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## Pediatric Oncology: The Use of Cluster Analysis to Examine Maternal Concerns

Ying-Mei Liu, RN, and Chao Hsing Yeh, PhD, RN

In Taiwan, the five-year survival rate for children who have cancer is greater than 60%; however, cancer still is the second-leading cause of death among children (Executive Yuan, Taiwan, 2007).

In the process of confronting the life-threatening diagnosis of cancer, the entire family, especially the mother, experiences many types of stress, such as persistent uncertainty, long-lasting distress about the future health of the child, the possibility that the cancer could return, and the potential for the child to die (Boman, Lindahl, & Bjork, 2003; Norberg & Boman, 2008; Patino-Fernandez et al., 2008). Mothers have expressed guilt for not taking proper care of their other children (Rajajee, Ezhilarasi, & Indumathi, 2007). Mothers of children with cancer have been reported to perceive more distress than fathers (Sloper, 2000; Stewart & Mishel, 2000).

Other studies have reported similar findings, suggesting that uncertainty and distress pervade parents' experiences, not only when a child is diagnosed with cancer, but during treatment, after the completion of treatment, and at relapse (Clarke, 2006; Dolgin et al., 2007; Norberg & Boman, 2008). Additionally, De Graves and Aranda (2008) conducted an ethnographic study of 12 families of children whose cancer had relapsed; parents experienced more distress and greater uncertainty than at the time of diagnosis. The study also reported that families fluctuated between two states of reality: hoping for a cure and contemplating death.

Parental uncertainty has been identified as a particularly important construct in parents' experience of childhood cancers (Santacroce, 2003). Mishel (1983, 1988), a pioneer in this area of study, and Santacroce (2003) further characterized parental uncertainty as ambiguity about the illness state, lack of information about the illness, complexity of the information, and unpredictability. Long-term uncertainty has been associated with parents' reduced ability to perform their parental roles and deterioration in their quality of life (QOL) (Wong &

**Purpose/Objectives:** To examine data from mothers whose children have cancer and to identify the characteristics of uncertainty and distress that they reported. The objectives were (a) to use cluster analysis to identify subgroups of maternal uncertainty and distress, (b) to examine whether the subgroups differed based on demographics and children's illness-related variables, and (c) to explore whether mothers in the subgroups differed on quality of life (QOL) and hope.

**Design:** Descriptive, correlational study.

**Setting:** Pediatric oncology units in northern Taiwan.

**Sample:** 200 mothers of children with cancer.

**Methods:** Participants completed the Parental Perception of Uncertainty Scale, the Symptom Checklist-35-Revised, the Short-Form 36 Health Survey, the Herth Hope Index, and a demographic questionnaire. Cluster analyses were used to identify subgroups of mothers regarding maternal perceived uncertainty and distress. Differences in demographic variables, disease characteristics, and outcome measures were evaluated with descriptive statistics, analysis of variance, and chi-square analysis.

**Main Research Variables:** Subgroup, maternal uncertainty, distress, QOL, and hope.

**Findings:** Four subgroups were identified by the cluster analyses: high uncertainty and high distress, moderate uncertainty and moderate distress, low uncertainty and low distress, and high uncertainty and low distress.

**Conclusions:** The subgroup of mothers who reported low uncertainty and low distress reported the highest QOL and hope.

**Implications for Nursing:** The findings of this study provide insight for pediatric oncology clinicians and offer issues related to uncertainty, distress, and QOL that such professionals can discuss with the mothers of their patients.

Chan, 2006; Rabineau, Mabe, & Vega, 2008; Yamazaki, Sokejima, Mizoue, Eboshida, & Fukuhara, 2005; Young, Dixon-Woods, Findlay, & Heney, 2002).

Several studies have compared the distress of parents whose children have cancer to that of parents whose