Supplementary online material A: Factor analysis of the quality of care items

Background

The national UES contained eight questions covering most of the dimensions of experience that have been found in the literature to be important to home care users. These eight questions had been shown previously to form a valid and reliable scale (Cronbach's alpha: 0.84) (Jones et al., 2007). To ensure better coverage of, particularly, the relationship dimension, however, the extension study included additional questions from a longer version of the home care survey (Qureshi and Rowlands, 2004) and from a survey of working age home care users (Malley et al., 2006).

Methods

We conducted an exploratory factor analysis to determine the dimensionality of all the items. The aim of the model is to explain the common variance of the items through a smaller number of latent variables, referred to as factors (De Vellis, 2003). We first investigated the structural relationship between the items, by examining inter-item polychoric correlations in recognition of the ordinal nature of the variables (Olsson, 1979a). The polychoric correlation matrix is then used as the basis for the exploratory factor analysis (Holgado–Tello et al., 2010; Olsson, 1979b). We used the method of maximum likelihood for factor extraction primarily because it allows for statistical evaluation of the factor solution (Fabrigar et al., 1999), and the matrix was rotated to enable the identification of solutions. Strong loadings of the items on the latent variable and low values for the unique variance of the items indicate that the latent variable explains the items well and the items can be summed together as a scale. We further explored the internal consistency of the retained scale using Cronbach's alpha (Cronbach, 1951)

Results

A correlation matrix for all the experience of care delivery items is shown in Table S1. Correlations between all the items are general high and in excess of 0.4.

Table S1: Polychoric correlation matrix for quality of care items

	SUITTIME	INFORM	ARRIVET	SAMECW	WANTDONE	RUSH_REV	SPENDLT	TREATED	RELSHIP	UNDSIT	VISITAMT
SUITTIME	1.0000										
INFORM	0.6022	1.0000									
ARRIVET	0.6429	0.5249	1.0000								
SAMECW	0.4604	0.4194	0.4386	1.0000							
WANTDONE	0.6000	0.4747	0.4800	0.3720	1.0000						
RUSH_REV	0.4632	0.3800	0.3854	0.2868	0.5469	1.0000					
SPENDLT	0.5163	0.4637	0.4786	0.3612	0.5953	0.5904	1.0000				
TREATED	0.5666	0.4611	0.4657	0.4159	0.6744	0.5124	0.5746	1.0000			
RELSHIP	0.5447	0.4424	0.4638	0.3969	0.6225	0.4460	0.5406	0.7523	1.0000		
UNDSIT	0.4332	0.4188	0.3437	0.2546	0.4889	0.3594	0.3983	0.5065	0.4724	1.0000	
VISITAMT	0.2610	0.1913	0.1806	0.1181	0.3795	0.2966	0.2736	0.3365	0.2785	0.4049	1.0000

Maximum likelihood (ML)[1] factor extraction was performed and one factor was extracted with an Eigenvalue 4.90 (Table S2). All variables loaded onto this factor with a loading greater than 0.4, except the VISITAMT variable. This was dropped as it also had very high uniqueness of over 0.8. The factor explains the majority of the variance of most items and the likelihood ratio test of independence against the saturated model is significant ($X^2(45)=8.9$x10^4, p=<0.001) indicating that the factor analysis is meaningful and the items are inter-correlated. Only the SAMECW and UNDSIT items have a unique variance greater than 0.6, which indicates that the factor does not explain these variables very well. Nevertheless, the strong loadings of all the items and the positive results from Bartlett's test of sphericity[2] and the KMO[3] suggest that the items are similar enough to be summed together into an experience of quality scale (QTOT). Cronbach's alpha for this scale is 0.86, which is considered to be very good and it is not increased by dropping any items.

Table S2: Pattern matrix for the one-factor solution

Variable	Factor	Uniqueness
SUITTIME	0.760	0.422
INFORM	0.645	0.584
ARRIVET	0.658	0.568
SAMECW	0.528	*0.721*
WANTDONE	0.798	0.363
RUSH_REV	0.638	0.593
SPENDLT	0.724	0.476
TREATED	0.819	0.329
RELSHIP	0.780	0.392
UNDSIT	0.590	*0.652*

Items with unique variance > 0.6 shown in italics.

A solution involving two highly correlated factors (r=0.73), was also extracted using promax rotation (Table S3). These two correlated scales broadly reflected interpersonal (WANTDONE, RUSH, SPENDLT, TREATED, RELSHIP, UNDSIT) and organisational (SUITTIME, INFORM, ARRIVET, SAMECW) aspects of care. Internal consistency was good for both of these scales, with a Cronbach's alpha of 0.79 for the interpersonal scale (QREL) and 0.74 for the organisational scale (QORG). Internal consistency was not affected by dropping any items from the scales.

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[1]The maximum likelihood factoring extraction method assumes that the items are multivariate normal, an assumption which is not met with these data: Mardia's test for skewness = 24.5, X^2 (286) =70,708, p < 0.001; Mardia's test for kurtosis = 197, X^2 (1) = 44,114, p < 0.001; Henze-Zirkler = 65.6, X^2 (1) = 3.44x10^6, p < 0.001; Doornik-Hansen X^2 (22) = 1.47x10^5, p < 0.001. We therefore repeated the analysis using principal axis factoring which is recommended when the assumption of multivariate normality is violated, but the same solution was found (Fabrigar et al., 1999).

[2] Bartlett's test for sphericity rejected the null hypothesis that the variables are not inter-correlated (X^2(55)=55,992, p=<0.001).

[3] The Kaiser-Meyer-Olkin (KMO) test of sampling adequacy for this dataset was 0.91, which is considered 'marvellous'.

Table S3: Pattern matrix for the one-factor solution

Variable	QREL	QORG	Uniqueness
SUITTIME	0.082	**0.776**	0.296
INFORM	0.028	**0.693**	0.491
ARRIVET	-0.032	**0.779**	0.429
SAMECW	0.117	**0.467**	*0.688*
WANTDONE	**0.610**	0.225	0.374
RUSH_REV	**0.433**	0.232	0.611
SPENDLT	**0.461**	0.297	0.498
TREATED	**0.931**	-0.054	0.206
RELSHIP	**0.825**	0.002	0.318
UNDSIT	**0.458**	0.162	*0.655*

Items with loading >.04 in italics; Items with unique variance > 0.6 shown in italics.

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