Antecedents of Cancer Related Fatigue (CRF) in Pediatric Oncology

Mohammad Othman, PhD, RN, CHSE

Disclosure

- Authors:
  - Mohammad Othman, PhD, RN, CHSE: University of Cincinnati, College of Nursing
  - Caroline F. Morrison, PhD, RN, CNL: University of Cincinnati, College of Nursing
  - Bin Zhang, PhD: Cincinnati Children's Hospital Medical Center
- Conflict of Interest/Financial Relationship: none of the authors has conflict of interest and/or financial relationship related to this work
- No sponsorship and/or commercial support was provided to and/or accepted by any of the authors from any entity to perform this work

Pediatric Cancer Statistics

- 15,950 new cases expected in 2022 (43/day)
- 1 in 285 children will be diagnosed with cancer before turning 20
- More than 13 million cases between 2020-2050
- More than 40,000 are in treatment every year
- In 2018, 483,000 adult survivors of childhood cancers, with a total of 16.9 million as of 2019
- 1,600 expected to die in 2022 (2nd leading cause of death)
- More than 95% of adult survivors of childhood cancers suffer from late treatment-related effects (e.g. CRF)

Pediatric CRF Statistics

CRF is one of the most common symptoms experienced by pediatric patients as reported from the patient's, parent's, and HCP's perspective

- 49% of cancer patients report experiencing CRF
- 56% – 71% of HCPs report that patients experience CRF
- 57% – 96% of parents that patients experience CRF
- 2nd most common symptom from patient perspective
- 3rd most common symptom from HCP perspective
- 5th most common symptom from parent perspective

What is CRF?

"Cancer-related fatigue is a distressing, persistent, subjective sense of physical, emotional, and/or cognitive tiredness or exhaustion related to cancer or cancer treatment that is not proportional to recent activity and interferes with usual functioning" (National Comprehensive Cancer Network, 2016, p. SFAT-1).

State of the Science

- Cancer and its treatments result in physical, psychosocial, and emotional negative effects in pediatric patients.
- CRF negatively impacts the patients' and survivors' quality of life.
- Evidence is limited on the effectiveness of CRF management interventions in pediatric population.

Gap in the Science

- CRF has been well-studied in the adult population; less studies addressing CRF in the pediatric population.
- No theoretical framework has provided a comprehensive explanation of CRF in the pediatric population.

Approach to Address the Gap

The Theory of Unpleasant Symptoms (TOUS) could provide a comprehensive explanation of CRF in the pediatric population.

Significance

- Findings of this study may advance our understanding of the antecedent constructs of CRF and their influence on CRF in the pediatric population through application of the TOUS.
- Greater understanding of the constructs associated with the symptom experience of CRF may eventually lead to interventions that could minimize or eliminate their negative influence on CRF in the pediatric population.

Purpose

The purpose of this study is to test the relationships of the TOUS antecedent constructs, physiological, psychological, and situational, with the CRF symptom experience in pediatric patients 8 to 17 years of age who are in active or have completed cancer treatment

Research Hypotheses

1. The TOUS physiological variables of age, gender, treatment status, and concurrent health conditions are related to the CRF intensity in pediatric patients 8 to 17 years of age who are in active or have completed cancer treatment
2. The TOUS psychological variables anxiety and depression are related to the CRF intensity in pediatric patients 8 to 17 years of age who are in active or have completed cancer treatment
3. The TOUS situational variable, ethnicity, is related to the CRF intensity in pediatric patients 8 to 17 years of age who are in active or have completed cancer treatment
4. The TOUS physiological, psychological, and situational variables are related to the CRF intensity in pediatric patients 8 to 17 years of age who are in active or have completed cancer treatment

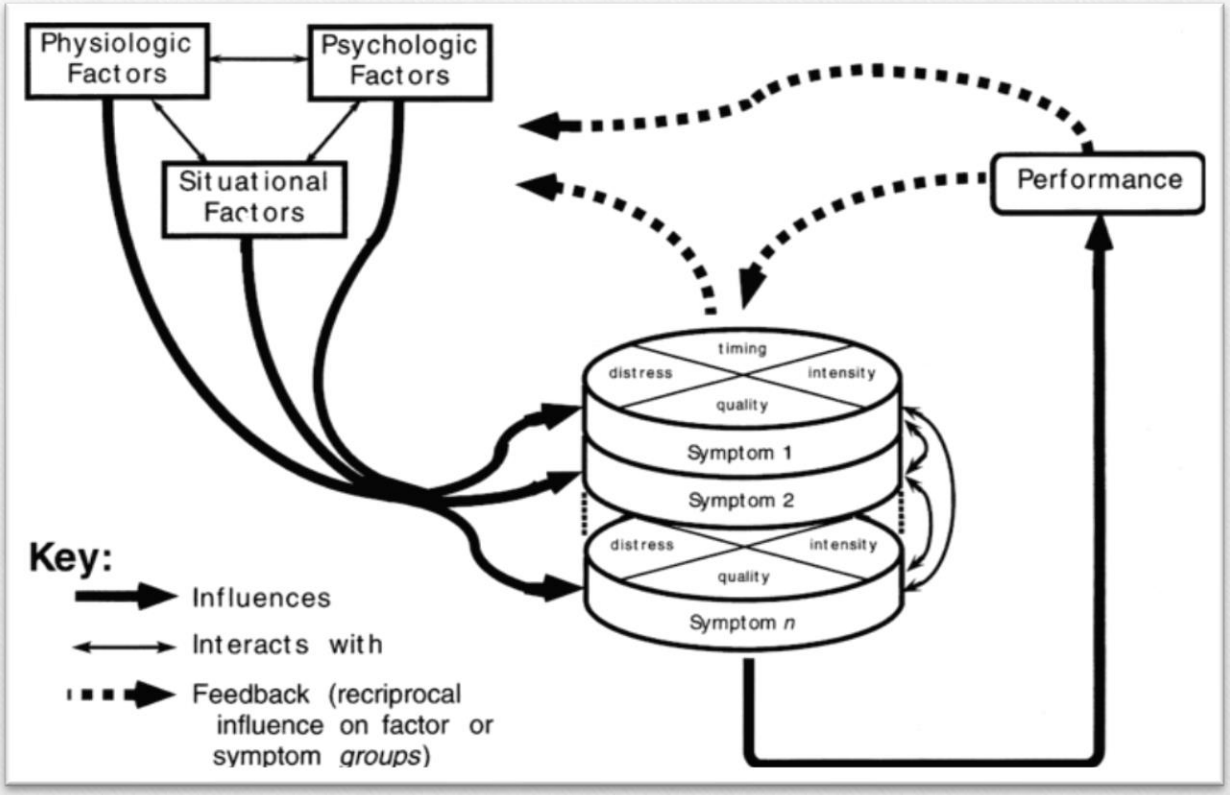
Theoretical Foundation: TOUS

- Middle-range Theory
- Developed by Lenz et al. in 1995; updated in 1997
- The outcome of a group of researchers' efforts who were studying fatigue and dyspnea in two different adult populations
- Represents the complexity and the interactive nature of the symptom experience

Components

1. Influencing Constructs
    1. Physiological construct
    2. Psychological construct
    3. Situational construct
2. Symptoms experience
3. Performance

Original Updated Model



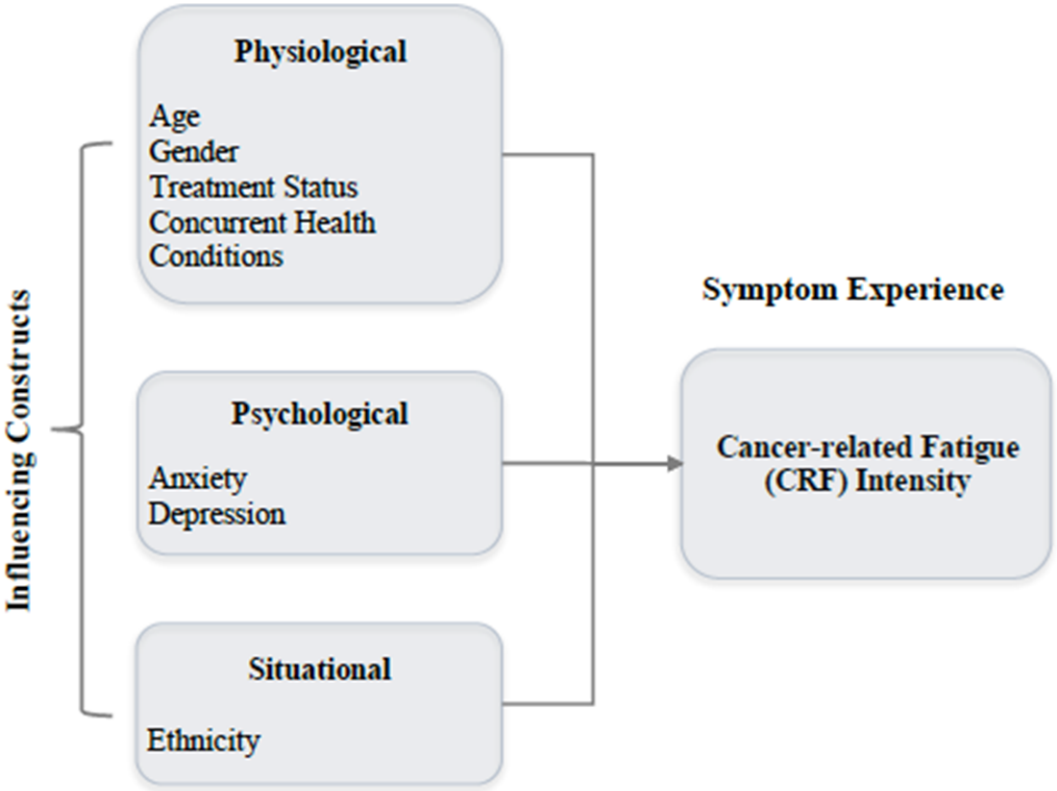


Figure 2. The adapted theoretical model of the TOUS. This figure illustrates the theorized physiological, psychological, and situational constructs as antecedents of cancer-related fatigue (CRF) intensity.

Methodology of Parent Study
(Hinds et al., 2013)

- Design: observational descriptive
- Sampling method: Convenience
- Sample size: 200
- Settings: inpatient & outpatient
- Sites: 5 Children's Oncology Group hospitals
- Data collection period: 16 weeks using computers

Methodology of Parent Study
(Hinds et al., 2013)

- Data Collection Instruments
  - PROMIS Pediatric Bank/Short Form – Anxiety
  - PROMIS Pediatric Bank/Short Form – Depression
  - PROMIS Pediatric Bank/Short Form – Fatigue

Methodology of Current Study

- Design: descriptive-correlational using a secondary analysis approach.
- Data Analysis – at .05 level of significance
  - Descriptive statistics: Sample characteristics
  - Inferential statistics: Standard and Stepwise Multiple regression

Results: Sample Characteristics

- Gender: Male-55%, Female-45%
- Age: 8-12 (45.5%), 13-17 (54.5%)
- Race: white 54%, Black/AA 20.5%, Asian 4%, other 14%, multiple races 6%, missing 1.5%
- Ethnicity: non-Hispanic 80%, Hispanic 20%
- Have one or more concurrent health conditions: 34%
- In-active cancer treatment: 45.5%
- Type of cancer: acute lymphocytic leukemia/lymphoma: 60%, brain tumor 11%, solid tumor 29%

Results: Hypothesis 1

- The physiological variables age, gender, treatment status, and concurrent health conditions are significantly related to CRF intensity in pediatric patients 8 to 17 years of age who are in or have completed cancer treatment (p=0.000)
- The physiological construct accounted for 18.5% (R^2=0.201, F(4, 190) = 11.983, p=0.000) of the variance in CRF intensity
- CRF Intensity = 34.755 + 0.764*age – 4.457*Gender + 9.685*Treatment Status + 4.002*Concurrent Health Conditions

Discussion – Physiological Construct

- Findings supported the TOUS proposition that the physiological construct is associated with the symptom experience CRF intensity.
- Several previous studies supported the relationship between age, gender, treatment status and CRF intensity.

Discussion – Physiological Construct

- Contrasting previous studies:
  - Age was not related to CRF:
    - Different sample: (Hinds et. al. (2007) & Daniel et. al. (2013)) were limited to patients in active treatment.
    - Different measurement scales:
      - Hinds et. al. (2007): used Fatigue Scale-Child and Fatigue Scale-Adolescent
      - Daniel et. al. (2013): used Multidimensional Fatigue Scale
  - Cancer treatment was not related to CRF Intensity: Crabtree et. al. (2015) measured CRF from the parents' perspective

Results: Hypothesis 2

- The psychological variables anxiety and depression are related to CRF intensity in pediatric patients 8 to 17 years of age who are in active or have completed cancer treatment (p=0.000)
- The psychological construct accounted for 36.7% (R^2=0.373, F(2, 187) = 55.698, p=0.000) of the variance in CRF intensity.
- CRF Intensity = 8.822 + 0.303*Anxiety + 0.512*Depression

Discussion – Psychological Construct

- Findings supported the TOUS proposition that the psychological construct is associated with the symptom experience of CRF intensity.
- Previous studies supported the relationship between depression and anxiety, and CRF intensity.

Results: Hypothesis 3

- The situational variable, ethnicity, is NOT related to CRF intensity in pediatric patients 8 to 17 years of age who are in active or have completed cancer treatment (p=0.913).
- No significant difference in CRF intensity between Hispanic and Non-Hispanic patients (p=0.913)

Discussion – Situational Construct

- Findings did not support the TOUS that the situational construct is associated with the symptom experience of CRF intensity
- Previous studies also did not support the presence of relationship between ethnicity and CRF intensity
- The contrast between the TOUS and this study could be due to measurement reasons were ethnicities were grouped into only 2 categories.

Results: Hypothesis 4

- Depression, treatment status, anxiety, age, and gender are significantly related to CRF intensity in pediatric patients 8 to 17 years of age who are in active or have completed cancer treatment (p=0.000)
- Theses variables are the strongest predictors of CRF intensity
- Concurrent health conditions and ethnicity were found insignificantly related to CRF intensity and were automatically eliminated from the model by Stepwise regression
- These variables accounted for 46.1% (R^2=0.476, F(5, 184) = 33.363, p=0.000) of the variance in CRF intensity.
- CRF Intensity = 1.034 + 0.449*Depression + 7.013*Treatment Status + 0.295*Anxiety 0.791*Age – 3.432*Gender

Limitations of Current Study

- Limitations of the parent study
- Inherent limitations of Secondary data analysis:
  - Lack of control over variable inclusion (e.g. additional situational construct variables)
  - Lack of control over data collection and measurement
  - Lack of control over participant inclusion criteria
- The convenience sample may not be representative of the population and therefore results may not be generalizable.

Recommendations for Future Research

- Include additional variables that represent the physiological, psychological, and situational constructs.
- Measure additional components of the symptom experience (i.e., distress, timing, and quality)
- Test the relationships among all the three components of the TOUS simultaneously
- Conducting longitudinal studies to establish temporal order amongst various symptoms and influencing variables

Thank You!

Questions