The Positive Psychology Outcome Measure (PPOM) for people with dementia: Psychometric properties and factor structure

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Conflict of Interest

The authors declare no conflicting interests.

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Author Contributions

CS oversaw recruitment, analysed data and wrote the manuscript. AS acted as Chief Investigator for the study, provided supervisory support to CS and commented on drafts of the manuscript. MO provided supervisory support, statistical advice and commented on drafts on the manuscript.

Abstract

Objectives: To conduct an in-depth psychometric assessment of the PPOM; a measure of hope and resilience. **Method:** An observational study at five NHS trusts across England. Participants either completed the study using self-complete or interview led procedures, dependent on their preference. Assessments were internal consistency, floor and ceiling effects, test-retest reliability, convergent validity and factor structure. **Results:** 225 participants were recruited and completed the study, with a subsample of 48 comprising the test-retest sample. Internal consistency was excellent α= .94, and significant correlations were observed between quality of life (*r* =.627, *p*<.001), depression (*r*= -.699, *p*<.001) and the Control, Autonomy, Self-realisation and Pleasure Scale (CASP-19; *r* = .73, *p*<.001). The PPOM remained moderately stable over a one week period (ICC: 880) and factor analyses indicated a two-factor structure solution with acceptable fit indices. **Discussion:** The PPOM has robust psychometric properties and is now suitable for use research and practice. People who met the clinical criteria for depression where more likely to have lower scores on the PPOM, indicating criterion validity. Future work is needed to establish the PPOM as sensitive to change and to investigate the relationship between hope, resilience and depression further.

Keywords: Alzheimer’s, reliability, validity, wellbeing.

Introduction

In the last twenty years quality of life has become recognised as a key outcome in dementia. However, despite this, the research literature has an overriding focus on negative aspects of the experience of dementia so that there has been almost nothing on positive psychology perspectives, with quality of life virtually the only measure of positive outcome for people with dementia. Whilst it is often inferred that a reduction in negative symptoms will increase quality of life, there is a need to also cover positive domains that may increase or contribute to quality of life. The approach of positive psychology recognises that, whilst people with dementia can face difficulties and challenges in day-to-day life, they also have the capacity for a positive life and that positive emotions or traits can contribute to a greater quality of life (Efklides & Moraitou, 2013).

Positive psychology (Seligman, 1998) theory refers to the study of positive emotions and traits that enable individuals, communities and organisations to thrive (Seligman, Steen, Park, & Peterson, 2005). Positive psychology focuses on the strengths and capabilities that people with dementia utilise in order to achieve or maintain wellbeing, in the face of difficulties or challenges faced, which has important implications for the understanding of wellbeing. However, a lack of gold standard outcome measures for people with dementia has hampered its evaluation within dementia research (Stoner, Orrell, & Spector, 2015).

An earlier development and pilot study indicated that hope and resilience were important concepts for people with dementia (Stoner, Orrell, Long, Csipke, & Spector, 2017). Despite hope within dementia previously receiving little attention

(Cotter, 2009), qualitative analysis indicated that hope was multifaceted, present on a day to day basis and generalised in nature, as consistent with previous studies (Wolverson, Clarke, & Moniz-Cook, 2010). Resilience was deemed also to be present within daily life and was defined more ambiguously with some referring to it as a form of emotional stamina in the face of difficulties. Furthermore, these concepts were seen as integral to maintaining wellbeing in everyday life. Due to the perceived importance of these particular concepts, they were integrated into a new outcome measure, that acts as an exemplar of positive psychology measurement in dementia. Termed the Positive Psychology Outcome Measure (PPOM; Stoner, 2017), the new 16-item measure consisted of an eight-item hope measure adapted from the Herth Hope Index (HHI; Herth, 1992) and an eight-item resilience measure developed with people with dementia, drawing on prominent theories of resilience within the literature (Connor & Davidson, 2003; Wagnild & Young, 1993).

Preliminary data suggested good psychometric properties and important implications for wellbeing in dementia but the sample size (n=33) was too small for an in-depth analysis of psychometric properties, factor structure and validity in terms of relatedness to well researched concepts of quality of life and depression. Therefore, the aim of this study was to conduct an in-depth psychometric assessment of the PPOM in a sample of older adults with dementia.

Methods

Design

A multi-site, observational study conducted at five National Health Service (NHS) trusts across England (Research Ethics Committee (REC) approval: 15/EE/0443).

The study was funded by a University College London (UCL) Grand Challenge of Human Wellbeing PhD study and consisted of one baseline questionnaire assessment and one retest assessment for a subsample of 48 participants. Measures could either be completed within an interview with a trained researcher or using a self-complete procedure. Methods for completion were discussed at point of contact with participants and was led by their preference.

Participants

Participants were recruited via the following avenues:

1) Referrals from support groups, memory clinics and previous research
2) The Join Dementia Research (JDR) Register (https://www.joindementiaresearch.nihr.ac.uk).

Participants were required to have a diagnosis of dementia according to DSM-IV criteria (American Psychiatric Association, 2000) and be deemed capable of providing informed consent. These inclusion criteria were purposefully all-encompassing to ensure that a wide range of people living with dementia were able to participate.

Procedure

Research assistants and clinical support officers at each NHS trust were responsible for identifying potential participants. Eligible participants were contacted to ascertain interest in the study and to establish capacity to give consent, via an informal capacity assessment. Staff at NHS trusts were also responsible for discussing participant preference with regard to manner of completion (interview or self-report). Participants were informed that that the questionnaire booklet could be sent to their address by post or email with a freepost return envelope, or that a research assistant could visit them at a place and time of their convenience to assist them with completion. Participants were encouraged to select the completion style that was most suitable for them. Instructions for self-completion and interview procedures were standardised across sites, ensuring that both methodologies were consistent across participants and sites.

Outcome Measures

Demographic and clinical information consisting of age, gender, ethnicity, dementia diagnosis, diagnosis date and current medication was collected. Participants were also asked to list any co-morbid ‘major mental or physical health problems’ they were currently experiencing. No restrictions were put on these additional diagnoses. Four outcome measures were selected to ascertain the convergent validity of the PPOM. These, in addition to the PPOM, are described below.

The Positive Psychology Outcome Measure (PPOM)

The PPOM measures the degree of hope and resilience for people with dementia. It is measured on a five-point Likert scale (0- not true at all, 4- true nearly all the time) and uses a one-month time frame (Stoner, Orrell, Long, Csipke, & Spector, 2017). It has an excellent level of internal consistency (α = .939; Stoner, 2017).

The Control, Autonomy, Self-realisation and Pleasure Scale (CASP-19)

Building on humanist psychology (Maslow, 1968), it views wellbeing as the satisfaction of four domains: control, autonomy, self-realisaton and pleasure. Each of the 19 questions is rated on a four-point Likert scale (0- never, 3 often), with higher scores reflecting increased satisfaction across domains. It was developed for older adults, for which adequate psychometric properties were reported and evidence emerged for a second order, latent quality of life factor solution (Hyde, Wiggins, Higgs, & Blane, 2003). The CASP-19 was assessed psychometrically as part of this study (Stoner, 2017).

The Geriatric Depression Scale Short Form (GDS-15)

The GDS consists of 15 dichotomous items (yes/ no), and was designed as a self-complete measure. A score of between 5-9 indicates mild depression, whilst a score of 10 or higher indicates severe and significant depression with a sensitivity specificity ratio of 84%: 95% (Yesavage, Brink, Rose, & Adey, 1983). The GDS has adequate psychometric properties for people with dementia (Lesher & Berryhill, 1994).

The Quality of Life in Alzheimer's Disease Scale (QoL-AD)

The QoL-AD consists of 13 items measured on a 4-point Likert scale, with scores ranging from 13 to 52 with higher scores indicate a better quality of life across domains. It can be used as a self-complete measure or within an interview, has an acceptable reported level of internal consistency (0.77-0.84) (Logsdon, Gibbons, McCurry, & Teri, 1999) and has demonstrated convergent validity with other quality of life (Thorgrimsen, et al., 2003) and health related measures (Wolak-Thierry, et al., 2015).

Analysis

A combination of mean and multiple imputations was selected to adjust for missing data. Mean imputation was conducted at the 10% level for the PPOM, GDS and CASP-19. The QoL-AD was imputed at the 20% level, based on previous studies (Logsdon, Gibbons, McCurry, & Teri, 1999). Following this, multiple imputation (Rubin, 1987) was applied at a measure level using 20 imputations as possible alternatives.

Measure norms and floor and ceiling effects were assessed using the mean, standard deviation, range and possible range. If less than 15% of respondents achieved the highest or lowest possible sores, ceiling and floor effects were not considered significant (Terwee, et al., 2007). Cronbach Alpha's were calculated to assess internal consistency at a measure and subscale level. To assess stability, Intraclass Correlation Coefficients (ICC) were used to assess linear agreement within a one-week period. To assess convergent validity (the degree to which concepts that are theoretically related are observed to be related on outcome measures of such concepts), Pearson's R correlations were calculated. It was hypothesised that a positive correlation would be observed between the PPOM and both the QoL-AD and CASP-19, and a negative correlation would be observed between the PPOM and GDS.

Factor structure was examined using best practice procedures. Firstly, data was randomly halved using SPSS and halves were labelled either 'construction' or 'validation'. Construction data was imported into MPlus and syntax was entered to conduct an Exploratory Factor Analysis (EFA) to identify the amount of 'latent' factors, or variables that were not overtly measured, and are usually denoted by an eigenvalue of one or greater (Kaiser, 1960). Factors identified within the EFA were then applied as Confirmatory (CFA) using the remaining validation data. To establish whether the proposed model was adequate, goodness of fit indexes were then used including chi-squared statistics, comparative fit index (CFI), standardised room mean square residuals (SRMR) and root mean square error of approximation (RMSEA). CFI values greater than .90 are generally acceptable, whilst SRMR values should be below .08. RMSEA values between .06 and .08 suggests acceptable model fit (Hu & Bentler, 1999). However, these values are considered guidelines with alternatives being suggested elsewhere (Schumacker, 2015).

Results

Participants

Participants consisted of 225 people with dementia (129 males and 96 females; Table 1), who were deemed capable of providing informed consent following an informal capacity assessment. Participants were, on average, 77.1 years of age (SD = 9.4), were most likely to have been diagnosed with Alzheimer's disease and had been living with dementia for under a year (Table 2). Depression was the most frequently reported co-morbid diagnosis, but examples of other diagnoses were diabetes (n = 11), cancer (n = 4), alcoholism (n = 1).

INSERT TABLE 1 AND 2 HERE

Internal Consistency

Internal consistency was very good with α= .94 and with no items identified as improving the internal consistency if deleted, meaning the PPOM had an adequate level of content validity. For the hope subscale, internal consistency was α=. 877 and, again, no items were identified as improving the internal consistency if removed. The resilience subscale had an internal consistency of α=. 919 with no items identified as improving the internal consistency if deleted.

Floor and Ceiling Effects

Possible scores ranged from 0- 64 and the observed range was 6-64 with a mean of 48.15 and standard deviation of 12.24. Analysis indicated that the PPOM was moderately, negatively skewed (- .83) and the kurtosis value was .354. No participants scored the lowest possible (0) and 14 participants achieved the maximum possible score of 64. This represented only 6.48% of the sample and therefore neither floor or ceiling effects for the PPOM were problematic.

Test-Retest Reliability

Consistency between the PPOM at test and retest was moderate (ICC= .687), with a Confidence Interval (CI) of .499 and .813. However, two outliers were identified. One participant scored 58 at baseline, whilst scoring 20 at retest and another participant scored 21 at baseline, whilst scoring 58 at retest. After these cases were removed from the analysis, consistency greatly improved with an ICC value of .880 and 95% CIs of .788 and .934. At a subscale level, consistency was ‘good’. The resilience subscale had an ICC value of .906, with a 95% CI from .832 to .948 and the hope subscale was considered moderate (ICC= .783), with a 95% CI of .632 to .877.

Convergent Validity

Both the hope and resilience subscales were significantly correlated with the QoL-AD (r =.597, p<.001; r =.548, p<.001), as was the measure total (r =.627, p<.001). The PPOM was also positively correlated with the CASP-19 (r = .73, p<.001), as were both the hope and resilience subscales (r = .699, p<.001; r = .642, p<.001), indicating convergent validity. A negative correlation was observed between both hope and resilience subscales (r = -.675, p<.001; r= -.594 p<.001) and between the GDS and PPOM total (r= -.699, p<.001). An independent samples t-test indicated that people who scored less than five on the GDS (n = 151), indicating few or no depressive symptoms, scored significantly higher on the PPOM (M= 52.25 SEM=.82) than those who scored ten or greater (n = 26) on the GDS (M= 29.38 SEM= 2.3) (t (1298723)= 10.497, p<.001), indicating those likely to have depressive symptomology were more likely to score lower on the PPOM.

Factor Structure

Eigenvalues during the EFA stage indicated the presence of two factors (8.574 and 1.142). Loadings indicated that items loaded onto two factors successfully, with all hope items significantly loading onto factor one and all resilience items significantly loading onto a second factor.

Fit indices were acceptable when this model was applied to validation half of data within the CFA stage and, whilst the chi-square analysis was significant, fit indices indicated acceptable fit when all data was integrated and the CFA re-run. All items significantly loaded onto their respective factor and a co-variance analysis indicated there was some shared variance between the hope and resilience factor (Figure 1).

Factor loadings at this stage ranged from 0.468 - 1.293. The two latent factors shared some covariance again (r = .5) and the average variance explained by the two factors was R^2= .55 for hope and R^2= .61 for resilience.

INSERT FIGURE 1 HERE

Discussion

Summary of Results

Overall the psychometric properties of the PPOM were satisfactory, supporting its suitability for research and clinical practice. Internal consistency of the PPOM was acceptable as was test-retest reliability. Whilst test-retest reliability was not absolute, as it rarely would be, the range of moderate to good suggests that hope and resilience for people with dementia, whilst subject to some fluctuation, largely remain stable. Only two participants were identified as fluctuating largely. All other measures remained stable and these participants did not identify any mental/ physical health problems or changes to medication between baseline and retest. It is, therefore, difficult to draw conclusions. It may be that there was a significant life event that this study was not designed to pick up, or it may be that for this particular participant hope and resilience were more of a state rather than an ingrained personality trait and, therefore, subject to variability (Chaplin, John, & Goldberg, 1988).

Correlations were in the expected direction and statistically significant. Whilst statistically significant, clinical significance is harder to define, as there are no other studies to compare the results here with. It is suggested that correlations above *r* =.40 are ‘moderate’ whilst *r* =.60 - .79 are ‘strong’ (Evans, 1996). However, it has also been suggested that correlations above .40 should be considered clinically significant (Dunn, 2000). Correlations any higher here may have indicated that positive measures were conceptually identical to existing quality of life measures. As such, moderate correlations were considered clinically significant and indicative that these measures, whilst measuring positive concepts, were distinct from quality of life.

Analysis of the PPOM indicated that both a one-factor and a two-factor solution might be appropriate, as some items loaded onto both factors. This may be attributable to the presence of hope contributing to adaptive recovery from stress (Ong, Edwards, & Bergeman, 2006). However, whilst related, the two are distinct concepts within the literature and consequently it was more appropriate to treat them as such and use a two-factor model, in which the factors were allowed to share covariance. Whilst two items loaded onto both factors, in no instance did an item load onto the incorrect factor, further providing evidence for a two-factor solution.

Future Research and Implications for Practice

The PPOM represents an important addition to the quantitative positive psychology literature. The ability of people with dementia to retain and use character strengths has been documented to some degree in the qualitative literature, but prior to this study, no measures of these concepts for people with dementia existed. This research, therefore, represents a first step in quantitatively assessing positive psychology for people with dementia. Furthermore, the significant correlation between the PPOM and QoL-AD provide evidence for hope as a trait like personal strength which underpins wellbeing in dementia (Kitwood & Bredin, 1992) and supports previous work detailing the contribution of positive emotions to quality of life in dementia (Wolverson & Clarke, 2016). It is therefore possible that by acting upon traits such as those measured within the PPOM, vicarious benefits to quality of life may be observed and supports the addition of the PPOM to studies examining quality of life outcomes using psychosocial interventions.

The high levels of hope reported here counteract narratives that reinforce hopelessness, with dementia portrayed as a tragic loss of a person (Peele, 2014) and the PPOM indicates levels of hope and resilience have been underestimated in dementia. For older adults receiving palliative care, the psychosocial benefits, including an increased quality of life, of hope fostering interventions has been noted (Duggleby, et al., 2007). It is possible that this benefit could also be observed in older adults with dementia, and the PPOM would be an accurate tool to measure the effect of such interventions. However, to our knowledge, no such interventions have been attempted within dementia research.

Most commonly, resilience is referred to as a dynamic psychosocial behaviour that can be learned (Allen, Haley, Harris, Fowler, & Pruthi, 2011). However, much of the existing literature base for resilience in dementia is based on a high and low resilience framework (e.g. Windle, 2012), with few studies identifying the processes by which resilience might be learned in dementia. Evidence here suggests that, whilst subject to some variability, resilience remained moderately stable over a one-week period. Again, whilst noted in the qualitative literature as an important means of retaining autonomy and wellbeing, no interventions for building resilience for people with dementia exist, with resilience interventions targeted at carers of those with dementia (e.g. Gaugler, Kane & Newcomer, 2007). This may be due to a lack of available measures and consequently, the PPOM represents an important contribution to the evaluation of resilience in people with dementia.

Results indicate that the PPOM is a robust measure that may now be used in further research for people with dementia. Whilst the psychometric property assessment here was extensive, an important aspect of psychometric theory, namely measure responsiveness or sensitivity to change (Stratford & Riddle, 2005), could not be established within the current study. However, the PPOM will be used as secondary outcomes to assess the efficacy of an Economic and Social Research Council (ESRC) funded social intervention in maintaining independence for people with mild dementia (Promoting Independence in Dementia 'PRIDE' Research Programme). This is an important step in garnering whether, if at all, the measures are able to pick up change as a result of this intervention. Furthermore, it will provide quantitative evidence as to whether positive concepts such as hope or resilience can be acted upon for people with dementia to induce improvements in concepts such as wellbeing or quality of life. This relationship has previously only been explored qualitatively.

Whilst much research for people with dementia is concerned with reducing behavioural and psychological symptoms of dementia such as agitation or depression (Livingston, et al., 2005), positive psychology research for this population is still lacking. Much resides in the qualitative literature such as studies examining the strengthening of a relationship between a person with dementia and a supporter (Quinn, Clare, McGuiness & Woods, 2012) and a book outlining positive psychology approaches to dementia (Clarke & Wolverson, 2016). It is suggested that, in addition to research aimed at reducing negative symptoms for people with dementia, research around developing interventions to foster hope and resilience for people with dementia is needed to explore how, if at all, concepts can be acted upon to improve wellbeing.

Methodological Problems and Limitations

Whilst randomly splitting data into construction and validation halves is best practice for structural equation modelling (SEM), this meant that the number of data points were substantially reduced at each stage. This may have impacted upon results, making models identified within the EFA stage more difficult to confirm within the CFA stage. Furthermore, sample sizes are known to impact upon the Chi-Squared goodness of fit statistic to the degree that small changes can have a large impact upon results. To ensure that the proposed model is the best possible fit for the observed data, further and more large-scale research is needed.

The main limitation was the lack of representation of Black, Asian and Minority Ethnic (BAME) groups. This may be due to a lack of diversity at sites to begin with or that research avenues were not sufficient enough to ensure representation. As such, the majority of this data reflects positive psychology concepts in White- British people and little can be said about the possible cross-cultural implications.

Proxy ratings (i.e. by carers) were not included within this study. Whilst this enabled people who could not identify carers to take part in the research, it is noted that no inferences can be made as potential differences between self and proxy perceptions of these positive concepts. However, within the qualitative literature, people with dementia have been accurately able to explore these concepts in great detail (Wolverson, Clarke, & Moniz-Cook, 2016) and, therefore, proxy ratings were not considered as in keeping with the theoretical underpinning of this research. Furthermore, participants all had capacity to consent in research and, consequently, were more likely to be in milder stages of dementia. Cognition was not assessed as part of this study and, therefore, it is not possible, to make inferences about the progression of hope and resilience across the course of dementia. Whilst not necessary for a psychometric evaluation, future researchers may wish to explore this area.

Whilst the GDS has previously been assessed psychometrically within a dementia population (Lesher & Berryhill, 1994), it is noted that the validity of this measure is sometimes questioned for people with dementia (Kørner, et al., 2006). In particular, the sensitivity and specificity of the GDS has been suggested as declining as dementia severity increases (Müller-Thomsen, et al., 2005). However, in mild to moderate dementia, the GDS has been established as a valid measure (Feher, Larrabee & Crook, 1992), although awareness of memory deficits was linked to accuracy of self-report. As participants here were all deemed capable of providing informed consent and, consequently, more likely to be in the milder stages of dementia, it is likely that the GDS was an accurate measure of depressive symptoms within the current study. For participants in the more severe stages of dementia, the Cornell Scale for Depression in Dementia (CSDD; Alexopoulos, Abrams, Young & Shamoian, 1988) may be a more appropriate means of assessing convergent validity with the PPOM.

The current study was designed to be short, requiring minimal effort for a person with dementia to complete the study, and allowing them to take part either as either self-reporters or by interview. Whilst the study employed two methodologies (self-report and interview) and this may have led to variability in completion, no significant differences were observed between groups suggesting such effects were minimal. Furthermore, measures selected were brief in nature and assessments of convergent validity were limited to quality of life and depression. It is noted that other concepts such as apathy are related to levels of hope (Rodriguez-Hanley & Snyder, 2000) and to resilience (Robottom et al., 2012) and future studies may wish to explore this.

Conclusions

The PPOM demonstrated satisfactory psychometric properties, in an area of research that has been neglected for people with dementia. The PPOM demonstrated significant correlations with both quality and life and depression suggesting that levels of hope and resilience have important implications for wellbeing in dementia. Future work will entail assessing the ability of the PPOM to detect change within psychosocial interventions and it is hoped that this will help to facilitate a strengths and capabilities based approach to future dementia research. A copy of the PPOM and scoring information is available from the corresponding author upon request. It is free to use but should be referenced accordingly.

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Table 1 Participant Demographics

	Total Sample (n =225)	Subsample (n =48)
Gender *n* (*%*)		
Male	129 (57.3)	29 (60.4)
Female	96 (42.7)	19 (39.6)
Age *M* (*SD*) Range	77.1 (9.4) 50-99	76.63 (10.2) 59-99
Marital status *n* (*%*)		
Single	9 (4)	5 (10.4)
Married	147 (65.3)	30 (62.5)
Widowed	51 (22.7)	9 (18.8)
Divorced	13 (5.8)	2 (4.2)
Other	5 (2.2)	2 (4.2)
Ethnicity *n* (*%*)		
White (British)	201 (89.3)	44 (91.7)
White (other)	10 (4.4)	3 (6.3)
Black	4 (1.8)	1 (2.1)
Asian	3 (1.3)	0 (0)
Mixed	1 (0.4)	0 (0)
Unknown (missing)	6 (2.7)	0 (0)

Table 2: Participant Clinical Characteristics

	Total Sample (n = 225)	Subsample (n =48)
Dementia diagnosis *n* (*%*)		
Alzheimer's disease	109 (48.4)	25 (52.1)
Vascular dementia	40 (17.8)	8 (16.7)
Dementia of mixed aetiology	47 (20.9)	8 (16.7)
Parkinson's related dementia	4 (1.8)	3 (6.3)
Other	9 (3.9)	3 (6.3)
Dementia (variant unknown)	19 (8)	1 (2.1)
Time since diagnosis *n* (*%*)		
<1 year	73 (32.4)	17 (35.4)
1- 3 years	92 (40.9)	19 (39.6)
3> years	42 (18.6)	9 (18.8)
Unknown	18 (8)	3 (6.3)

Acetylcholinesterase inhibitor *n* (*%*)		
None	88 (39.1)	18 (37.5)
Donepezil	90 (40)	17 (35.4)
Other	47 (20.9)	13 (27.1)
Other major mental or physical health problem *n* (%)		
None	167 (74.2)	34 (70.8)
Depression	17 (7.6)	2 (4.2)
Other	41 (18.2)	10 (25)
Other psychotropic medication *n* (*%*)		
None	186 (82.7)	41 (85.4)
Antidepressant	26 (11.6)	4 (8.3)
Other	13 (5.7)	3 (6.3)

Figure 1 Factor Loadings