

# Symptom Prevalence and Physiologic Biomarkers Among Adolescents Using a Mobile Phone Intervention Following Hematopoietic Stem Cell Transplantation

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Children undergoing hematopoietic stem cell transplantation (HSCT) have reported treatment-related symptoms as the worst part of their cancer experience. Those symptoms create difficulties with other life events and are remembered long after treatment ends (Enskar, Carlsson, Golsater, & Hamrin, 1997; Woodgate & Degner, 2003). Nausea, vomiting, fatigue, pain, anorexia, diarrhea, dry mouth, and taste changes develop immediately after HSCT and persist for months (Barker, Anderson, Sauve, & Butzner, 2005; Rodgers et al., 2008), increasing the need for medical care and negatively affecting patients' development, compliance to treatment, and quality of life (QOL) (Cohen et al., 2012; Erickson et al., 2013). The Eating After Transplant (EAT!) mobile phone application (app) was developed to provide descriptive information and useful strategies to adolescent patients regarding common symptoms and eating issues during the first 100 days post-HSCT (Rodgers, Krance, Street, & Hockenberry, 2013). To meet the expressed needs of patients recovering from HSCT to participate in self-care activities, manage their symptoms, and have available information delivered in a practical method (Larson, 1995), EAT! provides descriptions of common gastrointestinal (GI) problems and self-care strategies in an easily accessible format for mobile phones. The app has demonstrated acceptability and usability, and patients undergoing HSCT were immediately competent with the app following orientation (Rodgers et al., 2013). The current study extends those findings by assessing whether the EAT! app is associated with decreased symptom prevalence and distress or with improved biomarkers, thereby enhancing well-being.

## Background

HSCT is a common treatment modality for pediatric illnesses, including a variety of malignancies, hema-

**Purpose/Objectives:** To examine symptom reports and physiologic parameters in adolescents using the Eating After Transplant (EAT!) intervention during recovery after hematopoietic stem cell transplantation (HSCT).

**Design:** Repeated measures design.

**Setting:** HSCT service at a pediatric teaching institution in the southern United States.

**Sample:** 16 adolescents recovering from a first-time allogeneic HSCT.

**Methods:** Use of EAT! was monitored electronically, symptom reports were obtained from a questionnaire, and physiologic parameters were obtained from the medical record at HSCT hospital discharge and 20, 40, and 60 days postdischarge.

**Main Research Variables:** EAT! use, symptom prevalence, symptom-related distress, and physiologic parameters including weight, body mass index (BMI), pre-albumin, and albumin.

**Findings:** Symptom prevalence was highest at hospital discharge and steadily declined; however, mean symptom distress scores remained stable. Mean weight and BMI significantly declined during the first 60 days postdischarge; pre-albumin and albumin markers were unchanged. No correlation was noted among use of EAT! and any research variables.

**Conclusions:** The most frequent symptoms were not always the most distressing symptoms. Weight and BMI significantly declined during HSCT recovery.

**Implications for Nursing:** Nurses should assess symptom frequency and distress to fully understand patients' symptom experiences. Nurses should monitor weight and BMI throughout HSCT recovery.

**Key Words:** pediatric oncology; stem cell/marrow transplantation; quantitative nursing research

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tologic diseases, immunodeficiency disorders, and genetic disorders. About 1,200 allogeneic HSCTs are performed annually in the United States in children younger than age 18 years (National Marrow Donor