

Effectiveness of the navigation of cancer chemoradiotherapy patients: a retrospective cohort study

*Efetividade da navegação de pacientes com câncer em tratamento
quimiorradioterápico concomitante: estudo de coorte retrospectivo*

*Efectividad de la navegación de pacientes con cáncer sometidos a
quimiorradioterapia concomitante: un estudio de cohorte retrospectivo*

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ABSTRACT

Objective: To verify the effectiveness of a navigation program for cancer patients undergoing concomitant chemoradiotherapy treatment in a public hospital, regarding treatment completion, emergency service visits and unplanned hospitalizations.

Method: Retrospective double cohort study conducted in a hospital in southern Brazil. Adults with cancer referred for concomitant chemoradiation were included from January 2022 to December 2023. Participants were divided into before and after navigation program groups. Univariate analysis and Poisson regression were performed to assess outcomes.

Results: A total of 100 patients were evaluated in the before navigation group and 112 in the after navigation group. After the implementation of the program, there was a higher percentage of patients who achieved complete treatment (66% versus 89.3%; $p < 0.001$), a lower percentage of emergency room visits (50% versus 31.3%; $p = 0.008$) and hospital admissions (57% versus 33%; $p = 0.001$). In the multivariate analysis adjusted for exposure variables, no significant effect was observed for the primary outcome ($p > 0.05$).

Conclusion: Improvements in treatment success and a decrease in the use of emergency services and hospitalizations were observed, although more robust evidence is needed to prove the full effectiveness of the navigation program, no significant associations were identified in the multivariate analysis that proves the effectiveness of the navigation program.

Descriptors: Patient navigation; Patient-centered care; Oncology Nursing; Chemoradiotherapy; Continuity of patient care.

RESUMO

Objetivo: Verificar a efetividade de um programa de navegação de pacientes com câncer em tratamento quimiorradioterápico concomitante, em hospital público, quanto à completude do tratamento, atendimentos em serviço de emergência e internações não planejadas.

Método: Dupla coorte retrospectiva realizada em hospital do sul do Brasil. Foram incluídos adultos com câncer e indicação de quimiorradiação concomitante no período de janeiro/2022 a dezembro/2023. Os participantes foram divididos em grupos pré e pós-programa de navegação. Realizou-se análise univariada e regressão de Poisson para avaliação dos desfechos.

Resultados: Foram avaliados 100 pacientes no grupo pré-navegação e 112 no pós-navegação. Após a implementação do programa, houve maior percentual de pacientes que atingiram a completude do tratamento (66% versus 89,3%; $p < 0,001$), menor percentual de atendimentos na emergência (50% versus 31,3%; $p = 0,008$) e de internação hospitalar (57% versus 33%; $p = 0,001$). Na análise multivariada ajustada para variáveis de exposição não se observou efeito significativo para completude do tratamento ($p > 0,05$).

Conclusão: Ocorreram melhorias quanto ao êxito do tratamento e à diminuição no uso de serviços de emergência e internações, embora evidências mais robustas sejam necessárias para a comprovação da plena efetividade do programa de navegação.

Descritores: Navegação de pacientes; Assistência centrada no paciente; Enfermagem oncológica; Quimiorradioterapia concomitante; Continuidade da assistência ao paciente.

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RESUMEN

Objetivo: Verificar la efectividad de un programa de navegación para pacientes con cáncer sometidos a tratamiento concomitante de quimiorradioterapia, en un hospital público, en relación a la finalización del tratamiento, visitas a servicios de urgencia y hospitalizaciones no planificadas.

Método: Doble cohorte retrospectiva realizado en un hospital del sur de Brasil. Se incluyeron adultos con cáncer e indicación de quimiorradiación concomitante en el período de enero/2022 a diciembre/2023. Los participantes se dividieron en grupos de programas previos y posteriores a la navegación. Se realizó análisis univariado y regresión de Poisson para evaluar los resultados.

Resultados: Se evaluaron 100 pacientes en el grupo pre-navegación y 112 en el grupo post-navegación. Tras la implementación del programa, hubo un mayor porcentaje de pacientes que completaron el tratamiento (66% *versus* 89,3%; $p < 0,001$), un menor porcentaje de visitas a urgencias (50% *versus* 31,3%; $p = 0,008$) y de admisiones hospitalarias (57% *versus* 33%; $p = 0,001$). En el análisis multivariado ajustado por variables de exposición, no se observó un efecto significativo para el resultado primario ($p > 0,05$).

Conclusión: Hubo mejoras en el éxito del tratamiento y una disminución en el uso de servicios de emergencia y hospitalizaciones, aunque se necesita evidencia más sólida para demostrar la efectividad total del programa de navegación.

Descriptores: Navegación de pacientes; Atención dirigida al paciente; Enfermería Oncológica; Quimiorradioterapia; Continuidad de la atención al paciente.

INTRODUCTION

Cancer is one of the most complex public health problems facing health systems in the world today, given its epidemiological, social and economic impact⁽¹⁾. In Brazil, neoplasms are the second leading cause of death. Data from the National Cancer Institute (INCA) estimate 704 thousand new cases will have taken place from 2023-2025, especially in the South and Southeast regions, where nearly 70% of the incidence is centered. Population aging, modern lifestyles, and more environment and occupational exposure help increase the demand for oncological services in recent decades, and oncology has been the second largest field in regard to expenses with clinical treatment in the Single Health System (SUS)⁽²⁾.

Despite the advances in the struggle to control cancer in Brazil, literature points out several geographical, economic, relational, and organizational barriers in the access to technological services and resources to prevent, diagnose, and treat cancer. This is especially true in the public sector, and can have an impact on the severity of this disease⁽³⁻⁵⁾. In addition to the physical and emotional stress generated by the diagnosis and the secondary effects of treatment, there are several other challenges, such as inefficiencies in the health system, delays in diagnosis, delays in the beginning of treatment, lack of coordination of care, and insufficient social and emotional support^(1,6).

This is especially important for patients who undergo concomitant chemoradiotherapy, since this combination is associated to a higher frequency of toxicity, simultaneous collateral effects, and low tolerance to therapy, resulting in treatment interruption, hospitalizations, and decline in quality of life⁽⁷⁾. Therefore, strategies to manage the path of cancer patients are necessary, as they can minimize access barriers and help continue care, increase its quality, and lead to better health outcomes⁽⁸⁾.

Patient navigation has been increasingly important in the last few years, since there have been successful experiences with this practice, leading patients to reach better clinical outcomes⁽⁸⁾. This is a systematized process, whose goal is enabling timely and egalitarian access to quality care⁽⁸⁾. This practice, which is carried out by a patient navigator, involves cycles in which a person's needs are analyzed, and activities to coordinate their care and their path are developed and implemented, while they receive support to overcome any barriers to access health services⁽⁹⁾.

Developed in the 1990s in the United States, patient navigation presented models that expanded in several countries, providing care to many different populations and being quite common for cancer patients⁽⁹⁻¹⁰⁾. Existing models indicate that many different health workers can be navigators, in addition to lay people and even surviving cancer patients⁽¹⁰⁾. In Brazil, the Federal Council of Nursing instituted, in 2024, a resolution that regulates the role of the nurse as a navigator, which they must perform using advanced practices, autonomously, in the management of care⁽¹¹⁾. Despite the advancements in the structuring of navigation programs in the country, they have been implemented in few health services so far⁽⁹⁾.

International studies suggest that patient navigation reduces time between diagnosis and treatment, in addition to reducing hospitalizations and the severity of therapy-related symptoms; it also increases quality of life and the satisfaction of patients, facilitating the articulation of multidisciplinary work^(10,12-13). At the national level, there is little literature on the subject. Existing studies either address the implementation of navigation in health institutions with supplementary⁽¹⁴⁻¹⁵⁾ or mixed (SUS, insurances, and other private sector actors) care⁽⁹⁾, or are revisions^(6,12). There are none that focus on the navigation of patients under simultaneous chemo- and radiotherapy^(6,9,12,14-15).

Considering the determinants and social inequality in the access and continuity of cancer treatment in Brazil, as well as the high risk of adverse events related to concomitant chemoradiotherapy, research on navigation for patients under these therapies in the SUS should be carried out. As a result, this study aims to verify the effectiveness of a program of patient navigation for those undergoing chemotherapy and radiotherapy simultaneously in a public hospital, regarding the completeness of their treatment, attention in emergency services, and unplanned hospitalizations.

■ METHOD

This is a retrospective double-cohort study, in which cohorts can be formed considering different moments in the past⁽¹⁶⁾, following the directives of the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE). This study was conducted from January to March 2025, with data from January 2022 to December 2023, in a large, public, teaching clinical hospital with private legal status in the south of Brazil. Every year, the cancer service of this institution provides more than 20 thousand consultations, 8 thousand consultations in its outpatient chemotherapy unit, and 13 thousand consultations in its outpatient radiotherapy unit, mostly for SUS patients.

The navigation program (NP) for cancer patients was implemented in this institution in November 2022, being comprised of navigator nurses. These workers are in articulation with the multiprofessional team that helps patients in oncological treatment (physicians, nutritionists, social workers, psychologists, pharmacists, and dentists, and the administrative team). In the first year of implementation of this program, it only attended patients who were receiving concomitant endovenous chemotherapy and radiotherapy, seeing as a situational diagnosis found that this public dealt with many barriers to access and continue their care, including: the complexity of treatment (invasive devices, wound dressings, drugs to be taken at home, advanced stage diseases, previous comorbidities, clinical complications, and treatment interruptions); obstacles to self-care management (trouble understanding the complexity of the disease or its care, not being present for scheduled exams or consultations); mental health issues (fear, anxiety, appearance disorders, alcohol or tobacco dependency); social vulnerabilities (low income, no transportation or difficulties going to the hospital, insufficient family support); issues in the organization of the health system (weak connection with primary care, uncoordinated health care, bureaucratic and slow health system flow).

Navigator nurses carry out consultations, develop individualized care plans and monitor NP patients using electronic records. Educational activities about the disease are carried out, as well as treatments and care, guidance about how the health system works and community resources, follow up and management of symptoms and collateral effects; as well as care coordination, working as a link between patients, their relatives, and multiprofessional team members, referring them to support specialists to manage any barriers found. The NP prescribes hybrid care (in person or via phone), according to the needs of the patient. The navigator nurse will stop follow up when treatment is concluded, when the therapy recommendations change (concomitant), when follow up can no longer happen, or the patient dies.

The study population included adult cancer patients, regardless of etiology, who were recommended simultaneous treatment (endovenous chemotherapy and radiotherapy) from January 2022 to December 2023. We excluded patients if the data required for this investigation was nonexistent or unavailable, if they had changed or abandoned treatment, also excluding those who died in the period studied.

Sample size was calculated according to data from an Asian systematic review and meta-analysis. The authors evaluated the effects of a navigation program over the completion rates of treatment⁽¹⁷⁾. With a maximum amplitude of 5% for the confidence interval, considering a 95% power, the Wald method to estimate confidence intervals, we expected a 13% improvement in the relative proportion of treatment completion rates (CI95%), with a relative risk of 3.46 (1.7-6.9), as referred by the authors⁽¹⁷⁾. We estimated 168 patients as the minimum sample size. This calculation was carried out using the online version of the PSS Health tool (*PSS Health*®)⁽¹⁸⁾.

Patients in accordance with inclusion criteria were included. They were divided into two groups: before NP: patients from 2022 (cohort 1), a period in which the NP was yet to be implemented and patients received conventional care in the institution; and after NP: patients from 2023 (cohort 2), when the NP was already instituted in the institution, and attention was guided by navigator nurses.

Data was collected from January to March 2025 by a team formed by nurses specialized in cancer care, and a nursing scholar, all of whom were trained and supervised by PhD professors. Collection took place in the hospital that was the setting of the study through an analysis of the electronic records of the participants included. A registration instrument that included all variables for the study was used.

The primary outcome was the completion of the simultaneous cancer treatment, defined as the conclusion of the

simultaneous treatment of chemotherapy and radiotherapy, as recommended by the cancer physician according to diagnostic criteria and type of cancer. The secondary outcome were: attention in the emergency service care of adults, defined as the number of times the person was attended in the emergency service of the hospital during the simultaneous treatment; and unplanned hospital admissions, defined as the number of hospitalizations related to treatment that had not been scheduled or planned. Exposure variables and potential confounding factors evaluated were: age, sex, educational level, type of cancer, hospitalization time (if any), and number of times attended by the NP.

A statistical analysis was carried out using the software IBM Statistical Package for the Social Sciences (SPSS®), version 18.0, for Windows. Data normality was evaluated using the Shapiro-Wilk test. Continuous variables were described using mean and standard deviation when distribution was normal, or median and interquartile range when it was asymmetric. Categorical variables were expressed using absolute and relative numbers. Depending on data distribution, continuous variables were compared using Student's t test or Mann-Whitney's U test. Categorical variables were compared using Pearson's chi-squared test or Fisher's exact. P-values of 0.05 or lower were considered to be statistically significant. Poisson regression with robust variance and binary outcome was used to calculate relative risk, being adjusted for the confounding variables. For the regression model, we selected variables whose p-value was 0.5 or lower in the bivariate analysis (sex, age, educational level, etiology of the cancer, length of stay, being attended in the adult emergency service, and hospitalization). A two-tailed $p \leq 0.05$ was considered to be statistically significant. We adopted the analysis of adjusted standardized residues in the bivariate tests. In the Poisson regression we applied standardized Pearson and deviance residuals.

The ethical and methodological characteristics of this study were approved by the Research Ethics Committee of the institution under Certificate of Submission to Ethical Evaluation No. 3897224000005327 and Opinion No. 2024-0152. There was no need to sign an informed consent, since the data collected was retrospective, considering only past records.

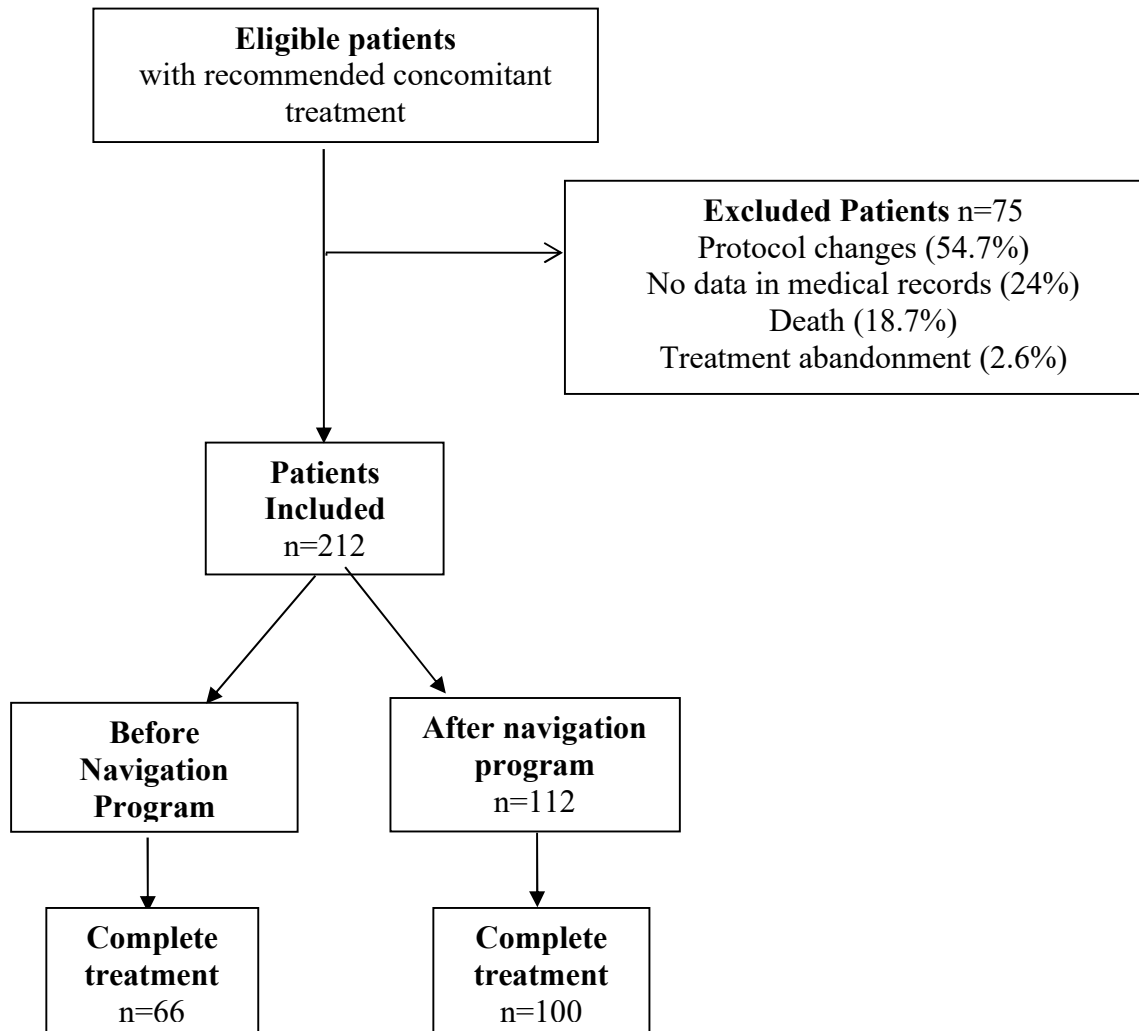
■ RESULTS

From the patients eligible during the study, 75 (26%) were excluded, due to the following reasons: treatment protocol had to be changed ($n=41$); missing data from records ($n=18$); death ($n=14$); treatment was abandoned ($n=2$). Thus, 212 patients were placed into the before and after NP groups, with 66 and 100, respectively, who had completed their treatment (Figure 1).

Most participants were male (53.8%), with a mean age of 59.6 (SD=12.1), and up to 8 years of formal education (52.8%). There was no statistically significant difference between the groups regarding their demographic characteristics. Regarding clinical characteristics, the main types of cancer found in the patients analyzed were head and neck cancer (38.7%), followed by cervix (23.6%) and esophagus (15.1%). Again, there was no difference between the groups. Patients in the before NP group had a longer length of stay than those in the after NP, with a median of 10 (7-16,5) days versus 1 (1-2) days, respectively ($p < 0.001$) (Table 1). It is worth noting that all patients were attended via SUS. In the post-NP group, 509 consultations were performed by navigator nurses, with a median of 4 (P25: 3; P75: 5) per patient.

Regarding the outcomes evaluated in the study, there was a higher percentage of patients who completed their chemoradiotherapy treatment after the NP was implemented (66% versus 89.3%; $p < 0.001$). There were significantly less unplanned care necessary in the adult emergency (50% versus 31.3%; $p = 0.008$) and hospitalization (57% versus 33%; $p = 0.001$) sectors (Figure 2). Nonetheless, it is important to note that the effect of the main outcome, found in the bivariate analysis (complete treatment), did not continue to be significant in the multivariate analysis ($p > 0.05$) (Table 2).

A comparison between the number of consultations provided by navigator nurses and the outcomes analyzed showed that patients who consulted with them in four occasions had a higher percentage of complete treatments (29% versus 16.7%, $p = 0.03$). Patients who were attended more than four times in the NP had a lower percentage of hospitalizations (29.7% versus 49.3%, $p = 0.02$) (Table 3).

Figure 1. Study flowchart. Porto Alegre, RS, Brazil, 2022 and 2023.**Table 1.** Demographic and clinical characteristics of the total number of patients, and comparisons between the patients before and after the implementation of the navigation program. Porto Alegre, RS, Brazil, 2022 and 2023.

Variable	Total (n=212)	Before NP (n=100)	After NP (n=112)	P-value
Males [§]	114 (53.8)	56 (56.0)	58 (51.8)	0.58 [#]
Age [£] (years)	59.6 ± 12.1	60.9 ± 12.2	58.4 ± 12.0	0.12 ^{##}
Educational level [§]				
None	8 (4.0)	5 (5.7)	3 (2.7)	0.56 [#]
Up to 8 years	105 (52.8)	48 (55.2)	57 (50.9)	
High school	77 (38.7)	30 (34.5)	47 (42.0)	
Higher education	9 (4.5)	4 (4.6)	5 (4.5)	

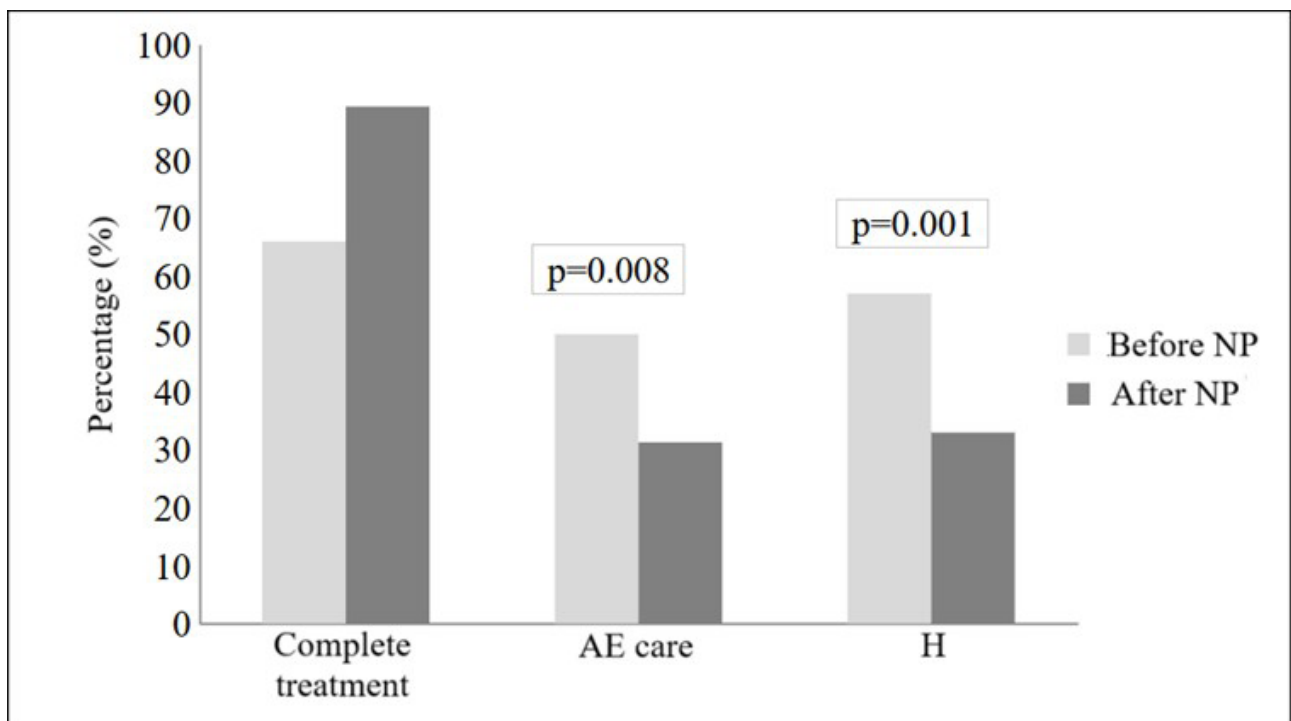
Table 1. Cont.

Variable	Total (n=212)	Before NP (n=100)	After NP (n=112)	P-value
Cancer etiology [§]				
Head and neck	82 (38.7)	37 (37.0)	45 (40.2)	0.09 ^{&}
Cervix	50 (23.6)	25 (25.0)	25 (22.3)	
Esophagus	32 (15.1)	16 (16.0)	16 (14.3)	
Anal canal	31 (14.6)	19 (19.0)	12 (10.7)	
Lungs	14 (6.6)	3 (3.0)	11 (9.8)	
Bladder	3 (1.4)	0 (0)	3 (2.7)	
Length of stay (days)	2 (1 – 8.25)	10 (7-16.5)	1 (1-2)	<0.001*

NP= navigation program

[§]Values expressed as absolute and relative numbers; [&]Values expressed as mean±standard deviation; ^{||}Values expressed as median and interquartile range; ^{*}Pearson's chi-square test; ^{##}Student's t-test; [&]Fischer's exact test; ^{*}Mann-Whitney test.

Figure 2. Percentage found for the outcomes evaluated (completeness of treatment, emergency care, and hospitalization) among patients before and after the navigation program. Porto Alegre, RS, Brazil, 2022 and 2023.



NP = navigation program; AE = adult emergency; H = hospitalization.

^{*}Pearson's chi-square test.

Table 2. Multivariate logistic regression with estimates of relative risk and confidence intervals (95% CI) for the dependent variable "complete treatment". Porto Alegre, RS, Brazil, 2022 and 2023.

Complete treatment			
Variables	Category	Relative risk (95% CI)	P-value
Sex	Female	0.96 (0.63-1.45)	0.84
	Male (ref.)	-	-
Age (years)	-	1.0 (0.99-1.02)	0.52
Educational level	None	0.81 (0.24-2.64)	0.72
	Up to 8 years	0.97 (0.43-2.14)	0.94
	9-12	0.99 (0.44-2.22)	0.72
	Over 12 years (ref.)	-	-
Cancer etiology	Bladder	0.99 (0.27-3.64)	0.99
	Head and neck	0.89 (0.47-1.69)	0.73
	Anal canal	1.09 (0.52-2.26)	0.82
	Cervix	1.05 (0.49-2.23)	0.89
	Esophagus	0.93 (0.45-1.92)	0.85
	Lungs (ref.)	-	-
Length of stay (days)	-	0.99 (0.88-1.12)	0.95
AE care	-	1.25 (0.88-1.77)	0.21
Hospitalization	-	1.05 (0.75-1.47)	0.75

ref = reference; AE = adult emergency.

Table 3. Comparison of the number of consultations in the navigation program per outcome evaluated. Porto Alegre, RS, Brazil, 2022 and 2023.

NP consultations	Outcome							
	Complete treatment		P-value	AE care		P-value	Hospitalization	
	Yes (n=100)	No (n=12)		Yes (n=35)	No (n=77)		Yes (n=37)	No (n=75)
<4	29 (29)	4 (33.3)	0.03	9 (25.7)	24 (31.2)	0.14	8 (21.6)	25 (33.3)
=4	29 (29) ^a	2 (16.7)		14 (40)	17 (22.1)		18 (48.6)	13 (17.3)
>4	42 (42)	6 (50)		12 (34.3)	36 (46.8)		11 (29.7)	37 (49.3) ^a

NP = navigation program; AE = adult emergency; H = hospitalization.
Values expressed in absolute and relative numbers.

^aPearson's chi-squared test with residuals.

DISCUSSION

The effectiveness of the navigation program for cancer patients in this study was not entirely evident, seeing as despite the practical improvement of results associated to the success of the treatment recommended and the lower usage of emergency and hospitalization services, we did not find a robust association that showed its efficacy. Nevertheless, this analysis is crucial to subsidize the use of SUS resources in the care to cancer patients, reducing the obstacles that may harm their treatment and reducing health system costs.

This study is the first to evaluate an NP for patients in the public sector of SUS in Brazil. Other studies have described its implementation for patients in the supplementary health system^(9,14–15). The NP is in line with the goals of SUS, such as to ensure that access to health resources is more equal. Still, its implementation in public institutions faces difficulties due to the complexity of the health system. However, this is not only a national problem, since the planning of successful and sustainable NPs is still a challenge for many health systems around the world^(19–20). Literature recommends that certain aspects should be considered for the implementation or expansion of NPs, such as knowing the population and defining a target-audience, paying particular attention to the more vulnerable and high-risk patients⁽²⁰⁾ in the different stages of

cancer. This includes prevention, early detection, diagnosis, treatment, survival, and palliative or end-of-life care⁽¹⁰⁾.

The institution where this research took place decided to develop an NP for patients who were under chemoradiotherapy, regardless of the etiology of their cancer. Other studies about NPs usually have, as their target audience, patients with specific diagnosis per organ, such as breast^(9,21) and esophagus⁽¹³⁾, or per body region/system, such as head and neck⁽⁹⁾, without specifying an oncological type of treatment. The choice of concomitant treatments as an inclusion criteria was important since this is a complex modality of treatment, being associated to lower adherence, high toxicity, and worse adverse effects. The protocol of chemoradiotherapy requires patients to be attentive and follow the rules to be in the simultaneous sessions with no delay, but there are often interruptions to treatment⁽⁷⁾. Thus, evaluating the completeness of the simultaneous treatment was essential to evaluate the implementation of the NP in the institution that was the setting of this investigation.

This study found that nearly 60% of patients managed to complete their treatment in the period before the NP. However, there was a significant increase of 35.3% in the percentage of complete treatments after the program was implemented. Although the multivariate analysis results did not reach a statistical significance for the outcome “complete

treatments", study data suggest a positive impact on care practice.

Cancer patients deal with several obstacles to access the health network and the technological resources for cancer treatment. This is especially true in SUS, and can have a negative impact in the rates of complete treatments^(3-4,22). Data from this investigation suggest that the work of the navigator nurse increased the ability to finish the work proposed, corroborating the results of a systematic review with analysis that found that the management of cases by nurses improved the rate of complete treatment in cancer patients⁽²³⁾. This may be explained by the fact that navigators evaluate and eliminate access barriers, helping patients and caregivers understand and use the health system in a more effective and efficient manner⁽²⁴⁾.

The secondary outcomes evaluated show how necessary the resources of the SUS are for cancer patients. There was a high number of unplanned hospitalizations and visits to emergency services. Before the NP, the percentage of patients who had to make unplanned use of emergency and hospitalization services was above 50%. This finding corroborates other studies, which found that there is a high risk of emergency unit visits and hospitalization in patients under concomitant cancer treatments⁽²⁵⁻²⁶⁾. A randomized clinical trial carried out in seven countries evaluated different dosages in chemoradiation for patients with cervical cancer. Nearly one third of patients presented with toxicity, requiring medical interventions to correct this disorder⁽²⁵⁾. In a North-American cohort of head-and-neck cancer patients, those treated with chemoradiotherapy were more likely to need unplanned hospitalizations and visits to emergency units⁽²⁶⁾. It was found that the chemoradiotherapy treatments present a significant risk to patients, reiterating the need to manage toxicity and adverse effects to avoid unnecessary morbidity, and NPs are promising in this regard.

In this study, the implementation of the NP brought a significant reduction of 38% in the search for care in emergency, in addition to a 42% drop in hospitalizations. Moreover, there was a significant reduction in the median length of stay of hospitalized patients. Other studies also showed that hospitalizations and visits to emergency services decreased after the NP was implemented in frequent health service patients, indicating potential cost-effectiveness benefits⁽²⁷⁻²⁸⁾.

The navigation approach provides patients with a constant line of communication, relieving psychosocial suffering, clarifying doubts, collecting additional information, and helping patients adhere to treatment. Therefore, by constantly monitoring patients, it becomes possible to detect signs and symptoms of potential adverse events that a patient may be experiencing during their treatment, making it possible

to refer these patients and provide early interventions in a timely manner, avoiding complications and extra costs to the health system⁽²⁹⁾ and providing patients, services, and the health system with an outstanding feature in the quality of assistance⁽³⁰⁾. Thus, the potential role of good health care practices in nursing stand out in the promotion of a better quality of life for cancer patients, including the provision of valuable clinical information, which helps improve patient management and care.

Finally, this study allowed noting that the number of consultations provided by the navigator nurse may influence the percentage of complete treatments and hospitalizations. There is no consensus in literature in regard to the frequency of meetings between navigator and patient, which vary from 1 to 18 meetings, with a weekly, monthly, or necessity-based frequency⁽¹⁰⁾.

There are tools to help navigators plan the number of meetings, such as the Navigation Needs Assessment Scale (NNAS), which highlights those who need to enter the program, categorize them in more or less intense navigation levels, and helps make the NP possible in regard to the physical and financial resources of the service⁽³¹⁾. The content validity of this scale was reviewed by specialists⁽³¹⁾, but it did not describe psychometric properties, and further research is necessary to verify the evidence of its validity, based on the internal structure and relationships with external variables.

This study has some limitations. First, this is an observational study, and factors unaccounted for may have influenced care in the period considered. Second, as this was a retrospective research, it is important to consider a risk of selection bias, information bias, and residual confounding factors, which are especially relevant in retrospective studies with secondary data, such as this one. Third, there is a risk of temporal bias, considering that there may have been previous institutional changes in addition to the implementation of the program, and changes in financial and human resource allocation, in referral numbers and health care practices over time, which may not have been possible to assess or control in this study. Fourth, the secondary outcomes considered only the use of emergency services and hospitalizations in the institution being investigated, which means we could not ascertain whether resources from other services in the health network were used. This limitation is an information bias, and may have impacted the measurement of the outcomes.

The application of these results to other institutions may be limited, since the components of an NP program may vary significantly between services. Finally, the lack of statistical significance in the adjusted analysis of the main result stands out, but the confidence interval suggests that the magnitude of the effect may vary considerably. These

findings show the need to conduct a study with a larger sample size or different design, in order to detect a relevant effect. Nevertheless, this study contributes to advance scientific knowledge and gives support to the implementation of models of navigation or to the improvement of existing services in other SUS institutions.

We presume this study has the potential to contribute to public health findings, seeing as its results suggest that navigation activities for cancer patients in chemoradiotherapy treatment may improve the quality of care, reducing obstacles to their access and, thus, enabling better health outcomes. Furthermore, our findings may support the formulation or improvement of health strategies and policies to implement NP to ensure appropriate treatment, reducing the influence of social inequality in cancer care in the Brazilian health system. Future research is necessary, using different sample sizes and designs to investigate how effective patient navigation is. It would also be interesting to consider other cancer stages, such as diagnosis and early detection, and other types of treatment.

■ CONCLUSION

The effectiveness of the navigation program for cancer patients was not entirely proven in this study, seeing as despite improvements in practical results related to treatment success, and a decrease in the use of emergency services and hospitalizations, there was not a significant association in the multivariate analysis that could prove its effectiveness. Patients in the NP who met with navigator nurses four times showed a higher percentage of completed treatments, while those who met with them more than four times showed a lower percentage of hospitalizations.

■ REFERENCES

1. Bamodu OA, Chung CC. Cancer care disparities: overcoming barriers to cancer control in low- and middle-income countries. *JCO Glob Oncol*. 2024;10:e2300439. <https://doi.org/10.1200/GO.23.00439>
2. Instituto Nacional de Câncer (Inca). Estimativa 2023: incidência de câncer no Brasil [Internet]. Rio de Janeiro: INCA; 2022 [cited 2025 May 28]. Available from: <https://www.inca.gov.br/publicacoes/livros/estimativa-2023-incidencia-de-cancer-no-brasil>
3. Souza MC, Trindade KF, Neves BP, Borges JCS, Souza JN, Santos MPS. Itinerários terapêuticos produzidos por mulheres na busca pelo acesso ao diagnóstico e cuidado no câncer de mama. *Saúde Redes*. 2022;8(3):239-51. <https://doi.org/10.18310/2446-4813.2022v8n3p239-251>
4. Lopes VAS. Acesso e continuidade assistencial na atenção ao câncer de colo de útero. *Soc Deb*. 2021;27(2):231-43. <https://doi.org/10.47208/sd.v27i2.2901>
5. Temporão JG, Santini LA, Santos ATC, Fernandes FMB, Zoss WP. Desafios atuais e futuros do uso da medicina de precisão no acesso ao diagnóstico e tratamento de câncer no Brasil. *Cad Saúde Pública*. 2022;38(10):e00006122. <https://doi.org/10.1590/0102-311XPT006122>
6. Pires JM, Rodrigues AB, Alencar MMSC, Castro RCMB. Oncologic patient navigation by nurses: a scoping review. *Rev Rene*. 2024;25:e94027. <https://doi.org/10.15253/2175-6783.20242594027>
7. Bonomi M, Blakaj DM, Sher D, Kabarriti R, Colvett K, Takiar V, et al. RRx-001 Affects multiple toxicities in patients receiving concomitant chemoradiation for head and neck cancers: observations of the PREVLAR Phase II Trial. *JCO Oncol Adv*. 2024;1:e2400021. <https://doi.org/10.1200/OA.24.00021>
8. Freeman HP. The origin, evolution, and principles of patient navigation. *Cancer Epidemiol Biomarkers Prev*. 2012;21(10):1614-7. <http://doi.org/10.1158/1055-9965.epi-12-0982>
9. Pautasso FF, Trevilato DD, Caregnato RCA, Floriani MA, Pertile NM, Pizzol Junior AD, et al. The path to implementing a patient navigation program in oncology: an experience report. *Online Braz J Nurs*. 2024;22(Suppl 2):e20246691. <https://doi.org/10.17665/1676-4285.20246691>
10. Chan RJ, Milch VE, Crawford-Williams F, Agbejule OA, Joseph R, Johal J, et al. Patient navigation across the cancer care continuum: an overview of systematic reviews and emerging literature. *CA Cancer J Clin*. 2023;73(6):565-89. <https://doi.org/10.3322/caac.21788>
11. Conselho Federal de Enfermagem (Cofen). Resolução Cofen-735/2024. Normatiza a atuação do enfermeiro navegador e do enfermeiro clínico especialista [Internet]. 2024 [cited 2025 Mar 28]. Available from: <https://www.cofen.gov.br/resolucao-cofen-no-735-de-17-de-janeiro-de-2024/>
12. Lima FC, Sagica TP, Correa Júnior AIS, Santana ME. Patient navigation by nurses in the context of head and neck neoplasms: an integrative review. *Aquichan*. 2025;25(1):e2512. <https://doi.org/10.5294/aqui.2025.25.1.2>
13. Arora N, Lo M, Hanna NM, Pereira J, Digby G, Bechara R, et al. Influence of a patient navigation program on timeliness of care in patients with esophageal cancer. *Cancer Med*. 2023;12(10):11907-14. <https://doi.org/10.1002/cam4.5882>
14. Siqueria SWA, Mattiello DP, Pautasso FF, Caregnato RCA. Private health plan operator: breast care navigation program and care line. *Texto Contexto Enferm*. 2023;32:e20230159. <https://doi.org/10.1590/1980-265X-TCE-2023-0159en>
15. Pecoraro JP, Fuly PSC. Patient profile navigated by nurses: time interval for start of treatment. *Cogitare Enferm*. 2024;29. <https://doi.org/10.1590/ce.v29i0.96761>
16. Fletcher GS. Epidemiologia clínica: elementos essenciais. 6. ed. Porto Alegre: Artmed; 2021.
17. Oh J, Ahn S. Effects of nurse navigators during the transition from cancer screening to the first treatment phase: a systematic review and meta-analysis. *Asian Nurs Res*. 2021;15(5):291-302. <https://doi.org/10.1016/j.anr.2021.10.001>
18. Borges RB, Mancuso ACB, Camey SA, Leotti VB, Hirakata VN, Azambuja GS. Power and sample size for health researchers: uma ferramenta para cálculo de tamanho amostral e poder do teste voltado a pesquisadores da área da saúde. *Clin Biomed Res*. 2021;40(4):247-53. <https://doi.org/10.22491/2357-9730.109542>
19. Pratt-Chapman ML, Silber R, Tang J, Le PT. Implementation factors for patient navigation program success: a qualitative study. *Implement Sci Commun*. 2021;2(1):141. <https://doi.org/10.1186/s43058-021-00248-0>
20. Ver Hoeve ES, Simon MA, Danner SM, Washington AJ, Coples SD, Percac-Lima S, et al. Implementing patient navigation programs: considerations and lessons learned from the Alliance to Advance Patient-Centered Cancer Care. *Cancer*. 2022;128(14):2806-16. <https://doi.org/10.1002/cncr.34251>

21. LeClair AM, Battaglia TA, Casanova NL, Haas JS, Freund KM, Moy B, et al. Assessment of patient navigation programs for breast cancer patients across the city of Boston. *Support Care Cancer*. 2022;30(3):2435-43. <https://doi.org/10.1007/s00520-021-06675-y>
22. Santos Salas A, Bassah N, Pujadas Botey A, Robson P, Beranek J, Iyiola I, et al. Interventions to improve access to cancer care in underserved populations in high income countries: a systematic review. *Oncol Rev*. 2024;18:1427441. <https://doi.org/10.3389/or.2024.1427441>
23. Wu YL, Padmalatha KMS, Yu T, Lin YH, Ku HC, Tsai YT, et al. Is nurse-led case management effective in improving treatment outcomes for cancer patients? a systematic review and meta-analysis. *J Adv Nurs*. 2021;77(10):3953-63. <https://doi.org/10.1111/jan.14874>
24. Varanasi AP, Burhansstipanov L, Dorn C, Gentry S, Capossela MA, Fox K, et al. Patient navigation job roles by levels of experience: Workforce Development Task Group, National Navigation Roundtable. *Cancer*. 2024;130(9):1549-67. <https://doi.org/10.1002/cncr.35147>
25. Mileschkin LR, Moore KN, Barnes EH, Gebiski V, Narayan K, King MT, et al. Adjuvant chemotherapy following chemoradiotherapy as primary treatment for locally advanced cervical cancer versus chemoradiotherapy alone (OUTBACK): an international, open-label, randomised, phase 3 trial. *Lancet Oncol*. 2023;24(5):468-82. [https://doi.org/10.1016/S1470-2045\(23\)00147-X](https://doi.org/10.1016/S1470-2045(23)00147-X)
26. Moore ZR, Pham NL, Shah JL, Nedzi L, Sumer BD, Day AT, et al. Risk of unplanned hospital encounters in patients treated with radiotherapy for head and neck squamous cell carcinoma. *J Pain Symptom Manage*. 2019;57(4):738-45.e3. <https://doi.org/10.1016/j.jpainsymman.2018.12.337>
27. Horyna TJ, Jimenez R, McMurry L, Buscemi D, Cherry B, Seifert CF. An evaluation of interprofessional patient navigation services in high utilizers at a county tertiary teaching health system. *J Healthc Manag*. 2020;65(1):62-70. <https://doi.org/10.1097/JHM-D-19-00123>
28. Kelley L, Capp R, Carmona JF, D'Onofrio G, Mei H, Cobbs-Lomax D, et al. Patient Navigation to Reduce Emergency Department (ED) Utilization Among Medicaid Insured, Frequent ED Users: a randomized controlled trial. *J Emerg Med*. 2020;58(6):967-77. <https://doi.org/10.1016/j.jemermed.2019.12.001>
29. Oliveira TB, Fontes DMN, Montella TC, Lewgoy J, Dutra C, Miola TM. The Best Supportive Care in Stage III Non-Small-Cell Lung Cancer. *Curr Oncol*. 2023;31(1):183-202. <https://doi.org/10.3390/curroncol31010012>
30. Pautasso FF, Zelmanowicz AM, Flores CD, Caregnato RCA. Atuação do Nurse Navigator: revisão integrativa. *Rev Gaúcha Enferm*. 2018;39:e2017-0102. <https://doi.org/10.1590/1983-1447.2017-0102>
31. Pautasso FF, Lobo TC, Flores CD, Caregnato RCA. Nurse Navigator: development of a program for Brazil. *Rev Latino-Am Enfermagem*. 2020;28:e3275. <https://doi.org/10.1590/1518-8345.3258.3275>

■ Data and Materials Availability

The data can be accessed via request to the corresponding author.

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