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# Investigating the role of psychological flexibility, masculine self esteem and stoicism as predictors of psychological distress and quality of life in men living with prostate cancer

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## Abstract

**Objective:** This study examined the predictive power of psychological flexibility, masculine self-esteem and stoicism in influencing psychological distress and quality of life in men diagnosed with prostate cancer. It explores relationships between these theorised predictors and prostate cancer physical symptoms, an established predictor of psychological distress and reduced quality of life.

**Method:** The study used a quantitative, cross sectional design. A heterogeneous sample of 286 men diagnosed with prostate cancer completed self-report questionnaires. Correlation, hierarchical multiple regression and conditional process analysis were used to explore relationships between variables.

**Results:** Psychological flexibility and masculine self-esteem predicted significant variance in both distress and quality of life, beyond the impact of physical symptoms. Stoicism was not significantly correlated with any predictor or outcome variable. Conditional process analysis showed psychological flexibility significantly moderated the predictive effect of both prostate cancer physical symptoms and masculine self-esteem in predicting distress, but did not significantly moderate these predictors on quality of life.

**Conclusions:** Interventions targeted at raising psychological flexibility, particularly those that encourage adaptive masculine values, may be effective in reducing psychological distress in prostate cancer patients.

**Introduction**

Over 1 million men are diagnosed with prostate cancer worldwide each year (International Agency for Research on Cancer, 2012). In the UK, incidence rates have increased dramatically in the past 25 years, and are projected to increase a further 12% by 2035 (Smittenaar, Peterson, Stewart & Moitt, 2016). Survival rates have also increased markedly over recent years, with over 90% of patients estimated to survive at least 5 years after diagnosis (ONS, 2016). This can be attributed to improvements in both detection and treatment. While this is encouraging, a large population of men will be living with prostate cancer, with the associated symptoms and side effects of treatment.

Common physical symptoms associated with prostate cancer and the side effects of treatment include incontinence, frequent urination, erectile dysfunction, bowel dysfunction, fatigue, gynecomastia, and hot flushes. (Roth, Weinberger, Nelson, 2008). Unsurprisingly, these symptoms have been shown to reduce quality of life (Fosså & Dahl, 2015). These symptoms are also predictive of psychological distress (De Sousa, Sonavane & Mehta, 2012; Sharp *et al*., 2016). Cancer patients who experience emotional disorders are at higher risk of poorer treatment outcomes, are less likely to adhere to a treatment plan and are more likely to have adverse reactions to treatment (Pasquini & Biondi, 2007; Pirl *et al*., 2002; DiMatteo, Lepper, Crogham, 2000).

Prostate Cancer symptoms may be directly related to distress, due to their unpleasantness. In addition, these symptoms may increase distress because they pose a threat to masculine self-esteem (Chambers *et al*., 2013; Hoyt *et al*., 2013). Masculine self-esteem refers to how men appraise their own masculinity after treatment for prostate cancer, particularly the extent to which they still consider themselves a 'whole man'. Treatment for prostate cancer can invoke changes in many men's urinary continence, sexual functioning, body aesthetics and energy levels (Chapple & Ziebland, 2002; Oliffe, 2005, 2006; Wassersug & Oliffe, 2009). These changes have been shown to impact on masculine self-esteem. For example, cross-sectional analysis has shown that prostate cancer patients report reduced masculine self-esteem compared to non-cancer populations and that one third of men experience low masculine self-esteem after treatment (Clark *et al*., 2003; Zaider *et al*., 2012). Lower levels of masculine self-esteem have been reliably linked with predicting increased anxiety and depression and lower mental quality of life in prostate cancer patients (Chambers *et al*., 2013). The impact prostate cancer has on an individual's masculine self-esteem is significantly correlated with a number of masculine ideals or norms that an individual may hold about their own

masculinity. Higher levels of masculine self-esteem are linked with men who are more optimistic, while it is inversely linked with those who place more importance on their sexual functioning and those who demonstrate higher levels of emotional self-reliance (Chambers *et al*., 2016).

Research has also reliably demonstrated that masculine ideals or norms influence the way that men respond to prostate cancer. For example, masculine values have been shown to influence help seeking behaviour in dealing with emotional and sexual difficulties (Oliffe, 2009; Chappele & Ziebland, 2002). Responses to prostate cancer are adopted in line with the wider social context in which masculinity is defined and produced. Masculine values and men's health seeking behaviours are contextually bound, subject to change across the life span and are influenced by social and economic factors (Oliffe, 2009; Evans *et al*., 2011). As men face the impacts of older age their masculinity is redefined in line with masculine values (Evans *et al*., 2011). Traditional normative conceptions of masculinity have been linked with behaviours which may pose health risks such as emotional suppression, non-disclosure and avoidance (Burns and Mahalik, 2007; Ettridge *et al*., 2018). Masculine values also influence which coping strategies men use to adjust to diagnosis and treatment for prostate cancer (Chambers *et al*., 2016; Hoyt *et al*., 2013). A range of coping strategies have been identified in research such as emotional restraint, stoicism, acceptance, optimism, and humour (Chambers *et al*., 2017). Gaining a better understanding of how these coping strategies influence psychological outcomes may provide insight into how masculine values influence men's adaption to health concerns as they develop into older age.

Stoicism has frequently been identified as a coping strategy employed by men in response to prostate cancer (Chambers *et al*., 2014; Gannon *et al*., 2010). In Ancient Greek philosophy, stoicism was associated with mastery of emotions, freedom from suffering, and an indifference to death (Moore, 2012; Pathak, Wieten & Wheldon, 2017). In current health discourse it is associated with not complaining about adversity, or having a 'stiff upper lip'. It is associated with older men, and is linked to coping with pain (Cairncross, Magee & Askham, 2007). Older men may adopt this coping strategy because they find it harder to identify and express their emotions (Calderón *et al*., 2017). Stoicism is often conceptualised as a traditional defining characteristic of masculinity, closely aligned with emotional restraint and self-reliance, that can be used to maintain an appearance of strength in the face of adversity (Chambers *et al*., 2016; Pathak, Wieten & Wheldon, 2017).

While stoicism has been identified as a coping strategy used by men adjusting to prostate cancer, there is little empirical evidence on whether it should be considered an adaptive

strategy for living well with difficult experiences, or a maladaptive avoidance of experience and suppression of emotion. It has been linked with reduced health seeking behaviour, because asking for help can be viewed as weakness (Chambers *et al*., 2018; Pinnock, O'Brien & Marshall, 1998; Magee and Askham, 2007). Conforming to the masculine norms of emotional control and self-reliance are correlated with negative health outcomes such as avoiding emotion, poorer communication and reduced health seeking behaviour (Gerdes & Levant, 2018; Chambers *et al*., 2016; Pinnock, O'Brien & Marshall, 1998). Men may experience a sense of loss or distress but attempt to avoid these emotions as help seeking may be construed as weakness, and not the emotional restraint associated with traditional masculine ideals (Wenger & Oliffe, 2014). Stoicism could therefore be considered to be a maladaptive element of traditional masculinity if adherence to it results in decreased quality of life or increased distress. Alternatively, it may be that stoicism is better conceptualised as an effective coping strategy for dealing with illness keeping in line with masculine values, and is not associated with poorer outcomes (Mróz, Oliffe & Davison, 2013). For example, recent research has shown that men who are more emotionally self-reliant and who attribute more importance to sex are more likely to seek help for sexual concerns (Hyde *et al*., 2016).

One recent addition to psychological understandings of avoidance is provided by the Psychological flexibility model (Hayes *et al*., 2006; Hayes, Strosahl and Wilson, 2012; Francis *et al*., 2016) It suggests that our ability to adopt a mindset that is open to our experience and awareness of how we are being influenced by internal and external stimuli, will allow us to respond to adversity in ways that keep us engaged in meaningful life activities. This 'open', 'aware' and 'engaged' mindset is known as psychological flexibility and it has been found to be predictive of successful adjustment to a range of life experiences and mental and physical health conditions (Hayes et al., 2006; Graham, Gouick, Krahé, & Gillanders, 2016). Importantly, psychological flexibility can be improved through training and therapy, and so represents a modifiable target for psychological intervention. The psychological flexibility model provides a conceptual framework through which we may gain a better understanding of the impacts of stoicism as a coping strategy.

Stoicism may be considered a form of Psychological Inflexibility, characterised by reduced openness, rigidity about expressing emotion and a self-protective reduction of engagement in meaningful life activity. This type of coping strategy has been reliably associated with heightened levels of distress and reduced quality of life in cancer patients (Gillanders, Sinclair, MacLean & Jardine, 2015; Aguirre-Camacho *et al*., 2017). If stoicism is a form of psychological inflexibility, it may be hypothesised that a more stoic ideology will also predict higher levels of distress and lower quality of life outcomes.

## Aims

This study aims to understand the predictors of psychological distress and quality of life for men with prostate cancer. Established predictors such as prostate cancer symptoms and masculine self-esteem were compared with theorised predictors: Stoic ideology and psychological flexibility, in both regression and conditional process analyses.

## Method

### Design

A quantitative cross-sectional design was used. Participants completed an online survey containing demographic and clinical questions, as well as standardised self-report measures of prostate cancer symptoms, psychological flexibility, masculine self-esteem, stoicism, quality of life and psychological distress. The survey was hosted on Bristol Online Survey tool. Ethical approval was granted by the Department of Clinical and Health Psychology Ethics research panel at the University of XXX.

### Sample Size

Power calculations carried out *a priori* estimated that a sample size of 110 participants were needed in order to detect a medium effect size using a linear regression with 6 predictors at an alpha level of .05 ($p<.5$) and a power of .80 (Green, 1991).

### Participants

The inclusion criteria for eligibility in the research was to have received a diagnosis of prostate cancer.  There were no exclusion criteria.

### Measures

#### Demographics

Participants were asked to provide information on their age, country of residence, marital status, employment status, year diagnosed with prostate cancer, the stage of cancer progression at diagnosis and which, if any, treatments they had received.

#### Depression Anxiety and Stress Scales- short version (DASS-21)

The DASS contains 21 items and measures symptoms of depression, anxiety and stress. A total score can be calculated, equating to generalised distress.  The scales have been shown to have high internal consistency and validity as a routine clinical outcome measure in cancer populations (Lovibond & Lovibond, 1995). The combined scale has been shown to measure

general psychological distress with considerable validity (Henry & Crawford, 2005). Alpha values for the current study for total distress $\alpha$=.95.

*The Functional Assessment of Cancer Therapy – (FACT-G)*

This is a 39-item scale measuring overall health related quality of life in cancer patients. It comprises 5 subscales, each measuring QoL in a different domain; physical wellbeing, social wellbeing, emotional wellbeing, functional wellbeing. It has demonstrated good content validity, internal consistency and reliability in a number of studies, $\alpha$=.89 (Esper *et al*., 1997; Hamoen *et al*., 2013). In the current study, reliability was $\alpha$=.92.

*Prostate Cancer Symptoms (PCS)*

The PCS comprises 12 items which measure prostate cancer specific symptoms – weight loss; pain; bowel difficulty; urinary difficulty; erection difficulty. This subscale of the FACT-P has demonstrated acceptable validity with $\alpha$=.69 (Esper *et al*., 1997). Alpha values for the current study were $\alpha$=.79.

*Comprehensive Assessment of Acceptance and Commitment Therapy Processes measure (CompACT)*

This is a 23 item self-report scale to measure each of the three theorised 'dyadic' processes of psychological flexibility. It comprises 3 subscale scores; openness to experience, behavioural awareness and valued action – in addition to an overall score of psychological flexibility. Alpha values for the current study for total score $\alpha$=.89.

*Masculine Self-Esteem Scale*

This 8 item scale measures men's appraisal of their masculinity after prostate cancer diagnosis and/or treatment. Initially designed as a subscale for the Prostate-Specific Quality of Life measurement, it has since been validated as a measure of the perceived impact of prostate cancer on one's masculinity (Clark *et al*., 2003; Zaider *et al*., 2012; Allensworth-Davies *et al*., 2015). This scale was selected to avoid likely overlaps between measures of stoicism and traditional masculine values such as emotional restraint and self-reliance which are measured in scales measuring masculine values and beliefs (Chambers *et al*., 2016; Mahalik *et al*., 2003). Participants rated the degree to which they experienced diminished masculinity (e.g., "I feel as if I am no longer a whole man"). For the current analyses higher scores reflect higher masculine self-esteem. The scale has demonstrated excellent internal consistency and validity with Cronbach's alpha $\alpha$=0.91 (Clarke *et al*., 2003). Alpha values for the current study were $\alpha$=.91.

*Pathak-Wieten Stoicism Ideology Scale (PW-SIS)*

This scale measures stoic beliefs in the context of illness. Stoicism is conceptualised as a system of self-regulation, rather than a behavioural trait. It measures endorsement of a personal ideology of stoicism across four theoretical domains; stoic serenity, the belief one should conceal one's problems and emotions from others; stoic taciturnity, the belief that one should refrain from experiencing strong emotions; stoic endurance, the belief that one should endure physical suffering without complaining; and stoic death indifference, the belief that one should not fear or avoid death (Pathak, Wieten *et al.*, 2017). It comprises of 12 self-report items on a 5-point Likert scale. Items include; 'I expect myself to avoid feeling intense emotions' 'when the time for my death comes, I believe I should accept it without fear'. It has good reliability, α=.78 (Pathak, Wieten *et al.*, 2017). Cronbach's alpha in the current study was $\alpha$=.82.

## Recruitment

Participants were recruited using a convenience approach where the survey link was distributed by prostate cancer charities in the UK (Prostate Scotland, Prostate Cancer UK, Prostate Cancer Research Centre) as well as members of prostate cancer support groups. In total 311 completed questionnaires were submitted, all of whom met the eligibility criteria.

## Analysis Plan

### Missing data

Cases where missing data accounted for >10% were excluded (n=25) based on Bennett's (2001) analysis that statistical analysis is likely to be biased when over 10% of data is missing (Dong, 2013). This resulted in a final sample of 286. The proportion of remaining missing data was 0.14%. A missing data analysis was used to assess the pattern of missingness (Enders, 2011). Little's MCAR test was not significant showing that the data was missing completely at random (Little's MCAR test: $\chi^2$=4232.32, *df*=4142, *p*=.16). Expectation-Maximization (EM) was selected as a statistically robust method to impute missing data (Enders, 2011).

### Assumptions of parametric data

The data was checked for the assumptions of parametric data, tests for normality of distribution were carried out by inspection of histograms and P-P plots. Visual inspection confirmed a normal distribution (Field, 2009). Collinearity was assessed through analysing standardised residual plots and assumptions were met. (Tabachnick and Fidell, 2006).

*Correlations*

Pearson's correlation coefficient was used to explore relationships between variables. Correlation effect sizes were analysed using Cohen's (1988) thresholds.

*Regression*

A hierarchal multiple linear regression analysis was used to determine the predictors of distress and quality of life. This method allowed known predictors to be entered into the model first, and could show the unique variance associated with adding new predictors at each step. Model validity was assessed by checking the difference between $R^2$ and the adjusted $R^2$ to assess any shrinkage or loss of predictive power (Field, 2009). Stein's formula was also used to cross validate each model. Each model was examined for outliers by examining standardised residuals, Mahalanobis distance, leverage and Cook's distance (Field, 2009). Final regression models were tested to confirm that the assumptions of a multiple regression were met by assessing multicollinearity, linearity, homoscedasticity and independence of residuals (Field, 2009). All the assumptions of regression were met for each model.

*Conditional Process Analysis*

It was predicted that masculine self-esteem would mediate the predictive effect of prostate cancer symptoms on distress and quality of life. It was further predicted that psychological flexibility would moderate the relationship between both prostate cancer symptoms and masculine self-esteem in predicting distress and quality of life. A moderated mediation model was used to determine the influence of the predictor variables on the outcome variables using Hayes PROCESS tool (version 3.0).

## Results

### Sample Characteristics

Of the 286 participants included in analysis the mean age was 67 years (SD=7.81), mean age at diagnosis was 62 (SD=7.43), and mean time since diagnosis was 4.9 years (SD 4.73). A profile of sample demographics is provided in Table 1.

[Insert Table 1 and Table 2 here]

### Demographic and covariate analysis

Analysis of Variance (ANOVA) was used to examine mean level differences across demographic groups on dependent variables. Significant differences between groups were found for age, with men aged <60 experiencing higher levels of psychological distress than those aged 70-75. Similarly, those aged under 60 had significantly lower scores on quality of life measures than those aged over 60. Age was therefore entered into regression models as a covariate.

### Correlation Analysis

Bivariate correlations between variables were analysed using Pearson's correlation coefficient (Table 3). The DASS Distress score and FACT-G quality of life score both demonstrated large negative correlations with PCS ($r > -.63$); masculine self esteem ($r > -.66$) and psychological flexibility ($r > -.64$). Contrary to hypotheses, stoicism was not significantly correlated with any predictor or outcome variables.

[Insert Table 3 here]

### Multivariate Analysis

Hierarchical multiple regression models were run to assess the predictors of distress and quality of life, while controlling for covariates age and age at diagnosis at step 1. Prostate cancer symptoms were entered at step 2, masculine self-esteem at step 3, stoic ideology at step 4 and psychological flexibility entered at step 5. The regression model for distress is shown in Table 4 and the model for quality of life in Table 5.

### Prediction of Distress

The final model accounted for 65% of the variance in predicting distress (Adj. $R^2=.65$). This was highly significant ($F(5,280)=105.1, p<.001$) and demonstrated a large effect size of $f^2 = 1.87$. Age ($\beta= -.09, p=0.018$), PCS ($\beta= -.26, p<.001$), masculine self-esteem ($\beta=-.27, p<.001$), stoicism ($\beta= -.11, p=.003$) and psychological flexibility ($\beta=-.41, p<.001$), were all significant predictors in the final model.

[Insert Table 4 here]

### Prediction of Quality of Life

The final model accounted for 67% of the variance in predicting quality of life (Adj. $R^2=.67$). This was highly significant ($F(5,280)=116.16, p<.001$) and demonstrated a large effect size of $f^2 =2.07$. Age ($\beta= .13, p<.001$), PCS ($\beta= .38, p<.001$), masculine self-esteem ($\beta=.28, p<.001$),

and psychological flexibility ($\beta$=.28, p<.001), were all significant predictors in the final model.

[Insert Table 5 here]

### *Conditional Process Analysis*

A conditional process analysis was used to examine the predictive power of prostate cancer symptoms on psychological distress, the mediation of this relationship by masculine self-esteem, and the moderation of both direct and indirect relationships by psychological flexibility. The model indicated that 69% of psychological distress was explained by the main effects and the interaction effects ($R^2$=.69, $F(6, 279)$=105.13, $p$<.001, $f^2$= 2.26). The impact of prostate cancer symptoms on distress was mediated by reduced masculine self-esteem. Both the mediated and direct paths were moderated by psychological flexibility. The direct and indirect paths became non-significant at high levels of psychological flexibility.

The model predicting quality of life accounted for 68% of the variance in quality of life ($R^2$=.68, $F(6, 279)$=98.53, $p$<.001, $f^2$= 2.12). None of the paths in this model were moderated by psychological flexibility. Higher masculine self-esteem, higher psychological flexibility and lower prostate cancer symptoms all individually predict increased quality of life, though they do not interact in hypothesized models of mediation and moderation.

Diagrammatic representations of these models are depicted in Figs. 1 and 2.

[Insert Figs 1 and 2 here]

## Discussion

This study explored the associations between prostate cancer symptoms, masculine self-esteem, psychological flexibility, stoicism, psychological distress and quality of life in prostate cancer patients. Results showed that masculine self-esteem and psychological flexibility statistically predicted significant variance in both distress and quality of life, beyond the impacts of the extent of symptoms. An increased adherence to a stoic ideology was not significantly correlated with distress, quality of life, nor was stoicism related to masculine self-esteem or psychological flexibility. Psychological flexibility predicted the greatest variance in the final regression model for distress, while prostate cancer symptoms accounted for the greatest variance in quality of life.

This was the first study to quantitatively examine the impact of stoicism on distress and quality of life in prostate cancer patients. Given its hypothesised link with psychological inflexibility, it was predicted that individuals who endorsed stoic ideology and behaviours

would be more at risk of psychological distress. The results do not support that hypothesis. Stoicism was not correlated in expected ways with other variables and was not predictive of either outcome variable when entered into the regression models.

This is an interesting finding and provides additional understanding of a concept for which there is little empirical evidence. It suggests that stoicism is neither adaptive, nor maladaptive to outcomes of distress, quality of life and is not highly correlated with masculine self-esteem or psychological flexibility. It may mean that stoicism can be drawn upon by men as a way to cope with prostate cancer in line with their own masculine values (Mróz et al., 2013). It is of course possible that stoicism operates in a more context specific manner than can be detected using self-report measures, or indeed that the measure used was not a good operationalisation of the construct of stoicism in this population. Contrary to this interpretation, the measure was chosen because it was psychometrically adequate and specific to illness contexts.

### Masculine self-esteem

Masculine self-esteem was shown to be a significant predictor of distress and quality of life. It was highly correlated with the extent of prostate cancer specific symptoms ($r=.62$), a relationship that was consistent with existing research (Zaider et al., 2012). It is worth noting that masculine self-esteem predicted marginally more variance of distress than symptoms of prostate cancer but was not as strong a predictor of quality of life. Masculine self-esteem was also positively correlated with psychological flexibility with a large effect size ($r=.53$). This shows that men who are more psychologically flexible are more likely to have higher masculine self-esteem.

The conditional process analysis showed that masculine self-esteem mediated the relationship between symptoms and distress. Results from this research suggest that masculine self-esteem may be considered a target for psychological intervention in future research, to help men adjust to prostate cancer physical symptoms without experiencing diminished self-esteem. The impacts of prostate cancer symptoms in predicting lower masculine self-esteem were reduced at higher levels of psychological flexibility.

### Psychological flexibility

Consistent with previous research, psychological flexibility demonstrated a large negative correlation with distress and positive correlation with quality of life. It accounted for the most variance in the final regression model for distress. It also significantly moderated the effects of both prostate cancer symptoms and masculine self-esteem in predicting distress. At high levels of psychological flexibility, prostate cancer symptoms and lower masculine self-

esteem were no longer significant predictors of distress. It was not a significant moderator of symptoms and masculine self-esteem in predicting quality of life. These results show that psychological flexibility may be an appropriate intervention target for distressed prostate cancer patients.

*Clinical Implications*

The large buffering effect of psychological flexibility in these cross sectional models supports the suggestion that a psychological intervention aimed at increasing psychological flexibility may be useful for prostate cancer patients. Increasing psychological flexibility is the primary treatment goal in Acceptance and Commitment Therapy (ACT) (Hayes *et al*., 2012), though the effects of other forms of psychological therapy such as CBT have also been shown to be mediated by psychological flexibility (Ackerblom *et al*., 2015).

This is a significant finding and paves the way for future research to explore how this might be applied in a clinical context. Future intervention developers would be wise to also consider how to accommodate the findings of masculine self-esteem as a further potential treatment target. In an ACT approach, patients would be encouraged to step back from 'traditional' masculine ideals, to examine their utility and to reduce their significance as a guide to behaviour, in favour of being guided by 'what works for me now, in living how I wish to live'? Interventions may also find value in supporting and encouraging healthier, more adaptive forms of masculine identity, and incorporating strategies that reinforce these such as group exercise, group activities, sports, and use of humour (Cormie *et al*., 2015).

*Limitations of the study*

There are a number of limitations to the study to consider. Firstly, the cross-sectional design means relationships remain correlational and causality should not be assumed. Relationships between variables may be subject to change over time and would be supported by further research with longitudinal designs. Potential subjective bias may have been introduced through using self-report measures. Additional bias may also have been introduced through using recruitment channels which relied on men attending prostate cancer support groups in the UK. The type of person who attends a support group may not be representative of the wider population of prostate cancer patients. Additional sample bias may arise from the online method of data collection among this demographic, who may not have ready internet access.

A further limitation is that the demographic information did not include any questions on co-morbidities or whether the individual had ever been treated for any form of psychological

distress. Previous research has identified that around 5% of patients are treated for depression after diagnosis (Drummond *et al.*, 2016). Using a hierarchical multiple regression to investigate the relationships between items may have obscured some of the predictive variance of variables that entered into the model at later steps. Whilst conservative, this approach can be problematic for understanding newer concepts such as stoicism and masculine-self esteem.

*Future research*

Future research replicating these findings would be useful. Longitudinal designs could determine the association of these relationships over time. Distress levels have been shown to decrease in the years after diagnosis, but it is unclear whether masculine-self esteem remains fixed over time or is also subject to change. This may also help to ascertain the most effective times for intervention and when before / during / after treatment levels of distress are raised. Age was a significant predictor of distress in this sample. Further research could also focus on identifying the types of individual most in need of psychological support.

Appropriate and tailored interventions should be developed and tested using randomised control trials to provide information on their effectiveness. This research has demonstrated that interventions targeting raising psychological flexibility such as ACT may be effective in reducing distress and protecting against diminished masculine self-esteem.

*Conclusion*

In a cross-sectional study, prostate cancer symptoms were significant predictors of distress and quality of life. Psychological flexibility was a significant predictor of both distress and quality of life. Masculine self-esteem was also a significant predictor of both distress and quality of life. Stoicism was not highly correlated with either distress or quality of life.

Conditional process analysis showed that psychological flexibility significantly moderated the predictive effect of both prostate cancer symptoms and masculine self-esteem in predicting distress. It was not a significant moderator of the predictive effects of symptoms on quality of life. These findings suggest that interventions targeted at raising psychological flexibility such as ACT may be effective in reducing the psychological impacts of prostate cancer.

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# Tables

## Table 1

**Table 1**

**Profile of sample demographics**

| Characteristic | Current Sample | | Comparative data | |
|---|---|---|---|---|
| | **N** | **%** | **N** | **%** |
| **Age** | | | | |
| Under 60 | 51 | 18 | | |
| 60 - 70 | 108 | 38 | | |
| 70 - 75 | 77 | 27 | | |
| Over 75 | 50 | 18 | | |
| | | | | |
| **Country of residence** | | | | |
| U.K. (Scotland) | 64 | 22 | 3,135 [†] | |
| U.K. (England) | 171 | 60 | 40,331 [†] | |
| U.K. (Wales) | 11 | 4 | 2252 [†] | |
| USA | 35 | 12 | 164,690 [†] | |
| Other | 5 | 2 | | |
| | | | | |
| **Age at Diagnosis** | | | | |
| <60 | 98 | 34 | 5,463 [¶] | 48 [¶] |
| 60 - 69 | 137 | 48 | 16,251 [¶] | 32 [¶] |
| >70 | 50 | 18 | 25,940 [¶] | 20 [¶] |
| | | | | |
| **Years since diagnosis** | | | | |
| 0-2 years | 110 | 39 | 1614 [§] | 48 [§] |
| 3-4.9 years | 65 | 23 | | |
| 5-9.9 years | 75 | 26 | 1075 [§] | 32 [§] |
| 10+ years | 35 | 12 | 659 [§] | 20 [§] |
| | | | | |
| **Cancer Stage** | | | | |
| Early Prostate Cancer (Stage 1) | 167 | 58 | | 30 [‡] |
| Locally Advanced Prostate Cancer (Stage 2) | 85 | 29 | | 20 [‡] |
| Advanced prostate Cancer (Stage 3 and 4) | 31 | 11 | | 37 [‡] |
| Don't know/ can't remember | 3 | 1 | | 13 [‡] |
| | | | | |
| **Marital status** | | | | |
| Married/ cohabiting | 247 | 86 | 2753 [§] | 82 [§] |
| Not married | 37 | 13 | 558 [§] | 17 [§] |
| Other | 2 | 1 | 37 [§] | 1 [§] |
| | | | | |
| **Employment status** | | | | |
| Employed | 78 | 27 | 1124 [§] | 34 [§] |
| Retired | 197 | 69 | 336 [§] | 12 [§] |
| Not employed | 9 | 3 | 1802 [§] | 54 [§] |
| Other | 2 | 1 | | |
| | | | | |
| **Treatment type** | | | | |
| I am still deciding on my treatment options | 7 | 2 | | |
| Active Surveillance/ monitoring | 38 | 13 | 164 [§] | 5 [§] |
| Prostatectomy – surgery to have the prostate removed | 147 | 51 | 934 [§] | 28 [§] |
| Brachytherapy | 16 | 6 | 124 [§] | 4 [§] |
| Radiotherapy (External beam) | 117 | 40 | 1718 [§] | 53 [§] |
| Hormone treatment | 115 | 40 | 901 [§] | 27 [§] |
| Chemotherapy | 12 | 4 | | |
| Novel Hormone Treatment (e.g. Abiraterone; | 9 | 3 | | |

| | | | |
|---|---|---|---|
| Enzalutamide) | | | |
| Clinical Trail | 15 | 5 | |
| Other | 13 | 5 | |

† New cases diagnosed in 2015 by UK country (Cancer Research UK, 2018)

‡ cases diagnosed by stage in England 2014 (Cancer Research UK, 2018)

§ Results from Drummond *et al.*, 2016

¶ UK Statistics age of diagnosis 2013 – 2015 (Cancer Research UK, 2018)

## Table 2

**Table 2**

**Descriptive statistics for dependent and independent variables with comparative data**

| Variable | Range | Min | Max | Mean | SD | Comparative Data Mean | SD |
|---|---|---|---|---|---|---|---|
| **Dependent Variables** | | | | | | | |
| DASS-21 Stress | 0 - 56 | 0 | 42 | 9.92 | 9.95 | 11.1[†] | |
| DASS-21 Anxiety | 0 - 56 | 0 | 40 | 4.88 | 7.07 | 6.1[†] | |
| DASS-21 Depression | 0 - 56 | 0 | 42 | 7.78 | 9.74 | 8.9[†] | |
| | | | | | | | |
| **Predictor Variables** | | | | | | | |
| Prostate Cancer Symptoms | 0 - 48 | 10 | 48 | 32.85 | 7.78 | 33.9[‡] | 7.5 |
| Stoicism | -30 - 30 | -24 | 23 | -1.95 | 9.15 | -0.16[§] | |
| Masculine Self-Esteem | 8 - 40 | 8 | 40 | 28.14 | 7.43 | 32[¶] | 6.9 |
| Psychological Flexibility | 0 - 138 | 35 | 135 | 91.54 | 18.88 | | |
| FACT-P overall score | 0 - 156 | 46 | 152 | 113.91 | 23.49 | 130.5[††] | 16.3 |
| FACT-G overall score | 0 - 108 | 25 | 108 | 81.07 | 17.34 | 93.6[††] | 11.7 |

† Sharp *et al.*, 2016

‡ Chipperfield *et al.*, 2013

§ Pathak *et al.*, 2017

¶ Clark *et al.*, 2003 (converted figures from score from 0-100)

†† Esper *et al.*, 1997

## Table 3

**Table 3**

**Correlation matrix showing predictor and outcome variables**

| | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| 1. DASS-21 | 1 | | | | | |
| 2. FACT-G | -.81** | 1 | | | | |
| 3. Prostate Cancer Symptoms | -.63** | .71** | 1 | | | |
| 4. Masculine Self-Esteem | -.66** | .68** | .62** | 1 | | |
| 5. Stoicism | -.06 | -.01 | -.04 | -.03 | 1 | |
| 6. Psychological Flexibility | -.69** | .64** | .49** | .53** | -0.11 | 1 |

** significant at $p<0.01$

**Table 4**

**Hierarchical Multiple Regression Analysis to predict distress**

| | Variables | $\beta$ | $t$ | $p$ | $R^2$ | Adj. $R^2$ | $\Delta R^2$ | $F_{(k,285-k)}$ | $\Delta F\,p$ | $p$ | $f^2$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Step: | | | | | | | | | | | |
| 1 | | | 0 | | 0.07 | 0.07 | 0.07 | 22.34 | 0 | <.001 | 0.07 |
| | Age | -0.27 | -4.73 | <.001 | | | | | | | |
| 2 | | | 0 | | 0.44 | 0.43 | 0.36 | 109.67 | 0 | <.001 | 0.78 |
| | Age | -0.19 | -4.27 | <.001 | | | | | | | |
| | Prostate Cancer Specific Symptoms (PCS) | -0.61 | -13.52 | <.001 | | | | | | | |
| 3 | | | 0 | | 0.54 | 0.54 | 0.10 | 110.25 | 0 | <.001 | 1.17 |
| | Age | -0.16 | -3.82 | <.001 | | | | | | | |
| | PCS | -0.36 | -6.99 | <.001 | | | | | | | |
| | Masculine Self-Esteem (MSE) | -0.41 | -7.95 | <.001 | | | | | | | |
| 4 | | | 0 | | 0.54 | 0.54 | 0.01 | 83.5 | 0.154 | <.001 | 1.19 |
| | Age | -0.15 | -3.51 | .001 | | | | | | | |
| | PCS | -0.36 | -7.05 | <.001 | | | | | | | |
| | MSE | -0.41 | -7.99 | <.001 | | | | | | | |
| | Stoicism | -0.06 | -1.43 | .154 | | | | | | | |
| 5 | | | 0 | | 0.65 | 0.65 | 0.11 | 105.1 | 0 | <.001 | 1.87 |
| | Age | -0.09 | -2.38 | .018 | | | | | | | |
| | PCS | -0.26 | -5.52 | <.001 | | | | | | | |
| | MSE | -0.27 | -5.72 | <.001 | | | | | | | |
| | Stoicism | -0.11 | -2.98 | .003 | | | | | | | |
| | Psychological Flexibility | -0.41 | -9.38 | <.001 | | | | | | | |

**Table 5**

**Hierarchical Multiple Regression Analysis to predict Quality of Life**

| | Variables | $\beta$ | $t$ | $p$ | $R^2$ | Adj. $R^2$ | $\Delta R^2$ | $F_{(k,285-k)}$ | $\Delta F\,p$ | $p$ | $f^2$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Step: | | | | | | | | | | | |
| 1 | | | 0 | | 0.08 | 0.08 | 0.08 | 26.03 | <.001 | <.001 | 0.09 |
| | Age | 0.29 | 5.10 | <.001 | | | | | | | |
| 2 | | | 0 | | 0.54 | 0.54 | 0.45 | 165.01 | <.001 | <.001 | 1.16 |
| | Age | 0.20 | 4.97 | <.001 | | | | | | | |
| | Prostate Cancer Specific Symptoms (PCS) | 0.68 | 16.69 | <.001 | | | | | | | |
| 3 | | | 0 | | 0.62 | 0.62 | 0.09 | 156. | <.001 | <.001 | 1.66 |
| | Age | 0.17 | 4.6 | <.001 | | | | | | | |
| | PCS | 0.45 | 9.76 | <.001 | | | | | | | |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Masculine Self-Esteem (MSE) | 0.37 | 8.02 | <.001 | | | | | | |
| 4 | | | 0 | | 0.62 | 0.62 | 0 | 116.67 | 0.72 | <.001 | 1.66 |
| | Age | 0.17 | 4.58 | <.001 | | | | | | |
| | PCS | 0.45 | 9.73 | <.001 | | | | | | |
| | MSE | 0.37 | 7.99 | <.001 | | | | | | |
| | Stoicism | -0.01 | -0.36 | 0.718 | | | | | | |
| 5 | | | 0 | | 0.68 | 0.67 | 0.05 | 116.16 | <.001 | <.001 | 2.07 |
| | Age | 0.13 | 3.73 | <.001 | | | | | | |
| | PCS | 0.38 | 8.5 | <.001 | | | | | | |
| | MSE | 0.28 | 6.05 | <.001 | | | | | | |
| | Stoicism | 0.02 | 0.57 | 0.569 | | | | | | |
| | Psychological Flexibility | 0.28 | 6.6 | <.001 | | | | | | |