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TITLE: CANCER RELATED FATIGUE AND SELF-CARE AGENCY: A MULTICENTRE SURVEY OF PATIENTS RECEIVING CHEMOTHERAPY

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ABSTRACT

Aims and Objectives: To measure Cancer Related Fatigue (CRF), Self-Care Agency (SCA) and fatigue self-care strategies, and to explore the relationship between CRF and SCA.

Background: CRF has been consistently rated as the most elusive, common and severe of symptoms that patients with cancer undergoing chemotherapy experience. Despite its frequency and severity, CRF is poorly managed. A renewed focus on supporting self-care

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among patients with cancer has been found to reduce symptom burden, empower patients and improve patient satisfaction. Understanding the link between self-care agency (i.e. capability and willingness to self-care) and CRF levels will help practitioners to better support individuals on the cancer journey.

Design: A descriptive, correlational survey design was employed.

Methods: Patients (n=362) undergoing chemotherapy with a primary diagnosis of breast, colorectal, Hodgkin's and non-Hodgkin's lymphoma cancers were recruited from four oncology centres in one city in the South of Ireland. Participants completed the Piper fatigue scale-revised, appraisal of self-care agency scale and a researcher developed fatigue self-care survey. Multivariate logistic regression was used to examine the relationship between CRF and self-care agency using a dichotomous dependent variable score of four as the cut off between those deemed to be fatigued (≥4) and those not fatigued (<4). As recommended by the EQUATOR Network, the STROBE checklist of items for cross-sectional studies is used to report the study.

Results: The incidence of CRF was high with 75% of participants scoring clinically relevant CRF. Higher SCA (OR = 0.96, 95% CI = 0.93-0.99, p = 0.011) was associated with decreased odds of developing CRF. Having non-Hodgkin's lymphoma (OR=3.02, 95% CI=1.29-7.07, p=0.011) was associated with increased odds of developing CRF.

Conclusions: Patient's undergoing chemotherapy experience significant fatigue. Higher capability for self-care is associated with lower fatigue. The promotion of SCA and self-care strategies can impact on CRF.

Relevance to Clinical Practice: Understanding the link between self-care abilities and fatigue can lead to more individualised and tailored approaches to CRF.

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Keywords: Cancer related fatigue, chemotherapy, self-care, self-care agency.

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1 | INTRODUCTION

Cancer related fatigue (CRF) is one of the most common and persistent side effects of cancer and its treatment (Wang, & Woodruff, 2015; Ebede, Jang, & Escalante, 2017; Mohandas et al., 2017). Fatigue is described as being subjective, multidimensional and variable in severity with physical, emotional, mental, functional and spiritual components (Wu, & Davis, 2013; Pearson et al. 2018). Studies exploring patients' symptom experiences have shown that patients consistently rate fatigue as the most severe symptom, compromising the individual's physical functioning as well as their quality of life (Wang et al., 2014; Jung et al., 2017).

2| BACKGROUND

CRF is a significant issue faced by many patients receiving chemotherapy. There is some conflicting data regarding whether CRF improves or declines over time (Anderson et al., 2013; Johansson et al. 2018). Some studies have found that CRF occurs within three to four days after the commencement of each chemotherapy treatment and generally lasts approximately 10 days and declines as time goes on (Hovey et al., 2012; Ream et al., 2015).

A number of pharmacological and non-pharmacological interventions for CRF have been evaluated (Ebede, Jang, Escalante, 2017). Activity enhancement has the most supporting evidence in terms of effectiveness (Cramp, & Byron-Daniel, 2012; Tomlinson et al., 2014), however, the best type, intensity and duration of exercise have not been clarified to date. Results of several studies reiterate the role of educational interventions in supporting patients' self-manage and moderate their CRF (Reif et al., 2013). Additionally, a growing body of empirical data supports the use of psychosocial interventions for the management of

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CRF (Goedendorp at al., 2009; Minton, Jo, Jane, 2015). Empirical literature has demonstrated that complementary therapies are somewhat beneficial in ameliorating CRF (Finnegan-John et al., 2013; Satija, & Bhatnagar, 2017).

Internationally, the enablement of self-care is increasingly being recognized as an essential component of chronic disease management (LeRoy et al., 2014). A patient-oriented focus which is characterized by active patient participation, with individuals taking personal responsibility and changing their lifestyle are important components of self-care (Wong et al., 2015). Through implementing a range of self-care strategies, the individual with cancer can do much to decrease the fatigue symptom burden and improve their quality of life.

Self-care agency (SCA) is an important feature of Orem's (2001) Self-Care Deficit Nursing Theory. SCA is defined as one's ability and willingness to engage in self-care, which is known to influence an individual's performance of self-care behaviours (Hu, Li, & Arao, 2013). A number of authors have highlighted how SCA is relevant to the promotion of self-care in the context of chronic illness (Sousa et al., 2009; Çiftçi, Yıldırım, Şahin Altun, & Avşar, 2015). SCA and engagement in positive lifestyle behaviours can be enhanced through targeted SCA interventions (Drevenhorn et al., 2015; Pagels, Hylander, Alvarsson, 2015).

Knowledge of the factors influencing the experience of fatigue, the role of SCA and the self-care behaviours patients with CRF use in ameliorating the adverse impact of CRF will assist healthcare professionals in developing effective interventions for CRF. Thus, the aim of this study was to 1) measure CRF and SCA 2) explore the associations between SCA, the frequency of use of various CRF self-care strategies and CRF in a sample of patients with a diagnosis of cancer undergoing chemotherapy.

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3| Methods

3.1 | Design

A descriptive, correlational, cross-sectional survey design was used. The study framework was informed by Pipers' Integrated Fatigue model (Piper, Lindsey, & Dodd, 1987), Orem's Self-Care Deficit Theory (Orem, 1983 and 2001; Hu, Li, & Arao, 2013) and the National Comprehensive Cancer Network (NCCN) Practice Guidelines on the management of CRF (NCCN, 2015) (Figure 1). The STrengthening the Reporting of OBservational studies in Epidemiology (STROBE) checklist of items for cross-sectional studies (as recommended by the Enhancing the QUAlity and Transparency Of health Research (Equator) network) is used in reporting this study (supplementary file 1).

Piper's (1987) Integrated Fatigue model (IFM) presents multiple factors thought to influence fatigue and relates them to both the individual's perception of fatigue and psychological, behavioural, and biochemical manifestations of fatigue. The model gives multiple possibilities on how fatigue can be manifested and provides a base for assessing fatigue across a number of dimensions of subjective fatigue including: subjective fatigue; behavioural/severity; affective meaning; sensory and cognitive/mood (Piper, 2003).

Orem (2001) identified the concept of SCA as an individual's acquired capability to perform self-care activities to maintain life and promote health and well-being (Sousa et al., 2008; Hu, Li, & Areo 2013). Orem (2001) highlighted the basic conditioning factors that influence a person's requirement for self-care and their SCA e.g. age and gender.

Fatigue self-care strategies are the patient initiated strategies that help them to manage their symptom experience (Dodd et al., 2001).

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3.2 | Participants

A consecutive sample of adult patients attending for their chemotherapy treatment was recruited thus limiting bias. Patients who had primary cancer receiving active chemotherapy (for a minimum time of six weeks) with a diagnosis of breast, colorectal, Hodgkin's and non-Hodgkin's lymphoma cancers were recruited from the four oncology centres based in a City in the South of Ireland over an eight-month period. These comprised of day chemotherapy units at four hospital sites; in-patient oncology wards at two of the hospitals, and oncology out patients department at one of the hospitals. Patients were excluded if they were receiving other concurrent cancer treatments (e.g. radiotherapy, immunotherapy or surgery).

An analysis of audit data from the data collection sites and population data from the Irish Cancer Registry for the previous year informed the sample size calculation revealing that much smaller numbers of patients present with Hodgkin's and non-Hodgkin's lymphoma compared to the larger numbers diagnosed with breast and colorectal cancer. Thus, the study was powered to detect a mean difference of one standard deviation in Piper Fatigue Scale-Revised (PFS-R) scores between the larger groups (breast and colorectal cancer) and a mean difference of two standard deviations between the two smaller groups (Hodgkin's and non-Hodgkin's lymphoma). To have 80% power to detect such differences at the 5% level of statistical significance 100 individuals were required in each of the larger diagnostic groups and 26 individuals in each of the smaller diagnostic groups.

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3.3 | Outcomes

Cancer Related fatigue

The Piper Fatigue Scale-Revised (PFS-R) (Piper et al., 1998) incorporates 27 items, 22 of which evaluate the perception of current fatigue using a 0-10 Likert scale. Results can be summarised into four dimensions (subscales) of subjective fatigue: behavioural/severity; affective meaning; sensory and cognitive/mood. A CRF score of 1-3 designates mild fatigue; 4-6 corresponds to moderate fatigue; and 7-10 indicates severe fatigue. Fatigue was also categorised in terms of a cut-off score of four; with scores <4 representing "not clinically significant fatigue", and scores of ≥4 demonstrating moderate-severe levels of fatigue (Kluthcovsky et al., 2012).

Self-care Agency

The Appraisal of Self-care Agency Scale Revised (ASAS-R) measured SCA enabling traits which represent the power components of SCA (Sousa et al., 2009 & 2010). These are specific personal capabilities necessary for the performance of self-care activities including self-care knowledge, self-care skills, and energy for self-care. ASAS-R is a 24-item survey with 5-point Likert-type scale answer options. Total scores ranged from 24 to 120, with higher scores indicating greater SCA.

Self-care Strategies

The Fatigue Self-Care Survey (FSCS) was a researcher developed 26 item-tool, which emanated from a review of the empirical literature and the NCCN fatigue management guidelines. For each fatigue self-care strategy, the participant was asked to rate on a Likert scale the frequency of engaging in the activity and its perceived effectiveness.

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A panel of experts (n=16) reviewed the FSCS by rating each item on a four-part content validity index (CVI) and addressing 1) the match between questionnaire items and research objectives and 2) relevance, clarity, and potential for ambiguity for each questionnaire item. Items with a CVI > 0.75 remained within the FSCS (Yaghmale, 2009). As items represented discrete fatigue self-management strategies, no total score was computed for the FSCS.

Following the pilot test (n=6 patients) a number of minor changes were made to the structure of the questionnaire items including sentence structure, clarification of ambiguous terms, and minor changes to the layout.

Socio-demographics and open ended questions

We also collected information relating to participant socio-demographics (gender, age, living arrangements, employment details, education level, and marital status) and clinical factors (primary cancer diagnosis, duration of chemotherapy). Information was not collected on chemotherapy regimens, haemoglobin levels or stages of disease each of which can influence fatigue levels. The empirical literature consistently demonstrates diversity in the fatigue experience of patients with the same disease and treatment. The fatigue experience can be modified by the patient's own physical, behavioural, and psychosocial and sociodemographic factors. One of these factors is power to self-care. Thus in the interest of limiting the factors studied the authors chose to measure a select number of socio-demographic-clinical factors, four dimensions (subscales) of subjective fatigue and self-care agency.

Supplemental open-ended questions were asked in both the fatigue and self-care strategies sections of the instrument. Answers to such questions provided a more nuanced understanding of patients' experiences.

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3.4 | Data Collection Procedure

The researcher communicated with the oncology nurses at each site before approaching potential participants. Each potential candidate, having met the inclusion criteria, received an information sheet and was invited to partake in the study. Consenting individuals could either self-complete the questionnaire or have the researcher assist them with completion of the survey.

3.5 | Data Analysis

Initially, descriptive and inferential statistics were used to describe the data and test the hypothesis of the study. The type of variable and distribution of data informed decisions relating to statistical tests chosen.

Fatigue can be assessed as a categorical variable, with a cut off score of ≥4 for assessing fatigue that is of clinical importance. A number of studies, including those focused on making treatment decisions (Stover et al., 2013) have used a score of four as the cut off between those deemed to be fatigued (≥4) and not fatigued (<4) (Ma et al., 2011; Kluthcovsky et al., 2012). In this study participants were classified as being fatigued (moderate to severe fatigue) if their total fatigue score was four or higher. Stover et al. (2013) whose analysis supported construct validity of the fatigue cut off scores noted that standardised fatigue cut off scores enhance interpretability and comparability across studies and populations, and guide treatment planning. Logistic regression is the appropriate regression analysis to conduct when the dependent variable is dichotomous. In order to consider variables of possible statistical and clinical importance (Hosmer, David, & Lemeshow, 2004), all variables which showed an association with the dependent variable at the 10% significance level (i.e. $p < 0.1$) were included in the multivariate analysis. The multivariate logistic regression model incorporated demographic variables in the first block,

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clinical factors in a second block and self-care strategy variables in a third block. Analysis were completed using SPSS version 18; statistical significance occurred at the standard level of significance ($p < 0.05$).

The Cronbach's Alpha for the Piper Fatigue Scale Revised (PFS-R) was 0.964 and Appraisal of Self-care Agency Scale Revised (ASAS-R) was 0.799 indicating a high level of internal consistency for these scales.

Written comments were transcribed and analysed using qualitative descriptive content analysis.

3.6 | Ethical Considerations

Ethical approval and stakeholder permission were sought and granted from the Clinical Research Ethics Committee of the Cork Teaching Hospitals (Ethics No: ECM 4W100810). Researchers briefed potential participants about the purpose of the study and study procedures. Potential participants were assured about confidentiality and informed about the right to withdraw from the study at any time without consequences. Written informed consent was obtained from the participants. Pseudonyms are used where qualitative comments are presented.

4| RESULTS

4.1 | Characteristics of the sample

The sample consisted of 362 patients from four cancer groups (response rate=93.6%). The majority of the sample were in the 55-64 year age range (31.5%), and the largest proportion were married (71.5%); 87.8% stated they were living with a supportive adult; 32.4% were retired and 26.3% were homemakers (Table 1). In relation to employment status, 33.8% were

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employed with only 6.4% being unemployed. The highest educational attainment of the group varied with the majority (37.1%) having completed primary school education.

INSERT TABLE 1 HERE

Patients in the study had various cancer diagnoses; the mean average time since starting chemotherapy was 14.1 weeks (SD=10.2) (Table 2).

4.2 Cancer Related Fatigue

Fatigue levels, measured using the PFS-R, revealed a mean total fatigue score of 4.9 and standard deviation (SD) of 2.2. The highest mean (SD) subscale score occurred in the affective meaning subscale (5.4 (2.9)) (Table 3). Over a quarter (25.2%) of participants had fatigue scores <four, and 74.8% had fatigue scores ≥ 4 (i.e. moderate to severe fatigue). Across cancer types the cancer group with the highest mean (SD) total fatigue score were those patients in the Hodgkin's lymphoma cohort (5.9, (2.2)).

4.3 | Self-Care Agency

SCA was measured using the ASAS-R (Sousa et al., 2009) with a possible range of scores from 24 to 120. Findings indicated that SCA levels were high with a mean (SD) of 93.0 (10.4). Interestingly, the highest scored individual items (mean (SD)) on the SCA five-point Likert scale related to: taking measures regarding sanitary conditions in the environment (4.7(0.6)); making adjustments to stay healthy (4.4(0.7); maintaining hygiene through adjusting bathing/showering (4.4(0.9)); having a circle of friends that the person can call upon to help with self-care (4.3(0.8); and when needed take time to care for oneself (4.3 (0.8)). In contrast, the lowest scored items were seldom having time for oneself (2.4 (1.3)); seldom taking time to care for oneself (2.5 (1.2); seldom asking for clarification (2.6 (1.3)); and rarely checking measures taken to stay healthy (2.6 (1.2)).

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4.4 | Fatigue Self-Care Strategies

Data relating to the frequency of use of various self-care strategies were presented according to total number of strategies used either "occasionally", "fairly often" or "very often". The mean number of strategies used at least "occasionally" was 14.8, (SD=3.42, range=5-24). The most frequently used strategy was receipt of support from family and friends (66.6%). The strategies perceived as being most effective were: receiving support from family and friends; having a healthy diet; and spending time chatting with friends.

4.5 | Factors associated with CRF

Multivariate regression analysis was performed to identify the associations between independent variables (conditioning factors, SCA, self-care strategies) and the dependent variable (CRF i.e. the total PFS-R score, Figure 2).

Of the demographic factors entered into the multivariate logistic regression, the final model indicated that marital status was independently associated with experience of moderate or severe fatigue (OR= 0.14, 95% CI=0.03 - 0.63, p=0.01). The type of cancer also made an independent contribution to experiencing fatigue. The odds of experiencing fatigue (≥4) was greater in each of the cancer groups compared to the patients with colorectal cancer though this was only statistically significant for patients with non-Hodgkin's lymphoma (OR=3.02, 95% CI=1.29-7.07, p=0.011). Within the qualitative textual comments participants expanded on the extreme nature of the fatigue:

"*At night I had to climb the stairs on all fours… I really felt the chemo* [chemotherapy] *nearly killed me, I was so exhausted*" (Mary, a patient with breast cancer).

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"The first week of chemo [chemotherapy], I would spend ninety percent of my time in bed" (Catherine patient with breast cancer).

"It feels like my whole body is ninety years old" (Michael patient with colorectal cancer).

"*Fatigue was so bad I couldn't watch a programme to the end"* (Martina patient with colorectal cancer).

Notably, increased SCA was significantly associated with reduced odds of experiencing: moderate/severe fatigue (total PFS-R scale scores), (OR=0.96, 95% CI=0.93-0.99, p=0.011); and subjective fatigue in each of the four dimensions (subscales) (behavioural/severity; affective meaning; sensory; and cognitive/mood).

The following self-care strategies were associated with increased odds of having fatigue (≥4): limiting naps to 20-30 minutes (OR=1.37, 95% CI =1.10-1.71, P=.006), and resting and taking it easy (OR=2.26, p<0.001. 95% CI =1.605-3.19, p <.001). Whilst spending time socialising was associated with reduced odds of experiencing fatigue (behavioural severity and sensory fatigue subscales (OR=0.63, 95% CI =0.45-0.88, P=.006 and OR=0.66, 95% CI =0.47-0.93, P=.016 respectively) and exercise was associated with reduced odds of experiencing fatigue (cognitive mood subscale) (OR=0.73, 95% CI =0.57-0.93, P=.012).

The linkage between the capability or power to self-care and perceptions of fatigue were evident in a number of qualitative comments as well. Participants held the view that a positive attitude towards fatigue management, and a deliberate choice to undertake self-care with an associated insight into its benefit, were important factors in the management of CRF. A participant wrote:

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"It is important to take time out and be good to one self" (Siobhan, patient with breast cancer).

Similarly, Jane a woman with breast cancer commented "*you can do it*" indicating her determination. Sheila a lady with colorectal cancer noted that "*you need to set yourself a goal; dress up and get out when feeling well and meet with friends…have a mantra: I can do it*".

5| DISCUSSION

Study participants had a high incidence of fatigue with 74.8% experiencing the symptom (CRF ≥4). Similar rates of fatigue have been identified in previous research involving patients receiving chemotherapy (ranges 70%-100%) (Karakoç & Yurtsever, 2010; Abu, et al., 2014).

The ASAS-R mean score of 92.98, (SD=10.37) was somewhat surprising considering the profile of the participants, all of whom had a cancer diagnosis, and were receiving chemotherapy which as previously highlighted is debilitating. The total ASAS-R mean scores are similar to those in Fex et al., (2012) study (M=87.8, SD=11.3) which focused on self-care agency and perceived health among individuals with chronic illness using advanced medical technology at home. Similarly, in a large sample of the general USA population (n= 629), Sousa and colleagues found the ASAS-R mean score to be 86.3 (SD=13.7).

Sousa and colleagues noted that adults through SCA improve their capacity for self-managing chronic conditions (Sousa et al., 2010). Previous research measured SCA in varying populations such as women in rural communities (Wang & Laffrey, 2011), homeless adults (Anderson et al., 2013), diabetic patients (Sousa et al., 2008), elderly participants (Karagozoglu, Arikan, & Eraydin, 2012) with mean scores in the studies ranging from 71-82.

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A Chinese sample of older adults scored a lower mean (SD) of 55.3 (5.22) on the Chinese translation of the ASAS-R (Guo et al 2016), which may be partially explained by older age of participants, presence of multi-morbidities and cultural differences whereby the focus is more on others as opposed to self. Tanimura et al., (2018), in a two year longitudinal study among older persons (n=133), found that higher self-care agency was a preventive factor for depression (OR <1).

The SCA power components are key factors to enabling successful self-care; within this study there were significant associations between increasing SCA scores (power components) across the four cancer cohorts and decreasing fatigue. Interestingly Karagozoglu, Arikan, & Eraydin (2012) study results also found a significant relationship between lower SCA scores and higher fatigue levels in a cohort of elderly participants (p=0.01, n=146). Likewise, a number of authors have found a relationship between lower capacity for self-care and poorer quality of life (Damásio, & Koller, 2013; Alhambra-Borrás et al., 2017). In the same way Akin & Kas Guner (2018) found an association between higher self-efficacy beliefs and lower fatigue which authors noted can positively influence an individual's quality of life during chemotherapy.

The literature has also highlighted significant relationships between higher self-care agency scores and health promoting behaviours, use of self-care activities, positive health and enhanced wellbeing (Fex et al 2012; Karagozoglu, Arikan & Eraydin 2012; Andersen et al 2013). This is an important finding, and very relevant to clinical practice as having greater self-care agency enhances an individual's capability for chronic disease self-management (Sousa et al 2010), and in the context of this study, enhances self-care of CRF.

Multivariate analysis showed that exercise and socialising were associated with decreased odds of having fatigue. Walking was the most popular form of exercise used (88%

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of participants walked regularly); this finding concurs with previous studies (Cramp &, Byron-Daniel, 2012; Tomlinson et al., 2014). In a systematic review (n=11 included trials) and meta-analysis, Kessels, Husson, van der Feltz-Cornelis (2018) showed that exercise improved CRF with aerobic exercise having the greater effect size. Furthermore, Abbott & Hooke (2018) implemented a physical activity programme (using activity trackers, resistance bands, instructions, and reminder text messages) with patients undergoing chemotherapy (n=39 completed the programme) and found that CRF did not worsen significantly during the intervention and self-reported activity levels increased, but not significantly so.

Socializing was associated with reduced CRF levels ($p = 0.006$). Similarly, socializing combines the strategies of spending time chatting with friends, and receiving support which have been highlighted as beneficial in ameliorating fatigue (Berg & Hayashi, 2013). The literature has also highlighted that CRF had a negative impact on patients' social and family life, causing individuals to feel isolated (Berger, Gerber & Mayer, 2012; Berg, & Hayashi, 2013). However, for those who maintained a social life, or potentially adjusted their social life to within their own limitations, socializing was perceived as effective in reducing CRF levels through the sharing of experiences, being connected and reduction of isolation.

However, in general, the higher the fatigue levels the more self-care strategies the patients adopted in this study highlighting the cognitive and behavioural aspects of self-care. In particular, participants rested or took short naps in an effort to deal with their fatigue. Chan, Yates, McCarthy (2016) also demonstrated that patients with cancer employed a range of strategies to manage their CRF; yet despite the relatively high number of fatigue strategies utilised, fatigue severity did not change significantly over the eight-week study period. Interestingly, Lacourt and colleagues (2017) sought to establish a possible link between incentive motivation (the amount of effort one is willing to engage in to obtain a reward) and fatigue, mood, and inflammation and found that increased fatigue was linked to high effort

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choices. This highlights that patients with cancer may make choices, which lead to increased energy expenditure whilst not necessarily improving their fatigue levels. Thus, it is highly likely that without education, individuals with fatigue adapted day-to-day self-care strategies that were familiar/normal parts of their life or individuals engaged in a trial and error process to see what worked for them. Lack of knowledge about evidence based CRF management strategies may also have been a factor; notably 35.3% (n=126) of respondents in this study received no information on the management of CRF. Van Hooft et al., (2017) using a realist review methodology sought to establish what nurse-led self-management interventions achieved for outpatients with chronic conditions. They found that the most successful interventions focused on individuals' intrinsic processes (i.e. self-efficacy or motivation) which the authors hypothesised was linked to the person's confidence in their power to change their behaviour. This reinforces the need for interventions to both provide information/education and to focus on strengthening the individuals' power and capacity to self-care.

6 | Limitations and Strengths

Limitations of the study included that the majority of patients were assessed for CRF at only one-time point thus the temporal and fluctuating nature of fatigue may not have been captured. Information was not collected on chemotherapy regimens, haemoglobin levels or stages of disease each of which can impact fatigue levels.

The sample is skewed unintentionally towards married females with breast cancer, which introduces the potential for sample bias. Thus, there is a need for future research to clarify gender-specific differences in CRF and associated self-care strategies. Strengths included the inclusion of four cancer groups, and the measurement of self-care agency.

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7| CONCLUSION

This study has demonstrated that patients with cancer undergoing chemotherapy are experiencing significant levels of CRF. Further studies are warranted with large samples incorporating a variety of cancer types and treatments, and where comparisons can be drawn with the general population. Higher SCA scores were statistically linked with lower fatigue levels. Thus, the study's findings provide a new insight regarding the linkage between the capability to self-care and CRF. This is an important finding as the promotion of SCA and self-care should be an integral component of interventions targeted at the management of CRF. This is especially important as the majority of cancer treatments are provided on an outpatient basis with limited ongoing support from health care providers. Patient education should include realistic expectations of treatment and the potential for CRF symptoms, information about evidence based CRF self-care interventions, how to identify personal goals, strategies to optimise SCA, monitor CRF patterns, and adjust self-care strategies accordingly.

8| RELEVANCE TO CLINICAL PRACTICE

All patients with cancer should be educated about CRF so that they can recognize and anticipate fatigue patterns. CRF has been highlighted as being a common occurrence in patients receiving chemotherapy, it is therefore necessary to use an assessment tool that can detect accurate and varying levels of CRF, whilst also demonstrating noteworthy changes over time. However, this study has highlighted many patients with cancer are living with the consequences of the symptom, with little guidance which requires further action. Understating the implications of SCA and the promotion of self-care can form the basis for interventions targeted at addressing CRF.

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Promoting SCA has been shown to positively enhance an individual's health-promoting behaviours i.e. capabilities for self-care. There is a lack of studies in this area, thus further empirical investigation is required focusing on SCA and its association with symptom experience.

What does this paper contribute to the wider global clinical community?

- Patient's undergoing chemotherapy continue to experience significant fatigue during and after treatment completion.
- Higher capability for self-care is associated with lower fatigue.
- Self-Care Agency (SCA) is an individual's acquired capability to perform self-care activities to maintain life and promote health and well-being. Thus the promotion of self-care agency and self-care strategies can have an impact on reducing CRF.

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TABLE 1 Profile of study participants: sociodemographic details

Characteristics		Frequency n	Valid Percentage %
Gender	Male	136	37.6
	Female	226	62.4
Age (years)	18-34	11	3.1
	35-44	33	9.4
	45-54	78	22.2
	55-64	111	31.5
	65-74	82	23.3
	75+	37	10.5
	Missing data	10	2.8
Relationship Status	Single	51	14.1
	Married	259	71.5
	Divorced	6	1.7
	Separated	15	4.1
	Widowed	31	8.6
Living with Supportive adult	Yes	318	87.8
	No	44	12.2
Employment Status	Employed	121	33.8
	Unemployed	23	6.4
	Home Maker	94	26.3
	Retired	116	32.4
	Student	4	1.1
	Missing Data	4	1.1
Educational Status	Primary School	134	37.1
	Inter Certificate / Junior Certificate	92	25.4
	Leaving Certificate	70	19.4
	Third Level University/ College	65	18.0
	Missing Data	1	0.3

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TABLE 2 Profile of study participants: cancer diagnosis and length of time since chemotherapy started

Primary Cancer Diagnosis	Frequency (n)	Valid Percentage (%)
Breast Cancer	142	39.2
Colorectal Cancer	114	31.5
Hodgkin's Lymphoma	30	8.3
Non-Hodgkin's Lymphoma	76	21.0
Time since commencement of chemotherapy (weeks)		
6-8	160	44.2
9-11	24	6.6
12-14	59	16.3
15-17	33	9.1
18-23	22	6.1
24-29	31	8.6
30 +	33	9.1

TABLE 3 Fatigue Scores as measured by the PFS-R Total Scale and four associated subscales

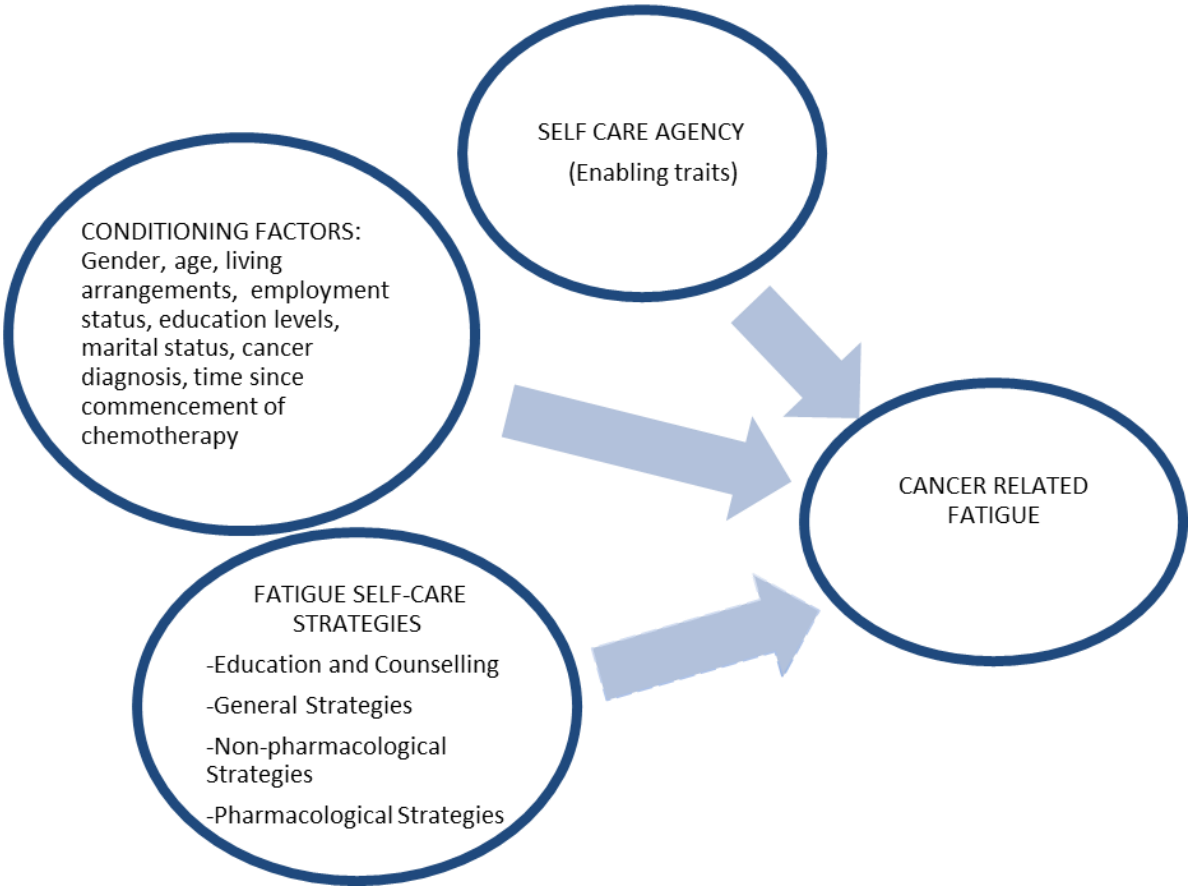
(n=361)	Mean	S.D.	(Range)
PFS-R total score	4.9	2.2	(0-9.8)
Behavioural / severity subscale	4.9	2.9	(0-10)
Affective meaning subscale	5.4	2.9	(0-10)
Sensory subscale	5.2	2.4	(0-10)
Cognitive mood subscale	4.3	2.1	(0-10)

S.D. = standard deviation

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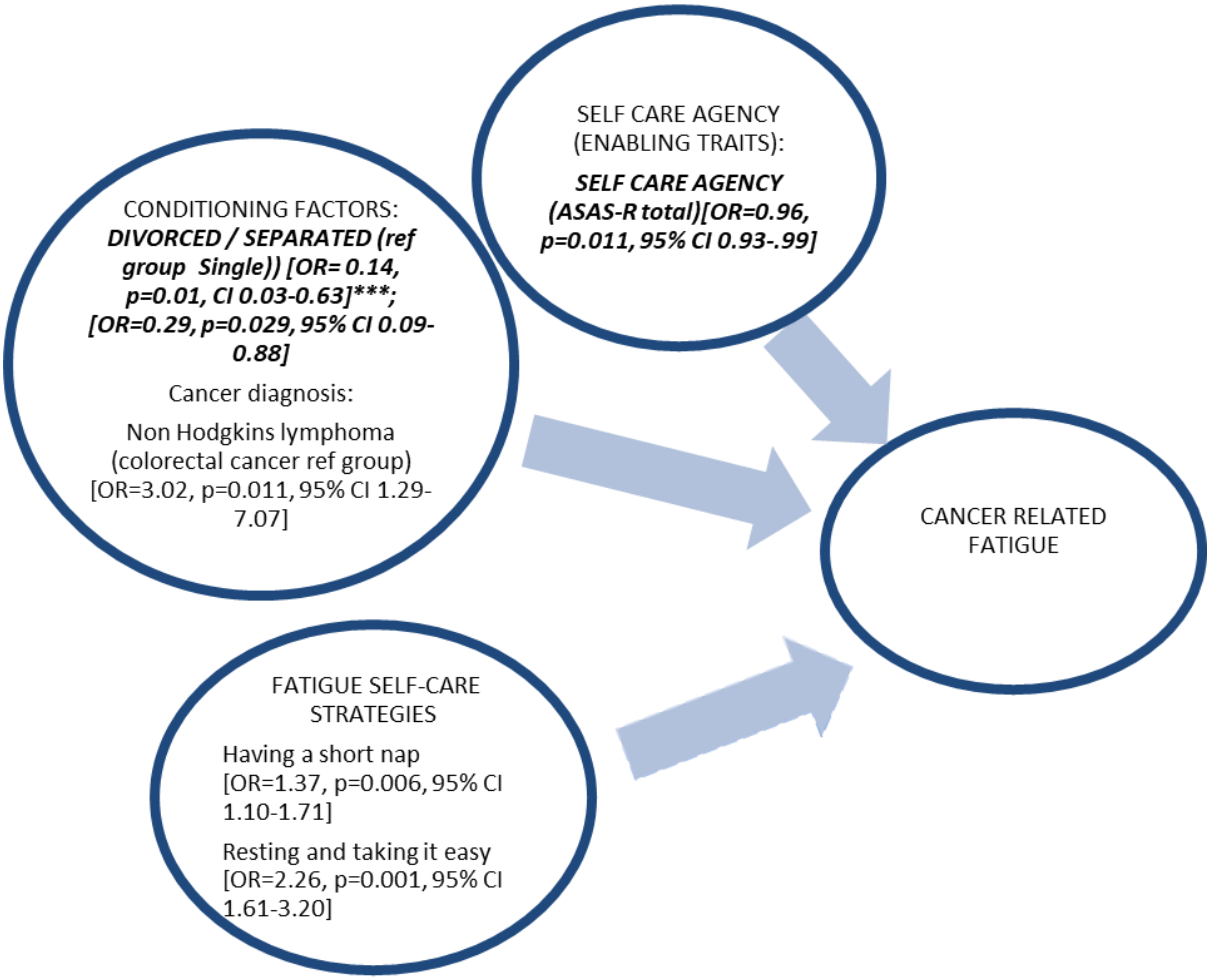
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