Background

The period immediately after the end of cancer treatment is a time when supportive care for the cancer patient decreases; this is known to increase risk of psychological distress and poor wellbeing. While there is broad recognition that unmet psychological and supportive care needs correlate with psychological wellbeing, little is understood about the factors that influence this relationship. This study explores the role of psychological flexibility, with a particular focus on its potential moderating role between unmet needs and psychological distress in haematological cancer survivors.

Materials and Method

Haematological cancer survivors were recruited for this cross-sectional study through two major UK blood cancer charities. Participants (n=91) were all over the age of 16 and had been diagnosed with any sub-type of haematological cancer more than 18 months previously. Participants completed self-report questionnaires assessing unmet psychological and supportive care needs (SCNS SF34), anxiety and depression (HADS), quality of life (EORTC QLQ-C30) and psychological flexibility (AAQ II).

Results

High levels of both unmet need and distress were present in the sample, indicating on-going care needs for these cancer survivors. Statistically significant correlations between unmet needs, psychological flexibility and all outcome variables (anxiety, depression, quality of life) were found. Using regression analysis based on Hayes' methodology (Hayes, 2013), psychological flexibility was found to act as a moderator between unmet need and distress in four out of 15 models; specifically, the statistical relationship between need and distress emerged only when levels of psychological flexibility were at average level or above.

Discussion

Haematological cancer survivors have on-going supportive care needs that persist well beyond the end of active treatment. Unmet needs can, in turn, increase levels of anxiety and depression, and reduce quality of life in this patient group. The understanding offered by our data that psychological flexibility plays a moderating relationship between need and psychological distress creates opportunities for the development of theoretically-informed interventions to reduce both unmet need and distress in cancer patients. As such, these findings support the growing emphasis on Acceptance and Commitment based interventions for cancer patients.

KEYWORDS: cancer; psychological flexibility; moderation; unmet need

Introduction

Haematological cancers are malignancies that affect the blood, bone marrow or lymphatic system. Prevalence of these cancers is increasing worldwide; in the UK context alone there are 38,700 cases diagnosed each year (HMRN, 2016). As a group, these cancers are diverse, ranging from those which are aggressive and fast growing, to others which are more akin to chronic disease pathologies and often monitored via 'watch and wait' regimes, in some cases for many years. These differences, when mapped against the common 'solid' tumour groups, may explain the comparatively high levels of psychological distress in both leukaemia and lymphoma patients (Carlson et al., 2004). There exists a high correlation between psychological distress and psychological co-morbidity (e.g. anxiety, depression) in cancer patients (e.g. Uchida et al., 2011; Morrison et al., 2012), though there is increased recognition that non-clinical distress is both problematic and an important patient reported outcome indicator in its own right (Bultz & Johansen, 2009). In haematological cancer groups specifically, prevalence of anxiety (27%), depression (17%), and adjustment disorder (19.4%) are high (Clinton-McHarg et al., 2014; Mitchell et al., 2011).

The maintenance of health and wellbeing in cancer survivors has increasingly come to the fore of both health and political agendas, yet the way in which we assess and intervene for distress and wellbeing in cancer patients has been a matter of considerable debate (e.g. Coyne & van Sonderen, 2012). A recent literature review by Hulbert-Williams, Storey & Wilson (2015) suggested that the inconsistency in effectiveness of interventions for cancer-related distress may be due to a reliance on problem-focussed intervention frameworks, and that third-wave approaches such as Acceptance and Commitment Therapy (ACT) may hold potential. In cancer samples specifically, interventions that utilise ACT-based techniques have been shown to feasible for delivery in community care settings (Arch & Mitchell, 2015) and of benefit in improving mood and quality of life (e.g. Rost et al, 2012; Feros et al, 2013). However, this literature is small and in many cases methodologically poor, and there is a need for further, more robustly designed empirical research (Hulbert-Williams, Storey, & Wilson, 2015).

Unmet supportive care needs can be defined as a desire for help or support in managing the physical, social and psychological impacts of illness (Swash et al. 2014). The relationship between presence of unmet need and psychological wellbeing has been recognised within the broader psycho-oncology literature (Armes et al., 2009) and so ongoing assessment of needs is recommended as a way of ensuring that supportive care provision is sufficient to meet the needs of cancer patients and their families (Sanson-Fisher et al., 2000; Hodgkinson et al., 2007; Morrison et al., 2012), and thus as a pathway to reducing distress and poor quality of life. Unmet needs are typically broken

down into sub-domains, often encompassing physical, psychological and emotional, information, care and support, and sexual needs. It is plausible that there are differences in the levels of distress associated with different types of unmet need, for example physical needs may be associated with lower levels of distress due to an anticipation of their presence in the cancer context (Swash et al., 2016). Although there is only a small literature on unmet care needs in haematological cancer samples (Swash et al., 2014), this body of evidence clearly indicates that unmet needs both exist and present considerable on-going challenges for good quality patient care and support (Hall et al., 2013). This is gaining increasing recognition in the UK, with assessment recommended as part of best practice care (Watson et al., 2012). Holistic needs assessment is gradually becoming a standard aspect of the cancer care pathway, yet we do not yet fully understand how unmet need plays into the broader picture of psychological health in cancer patients. As a broader point of interest, few psychosocial oncology studies have established clear evidence for the active mechanisms or process variables that might moderate the relationship between needs and distress, and yet this knowledge it essential for the development of effectively and efficient supportive care interventions (Stanton et al, 2013).

Psychological flexibility is cited as being central to overall psychological health and wellbeing and is a key process by which Acceptance and Commitment Therapy (ACT) exerts its benefits (Fledderus et al., 2013; Kashdan et al., 2010). If we are to develop successful trials of ACT for cancer survivors, work that explores the potential mechanisms of components underlying psychological flexibility in explaining variance in distress outcomes is essential. Non-interventional research in cancer samples has begun to address this important question. Ciarrochi et al (2011), for example, reported on the significant relationship between valued living and improved wellbeing in cancer patients. A more recently published study from Gillanders et al (2015) demonstrated the mediating role of cognitive fusion in the relationship between illness appraisals and post-treatment anxiety in cancer survivors. And, the significance and considerable effect size of correlations between psychological flexibility and a wide range of patient-reported outcomes for cancer survivors (including mood, quality of life, stress and benefit finding) has also been reported (Hulbert-Williams & Storey, 2016).

This study aimed to build upon these earlier findings by investigating whether psychological flexibility acts as a moderating variable in the relationship between unmet need and distress outcomes (anxiety, depression and quality of life) in haematological cancer survivors, in addition to investigating the level and type of unmet needs present in this patient group. In line with previous research we hypothesised that high needs would correlate with poorer psychological outcomes. In addition, we hypothesised that this relationship would be moderated by the psychological flexibility,

such that higher levels of psychological flexibility would weaken the statistical relationship between high needs and poor psychological outcome.

Material and Methods

Design

A cross-sectional, questionnaire design was used. Participants were recruited during the survivorship phase of illness (defined for these purposes as after primary treatments had been completed) and asked to complete four self-report questionnaires measuring: unmet supportive care needs (the predictor variable); anxiety, depression, and quality of life (the outcome variabless); and, psychological flexibility (the moderator variable). The study was conducted in accordance with codes of ethics and conduct as specified by the British Psychological Society. Ethical approval was granted by the University of Chester.

Statistical power and sample size

A priori power calculations suggested that 114 participants were needed in order to detect a medium effect size, using regression analysis with nine predictors, at an alpha level of .05 ($p<.05$) and a power of .80 (Coe, 2002; Cohen, 1988).

Participants

At the point of recruitment participants were required to self-assess their inclusion according to the following criteria:

- Currently have, or have had previously, a confirmed diagnosis of haematological cancer.
- At least 18 months post-diagnosis of their cancer.
- Over the age of 16.

Recruitment

Participants were recruited via advertisements placed both online and in printed newsletters with two of the major UK blood cancer charities: the Lymphoma Association and Leukaemia & Lymphoma Research. Participants were able to complete a questionnaire either online or to request a copy via post. 91 questionnaires were returned, falling just short of our target sample size. Due to the method of data collection, it was not possible to determine response rate.

Study Measures

1. Participants were asked to complete a short demographic questionnaire which assessed: age, gender, diagnosis, time since diagnosis, treatment type, when they were treated, current employment, and ethnicity.
2. The short-form Supportive Care Needs Survey (SCNS SF34; Bonevski et al., 2000) is a 34 item, validated measure of unmet supportive care need that assesses need across five domains: psychological, health system and information, physical and daily activity, patient care and support, and sexual. Items are rated on a likert scale from 1 (no need) to 5 (high unmet need). Cronbach's alphas for the current study were: Psychological (0.96), Health systems and information (0.93), Patient care and support (0.88), Physical and daily living (0.93), and Sexual (0.88).
3. The Hospital Anxiety and Depression Scale (HADS; Zigmond & Snaith, 1983) is a 14 item screening tool for both anxiety and depression that has been widely used in cancer patients and has excellent psychometric properties. Cronbach's alphas for the current study were: Depression (0.84), Anxiety (0.87). A score of 8-10 is considered borderline clinically significant, with 11 and over considered clinically significant for both anxiety and depression.
4. The EORTC QLQC30 (Aaronsen et al., 1993) is a 30 item measure of quality of life in cancer patients where items are ranked from 1 (not at all) to 4 (very much). There are nine sub-scales: five functional scales (physical, role, cognitive, emotional, and social); three symptom scales (fatigue, pain, and nausea and vomiting); and a global health and quality-of-life scale. Cronbach's alpha for the current study were: Physical Functioning (0.88), Role Functioning (0.91), Cognitive Functioning (0.44), Emotional Functioning (0.89), Social Functioning (0.86), Symptoms - NAUS (0.59), Symptoms - FAT (0.94), Symptoms-PAIN (0.95), Global health score (0.95). We used only the Global score in both correlational and moderation analysis.
5. Finally, the acceptance and action questionnaire (AAQ II: Bond et al., 2011) is a 7 item measure of psychological flexibility where items are ranked from 1 (never true) to 7 (always true). Higher score indicates greater levels of psychological inflexibility. This measure was chosen as it is a well validated, general measure of psychological flexibility. Cronbach's alphas for the current study was .924.

Analytic Plan

Initially, an exploratory analysis was conducted to determine data parametricity and reliability of the measures. Preliminary analysis tested for normal distributions in the data: a marginal floor effect was present on the unmet need sub-scales due to a high number of participants selecting the 'no need' response, however, all other variables were normally distributed. Given the predominantly normally distributed data, and the question of the degree to which parametric conditions need to be met (Bryman & Cramer, 2011), the decision was made to use parametric testing. In addition, no non-

linear relationships between variables were observed. Descriptive statistics were then used to explore the data and to form comparisons between clinical and demographic subgroups.

Correlations were used to determine which predictor variables correlate with outcome variables. Using a correlational design enabled us to examine the direction of any such relationships, the strength of relationships and the statistical significance of relationships. This enabled the investigation of whether unmet psychosocial needs correlate with either psychological flexibility or outcome variables (anxiety, depression, and quality of life).

In order to determine whether psychological flexibility acts as a moderator between unmet psychosocial need and the outcome variables, a moderation analysis was employed. The macro PROCESS method developed by Hayes (2013) was used to perform this part of the analysis. PROCESS uses an ordinary least squares or logistic regression-based path analytical framework for estimating two and three way interactions in moderation models along with simple slopes and regions of significance for probing interactions. Due to a lack of existing literature on the relationship between unmet needs, psychological flexibility and distress, the analysis was somewhat exploratory in nature. Unmet needs were broken down into the five sub-domains of the SCNS-SF34, and each tested against all outcome variables (anxiety, depression and quality of life). While this did mean that a high number of moderation analyses were conducted; the potential for improving understanding of how different types of unmet need affect psychological outcomes, and the associated clinical applications, justified this. Variables were mean-centred prior to the computation of interaction terms, as recommended by Aiken and West (1991).

Results

Sample Characteristics

In total, 91 questionnaires were returned with variable amounts of missing data. All participants had a haematological cancer diagnosis, were over the age of 16, and most had received treatment for their condition at some stage. Of those that had received active treatment, only 8 were currently still receiving ongoing, or maintenance, treatment. Missing data was handled in accordance with measure scoring guidance (Bonevski et al., 2000; Aaronsen et al., 1993; Zigmond & Snaith, 1983; Bond et al., 2011), with imputation the predominant method used. Where over half of the data for a scale was missing, the case was excluded. The number of data points for each scale after imputation and case exclusion ranged from 66-75 (See Table 2). The number of participants for whom either imputation or case exclusion was applied ranged between 1 and 11 across the variables. Demographic information for the sample is presented in Table 1.

Table 1: Participant demographic information.

Demographic		***Percentage***
Gender	*Male*	*46.80%*
	Female	*53.20%*
Ethnicity	*White*	*97.50%*
	Black Caribbean	*1.30%*
	Chinese	*1.30%*
Employment	*Employed*	*27.50%*
	Retired	*45.10%*
	Fulltime Education	*1.10%*
	Unable to Work	*13.40%*
Diagnosis	*AML*	*1.2%*
	CLL	*22.0%*
	CML	*2.4%*
	Hodgkin Lymphoma	*9.8%*
	NHL	*64.6%*
Treatment	*Active Treatment*	*78%*
	Watch and Wait	*22%*

Prevalence of distress and quality of life disturbance

An initial exploratory analysis was conducted to explore and describe the data and to form comparisons between clinical and demographic subgroups. These analyses indicated that 51.4% of the sample were above the threshold for borderline clinically significant anxiety and 27% of the sample were within the clinically significant range. For depression, results show that 27% of the sample were above the borderline level of clinical significance and 12.2% were within the clinically significant range. This makes the levels of anxiety and depression within this sample above the point prevalence rates for either disorder within the general population, where it is estimated that the global prevalence of anxiety is 7.3%, and 4.7% for depression (Baxter et al., 2013; Ferrari, Somerville, Baxter & Norman, 2013). This is also considerably higher than populations with other types of non-haematological cancer (Nikbakhsh et al., 2014; Gillanders et al., 2015).

Prevalence of unmet needs and psychological flexibility

Regarding the presence of unmet need within the sample, Table 2 indicates that the domain with the highest area of unmet need is psychological need. The mean scores for each subscale cluster around the centre of the response scale, indicating that needs are present within the sample, but that they are largely being met.

Table 2: Mean scores for key variables

Measure	Sub-Scale	Mean (SD)
SCNS SF34	Physical and Daily Living needs (N=71)	2.34 (1.2)
	Psychological needs (N=71)	2.42 (1.1)
	Health Systems and Information needs (N=66)	1.79 (0.8)
	Patient Care and Support needs (N=76)	1.89 (0.8)
	Sexual needs (N=74)	1.96 (1.1)
AAQ-II	Psychological flexibility (N=75)	19.8 (9.1)
HADS	Anxiety (N=74)	7.35 (4.3)
	Depression (N=74)	5.11 (3.7)
EORTC QLQ-C30	Global quality of life (N=73)	4.90 (1.45)

Under ten per cent (9.9%) of the sample had unmet psychological needs that were within the moderate to high need range with almost a third of the sample (32.4%) reporting a need that remained unmet within this domain; similar figures were also reported for the physical and daily living domain (35.2%). Moderate needs were defined as a score of four on the SCNS SF34, and high needs a score of five (out of five). Any score of three or higher was defined as an unmet need. The levels of unmet need present vary considerably from low need to high need within the sample.

Some specific areas of need emerged of particular relevance to this sample. *Lack of energy/tiredness* and *not being able to do the things you used to do* were the most commonly reported high unmet needs (14.3%) within the sample. 12.1% of the sample report *uncertainty about the future* as a high unmet need, with *concerns about the worries of those close to you* having the same percentage reporting high unmet need. Unmet needs relating to *anxiety* and *fears about the cancer spreading* were the other two most commonly reported unmet needs at the high level, each present in 9.9% of the sample.

Correlational analysis

Pearson's correlation analysis were used to determine which domains of unmet needs correlate with those outcomes assessed. These results (see Table 3) indicate that there are statistically significant relationships present between unmet needs and all psychosocial outcomes. All correlations were statistically significant at the 0.01 level (two-tailed test) with the exception of HADS Anxiety and SCNS Health services and information needs; this correlation was significant but only at the 0.05 level (two-tailed test).

Table 3 shows a pattern of moderate to strong correlations, in line with predicted directions, and which is consistent with previous research. As unmet needs increase, so does associated distress. Psychological flexibility was found to significantly correlate with all outcomes: positive correlations were found with needs domains, anxiety and depression, and a negative correlation was found with quality of life. Particularly strong correlations with unmet psychological needs and anxiety were noted.

Table 3: Correlations between variables.

	Psychological Needs	HSI Needs	PCS Needs	Sexual Needs	Anxiety	Depression	QoL	Psychological Flexibility	Total Unmet Need
PDL Needs	.685**	.489**	.503**	.507**	.441**	.643**	-.820**	.391**	.791**
Psychological Needs		.532**	.643**	.652**	.696**	.605**	-.571**	.712**	.919**
HSI Needs			.795**	.417**	.298*	.402**	-.484**	.428**	.834**
PCS Needs				.469**	.418**	.524**	-.509**	.534**	.835**
Sexual Needs					.545**	.359**	-.402**	.380**	.695**
Anxiety						.692**	-.484**	.728**	.595**
Depression							-.726**	.604**	.649**
QoL								-.416**	-.708**
Psychological Flexibility									.674**

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Moderation analysis

In total, 15 moderation analysis models were tested: one for each of the five domains of unmet need against anxiety, depression and quality of life.

Table 4: Moderation Analysis

Model	□	**t**	**p**	**R^2**	**F**	**p**
1: QoL						
PF	-0.025	-1.421	0.16			
PCS Needs	-0.936	-3.97	0.001			
PF X PCS Needs	0.061	4.928	<.001	0.385	14.71	<.001
PF	-0.006	-0.269	0.7885			
Psychological Needs	-0.774	-3.399	0.0012			
PF X Psychological Needs	0.042	2.933	0.0047	0.377	12.25	<.001
PF	-0.048	-2.567	0.013			

Sexual Needs	-0.509	0.171	0.004			
PF X Sexual Needs	0.036	2.528	0.014	0.316	11.83	<.001
PF	-0.02	-1.611	0.112			
PDL Needs	-0.885	0.111	<.001			
PF X PDL Needs	0.012	0.011	0.289	0.69	35.96	<.001
PF	-0.056	-3.006	0.004			
HSI Needs	-0.602	-3.364	0.001			
PF X HSI Needs	0.038	1.369	0.176	0.367	13.91	<.001
2: Anxiety						
PF	0.315	6.448	<.001			
PCS Needs	1.073	2.449	0.017			
PF X PCS Needs	-0.167	-2.365	0.021	0.612	30.95	<.001
PF	0.221	3.383	0.001			
Psychological Needs	1.56	3.08	0.003			
PF X Psychological Needs	-0.028	-0.601	0.55	0.604	26.5	<.001
PF	0.287	5.918	<.001			
Sexual Needs	1.337	4.233	0.001			
PF X Sexual Needs	-0.002	-0.078	0.939	0.629	25.87	<.001
PF	0.296	5.158	<.001			
PDL Needs	0.734	2.341	0.022			
PF X PDL Needs	0.003	0.084	0.934	0.57	20.87	<.001
PF	0.325	4.433	<.001			
HSI Needs	0.116	0.181	0.857			
PF X HSI Needs	-0.118	-1	0.321	0.542	22.19	<.001
3: Depression						
PF	0.174	2.929	0.005			
PCS Needs	1.568	2.856	0.006			
PF X PCS Needs	-0.078	-1.567	0.122	0.447	28.69	<.001
PF	0.153	2.563	0.013			
Psychological Needs	1.157	2.837	0.006			
PF X Psychological Needs	-0.036	-0.855	0.396	0.436	22.85	<.001
PF	0.217	4.487	<.001			
Sexual Needs	0.722	2.412	0.019			
PF X Sexual Needs	-0.046	-1.077	0.286	0.404	18.27	<.001
PF	0.162	3.288	0.002			
PDL Needs	1.46	4.167	0.001			
PF X PDL Needs	0.014	0.36	0.72	0.557	29.55	<.001
PF	0.218	3.189	0.002			
HSI Needs	0.877	1.439	0.155			
PF X HSI Needs	-0.082	-0.859	0.394	0.407	17.7	<.001

Of these, four moderations were found to be significant:

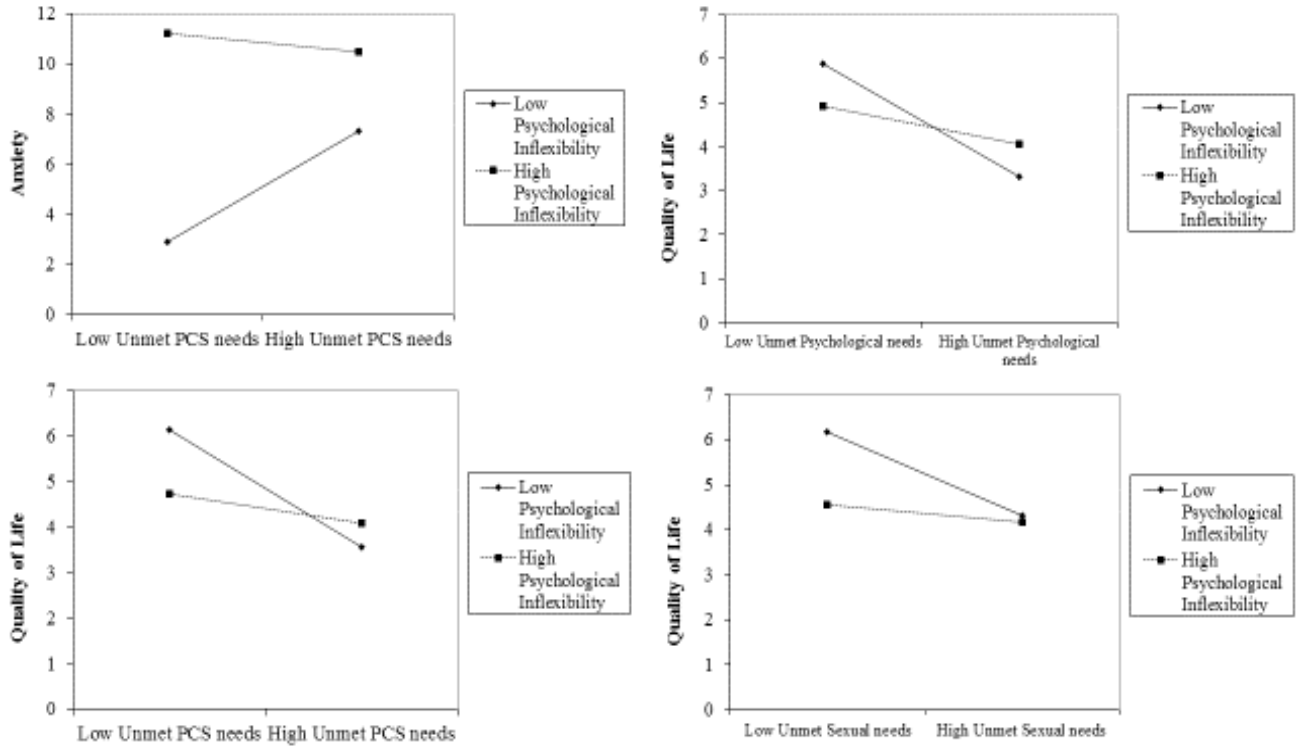

Figure 1: Significant interactions.

In all cases of significant moderation effect, the conditional effects analysis demonstrated that the relationship between unmet need domain and outcome emerged *only* in people with average or above average levels of psychological flexibility for the sample (average psychological flexibility was calculated as the sample mean, with higher or lower levels of flexibility either one standard deviation above or below the mean). This means that the relationship between unmet need and outcome goes from being non-significant in those with low levels of psychological flexibility (put another way, in those who display high inflexibility), to a relationship between need and outcome that increases in significance as the level of psychological flexibility increases.

Discussion

The aim of this study was to investigate the level and type of unmet needs present in haematological cancer survivors, and to explore the relationship between unmet need, distress and psychological flexibility. A moderating effect of psychological flexibility was found between unmet psychological needs and quality of life, sexual need and quality of life, and patient care and support needs and both anxiety and quality of life. Psychological flexibility was not found to moderate between unmet need and depression.

This study highlights that a sub-group of haematological cancer survivors have on-going unmet supportive care needs, and that greater levels of unmet needs relate to a broader picture of poor psychological wellbeing in this patient group. Results indicated that both anxiety and depression were above the point-prevalence rates found within the general population (Baxter et al., 2013; Office for National Statistics, 2013). These rates were high even when compared to similar studies conducted in broader cancer samples (Armes et al., 2009; Carroll et al., 2003; Stark et al., 2002), although this is not the first time that this has been found in haematological samples (Molassiotis et al., 2011).

The findings highlight a discrepancy between the level of distress found and those expressing a desire for psychological support via their unmet needs assessment. More participants are anxious than indicate an unmet support need for help to address their anxiety. This finding is consistent with previous findings: not all of those who experience psychological distress want help to manage their concerns; indeed previous research has indicated that of those patient who experience both cancer and depression, only 36% wanted professional help to improve their psychological wellbeing (Baker-Glenn et al., 2011). This demonstrates the clinical utility of an unmet needs assessment above and beyond more simplistic psychosocial distress screening tools. In addition to signifying to clinicians where patients may benefit from further support, an unmet needs assessment also provides an indication of where and with what the patient would like to receive support, thus helping to ensure that resources are allocated to both the area of greatest need but also where they are most likely to be accepted by the patient. It, nonetheless, remains important that clinicians are aware of the on-going potential for distress in patients who do not report a desire for formal support at that time.

The findings from this study further indicate that psychological concerns continue into survivorship for some patients, and that unmet need does not need to be in the psychological domain in order to have a negative impact on psychological wellbeing, previously demonstrated in both patient and carer samples (Ugalde et al., 2012; Heckel et al., 2015). Of the six most common unmet needs, four are needs within the psychological domain; this is unsurprising given that psychological need had the highest average score of all five unmet need domains. This clearly indicates a need for psychological support for cancer survivors that is not being met by current service provision or policy (Swash et al., 2016). A patient's active desire for further support may change as their psychological adjustment process evolves, and the absence of formal support at the higher levels of the stepped-care model (National Institute for Health and Clinical Excellence CSGSP, 2004; Moorey, 2013) does not mean that a patient would not benefit from on-going support from their current healthcare team. That is to

say, the absence of extreme or clinically-significant distress does not mean that a patient would not benefit psychologically from on-going support.

High levels of unmet psychosocial needs elsewhere are related to poorer psychological wellbeing and suffering (e.g. Morrison et al., 2012; Uchida et al., 2011), making it unsurprising that the same has been found in this patient group. The presence of needs relating to tiredness, uncertainty, and fear are *bound* to make people feel as though they are suffering. In this manner, haematological cancer patients, and indeed cancer patients more broadly, can be viewed as an at-risk group for distress and the assessment of their unmet needs is both relevant and important when building a picture of overall psychological health.

The insights provided within this work indicate that the presence of unmet need, a gap between what is real and what is desired with regards to a patient's supportive care, may, at least partially, provide an explanation for the distress that is present in a sub-group of patients. It is, therefore, likely that interventions that are designed to meet unmet need in cancer patients will display a broader clinical utility than interventions that are targeted towards a specific psychological concern and will also act to improve the psychological wellbeing of patients more generally. In the current climate of limited healthcare resources, implementing supportive care measures that have the greatest clinical impact will always be of benefit, with timely, effective support meaning that psychological problems can be avoided or managed more cost-effectively (Carlson & Bultz, 2004). Our aim of exploring the moderating role of psychological flexibility was a first step towards establishing whether Acceptance and Commitment based interventions may be suitable for haematological cancer patients. The ACT literature around oncology more widely has produced promising results. Improvements have been demonstrated for both cancer-specific and broader outcomes (Arch & Mitchell, 2016; Rost et al., 2012). Indeed, not only have improvements in both distress and quality of life been found in oncology samples, but improvements have been found to be sustained over time (Feros et al., 2011).

The analyses contained in this study highlight the role that psychological flexibility plays in the relationship between unmet need and psychological wellbeing, lending support to the assertion that psychological flexibility functions as the process of change via which ACT produces benefits (Fledderus et al., 2013; Kashdan et al., 2010). Psychological flexibility was comparatively high in the sample, with an average score of 19.7 (out of 49, where a lower score indicates higher flexibility). Compared with previous findings in cancer patients, psychological flexibility was slightly higher than might have been predicted (Feros et al., 2013). Some aspects of our results are, however, somewhat surprising, and in direct contrast to the original hypothesis in which we expected that psychological

flexibility would buffer the relationship between unmet need and psychological wellbeing, thus reducing the negative impact of the presence of unmet need. Instead, the results indicated that the relationship between unmet need and psychological wellbeing was only present in those participant with average or above average levels of psychological flexibility for the sample. The results indicate a division in the way in which unmet needs are experienced between those patients with low psychological flexibility and those with high psychological flexibility. The fact that the relationship between unmet need and outcome only emerges where psychological flexibility is at average or above average levels could be an indication that people who are more psychologically flexible are also more insightful into their cancer experience (insight leading to self-identification of need) and its resultant psychological impact. This finding makes sense in the context of the broader ACT model whereby flexibility is characterised by an accepting, mindful and cognitively defused stance toward values-based living (Hayes, 2006). In this context, mindfulness implies an awareness of the present moment and of one's own thoughts and feelings within that moment (Kabat-Zinn, 2003), and acceptance implies an ability to allow thoughts to be present without struggling with them (Hayes, 2006). It is plausible, therefore, that these results provide a useful demonstration of this complex inter-relation of coping skills; what we see in those with higher level of flexibility (and in whom the moderation relationship was significant) is a group of patients who are more likely to be aware of their unmet needs and to therefore report them as distressing. Those who are low in psychological flexibility are conversely unaware of what their needs are, thus meaning that the relationship between needs and distress is not expressed. In turn, this may lead to low reporting of distress and other psychosocial outcomes on traditional measurement tools.

If we expand our interpretation further, to consider also the values component of psychological flexibility, further clarity can be found. By definition, those who are more psychologically flexible are more insightful of their own value systems, they are more likely to be aware of how a diagnosis of cancer has impacted upon their life and values; it is precisely this realisation that may give rise to an awareness of unmet needs in the first place. Observation of the self, or observing the self within a wider context may relate to participants with higher levels of psychological flexibility being more able to separate their needs and thoughts from their core view of themselves. For those patients with higher flexibility the presence of unmet needs can be viewed as a product of the situation rather than as an inner failing, so that the patient is able to acknowledge and express the need. In short, those who are more psychologically flexible may be more insightful into their own unmet needs and, therefore, more likely to report the presence of unmet need or psychological distress. If people are psychologically inflexible, they may be less likely to be aware of or to acknowledge the impact of

their diagnosis or be sufficiently aware of their own life values to have an awareness of how cancer has created a rift between their desired and actual states.

Clinical and theoretical implications of the findings

These findings raise important questions for the psycho-oncology community, and for those interested in applying ACT interventions in an applied setting. While results indicate that psychological flexibility does play a moderating role in the relationship between unmet needs and distress, questions are also raised. Previous research has highlighted the potential for mindfulness and awareness raising interventions to be problematic for some (Fjorback, Arendt, Ornbol, Fink & Walach, 2011). In a group of people where the problem at the core of suffering is so concrete and, for some, unchanging, increasing awareness alone may have unintended negative effects. ACT-based interventions, where increasing awareness is accompanied by skills training (such as acceptance, cognitive defusion, values clarification), may represent the answer to these findings, as these additional components better equip patients to build resilience, and to manage and accept their fears and distress.

Component analysis of interventions is essential to fully understand why interventions work, and to make them optimally effective (Stanton, 2013). To date, no study has undertaken a robust examination of the process of longer-term psychological adjustment to survivorship using the ACT framework, although such a study is currently underway; led by our group in the UK, we are also recruiting cancer survivors from Canada and Australia and we will follow their adjustment for a period two years from the end of treatment using self-report questionnaires (Hulbert-Williams et al., *2016*).

Study limitations

A major limitation of this work was the small sample size, notably of some of the rarer types of haematological cancers. While the sample is representative of the haematological cancer population with NHL and CLL as the most commonly diagnosed conditions (Public Health England, 2014), it does mean that the influence of the participants with Chronic Myeloid Leukaemia and Acute Myeloid Leukaemia on the overall sample outcomes may have been negligible. There was limited ethnic diversity within the sample (97.5% White). This may reflect the method of recruitment, but also mirrors broader concerns within the field that patients from diverse ethnic minority backgrounds are less likely to take part in cancer research in the UK (Wright, Foster, Gunaratnam & Okamoto, 2008).

Recruitment challenges meant that the sample size suggested by the power analysis was not quite met. While important to note, a majority of our results were significant at the .01 level and a lack of borderline significant results elsewhere suggests that the analysis was not in effect underpowered. ADD IN REF

The sample was recruited online and based on patient self-report it was not possible to confirm the clinical demographics of the sample. It was also not possible to provide any follow-up support to patients who scored highly on the measures for anxiety and depression; whilst ideal and often the case in a sample recruited from within a clinical setting, our method of recruitment meant that these usual ethical good practice guidelines could not be put into place. Instead participants were advised to seek advice from their healthcare teams if the questionnaire had raised concerns for them. A more worrying implication is that this highlights the presence of a sub-group of cancer survivors who would benefit from ongoing support, yet the current provision of support services means that their concerns are not routinely picked up and managed.

Recruiting a sample via online blogs and newsletters that are published by relevant cancer charities brings a potential bias to the sample. This was a self-selecting sample, engaging with the charities prior to participation. They could, therefore, be viewed as either seeking support from their contact with the charities or who were sufficiently well psychologically adjusted to their diagnosis that they are able to confront their diagnosis by engaging with charities that provide support to people like themselves. Previous literature has demonstrated that patients who are more anxious or depressed are likely to be less engaged generally with their treatment, are less motivated, and less able to cope with the diagnosis (Hemingway, 1999). However, the relatively high point-prevalence rates of anxiety and depression in the sample do not indicate that only the well-adjusted took part. Prevalence rates such as the ones presented here goes somewhat against the perception that only the psychologically-well are willing to take part in research. It may be the case therefore, that those who do engage with cancer charities may be more likely to be anxious or feel a need for additional information or support than those who do not seek out newsletters or blog posts online.

Conclusions

In summary, a sub-group of haematological cancer patients have unmet needs that persist well into the survivorship phase. The assertion that psychological flexibility affects change is supported, and as a construct it is theorised to have the potential to provide the basis for interventional approaches that seek to improve both reported level of unmet need and related suffering in this patient group. However, the generalisability of the moderation results require further exploration against wider

cancer groups. These findings strengthen the growing body of research that highlights ACT as beneficial to the improvement of distress in cancer patients, and sheds light on the added value that a multi-component intervention such as ACT may hold, over for example, less complex mindfulness based interventions. More research into the active components of an ACT intervention within a cancer patient sample is needed to fully explore which aspects of the model are most effective in producing positive change.

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