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Development of a Long-Term Conditions Questionnaire (LTCQ) social care subscale (LTCQ-S)

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Background

The 20-item Long-Term Conditions Questionnaire (LTCQ) is a patient-reported outcome measure (PROM) which aims to capture the experience of 'living with long-term conditions' (LTCs). The LTCQ has been developed (Peters et al., 2016) and validated (Potter et al., forthcoming) for use in both health and social care settings with individuals who have physical health conditions, mental health conditions and multiple health conditions. There may be certain items in the LTCQ that capture the experience of those who have LTCs who receive social care, so it is important to highlight patient-reported outcomes specific to those who receive social care services.

Aim

To examine the psychometric properties of the LTCQ using Rasch analysis in a sample of participants with LTCs who receive social care services.

Procedure (as part of a larger study)

- 2,294 participants receiving long-term social care support were invited to take part, 295 participants were successfully recruited (12.86% response rate).
- Invited via local authorities in four different geographical regions in England between July 2016 and February 2017.
- To complete a questionnaire containing the LTCQ, alongside other questions on demographics, comorbidities, functioning and quality of life.

Method: Rasch analysis of the LTCQ (using Winsteps Rasch 3.92.0 software)

Steps	Psychometric property	Aim	Criterion
1	Rating scale function	Assess the scale's functionality, i.e. does the scale advance monotonically.	Goodness-of-fit: <2.0 outfit mean square fit statistic (MNSQ), minimum 10 participants per value per item
2	Internal scale validity	Examine how well the item responses match the expected responses in the Rasch model	Item goodness-of-fit: ≤ 1.2 MNSQ, worst fitting item was removed one at a time and models were subsequently run.
3	Dimensionality	Assess if the scale measures a single construct	>50% total variance explained by 1 st component (Rasch model), additional components $\leq 5\%$ (or eigenvalue ≤ 2.0) after removal of 1 st component. No more than 1 out of 20 (or 5%) of the residual correlations > 0.30
4	Person response validity	Examine how well the participant responses match the expected responses in the Rasch model	Item goodness-of-fit: ≤ 1.5 infit MNSQ and z-value ≤ 2.0 $\leq 5\%$ of sample shows poor goodness-of-fit to Rasch model
5	Internal consistency	Assess if the scale responses are consistent	Cronbach's alpha > 0.80

Results of Rasch analysis

Rating scale function	Internal scale validity	Dimensionality	Person response validity (# of misfitted participants)	Internal consistency	Items changed	
3 items	4 items Infit MNSQ >1.2	1: 52.6% 2: 6.9% (eigenvalue=2.9)	37 (12.5%)	0.92	-	Model 1 • 20 items
4 items	5 items Infit MNSQ >1.2	1: 54.8% 2: 6.8% (eigenvalue=2.8)	36 (12.2%)	0.92	Deleted LTCQ-Knowledge & 7 respondents	Model 2 • 19 items
3 items	5 items Infit MNSQ >1.2	1: 53.8% 2: 7.2% (eigenvalue=2.8)	35 (11.9%)	0.92	Deleted LTCQ-Dependent	Model 3 • 18 items
4 items	4 items Infit MNSQ >1.2	1: 55.4% 2: 6.9% (eigenvalue=2.6)	36 (12.2%)	0.92	Deleted LTCQ-Stigma	Model 4 • 17 items
2 items	3 items Infit MNSQ >1.2	1: 51.7% 2: 7.3% (eigenvalue=1.81)	27 (9.18%)	0.88	Deleted LTCQ-Role, LTCQ-Physical, LTCQ-Control, LTCQ-Enjoy.	Model 5 • 12 items
2 items	3 items Infit MNSQ >1.2	1: 51.8% 2: 7.1% (eigenvalue=1.90)	33 (11.2%)	0.89	Re-instated LTCQ-Control	Model 6 • 13 items
3 items	3 items Infit MNSQ >1.2	1: 52.8% 2: 6.7% (eigenvalue=1.98)	32 (10.8%)	0.90	Re-instated LTCQ-Enjoy	Model 7 • 14 items
3 items	2 items Infit MNSQ >1.2	1: 54.3% 2: 7.0% (eigenvalue=2.0)	32 (10.8%)	0.90	Deleted LTCQ-Treatment	Model 8 • 13 items
2 items	3 items Infit MNSQ >1.2	1: 56.7% 2: 7.3% (eigenvalue=2.0)	24 (8.2%)	0.90	Deleted LTCQ-Services	Model 9 • 12 items
1 item	2 items Infit MNSQ >1.2	1: 56.7% 2: 7.8% (eigenvalue=1.98)	24 (8.2%)	0.89	Deleted LTCQ-Symptoms - checked removal of top 5 unfit respondents & found no differences in fit	Model 10 • 11 items

Discussion

- The resulting 11-item subscale derived from the 20-item LTCQ using Rasch analysis showed better psychometric properties in a sample of individuals who receive social care services.
- This shortened LTCQ includes key items within this sample and has the potential for a less burdensome method for collection of data.
- The 20-item scale explained 52.6% total variance by the first component ('living with long-term conditions'), however four items showed misfit to the Rasch model and one item that did not advance monotonically in the social care sample.
- The resulting 11-item subscale revealed a higher variance proportion (56.7%) explained by the first component in this sample. The eigenvalue for second dimension in the 11-item subscale was ≤ 2.0 (7.8% variance). These were considered to be noise rather than theoretical substantive factors.
- Both scales show limitations related to person response validity (both exceeded <5% of persons showing acceptable fit), although this improved in the 11-item subscale. No sociodemographic or differences in number of LTCs between the respondents with/without misfit, therefore misfitted individuals were included.
- Further analysis includes a confirmatory factor analysis to confirm the 11-item subscale.

References

Potter CM, Batchelder L, A'Court C, et al. The Long-Term Conditions Questionnaire (LTCQ): initial validation survey among primary care patients and social care recipients in England (forthcoming).
 Peters M, Potter CM, Kelly L, et al. 2016. The Long-Term Conditions Questionnaire: conceptual framework and item development. *Patient Related Outcome Measures* 7:109-125.

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