

Evaluation of a Symptom Diary Card for Tailoring Antiemetic Therapy for Children with Cancer

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ABSTRACT

Objective: The Alberta Children's Hospital lacks definitive antiemetic guidelines for oncology outpatients. In addition, under the current system, clinicians often have difficulty in monitoring delayed chemotherapy-induced nausea and vomiting in outpatients. The objective of this study was to evaluate the feasibility of using a symptom diary card to monitor the outcome of antiemetic therapy in outpatients.

Methods: Using a 4-point scale, outpatients and their parents recorded episodes of nausea or vomiting, activity levels, and diet on symptom diary cards after a course of chemotherapy. On their return to the clinic, the patients or their parents completed a questionnaire to evaluate the symptom diary card. Health-care staff evaluated the symptom diary cards at the end of the study period.

Results: Twenty oncology patients (ranging in age from 1 to 18 years) were enrolled in the study over a 2-month period. Seventeen (85%) of the 20 symptom diary cards were returned. In all patients nausea and vomiting were controlled, but nausea was still distressing for most patients. Older children experienced higher frequencies of nausea and vomiting. Patients receiving 5-day treatments experienced higher frequencies of nausea and vomiting than did patients receiving shorter courses of treatment. Fourteen (70%) of the 20 participants felt that the format of the symptom diary card needed improvement, but most patients and parents were interested in using the cards again.

Conclusion: With a few modifications, symptom diary cards would be a feasible way to monitor response to antiemetic therapy at the Alberta Children's hospital. The card would be a useful monitoring tool for selected patients who experience severe nausea and vomiting and for formal clinical trials. Furthermore, the symptom diary card will be useful for evaluating the effectiveness of the current antiemetic regimen for outpatients.

Key words: chemotherapy, symptom diary card, ambulatory patients, pediatrics, nausea and vomiting

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RÉSUMÉ

Objectif : Le Alberta Children's Hospital ne dispose d'aucunes lignes directrices officielles sur les traitements antiémétiques destinés aux patients externes en oncologie. De plus, dans le système actuel, les cliniciens ont souvent des difficultés à faire le suivi des épisodes de nausées et de vomissements retard causés par la chimiothérapie chez ces patients. L'objectif de la présente étude était d'évaluer la faisabilité d'utiliser une fiche quotidienne des symptômes pour faire le suivi des résultats des traitements antiémétiques chez les patients traités en externe.

Méthodes : À l'aide d'une échelle de quatre points, les patients en externe et leurs parents ont consigné les épisodes de nausées et de vomissements, le niveau d'énergie, et le régime alimentaire suivi sur des fiches quotidiennes des symptômes suite à une séance de chimiothérapie. Lors de leur visite suivante à la clinique, les patients et leurs parents ont rempli un questionnaire pour évaluer la fiche quotidienne des symptômes. Le personnel soignant a évalué les fiches quotidiennes des symptômes à la fin de la période d'étude.

Résultats : Vingt patients en oncologie (dont l'âge variait entre 1 an et 18 ans) ont été admis à l'étude qui s'est déroulée sur une période de deux mois. Dix-sept (85%) des 20 fiches quotidiennes des symptômes ont été retournées. Chez tous les patients, les épisodes de nausées et de vomissements ont été maîtrisés, mais les épisodes de nausées étaient toujours pénibles pour la plupart des patients. Les enfants plus vieux avaient des épisodes de nausées et de vomissements plus fréquents. Les patients qui ont reçu des traitements sur une période de cinq jours avaient des nausées et des vomissements de façon plus fréquente que ceux qui avaient reçu des traitements sur une période plus courte. Quatorze des 20 participants ont jugé que le format des fiches quotidiennes des symptômes pouvait être amélioré, mais la plupart des patients et des parents étaient intéressés à utiliser à nouveau ces fiches.

Conclusion : En y apportant quelques modifications, ces fiches quotidiennes des symptômes pourraient être un moyen de faire le suivi des réactions à un traitement antiémétique au Alberta Children's Hospital. Cette fiche représenterait un outil de suivi intéressant pour une population de patients choisis qui souffrent de nausées et de vomissements graves et dans le cadre d'essais cliniques officiels. En outre, la fiche quotidienne des symptômes serait utile dans l'évaluation de l'efficacité des traitements antiémétiques actuels chez les patients externes.

Mots clés : chimiothérapie, fiche quotidienne des symptômes, patients ambulatoires, pédiatrie, nausées et vomissements

INTRODUCTION

Reducing the length of hospital visits for children with cancer may afford significant cost savings for health-care institutions through reduction in staff time and other resources. However, patients cannot be discharged without effective control of acute adverse effects from chemotherapy. Acute chemotherapy-induced nausea and vomiting have a significant negative psychosocial effect on children's behaviour, self-image, and coping skills.¹ Patients with uncontrolled nausea and vomiting may require hospitalization for administration of parenteral antiemetic agents and rehydration.² New antiemetic agents such as serotonin antagonists have significantly improved control of chemotherapy-induced nausea and vomiting; however, the increased control has not reduced the level of distress experienced by patients.³

The 3 patterns of nausea and vomiting associated with chemotherapy (acute, anticipatory, and delayed) are closely related. Chemotherapy agents are generally classified according to their potential to cause acute nausea and vomiting.⁴

Anticipatory nausea and vomiting can be treated or prevented with antiemetic agents given before chemotherapy is started. Delayed nausea and vomiting are difficult for the health-care team to monitor because they often occur at home. Patients who experience both acute and delayed vomiting are more likely to experience anticipatory nausea and vomiting.⁵ Once anticipatory emesis occurs, acute and delayed emesis become more severe and more difficult to control.⁶

One approach to the prevention and management of nausea and vomiting is to monitor antiemetic outcome systematically. A symptom diary card combines the subjective experience of nausea and the quantitative experience of vomiting into a single measuring tool.⁷ The card is completed by a parent, a caregiver, or the patient to monitor symptoms of nausea and vomiting at home or in hospital. Previous experience with symptom diary cards has shown that they can be practical and valuable tools in the assessment of chemotherapy-induced nausea and vomiting (S. Nazarali and J. McTavish, Alberta Children's Hospital, personal communication, 1998).

The Alberta Children's Hospital, Calgary, lacks definitive antiemetic guidelines for oncology outpatients. In addition, under the current system, clinicians often have difficulty in monitoring delayed chemotherapy-induced nausea and vomiting in outpatients. The goal of this study was to explore the feasibility of monitoring antiemetic outcome at home with a symptom diary card. An enhanced capability to assess chemotherapy-induced nausea and vomiting would facilitate implementation of an effective antiemetic regimen for each patient, with the aim of preventing complications at home and improving quality of life.

METHODS

Study candidates were children 18 years of age and under who were receiving moderate to highly emetogenic chemotherapy at the Alberta Children's Hospital, as either inpatients or outpatients. Patients who had undergone bone marrow transplantation were excluded. Demographic and patient characteristics such as age, sex, diagnosis, experience with chemotherapy (chemotherapy naive or prior chemotherapy), past problems with chemotherapy-induced nausea and vomiting, and the chemotherapy agents (and their relative emetogenicity) were recorded. Body weight was recorded at the beginning of each course of chemotherapy to monitor any changes and to help detect uncontrolled nausea and vomiting at home.

To maximize the efficiency of patient assessments and consistency in approach, patients' telephone calls from home regarding the diary cards were forwarded to the pharmacists. Telephone calls regarding other problems or questions were handled by the primary nurses according to usual procedure. Nurses were encouraged to briefly document their interactions with participants in the outpatient chart.

Over a 2-month period, the diary cards were introduced to all eligible patients and their parents on admission to hospital for administration of chemotherapy or during clinic visits. When patients and their parents agreed to participate, instructions for the symptom diary card were given and the potential benefits of the study were explained. Each patient was given a symptom diary card, which included the investigators' contact numbers.

The definitions of nausea and vomiting were clarified to ensure accuracy of scoring. The definitions of nausea, vomiting, and retching given in the instructions were as follows:

- nausea = feeling the urge to vomit or feeling sick to the stomach.
- vomiting = throwing up whatever is in the stomach.
- retching = trying to vomit, but nothing comes up (dry heaves).

Patients and their parents were asked to record nausea, vomiting, activity, and diet on the Glaxo Symptom Diary Card (Figure 1). Nausea and vomiting were rated on a scale of 1 (no symptoms) to 4 (severe). Parents also recorded the duration of each episode of nausea. For activity and diet, a score of 1 represented ability to perform regular physical activities or regular dietary intake, and 4 represented inability to perform any regular activities (bedridden) or not eating at all. Scores were recorded for 3 periods of the day: daytime, between 8:00 AM and 4:00 PM; during the evening, between 4:00 PM and midnight; and overnight, between midnight and 8:00 AM. The antiemetic agents administered and the dose, as well as any nonpharmacological



NAME: _____ CHEMOTHERAPY: _____ CYCLE: _____

TREATMENT DATE / TIME: _____ ANTIEMETICS: _____

	DAY 1			DAY 2			DAY 3			DAY 4			DAY 5			DAY 6	DAY 7	DAY 8	DAY 9	DAY 10	DAY 11	DAY 12	DAY 13	DAY 14
	8-4	4-12	12-8	8-4	4-12	12-8	8-4	4-12	12-8	8-4	4-12	12-8	8-4	4-12	12-8									
	DAY	EVE	NIGHT	DAY	EVE	NIGHT	DAY	EVE	NIGHT	DAY	EVE	NIGHT	DAY	EVE	NIGHT									
NAUSEA																								
DURATION																								
VOMITING																								
ACTIVITY																								
DIET																								
ANTIEMETICS																								

SCALES	NAUSEA:	VOMITING:	ACTIVITY:	DIET
	1 = None	1 = (0 vomits)	1 = Active (able to play with some restrictions in physically strenuous activities)	1 = Regular diet
	2 = Mild (does not interfere with normal daily life)	2 = (1 - 2 vomits)	2 = Moderate (some play, tires quickly, keeps busy with quieter activities)	2 = Fluids and some solids
	3 = Moderate (interferes with normal daily life)	3 = (3 - 5 vomits)	3 = Mild (gets dressed but lies around, no active play)	3 = Fluids only
	4 = Severe (bedridden due to nausea)	4 = (> 5 vomits)	4 = None (bedridden)	4 = None (Not eating at all)

Figure 1. Symptom Diary Card (Glaxo) used in this study. Reproduced with permission.

strategies used to cope with nausea and vomiting, were also recorded.

Parents' interpretations were assumed to be reliable, and at least one parent was assumed to be present during every episode of nausea, vomiting, or retching. However, if the patient was capable of understanding the diary cards, the parents and children were encouraged to collaborate in providing thorough and accurate observations and feedback on the diary card. Parents were also encouraged to call the clinic if any problem arose.

Parents were asked to record information on the diary cards for a minimum of 5 days. For inpatients, data collection began on the day of discharge from the hospital. For outpatients, data was recorded after departure from the outpatient clinic. Cards were returned to clinic nurses or pharmacists at the first clinic visit after discharge from hospital or a course of outpatient chemotherapy. When diary cards were collected during clinic visits, brief comments and feedback from patients and their parents were collected on a questionnaire. Evaluations emphasized the level of parents' satisfaction and whether or not the patients and their parents found the data useful.

Each patient was given a summary of their own responses to chemotherapy and the antiemetic agents prescribed (Figure 2). The program staff held a group discussion to evaluate the symptom diary cards and determine their feasibility for regular use.

RESULTS

During the period May 25 to July 27, 1998, 27 potential study candidates (inpatients and outpatients) were identified; of these, 7 refused to participate. A common reason for refusal was that parents felt that their children's nausea and vomiting were adequately controlled, and they did not feel that the symptom diary card would offer much benefit. Of the 20 patients who participated in the study, 10 were male and 10 were female. Patients ranged in age from 1 to 18 years (mean 10 years).

The diagnoses included acute megakaryoblastic leukemia, acute lymphoblastic leukemia, Hodgkin's disease, lymphoma, Ewing's sarcoma, osteosarcoma, neuroblastoma, central spinal tumour, brain tumour, germ cell tumour, and Wilms' tumour. Three candidates recorded more than 5 days of data, 7 recorded exactly 5 days of data, and 6 recorded less than 5 days of data. One participant returned a blank card because the child did not appear to have problems with nausea and vomiting. One participant forgot to complete the card, and two participants did not return their cards. There were no significant weight changes during the study period for any of the participants.

Chemotherapy agents received, in combination or alone, included bleomycin, cisplatin, cyclophosphamide, cytarabine, doxorubicin, etoposide, ifosfamide, lomustine, high- and intermediate-dose methotrexate, topotecan, and vincristine. All patients received highly or moderately emetogenic chemotherapy

Treatment: Lomustine, cisplatin, vincristine

	Nausea	Vomiting	Activity	Diet	Daily Score	Rating
Total	36.5	25	31	29	121.5	
Mean	7.3	5.0	6.2	5.8	24.3	Moderate

Ratings of Mean Daily Score

Daily Score	Rating
12-24	Well
25-36	Moderate
37-48	Poor

Max score for each category each day: 12 – severe symptoms

Min score for each category each day: 3 – no symptoms

Comments:

Saliva production is on "fast forward" and makes her gag a lot.

*Acupuncture was very helpful – increased energy.

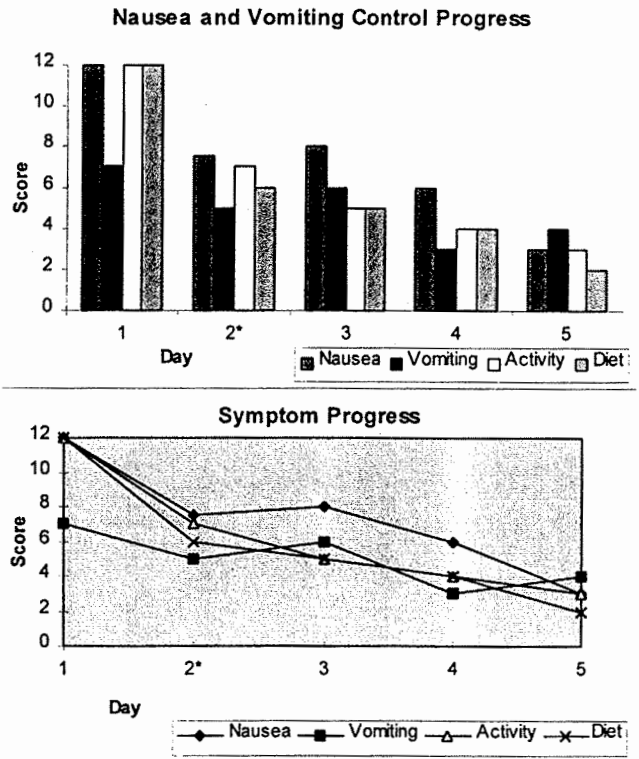


Figure 2. Summary information from symptom diary card for one patient.

and were given prescriptions for ondansetron and dimenhydrinate according to standard practice on discharge from hospital. Ten patients received 5 days of chemotherapy, whereas the others received 1-day or 2-day courses of treatment.

No patients had severe nausea and vomiting, according to daily mean scores recorded on the symptom diary cards and weight changes. There seemed to be no correlation between sex and severity of symptoms related to nausea and vomiting. Older children seemed to have a higher level of nausea and vomiting. However, the severity of nausea and vomiting did not differ during the daytime or overnight. Patients who had received therapy for solid tumours seemed to have higher nausea and vomiting scores on the first day after discharge than patients who had received therapy for hematological malignancy.

Prior exposure to chemotherapy did not affect the severity of nausea and vomiting. Unexpectedly, the emetogenicity of the drugs did not affect the level of nausea and vomiting. Patients who had received more than one chemotherapy agent recorded more severe

nausea and vomiting in the first 2 days after discharge than patients who had received only one agent. Patients who had undergone 5-day regimens experienced more nausea and vomiting than patients who received chemotherapy for less than 5 days.

Fourteen of the 20 participants completed the evaluations on the symptom diary cards. Some parents and patients provided comments on the factors that caused nausea and vomiting. One patient claimed that the smells of the hospital and latex gloves caused nausea. One patient, who received dexamethasone and nabilone during chemotherapy (added because of previous experience with severe nausea and vomiting), felt that these 2 antiemetics improved the chemotherapy experience. One parent commented that the addition of dexamethasone during chemotherapy helped the patient to eat and drink during the hospital stay and at home. Acupuncture appeared to have helped one patient to gain energy and reduce nausea after a course of chemotherapy. One parent had trouble interpreting the child's experience of nausea because the child was too young to speak.



Most study participants felt that the symptom diary card needed improvement. The most commonly asked questions were "What are antiemetics?" and "What is the activity score when the child is sleeping at night?" Most parents felt that more space was required for recording the antiemetics administered, the chemotherapy received, and other comments (such as an acupuncture appointment). They also felt that the time periods for each day should be divided differently. Most participants felt that the explanations and instructions were easy to understand, that the exact dates and times to use the diary cards were clear, that the number of days presented on the card was sufficient, and that the diary card helped to outline the progression of patients' symptoms. Most patients and their parents were interested in using symptom diary cards again.

A meeting was held at the end of the data collection period to obtain evaluations from 4 primary care nurses and a nurse practitioner. Most felt that the data obtained from the symptom diary cards would have been more meaningful if the nursing staff had been more involved with the study. Because nausea and vomiting have become less of a problem over the years, nurses felt that the data collection could be simplified by developing a nausea and vomiting scale (similar to a pain scale) to monitor patients' conditions at home.

DISCUSSION

Not surprisingly, older patients recorded more nausea and vomiting. Teenagers tend to have more difficulties with emesis associated with conditioned behaviour than younger children.⁸ Given these findings, it may be appropriate to consider an aggressive approach to emesis control in adolescents.

Past studies have shown that severity of nausea and vomiting varies with the emetogenic potential of the chemotherapy.⁶ However, the data in this study did not seem to present any significant correlations between nausea and vomiting and the emetogenicity of the chemotherapy. This may be because of the small sample size or because the emetogenic ranking scale used in this study was one developed for adults and it may not be applicable for children. Many patients who had prior experience with chemotherapy already had good control of nausea and vomiting and refused to participate in the study. Therefore, our sample was biased toward more inexperienced patients (chemotherapy naive or just a little experience), and the study could not adequately assess the relationship between patients' prior experience with chemotherapy and level of nausea and vomiting.

A survey of antiemetic practice in pediatric settings has shown that the choice of regimen is based on experience and varies from one institution to another.⁹ Although none of the participants experienced severe nausea and vomiting, the current outpatient antiemetic regimen at Alberta Children's Hospital could be further

improved for better outcomes. Although all study participants recorded complete control of vomiting, nausea was still a concern for most of them. The level of distress that these patients experienced as a result of residual nausea likely had a negative impact on their quality of life. Because observer rating of vomiting is highly accurate,¹⁰ it is easier to treat this problem with antiemetics. Nausea, however, is highly subjective, and each person has his or her own nausea threshold. Parents' accuracy in documenting their children's experience may vary. Therefore, nausea is very difficult to assess, especially in infants and young children.

An outpatient antiemetic guideline should outline a simple, effective antiemetic regimen that is flexible enough to accommodate individual patients' needs and preferences. Ideally, it should also be able to maintain the desired level of nausea and vomiting control for inpatients as well as outpatients. Bristol Children's Hospital Oncology and Hematology Unit developed an effective antiemetic guideline for both outpatients and inpatients that was accepted by hospital staff.⁷ Regimens were classified according to 4 levels of chemotherapy emetogenic potential and 2 age groups (>5 and ≤5 years). Currently, antiemetic guidelines are in place at the Alberta Children's Hospital for pediatric oncology inpatients only. The aim is to achieve complete control (no nausea, vomiting, or retching) or a major response to antiemetics (< 2 vomits or retches, acceptable nausea). Chemotherapy regimens are divided into highly and moderately emetogenic combinations. No guidelines are in place for chemotherapy of low emetogenic potential because most children receiving these agents have adequate control of nausea and vomiting. Alberta Children's Hospital uses dimenhydrinate extensively for delayed nausea and vomiting, and our guidelines include many alternatives for patients who do not respond to the prescribed antiemetic regimen. However, a specific outpatient guideline, catering to different age groups, is lacking at Alberta Children's Hospital. Our current approach in managing chemotherapy-induced nausea and vomiting in outpatients requires evaluation. An effective symptom diary card would facilitate this evaluation.

In addition, symptom diary cards are useful in assessing the response of chemotherapy-naive patients, those with a history of severe nausea and vomiting, and those at high risk of a poor response (such as adolescents and those receiving multiple-agent or multiple-day therapy).

Participants in this study suggested several modifications to the symptom diary card. The diary card was subsequently revised (Figure 3). Two participants from the original sample used the new diary card and felt that it provided more space for recording information about antiemetics and comments. The revised symptom diary card should be further evaluated to determine its usefulness.

Scales

Nausea (N)

- 1 = None
- 2 = Mild (does not interfere with normal daily life)
- 3 = Moderate (interferes with normal daily life)
- 4 = Severe (bedridden because of nausea)

Vomiting (V)

- 1 = 0 vomits
- 2 = 1 or 2 vomits
- 3 = 3 to 5 vomits
- 4 = > 5 vomits

Activity (A)

- 1 = Active (able to play with some restrictions in physically strenuous activities)
- 2 = Moderate (some play, tires quickly, keeps busy with quieter activities)
- 3 = Mild (gets dressed but lies around, no active play)
- 4 = None (bedridden)

Diet (D)

- 1 = Regular diet
- 2 = Fluids and some solids
- 3 = Fluids only
- 4 = Non (not eating at all)

Morning = 8 AM to 4 PM

Afternoon = 4 PM to 12 AM

Night = 12 PM to 8 AM

N = Nausea

V = Vomiting

A = Activity

D = Diet

Duration = duration of nausea

Antiemetics = medication for nausea and vomiting

Day	Time	N	Duration	V	A	D	Antiemetics
1	Morning						
	Afternoon						
	Night						
2	Morning						
	Afternoon						
	Night						
3	Morning						
	Afternoon						
	Night						
4	Morning						
	Afternoon						
	Night						
5	Morning						
	Afternoon						
	Night						
6	Morning						
	Afternoon						
	Night						
7	Morning						
	Afternoon						
	Night						

Figure 3. The revised version of the symptom diary card.

Other modifications to the diary card should be considered. First, instead of using the numbers 1 to 4 to measure nausea, a "nausea scale" could be created using the numbers 0 to 10 (similar to the pain scale). For example, when nausea is at its worst, the nausea score would be reported as 10. A nausea scale would save time because patients could simply report their

conditions at home verbally to health-care staff, giving one number for each day or each time period. To assess the amount of vomiting, patients or their parents would simply state the number of episodes occurring in a specific time period. Pharmacists and nurses can easily use this grading system in their charts when patients return for a clinic visit. Activity and diet were difficult to



monitor because they depend on many underlying factors such as personality, previous eating habits, and age. Regular activity and diet are assumed to correlate with complete control of nausea and vomiting.¹¹ Therefore, health-care professionals can assess these parameters retrospectively instead of collecting formal data.

Second, instead of initiating the symptom diary card on day 1 or 2 after discharge from hospital, nausea and vomiting should be measured in relation to the number of hours after the end of chemotherapy (for example, 24 or 48 h) so that the time of onset can be captured. Third, if a patient has severe nausea, individual reports could be included in the patient's chart so that all members of the care team could assess the patient's response immediately. Finally, pharmacists and other health-care professionals should document the nonpharmacological interventions or behaviours that affect antiemetic response (such as acupuncture or special diets), since these data can help tailor the most effective antiemetic strategies for each patient.

The patient education process necessary for use of the symptom diary cards presented a benefit because it allowed for a thorough discussion of nausea and vomiting and increased patients' compliance with diary cards and antiemetics. Patient education is important in managing nausea and vomiting, because teaching alone can decrease anxiety. One study showed that two-thirds of hospitalized patients do not understand the concept of nausea.¹² Therefore, health-care providers must clarify the definitions of nausea, vomiting, and retching with patients receiving chemotherapy and their parents. If the patient is old enough to understand the therapy, the child should also have an awareness of the disease, the treatment and its side effects, the emetic properties of the drugs, the signs and symptoms of dehydration,¹³ previous history of nausea and vomiting, experiences with antiemetics, and home remedies that have helped.¹⁴

The patient and the health-care team must decide together whether a diary card would be helpful. The symptom diary cards provide an excellent opportunity to communicate with patients so that severe nausea and vomiting can be identified immediately. Using their knowledge of pharmacology and pharmacokinetics, pharmacists can use the data derived from the symptom diary cards to investigate the relationship between patient characteristics and responses to various antiemetics and to recommend alternative combinations. Analysis of the data from diary cards can help both the health-care team and patients to estimate the efficacy of various types of antiemetics and nonpharmacological interventions such as acupuncture and relaxation. Most important of all, the data collected by means of the diary card will guide the health-care team in proposing a more effective antiemetic regimen, so that patients can continue to receive optimal prophylaxis for chemotherapy-induced nausea and vomiting.

In conclusion, symptom diary cards are feasible for routine use in pediatric oncology and provide data that can be used to optimize control of chemotherapy-induced nausea and vomiting.

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