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**A new measure of quality of care experience in aged care:
psychometric assessment and validation of the Quality of
Care Experience (QCE) questionnaire**

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A new measure of quality of care experience in aged care: psychometric assessment and validation of the Quality of Care Experience (QCE) questionnaire

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Executive Summary

- This report describes the methods and findings from a study to investigate the psychometric properties and validity of a new measure of the Quality of Care Experience (QCE) developed by the Caring Futures Institute at Flinders University. The psychometric properties and validity of the QCE were assessed using two separate datasets collected through surveys of aged care residents and home care clients. The surveys were led by the National Ageing Research Institute (NARI) for the Royal Commission into Aged Care Quality and Safety, with results published in the Royal Commission's Research Papers 13 and 14.
- The QCE comprises 6 key attributes reflecting the extent to which the person is treated with respect and dignity; supported to make their own decisions about care and services; receives aged care services from staff who have appropriate skills and training; receives services and support for daily living that are important for health and wellbeing; supported to maintain social relationships and connections; and comfortable lodging complaints with confidence that appropriate action will be taken. Each is measured with a 5-point Likert type response scale indicating the extent to which each attribute is achieved (never, rarely, sometimes, mostly, always).
- Comprehensive psychometrics and validity assessments have been conducted on the QCE and are described in this report. The assessments demonstrate the psychometric properties and validity of the QCE questionnaire as a fit for purpose tool to assess the quality of care experience from the perspective of older people and family carers in residential aged care and home care settings.
- For the residential aged care sample, higher QCE scores (indicating a better quality of care experience) were statistically significantly associated ($P < 0.001$) with higher scores on the Consumer Choice Index (CCI-6D, a validated measure of care quality for long-term care) indicating the construct validity (demonstration that the QCE measures the quality of care construct that it purports to measure) of the QCE measure in residential care settings.
- For the home care sample, participants reporting higher social care-related quality of life as measured by the Adult Social Care Outcome Toolkit (ASCOT), and higher psychological-need related quality of life measured by the CASP-12, generally exhibited higher scores for the QCE (i.e. better quality of care experience) providing evidence of the construct validity of the QCE in home care settings.
- In both the residential and home care samples, higher life satisfaction as measured by the Global Life Satisfaction Scale was associated with higher quality of care experience measured by the QCE and vice versa.
- Proxies reported a significantly lower QCE in both home and residential aged care samples, indicating that proxies generally perceived lower quality of care experience in comparison with older people themselves. These findings add to a growing body of evidence of differences

between proxy-reports and self-reports of quality of care experience and quality of life in aged care, with proxies tending to report lower scores on average on both these indicators across a variety of validated measures.

- Respondents who expressed concerns about the aged care services they were receiving tended to score lower on the QCE and the higher the number of concerns the lower the QCE scores on average indicating a lower quality of care experience.
- For the residential care sample, females exhibited statistically significantly ($P=0.04$) higher QCE scores than males, indicating that females perceived a better quality of care experience than males. Similarly, higher QCE scores were observed for females relative to males for the home care sample but these differences were not statistically significant ($P=0.69$).

1. Background

In 2019 our team was invited by the Royal Commission into Aged Care Quality and Safety to design, analyse and report upon a survey to investigate the views and preferences of a representative sample (by age, gender and state of residence) of the Australian general population about what constitutes quality of care in aged care.

The first stage of this project involved an extensive literature review to identify the key attributes or characteristics associated with the quality of care experience from the perspective of the older person and family carers in aged care in Australia and internationally.

The second stage involved formulating the key characteristics identified into a quality of care experience (QCE) descriptive system and piloting the content and phraseology of the descriptive system with a small convenience sample of the general population. Minor changes were made in phraseology to some of the identified attributes as a consequence of the pilot study.

The third stage of the project involved the development of a preference weighted scoring system for the QCE descriptive system (Table 1) using discrete choice experiment (DCE) methodology [Ratcliffe et al. 2020]. A large Australia wide-sample comprising over 10,000 members of the Australian general population aged 18 years and above were asked to make hypothetical choices between alternative service providers with different quality of care characteristics defined by the QCE descriptive system. A report emanating from the study was published by the Royal Commission into Aged Care and Safety in July 2020 as Research Paper 6 [Ratcliffe et al. 2020]. The report provided evidence on what the community sees as important quality of care defining characteristics in aged care and how much the community are willing to pay in the form of additional taxation to ensure universal access to high quality aged care.

Subsequently, the QCE instrument was also used as part of national surveys of aged care recipients. In this new study, we examine the validity of the QCE instrument for routine application in assessing quality of care experience in aged care (for both home and residential aged care settings) through a detailed assessment of its psychometric performance and validity.

Table 1: Six attributes of the Quality of Care Experience in Aged Care (QCE)

Attributes of the Quality of Care Experience in Aged Care*
1. I am treated with respect and dignity
2. I am supported to make my own decisions about the care and services I receive
3. I receive care and support from aged care staff who have the appropriate skills and training
4. I receive services and support for daily living that are important for my health and wellbeing
5. I am supported to maintain my social relationships and connections with the community
6. I am comfortable lodging complaints, with confidence that appropriate action will be taken
*Note: Each attribute is rated on a 5-point Likert scale (Never, Rarely, Sometimes, Mostly, Always)

2. Methods

2.1. Study Population

The quality of care experience for older people currently receiving home care and those living in residential care facilities was assessed by incorporating the QCE within two surveys undertaken for the Royal Commission (Research Papers 13 and 14) by the National Ageing Research Institute, working in partnership with Ipsos and the Social Policy Research Centre of the University of New South Wales [Batchelor et al. , Batchelor et al. 2020].

The residential care survey involved a computer assisted personal interview (CAPI) with residents or, where necessary, proxy surveys (completed by resident representatives) drawn randomly from a sample of 67 Australian residential aged care facilities. These residential aged care facilities were randomly sampled using a random number generator to achieve a nationally representative sample. Randomisation was proportionally stratified by State/Territory, metropolitan/non-metropolitan areas determined by Greater Capital City Statistical Areas (GCCSA), organisation type (for-profit, non-profit, government), and facility size (number of beds: 0-60, 61-100, >100). A total of 391 interviews were completed, 367 (93.9%) were completed by residents and 24 (6.1%) were completed by proxies. The results were weighted to be representative of the residential care population in Australia by location (metropolitan or rural) and organisation type (for-profit, non-profit or government). The socio-demographic characteristics of the residential aged care sample are presented in Table 3.

The home care survey involved telephone interviews with a sample of clients or their proxies receiving a Home Care Package (HCP). The sample was proportionally stratified by State/Territory, remoteness (major city, inner regional, and outer regional) and provider type (profit, non-profit, government). A total of 865 interviews were completed. Overall, care recipients comprised 70% of the total number of respondents to this survey and proxies comprised 30%. Results were also weighted to be nationally representative. The socio-demographic characteristics of the home care sample are presented in Table 4.

2.2. The Quality of Care Experience in Aged Care (QCE)

This psychometric performance and validity assessment utilized the data from the home and residential care surveys. In the surveys, the complaints attribute was collected through three questions which we have amalgamated and coded according to the final question “I am confident that appropriate action will be taken when I lodge a complaint”. Individual responses to the QCE were scored by applying the general public preference weighted scoring algorithm developed from an earlier study for the Royal Commission [Ratcliffe et al. 2020]. The scoring algorithm was developed using discrete choice experiment (DCE) methodology.

Briefly, in the DCE each respondent aged 18 years and above from the Australian general population was presented with a series of six scenarios comprising two aged care providers with different quality of care characteristics and asked to indicate their preferred provider based upon the presented characteristics. The ordering of the choice questions was randomised across respondents [Nguyen et al. 2015]. To reduce the complexity of the task, improve choice consistency and reduce the drop-out rate, colour coding was adopted for the presentation of attribute levels with the lightest colour for the

highest level (Always) and the darkest colour for the lowest level (Never). Following the completion of each DCE scenario, respondents were asked to rate the quality of care provided by their chosen provider on a five-point Likert scale ranging from 'unacceptable' to 'very high' (presented in Figure 3). The general public sample provided a total of 61,349 individual quality ratings (6 quality ratings responses per respondent). Econometric modelling (including conditional logit and mixed logit regression models) was then used to estimate the relative importance of the various quality attributes to the choice of aged care provider and the quality rating assigned by respondents.

For this study, we applied the general public preference weighted scoring algorithm to the responses to the QCE from the home and residential care samples. We then translated the mean re-scaled score (min=0 and max=1). For example, for an individual responding 'never' to all 6 QCE attribute their total preference weighted score was derived by summing the coefficient values attached to the response category 'never' for each attribute from the DCE task, giving a minimum score of 0. Similarly, for an individual responding 'always' to all 6 QCE attributes, their total preference weighted score was derived by summing the coefficient values attached to the response category 'always' for each attribute, giving a maximum score of 1.

2.3. Other instruments

In addition to completing the QCE, the residential care sample participants also completed the Consumer Choice Index-6 Dimension (CCI-6D) and the Global Life Satisfaction instruments. The home care sample also completed the Adult Social Care Outcome Toolkit (ASCOT), the Control, Self-Realisation and Pleasure (CASP-12) questionnaire, and the Global Life Satisfaction question (GLS). Both samples also completed a feedback questionnaire in which they identified concerns about the services they had received.

The CCI-6D is validated instrument which was specifically designed to evaluate the quality of care in long-term care from a consumer perspective. It has 6 dimensions (Care time, Shared space, Own room, Outside and gardens, Meaningful activities and Care flexibility), each with three different levels ranging from low to high levels of performance. A preference-weighted scoring algorithm produced by the instrument developer was used to score individual responses to the CCI-6D [Milte et al. 2019]. The CCI-6D preference weighted summary scores range from 0-1 and a higher score represents a better quality of care.

The ASCOT is a preference-based weighted social-care related quality of life instrument [Malley et al. 2012]. It has eight attributes with one item per attribute: personal cleanliness and comfort, food and drink, control over daily life, personal safety, accommodation cleanliness and comfort, social participation and involvement, occupation and dignity. Each attribute has four response levels and the ASCOT total scores range from -0.17 to 1.0 and a higher score represents a better quality of life.

The 12-item CASP is a psychological needs satisfaction-specific quality of life instrument which was designed for use in the survey of health, ageing and retirement in Europe (SHARE) study. The CASP-12 self-report instrument comprises twelve items measuring psychological needs satisfaction related quality of life [Kerry 2018]. Each item is scored on a 4-point Likert-type scale, with descriptive anchors provided for each response option: 1 ('Often'), 2 ('Sometimes'), 3 ('Not often'), and 4 ('Never'). The

possible range of the CASP scores is 12 to 48 and higher CASP total scores are interpreted as better quality of life.

The Global Satisfaction of Life is a single item instrument and its scores range from 0 to 10. Higher total scores are interpreted as better life satisfaction.

The feedback questionnaires were designed for the two Royal Commission surveys and collected data on the number and nature of concerns that the care recipients or their proxies held about care services.

2.4. Psychometric assessment of the QCE

The individual level responses to the QCE attributes were subjected to Classical Test Theory (CTT) and a modern psychometric method (Rasch model analysis). CTT and Rasch are widely accepted methods of testing the psychometric properties of a new instrument [Khadka et al. 2013]. A series of CTT and Rasch analysis statistics were assessed to identify whether the QCE attributes fit to form a latent trait of “quality of care”. The CTT based statistics include evaluation of missing values, ceiling/floor effect, attribute-dependency and internal consistency reliability (Cronbach’s alpha). The Rasch based statistics include item fit statistics. The exact criteria for grading instruments are shown in Table 2 and are based on the guideline proposed by Kandel et al [Kandel et al. 2017].

Table 2: Criteria used to assess the psychometric properties of the Quality of Care Experience

Classical Test Theory Based psychometric properties	
Acceptability	A: The percentage of missing data for majority of items: ≤5% B: The percentage of missing data for majority of items: >5% ≤40% C: The percentage of missing data for majority of items: >40%
Targeting	A: End-point categories ≤5% for majority of items B: End-point categories >5% ≤40% for majority of items C: End-point categories >40% for majority of items
Internal consistency reliability	A: $0.95 \geq \text{Cronbach's } \alpha \geq 0.70$ B: $0.7 > \text{Cronbach's } \alpha \geq 0.60$, or $\text{Cronbach's } \alpha > 0.95$ C: $\text{Cronbach's } \alpha < 0.6$
Item dependency	A: Inter-item correlations <0.3 B: Inter-item correlations $\geq 0.3 < 0.6$ C: Inter-item correlations ≥ 0.6
Rasch analysis based psychometric properties	
Item fit statistics/ Dimensionality	A: All items with infit and outfit mean square (MNSQ): 0.70-1.30 indicated unidimensionality B: One or two item outside 0.70-1.30 limit but within 0.5-1.5 limit C: More than two items outside 0.5-1.5 limit
Validity	
Construct validity	A: Tested with appropriate instruments and correlation: 0.3 to 0.7 B: Tested with appropriate instruments and correlation: >0.7 <0.90 C: Correlation <0.3 or >0.7
Known group validity	A: Tested between appropriate groups: significant difference between groups B: Tested between debatable groups: significant difference between groups C: Insignificant difference between groups

2.5. Construct validity assessment of the QCE

Construct validity is an assessment of whether the QCE measures what it purports to measure. For assessing the construct validity of the QCE, total QCE scores generated from the QCE preference weighted scoring system were empirically compared to other variables including socio-demographics, CCI-6D, ASCOT, CASP-12, Global Life Satisfaction and concerns about aged care services using hypothesis testing to investigate the direction and magnitude of expected relationships. We hypothesized higher quality of care experience as measured by the QCE would be associated with better quality of life, life satisfaction and fewer aged care service concerns. Hence, we expected positive relationships between the QCE and the CCI-6D, ASCOT, CASP-12, Global Life Satisfaction (GLS) and a negative relationship between the QCE and service concerns. Known group validity was assessed by examining the extent to which the QCE discriminated between those who reported a concern about their care versus those who had not, with those who had not reported a concern being expected to report higher QCE scores in general.

2.6. Statistical analysis

The data set was weighted so that the analyses with each group was representative of the home and residential care population in Australia. Descriptive data were analysed using STATA Version 15.1, Stata Corp LLC, Texas, USA (Texas USA). The difference in the QCE scores by socio-demographics were tested using Pearson's chi-squared tests (categorical dichotomous variables) or Mann Whitney U Tests (continuous outcome variable) and Kruskal Wallis test (categorical three or more groups) with post-hoc Mann Whitney U tests for difference between groups. Based on the test of normality, Spearman's rho (skewed distribution) or Person's correlations (normal distribution) were used to establish relationships between the QCE scores, socio-demographic variables and other measures (CASP12, GLS, service concerns). All statistical analyses used a level of significance at 2-sided alpha of ≤ 0.05 .

3. Results

3.1. Socio-demographics of the residential and home care sample

Socio-demographic details of the people included in the analysis of the residential care and home care samples are presented in Tables 3 and 4 respectively. More than two thirds of respondents were female and 75 years and over in both samples. There were significantly more proxies in the home care ($n=234$, 31.0%) sample than in the residential care ($n=11$, 3.4%) sample. Overall, the residential aged care sample had higher QCE scores than the home care sample (median scores of 0.95 vs 0.92). Proxies exhibited significantly lower QCE scores than the aged care recipient in both the samples (Mann-Whitney Test: residential care, $z=2.4$ $P=0.001$; home care, $z=3.0$ $p=0.002$) suggesting that proxies of the aged care recipient perceived a lower quality of aged care experience than older people themselves.

Table 3: Residential care sample socio-demographic characteristics

Variables		All (n=328)			Self (n=317)			Proxy (n=11)		
		n	Unweighted %	Weighted %	n	Unweighted %	Weighted %	n	Unweighted %	Weighted %
Gender	Male	116	35.4	36.4	113	35.6	37	3	27.3	21.2
	Female	212	64.6	63.6	204	64.4	63	8	72.7	78.8
Age	45-54 years	2	0.6	1.4	2	0.6	1.4			
	55-64 years	7	2.1	2.1	7	2.2	2.1			
	65-74 years	43	13.1	12.7	43	13.6	13.2			
	75 - 84 years	101	30.8	30.2	97	30.6	30.2	4	36.4	29.9
	85 - 94 years	135	41.2	42.8	129	40.7	41.9	6	54.5	63.1
	95 years and older	36	11	10.3	35	11	10.4	1	9.1	7
	Missing	4	1.2	0.7	4	1.3	0.7			
Marital status	Single (never married)	39	11.9	12.7	38	12	12.9	1	8	13.9
	Married/de-facto	83	25.3	25.7	80	25.2	25.8	3	21.9	33.3
	Divorced/Separated	38	11.6	11	37	11.7	11.1	1	7.7	8.3
	Widowed	167	50.9	50.3	161	50.8	49.8	6	62.4	44.4
	Missing	1	0.3	0.3	1	0.3	0.3			
Region	Metro	215	65.5	60	207	65.3	60	8	72.7	58.3
	Regional	113	34.5	40	110	34.7	40	3	27.3	41.7
Type of facility	For profit	112	34.1	41	108	34.1	40.7	4	36.4	48.2
	Government	29	8.8	5.1	28	8.8	5	1	9.1	8
	Non-profit	187	57	53.9	181	57.1	54.3	6	54.5	43.8
Facility size	0-60	82	25	27	80	25.2	27.5	2	18.2	15
	61-100	95	29	25.5	89	28.1	24.7	6	54.5	43.1
	100+	151	46	47.6	148	46.7	47.8	3	27.3	41.9
Duration of stay in the aged care home	6 weeks to 6 months	40	12.2	12	40	12.6	12.5			
	Between 6-12 months	54	16.5	17.3	53	16.7	17.8	1	9.1	7
	1-2 years	66	20.1	20.5	65	20.5	21	1	9.1	7.7
	2-5 years	114	34.8	33	108	34.1	32.6	6	54.5	42.8
	5-10 years	33	10.1	11.8	30	9.5	10.5	3	27.3	42.5
	Over 10 years	15	4.6	4.1	15	4.7	4.3			
	Don't know	6	1.8	1.3	6	1.9	1.4			
Interpreter required	No	324	98.8	98.8	313	98.7	98.7	11	100	100
	Yes	4	1.2	1.2	4	1.3	1.3			
QCE scores	Mean (SD)	0.91 (0.10)			0.92 (0.10)			0.80 (0.17)		
	Median (IQR)	0.95 (0.86-1.0)			0.95 (0.87-1.0)			0.88 (0.60-0.97)		
	Range	0.54-1.0			0.55-1.0			0.54-1.0		

Note: QCE= Quality of Care Experience

Table 4: Home care sample socio-demographic characteristics

Variables		All (n=755)			Self (n=521)			Proxy (n=234)		
		n	Unweighted %	Weighted %	n	Unweighted %	Weighted %	n	Unweighted %	Weighted %
Gender	Male	236	31.3	31.7	148	28.4	28.4	88	37.6	38.8
	Female	519	68.7	68.3	373	71.6	71.6	146	62.4	61.2
Age*	45-54 years	3	0.4	0.3	3	0.6	0.5	-	-	-
	55-64 years	13	1.7	1.5	12	2.3	2.1	1	0.4	0.2
	65-74 years	131	17.4	16.9	105	20.2	19.3	26	11.1	11.7
	75 - 84 years	316	41.8	41.3	234	44.9	44.9	82	35.1	33.7
	85 - 94 years	265	35.1	35.9	154	29.6	30.2	111	47.4	48.1
	95 years and older	25	3.3	3.5	11	2.1	2.2	14	6.0	6.3
	I'd prefer not to say	2	0.3	0.6	2	0.4	0.8	-	-	-
Remoteness region	Major Cities of Australia	489	64.8	67.4	320	61.4	64.4	169	72.2	73.8
	Inner Regional Australia	186	24.6	25.4	143	27.5	27.8	43	18.4	20.3
	Outer Regional/Remote/Very Remote	80	10.6	7.2	521	11.1	7.8	22	9.4	5.9
Provider type*	For profit	146	19.4	20.4	94	18.1	19.6	52	22.2	21.9
	Not For Profit	501	66.4	72.3	347	66.7	72.5	154	65.8	71.9
	Government	107	14.2	7.3	79	15.2	7.8	28	12.0	6.2
HCP level	Level 1	123	16.3	8.0	106	20.3	19.1	17	7.3	3.6
	Level 2	246	32.6	42.6	198	38.0	50.6	48	20.5	25.6
	Level 3	182	24.1	20.2	118	22.7	18.9	64	27.3	23.0
	Level 4	204	27.0	29.2	99	19.0	20.5	105	44.9	47.8
Home care duration	Less than 1 year	116	15.4	13.0	95	18.2	15.3	21	9.0	8.0
	1 - 2 years	363	48.1	49.7	258	49.5	51.2	105	44.9	46.6
	3 - 5 years	207	27.4	28.5	124	23.8	25.8	83	35.5	34.4
	Over 6 years	63	8.3	8.1	41	7.9	7.2	22	9.4	9.9
	Don't know	6	0.8	0.7	3	0.6	0.5	3	1.3	1.1
Interpreter required	No	706	93.5	92.8	480	92.1	91.2	226	96.6	96.2
	Yes	49	6.5	7.2	41	7.9	8.8	8	3.4	3.8
QCE score	Mean (SD)	0.88 (0.13)			0.89 (0.13)			0.87 (0.13)		
	Median (IQR)	0.92 (0.83-0.99)			0.93 (0.85-0.99)			0.89 (0.8-0.97)		
	Range	0.22-1.0			0.22-1.0			0.31-1.0)		

Note: QCE= Quality of Care Experience

3.2. Psychometric properties and validity

3.2.1. Acceptability and targeting

In total, 391 residential care and 869 home care users or proxy assessors completed the QCE instrument. More than 70% of residential and home care participants responded to either mostly or always (i.e. endorsed two higher level response categories) across all 6 attributes of the QCE (Table 5). A total of 63 (16.1%) and 114 (13%) of the participants from the residential and home care samples respectively had one or more missing data responses across the QCE attributes. However, only one attribute had >5% missing data in the residential sample (attribute 6-feedback, 7.7%) and home care sample (attribute-5 social connectedness, 6.0%). This suggests good acceptability overall of the QCE in the study populations. As missing data precludes estimating the QCE preference scores, study participants who had missing data in any of the QCE attributes were removed from further analyses. There was no significant difference in age and gender between those included and excluded from the study.

Table 5: Category utilisation across the Quality of Care Experience questionnaire in the residential care and home care samples

Item	Categories	Residential care (N=391) (N, %)	Home care (N=869) (N, %)
1. I am treated with respect and dignity	Never	1 (0.1)	1 (0.1)
	Rarely	8 (0.6)	7 (0.8)
	Sometimes	75 (5.9)	37 (4.3)
	Mostly	230 (18.2)	158 (18.2)
	Always	947 (75.1)	663 (76.2)
	Don't Know/ Missing data	0	0
2. I am supported to make my own decisions about the care and services I receive	Never	23 (1.8)	26 (3.0)
	Rarely	40 (3.2)	22 (2.5)
	Sometimes	96 (7.6)	79 (9.1)
	Mostly	378 (30.0)	198 (22.8)
	Always	703 (55.7)	523 (60.2)
	Don't Know/ Missing data	21 (1.7)	21 (2.4)
3. I receive care and support from aged care staff who have the appropriate skills and training	Never	1 (0.1)	18 (2.1)
	Rarely	14 (1.1)	21 (2.4)
	Sometimes	174 (13.8)	78 (9.0)
	Mostly	357 (28.3)	237 (27.3)
	Always	696 (55.2)	494 (56.8)
	Don't Know/ Missing data	19 (1.5)	21 (2.4)
4. I receive services and support for daily living that are important for my health and wellbeing	Never	3 (0.2)	40 (4.6)
	Rarely	7 (0.6)	33 (3.8)
	Sometimes	109 (8.6)	78 (9.0)
	Mostly	316 (25.1)	225 (25.9)
	Always	799 (63.4)	476 (54.8)
	Don't Know/ Missing data	27 (2.1)	17 (2.0)
5. I am supported to maintain my social relationships and connections with the community	Never	27 (2.1)	88 (10.1)
	Rarely	71 (5.6)	61 (7.0)
	Sometimes	129 (10.2)	125 (14.4)
	Mostly	332 (26.2)	179 (20.6)
	Always	664 (52.7)	364 (41.9)
	Don't Know/ Missing data	38 (3.0)	52 (6.0)*
6. I am comfortable lodging complaints, with confidence that appropriate action	Never	42 (3.3)	47 (5.4)
	Rarely	51 (4.0)	48 (5.5)
	Sometimes	169 (13.4)	107 (12.3)
	Mostly	315 (25.0)	192 (22.1)
	Always	587 (46.6)	439 (50.5)
Don't Know/ Missing data	97 (7.7)*	36 (4.1)	

*Values outside thresholds values are in bold.

3.2.2. Internal consistency reliability, attribute-test correlations and fit statistics

Internal consistency reliability of the QCE was high as demonstrated by Cronbach’s alpha ≥ 0.70 (or near) for the attributes and overall test in both residential and home care samples (Table 6). This indicates that the QCE is a fit for purpose reliable measure of quality of care experience in aged care settings. The item-test correlations for attribute-1 (respect) and attribute-5 (relationship) in the residential care sample and attribute-4 (health) and attribute-5 (relationship) in the home care sample were slightly lower than those for other items. However, the correlation co-efficient values for these attributes were close to those for other items suggesting that all 6 attributes contributed well into the overall measure of the quality of care construct in both samples. Furthermore, all six QCE attributes demonstrated adequate Rasch analysis model-based infit and outfit fit statistics (Table 7) to form an overall test, providing further evidence that the QCE measure forms a uni-dimensional construct of quality of care experience in aged care.

Table 6: Correlations and Cronbach’s alpha co-efficient of the Quality of Care Experience questionnaire and its attributes

Attributes	Residential care		Home care	
	Attribute-test correlation	Cronbach’s alpha	Attribute-test correlation	Cronbach’s alpha
Respect	0.66	0.77	0.67	0.70
Decision	0.73	0.74	0.67	0.70
Skills	0.73	0.74	0.70	0.69
Health	0.72	0.75	0.63	0.71
Relationship	0.62	0.78	0.61	0.72
Feedback	0.71	0.75	0.68	0.70
Overall test		0.79		0.74

Table 7: Rasch based fit indices of the Quality of Care Experience questionnaire and its attributes

Attributes	Residential care		Home care	
	Infit MNSQ	Outfit MNSQ	Infit MNSQ	Outfit MNSQ
Respect	0.94	0.95	0.91	0.77
Decision	0.88	0.88	0.96	0.99
Skills	0.94	0.92	0.93	0.96
Health	0.91	0.89	1.07	1.10
Relationship	1.29	1.36	1.18	1.12
Feedback	1.03	1.02	0.99	0.95
Overall	1.00	1.00	1.01	0.98

Note: MNSQ= Mean Square statistics

3.2.3. Attribute-invariance test of dependency

All the attributes exhibited acceptable correlations (<0.60) with other attributes, indicating attribute independence whereby the response to a single QCE attribute was not unduly influenced by responses to other QCE attributes (Table 8). This is an important psychometric expectation of a new instrument which was met by the QCE in both residential care and home care samples [Petrillo et al. 2015].

Table 8: Person correlation co-efficient matrix for 6 attributes of the Quality of Care Experience questionnaire in the residential care and home care samples

Residential care sample						
	Respect	Decision	Skills	Health	Relationship	Feedback
Respect	1.0					
Decision	0.33	1.0				
Skills	0.36	0.47	1.0			
Health	0.38	0.44	0.46	1.0		
Relationship	0.32	0.32	0.34	0.33	1.0	
Feedback	0.39	0.49	0.41	0.39	0.29	1.0
Home care sample						
Respect	1.0					
Decision	0.33	1.0				
Skills	0.43	0.34	1.0			
Health	0.24	0.28	0.39	1.0		
Relationship	0.24	0.34	0.24	0.29	1.0	
Feedback	0.38	0.37	0.38	0.29	0.28	1.0

Note: Item dependency <0.3 best: acceptable ≥0.3 <0.6

3.2.4. Construct validity of the QCE instrument with other instruments

We hypothesised that there would be low to moderate but significant correlations between the QCE and the CCI-6D dimensions/overall utility scores, Global Satisfaction of Life, social care related quality of life (ASCOT) and psycho-social quality of life (CASP). A high correlation (>0.70) indicates that the two scales are measuring similar constructs, making two questionnaires less necessary. However, a low to moderate correlation indicates that the two instruments are measuring distinct but associated constructs (convergent validity).

For the residential care sample, there were moderate and significant correlations between the QCE score and the CCI-6D dimensions (with the exception of own room and garden & outdoor), the overall utility scores of the CCI-6D, and the Global Satisfaction of Life score (Table 9). Similar, moderate and significant correlations were observed with the ASCOT and CASP in home care sample (Table 9). The findings suggest that the QCE is measuring a construct which is different to these other instruments. The QCE score was found to be associated with these other measures in the expected directions, indicating good construct validity of the QCE.

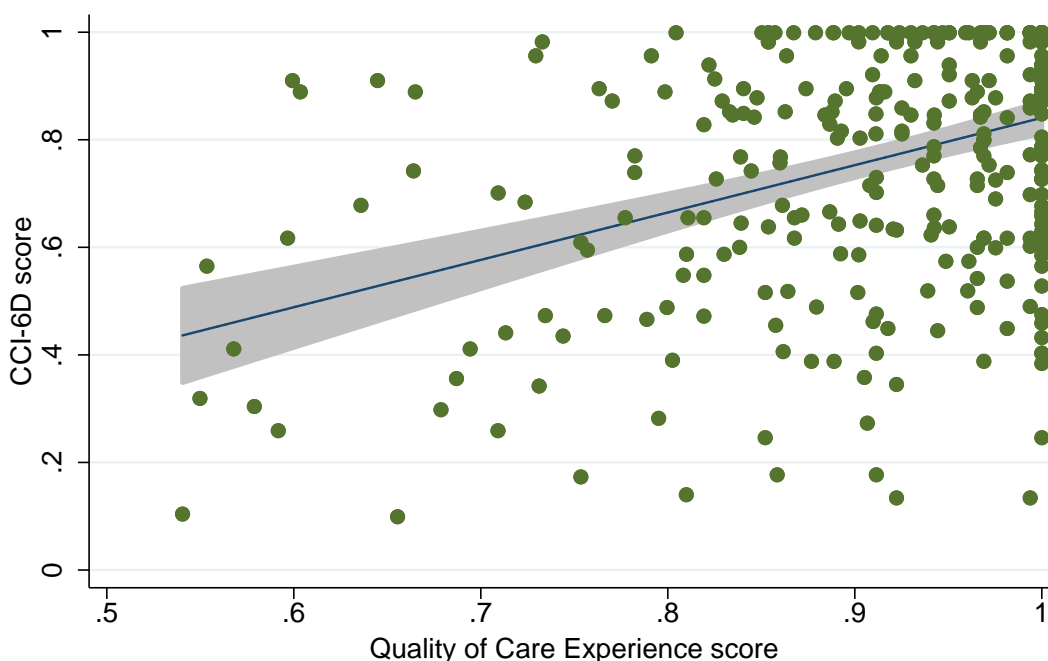
Table 9: Relationship between the Quality of Care Experience and other instruments

Residential care sample	Spearman's rho	P
CCI-6D_staff time	0.33	<0.001
CCI-6D_shared space	0.33	<0.001
CCI-6D_own room	0.18	0.0012
CCI-6D_garden & Outdoor	0.24	<0.001
CCI-6D_feel valued	0.37	<0.001
CCI-6D_flexibility_care routine	0.31	<0.001
CCI-6D_total	0.37	<0.001
Global Satisfaction of Life	0.40	<0.001
Home care sample		
CASP	0.30	<0.001
ASCOT	0.35	<0.001
Global Satisfaction of Life	0.30	<0.001

Note: CCI= Consumers Choice Index; CASP=Control, Autonomy, Self-realisation and Pleasure; ASCOT= Adult Social Care Outcome Toolkit

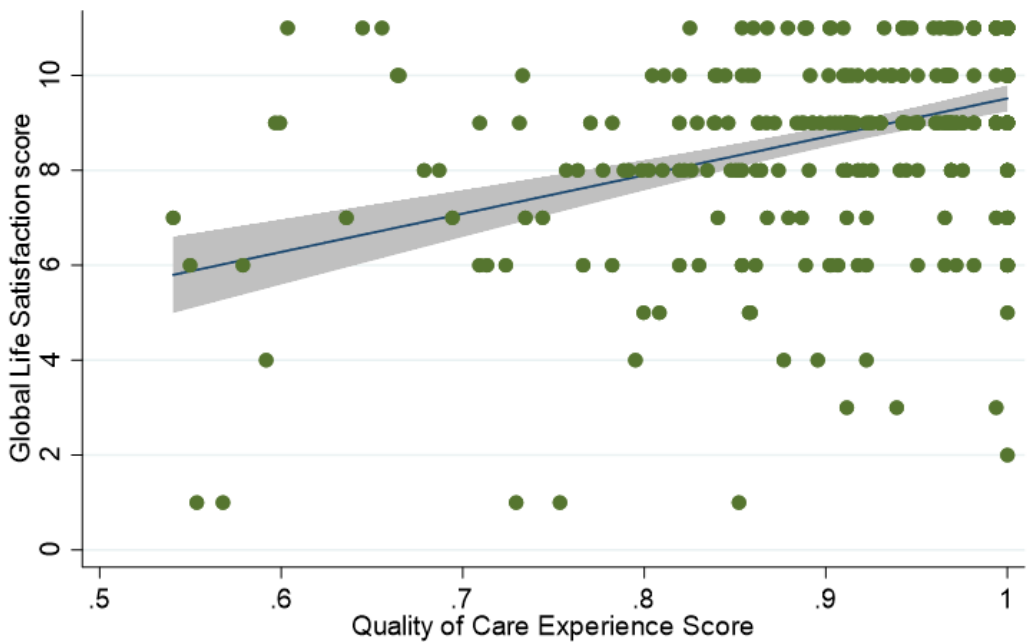
The residential aged care sample completed the QCE, CCI-6D and the Global Satisfaction of Life instrument. We produced scatter plots to assess the direction of the relationships between the QCE and other measures. We found that a higher QCE score (i.e. a better perceived quality of care) was associated with a higher CCI-6D index score (i.e. a better quality of care in a long term care, Figure 1) and a higher score on the Global Satisfaction of Life (i.e. a better life satisfaction, Figure 2) and vice versa.

Figure 1: Scatter plot showing the relationship between the Quality of Care Experience and the Consumer Choice Index overall utility scores in the residential care sample



Note: Blue line denotes the fitted values and grey area around the line denotes 95% confidence interval

Figure 2: Scatter plot showing the relationship between the Quality of Care Experience and the Global Life Satisfaction scores in the residential care sample



Note: Blue line denotes the fitted values and grey area around the line denotes 95% confidence interval

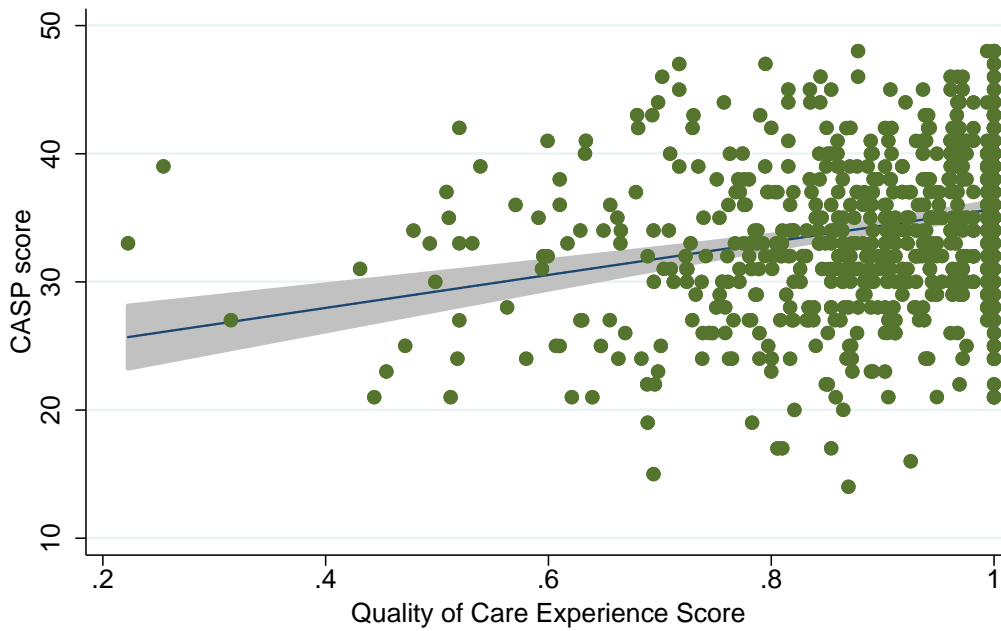
The home care sample completed two measures of quality of life (ASCOT and CASP) and the Global Satisfaction of Life. We found that a higher QCE score (i.e. a better perceived quality of care) was associated with a higher ASCOT score (i.e. a better social care-related quality of life, Figure 3), a higher CASP score (i.e. a better psychological needs satisfaction-related quality of life, Figure 4) and a higher score on the Global Satisfaction of Life (a better life satisfaction, Figure 5), and vice versa.

Figure 3: Scatter plot showing the relationship between the Quality of Care Experience instrument and the Adult Social Care Outcomes Tool Kit (ASCOT) in the home care sample



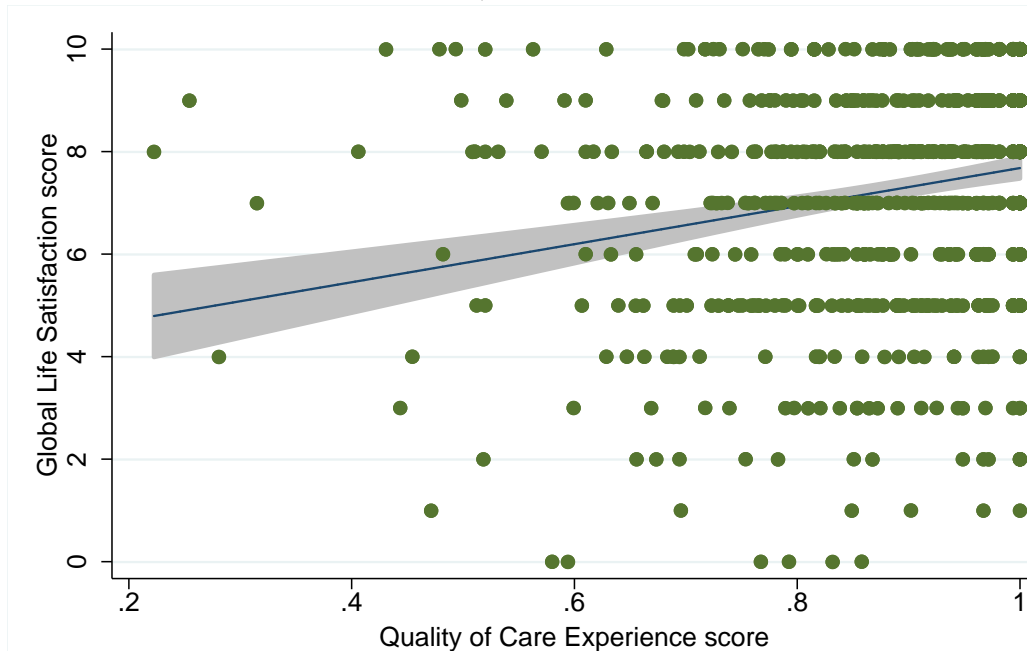
Note: Blue line denotes the fitted values and grey area around the line denotes 95% confidence interval

Figure 4: Scatter plot showing the relationship between the Quality of Care Experience and the Control, Autonomy, Self-realisation and Pleasure (CASP) instrument in the home care sample



Note: Blue line denotes the fitted values and grey area around the line denotes 95% confidence interval

Figure 5: Scatter plot showing the relationship between the Quality of Care Experience and the Global Life Satisfaction scores in the home care sample

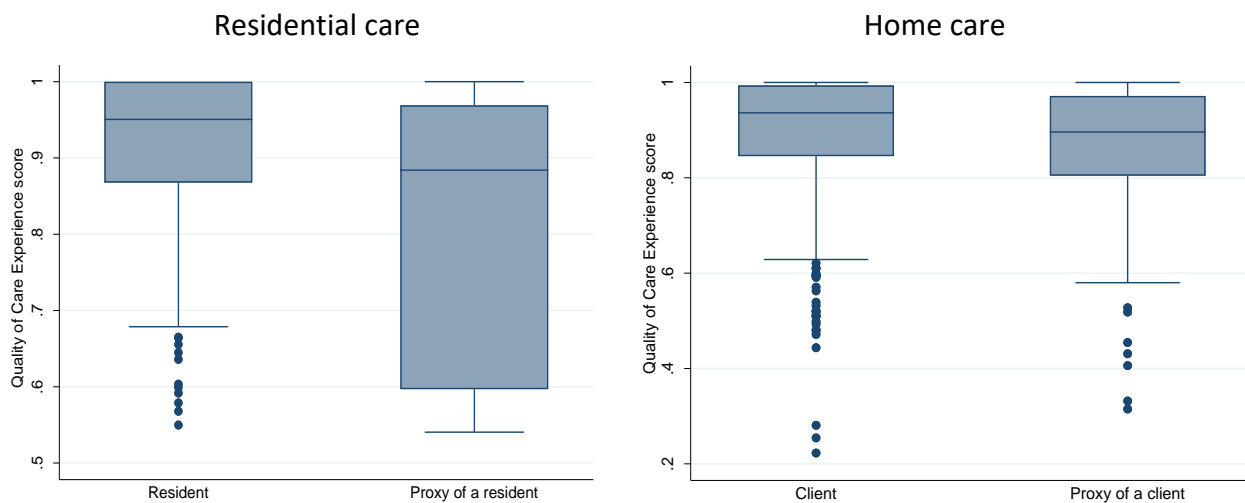


Note: Blue line denotes the fitted values and grey area around the line denotes 95% confidence interval

3.2.5. The QCE and respondent types, gender and age

Proxies of the clients showed significantly lower median QCE scores than the aged care recipients themselves (self-reported) both in the residential and home care samples (Figure 6 and Table 10). Females had statistically significantly better median QCE scores than males in the residential care sample ($P=0.04$). Higher scores in females were also observed in the home care sample but these differences were not found to be statistically significant. With the exception of the youngest age group, the QCE scores increased with age in the residential sample but the differences in scores were not statistically significant. There were no significant differences in the quality of care experience by age in the home care sample.

Figure 6: Box and whisker plots showing the difference in the Quality of Care Experience Score between care recipients and proxies



3.2.6. The QCE and the characteristics of the aged care providers

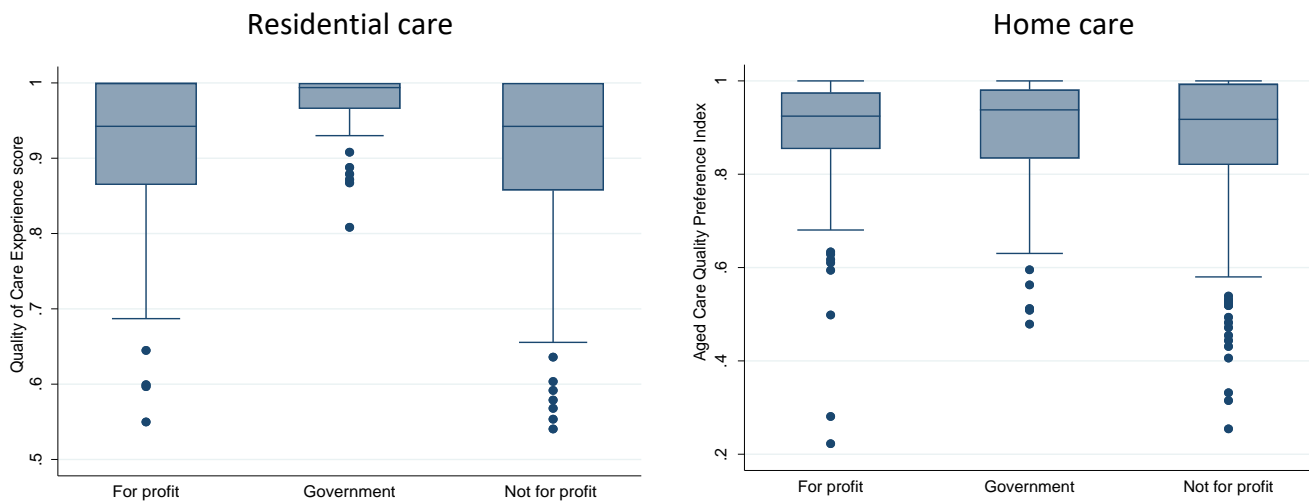
Respondents using services from government providers had higher QCE scores than not-for-profit and for-profit providers. However, the difference in scores were statistically significant in the residential care sample only (Table 10 and Figure 7). Post-hoc analyses showed that there were statistically significant differences in scores between government and not-for-profit ($P=0.001$), and government and for-profit providers ($P=0.004$), but not between not-for-profit and for-profit providers. Although not statistically significant, residents living in smaller aged care facilities (number of residents <60) reported a better quality of care experience than those living in larger facilities.

Table 10: The Quality of Care Experience scores stratified by demographic characteristics

Variables	Residential care sample		Home care sample	
	QCE score, Median (IQR)	P value	QCE score, Median (IQR)	P value
Gender				
Male	0.92 (0.85-0.99)	0.04*	0.91 (0.83-0.98)	0.69*
Female	0.96 (0.88-1.0)		0.93 (0.82-0.99)	
Age group				
45-64 yrs	0.94 (0.82-0.99)	0.24#	0.92 (0.88-0.98)	0.99#
65-74 yrs	0.90 (0.83-1.0)		0.92 (0.83-0.99)	
75-84 yrs	0.93 (0.87-0.99)		0.92 (0.83-0.99)	
84-95 yrs	0.96 (0.89-1.0)		0.92 (0.82-0.99)	
≥95 yrs	0.96 (0.85-1.0)		0.91 (0.85-0.99)	
Respondent type				
Client Self	0.95 (0.87-1.0)	0.001*	0.94 (0.84-0.99)	0.002*
Proxy	0.88 (0.60-0.97)		0.90 (0.80-0.97)	
Provider type				
Not for profit	0.94 (0.86-1.0)	0.01#	0.92 (0.82-0.99)	0.93
For profit	0.94 (0.85-1.0)		0.92 (0.85-0.97)	
Government	0.99 (0.96-1.0)		0.94 (0.83-0.98)	
Size of the facility				
<60	0.97 (0.87-1.0)	0.35#	-	
61-100	0.94 (0.85-1.0)			
100+	0.94 (0.86-1.0)			
Number of concerns expressed				
0	0.99 (0.94-1.0)	<0.001#	0.97 (0.90-1.0)	<0.001#
1	0.97 (0.89-1.0)		0.92 (0.82-1.0)	
2	0.94 (0.83-1.0)		0.93 (0.84-0.97)	
≥3	0.89 (0.81-0.96)		0.86 (0.76-0.93)	
Home Care Package Levels				
Level 1			0.90 (0.79-0.99)	0.05#
Level 2			0.94 (0.85-0.99)	
Level 3			0.91 (0.80-0.97)	
Level 4			0.93 (0.83-0.99)	

Note: *Mann Whitney Test; #Kruskall Wallis Test; statistically significant values are in bold.

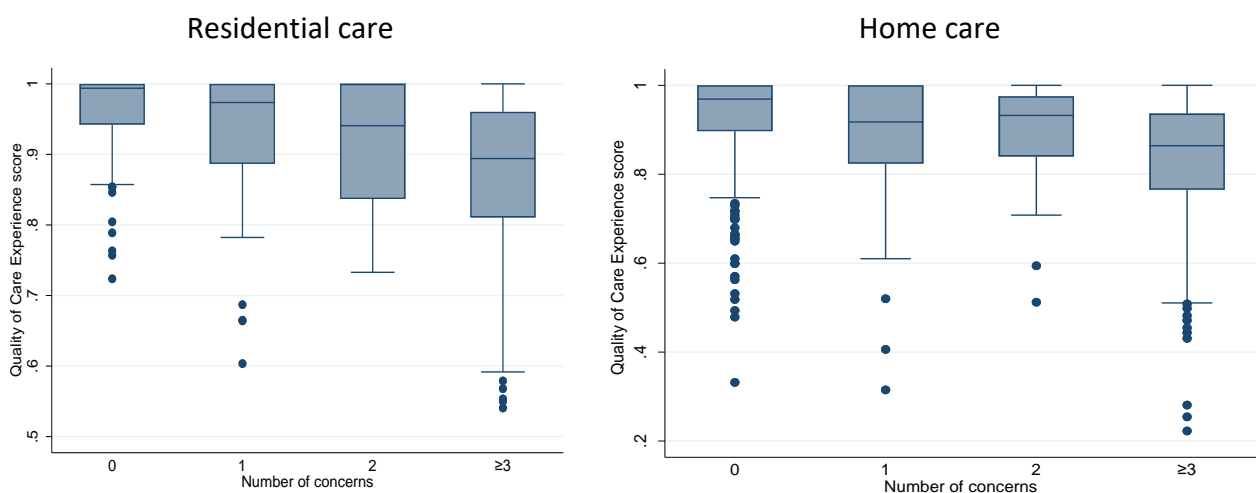
Figure 7: Box and whisker plots showing the difference in the Quality of Care Experience Score between aged care provider types



3.2.7. The QCE and the number of concerns expressed

We hypothesised that older people with concerns about the services they receive would exhibit poorer QCE scores those without concerns, and also the higher the number of concerns expressed the lower the QCE score on average. There were statistically significant differences in the QCE scores for those who expressed concerns with the services they were receiving, both in the residential and home care samples (Table 10 and Figure 8). The higher the number of concerns, the lower the QCE scores, indicating that respondents who expressed concerns about the care quality they were receiving tended to score relatively poorly on the QCE. The number of concerns expressed was associated with poorer QCE scores with significant differences between all the groups in the home care sample ($P \leq 0.004$). In the residential aged care sample there were statistically significant differences within and between all groups ($P \leq 0.003$) with the exception of the comparisons between respondents with 1 and 2 concerns ($P = 0.13$). These findings support our priori hypothesis indicating both construct and known-group validity of the QCE.

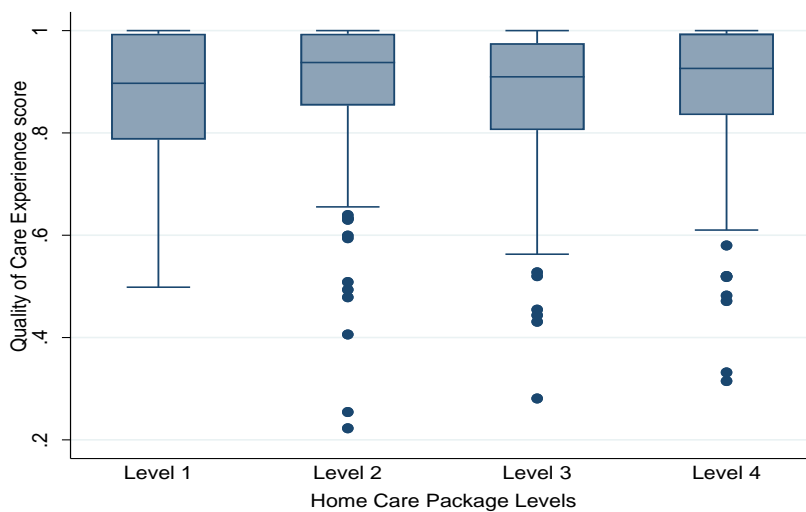
Figure 8: Box and whisker plots showing the difference in the Quality of Care Experience Score by number of concerns raised



3.2.8. The QCE and home care package (HCP) levels

There were statistically significant differences in QCE scores across the four levels of HCP (Table 10 and Figure 9). The respondents receiving HCP level 1 scored lowest and HCP2 scored highest on the QCE. When compared between groups, there was a significant difference in the QCE scores between level 1 and level 2 ($P=0.01$) and level 2 and level 3 ($P=0.008$). However, there was no statistically significant difference between level 1 and level 3 ($P=0.49$), level 1 and level 4 ($P=0.10$), level 2 and level 4 ($P=0.15$), and level 3 and level 4 ($P=0.09$).

Figure 9: Box and whisker plots showing the difference in the Quality of Care Experience score by the level of home care packages



4. Discussion and conclusions

This study has demonstrated that the QCE questionnaire is a fit for purpose tool to assess the quality of care experience from the perspectives of older people and family carers, in both residential and home care settings. The QCE met a series of CTT and other modern psychometric criteria, as well as tests of construct, convergent and known group validity (demonstrating the ability of the QCE to discriminate between groups who are known to be different in care experience e.g. those who reported any concerns about their care versus those who reported no concerns).

The QCE is a relatively concise and brief questionnaire (6 questions with 5 response options). The vast majority of the study participants were able to complete the QCE, indicating the practicality of applying the measure with older people and proxy family carers in aged care settings.

Aged care currently lacks routine measurement of the quality of care experience from the perspective of older people or their family members. If the QCE questionnaire were to be incorporated into routine national data collection, it would provide this missing part of the picture about how the aged care system performs. Use of the QCE would also show variations in the quality of care experience across different aged care providers and facilities, helping to drive efforts to continuously improve the quality of services for older people. Similarly, use of the QCE questionnaire in aged care would provide longitudinal data needed to monitor the performance of reforms over time.

5. References

- Batchelor, F., S. Savvas, C. Dang, A. Goh, P. Levinger, A. Peck, I. Katz and B. Dow Inside the system: aged care residents' perspectives. , National Ageing Research Institute: Parkville, Victoria, Australia. Oct 2020. .
- Batchelor, F., S. Savvas, A. Peck, C. Dang, C. Wade, A. Goh and B. Dow (2020). Inside the system: home and respite care clinets perspectives. . S. S. Frances Batchelor, Anabelle Peck, Christa Dang, Christina Wade, Anita and B. D. M.Y. Goh, National Ageing Research Institute: Parkville, Victoria, Australia. Oct 2020. .
- Kandel, H., J. Khadka, M. Goggin and K. Pesudovs (2017). "Patient-reported Outcomes for Assessment of Quality of Life in Refractive Error: A Systematic Review." Optom Vis Sci **94**(12): 1102-1119.
- Kerry, M. J. (2018). "Bifactor model of the CASP-12's general factor for measuring quality of life in older patients." J Patient Rep Outcomes **2**(1): 57.
- Khadka, J., C. McAlinden and K. Pesudovs (2013). "Quality assessment of ophthalmic questionnaires: review and recommendations." Optom Vis Sci **90**(8): 720-744.
- Malley, J. N., A. M. Towers, A. P. Netten, J. E. Brazier, J. E. Forder and T. Flynn (2012). "An assessment of the construct validity of the ASCOT measure of social care-related quality of life with older people." Health Qual Life Outcomes **10**: 21.
- Milte, R., J. Ratcliffe, C. Bradley, W. Shulver and M. Crotty (2019). "Evaluating the quality of care received in long-term care facilities from a consumer perspective: Development and construct validity of the Consumer Choice Index – Six Dimension instrument." Ageing and Society **39**(1): 138-160.
- Nguyen, T., J. Robinson, S. Nguyen and T. Chinh (2015). "Examining ordering effects in discrete choice experiments: a case study in Vietnam." Economic Analysis and Policy **45**: 39-57.
- Petrillo, J., S. J. Cano, L. D. McLeod and C. D. Coon (2015). "Using Classical Test Theory, Item Response Theory, and Rasch Measurement Theory to Evaluate Patient-Reported Outcome Measures: A Comparison of Worked Examples." Value Health **18**: 25-34.
- Ratcliffe, J., G. Chen, J. Cleland, B. Kaambwa, J. Khadka, C. Hutchinson and R. Milte (2020). Australia's aged care system: assessing the views and preferences of the general public for quality of care and future funding. , Caring Futures Institute, Flinders University, South Australia, July 2020.