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## Symptom Clusters in Children and Adolescents Receiving Cisplatin, Doxorubicin, or Ifosfamide

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A review of the literature confirms the presence of significant fatigue, sleep disturbances, and nausea and vomiting in children and adolescents during treatment for cancer. Previous research provides insight into the suffering experienced by such individuals and the potential influence the symptoms have on clinical outcomes. Symptoms experienced by children and adolescents with cancer clearly can cluster, resulting in potential increases in their toxicity when combined. This study explored the relationships among fatigue, sleep disturbance, and nausea and vomiting, as well as how they specifically influenced children's or adolescents' clinical outcomes, measured by behavior, depression, and performance status. The symptom cluster was explored with parallel dimensions of fatigue, sleep disturbance, and nausea and vomiting in children and adolescents with cancer receiving similar chemotherapy during the same time period. The methodology strengthened understanding of the multiplicative effect that two or more symptoms can have on specific clinical outcomes.

The National Institutes of Health (2002) State-of-the-Science on Symptom Management in Cancer: Pain, Depression, and Fatigue found that efforts to manage symptoms of cancer and its treatments have not kept pace with new advances in the causes and cure for cancer. Several studies have addressed distressing cancer symptoms from the perspective of children and their families (Collins et al., 2000; Hedstrom, Haglund, Skolin, & von Essen, 2003; Woodgate & Degner, 2003). Hedstrom et al. discovered that the most common causes of distress in a group of 121 children with cancer were treatment-related pain, nausea, and fatigue. Collins et al. described the most common physical symptoms (prevalence higher than 35%) in a group of 160 children with cancer as lack of energy, pain, drowsiness, nausea, cough, and lack of appetite. Docherty (2003) completed a review of the published literature on symptom experiences of children and adolescents with cancer and

**Purpose/Objectives:** To examine the influence of the proposed symptom cluster of fatigue, nausea and vomiting, and sleep disturbances on clinical outcomes defined as behavior changes, depression, and performance status in children and adolescents before and after receiving cisplatin, doxorubicin, or ifosfamide chemotherapy.

**Design:** A prospective, descriptive, within-group, before-and-after-chemotherapy design was used.

**Setting:** Two major childhood cancer treatment hospitals in the United States.

**Sample:** 67 patients aged 7–18 years who were receiving chemotherapy courses of cisplatin, doxorubicin, or ifosfamide.

**Methods:** Fatigue, depression, behavior, and performance assessments were completed on the first day of cisplatin, doxorubicin, or ifosfamide therapy and one week later. Patients wore a wrist actigraph on the nondominant hand during the course of therapy and for 48 hours after discharge from the hospital. Nausea and vomiting were measured every 24 hours during the course of therapy and for 48 hours after discharge. A linear mixed model was used to evaluate the influence of the symptom cluster. Regression analysis was used to examine the associations between performance status and the symptom cluster. Principal component analysis with varimax rotation was used to produce the correlation of sleep symptoms.

**Main Research Variables:** Fatigue, nausea and vomiting, sleep disturbances, behavior, depression, and performance.

**Findings:** Adolescents with the cluster of increased fatigue and sleep disturbances experienced more depressive symptoms and behavior changes. Children with higher levels of fatigue had increased depressive symptoms. The more fatigue parents perceived in their children or adolescents, the more behavior and emotional difficulties were reported.

**Conclusions:** Fatigue, sleep disturbance, and nausea and vomiting, when clustered, impacted depressive symptoms and behavior changes in adolescents after chemotherapy. In children, fatigue alone impacted depressive symptoms and behavior changes.

**Implications for Nursing:** Symptom clusters can have a significant impact on children's and adolescents' quality of life during cancer treatment. Early recognition and intervention for these symptoms are an important nursing role.