Who prefers death to life in composite time trade-off interviews and why: A mixed-methods analysis of the Singapore EQ-5D-5L valuation study

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BACKGROUND

- The EuroQol Valuation Technology employs a composite time trade-off (cTTO) design, using a 20-year timeframe that includes 10 years in full health (i.e., lead-time) to evaluate states considered worse than death, with values ranging from -1 to 1.
- Numerous EQ-5D-5L valuation studies have noted a significantly high frequency of "-1" values.
- However, respondents' characteristics associated with this death-preferring response and underlying reasons remain unclear.

AIMS

- This study aimed to identify the characteristics of respondents associated with "-1" cTTO value in the new Singapore EQ-5D-5L valuation study and to explore the rationale behind this seemingly unusual preference.

METHODS

- Five hundred adult Singaporeans were quota-sampled by age, sex, ethnicity, and education.
- Participants completed 20 cTTO tasks through computer-assisted personal interviews, either face-to-face or via Zoom, using the EQ-VT tool.
- At the end of the interviews, a closed-ended question was used to ascertain respondents' priorities during cTTO tasks, and open-ended questions were used to explore the reasoning behind their general preferences.
- We used univariate and multivariable two-part models (mixed discrete-continuous outcomes) to identify respondent characteristics associated with the "-1" value and primary priorities when comparing Life A and Life B.
- Qualitative feedback from respondents was summarized using content analysis, focusing on the association between their priorities and tendencies of preferring death.

RESULTS

- Participants had a mean age of 48.1 years (SD 16.6), were predominantly Chinese ethnicity (76.8%), held at least a diploma (46.6%), and were equally distributed across genders.
- This Singapore EQ-5D-5L valuation study observed a 16.1% occurrence of the "-1" value; 128 (25.6%), 70 (14.0%), and 60 (12.0%) respondents assigned "-1" to 1-4, 5-9, and ≥10 health states, respectively.
- Age, education level, marital status, interviewer, and experience of serious illness in caring for others were associated with the number of "-1" in simple linear regression analysis.
- However, only age remained significant in the multivariable analysis (β: 1.07, 95% CI: 0.04, 2.11), with middle-aged respondents (mean 3.82, SD 4.91) assigning more "-1" values than young respondents (mean 2.37, SD 3.71) (**Table 1**).
- When comparing Life A and B, physical (89.0%), mental (83.2%), and financial (78.8%) burden related to poor health was the primary consideration among respondents (**Table 2**).
- Specifically, the middle-aged group reported physical (91.1%), mental (87.1%), and financial (83.8%) burdens as their primary considerations.

Table 1. Two-part models analyses of factors associated with health state value '-1'.

Variables	Sum of health states as '-1' value			
	β (95% CI)	*p*-value	Adj β (95% CI)	*p*-value
Age (ref: 21-44)				
45-64	**1.45 (0.56, 2.34)**	**0.001**	**1.07 (0.05, 2.08)**	**0.04**
≥65	**1.53 (0.46, 2.59)**	**0.005**	0.70 (-0.51, 1.92)	0.26
Gender (ref: Male)				
Female	-0.28 (-1.08, 0.52)	0.50		
Ethnicity (ref: Chinese)				
Malay	-0.35 (-1.46, 0.76)	0.53		
Indian / Others	0.85 (-0.64, 2.34)	0.27		
Education (ref: Tertiary)				
Non-tertiary	**1.00 (0.20, 1.80)**	**0.01**	0.46 (-0.39, 1.31)	0.29
Marital status (ref: Married)				
Single	**-1.08 (-1.91, -0.25)**	**0.01**	-0.42 (-1.36, 0.53)	0.39
Widowed/Divorce/Separated	0.55 (-0.90, 1.99)	0.46	0.35 (-1.02, 1.72)	0.61
Employment status (ref: Employed)				
Non-employed	0.23 (-0.63, 1.10)	0.60		
Religious (ref: Buddhism/Taoism)				
Islam	-0.57 (-1.80, 0.67)	0.37		
Christianity	0.30 (-0.84, 1.45)	0.60		
Others (Hinduism, Sikhism, refuse to answer)	-0.43 (-1.50, 0.63)	0.42		
Housing type (ref: HDB 4-5 room/executive)				
HDB 1-3 room	0.67 (-0.37, 1.70)	0.21		
Private	-0.11 (-1.21, 0.98)	0.84		
Interviewer (ref: #1)				
#2	-1.09 (-2.25, 0.06)	0.06	-0.83 (-1.97, 0.31)	0.15
#3	**-1.19 (-2.34, -0.04)**	**0.04**	-0.98 (-2.12, 0.15)	0.09
#4	0.13 (-1.19, 1.45)	0.85	0.43 (-0.88, 1.75)	0.52
#5	**-1.93 (-3.56, -0.31)**	**0.02**	**-1.87 (-3.43, -0.31)**	**0.02**
Experienced serious illness in yourself? (ref: No)				
Yes	0.34 (-0.47, 1.15)	0.41		
Experienced serious illness in your family? (ref: No)				
Yes	0.23 (-0.58, 1.03)	0.58		
Experienced serious illness in caring for others? (ref: No)				
Yes	**1.10 (0.14, 2.05)**	**0.03**	0.67 (-0.27, 1.60)	0.16

Note: Adj β = Adjusted Coefficient; CI = Confidence interval.

- This observation was supported by qualitative feedback, which highlighted that the primary reason for preferring death over life was to avoid imposing physical and mental burden on family members (**Table 3**). Additionally, the middle-aged group often mentioned financial burden and medical costs as concerns, saying, "*I don't want to burden people around me and waste money on hospital bills*" (Female, Malay, 49 years old) and "*The cost of treatment can burden my family*" (Male, Malay, 46 years old).

Table 2. Difference in priorities by different age groups.

When asked to compare two different lives, did you consider...	Age group			
	Total	21-44	45-65	>=65
Physical burden				
No	55 (11.0)	20 (9.5)	16 (8.9)	19 (17.1)
Yes	445 (89.0)	190 (90.5)	163 (91.1)	92 (82.9)
Mental burden				
No	84 (16.8)	41 (19.5)	23 (12.9)	20 (18.0)
Yes	416 (83.2)	169 (80.5)	156 (87.1)	91 (82.0)
Financial burden				
No	106 (21.2)	52 (24.8)	29 (16.2)	25 (22.5)
Yes	394 (78.8)	158 (75.2)	150 (83.8)	86 (77.5)
Loss of enjoyment in life				
No	128 (25.6)	42 (20.0)	52 (29.1)	34 (30.6)
Yes	372 (74.4)	168 (80.0)	127 (70.9)	77 (69.4)
Medical costs				
No	144 (28.8)	75 (35.7)	39 (21.9)	30 (27.0)
Yes	356 (71.2)	135 (64.3)	140 (78.2)	81 (73.0)
Increased living costs				
No	146 (29.2)	74 (34.2)	46 (25.7)	26 (23.4)
Yes	345 (70.8)	136 (64.8)	133 (74.3)	85 (76.6)
Loss of dignity and independence				
No	160 (32.0)	79 (37.6)	52 (29.1)	29 (26.1)
Yes	340 (68.0)	131 (62.4)	127 (71.0)	82 (73.9)

- Whereas the young and old groups focused on the loss of enjoyment and dignity, with one participant stating, "*I should be able to do things that I like*" (Male, Chinese, 26 years old).

Table 3. Content analysis of the priorities by different age groups.

Age group (21-44)	n (%)	Age group (45-65)	n (%)	Age group (>=65)	n (%)
Total codes: 210		**Total codes: 179**		**Total codes: 111**	
Pain & Discomfort	42 (20%)	Burden to Family/Others	36 (20%)	Burden to Family/Others	22 (20%)
Burden to Family/Others	30 (14%)	Pain & Discomfort	34 (19%)	Pain & Discomfort	18 (16%)
Mental Health	26 (12%)	Financial Burden	22 (12%)	Mobility	12 (11%)
Self-care/Independence	16 (8%)	Mobility	16 (9%)	Mental Health	10 (9%)
Mobility	15 (7%)	Mental Health	15 (8%)	Healthy/Quality life	10 (9%)

Note: n = Number of responses; % = Percentage.

CONCLUSIONS

- The preference for immediate death over living in very poor health states is common in Singapore, particularly among the middle-aged group. This unusual preference is primarily driven by concerns about the burden poor health places on the family, a sentiment that middle-aged Singaporeans might feel more acutely, likely due to their experiences caring for both the young and the elderly.
- Our study validates the very low health-state values observed in the EQ-5D valuation study in Singapore and may explain the excessive -1 values observed in other EQ-5D valuation studies across various Asian countries.

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