with LSPAF	Ablation	387	71%	577 (9.7)	I, V
Farkowski, 2014 [25]	Poland	Prospective cohort	≥ 18-year-old patients with supraventricular tachycardia	Ablation	64	36%	44.8 (13.7)	I, V
Fiala, 2014 [44]	Czech Republic	Prospective cohort	> 18-year-old patients with long-standing (median of 28 months) persistent AF	Ablation	160	78%	59 (9)	I, V
Fiala, 2016 [48]	Czech Republic	Registry	≥ 18 years old LSPAF	Ablation	202	76%	59.5 (8.9)	I, V
Haman, 2012 [45]	Czech Republic	Prospective cohort	Adult patients AF	Ablation	303	57%	57	I, V

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Table 1 (cont.). Description of studies that have used the EQ-5D as an outcome measure in patients with cardiovascular diseases

Author, year, reference number	Country	Study design	Population	Surgery/procedure	n*	Men (%)	Mean age (SD)	EQ-5D type of outcome
CEREBROVASCULAR DISEASES (I60–I63)								
Golicki, 2015a [19]	Poland	Cross-sectional	Adult patients with acute stroke	NA	408	51%	69 (12.9)	I, V
Golicki, 2015b [20]	Poland	Prospective cohort	Adult patients with primary intracerebral haemorrhage or cerebral infarction	NA	114	48%	70.6 (11.0)	D, I, V
Jarosławska, 2012 [26]	Poland	Cross-sectional	Adult patients with a diagnosis of ischaemic stroke, who survived more than six months after stroke	NA	172	48%	70.5	D, I, V
PERIPHERAL ARTERIAL OCCLUSIVE DISEASE (I70–I74)								
Balogh, 2012 [52]	Hungary	Cross-sectional	Patients with PAOD, Fontaine stages II–IV	NA	102	57%	70 (10)	D, I, V
Klepanec, 2012 [54]	Slovakia	RCT	Patients with critical limb ischaemia, not eligible for endovascular or surgical revascularisation	NA	41	85%	66 (10)	V
Slovácek, 2007 [47]	Czech Republic	Prospective cohort	> 18-year-old patients with PAOD	PTBA	30	67%	63.1	I, V
CONGENITAL MALFORMATIONS OF CARDIAC SEPTA (Q21)								
Gierat-Haponiuk, 2015 [37]	Poland	Prospective cohort	Patients with congenital heart disease at least 12 months after cardiac surgery	Surgical correction of VSD or ASD II	57	47%	23 (3.4)	I, V
NOT SPECIFIED								
Prevolnik Rupel, 2014 [49]	Slovenia	Prospective cohort	Patients taking part in a health care programme	Veins surgery/intravascular medical procedures	437	NR	NR	I

*Only patients with circulatory system diseases
EQ-5D type of outcome: D — percentage dimension scores, I – EQ-5D index, V — EQ VAS
ACS — acute coronary syndrome; AF — atrial fibrillation; AS — aortic stenosis; ASD — atrial septal defect; CABG — coronary artery bypass graft; CAD — coronary artery disease; CHD — coronary heart disease; CVD — cardiovascular disease; IHD — ischaemic heart disease; LSPAF — long-standing persistent atrial fibrillation; MI — myocardial infarction; NA — native coronary artery; NR — not reported; PAF — paroxysmal atrial fibrillation; PAOD — peripheral arterial occlusive disease; PCI — percutaneous coronary interventions; PTBA — percutaneous transluminal balloon angioplasty; PTCA — percutaneous transluminal coronary angioplasty; RCT — randomised controlled trial; SAVR — surgical aortic valve replacement; SD — standard deviation; STEMI — ST-segment elevation myocardial infarction; TAVI — transcatheter aortic valve implantation; VSD — ventricular septal defect

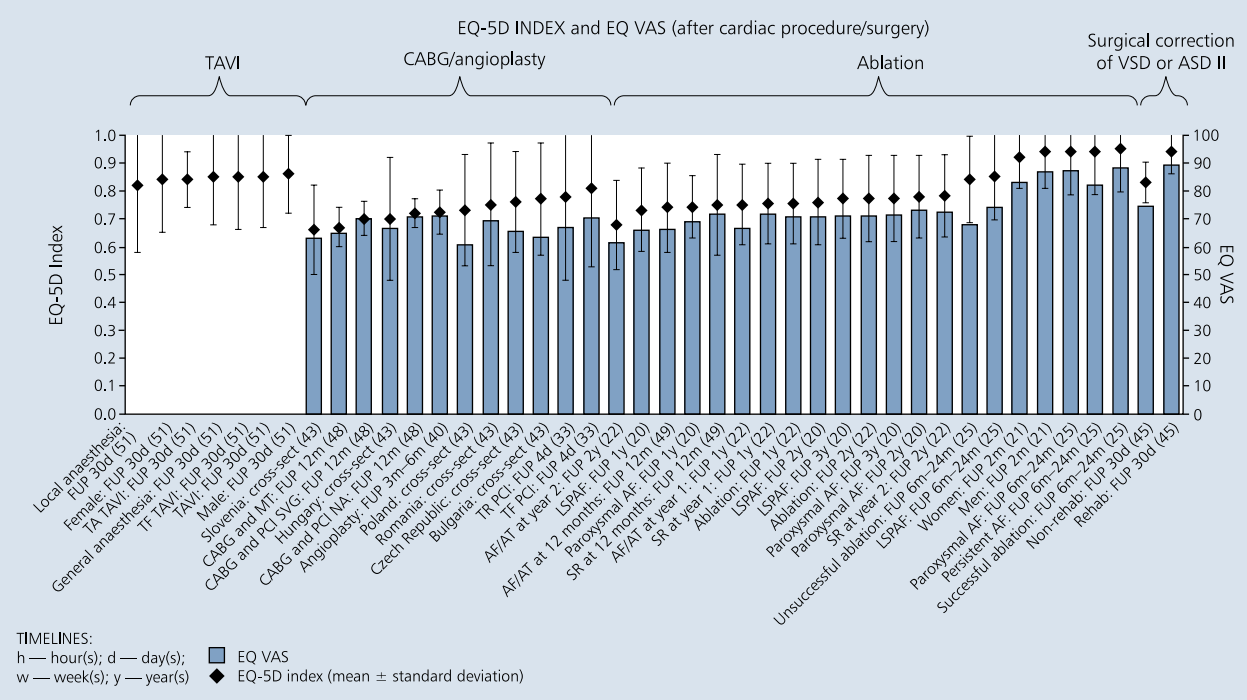

Figure 3. Mean EQ-5D index and EQ VAS scores for patients after cardiac procedure/surgery; AF — atrial fibrillation; ASD II — ostium secundum atrial septal defect; AT — atrial tachycardia; CABG — coronary artery bypass grafting; FUP — follow-up; LSPAF — long-standing persistent atrial fibrillation; MT — medical treatment only; NA — native coronary artery; PCI — percutaneous coronary intervention; Rehab — rehabilitation group; TAVI — transcatheter aortic valve implantation; VSD — ventricular septal defect; TA — transapical; TF — transfemoral; TR — transradial; SR — sinus rhythm; SVG — saphenous vein graft

of high-risk elderly patients who underwent TAVI (0.24) [42]. Looking at the EQ-5D dimensions, we found that there were improvements in all aspects of patients' health. The widest variance of improvement was noticed after ablation, with the incremental EQ-5D index score ranging from 0.009 in the population of patients with no conversion into sinus rhythm at two years after the first procedure [44] to 0.16 in the population who underwent successful ablation [45].

Studies in which invasive treatment was not assessed reported mean EQ-5D index scores ranging from 0.18 (0.3) to 0.8 (0.16) (**Supplementary Figure 1 — see journal website**) and EQ VAS scores ranging from 38 (17) to 67.8 (16.1). The lowest EQ-5D index scores were reported in patients with peripheral arterial occlusive disease (PAOD; stages III and IV) [52].

In examining the dimension-specific burden of the disease among all cardiovascular studies, problems with self-care tended to be the least common. Among patients who underwent the cardiac procedure, a trend towards greater impact on mobility and a fairly similar distribution across the other dimensions were observed. For two other subpopulations (i.e. without and before cardiac procedure/surgery), problems with pain/discomfort tended to be the most common, followed by problems with anxiety/depression and mobility (Fig. 4, **Supplementary Figures 3–6 — see journal website**).

DISCUSSION

The number of published studies on the use of EQ-5D within CVD in CEE countries is still increasing, which is consistent with the worldwide trend observed by Dyer et al. in 2010 [9]. This significant and sustained upward trend in recent years affirms that patient-reported outcomes such as HRQoL have gained acceptance as routine measures in cardiovascular clinical trials. The present review of the EQ-5D index and EQ VAS scores in CVD in CEE elaborates upon a previously published systematic review of EQ-5D outcomes in CEE associated with various fields of medicine [10].

We found studies on IHD to be the most common among the cardiovascular literature that included EQ-5D. It mirrors the relative prevalence because IHD is the most prevalent CVD in Europe [1]. Despite such a large number of studies in the IHD population, it was not possible to carry out the stratification by disease severity measured by Canadian Cardiovscular Society (CCS) Grading Scale, which was done by Dyer et al. [9]. However, in the present review there were sufficient data available to stratify EQ-5D index scores by the type of cardiac procedure/surgery. As predicted, in all cases, mean EQ-5D index scores increased after cardiovascular procedures, including angioplasty, CABG, ablation, TAVI, or surgical corrections of VSD or ASD (**Supplementary Figures 1**

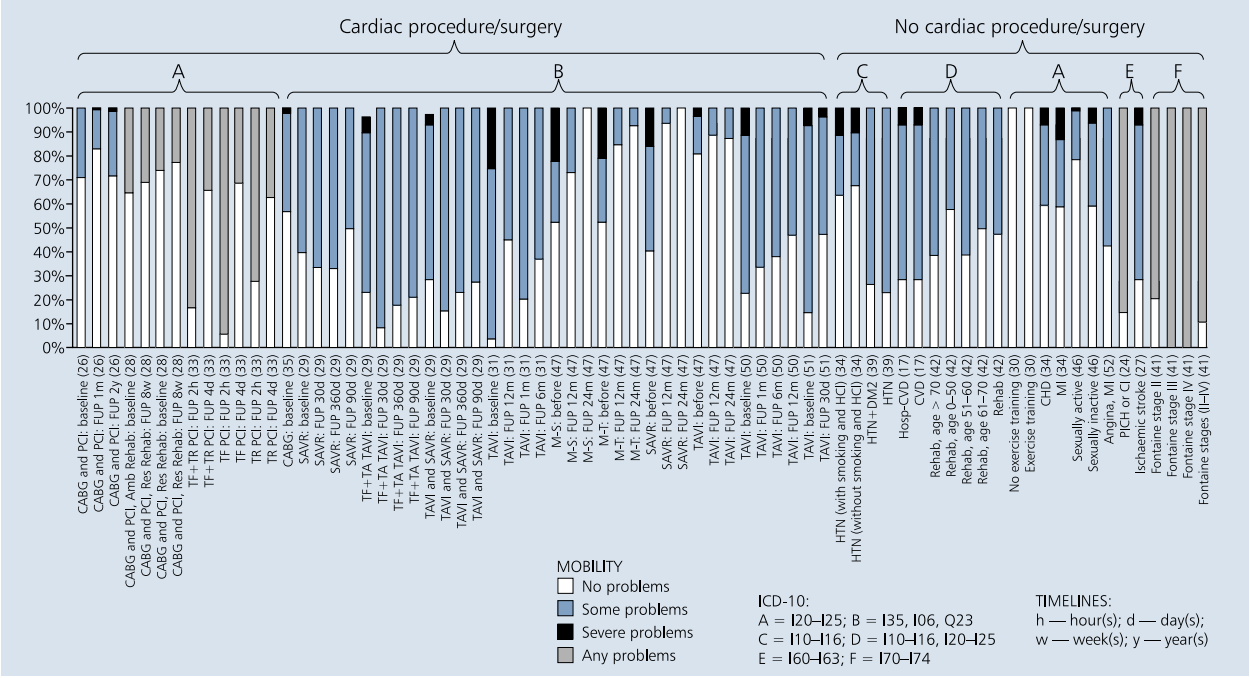

Figure 4. Distribution of limitations within mobility dimension of the EQ-5D; Amb — ambulatory; CHD — coronary heart disease; CI — cerebral infarction; CVD — cardiovascular disease; DM2 — type 2 diabetes mellitus; HCl — hypercholesterolaemia; Hosp — hospitalisation; HTN — hypertension; MI — myocardial infarction; M-S — mini-sternotomy; M-T — mini-thoracotomy; PICH — primary intracerebral haemorrhage; Rehab — rehabilitation; Res — researched; SAVR — surgical aortic valve replacement; TA — transapical; other abbreviations — see Figure 3

and 3 — see journal website). A considerable amount of heterogeneity was observed in the outcomes across studies assessing HRQoL after ablation, which can be explained by the fact that these studies were the only ones that took into account the final result of the procedure — both successes and failures.

In general, patients' subjective assessment (EQ VAS) gave lower scores regarding HRQoL than the assessment reflecting the preferences of society (EQ-5D index), which is in line with the literature on other diseases. The most significant differences were recorded in the population of patients who underwent catheter ablation for atrial fibrillation, especially an unsuccessful one [45]. The only exception was a population with advanced PAOD (Fontaine stage III and IV) [52]. The causes of lower societal than patient scoring may be because at that stage of the disease, problems with mobility and pain/discomfort were particularly high, and at the same time, elderly patients managed to get used to the long-lasting problems.

In terms of the EQ-5D descriptive part, studies indicated that self-care was the least affected dimension. However, this observation is not disease-specific because it was similar to what is seen in the general population [13, 14]. Patients after cardiac procedure reported the most serious problems within mobility dimension. Because this remark only applied to patients who underwent the cardiac procedure, it would seem that this limitation should be particularly high immediately after the procedure, decreasing over time. In general, that was a true statement, apart from the elderly patients with symptomatic severe aortic stenosis, in whom aortic valve intervention was indicated [46]. In this case, however, the mobility perception was impacted not only by the surgery but also the by age and the disease severity [46]. Problems with pain/discomfort were generally the most common, followed by problems with anxiety/depression and mobility, which coincides with the observations made in the general population [13, 14].

The main limitation of this review was the inability to calculate pooled means across the studies. That was caused by differences in the study designs and patient characteristics. In addition, not all studies used the same value set to calculate EQ-5D index scores. The choice of tariff used to convert self-classification scores can affect the index. This was shown in the study included in this review, which compared Polish and British scoring algorithms in adult patients with a diagnosis of ischaemic stroke, who survived for more than six months after the stroke [26]. Although nation-specific societal preferences are preferred in local decision making, a common algorithm across all studies would enhance the comparability of HRQoL.

In conclusion, the number of cardiovascular-related studies that reported HRQoL using EQ-5D has consistently increased in the CEE countries over the past decade and is outstanding compared with other clinical fields. As would be

expected, in these studies EQ-5D index and EQ VAS scores varied based on the disease severity, patient characteristics, and treatment protocol. Although more and more CVD studies present EQ-5D scores stratified by these variables, it was not possible to conduct a meta-analysis.

Conflict of interest: *Dominik Golicki and Valentina Prevolnik Rupel are members of the EuroQoL Group — a not-for-profit organisation that develops and distributes instruments that assess and value health.*

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