

# Development and Validation of a Chemotherapy-Induced Taste Alteration Scale

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**T**aste alterations are a common side effect seen in 30%–75% of all chemotherapy recipients (Bernhardson, Tishelman, & Rutqvist, 2009; Hovan et al., 2010; Kanda, Iida, & Ohta, 1998). Taste alterations result in various forms of distress for patients, including aversions to certain foods, reduction in meal intake, and weight loss (Boltong & Keast, 2012), as well as malnutrition in severe cases (Ravasco, 2005). In addition, loss of sense of taste can lead to a decrease in interest and enjoyment in social interactions because food plays a crucial role in societal activities (Epstein et al., 2002). Other studies have reported that taste alterations are significantly related to worsened quality of life (QOL) as measured with the Functional Assessment of Cancer Therapy–General and the European Organisation for Research and Treatment of Cancer Quality of Life Questionnaire–Core 30 (Wickham et al., 1999; Zabernigg et al., 2010). Therefore, taste alterations do not merely interfere with the functioning of the senses, but greatly influence QOL in patients with cancer, and management of taste alterations during cancer chemotherapy is essential.

For definitions of terms, see Figure 1. Proper management of the symptoms of taste alteration requires assessment. Established objective methods for that purpose include electrogustometry (Krarup, 1958), the filter paper method (Berling, Knutsson, Rosenblad, & von Unge, 2011), and the whole-mouth gustatory test (Yamaguchi, Endo, Sakai, & Yoshimura, 2002), which are used in otolaryngology. Those methods involve evaluating taste threshold using electric stimulations, filter paper disc, or taste solutions. Although those objective indices are effective in evaluating hypogeusia and ageusia, they cannot assess the subjective symptoms that are commonly observed in patients with cancer undergoing chemotherapy, including phantogeusia and cacogeusia. In addition, those objective assessments require specialized knowledge and skills that can only be administered by otolaryngologists or laboratory technicians with special training.

**Purpose/Objectives:** To develop an instrument to assess the specific symptoms of chemotherapy-induced taste alterations.

**Design:** Cross-sectional study.

**Setting:** Two outpatient chemotherapy centers in Kanto, Japan.

**Sample:** Convenience sample of 214 adult patients with chemotherapy-induced taste alterations.

**Methods:** Items on the chemotherapy-induced taste alteration scale (CiTAS) were developed by a qualitative study of patients with taste alterations, and the content validity of each item was assessed by a panel of specialized oncology nurses. Data were analyzed for item consistency using Cronbach alpha and construct validity using factor analysis.

**Main Research Variables:** Taste alterations, symptoms of discomfort, and impact of taste alterations on daily life.

**Findings:** An 18-item scale was developed with four dimensions identified through factor analysis: decline in basic taste, discomfort, phantogeusia and parageusia, and general taste alterations. The scale demonstrated excellent reliability (Cronbach alpha = 0.9) and test-retest reliability ( $r = 0.94$ ,  $p < 0.001$ ,  $n = 28$ ), as well as good validity, which was indicated by its strong correlation with a visual analog scale of the impact of taste alterations on daily life ( $r = 0.62$ ,  $p < 0.001$ ) and by negative correlations with Short Form–8 quality-of-life measures (physical component summary,  $r = -0.33$ ; mental component summary,  $r = -0.47$ ).

**Conclusions:** The CiTAS enabled valid, reliable measurement of specific symptoms of chemotherapy-induced taste alterations.

**Implications for Nursing:** The CiTAS has potential as a clinical tool and also could be used as a measure of chemotherapy-induced taste alterations in future studies.

**Knowledge Translation:** The CiTAS may help evaluate the effectiveness of interventions to reduce the symptoms of taste alterations, such as administering zinc and self-care strategies.

In that context, the authors sought to develop a subjective assessment scale for comprehensively evaluating the taste alterations experienced by patients with cancer undergoing chemotherapy, with the aim of ensuring ease of use. More specifically, the authors wanted the