Chemotherapy-induced nausea and vomiting in Portugal: incidence versus healthcare provider estimations and effect on quality of life

Aim: To compare chemotherapy-induced nausea and vomiting (CINV) incidence with healthcare provider (HCP) estimations, and determine predictors of CINV-related quality of life in patients receiving highly or moderately emetogenic chemotherapy. **Methods:** A prospective observational study of patients in Portugal was conducted. A logistic regression model was used to predict the individual probability of CINV and compare it with the HCP estimate for each patient using a paired t-test. Quality of life was evaluated using the Functional Living Index of Emesis. **Results:** A total of 81 patients and ten HCPs participated at five hospitals. HCPs significantly underestimated acute nausea (difference = 38.3%), delayed nausea (difference = 41.1%) (both $p < 0.001$) and delayed vomiting (difference = 7.15%; $p = 0.03$) in cycle 1. CINV was the only statistically significant predictor of impaired quality of life. **Conclusion:** Nausea and delayed emesis are underestimated by HCPs.

KEYWORDS: chemotherapy • CINV • incidence • Portugal • quality of life

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Cancer incidence and mortality rates in Portugal have increased substantially over the past few decades [1]. Cancer patients will likely be exposed to chemotherapy, and are therefore at risk from chemotherapy-induced nausea and vomiting (CINV), one of the most common and feared complications of the treatment [2,3]. CINV risk factors include female gender; an age of less than 50 years; minimal alcohol intake; history of nausea and vomiting; and vomiting after previous chemotherapy [4]. The emetogenicity of a single chemotherapy agent is classified as high, moderate, low or minimal if it induces emesis in more than 90%, 30–90%, 10–30% or less than 10% of patients, respectively [101], and may be classified under different criteria; one common classification considers the most emetogenic single chemotherapy agent as the indicator of emetic risk in a multidrug regimen. In the absence of prophylaxis, between 70 and 80% of cancer patients experience emesis following chemotherapy; of these, up to 40% also describe anticipatory vomiting based on previous chemotherapy experience [102].

CINV is a major cause of impaired quality of life (QoL) among cancer patients [5–7], with the potential to reduce adherence to subsequent chemotherapy. While recent data suggest that social factors may be overtaking CINV as the foremost concern for patients [8], CINV nonetheless remains a cause of significant morbidity [9]. Studies to date demonstrate a good awareness of acute CINV among healthcare providers (HCPs), but a notably poorer appreciation of the delayed effects of chemotherapy (i.e., symptoms with an onset >24 h after chemotherapy) [9–11], which are known to reduce QoL significantly [5,6,12].

Data comparing the incidence of CINV as reported by patients versus that estimated by HCPs, and data documenting the effect of CINV on QoL in Portuguese patients, are limited. This study records the incidence of CINV as reported by patients and compares this with the incidence and course of CINV estimated by HCPs. It also determines the factors that predict reduced QoL in Portuguese patients receiving highly emetogenic chemotherapy (HEC) or moderately emetogenic chemotherapy (MEC).

Patients & methods

Study design

In this prospective, observational study, participants were recruited from five geographically diverse hospitals in Portugal that were considered representative of the national healthcare delivery system. Patients were included if they were at least 18 years old, were scheduled to receive two or more cycles of single-day HEC or MEC as defined by the Multinational Association of Supportive Care in Cancer (MASCC) [101], and had received neither radiation nor chemotherapy 1 week prior to, or between days 1–6 of, the study. All patients were able to complete written questionnaires and fulfilled the requirements for signed informed consent. Enrollment for this study began in September 2005 and concluded in September 2007.

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In advance of chemotherapy treatment, nurses and physicians were asked to estimate the likelihood (between 0 and 100%) that each patient receiving HEC or MEC would experience nausea and vomiting in the acute and delayed stages, where the acute stage was defined as the first 24 h after treatment, and the delayed stage as 25–120 h after treatment. As per the MASCC guidelines [101], patients were considered to have received HEC if treatment contained cisplatin, dacarbazine or cyclophosphamide at a dose greater than or equal to 1500 mg/m^2, and MEC if the most emetogenic agent in their regimen was cyclophosphamide at a dose of less than 1500 mg/m^2, doxorubicin/epirubicin, 5-fluorouracil or carboplatin.

Patients recorded the daily incidence of symptoms in a symptom diary. Entries included the number, time and date of emetic episodes, where an emetic episode was defined as one or more periods of continuous expulsion of stomach contents through the mouth (emesis) starting after one or more minutes without emesis, or attempts to vomit that were not productive of stomach contents (retching). The severity of nausea for the preceding 24 h was recorded on a visual analog scale from 0 (no nausea) to 8 (severe nausea) at the end of each day; patients were determined to have experienced nausea if they indicated any score above 0. CINV was defined as the presence of nausea, emesis or both.

Patient QoL was evaluated using the validated Functional Living Index of Emesis (FLIE) questionnaire [13,14], a patient-reported outcome measure comprising nine items (ability to enjoy meals and drinks, willingness to spend time with family and friends, ability to prepare a meal, ability to undertake household tasks and daily functions, ability to perform typical leisure activities and extent to which symptoms have caused personal hardship or difficulty for others) in each of two domains: nausea and vomiting. The questionnaire assesses QoL for the 5 days post-chemotherapy. Responses for each item were marked on a 7-point scale with 0 corresponding to 'none/not at all' and 7 to 'a great deal'. Higher scores are favorable and reflect less impact on daily life, and hence greater ability to maintain daily functioning.

Data analysis

Patient demographic data and clinical characteristics, chemotherapy and antiemetic prophylaxis, and rescue antiemetic treatments were summarized using descriptive statistics. Statistical analyses were stratified by degree of emetogenicity of treatment (HEC or MEC), and then by incidence of acute and delayed nausea and/or emesis. Descriptive analyses were also employed to summarize the incidence of patient-reported acute and delayed CINV symptoms.

HCP estimates and patient reports for CINV were first compared via the overlap between the Klopper–Pearson-type exact 95% confidence intervals (CIs) for the proportion of patients with CINV, and the 95% CIs for the HCP estimates based on a t-distribution. Subsequently, a multivariate logistic regression model was used to predict the individual probability of having CINV based on baseline characteristics and type of chemotherapy (HEC or MEC); the predicted probability was then compared with the HCP estimate for each patient using a paired t-test. Data for cycles 1 and 2 were analyzed separately.

The effect of CINV on QoL was estimated by averaging nausea and vomiting domain FLIE scores to achieve a total domain FLIE score; a total score less than or equal to 6 was interpreted as a negative impact of CINV on daily living as indicated in the FLIE Scoring and Interpretation Manual. Predictors of reduced QoL were assessed using a multivariate linear regression model by cycle and also for pooled data, by treating patients as a random effect using a linear mixed model. The following potential predictors of CINV-related QoL were evaluated: presence of CINV, baseline FLIE score, chemotherapy regimen, antiemetic medication, gender, age, weight, presence of metastases and receipt of previous chemotherapy; the dependent variable was the total domain FLIE score. Variables were deemed significant predictors when the p-value was less than or equal to 0.05.

Results

Patient & baseline characteristics

Baseline patient demographics and clinical characteristics are presented in Table 1. Approximately two-thirds of patients received HEC, and approximately a third were treated with MEC regimens (Table 2). In cycles 1 and 2, approximately 55% of HEC patients received a 5-hydroxytryptamine-3 (5HT-3) receptor antagonist (ondansetron or granisetron) plus a corticosteroid, typically dexamethasone, while a slightly greater proportion (60–70%) of MEC patients received similar prophylactic antiemetic therapy in cycles 1 and 2.

Incidence of CINV

The incidence of overall CINV in HEC and MEC groups was 87.5 and 80.8%, respectively, in cycle 1, with 81.6 and 69.6% of respective patients reporting CINV in cycle 2.

Table 1. Baseline patient demographics and clinical characteristics.

Characteristic	Cycle 1 (n = 74)	Cycle 2 (n = 72)
HEC (n [%])	48 (64.9)	49 (68.1)
MEC (n [%])	26 (35.1)	23 (31.9)
Age in years (mean ± SD)	48.7 ± 14.3	49.8 ± 14.45
Gender: F (n [%])	43 (58.1)	41 (56.9)
Diagnosis		
Breast cancer (n [%])	21 (28.4)	19 (26.4)
Hodgkin's lymphoma (n [%])	16 (21.6)	16 (22.2)
Lung cancer (n [%])	29 (39.2)	29 (40.3)
Other* (n [%])	6 (8.1)	6 (8.3)
Positive for metastases (n [%])	24 (32.4)	24 (33.3)
Positive for previous chemotherapy (n [%])	51 (68.9)	49 (68.1)

*'Other' includes oral, gynecological and unknown malignancies.
F: Female; HEC: Highly emetogenic chemotherapy; MEC: Moderately emetogenic chemotherapy; SD: Standard deviation.

The incidence of overall nausea was 83.3 and 76.9% for patients receiving HEC and MEC, respectively, in cycle 1, and 79.6 and 69.6%, respectively, in cycle 2. Overall emesis was reported by 41.7 and 38.5% in HEC and MEC groups, respectively, during cycle 1 and 49.0 and 34.8%, respectively, in cycle 2. Comparison of the observed incidence of acute and delayed emesis revealed a higher incidence of delayed relative to acute emesis for HEC and MEC, across both cycles (Figure 1).

Comparison between HCP estimations & patient-reported outcomes

Comparisons between HCP-estimated and patient-reported incidence of acute and delayed nausea and emesis for HEC and MEC are presented in Figure 2 & Table 3. The results were confirmed by contrasting the HCP estimate with each individual's predicted probability of having CINV, as derived from the multivariate logistic regression. HCPs significantly underestimated

Table 2. Chemotherapy regimen for all patients (A) and antiemetic prophylaxis among patients receiving highly emetogenic chemotherapy (B) and moderately emetogenic chemotherapy (C).

(A) Chemotherapy regimen (n [%])	Cycle 1 (n = 74)	Cycle 2 (n = 72)
Cisplatin-based	34 (45.9)	33 (45.8)
Cyclophosphamide + doxorubicin/epirubicin	22 (29.7)	20 (27.8)
ABVD	14 (16.2)	16 (22.2)
Other*	4 (5.4)	3 (4.2)
(B) Antiemetic prophylaxis for HEC (n [%])	**Cycle 1 (n = 48)**	**Cycle 2 (n = 49)**
5HT-3 + corticosteroid	27 (56.3)	26 (53.1)
5HT-3 alone	12 (25.0)	11 (22.5)
5HT-3 + other‡	8 (16.7)	10 (20.4)
No antiemetic	1 (2.0)	2 (4.1)
(C) Antiemetic prophylaxis for MEC (n [%])	**Cycle 1 (n = 26)**	**Cycle 2 (n = 23)**
5HT-3 + corticosteroid	16 (61.5)	16 (69.6)
5HT-3 alone	3 (11.5)	1 (4.3)
5HT-3 + other§	7 (26.9)	6 (26.1)

*Other includes carboplatin based (n = 2); adriamicin, bleomycin, vinblastine, prednisone (n = 1); and adriamycin, bleomycin, vinblastine plus an unknown agent (this was categorized as MEC) (n = 1) for cycle 1 and carboplatin-based (n = 3) for cycle 2.
‡Other includes metoclopramide and aprepitant (n = 1 in cycles 1 and 2).
§Other includes metoclopramide and aprepitant (n = 1 in cycles 1 and 2).
ABVD: Adriamycin, bleomycin, vinblastine, dacarbazine; HEC: Highly emetogenic chemotherapy; MEC: Moderately emetogenic chemotherapy.

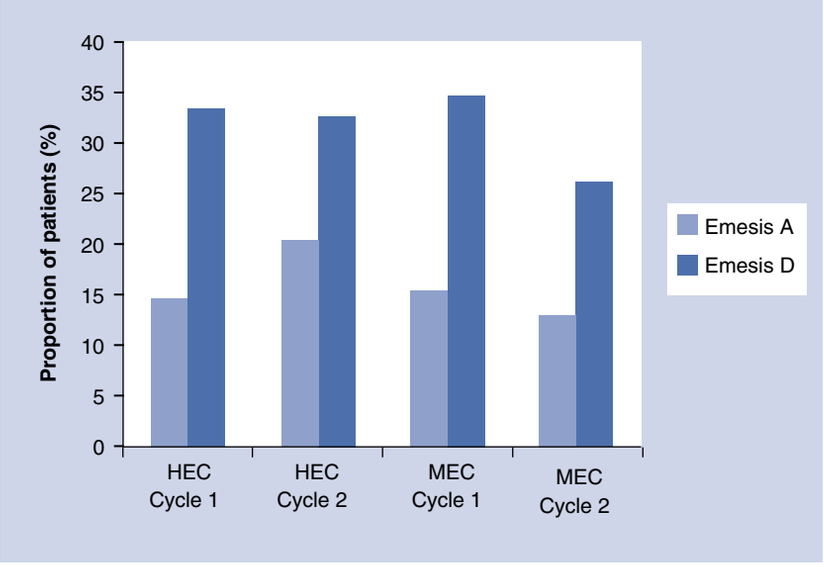

Figure 1. Patient-reported incidence of acute and delayed emesis after highly emetogenic chemotherapy and moderately emetogenic chemotherapy.
A: Acute; D: Delayed; HEC: Highly emetogenic chemotherapy; MEC: Moderately emetogenic chemotherapy.

the frequency of acute and delayed nausea for patients treated with HEC or MEC, in both treatment cycles (mean difference in estimations vs actual incidence was 38.3 and 41.1% for acute and delayed nausea, respectively, in cycle 1 [$p < 0.0001$ for both], and 41.0 and 37.5% for acute and delayed nausea, respectively, in cycle 2 [$p < 0.0001$ for both]). HCPs overestimated acute vomiting (mean difference = -10.8%; $p = 0.003$) but underestimated delayed vomiting (mean difference 7.15%; $p = 0.03$) in cycle 1.

Effect of CINV on QoL

The proportion of patients who indicated on the FLIE questionnaire that chemotherapy had a negative effect on their daily life increased from 3.9% before cycle 1, to 41.7% afterwards, and from 9.7 to 43.1% after cycle 2. Patients in both cycles who had experienced prior CINV experienced a greater reduction in QoL (reduction in mean total FLIE score of 1.1–1.4 points) than those who did not report prior CINV (reduction in mean total FLIE score of 0.1–0.4 points) (Table 4).

CINV was the only significant predictor of impaired QoL after both cycles 1 and 2 ($p = 0.01$ for each individual treatment cycle, and $p = 0.003$ for combined cycles 1 and 2). Other predictors of reduced QoL after cycle 1 were increased age ($p = 0.02$) and lack of an antiemetic. Patients who received a 5HT-3 antagonist alone or in combination with a corticosteroid had total mean FLIE scores that were 4.2 ($p = 0.01$) and 3.2 points ($p = 0.03$) higher than those receiving no antiemetic, respectively. Mean pre-treatment FLIE score predicted reduced QoL after cycle 2 ($p = 0.03$).

FLIE data were also analyzed after excluding patients who received no antiemetic. In this case, CINV was the only significant predictor of impaired QoL after cycles 1 ($p = 0.01$) and 2 ($p = 0.02$), while age ($p = 0.02$) and pre-treatment FLIE scores ($p = 0.03$) were further predictors after cycles 1 and 2, respectively.

Discussion

Our findings suggest that HCPs in Portugal significantly underestimate the incidence of acute and delayed nausea after HEC and MEC, and delayed emesis after the first cycle of chemotherapy. These findings are consistent with those of other published studies. In a study by Grunberg and colleagues, HCPs underestimated the incidence of delayed nausea and emesis after HEC (39 and 22%, respectively, vs patient reports of 60 and 50%), and the incidence of acute and delayed nausea after MEC (24% for both, vs patient reports of 37 and 52%, respectively) [9]. A study of 82 patients in Mexico found that HCPs predicted with reasonable accuracy the incidence of acute CINV after HEC and MEC, and delayed CINV after MEC, but underestimated the frequency of delayed CINV after HEC [11]. Studies and surveys from the USA [15] and Europe [5,9,16,17] typically indicate a 54–60% incidence of delayed nausea and a broader 25–38% incidence rate for delayed emesis. Of note, delayed CINV occurs in 18–36% of patients, even without the prior warning of acute symptoms [9,15,17,18], which may partially explain the underestimation by HCPs who, by the time of delayed symptom onset, have often discharged patients from the clinic or hospital.

The proportion of patients whose responses to the FLIE questionnaire indicated that chemotherapy had a negative impact on their daily living increased by 37.8% after cycle 1 and by 33.4% after cycle 2. This proportion is somewhat lower than that found in a similar study in Italy, in which 67–77% of patients with delayed nausea or vomiting, and more than 90% of patients with both acute and delayed nausea or vomiting, reported a negative impact on daily life, with delayed nausea contributing more than acute nausea to the reduction in QoL [7]. As anticipated, CINV was the only independent predictor of reduced QoL in both treatment cycles in our study, and it remained so irrespective of the emetogenicity of treatment, type of antiemetic prophylaxis or prior chemotherapy experience.

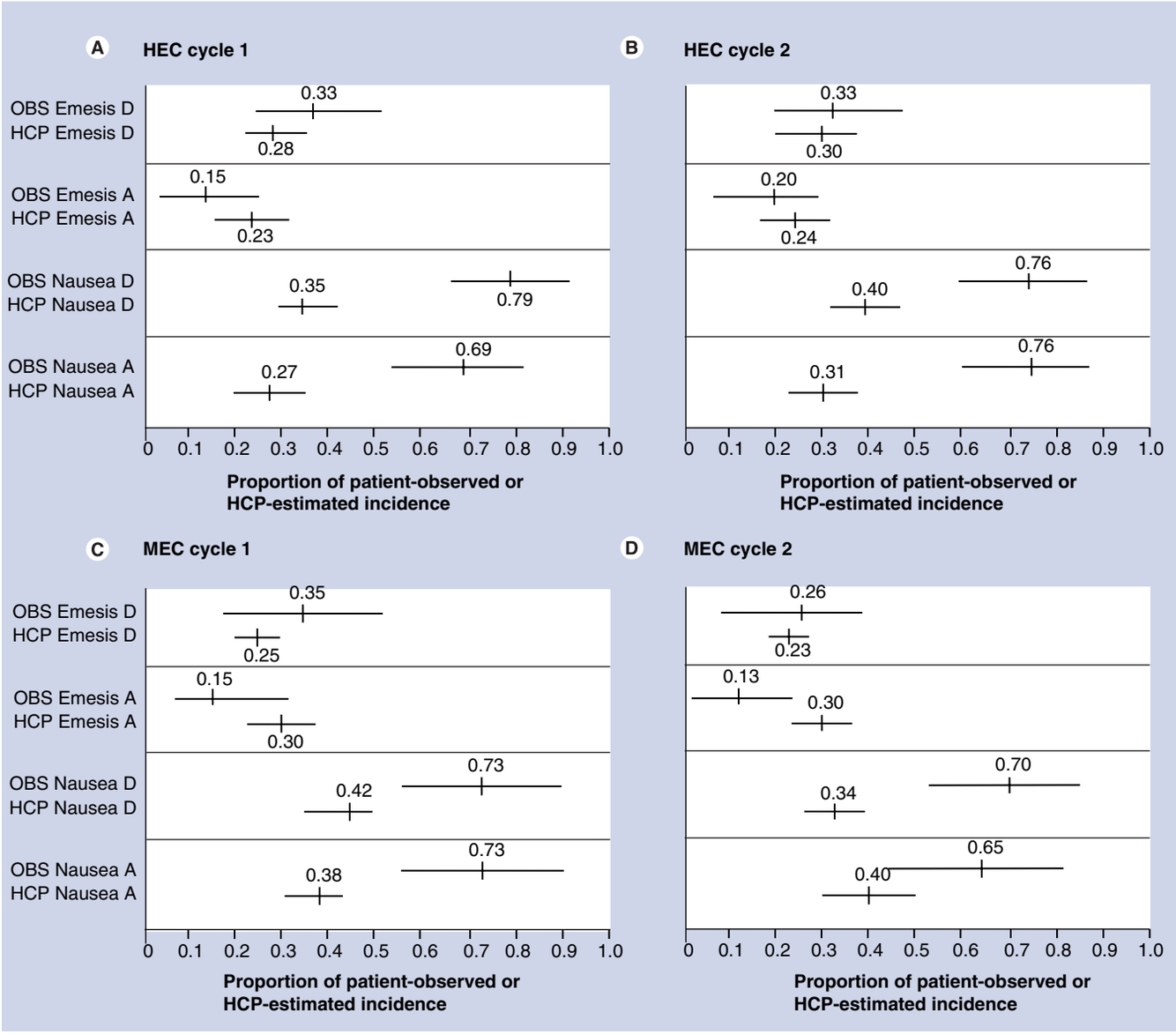

Figure 2. Comparison of patient-reported incidence of acute and delayed nausea and emesis versus healthcare provider predictions in highly emetogenic chemotherapy cycles 1 (A) and 2 (B) and moderately emetogenic chemotherapy cycles 1 (C) and 2 (D). Note: overlapping confidence intervals suggest no difference between groups.
A: Acute; D: Delayed; HCP: Healthcare provider; HEC: Highly emetogenic chemotherapy; MEC: Moderately emetogenic chemotherapy; OBS: Observed incidence.

The fact that a greater proportion of patients reported reduced QoL prior to beginning cycle 2 compared with the period before cycle 1 suggests that simply the prospect of treatment itself has a negative effect in patients who have already received one cycle of chemotherapy, a phenomenon known as anticipatory CINV.

Despite the use of multiple classes of antiemetic agents in this study, over 80% of patients still experienced CINV in cycle 1, and 70–80% in cycle 2. This may reflect the fact that not all patients received antiemetic prophylaxis in accordance with established guidelines and, while the majority of patients received a 5HT-3 antagonist and corticosteroid, approximately 40% did not receive even this standard of care. Of note, only one patient in each cycle received antiemetic prophylaxis with the novel neurokinin 1 (NK1)-receptor antagonist aprepitant, an agent well-recognized as a major advance in the treatment of delayed emesis and one that is now included in international antiemetic guidelines [101,102]. It is difficult to speculate as to why patients did not receive antiemetic prophylaxis in line with published guidelines, although data suggest this is not uncommon [7,19–21]. The limited use of aprepitant is more easily understood. The cost of NK1-receptor antagonists is not reimbursed in Portugal and patients

Table 3. Incidence of chemotherapy-induced nausea and vomiting compared with healthcare provider estimates.

Cycle 1	Incidence (HEC) (n = 48)	HCP estimate (HEC) (n = 47)	Incidence (MEC) (n = 26)	HCP estimate (MEC) (n = 26)
	Incidence (%) (95% CI)	*Estimate (%) (95% CI)*	*Incidence (%) (95% CI)*	*Estimate (%) (95% CI)*
Nausea A	68.8 (55.6–81.9)	26.7 (18.6–34.7)	73.1 (56.0–90.1)	41.7 (33.7–49.8)
Nausea D	79.2 (67.7–90.7)	35.4 (27.9–43.0)	73.1 (56.0–90.1)	37.5 (30.9–44.1)
Emesis A	14.6 (4.6–24.6)	22.9 (15.1–30.7)	15.4 (4.4–34.9)	30.2 (23.9–36.5)
Emesis D	33.3 (20.0–46.7)	28.0 (20.8–35.1)	34.6 (16.3–52.9)	24.8 (20.5–29.1)
Cycle 2	**Incidence (HEC) (n = 49)**	**HCP estimate (HEC) (n = 48)**	**Incidence (MEC) (n = 23)**	**HCP estimate (MEC) (n = 22)**
	Incidence (%) (95% CI)	*Estimate (%) (95% CI)*	*Incidence (%) (95% CI)*	*Estimate (%) (95% CI)*
Nausea A	75.5 (63.5–87.6)	31.2 (23.2–39.2)	65.2 (45.8–83.6)	39.5 (29.5–49.5)
Nausea D	75.5 (63.5–87.6)	40.4 (32.9–47.9)	69.6 (50.8–88.4)	34.1 (24.9–43.2)
Emesis A	20.4 (9.1–31.7)	24.4 (16.7–32.2)	13.0 (0.0–26.8)	30.0 (22.4–37.6)
Emesis D	32.7 (19.5–47.5)	30.8 (23.4–38.1)	26.1 (8.1–44.0)	23.2 (17.1–29.2)

A: Acute; D: Delayed; HCP: Healthcare provider; HEC: Highly emetogenic chemotherapy; MEC: Moderately emetogenic chemotherapy.

must self-pay, which can be prohibitive. Increased patient access to this group of antiemetics may result in a reduction in the frequency of CINV, particularly during the delayed stage [22,23].

Table 4. Mean Functional Living Index of Emesis scores (95% CI) pre- and post-chemotherapy.

	Before treatment	After treatment
Cycle 1 (all patients)	6.8 (6.7–6.9)	5.6 (5.3–6.0)
Nausea domain	6.7 (6.6–6.9)	5.2 (4.7–5.6)
Vomiting domain	6.9 (6.8–7.0)	6.0 (5.7–6.4)
No prior CINV	7.0 (6.9–7.1)	6.9 (6.7–7.0)
Nausea domain	7.0 (6.9–7.1)	6.8 (6.5–7.1)
Vomiting domain	7.0 (6.9–7.1)	6.9 (6.8–7.0)
Prior CINV	6.8 (6.7–6.9)*	5.4 (5.0–5.8)‡
Nausea domain	6.7 (6.5–6.9)	4.9 (4.4–5.4)
Vomiting domain	6.9 (6.8–7.0)	5.9 (5.5–6.3)
Cycle 2 (all patients)	6.6 (6.4–6.9)	5.7 (5.4–6.1)
Nausea domain	6.6 (6.3–6.8)	5.2 (4.8–5.7)
Vomiting domain	6.7 (6.5–6.9)	6.2 (5.9–6.5)
No prior CINV	7.0 (6.9–7.0)	6.6 (5.9–7.3)
Nausea domain	7.0 (6.9–7.0)	6.5 (5.8–7.3)
Vomiting domain	7.0 (6.9–7.0)	6.6 (5.9–7.4)
Prior CINV	6.6 (6.3–6.8)§	5.5 (5.1–5.8)§
Nausea domain	6.4 (6.1–6.4)	4.8 (4.3–5.3)
Vomiting domain	6.6 (6.3–6.9)	6.1 (5.7–6.4)

Complete data were available for 72 and 71 patients in cycles 1 and 2, respectively.
**p = 0.04 vs patients without prior CINV in same cycle.*
‡p < 0.001 vs patients without prior CINV in same cycle.
§p < 0.01 vs patients without prior CINV in same cycle.
Range of total FLIE scores is 0–7. A lower score indicates a negative impact on quality of life.
CINV: Chemotherapy-induced nausea and vomiting.

Patients in the current study who received either HEC or MEC reported nausea approximately twice as frequently as emesis (83 vs 42%, and 77 vs 39% in HEC and MEC, respectively) in cycle 1; a similar situation was reported by MEC patients in cycle 2 (70 vs 35%). These findings mirror those of other studies [5,9], which have highlighted the lack of control of chemotherapy-induced nausea in particular.

The present study also found a statistically significant increase in emesis between the acute and delayed stages of treatment for both HEC and MEC in both cycles. These findings again replicate those of other studies, which have documented marked increases in delayed symptoms compared with those in the acute stage [5,9,15,24]. These data demonstrate a particular need for improved prophylaxis and/or treatment of delayed emesis, which requires increased awareness of the problem on the part of HCPs, improved adherence to agreed treatment guidelines and antiemetic approaches that address the etiology of both acute and delayed CINV.

The results of this and other studies suggest that treatment outcomes with respect to impact on QoL following chemotherapy remain poor. The discrepancy between the potential for effective symptom control and real-life patient experience demands further research, in particular focusing on the correlation between guideline-consistent practice and clinical outcomes. Since poorly controlled

CINV not only takes a significant toll on patient wellbeing, but also increases direct and indirect medical costs [25,26], the combined burden of adverse health and economic consequences underscores the need for more effective control of CINV.

Limitations of this study include the small patient sample size, a limited number of sites and the fact that follow-up was restricted to two chemotherapy cycles. Although patients were drawn from five geographically varied treatment centers, generalized results may not be applicable to all Portuguese hospitals.

Conclusion

Despite advances in antiemetic therapy, the incidence of CINV, and delayed symptoms in particular, remains high in Portugal, with a striking increase in the incidence of delayed emesis following the acute stage. HCPs underestimate the frequency of acute and delayed chemotherapy-induced nausea, while having a more accurate sense of the incidence of chemotherapy-induced emesis. There is a pressing need for improved control of CINV in Portugal, particularly for the prevention of delayed-stage symptoms.

Future perspective

Further research is needed to determine the reasons why patients are not receiving optimal antiemetic treatment. The relationship between guideline-consistent antiemetic prescribing and clinical outcomes warrants further investigation.

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Author contributions

Ms Wisniewski and Dr Burke assisted in the design of this study and the electronic data capture system. Dr Ma conducted all statistical analyses with input from Ms Wisniewski. Dr Dinis, Dr Moreira and Dr Raposo acted as primary investigators at their respective study sites and also contributed to the study design.

Financial & competing interests disclosure

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Ethical conduct of research

The authors state that they have obtained appropriate institutional review board approval or have followed the principles outlined in the Declaration of Helsinki for all human or animal experimental investigations. In addition, for investigations involving human subjects, informed consent has been obtained from the participants involved.

Executive summary

Incidence of CINV

- Despite antiemetic therapy, approximately 80% of patients in this study experienced chemotherapy-induced nausea and vomiting (CINV).
- There was a greater incidence of delayed emesis relative to acute emesis with highly and moderately emetogenic chemotherapy, across two cycles.
- There was a marked increase in the incidence of delayed emesis in comparison with acute emesis.

Comparison between healthcare provider estimations & patient-reported outcomes

- Healthcare providers underestimated the frequency of acute and delayed nausea over two cycles, and delayed emesis in cycle 1.

Effect of CINV on quality of life

- CINV was the only significant predictor of impaired quality of life in both treatment cycles, irrespective of whether patients received an antiemetic.

Conclusion

- There is a pressing need for improved control of CINV in Portugal, particularly for prevention of delayed-phase symptoms.

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▪▪ of considerable interest

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