Exploring the Sensitivity of Utility Scores Predicted by the EQ-5D, SF-6D, HUI3, 15D, AQoL4D and AQoL8D Multiattribute Utility Instruments to SF-36 Dimensions

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BACKGROUND AND OBJECTIVES

Cost-utility analysis (CUA) evaluates interventions by assessing health-related quality of life (HRQoL) through quality-adjusted life years (QALYs), which integrate life-years with utility values derived from multi-attribute utility instruments (MAUIs). **However, different MAUIs yield different utility values and vary in their content validity and responsiveness to changes in HRQoL**. Given the significant impact that instrument selection can have on utility values, this study aims to explore the sensitivity of utility scores predicted by six different MAUIs in relation to the dimensions of the SF-36.

DATA & METHODS

Data were collected from the multi-instrument comparison (MIC) database (Richardson et al., 2015), which includes responses from 8,022 participants across six countries. Participants completed **six health-related quality of life instruments: EQ-5D, SF-6D, HUI-3, 15D, AQoL-4, AQoL-8, and the generic HRQoL profile instrument SF-36.** Ordinary least squares (OLS) regression models were used to evaluate the relationships between the SF-36 dimensions and each of the six MAUIs. We also performed pairwise comparisons of instrument sensitivity by dimension. The SF-36 dimensions assessed include physical functioning, role physical, bodily pain, general health, vitality, social functioning, role emotional, and mental health.

RESULTS & KEY FINDINGS

We examined how individual SF-36 dimensions influence the six different MAU instruments through regression analysis.

Table 1. presents the results for the importance (of ranking) of SF-36 dimensions for predicting each MAU instrument score from multiple linear regressions.

MAUI	Rank							
	1	2	3	4	5	6	7	8
EQ5D	BP	PF	MH	GH	RE	SF	VT	RP
HUI3	MH	BP	PF	GH	SF	VT	RE	RP
SF6D	BP	SF	RE	MH	PF	VT	RP	GH
15D	PF	GH	BP	VT	MH	RE	SF	RP
AQoL4D	MH	PF	BP	SF	GH	VT	RP	RE
AQoL8D	MH	VT	BP	GH	PF	SF	RE	RP

Table 1: Ranked SF36 dimension importance for different MAUI

We also modelled pairwise relationships between MAUIs and then performed residual analysis to correlate residuals from regression models with SF-36 dimensions.

Figure 1. presents the results of pairwise comparisons of MAU instrument sensitivity by SF-36 dimensions.

SF-36 dimensions
GH: General Health
PF: Physical Function
RP: Role limitations Physical
BP: Bodily Pain
VT: Vitality
SF: Social Functioning
RE: Role limitations Emotional
MH: Mental Health

Figure 1: Pairwise comparisons of MAUI sensitivity by dimension

CONCLUSION

Our study shows that the sensitivity of HRQoL utility scores to the eight SF-36 dimensions depends on the specific MAUI used.

Key findings

- AQoL-8D is the most sensitive to changes in MH.
- EQ-5D demonstrates the highest sensitivity to BP.
- 15D shows greater sensitivity to PF than AQoL-4D and AQoL-8D.
- SF-6D is more sensitive to RE than 15D, AQoL-4D, and AQoL-8D.
- Overall, physical health dimensions (BP and PF) have the greatest influence on EQ-5D, SF-6D, and D15, while mental health is key for HUI3, AQoL-4D, and AQoL-8D.

Key Takeaways

- Utility scores differ significantly across MAUIs in their response to SF-36 dimensions.
- Selecting the right MAUI is crucial for research focused on specific health domains.

Key Reference

Richardson, J., et al (2015). Comparing and explaining differences in the magnitude, content, and sensitivity of utilities predicted by the EQ-5D, SF-6D, HUI 3, 15D, QWB, and AQoL-8D multiattribute utility instruments. Medical Decision Making, 35(3), 276-291.

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