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Systematic Literature Review

Valuation of EQ-5D Health States for Adults in Low-, Lower-Middle, and Upper-Middle-Income Countries: A Systematic Review

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ABSTRACT

Objectives: Preference-based measurement of health-related quality of life is crucial for informing resource allocation decisions, with the EQ-5D instrument widely used as a measure of health-related quality of life. Although country-specific value sets are well established in many high-income countries, current summarized evidence from valuation studies in low- and middle-income countries (LMICs) remains limited. This review systematically identified EQ-5D valuation studies in LMICs, summarized methodologies and scoring algorithms by country type, and highlighted key challenges.

Methods: A systematic search was undertaken across 7 academic databases and the EuroQol website. Two independent reviewers screened titles and abstracts and performed full-text reviews and data extraction. Reporting followed Checklist Reporting Valuation Studies of Multi-Attribute Utility-Based Instruments for quality assessment. The synthesis included study characteristics, methodologies, and summarized scoring algorithms from the best-performing models, highlighting variations across countries.

Results: Through screening 9378 studies, 35 studies from 22 LMICs were included. Of these, 20 (58%) were from upper-middle-income countries, whereas low-middle and low-income countries accounted for 13 (37%) and 2 (6%) studies, respectively. Eighteen (51%) studies reported EQ-5D-5L valuations. Sample sizes ranged from 148 to 5503, with the time trade-off method being predominant. Scoring algorithms showed no significant variation between upper-middle- and low-middle-income countries, except for the pain/discomfort dimension in EQ-5D-5L. Mobility was the most reported utility decrement among studies.

Conclusions: There is a growing trend in developing country-specific value sets in LMICs. Contextually relevant designs and adequate pilot studies could enhance the accuracy of value sets in culturally diverse settings, particularly where severe health states are commonly reported.

Keywords: adult, EQ-5D, health states, LMIC, valuation.

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Introduction

Globally, health technology assessment (HTA) has increasingly been used to evaluate health-related quality of life (HRQoL) through clinical and economic evaluations of health interventions, to inform healthcare decision making.[1,2] Cost-utility analysis, a predominant approach of economic evaluation, quantifies health outcomes in quality-adjusted life-years, combining both quantity and quality of life, establishing HRQoL measurement as a crucial component of both economic evaluation and HTA. Although HTA and economic evaluations are routinely performed in high-income countries (HICs) to optimize health resource allocation,[3–6] limited evidence exists on what has been initiated in resource-constrained low- and middle-income countries (LMICs).[5]

The EuroQol 5-dimension instrument (EQ-5D), developed by the EuroQol Group, is a simple preference-based instrument, commonly used to estimate HRQoL and quality-adjusted life-year in economic evaluations and outcome research.[7] The instrument consists of 5 dimensions: mobility, self-care, usual activity, pain or discomfort, and anxiety or depression with each dimension consists of either a 3-level (EQ-5D-3L) or 5-level (EQ-5D-5L) response options. Additionally, it includes a visual analog scale for self-rating general health scale ranged from 0 to 100. The EQ-5D-3L defines 243 possible health states, whereas the EQ-5D-5L encompasses 3125.[7–9] Utility weights for health states are derived through population-based valuation studies.[10] Several methods such as time trade-off (TTO), standard gamble, ranking exercise, visual analog scale, and, discrete choice experiments (DCEs) are often used to elicit preferences from the general

population. The EuroQol Group has developed protocols for valuing these health states, such as Measurement and Valuation of Health (MVH), the "Paris," and the EuroQol Valuation Technology (EQ-VT). The first 2 are recommended for 3-level version, whereas the third is for the 5-level version.[11-13] For instance, EQ-VT protocol includes a composite TTO (cTTO) tasks for respondents to assess health states better than death by comparing x years in full health with 10 years in a disease state (eg, being in a wheelchair). For states worse than death, lead-time TTO is used, offering choices between x years in full health and 10 years in full health followed by 10 years in the disease state. The health state value is determined at the point of indifference.[13] DCE design requires respondents to compare 2 health states (multiple times) and select which one is better.

Prior reviews have systematically examined EQ-5D valuation studies for both 3-level and 5-level versions, recent evidence from LMICs remains limited. For instance, Norman et al[14] identified and summarized 11 EQ-5D valuation studies, all conducted in HICs. Subsequently, Xie et al[9] identified 31 EQ-5D valuation studies in their review, with only 2 from LMICs. Similarly, Kularatna et al[5] summarized health-states valuation studies in LMICs (n = 17), incorporating both preference- and nonpreference based multiattribute utility-based instruments, such as the Short-Form 6-Dimension (SF-6D), the Assessment of Quality of Life, and EQ-5D, revealing only 1.7% of 943 screened articles were from LMICs. This highlighted the need for country-specific valuation studies in LMICs, given their large population.[5] However, this review was conducted over a decade ago, highlighting a gap in recent literature. Although more valuation studies have emerged in recent years, no comprehensive systematic synthesis of LMIC-specific evidence exists. Given the rapid expansion of economic evaluation in LMICs, a consolidated review of valuation studies is essential to support evidence-based policy and strengthen the methodological foundation for future research. Considering that EQ-5D is the simplest preference-based measure among multiattribute utility-based instruments, this review aims to identify EQ-5D valuation studies in LMICs, systematically summarize the methodologies (by LMIC types, eg, upper-middle-income (UMI), lower-middle-income (LMI)), and summarize scoring algorithms.[15]

Methods

The systematic review was registered in the International Prospective Register of Systematic Reviews (PROSPERO) database (CRD42023438387) and followed the Preferred Reporting Items for Systematic Reviews and Meta-analysis (PRISMA) guidelines. The PRISMA Checklist is provided in Appendix Table 1 in Supplemental Materials found at https://doi.org/10.1016/i.vhri.2025.101505.

Search Strategy and Screening Procedures

A systematic electronic search was conducted through July 2023 across 7 academic databases: Academic Search Complete, CINAHL Complete, EconLit, MEDLINE Complete, APA PsycINFO, Embase, and PubMed together with the EuroQol website and manual reference checks. The search strategy was developed with a subject librarian and authors. Two reviewers (M.S., T.C.) conducted initial searches independently and cross-checked results. The search was updated in August 2024 by 1 reviewer (M.S.). Search details are provided in Appendix Tables 2 and 3 in Supplemental Materials found at https://doi.org/10.1016/i.vhri.2025.101505.

The study inclusion criteria were as follows:

- Original peer-reviewed articles
- Reported EQ-5D valuation studies (3 level or 5 level)
- Conducted among adults (18+ years)
- Used established preference elicitation techniques and conducted in low, lower-middle, UMICs (World Bank classification)[16]
- Published in English language

Studies were excluded if they focused on valuation in children or young populations, were conducted in HICs, were review articles or methodological articles without empirical results (eg, discussions on DCE/TTO concepts or EQ-VT protocol design), or constituted gray literature such as conference abstracts and posters. These exclusions were made to ensure the review captured detailed methods and findings available only in full-text sources. Duplicates were removed from the identified records, and remaining records were exported to Covidence[17] for independent title and abstract screening by 2 reviewers per study (M.S., T.C., M.K., and M.A.K.). Full texts were reviewed independently by M.S. and T.C., with conflicts resolved by consensus or discussion with a third reviewer (M.K. or J.K.). Reference lists of included studies were hand searched for additional inclusions (M.S.).

Data Extraction and Synthesis

A data extraction tool was developed in Microsoft Excel following Checklist for Reporting Valuation Studies of Multi-Attribute Utility-Based Instruments (CREATE) by Xie et al.[15] Two independent reviewers (M.S., T.C., M.K., and M.A.K.) extracted data from each study, which was double checked by the lead reviewer (M.S.). Extracted information included study characteristics (eg, country, population) method (eg, valuation techniques, health states, and statistical modeling), results (eg, scoring algorithm), funding, and limitations.

A narrative synthesis was undertaken to summarize the characteristics, methods, and results of the included studies, with particular focus on valuation methods (TTO, DCE, or both), health states, modeling approaches, best-performing models and scoring algorithms, and reported challenges. The review also synthesized the percentages of negative scores, utility decrements, and response versus analysis rates. Descriptive statistics (means and standard deviations) for EQ-5D-3L and EQ-5D-5L dimensions were reported based on the scoring algorithms from the best models.

Assessment of Individual Studies and Reporting Quality

The CREATE checklist was used to assess the reporting quality and methodological transparency of the included valuation studies. Although CREATE is not a formal critical appraisal tool for evaluating risk of bias, it provides structured guidance for reporting key methodological components of health state valuation studies. CREATE consists of 21 items grouped into 7 sections: (1) descriptive system, (2) health states valued, (3) sampling, (4) preference data collection, (5) sample, (6) modeling, and (7) scoring algorithm.[9] For this review, each item was scored as 1 for "Yes," 0 for "No," and 0.5 for "Partial" with higher total scores indicating more comprehensive reporting. Studies were classified as "excellent" (≥85%), "very good" (70%-84%), and "good" (55%-69%), based on prior published reviews. This assessment aimed to improve transparency and comparability across studies.

Results

Study Selection

The systematic search and study selection process is presented in the PRISMA diagram (Fig. 1). Of 17 439 records identified through 7 databases and the EuroQol website, 8061 duplicates were removed, and 9317 records excluded based on title and abstract screening. A full-text review was undertaken for 61 studies, with 35 studies from 22 LMICs included for detailed synthesis. Of these, 69% (n = 24)[18-41] were available on the EuroQol website, whereas several recent studies and those focused on specific populations or regions were not available the site.

Among 22 LMICs, 9 (41%) were UMIs countries and reported 20 valuation studies[24,25,29,30,32-36,38-40,42-49] with most conducted in China (n = 8, 23%)[32,35,38,43-46,49] and Brazil (n = 3, 9%).[36,42,48] Eleven (50%) were from LMICs, reporting 13 studies,[19,21-23,26,28,31,37,41,50] with 3 studies from Iran (9%)[19,31,50] (Table 1).[51-53] Two countries (9%) were from low-income (LI) category, with each reporting 1 valuation study (Table 1).[20,27] Further details on country-specific value sets and study frequencies are provided in Appendix Figure 1 in Supplemental Materials found at https://doi.org/10.1016/i.vhri.2025.101505.

Characteristics of the Studies

Table 2 illustrates study characteristics by LMIC type. Of 35 studies, 34 studies focused on general adult population, with 1 study reported value set with diabetes mellitus.[43] All used face-to-face interviews, with participant ages ranging from 15 to 97 years (mean 39.6 years in 18 studies). Seventeen studies (49%) generated EQ-5D-3L value set, predominantly from UMI countries (n = 10, 59%),[24,32,36,38-40,42,46-48] and LMI countries (n = 7, 41%).[18,26,31,37,41,50,52] The remaining 18 studies (53%) derived EQ-5D-5L value-sets, with 10 (51%) from UMI,[25,29,30,33-35,43-45,49] 6 from LMI,[19,21-23,28,51] and 2 from LI countries.[20,27] Among 13 studies from LMI and LI countries, 77% (n = 10) were published since 2020.

Sample sizes for EQ-5D-3L studies ranged from 148[39] to 5503,[32] with 47% (8 of 17) having 1000 or more participants.[32,36,38,41,42,46-48] For EQ-5D-5L, sample sizes ranged from 193[43] to 2409,[22] with 72% (13 out of 18) having at least 1000 participants.[19,21-23,25,27-30,33-35,44] The proportion of respondents analyzed for EQ-5D-3L value sets ranged from 90% to 100% and for EQ-5D-5L, from 68% to 100%, the lowest being reported in India (67.9%)[22] and Egypt (74.8%).[23] Fourteen studies reported the mean interview durations, averaging 34.4 minutes (range:12.0[29] to 71.3[51] minutes) (Table 2).

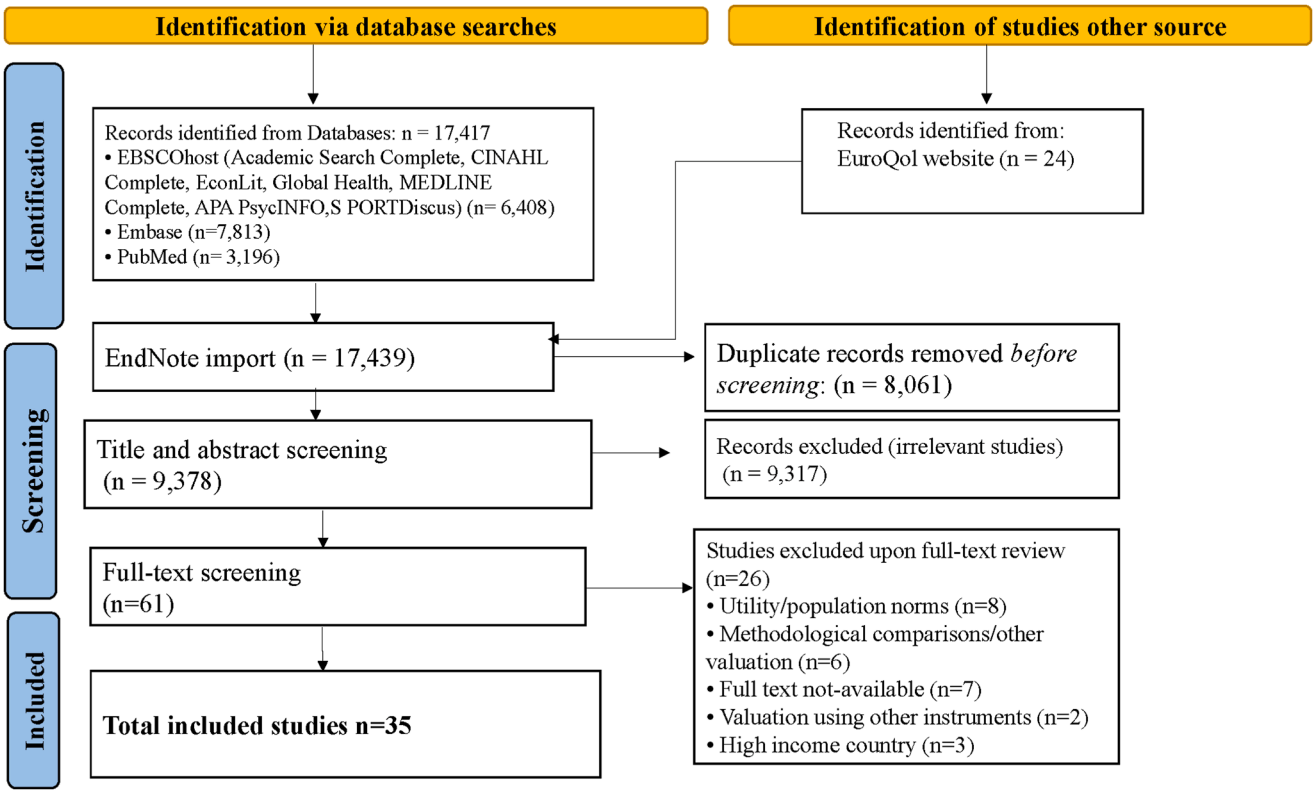
Quality of the Included Studies

Among the 35 studies, 30 reported country-specific valuations for the general population and were considered high quality based on the checklist (see Appendix Table 4 in Supplemental Materials found at https://doi.org/10.1016/i.vhri.2025.101505). Four studies reported all 21 checklist items,[18,26,37,51] 3 reported 20 items,[28,36,52] and 10 reported 19 items. The most commonly unreported items were "response rate" (n = 11) and "recruitment strategies" (n = 6).

Summary of Valuation Methods

For EQ-5D-3L valuation, MVH protocol is recommended; it is based on conventional TTO and includes 43 EQ-5D health states

Figure 1. PRISMA flow chart of the study selection process.



PRISMA indicates Preferred Reporting Items for Systematic Reviews and Meta-analysis.

Table 1. Studies included by country and publication year.

Classification by income level, *n* (%)	Name of country (reference)	Number of studies, (%)	Publication years
Upper middle-income countries (*n* = 9, 40.9%)	Argentina[40]	1 (2.9%)	2009
	Brazil[36,42,48]	3 (8.6%)	2013, 2016
	China[32,35,38,43-46,49]	8 (22.9%)	2014-2023
	Indonesia[34]	1 (2.9%)	2017
	Malaysia[30,39]	2 (5.7%)	2012-2019
	Mexico[25]	1 (2.9%)	2021
	Peru[29]	1 (2.9%)	2020
	Russia[24]	1 (2.9%)	2021
	Thailand[33,47]	2 (5.7%)	2011-2018
Lower middle-income countries (*n* = 11, 50%)	Egypt[23]	1 (2.9%)	2022
	Ghana[51]	1 (2.9%)	2024
	India[22]	1 (2.9%)	2022
	Iran[19,31,50]	3 (8.6%)	2016-2023
	Jordan[18]	1 (2.9%)	2024
	Pakistan[52]	1 (2.9%)	2023
	Philippines[21]	1 (2.9%)	2022
	Sri Lanka[37]	1 (2.9%)	2015
	Tunisia[26]	1 (2.9%)	2021
	Vietnam[28]	1 (2.9%)	2020
	Zimbabwe[41]	1 (2.9%)	2003
Low-income countries (*n* = 2, 9.1%)	Ethiopia[27]	1 (2.9%)	2020
	Uganda[20,53]	1 (2.9%)	2022
Total	22 countries	35	2003-2024

Note. Summary of the 35 included valuation studies, grouped by World Bank income classification and publication years. Countries with more than 1 study are listed with multiple references. Percentages indicate the proportion of studies in each income group relative to the total.

(plus "unconscious" and "immediate death") to derive scores for 243 health states.[54] The EQ-VT protocol, which is recommended for EQ-5D-5L, includes a composite TTO and DCE with multiple hypothetical health states scenarios, with a time horizon ranging from 10 to 20 years.[11,13]

Among included studies, the majority of (71%, *n* = 17) EQ-5D-3L valuations used MVH/Paris protocol, although directly valued health states ranged from 38 to 243 (UMI: 43 to 102; LMI: 38 to 243).[36] In contrast, 4 studies (24%) used EQ-VT protocol (UMI = 1 [6%], LMI = 3 [18%]) and for EQ-5D-3L (UMI = 1, LMI = 3), despite it being designed for EQ-5D-5L, and incorporated both TTO and DCE methods.[26] For EQ-5D-5L, most studies (14 of 18) reported valuations for the general population and consistently used versions of the EQ-VT protocol, with the majority (*n* = 12) using both cTTO and DCE designs (UMIs = 6 [43%],[25,29,30,33-35] LMICs = 6 [43%],[19,21-23,28,51] and LICs = 2 [14%][27,55]), except for 2 studies (Uganda and China) that used only the cTTO method.[35,55] Most studies (*n* = 11) considered 86 health states (UMI = 6, LMI = 4, LI = 1), with the health states ranging from 80 to 150. Two studies incorporated cultural and social adaptations to the TTO method. For example, Egyptian valuation replaced "wheelchair" with "migraine" and incorporated color codes to enhance respondent understanding,[23] whereas the Ethiopian study included "wearing glasses" or "being confined to bed" alongside "wheelchair" to improve respondents' understanding.[27]

The remaining 4 studies, all from China, focused on specific populations (eg, diabetes mellitus)[43] or reported differences in scoring algorithms among various groups.[44-46] For instance, one study explored health preference variations by demographic and cultural factors,[44] another compared value sets between urban and rural populations,[45] and the third derived a value set specifically for the rural Chinese population.[46]

Summary of Models to Derive Scoring Algorithms

Various statistical models were constructed across UMIC, LMIC, and LIC settings to derive EQ-5D-3L and EQ-5D-5L scoring algorithms (Table 2), including individual- and aggregate-level ordinary least squares (OLS), multilevel modeling, generalized least squares with random effects or fixed effects, residual maximum likelihood, 20-parameter linear main-effect models, and weighted least squares. For TTO models, the dependent variable was either the TTO score divided by 10 or 1 minus the observed TTO value. Hybrid models combined cTTO and DCE responses to derive scoring algorithms. Model selection was based on logical consistency, coefficient significance, AIC, BIC, and the comparison of predicted and observed TTO values using TTO values using mean absolute error (MAE) and root mean squared error.

Scoring Algorithms

EQ-5D-3L

Table 3 summarizes the scoring algorithms from the best-performing models from EQ-5D-3L valuation studies. The earliest UMI study, from Argentina (2009), used a TTO-based OLS 16-variable model (MAE: 0.039; scores: −0.380 to 0.931),[40] whereas the most recent, from Russia (2021), used a hybrid cTTO-and-DCE-based model corrected for heteroskedasticity(MAE 0.050; scores −0.574 to 1). Of 9 UMI studies, 5 (56%) used OLS models, (Table 3),[32,38,40,46,47] with others using individual-level mixed-effect model (MAE: 0.063),[36] an individual-level random-effect model (MAE: 0.035),[48] and a linear additive model (MAE: 0.032).[39]

Among the 7 LMIC studies, the earliest (2003) used residual maximum likelihood linear mixed model (MAD of 0.045; scores: −0.24 to 0.94).[41] The latest was published in 2024 in Jordan, used the EQ-VT protocol with cTTO and DCE,[18] and derived scoring algorithms from a hybrid model corrected for heteroskedasticity (MAE of 0.387) (Table 3).

Details of coefficients from best-performing models are presented in Table 3, with additional model coefficients available in Appendix Table 5 in Supplemental Materials found at https://doi.org/10.1016/i.vhri.2025.101505. Appendix Tables 4 and 6 in Supplemental Materials found at https://doi.org/10.1016/i.vhri.2025.101505 provide the overall mean and standard deviations of coefficients from best-performing models by country type. No significant differences were observed for any dimensions between UMIs and LMIs (*P* values ranged from .56 to .94).

EQ-5D-5L

The scoring algorithms from the best-performing models for EQ-5D-5L are summarized in Table 4, with additional models in Appendix Table 7 in Supplemental Materials found at https://doi.org/10.1016/i.vhri.2025.101505. Six UMI studies (2017-2021) developed scoring algorithms for the general population, with 3 (50%) using hybrid models,[30,33,34] 2 applied heteroscedastic models with censoring (*n* = 2),[25,29] and 1 used 8-parameter multiplicative model (MAE: 0.026 to 0.460). Reported health state values ranged from 1 to −0.865, with the lowest from Indonesia.[34] The percentage of reported negative health values, indicating health states worse than death, was below 10% in 3 studies,[30,33,35] whereas among the other 3 studies with over 10% negative values, Indonesia reported the highest at 35.4%.[34] Four studies reported the dimension with the greatest impact on

Table 2. Summary characteristics of the included studies.

Author (Year)	Country	Instrument	Population group	Age (years) (mean/ range)	Valuation protocol	Design	No of health states	Health states/ respondent	No. of models reported	Respondents	Sample analyzed, (%)	Mean interview (minutes)
UMIC-EQ-5D-3L												
Augustovksi et al[40]	Argentina	EQ-5D-3L	General adults	43.5	MVH protocol	TTO VAS	42 22	5-10 15	2	679	611 (90)	29.4 6.1
Santos et al[36]	Brazil	EQ-5D-3L	General adults	37.8	Revised MVH	TTO	74	7	8	NS	9148	NS
Viegas Andrade et al[48]	Brazil	EQ-5D-3L	General adults (urban)	18-64	Revised MVH	TTO	102	6	5	3362	3362 (100)	44
Viegas Andrade et al[42]	Brazil	EQ-5D-3L	General adults (urban)	18-64	Revised MVH	TTO	101	6	5	3362	3362 (100)	NS
Liu et al[38]	China	EQ-5D-3L	General adults (urban)	43.3	Revised MVH	TTO	97	12	6	1,222	1,147 (94)	43.1
Liu et al[46]	China	EQ-5D-3L	General adults (rural)	43.2	Revised MVH	TTO	97	15	6	1,201	1,173 (98)	NS
Zhuo et al[32]	China	EQ-5D-3L	General adults	15-97	Revised MVH	TTO	43	11	7	5939	5503 (63)	NS
Yusof et al[39]	Malaysia	EQ-5D-3L	General adults	41	MVH	TTO VAS	45 45	15 15	4	153	148 (97)	NS
Omelyanovskiy et al[24]	Russia	EQ-5D-3L	General adults	18-65+	EQ-PVT	cTTO DCE	27 60	10 10	4	313	300 (96)	23.7
Tongsiri and Cairns[47]	Thailand	EQ-5D-3L	General adults	44.6	MVH	TTO VAS	86 NS	10 11	3	1409	1409 (100)	NS
LMICs-EQ-5D-3L												
Goudarzi et al[50]	Iran	EQ-5D-3L	General adults	38.2	MVH	VAS	40	13	4	869	853 (98)	25
Goudarzi et al[31]	Iran	EQ-5D-3L	General adults	38.2	MVH	TTO	43	11	4	870	846 (97)	25
Al Rabayah et al[18]	Jordan	EQ-5D-3L	General adults	18-65+	EQ-VT 2.1	TTO DCE	28 60	10 10	9	301	300 (99.9)	52
Malik et al[52]	Pakistan	EQ-5D-3L	General adults	34.1	EQ-PVT	TTO DCE	28 60	10 10	6	300	289 (96.3%)	NS
Kularatna et al[37]	Sri Lanka	EQ-5D-3L	General adults	18-60+	MVH	TTO	198	15	9	780	736 (94)	NS
Chemli et al[26]	Tunisia	EQ-5D-3L	General adults	20-60+	EQ-VT 2.1	TTO DCE	28 60	10 10	7	327	300 (92)	NS
Jelsma et al[41]	Zimbabwe	EQ-5D-3L	General adults	15-65+	MVH	TTO	38	5	2	2500	2384 (95)	NS
UMIC- EQ-5D-5L												
Hao et al[43]	China	EQ-5D-5L	Adults with diabetes	57.3	Revised MVH	TTO	NS	NS	7	202	193 (96)	NS
Jin et al[44]	China	EQ-5D-5L	General adults	42.3	MVH protocol	cTTO DCE	86 196	10 14 (7 pairs)	4	1328	1296 (98)	31.9
Liao et al[45]	China	EQ-5D-5L	General adults (Urban, rural)	44.1	NS	TTO	30	15-16	4	597	597 (100)	39.4
Luo et al[35]	China	EQ-5D-5L	General adults (Urban)	18-60+	EQ-VT 1.0	TTO	86	10	4	1332	1296 (97)	NS
Wang et al[49]	China	EQ-5D-5L	General adults	37.5	EQ-VT	TTO DCE	NS NS	5 20	NA	405	339 (84)	NS
Purba et al[34]	Indonesia	EQ-5D-5L	General adults	17-70+	EQ-VT 2.0	TTO DCE	86 196	10 14 (7 pairs)	3	1117	1054 (94)	NS
Shafie et al[30]	Malaysia	EQ-5D-5L	General adults	18-65	EQ-VT	TTO DCE	86 196	10 14 (7 pairs)	4	1137	1125 (99)	NS
Gutierrez-Delgado et al[25]	Mexico	EQ-5D-5L	General adults	18-75+	EQ-VT 2.0	cTTO DCE	86 196	10 14 (7 pairs)	2	1032	1000 (97)	44.2
Augustovski et al[29]	Peru	EQ-5D-5L	General adults	45.6	EQ-VT-2.1	cTTO DCE	80 180	11 44 (22 pairs)	4	1000	1000 (100)	12
Pattanaphesaj et al[33]	Thailand	EQ-5D-5L	General adults	43.6	EQ-VT	cTTO DCE	86 196	10 14 (7 pairs)	3	1207	1207 (100)	NS
LMIC- EQ-5D-5L												
Al Shabasy et al[23]	Egypt	EQ-5D-5L	General adults	36.9	EQ-VT-2.1	cTTO DCE	86 196	10 14 (7 pairs)	9	1303	974 (75)	46
Addo et al[51]	Ghana	EQ-5D-5L	General adults	18-54+	EQ-VT-2.1	cTTO DCE	86 196	10 14 (7 pairs)	7	300	300 (100)	71.3
Afshari et al[19]	Iran	EQ-5D-5L	General adults	37.8	EQ-VT-2.0	cTTO, DCE	86 196	10 14 (7 pairs)	7	1179	1009 (86)	22
Jyani et al[22]	India	EQ-5D-5L	General adults	17-70+	EQ-VT version 2.1	cTTO DCE DCE	150 252 28	18 36 (18 pairs) 14 (7 pairs)	3	3548	2409 (68)	NS
Miguel et al[21]	Philippines	EQ-5D-5L	General adults	18-50+	EQ-VT 2.0	TTO DCE	86 196	10 14 (7 pairs)	4	1107	1000 (90)	NS
Mai et al[28]	Vietnam	EQ-5D-5L	General adults	18-60+	EQ-VT 2.1	cTTO DCE	100 28	10 14 (7 pairs)	6	1299	1200 (92)	NS

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Table 2. Continued

Author (Year)	Country	Instrument	Population group	Age (years) (mean/ range)	Valuation protocol	Design	No of health states	Health states/ respondent	No. of models reported	Respondents	Sample analyzed, (%)	Mean interview (minutes)
LIC- EQ-5D-5L												
Welie et al[27]	Ethiopia	EQ-5D-5L	General adults	18-65+	EQ-PVT 2.1	cTTO DCE	86 196	10 14	3	1050	1041 (99)	NS
Yang et al[20]	Uganda	EQ-5D-5L	General adults	38.6	EQ-VT	TTO	91	20	6	545	492 (90)	NS

utility decrement, with Mobility being the most significant (n = 3),[30,33,34] followed by Pain/Discomfort.[25]

Six LMI studies published between 2020 and 2024 reported EQ-5D-5L valuation. Four studies used hybrid models combining cTTO and DCE,[19,22,28,51] whereas 2 used TTO-based models: one used a heteroskedastic model with constraints (MAE: 0.360),[23] and other used a homoscedastic 8-parameter model.[21] The health state values ranged from −1.19 to 1, with the lowest reported in Egypt.[23] The proportion of negative values was lowest in the Philippines (5.4%)[21] and Vietnam (8.3%)[28] but higher in Iran (53.6%),[19] Egypt (35.9%),[23] and India (28.0%).[22] Mobility was the most influential dimension in Iran,[19] Vietnam,[28] Egypt,[23] the Philippines,[21] and Ghana,[51] whereas pain/discomfort was most influential in India.[22]

The review identified 2 valuation studies in LIs, conducted in Uganda and Ethiopia.[20,27] Ethiopia used a hybrid censored model with health states ranging from −0.718 to 1, with 11% negative values.[27] Uganda used a Tobit heteroscedastic model (cTTO, MAE 0.075) with health states from −1.16 to 1 and 44.3% negative states.[20] Anxiety/depression was most influential dimension in Ethiopia and pain/discomfort in Uganda.

Details of scoring algorithms for all EQ-5D-5L dimensions and levels are presented in Table 5 and Appendix Table 6 in Supplemental Materials found at https://doi.org/10.1016/i.vhri.2025.101505 with overall mean coefficients with standard deviations in Table 4 and Appendix Table 8 in Supplemental Materials found at https://doi.org/10.1016/i.vhri.2025.101505. No significant differences were found between coefficients between UMI, LMI, and LI countries, except for level 4 of the pain/discomfort dimension (P value = .023), P values for other dimensions ranged from 0.093 to 0.925.

Of the 27 studies reporting funding sources, approximately half (n = 14) were cofunded by the EuroQol Group, UK Research and Innovation, academic institutions, national sponsors (including government agencies and universities), and the WHO. The remaining studies (n = 13) were primarily supported by local entities, including national ministries, research institutes, and higher-degree scholarships or fellowships.

Table 3. Summary of scoring algorithms for EQ-5D-3L reported from the best-performing models in the included studies.

Authors (references)	Best performing model	R/R-squared	MAE/ MAD	Constant	MO2	MO3	SC2	SC3	UA2	UA3	PD2	PD3	AD2	AD3
UMI (N = 9)														
Augustovksi et al[40]	OLS	0.897	0.039	None	0.189	0.272	0.128	0.209	0.111	0.067	0.130	0.209	0.082	0.135
Liu et al[38]	OLS (N3 model at aggregate level)	0.479	0.020	0.041	0.097	0.249	0.104	0.212	0.073	0.197	0.092	0.242	0.086	0.210
Liu et al[46]	OLS (N3 model at aggregate level)	0.993	0.017	0.067	0.101	0.275	0.103	0.239	0.086	0.217	0.110	0.232	0.074	0.172
Omelyanovskiy et al[24]	Hybrid corrected for heteroskedasticity	NA	0.050	None	0.041	0.458	0.075	0.246	0.073	0.242	0.066	0.377	0.041	0.179
Santos et al[36]	ME Model without Constant	0.47	0.063	None	−0.160	−0.393	−0.156	−0.246	−0.091	−0.141	−0.217	−0.200	−0.098	−0.130
Tongsiri et al[33]	OLS (Dolan 1997 model)	0.448	0.080	0.202	0.121	0.190	0.121	0.190	0.072	0.065	0.072	0.065	0.032	0.046
Viegas Andrade et al[48]	Individual level RE	0.364	0.035	None	0.127	0.403	0.121	0.246	0.095	0.205	0.067	0.200	0.061	0.113
Yusof et al[39]	Linear additive regression with N3	0.757	0.032	0.933	−0.084	−0.191	−0.097	−0.160	−0.053	−0.122	−0.054	−0.127	−0.081	−0.086
Zhuo et al[32]	OLS (without N3 and constant)	0.899	0.084	None	−0.077	−0.267	−0.044	−0.291	−0.037	−0.054	−0.027	−0.041	−0.036	−0.177
LMI (N=7)														
Al Rabayah et al[18]	Hybrid corrected for heteroskedasticity	NA	0.387	None	0.119	0.503	0.174	0.290	0.090	0.135	0.085	0.295	0.101	0.340
Chemli et al[26]	HET corrected for heteroskedasticity	NA	0.341	None	0.076	0.597	0.165	0.340	0.078	0.251	0.057	0.276	0.095	0.332
Goudarzi et al[50]	GLS ME (without N3)	0.550	0.200	0.106	0.099	0.156	0.199	0.246	0.147	0.242	0.103	0.207	0.143	0.254
Goudarzi et al[31]	GLS RE (without N3)	0.452	0.214	0.081	0.093	0.220	0.103	0.235	0.085	0.127	0.075	0.149	0.098	0.205
Jelsma et al[41]	Linear mixed model		0.049	0.900	−0.056	−0.204	−0.092	−0.231	−0.043	−0.135	−0.067	−0.302	−0.046	−0.173
Kularatna et al[37]	GLS RE (without N3)	NS	0.073	0.848	−0.166	−1.071	−0.119	−0.337	−0.071	−0.419	−0.057	−0.300	−0.044	−0.194
Malik et al[52]	Hybrid (no constant)	NA	0.202	None	0.033	0.321	0.055	0.267	0.038	0.342	0.007	0.245	0.010	0.209

Note. MO2 = 1 if mobility level = 2, 0 otherwise; MO3 = 1 if mobility level = 3, 0 otherwise. SC2 = 1 if self-care level = 2, 0 otherwise; SC3 = 1 if self-care level = 3, 0 otherwise. UA2 = 1 if usual activities level=2, 0 otherwise; UA3 = 1 if usual activities level = 3, 0 otherwise. PD2 = 1 if pain/discomfort level = 2, 0 otherwise; PD3 = if pain/discomfort level = 3, 0 otherwise. AD2 = 1 if anxiety/depression level = 2, 0 otherwise; AD3 = 1 if anxiety/depression level =3, 0 otherwise. N3 = 1 if any dimension level =3, 0 otherwise.
GLS indicates generalized least squares; MAD, mean absolute difference; MAE, mean absolute error; ME, mixed effects model; NS, not clearly stated; OLS, ordinary least squares; RE, random effects model.

Table 4. Summary of scoring algorithms for EQ-5D-5L reported from the best-performing models in the included studies.

Author	Model	MO2	MO3	MO4	MO5	SC2	SC3	SC4	SC5	UA2	UA3	UA4	UA5	PD2	PD3	PD4	PD5	AD2	AD3	AD4	AD5
UMI countries (n = 6)																					
Augustovski et al[29]	Heteroskedastic censored	0.104	0.119	0.089	0.161	0.117	0.097	0.050	0.091	0.143	0.014	0.074	0.116	0.072	0.060	0.155	0.189	0.123	0.003	0.062	0.234
Gutierrez-Delgado et al[25]	Heteroskedastic censored	0.016	0.047	0.179	0.270	0.048	0.082	0.170	0.259	0.055	0.095	0.180	0.276	0.053	0.081	0.228	0.458	0.055	0.082	0.161	0.334
Luo et al[35]	8-parameter multiplicative	0.058	0.139	0.253	0.303	0.043	0.102	0.185	0.222	0.039	0.094	0.171	0.205	0.051	0.122	0.221	0.266	0.043	0.104	0.189	0.227
Pattanaphesaj et al[33]	Hybrid model	0.066	0.087	0.211	0.371	0.058	0.071	0.193	0.250	0.058	0.071	0.154	0.248	0.056	0.067	0.207	0.256	0.058	0.096	0.233	0.295
Purba et al[34]	Hybrid model	0.119	0.073	0.218	0.203	0.101	0.039	0.108	0.068	0.090	0.066	0.145	0.084	0.086	0.009	0.103	0.048	0.079	0.055	0.093	0.078
Shafie et al[30]	Hybrid model	0.081	0.108	0.261	0.340	0.062	0.083	0.200	0.261	0.048	0.064	0.155	0.202	0.081	0.107	0.259	0.338	0.072	0.095	0.230	0.300
LMI countries (n = 6)																					
Addo et al[51]	Hybrid Tobit heteroscedastic-constrained	0.062	0.075	0.230	0.372	0.055	0.094	0.240	0.288	0.032	0.078	0.183	0.276	0.057	0.089	0.230	0.331	0.022	0.080	0.208	0.272
Afshari et al[19]	Heteroskedastic censored (hybrid)	0.179	0.267	0.352	0.612	0.102	0.123	0.235	0.382	0.073	0.119	0.175	0.302	0.120	0.239	0.368	0.485	0.084	0.219	0.339	0.409
Al Shabasy et al[23]	Heteroskedastic with constraint	0.074	0.208	0.401	0.604	0.053	0.106	0.248	0.283	0.052	0.078	0.230	0.230	0.054	0.106	0.274	0.434	0.054	0.181	0.331	0.413
Jyani et al[22]	Heteroskedastic censored (hybrid)	0.050	0.049	0.155	0.133	0.051	0.079	0.171	0.078	0.046	0.043	0.153	0.082	0.051	0.074	0.264	0.195	0.016	0.046	0.101	0.084
Mai et al[28]	Hybrid model	0.069	0.079	0.206	0.376	0.043	0.046	0.147	0.231	0.046	0.059	0.174	0.299	0.084	0.152	0.270	0.367	0.064	0.113	0.171	0.239
Miguel et al[21]	8-parameter multiplicative	0.021	0.004	0.161	0.3	0.031	0.045	0.196	0.292	0.036	0.066	0.178	0.258	0.047	0.063	0.279	0.343	0.016	0.059	0.133	0.214
LI countries (n = 2)																					
Welie et al[27]	Hybrid model	0.034	0.031	0.163	0.132	0.024	0.016	0.102	0.080	0.032	0.016	0.109	0.115	0.036	0.016	0.219	0.136	0.026	0.059	0.214	0.159
Yang et al[20]	Heteroskedastic tobit	0.073	0.146	0.245	0.376	0.068	0.110	0.240	0.354	0.060	0.081	0.243	0.306	0.082	0.138	0.580	0.798	0.050	0.127	0.235	0.282

Note. MO2 = 1 if mobility level = 2, 0 otherwise; MO3 = 1 if mobility level = 3, 0 otherwise; MO4 = 1 if mobility level = 4, 0 otherwise; MO5 = 1 if mobility level = 5, 0 otherwise. SC2 = 1 if self-care level = 2, 0 otherwise; SC3 = 1 if self-care level = 3, 0 otherwise; SC4 = 1 if self-care level = 4, 0 otherwise; SC5 = 1 if self-care level = 5, 0 otherwise. UA2 = 1 if usual activities level = 2, 0 otherwise; UA3 = 1 if usual activities level = 3, 0 otherwise; UA4 = 1 if usual activities level = 4, 0 otherwise; UA5 = 1 if usual activities level = 5, 0 otherwise. PD2 = 1 if pain/discomfort level = 2, 0 otherwise; PD3 = if pain/discomfort level = 3, 0 otherwise; PD4 = if pain/discomfort level = 4, 0 otherwise; PD5 = if pain/discomfort level = 5, 0 otherwise. AD2 = 1 if anxiety/depression level = 2, 0 otherwise; AD3 = 1 if anxiety/depression level = 3, 0 otherwise; AD4 = 1 if anxiety/depression level = 4, 0 otherwise; AD5 = 1 if anxiety/depression level = 5, 0 otherwise.

Discussion

This systematic review summarized evidence on EQ-5D valuation studies for adults conducted in low-, lower-middle-, and UMICs, identifying 35 studies across 22 countries. With over 120 LMICs globally, findings suggest that more than 100 countries still lack a national value set, highlighting a significant gap in country-specific value set development. Consistent with prior review,[5] findings from this review indicate that UMICs are more advanced in generating evidence to inform resource allocation. Notably, 57% (n = 20) studies were conducted in UMICs, predominantly from China (n = 8), suggesting that valuation research remains concentrated in a few countries despite recent expansion. This review identified very few EQ-5D value sets for specific populations (eg, disease conditions) or demographic groups (eg, geographic variations), all conducted in a single country (China). In contrast, a prior review on health state valuations in LMICs using multiple instruments reported more studies focused on specific populations. Although it is unclear whether this reflects a limitation of the EQ-5D or current research practices, these findings indicate that the instrument has mainly been used to generate general population value sets in these settings. It is important to acknowledge that most EQ-5D-5L valuation studies from LMI and LICs have been published since 2020, indicating their emerging presence in the field and development of scoring algorithms; however, only 5L valuations are being conducted. Although there may be arguments for exclusive use of 5L version, this review suggests developing a 3L value set to ensure inclusivity across various population segments, considering the social and demographic contexts of LMICs and LICs.

The review found that all included studies aligned with to the EuroQol Group's recommended protocols.[11-13] For EQ-5D-3L valuations, most studies utilized the MVH/Paris protocol to derive scores for 243 states. Although Tsuchiya et al[56] recommended valuing a subset of 17 states to reduce respondent burden, the selection criteria were unclear. Both MVH and Tsuchiya's approaches were criticized because of uncertainty around extrapolated values.[57] The Paris protocol suggests valuing 97 to 101 health states,[12] which most studies in this review followed. Previous studies argued that it is feasible to directly value all EQ-5D-3L health states,[36,57] and 2 studies in this review followed this method.[36,37] A prior review of EQ-5D-3L predominantly from HICs, reported valued health states ranging from 7 to 198,[9] whereas this review found less variation with LMICs studies valuing most health states to strengthen methodology. The number of health states valued per respondent in TTO designs[5-20] also showed less variation than previously reported.[9] Although directly valuing most health states would be ideal, a prior review stressed the need to reduce the time burden for respondents to under 30 minutes, considering LMIC contexts.[5] With HTA expansion in LMICs, several studies in this review adopted smaller sample (≤400) to ease respondent burden in intensive procedures, such as cTTO and DCE,[18,20,24,26,29,51,52] which are

Table 5. Descriptive summary of scoring algorithms for EQ-5D-3L and EQ-5D-5L.

Statistic	MO2	MO3	MO4	MO5	SC2	SC3	SC4	SC5	UA2	UA3	UA4	UA5	PD2	PD3	PD4	PD5	AD2	AD3	AD4	AD5
EQ-5D-3L (*N* = 16)																				
UMI (*n* = 9)																				
Mean	0.039	0.111			0.039	0.072			0.037	0.075			0.027	0.106			0.106	0.051		
SD	0.119	0.311			0.109	0.231			0.076	0.15			0.109	0.193			0.071	0.146		
LMI (*n* = 7)																				
Mean	0.009	−0.06			0.051	0.051			0.039	0.013			0.022	0.006			0.049	0.085		
SD	0.117	0.632			0.148	0.31			0.92	0.287			0.079				0.088	0.249		
Overall 3L (*n* = 16)																				
Mean	0.029	0.05			0.044	0.064			0.038	0.053			0.025	0.071			0.029	0.063		
SD	0.114	0.435			0.118	0.25			0.078	0.201			0.096	0.224			0.076	0.18		
EQ-5D-5L (*N* = 14)																				
UMI (*n* = 6)																				
Mean	0.074	0.095	0.202	0.275	0.072	0.079	0.151	0.192	0.072	0.067	0.146	0.189	0.067	0.074	0.196	0.259	0.072	0.072	0.161	0.245
SD	0.036	0.033	0.063	0.081	0.03	0.023	0.059	0.088	0.039	0.03	0.038	0.075	0.015	0.044	0.057	0.138	0.028	0.038	0.071	0.091
LMI (*n* = 6)																				
Mean	0.079	0.121	0.255	0.405	0.056	0.08	0.199	0.253	0.051	0.073	0.182	0.234	0.071	0.127	0.291	0.365	0.047	0.124	0.215	0.272
SD	0.06	0.111	0.114	0.205	0.027	0.035	0.042	0.112	0.014	0.029	0.029	0.09	0.031	0.072	0.043	0.11	0.03	0.075	0.112	0.14
LI (*n* = 2)																				
Mean	0.053	0.088	0.204	0.254	0.046	0.063	0.171	0.217	0.046	0.049	0.176	0.21	0.059	0.077	0.399	0.467	0.038	0.093	0.224	0.221
SD	0.028	0.082	0.058	0.172	0.031	0.066	0.097	0.193	0.02	0.046	0.095	0.135	0.032	0.087	0.255	0.468	0.017	0.048	0.015	0.087
Overall 5L (*n* = 14)																				
Mean	0.073	0.104	0.223	0.328	0.062	0.077	0.173	0.219	0.06	0.067	0.165	0.21	0.067	0.091	0.264	0.332	0.057	0.095	0.192	0.251
SD	0.043	0.073	0.083	0.155	0.029	0.032	0.058	0.107	0.029	0.044	0.171	0.084	0.023	0.061	0.114	0.191	0.029	0.057	0.085	0.105

Note. MO2 = 1 if mobility level = 2, 0 otherwise; MO3 = 1 if mobility level=3, 0 otherwise; MO4 = 1 if mobility level=4, 0 otherwise; MO5 = 1 if mobility level = 5, 0 otherwise. SC2 = 1 if self-care level = 2, 0 otherwise; SC3 = 1 if self-care level =3, 0 otherwise; SC4 = 1 if self-care level = 4, 0 otherwise; SC5 = 1 if self-care level =5, 0 otherwise. UA2 = 1 if usual activities level=2, 0 otherwise; UA3 = 1 if usual activities level = 3, 0 otherwise; UA4 = 1 if usual activities level = 4, 0 otherwise; UA5 = 1 if usual activities level = 5, 0 otherwise. PD2 = 1 if pain/discomfort level = 2, 0 otherwise; PD3 = if pain/discomfort level = 3, 0 otherwise; PD4 = if pain/discomfort level = 4, 0 otherwise; PD5 = if pain/discomfort level = 5, 0 otherwise. AD2 = 1 if anxiety/depression level = 2, 0 otherwise; AD3 = 1 if anxiety/depression level =3, 0 otherwise; AD4 = 1 if anxiety/depression level = 4, 0 otherwise; AD5 = 1 if anxiety/depression level = 5, 0 otherwise.

challenging at the EQ-VT recommended size of 1000. Studies with "smaller sample" approach strongly recommended this approach in similar settings. Additionally, recent evidence suggests that smaller designs (eg, TTO only) perform well with no significant increase in predicting errors, making them suitable for resource-constrained contexts.[55]

The review also highlights the importance of adapting protocols to align with a country's social, cultural, and religious contexts as reported by Egypt and Ethiopia.[23,27] Both studies recommended modifying the initial health state by incorporating alternatives to wheelchair scenarios (eg, migraine) could be beneficial in similar settings. Additionally, they recommended coding or pictorial representations of severity levels to assist respondents with limited literacy.[27,58] Many LMICs reported a high proportion of negative health states, with over 30% of respondents in five studies assigning values worse than death. Additionally, Limited access to social health insurance in LMICs, particularly in Asia, may heighten the significance of the mobility dimension, as reflected in the wheelchair example in Egypt and more negative values observed in other Asian countries. This raises concerns about respondents' understanding of health state valuation, highlighting the need for pilot interviews that consider socio-economic contexts. This is clearly within the scope of future work in this area to address these challenges in socio-economic and cultural contexts. Therefore, further research is recommended to ensure both inclusivity and accuracy. This review found that an average of 92% of interviews were analyzable. In India, however, only 68% were analyzable because of a high number of pilot interviews (788), given the low literacy rate and cognitively demanding nature of the interviews.[22] Similarly, Egypt excluded over 300 pilot interviews.[23] Both countries excluded a significant number of interviews because of factors such as lack of understanding, religious beliefs, interview length, and interaction challenges. In Ethiopia, pictorial representations were used for illiterate and less-educated respondents,[27] whereas some studies (eg, Tunisia) excluded illiterate participants.[26] These findings suggest that extensive piloting and adaptation can improve data reliability in LMICs with varying literacy and cultural sensitivities. The review found no significant difference in EQ-5D-3L scores between LMICs and UMICs. For the EQ-5D-5L, significant variation was observed only in the pain/Discomfort dimension, likely because of its greater sensitivity and reduced ceiling effects compared with the 3L version. Although not significant, the relatively high standard deviation for a few dimension levels (eg, MO3, PD4) suggests varying emphasis between dimensions across countries. In contrast, a previous review in HICs reported significant differences, with a median index difference of 0.42 across health states.[59] Future research should further explore these contextual differences and compare value set elicitation between HICs and LMICs.

Funding for valuation studies shows significant contributions from HICs and international partners, such as the EuroQol Group, alongside substantial local leadership and funding. This reflects growing domestic capacity and interest in producing context-specific utility data, enhancing the relevance of health economic evaluations in LMICs.

Limitations

This review has several limitations. First, the search was conducted using selected academic databases and excluded gray literature, which may have led to the omission of relevant studies. Additionally, this review focused exclusively on EQ-5D valuation studies conducted with adult populations using adult-specific instruments. Studies involving the valuation of EQ-5D-Y instrument for youth population were excluded because of important methodological and conceptual differences in how youth health states are valued. Including youth studies would have limited the comparability of findings across the adult-focused literature. The exclusion of non-English journals introduces the potential for selection bias. Given the review's aim to provide general evidence on value sets in LMICs, the findings were reported broadly rather than critically analyzed in depth. Furthermore, comparisons between studies regarding participant recruitment and sampling methods were limited because the studies followed the EuroQol protocol for deriving value sets and provided limited information on recruitment strategies and sampling methods.

Despite these limitations, this review provides a robust synthesis of peer-reviewed EQ-5D valuation studies in LMICs, highlighting key trends, gaps, and future research opportunities. The structured methods and systematic reporting enhance the relevance of findings for researchers and policymakers in resource-constrained settings.

Conclusions

This review highlights a rising trend in LMICs in developing country-specific value sets in recent years, although evidence remains limited. Strong adherence to EuroQol protocols and similar scoring algorithms were found across UMI and LMI countries. In resource-constrained contexts, simplified design with smaller samples could be a valuable approach for certain countries. Given the diverse cultural and socio-demographic characteristics in these regions, the review also recommends pilot interviews and qualitative measures to ensure participant understanding, along with potential adaptations in deriving value sets.

Author Disclosures

Author disclosure forms can be accessed below in the Supplemental Material section.

Supplemental Material

Supplementary data associated with this article can be found in the online version at https://doi.org/10.1016/i.vhri.2025.101505 .

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REFERENCES

1. World Health Organization. Global Survey on Health Technology Assessment by National Authorities: Main Findings. https://www.who.int/publications/i/item/9789241509749; 2015. Accessed December 16, 2023.
2. Poder TG, Bellemare CA. Importance of contextual data in producing health technology assessment recommendations: a case study. *Int J Technol Assess Health Care*. 2018;34(1):63–67.
3. Drummond M, Sculpher MJ, Claxton K, et al. *Methods for the Economic Evaluation of Health Care Programmes*. 4th ed. Oxford, England: Oxford University Press; 2015.
4. Excellence NIfHaC. Developing NICE guidelines: the manual. https://www.ncbi.nlm.nih.gov/books/NBK310375/; Published 2023. Accessed December 6, 2023.
5. Kularatna S, Whitty JA, Johnson NW, Scuffham PA. Health state valuation in low- and middle-income countries: a systematic review of the literature. *Value Health*. 2013;16(6):1091–1099.
6. Scuffham PA, Whitty JA, Mitchell A, Viney R. The use of QALY weights for QALY calculations: a review of industry submissions requesting listing on the Australian Pharmaceutical Benefits Scheme 2002-4. *Pharmacoeconomics*. 2008;26(4):297–310.
7. EuroQol EQG. a new facility for the measurement of health-related quality of life. *Health Policy*. 1990;16(3):199–208.
8. EuroQoL EQ. About. https://euroqol.org/about-us/; Published 2021. Accessed December 21, 2024.
9. Xie F, Gaebel K, Perampaladas K, Doble B, Pullenayegum E. Comparing EQ-5D valuation studies: a systematic review and methodological reporting checklist. *Med Decis Mak*. 2014;34(1):8–20.
10. Bernert S, Fernandez A, Haro JM, et al. Comparison of different valuation methods for population health status measured by the EQ-5D in three European countries. *Value Health*. 2009;12(5):750–758.
11. Oppe M, Devlin NJ, van Hout B, Krabbe PFM, De Charro F. A program of methodological research to arrive at the new international EQ-5D-5L valuation protocol. *Value Health*. 2014;17(4):445–453.
12. Oppe M, Rand-Hendriksen K, Shah K, Ramos-Goñi JM, Luo N. EuroQol protocols for time trade-off valuation of health outcomes. *Pharmacoeconomics*. 2016;34(10):993–1004.
13. Stolk E, Ludwig K, Rand K, Van Hout B, Ramos-Goñi JM. Overview, update, and lessons learned from the international EQ-5D-5L valuation work: Version 2 of the EQ-5D-5L Valuation Protocol. *Value Health*. 2019;22(1):23–30.
14. Norman R, Cronin P, Viney R, King M, Street D, Ratcliffe J. International comparisons in valuing EQ-5D health states: a review and analysis. *Value Health*. 2009;12(8):1194–1200.
15. Xie F, Pickard AS, Krabbe PF, et al. A checklist for reporting valuation studies of multi-attribute utility-based instruments (CREATE). *Pharmacoeconomics*. 2015;33(8):867–877.
16. World Bank Blogs. New World Bank country classifications by income level: 2022-2023. https://blogs.worldbank.org/en/opendata/new-world-bank-country-classifications-income-level-2022-2023. Accessed August 2023.
17. Covidence. https://www.covidence.org. Accessed August 25, 2025.

18. Al Rabayah A, Roudijk B, Purba FD, Rencz F, Jaddoua S, Siebert U. Valuation of the EQ-5D-3L in Jordan. *Eur J Health Econ*. 2025;26(3):487–501.
19. Afshari S, Daroudi R, Goudarzi R, et al. A national survey of Iranian general population to estimate a value set for the EQ-5D-5L. *Qual Life Res*. 2023;32(7):2079–2087.
20. Yang F, Katumba KR, Roudijk B, et al. Developing the EQ-5D-5L value set for Uganda using the 'lite' protocol. *Pharmacoeconomics*. 2022;40(3):309–321.
21. Miguel RTD, Rivera AS, Cheng KJG, et al. Estimating the EQ-5D-5L value set for the Philippines. *Qual Life Res*. 2022;31(9):2763–2774.
22. Jyani G, Sharma A, Prinja S, et al. Development of an EQ-5D value set for India using an extended design (DEVINE) study: the Indian 5-level version EQ-5D value set. *Value Health*. 2022;25(7):1218–1226.
23. Al Shabasy S, Abbassi M, Finch A, Roudijk B, Baines D, Farid S. The EQ-5D-5L valuation study in Egypt. *Pharmacoeconomics*. 2022;40(4):433–447.
24. Omelyanovskiy V, Musina N, Ratushnyak S, et al. Valuation of the EQ-5D-3L in Russia. *Qual Life Res*. 2021;30(7):1997–2007.
25. Gutierrez-Delgado C, Galindo-Suarez RM, Cruz-Santiago C, et al. EQ-5D-5L health-state values for the Mexican population. *Appl Health Econ Health Policy*. 2021;19(6):905–914.
26. Chemli J, Drira C, Felfel H, et al. Valuing health-related quality of life using a hybrid approach: Tunisian value set for the EQ-5D-3L. *Qual Life Res*. 2021;30(5):1445–1455.
27. Welie AG, Gebretekle GB, Stolk E, et al. Valuing health state: an EQ-5D-5L value set for Ethiopians. *Value Health Reg Issues*. 2020;22:7–14.
28. Mai VQ, Sun S, Minh HV, et al. An EQ-5D-5L value set for Vietnam. *Qual Life Res*. 2020;29(7):1923–1933.
29. Augustovski F, Belizan M, Gibbons L, et al. Peruvian valuation of the EQ-5D-5L: A direct comparison of time trade-off and discrete choice experiments. *Value Health*. 2020;23(7):880–888.
30. Shafie AA, Vasan Thakumar A, Lim CJ, Luo N, Rand-Hendriksen K, Md Yusof FA. EQ-5D-5L valuation for the Malaysian population. *Pharmacoeconomics*. 2019;37(5):715–725.
31. Goudarzi R, Sari AA, Zeraati H, Rashidian A, Mohammad K, Amini S. Valuation of quality weights for EuroQol 5-dimensional health states with the time trade-off method in the capital of Iran. *Value Health Reg Issues*. 2019;18:170–175.
32. Zhuo L, Xu L, Ye J, et al. Time trade-off value set for EQ-5D-3L based on a nationally representative Chinese population survey. *Value Health*. 2018;21(11):1330–1337.
33. Pattanaphesaj J, Thavorncharoensap M, Ramos-Goni JM, Tongsiri S, Ingsrisawang L, Teerawattananon Y. The EQ-5D-5L Valuation study in Thailand. *Expert Rev Pharmacoecon Outcomes Res*. 2018;18(5):551–558.
34. Purba FD, Hunfeld JAM, Iskandarsyah A, et al. The Indonesian EQ-5D-5L value set. *Pharmacoeconomics*. 2017;35(11):1153–1165.
35. Luo N, Liu G, Li M, Guan H, Jin X, Rand-Hendriksen K. Estimating an EQ-5D-5L value set for China. *Value Health*. 2017;20(4):662–669.
36. Santos M, Cintra MA, Monteiro AL, et al. Brazilian valuation of EQ-5D-3L health states: results from a saturation study. *Med Decis Mak*. 2016;36(2):253–263.
37. Kularatna S, Whitty JA, Johnson NW, Jayasinghe R, Scuffham PA. Valuing EQ-5D health states for Sri Lanka. *Qual Life Res*. 2015;24(7):1785–1793.
38. Liu GG, Wu H, Li M, Gao C, Luo N. Chinese time trade-off values for EQ-5D health states. *Value Health*. 2014;17(5):597–604.
39. Yusof FA, Goh A, Azmi S. Estimating an EQ-5D value set for Malaysia using time trade-off and visual analogue scale methods. *Value Health*. 2012;15(1 suppl):S85–S90.
40. Augustovski FA, Irazola VE, Velazquez AP, Gibbons L, Craig BM. Argentine valuation of the EQ-5D health states. *Value Health*. 2009;12(4):587–596.
41. Jelsma J, Hansen K, De Weerdt W, De Cock P, Kind P. How do Zimbabweans value health states? *Popul Health Metr*. 2003;1(1):11.
42. Andrade MV, Noronha K, Kind P, Reis Cde B, De Carvalho LR. Logical inconsistencies in 3 preference elicitation methods for EQ-5D health states: a study in the Brazilian population. *Med Decis Mak*. 2016;36(2):242–252.
43. Hao S, Heintz E, Helgesson G, Langenskiöld S, Chen J, Burström K. Influence of elicitation procedure and phrasing on health state valuations in experience-based time trade-off tasks among diabetes patients in China. *Qual Life Res*. 2020;29(1):289–301.
44. Jin X, Liu GG, Luo N, Li H, Guan H, Xie F. Is bad living better than good death? Impact of demographic and cultural factors on health state preference. *Qual Life Res*. 2016;25(4):979–986.
45. Liao M, Luo N, Rand K, Yang Z. Urban/rural differences in preferences for EQ-5D-5L health states: a study of a multi-ethnic region in China. *Qual Life Res*. 2023;32(8):2329–2339.
46. Liu GG, Guan H, Jin X, Zhang H, Vortherms SA, Wu H. Rural population's preferences matter: a value set for the EQ-5D-3L health states for China's rural population. *Health Qual Life Outcomes*. 2022;20(1):14.
47. Tongsiri S, Cairns J. Estimating population-based values for EQ-5D health states in Thailand. *Value Health*. 2011;14(8):1142–1145.
48. Viegas Andrade M, Noronha K, Kind P, et al. Societal preferences for EQ-5D health states from a Brazilian population survey. *Value Health Reg Issues*. 2013;2(3):405–412.
49. Wang P, Li MH, Liu GG, Thumboo J, Luo N. Do Chinese have similar health-state preferences? A comparison of mainland Chinese and Singaporean Chinese. *Eur J Health Econ*. 2015;16(8):857–863.
50. Goudarzi R, Zeraati H, Akbari Sari A, Rashidian A, Mohammad K. Population-based preference weights for the EQ-5D health states using the visual analogue scale (VAS) in Iran. *Iran Red Crescent Med J*. 2016;18(2):e21584.
51. Addo R, Mulhern B, Norman R, Owusu R, Viney R, Nonvignon J. An EQ-5D-5L value set for Ghana using an adapted EuroQol valuation technology protocol. *Value Health Reg Issues*. 2024;45:101045.
52. Malik M, Gu NY, Hussain A, Roudijk B, Purba FD. The EQ-5D-3L valuation study in Pakistan. *Pharmacoecon Open*. 2023;7(6):963–974.
53. Yang F, Katumba KR, Greco G, et al. Incorporating concern for health equity into resource allocation decisions: development of a tool and population-based valuation for Uganda. *Value Health Reg Issues*. 2022;31:134–141.
54. Devlin N, Roudijk B, Viney R, Stolk E. EQ-5D-Y-3L value sets, valuation methods and conceptual questions. *Pharmacoeconomics*. 2022;40(suppl 2):123–127.
55. Yang Z, Luo N, Oppe M, Bonsel G, Busschbach J, Stolk E. Toward a smaller design for EQ-5D-5L valuation studies. *Value Health*. 2019;22(11):1295–1302.
56. Tsuchiya A, Ikeda S, Ikegami N, et al. Estimating an EQ-5D population value set: the case of Japan. *Health Econ*. 2022;11(4):341–353.
57. Viney R, Norman R, King MT, et al. Time trade-off derived EQ-5D weights for Australia. *Value Health*. 2011;14(6):928–936.
58. Al Shabasy S, Abbassi M, Farid S. EQ-VT protocol: one-size-fits-all? Challenges and innovative adaptations used in Egypt: a cross-sectional study. *BMJ Open*. 2021;11(12):e051727.
59. Gerlinger C, Bamber L, Leverkus F, et al. Comparing the EQ-5D-5L utility index based on value sets of different countries: impact on the interpretation of clinical study results. *BMC Res Notes*. 2019;12(1):18.