Valuing EQ-5D-Y-3L Health States using composite Time-Trade off values in Taiwan

Hsiang-Wen Lin, Yeng-Ming Huang, Siang-Hao Cheng, Hao-Ping Chiang, Pin-Hsuan Liao, Jen-Yu Amy Chang, Chia-Ing Li, Chien-Ning Hsu

1. School of Pharmacy and Graduate Institute, China Medical University (CMU), 2. James L. Winkle College of Pharmacy, University of Cincinnati, Cincinnati, Ohio, 3. College of Medicine, CMU, 4. Department of Pharmacy, CMU hospital, 5. Department of Chinese Pharmaceutical Sciences and Chinese Medicine Resources, CMU 6. Department of Nutrition , CMU, 7. Department of Pharmacy, National Taiwan University

Background and Objective

Background: Given the absence of a locally derived value set for pediatric health-related quality of life (HRQoL) instruments in Taiwan, we conducted the first EQ-5D-Y-3L valuation study across cities in Taiwan. This study followed the standardized protocol of a multi-country EQ-5D-Y-3L valuation initiative in Asia.

Research aim: to explore the feasibility of generating a preliminary value set for EQ-5D-Y-3L health states based on the composite Time Trade-Off (cTTO) method.

Methods

- **Study subjects:** A total of 200 adults were recruited through stratified sampling by gender and age from four major regions in Taiwan.
- **Interview process:** Each participant completed face-to-face interviews and was asked to evaluate randomly 10 out of 28 EQ-5D-Y-3L health states for a hypothetical 10-year-old child from a proxy perspective using the cTTO elicitation method.
- **Data analysis:** We examined the characteristics and distribution of the collected data and applied several modeling approaches, including Ordinary Least Squares (OLS), Generalized Least Squares (GLS), Tobit models censored at -1, and Tobit GLS models censored at -1 (with and without intercepts).
- **Model performance:** compared using root mean square error (RMSE), mean absolute error (MAE), log-likelihood, Akaike Information Criterion (AIC), and Bayesian Information Criterion (BIC) to identify the optimal model.

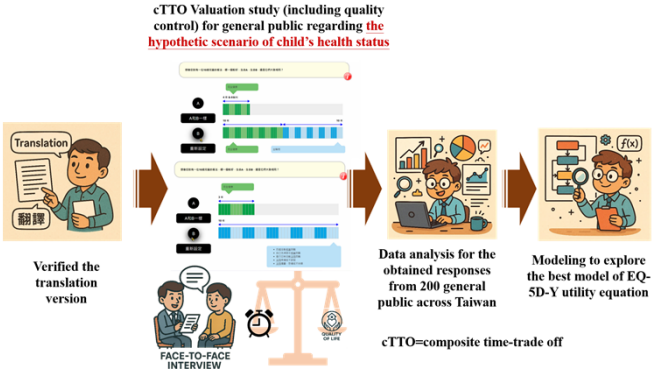

Figure 1. Implementation process to explore the feasibility of generating a preliminary value set for EQ-5D-Y-3L health states based on the composite Time Trade-Off (cTTO) method in Taiwan .

Results

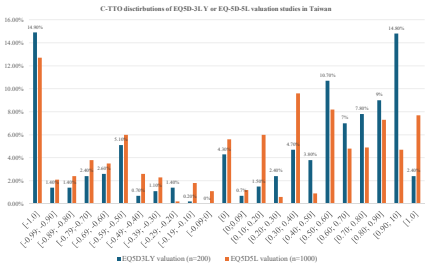

Figure 1: C-TTO distributions for the studies of EQ5D 3L Y valuation or EQ5D 5L valuation

Table 1: Characteristics of respondents compared to Taiwan adult general population

Characteristics	Full sample	Taiwan adult general population*	Differences # (%)
Sample size	**200**	**18,963,159**	**NA**
Gender			
Female	103(51.5%)	9,627,275(50.8%)	-0.70%
Male	97(48.5%)	9,335,884(49.2%)	+0.70%
Age			
20~29	40(20.0%)	3,375,442(17.8%)	-2.40%
30~39	33(16.5%)	4,058,116(21.4%)	+4.90%
40~49	41(20.5%)	3,621,963(19.1%)	-1.40%
50~59	42(21.0%)	3,603,001(19.0%)	-2.00%
>60	44(22.0%)	4,304,637(22.7%)	+0.70%
Living area			
North &East	100(50.0%)	9,614,322(50.7%)	+0.70%
Central	38(19.0%)	4,077,079(21.5%)	+2.50%
South	62(31.0%)	5,271,758(27.8%)	-3.20%
Education			
Primary sch.	18(9.0%)	8,362,753(44.1%)	+35.10%
High sch.	48(24.0%)	5,461,390(28.8%)	+4.80%
Higher education	134(67.0%)	5,139,016(27.1%)	-39.90%

*Taiwan general adult population=data from 2016 for all population with aged 20 or more, #Difference = Proportion in full sample- Proportion in Taiwan adult general population who participate this study

Table 2: Estimation results for C-TTO models (for all samples)

	For all samples			
Independent variables of the model	OLS model	GLS model	Tobit model censored at -1	Tobit GLS model censored at -1
Mobility (MO)				
No problems to slight problem	0.1340 (0.0336)¶	0.1184 (0.0253)¶	0.1303 (0.0389)¶	0.1111 (0.0218)¶
Slight problems to extreme problems	0.0630 (0.0338)	0.0728 (0.0238)¶	0.0771 (0.0392)	0.0766 (0.0213)¶
Self-care (SC)				
No problems to slight problem	0.0781 (0.0382)	0.0613 (0.0278)	0.0867 (0.0441)¶	0.0253 (0.0244)
Slight problems to extreme problems	0.1306 (0.0362)¶	0.1276 (0.0245)¶	0.1457 (0.0420)	0.1188 (0.0219)¶
Usual Activities (UA)				
No problems to slight problem	0.1090 (0.0380)¶	0.0995 (0.0265)¶	0.1075 (0.0439)	0.0674 (0.0228)¶
Slight problems to extreme problems	0.2224 (0.0356)¶	0.2138 (0.0259)¶	0.2488 (0.0411)¶	0.1682 (0.0228)¶
Pain/Discomfort (PD)				
No problems to slight problem	0.1309 (0.0351)¶	0.1180 (0.0249)¶	0.1282 (0.0406)¶	0.0838 (0.0214)¶
Slight problems to extreme problems	0.2184 (0.0326)¶	0.2344 (0.0244)¶	0.2492 (0.0377)¶	0.2005 (0.0216)¶
Anxiety/depression (AD)				
No problems to slight problem	0.0982 (0.0331)¶	0.0887 (0.0244)¶	0.0936 (0.0383)	0.1004 (0.0211)¶
Slight problems to extreme problems	0.2972 (0.0326)¶	0.3064 (0.0226)¶	0.3418 (0.0379)¶	0.2355 (0.0202)¶
Range of possible values	[-0.4819, 1]	[-0.4409, 1]	[-0.6090, 1]	[-0.1876, 1]
RMSE[a] or Sigma[b]	0.61335[a]	0.39361[a]	0.70247[b]	0.34023[b]
MAE	0.50557	0.30716	-	-
Log likelihood	-1860.3	-1356.5	-2162.0	-809.5
AIC	3742.5	2716.9	4347.0	1642.9
BIC	3804.1	2723.5	4408.0	1682.5

Model estimates are presented as coefficient (SE).
¶p value <0.01. RMSE, root mean square error; MAE, mean absolute error; AIC, Akaike information criteria; BIC, Bayesian information criteria; OLS, ordinary least squares; GLS, generalized least squares

Conclusion

- Although this study did not include discrete choice experiment (DCE) data, it demonstrates the feasibility of generating a value set for EQ-5D-Y-3L using cTTO data alone.
- The resulting utility range was narrower than that observed in the 2018 EQ-5D-5L valuation study, despite a similar proportion of negative utility values.
- Further research integrating DCE and advanced modeling techniques is needed to develop a robust value set for EQ-5D-Y-3L in Taiwan. These findings offer preliminary evidence to support pediatric health evaluations and inform decision-making by clinicians and policymakers.

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