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Feasibility of psychoeducational interventions in managing chemotherapy-associated nausea and vomiting (CANV) in pediatric oncology patients

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A B S T R A C T

Purpose: Childhood cancer patients often suffer from Chemotheraphy-Associated Nausea and Vomiting (CANV). To alleviate CANV, relaxation techniques and patient education were combined to develop a multidimensional psychoeducational intervention package. The aim of this pilot study was to assess the feasibility of the two major components, namely, (1) relaxation, and (2) patient education, of a psychoeducational intervention, prior to the commencement of the main study.
Methods: A pre-test–post-test control group design was adopted. Twenty patients were allocated equally to the relaxation group (10 participants) and to the educational group (10 participants). Twenty historical matched control cases were identified to form the control groups. Besides, a process evaluation was adopted to assess the feasibility of the study.
Results: In relation to episodes of vomiting on day 3, a significant difference was detected from the results ($X^2 = 8.54$, $p = 0.036$), in that fewer patients in the relaxation group experienced vomiting. A significant difference was not found in both the use of antiemetics and body weight between the groups. All subjects in the intervention groups adhered to the intervention and completed the questionnaire without difficulty. Patients and parents perceived the intervention as being moderately useful.
Conclusions: Although the beneficial effect of relaxation and education in alleviating CANV was not well-supported statistically, the findings from descriptive data suggest that these interventions promoted the intake of antiemetics as a preventive method. Both interventions and instruments were well-received by the patients and also by their parents.

Introduction

In the treatment of childhood malignancies, intensive chemotherapy (CT) regimens are often used. In general, they are more emetogenic compared to those used in adults (Chan et al., 2007). CANV normally appears one to 2 h after CT has started and it then persists for six to 12 h or even for a few days post the CT cycle (Molassiotis et al., 2002; Chan et al., 2003). Limited studies were carried out on the management of CANV in children, and a majority of the existing literature places an emphasis on pharmacological intervention.

The immediate adverse effects of CANV in young children include dehydration, electrolyte imbalance, and weight loss (Keller, 1995). Later problems can follow; these are, for example, an increased susceptibility to infections and a decreased renal elimination of drugs (Joss et al., 1990). Without the proper initial control of CANV, the development of conditioned nausea and vomiting, avoidance of care, patients' self-deprecation, and even a refusal of CT can be found in pediatric patients, together with parental anxiety (Chan et al., 2007).

Because children with CANV often experience changing preferences towards food, the odors or colors that are particular to the ward can nauseate them (Hockenberry-Eaton and Benner, 1990). It has been reported that CANV is significantly correlated with motion sickness, the child's anxiety, and parental anxiety (Chan et al., 2007). This may seriously compromise the

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quality of life of pediatric patients suffering from CANV (Li et al., 2010).

Theoretical framework

Nausea and vomiting result from the stimulation of the vomiting center in the brain (Fessele, 1996). This can happen through the following four pathways: (a) the cerebral cortex and limbic system; (b) the vestibular system; (c) the chemoreceptor trigger zone; and (d) the afferent vagal and visceral nerves. Despite the growing availability of more potent antiemetics every year, the efficacy of these drugs is not guaranteed to all patients and no single drug can be effective against CANV which results through multiple pathways (Fessele, 1996; Holdsworth et al., 1995). A hypothesis is proposed that multi-dimensional intervention is more effective provided that more than one pathway is blocked (Fig. 1).

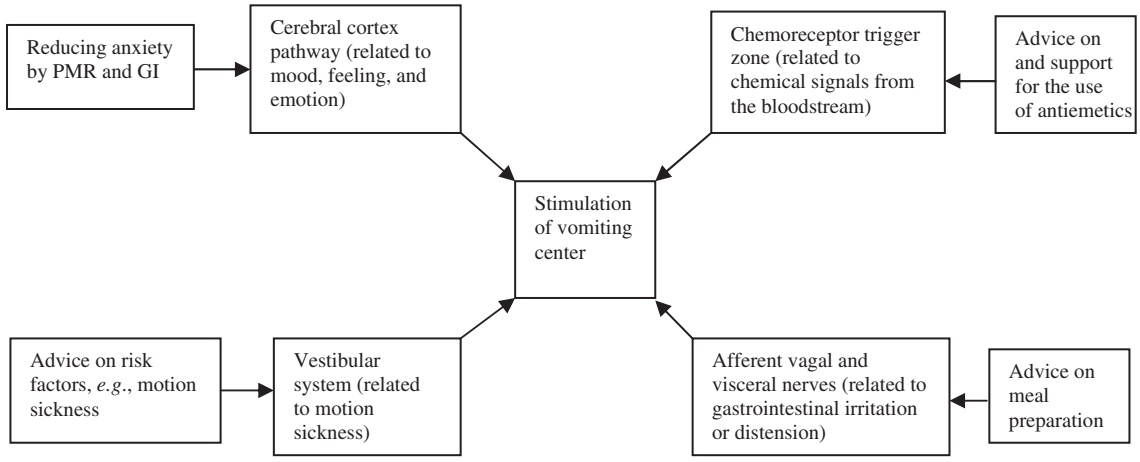
Preventive measures for chemotherapy-naïve patients are regarded as the most effective treatment because the severity of CANV may increase with time (Chan et al., 2007). Founded on the theoretical framework of the neural pathways involved in transmitting emetic stimuli (Fessele, 1996), the authors have developed a multi-dimensional psychoeducational program which combines the use of relaxation techniques and patient education (Chan and Thompson, 2006; Chan et al., 2011; Fessele, 1996; Keller, 1995) (Fig. 1). Relaxation works by blocking the cerebral cortex pathway whereas patient education emphasizing risk assessment, the use of antiemetics, and meal preparation works by blocking the remaining three pathways. Although it sounds logical to block all the pathways of emetic stimuli by adopting a comprehensive program, every major component of the program has to be examined individually in an exploratory trial to ascertain its effect (Chan and Thompson, 2006).

Most studies have reported that psychoeducational interventions are effective in treating CANV in adults (Arakawa, 1997; Molassiotis et al., 2002; Redd et al., 2001). Other effects reported are the reduction of negative emotions and physiological arousal, and an improvement in caloric intake and greater satisfaction with the care received (Burish and Tope, 1992). Among these psychoeducational interventions, relaxation techniques are the most widely researched; they include the combined use of progressive muscle relaxation (PMR) and guided imagery (GI) (Chan et al., 2011). As defined, PMR is the progressive tensing and relaxing of successive muscle groups, and GI is a technique which uses a favorable and relaxing mental image to distract an individual's attention from the distressful side of the CT administration (Snyder and Lindquist, 2002). It has been reported that nurses can successfully deliver PMR and GI to cancer patients and receive favorable responses (Chan et al., 2011, 2012; Molassiotis et al., 2002). Young children undergoing the pre-operational and concrete operational developmental stages (aged 4–11) are more responsive to distraction and imagination and they also have the faculty of logical thought. Therefore, the PMR and GI techniques which are taught to adults can also be adopted for children as young as preschoolers (Ladas et al., 2006; Redd et al., 2001). Although the adoption of psychoeducational interventions in handling pain and general distress is frequently suggested in pediatric oncology literature (Chan, 2005; Ladas et al., 2006), the effect of such interventions on CANV has rarely been examined in children. This pilot study serves as a pioneer which explores multiple components in a comprehensive program with the ultimate aim of blocking all four emetic pathways.

Aims

The aim of this pilot study was to assess the feasibility of the two major components, namely, (1) relaxation, and (2) patient education, of a psychoeducational intervention, prior to the commencement of the main study. The objectives of this pilot study were as follows:

(1) to estimate the effect size of relaxation and patient education on the reduction and occurrence of CANV, improvement in the use of antiemetics, calorie intake, body weight, anxiety, satisfaction with care, and performance status;
(2) to assess the feasibility of the study design, including recruitment, implementation of intervention, and measurement of outcomes, by process evaluation; and
(3) to evaluate the suitability of using the instruments the Morrow Assessment of Nausea and Emesis (MANE) (Morrow, 1992) and the Chinese version of A-State scale of the State-Trait Anxiety Inventory (STAI) (Tsoi et al., 1986) in children



Remarks:

PMR: progressive muscle relaxation; GI: guided imagery.

Fig. 1. Theoretical rationale supporting the relationship between CANV and proposed intervention. PMR: progressive muscle relaxation; GI: guided imagery.