



Examining the incremental impact of long-standing health conditions on subjective well-being – is there anything missing from the EQ-5D?

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Introduction

Generic preference-based measures (GPBMs) such as the EQ-5D and SF-6D are commonly used to obtain health utility scores for economic evaluations. Previous studies examining the way that subjective well-being (SWB) might value health using GPBMs did not explore whether aspects of health important to patients in terms of the impact on SWB were not being picked up by the EQ-5D.

Our intention is to examine whether the EQ-5D is adequate in reflecting the impact of health conditions on SWB by examining whether long-standing health conditions have an incremental impact on SWB alongside the EQ-5D.

Methodology

Data from the South Yorkshire Cohort (SYC) were used to undertake all the analyses. Two regression models were used to examine the impact of additional input of long-standing health conditions on life satisfaction.

- Ordered logit model was used when the proportional odds assumption held.
- Partial proportional odds ordered logit model namely generalised model was employed when the assumption did not hold.
- Regression models estimate:
 - Odds ratios – the coefficients of the independent variables in terms of the sign and the magnitude
 - Model performance: AIC, BIC and McKelvey & Zavoina's R²
 - Threshold cuts: the estimates on life satisfaction to differentiate respondents choosing from one level to the next

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Table 1 Ordered logit regression: EQ-5D & long-standing health conditions

Explanatory variables	Model 1 EQ-5D dimensions + health conditions		Model 1 EQ-5D score + health conditions	
	Odds ratio	SE	Odds ratio	SE
Mobility 2	0.927	0.053		
Self-care 2	0.793***	0.068		
Usual activities 2	1.056	0.062		
Usual activities 3	1.027	0.162		
Pain/discomfort 2	0.925**	0.035		
Pain/discomfort 3	0.860	0.088		
Anxiety/depression 2	0.728***	0.029		
Anxiety/depression 3	0.603***	0.077		
EQ-5D score			1.971***	0.162
Tiredness/fatigue	0.949	0.049	0.914*	0.046
Insomnia	0.877*	0.061	0.840**	0.058
Diabetes	0.973	0.067	0.976	0.067
Breathing problems	0.917*	0.048	0.915*	0.048
High blood pressure	1.028	0.044	1.038	0.044
Heart disease	1.098	0.077	1.114	0.078
Osteoarthritis	0.970	0.058	1.003	0.058
Stroke	0.873	0.105	0.868	0.104
Cancer	0.960	0.093	0.953	0.090
Control variables				
Age	0.952***	0.005	0.952***	0.005
Age ²	1.001***	5E-05	1.001***	5E-05
Male	1.039	0.032	1.041	0.032
White	1.152*	0.097	1.155*	0.097
GCSEs	1.054	0.056	1.043	0.055
A levels	1.029	0.024	1.023	0.023
Degree	1.016	0.016	1.013	0.016
White collar	1.001	0.035	0.998	0.035
Currently employed	0.933**	0.030	0.932**	0.030
Threshold 1	-3.285***	0.155	-2.592***	0.169
Threshold 2	-1.853***	0.153	-1.163***	0.167
Threshold 3	-0.947***	0.152	-0.260	0.167
Threshold 4	0.220	0.152	0.904***	0.167
Threshold 5	1.215***	0.153	1.899***	0.168
Observations	13591		13591	
Likelihood ratio χ^2	642.88		596.00	
McKelvey & Zavoina's R ²	0.045		0.042	
AIC	46288		46320	
BIC	46521		46501	

* p < 0.1, ** p < 0.05, *** p < 0.01.

Results

Ordered logit:

- Anxiety/depression had the largest negative impact on life satisfaction, followed by self-care and pain/discomfort.
- People with better health-related quality of life were likely to report higher levels of life satisfaction.
- People with insomnia/breathing problems were likely to report lower levels of life satisfaction.
- Age had a negative association with SWB but age squared had a positive correlation with SWB.

Table 2 Generalised logit regression: EQ-5D dimensions & long-standing health conditions

Life satisfaction level	I	II	III	IV	V
	Odds ratio				
Mobility 2	0.865	0.893	0.912	0.960	0.993
Self-care 2	0.881	0.791**	0.828*	0.779**	0.761*
Usual activities 2	1.092	1.053	1.111	1.009	0.990
Usual activities 3	0.847	1.038	1.072	0.944	1.215
Pain/discomfort 2	0.997	0.952	0.911**	0.916*	0.939
Pain/discomfort 3	0.869	0.966	0.832	0.858	0.827
Anxiety/depression 2	0.646***	0.656***	0.700***	0.791***	0.912
Anxiety/depression 3	0.253***	0.524***	0.694***	0.889	0.890
Tiredness/fatigue	1.060	0.931	0.948	1.039	0.931
Insomnia	0.812*	0.908	0.906	0.881	0.780**
Diabetes	0.721**	0.938	0.982	1.039	1.061
Breathing problems	0.864	0.900	0.905*	0.973	0.937
High blood pressure	1.005	1.023	1.021	1.058	0.984
Heart disease	1.199	1.218**	1.095	1.014	1.007
Osteoarthritis	0.929	0.940	0.981	1.041	0.875
Stroke	0.833	0.943	0.800	0.901	0.931
Cancer	1.158	0.957	0.956	0.925	0.988
Control variables					
Age	0.946***	0.963***	0.960***	0.951***	0.947***
Age ²	1.001***	1.000***	1.001***	1.001***	1.001***
Male	0.995	1.079*	1.030	1.028	1.024
White	1.212	1.463***	1.312***	0.927	0.613***
GCSEs	1.145	1.166**	1.103	0.990	0.892
A levels	1.052	1.070**	1.051*	1.002	0.968
Degree	1.092**	1.076***	1.046**	0.976	0.917***
White collar	0.957	1.000	0.964	1.047	0.983
Currently employed	0.917	0.935	0.900***	0.951	0.942
Observations	13591				
Likelihood ratio χ^2	923.94				
P value	0.000				

* p < 0.1, ** p < 0.05, *** p < 0.01.

Table 3 Generalised logit regression: EQ-5D score & long-standing health conditions

Life satisfaction level	I	II	III	IV	V
	Odds ratio				
EQ-5D score	3.143***	2.080***	1.911***	1.762***	1.477***
Tiredness/fatigue	1.022	0.880**	0.915	0.912	0.917
Insomnia	0.768**	0.851*	0.866*	0.862*	0.777**
Diabetes	0.733**	0.934	0.987	1.041	1.065
Breathing problems	0.893	0.897	0.904*	0.966	0.933
High blood pressure	1.043	1.040	1.029	1.060	0.983
Heart disease	1.308*	1.251**	1.116	1.009	1.007
Osteoarthritis	1.080	0.989	1.011	1.047	0.880
Stroke	0.859	0.939	0.801	0.887	0.911
Cancer	1.143	0.941	0.949	0.912	0.975
Control variables					
Age	0.945***	0.962***	0.960***	0.951***	0.946***
Age ²	1.001***	1.000***	1.001***	1.001***	1.001***
Male	1.007	1.084*	1.031	1.027	1.027
White	1.214	1.467***	1.319***	0.928	0.617***
GCSEs	1.114	1.148**	1.086	0.983	0.894
A levels	1.038	1.061**	1.043	0.998	0.966
Degree	1.073**	1.070***	1.043**	0.975	0.917***
White collar	0.951	1.001	0.963	1.043	0.984
Currently employed	0.922	0.938	0.900***	0.950	0.944
Observations	13591				
Likelihood ratio χ^2	823.42				
P value	0.000				

* p < 0.1, ** p < 0.05, *** p < 0.01.

Results Continued

- White people were likely to report higher levels of life satisfaction but currently employed people were likely to report lower levels of life satisfaction.
- Generalised ordered logit:**
 - People with more severe anxiety/depression were more likely to report lower levels of life satisfaction and people with the most severe anxiety/depression were likely to report the lowest level of life satisfaction.
 - People with insomnia were likely to become completely dissatisfied or satisfied with their lives.
 - Males were likely to report higher levels of life satisfaction than females. People educated at GCSEs/A levels were likely to report higher levels of life satisfaction.
 - The difference between people who reported lower levels and those who reported the highest levels of life satisfaction was significant for being white and educated at a degree level.

Discussion

- Similar findings about anxiety/depression as in the literature were confirmed – the largest negative association with SWB among five dimensions. Surprisingly, self-care tended to have the second largest negative impact.
- The coefficient of insomnia was significant and inclusion of insomnia had some impact on the EQ-5D dimensions particularly anxiety/depression and self-care. Therefore, insomnia could be considered as an additional 'bolt-on' dimension to the EQ-5D.
- An interesting finding was that all other health conditions had little or no impact on SWB.
- For further research, longitudinal data sets should be used for analysis to observe whether the association remains over time and establish a causality relationship.