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Cost-effectiveness analysis of the oncology patient navigation program at a referral cancer center for colorectal tumor treatment

Análise de custo-efetividade do programa de navegação de pacientes oncológicos em um centro oncológico de referência para tratamento de tumor colorretal

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ABSTRACT

Objective: To evaluate the financial impact and effectiveness of a navigation program in patients with colorectal tumors undergoing videolaryngoscopic rectosigmoidectomy. **Material and Methods:** Retrospective, case-control type study from May 2019 to December 2020 with patients 18 years-old or older; with sigmoid, retosigmoid junction or upper rectal tumors, submitted to elective laparoscopic sigmoidectomy or high anterior resection with high colorectal anastomosis. The main endpoints were: costs during the patients pathway; interval between first appointment and surgery; use of unit of intensive care (ICU) or not; use of emergency room after discharge. Categorical variables were compared by chi-square test, Fisher's exact test, and Mann-Whitney. **Results:** 71 patients, with 49 (69%) not navigated and 22 (31%) navigated. In the diagnostic stage, navigated patients were more referred to physical therapy (81.8% vs. 46.9%, p=0.013) and nutrition specialist (81.8% vs. 57, p=0.081) and performed more diagnostic tests according to the institutional protocol (86.4% vs. 75.5%), contributing with an average revenue per patient 90% higher, p=0.01). The mean time from first visit to surgery, although shorter, had no statistical difference (26 vs. 28 days, p=0.794), as well as the length of stay (5.3 vs. 8.2, p=0.082) and visits to the emergency room within 30 days after discharge (18% vs. 22%, p=1.0). However, the percentage of patients in ICU was 73.8% lower in navigated patients (34.7% vs. 9.1%, p=0.05). 4.5% of navigated patients were cost-outliers vs. 36.5% of non-navigated patients, p=0.05. This resulted in a 18.5% lower cost of surgery and a 16% cheaper journey compared to the non-navigated patients. **Conclusion:** Navigated patients on oncology treatment have lower costs along the journey and better outcomes with shorter ICU stays, as well as more compliant with institutional protocols.

Keywords: Patient navigation; Neoplasms; Gastrointestinal neoplasms; Nursing care; Cost-effectiveness evaluation.

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RESUMO

Objetivo: Avaliar o impacto financeiro e a eficácia de um programa de navegação de pacientes com tumores colorretais submetidos à retossigmoidectomia videolaringoscópica. **Material e Métodos:** Estudo retrospectivo, tipo caso-controle, de maio de 2019 a dezembro de 2020, com pacientes maiores de 18 anos; com tumores de sigmóide, junção retossigmóide ou reto superior, submetidos à sigmoidectomia laparoscópica eletiva ou ressecção anterior alta com anastomose colorretal alta. Os principais *endpoints* foram: custos durante o percurso do paciente; intervalo entre a primeira consulta e a cirurgia; uso de unidade de terapia intensiva (UTI) ou não; utilização do pronto-socorro após a alta. As variáveis categóricas foram comparadas pelo teste qui-quadrado, teste exato de Fisher e Mann-Whitney. **Resultados:** 71 pacientes, sendo 49 (69%) não-navegadores e 22 (31%) navegadores. Na fase diagnóstica, os pacientes navegadores foram mais encaminhados para fisioterapia (81,8% vs. 46,9%, p=0,013) e nutricionista (81,8% vs. 57, p=0,081) e realizaram mais exames diagnósticos de acordo com o protocolo institucional (86,4% vs. 75,5%), contribuindo com uma receita média por paciente 90% maior, p=0,01). O tempo médio desde a primeira visita à cirurgia, embora menor, não apresentou diferença estatística (26 vs. 28 dias, p=0,794), assim como o tempo de permanência (5,3 vs. 8,2, p=0,082) e visitas à emergência até 30 dias após a alta (18% vs. 22%, p=1,0). No entanto, a porcentagem de pacientes em UTI foi 73,8% menor em pacientes navegadores (34,7% vs. 9,1%, p=0,05). 4,5% dos pacientes navegadores tiveram valores atípicos vs. 36,5% dos pacientes não-navegadores, p=0,05. Isso resultou em um custo de cirurgia 18,5% menor e uma jornada 16% mais barata em comparação com os pacientes não-navegadores. **Conclusão:** Pacientes navegadores em tratamento oncológico apresentam menores custos ao longo da jornada e melhores resultados, com menor tempo de permanência na UTI, além de maior adesão aos protocolos institucionais.

Descritores: Navegação do paciente; Neoplasias; Neoplasias gastrointestinais; Cuidados de enfermagem; Avaliação de custo-eficácia.

INTRODUCTION

The concept of patient navigation emerged in 1990 with the physician Harold Freeman, in New York - United States. The original model had a greater focus of action by the navigators in the period called "critical window", which consists of the suspicion of disease, diagnostic confirmation, and the phases of treatment. Later, the role of the navigator emerged to promote the reduction of barriers related to access to health care, being these social, financial, cultural, bureaucratic, and psychological barriers. In this context, navigation could enhance the access and permanence of patients in health services.[1]

The term navigation makes an analogy that relates the patient to a "ship", so the navigator is the individual who guides/ships the patient in the different services and stages of the journey. Over the years, the navigation models have been improved and expanded, contemplating the navigator's intervention and follow-up during the entire patient's treatment trajectory, from the prevention and diagnosis phases to treatment, survival, and end-of-life care.[1,2]

In Brazil, with the publication of the OncoRede manual in 2016 by the National Supplementary Health Agency (ANS), the navigator is entitled as the assistant of care and his/her performance contemplates an effective strategy to improve patient adherence in all phases of treatment, through the coordination of care structured by protocols and integrated clinical journeys guided by anatomical topographic site and by stages of treatment.[3]

The navigation supports several steps of the patient's journey. In the United States it is mainly directed to oncology patients, especially in diagnoses such as colorectal cancer, which contemplates multidisciplinary therapeutic strategies.[4] Colorectal cancer is evidenced as one of the leading causes of death by cancer in developed countries, and its incidence is associated with habits of low quality diet and nutrition, lack of physical activity, and hereditary factors such as Lynch's syndrome (autosomal disease resulting from the mutation of the gene responsible for the DNA repair system). According to the *Instituto Nacional do Câncer* (INCA), in Brazil, the estimate for new cases of colon and rectum cancer was 41,010 cases in 2020; as for incidence, it is classified as the second type of primary tumor in men and women.[5]

The navigation of patients with colorectal cancer presents different challenges in the oncological treatment journey. The diagnostic and staging phase is of fundamental importance for the correct therapeutic plan design, and the navigator is an important link in the follow-up, guidance, and coordination with other members of the health team, in order to eliminate barriers that may hinder access to these professionals, allowing the patient to enter the appropriate treatment modality as early as possible.[6]

Surgical treatment in the field of colorectal cancer encompasses a range of complex procedures that has recommendations from the preoperative preparation until the transoperative period that leads to various restrictions and management in the immediate and late postoperative period. With the growing need for modification of this practice and aiming at the best practices of care in this scenario, was instituted the protocol for early recovery in colorectal surgery.[7]

The protocol for early recovery in colorectal surgery comprehends a series of evidence-based conducts with the purpose of reducing surgical stress, maintenance of physiological functions and optimized early recovery of patients. The protocol begins on the preoperative phase when the patient is referred by the medical team to the multidisciplinary team composed of: nutritionists, for nutritional risk assessment and dietary guidance; physiotherapists, for physical assessment and exercise plan during the preoperative days, immediate postoperative and later; and nurses, for prior marking of stoma and guidance on postoperative care and rehabilitation.[7]

In a study conducted in 21 primary care medical centers in Washington, USA with nurse navigators and colorectal cancer patients, it was investigated whether nurse navigator performance increased colonoscopy completion in patients with positive colon cancer screening tests, with 70 patients in each group. Although the statistical differences were not significant (91.0% in the navigator group *vs.* 80.8% in the non-navigator group; adjusted difference, 10.1%; *p*=0.10), without the navigator, 56 patients completed the investigation (performance of colonoscopy) and 64 accompanied by the navigator completed the investigation.[8]

In another American study, it was evaluated if the intervention/support of the nurse navigator influences the improvement of quality of life during treatment for patients with initial diagnosis of breast, colorectal and lung cancer and concluded that there were significant differences, and the group assisted by navigation had higher quality of life scores and scored fewer problems related to care (psychological assistance, care coordination, and information). This same study concluded that the cumulative costs after diagnosis did not differ significantly between the groups, but were $6,852 less among the navigated patients.[9]

To demonstrate the effectiveness of navigation, as previously highlighted, the cost- effectiveness analysis is essential in order to join efficiency in the allocation of resources, incorporate the scientific evidence of new technologies in decision making facing therapeutic alternatives, and has great prominence in the formulation of budgets for health resources.[10]

The cost-effectiveness evaluation has shown itself to be an important ally in this process and aims to systematically determine the relationship between cost, benefit, and value of health interventions. In this type of analysis, costs are confronted with clinical outcomes in order to understand the impact of different alternatives, identifying the best strategy with the best results in exchange for a lower cost.[10]

In this aspect, the cost-effectiveness analysis becomes a fundamental tool to evaluate and compare therapeutic options always aiming at the best outcome at the lowest cost, corroborating for an adequate allocation of resources, identifying the best alternatives between cost, quality and efficiency of technologies.[10]

Patient navigation has proven to be an important tool in the treatment of cancer patients with colorectal cancer. Thus, knowing the financial impact, correlating the performance of navigation as a cost-effective tool, is extremely valuable to understand the performance of these professionals in cancer patient care as a conditioning factor to reduce the incidence of complications during treatment and adherence to cancer treatment by patients.

This article aims to evaluate the financial impact and effectiveness of a navigation program for oncology patients with colorectal tumors undergoing videolaryngoscopic rectosigmoidectomy and validate the effectiveness of the performance of navigation against the fulfillment of the clinical operational guided by tumor site as a conditioning factor for lower incidence of intra and postoperative complications.

MATERIAL AND METHODS

This is a retrospective, case-control type study, with a quali-quantitative approach to data, carried out at A.C.Camargo Cancer Center, located in the city of São Paulo - São Paulo, Brazil. The analysis was performed in the period between May 2019 and December 2020.

The choice for study participants was obtained by analyzing the data contained in the electronic medical records at the institution of patients who underwent surgical treatment for colorectal cancer. Patients who were followed at the Colorectal Tumor Reference Center with the ICD diagnoses (International Classification of Diseases) - C18: malignant colon neoplasm; C19: malignant neoplasm of the rectal junction; and C20: malignant rectal neoplasm were included.

The inclusion criteria were patients with 18 years-old or older; with sigmoid, retosigmoid junction or upper rectal tumors, submitted to elective laparoscopic sigmoidectomy or high anterior resection with high colorectal anastomosis. We excluded patients submitted to total mesorectal excision; patients submitted to neoadjuvant radiation therapy; patients which accounts were insured by the public health system; patients with previous urgent diverting stoma.

The main endpoints were: financial income in different moments (diagnosis between 60-0 days before surgery, surgical hospitalization, between 1-30 days after discharge and between 30-90 days after discharge); interval between first appointment and surgery; use of unit of intensive care (ICU) or not; use of emergency room after discharge. Financial income was presented in reais, Brazilian currency.

Data was collected through the extraction of reports containing the variables studied. After analysis and filtering of the content, the data was transcribed and tabulated in a database in Microsoft Office Excel®. The variables surveyed were: comorbidities reported, risk habits (smoking and alcoholism), ASA (American Society of Anesthesiologists) physical status classification, average cost per patient, postoperative clinical outcome with follow-up to ward or need for admission to ICU (intensive care unit) and referrals to multidisciplinary support team (nutrition and physiotherapy) preoperatively.

Initially, a descriptive analysis of the variables was performed, in which the absolute (n) and relative (%) frequency distributions for the qualitative operational variables were presented; for the statistical analysis, the chi-square test or Fisher's exact test when appropriate and the Mann-Whitney test were used. Data was analyzed by the SPSS program and *p*-values <0.05 were considered significant.

This research was preceded by the approval of the research ethics committee, number 4.841.365 of the Antonio Prudente Foundation, in accordance with the guidelines and standards governing research with human beings, Resolution CNS No. 466/12 (National Health Council, 2012).

The data collected was kept confidential in accordance with the Access to Information Law - Law No. 12,127 - of November 18, 2011, and the disclosure of data, in whole or in part, is guided only for purposes of scientific development.

For financial analysis, revenue values were compared between patient groups and taken for statistical analysis. The comparative values were shown in this study in percentages to ensure institutional confidentiality of the commercial agreements negotiated.

RESULTS

A total of 71 patients undergoing laparoscopic rectosigmoidectomy were analyzed for this study, with 49 (69%) patients not navigated and 22 (31%) patients navigated. Only 8.2% of patients who did not navigate were smokers and 2% were alcoholics (Table 1). In addition to having a similar journey treatment, the classification of physical status and anesthetic risk recommended by the American Society of Anesthesiologists (ASA) was applied to all patients, and the navigated and non-navigated groups had homogeneous distributions (*p*=0.38), enabling statistical comparison between groups.

In the diagnostic stage, evaluated during the 60-day period prior to laparoscopic rectosigmoidectomy, it was identified that navigated patients are referred more to physical therapy 81.8% (n=18) *versus* 46.9% (n=23) of those not navigated (*p*=0.013).

These same patients were more referred to a nutrition specialist 81.8% (n=18) *versus* 57.1% (n=28), (*p*=0.081).

At this stage, navigated patients performed more diagnostic tests at A.C.Camargo 86.4% (n=19) *versus* 75.5% (n=37) of non-navigated patients. Only 86% (n=36) of the non- navigated patients attended all preoperative appointments required for surgical preparation, while 100% (n=22) of the navigated patients attended the appointments.

Another point evaluated was that only 10% (n=4) of non-navigated patients underwent evaluation by stomal therapist nurses and 100% (n=22) of navigated patients had the evaluation of this specialty.

Examination performed by all patients during the diagnostic phase was analyzed and 100% (22) of the navigated patients performed at least one institutional protocol examination, compared to 88.8% (43) of the non-navigated.

Table 1. Characteristics of navigated and non-navigated patients (N=71).

Characteristic	Non-navigated	Navigated	p for difference between groups
Total	49	22	
Smoking			
Non-smoker	45(91,8%)	22(100%)	0,30
Smoker	4(8,2%)	0(0%)	
Alcoholism			
Non-ethylist	48(98,0%)	22(100%)	1,0
Ethylist	1(2,0%)	0(0%)	
ASA			
1	9(18,4%)	6(27,3%)	
2	33(67,3%)	11(50,0%)	0,38
3	7(14,3%)	5(22,7%)	
Comorbidities			
Hypertension	21(42,9%)	5(22,7%)	0,17
Type 2 diabetes	6(12,2%)	4(18,2%)	0,49
Coronary disease	4(8,2%)	0(0,0%)	0,30
Heart failure	3(6,1%)	0(0,0%)	0,55

The average financial revenue per patient generated from protocol diagnostic tests in navigated patients was 90% higher than in non-navigated patients, with *p*=0.01.

The time from first visit to surgery between navigated and non-navigated patients had similar mean times 27.9 days for non-navigated and 25.91 days for navigated, *p*=0.794 (Table 2).

In the surgical stage we evaluated the length of hospital stay, and the mean hospital stay was 5.3 days for patients who had been navigated and 8.2 days for those who had not, with a median of five days for both groups, without statistical differences (*p*=0.082). The maximum length of stay for non-navigated patients was 23 days, while for navigated patients it was 13 days.

Overall, 19 patients (26.8%) stayed in the ICU during surgical admission, but the percentage of patients in the ICU was 73.8% lower in navigated patients (34.7% of non- navigated patients and 9.1% of navigated patients), *p*=0.05.

During the analysis, the 20% patients who were most expensive during their hospitalization were considered outliers. Of these, only 7% of outliers were navigated patients, *versus* 93% in non-navigated patients (4.5% of navigated were outliers *vs.* 36.5% of non-navigated), *p*=0.05.

This resulted in 18.5% lower payment for surgery in navigated patients, although this value had no statistical difference (*p*=0.921).

When we analyzed the 30-day post-surgery discharge period, the volumetry of patients who came to the hospital emergency room corresponded to 4 (18%) of the navigated patients compared to 10 (22%) of the non-navigated patients, *p*=1.0.

Analyzing the revenue of the two patient profiles between 60 days before surgery to 90 days post-surgery, it was observed that the patient who was accompanied by the navigation team had a 16% cheaper journey compared to the non-navigated patient, as can be seen in Graph 1.

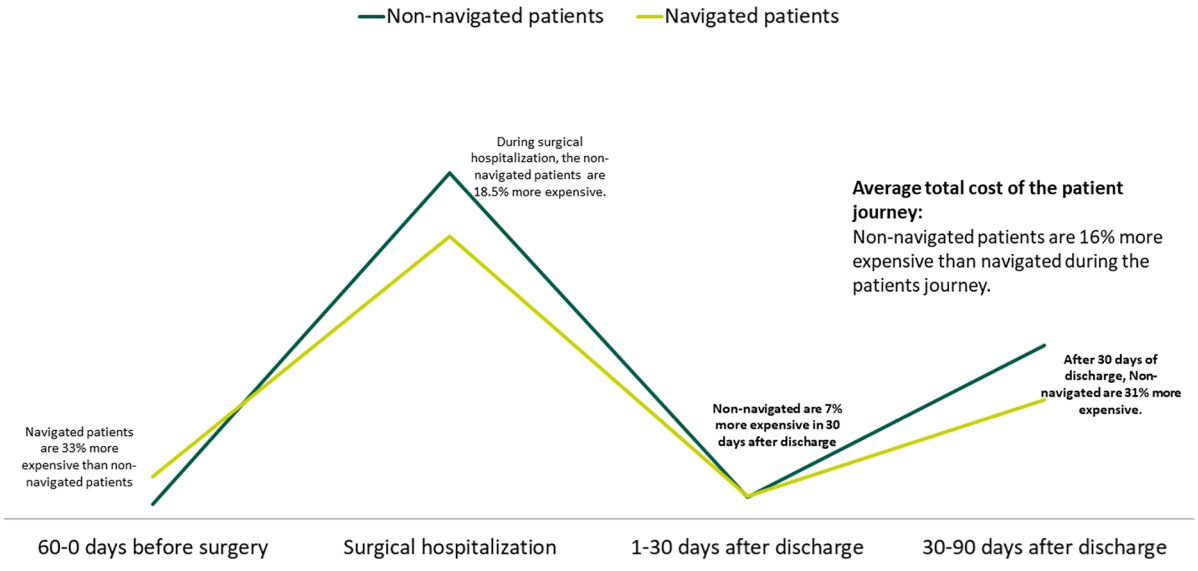
DISCUSSION

Oncologic treatment is characterized as one of the most complex and costly therapies in the interventional medical field due to the complexity of the disease. The therapeutic approaches are challenging and require a considerable contingent of materials, medical equipment and specialized human resources, which is not routinely employed for other non-oncologic clinical and surgical conditions due to the low complexity of the pathophysiological process of these other scenarios.[11]

It becomes a challenge to implement strategic tools that act together with the therapeutic process leading to reduced costs and maintaining the quality and effectiveness of treatments used in oncology. The navigation emerges as a tool in the management of the treatment of cancer patients, especially those with colorectal cancer, highlighting its performance mainly in the phase of diagnosis and staging where the need for agility and speed in this process are fundamental for the patient to enter the treatment phase with greater agility, increasing the rate of disease-free survival and reducing the rates of complications in the post-surgical period.[6,12]

Table 2. Time from first consultation to surgery in days (N=71).

	Mean	SD	Minimum	Maximum	*p*
Non-navigated	27,9	27,418	0	152	0,794
Navigated	25,91	19,605	9	100	



Graph 1. Mean revenue per patient during the patients' journey.

The stage of diagnosis and staging of the oncologic disease holds special attention due to the need for correct and adequate radiographic documentation of the tumor's characteristics. At this stage, the size, histological profile, presence of clinical complications (intestinal occlusion, enterorrhagia, and even intestinal loop rupture), and distant metastases are investigated. Thus, it is necessary that the indicated tests are performed in the shortest possible time and that the findings are well documented with the greatest possible clarity and quality.[11]

At this stage, the performance of the navigation system evidenced two important fronts, the first related to the strict compliance with the performance of imaging exams required for the diagnostic stage at the institution, thus facilitating the quick release of results and reports, enabling multidisciplinary discussion of the findings among the specialties involved in this process (surgeon and radiologist); and contributing effectively and assertively to the retention of financial revenue and patient loyalty to the institution.

In the post-surgical scenario, the results presented showed a lower rate of occupancy of ICU beds by navigated patients, to this result it is inferred that the monitoring of the nurse navigator in the identification of previous comorbidities, referral to the support specialties (physiotherapy, nutrition, endocrinology cardiology, and geriatrics) and in health education regarding the management of the control of such comorbidities in order to maintain the individual in a compensatory clinical state, stands out as an important factor for obtaining such a result, thus navigation stands out once again as a cost-effective tool for the oncological journey of colorectal tumors.[13]

In the post-surgical hospitalization, we also observed a shorter period of hospital stay by the navigated patients, with a shortening of the hospital stay in less 10 days if compared to the non-navigated patients. The nurse navigator as an active member of the clinical team, interfaces with all care and non-care teams of the institution, this link reflects in greater benefit to the patient, because it has a professional who follows and knows all the clinical and personal particularities of his/her condition, interfacing with the teams in order to rescue such singularities and enhancing the resoluteness of such demands directed to the appropriate professionals to solve the demands.[2]

In this scenario of hospitalization, the nurse navigator made weekly clinical visits to the patients, collecting their anxieties, doubts, and symptoms, and directing the specific demands to each member of the team, offering greater resoluteness in the demands mentioned by the patients, resulting in greater satisfaction and consequent clinical improvement in a timely manner evidenced by the shortening of the hospitalization period.

The early recovery protocol stands out as an important tool in clinical practice that enables the acceleration of the recovery process of patients who are directed to surgery as the initial treatment. The follow-up by the multidisciplinary team of nutrition, physiotherapy, and stomal therapy, demonstrated a direct impact on the improvement of the recovery rate of patients in the post-surgical period evidenced by the decrease in the average length of stay of the group of patients navigated and low admission to the intensive care unit.[7,14]

In the fulfillment of the early recovery protocol, the navigation developed an important role in ensuring the referral and scheduling for the necessary specialties, guiding patients and their families on the importance of evaluations, highlighting the benefits of following the protocol after surgical treatment, and also acting in the perspective of health education, highlighting and adapting language to the guidance provided and the necessary preparations.

Another important aspect in discussions about cost and effectiveness in oncology concerns the delivery of sustainable value in health that relates to the physical and clinical state that the individual who has undergone oncologic treatment is reinserted into society. In the ideal scenario, it is expected that the individual who underwent surgical oncologic treatment can return to his life activities without major difficulties or physical sequelae resulting from the treatment, thus, the best treatment should always be used aiming at the remission of the disease, but the physical and social aspects must be considered in the decision making of therapeutic interventions always aiming at the wellbeing of the cancer patient.[12]

Thus navigation participates in this sustainable delivery process through measures aimed at the best outcome: the analysis of barriers that can impact on the time of treatment initiation, support for the brief start of up-front treatment, coordination of the journey for adequate preoperative preparation by multiprofessional teams, aiming for the shortest hospitalization time.

The need to direct financial resources by health institutions and operators is a theme in strong evidence in the panorama of cost and effectiveness in Brazil and worldwide. The use of strategies that result in greater clinical benefits and lower financial costs is a constant search in all health scenarios. The results of this study allowed us to evaluate, at different moments of the oncologic treatment journey, that navigation constitutes a tool that meets these demands stipulated in the health market.

CONCLUSION

The support of navigation during the oncological treatment journey in colorectal cancer has proven to be an important tool allied to the treatment process.

The navigator helps the patient and family in the full accomplishment of the journey and assists post-treatment recovery always aiming at sustainable clinical and physical delivery in health.

The results of this study allowed us to infer that patients navigated in oncologic treatment contribute more to the revenue of the institution under analysis in the diagnostic phase and staging with the performance of tests in the institution, and these same patients showed lower costs against hospitalization, because they went less to ICU after surgery, and this result is related to proper compliance with the protocol for early recovery and adequate compensatory control of previous comorbidities, always aided and monitored by the navigator.

The small number of patients is a limitation of our study. A larger contingent of participants would allow us to investigate other variables of cost *versus* surgical treatment for colorectal cancer to ensure navigation as an effective strategy in the oncologic treatment process.

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AUTHORS' CONTRIBUTIONS

JRS	Collection and assembly of data, Conception and design, Data analysis and interpretation, Final approval of manuscript, Manuscript writing, Provision of study materials or patient
CFA	Conception and design, Final approval of manuscript, Manuscript writing
LFZ	Collection and assembly of data, Conception and design, Manuscript writing, Provision of study materials or patient
NMM	Collection and assembly of data, Conception and design, Data analysis and interpretation, Final approval of manuscript, Manuscript writing, Provision of study materials or patient
ECB	Collection and assembly of data, Provision of study materials or patient
SAJ	Conception and design, Data analysis and interpretation, Final approval of manuscript, Manuscript writing

REFERENCES

1. Freeman HP, Rodriguez RL. The history and principles of patient navigation. Cancer. 2011 Aug;117(15 Suppl):3539-42.
2. Pautasso FF, Zelmanowicz AM, Flores CD, Caregnato RCA. Atuação do *Nurse Navigator*: revisão integrativa. Rev Gaúcha Enferm. 2018;39:e2017-0102.
3. Agência Nacional de Saúde Suplementar (ANS). Projeto Oncorede: a (re)organização da rede de atenção oncológica na saúde suplementar [Internet]. Rio de Janeiro (RJ): ANS; 2016; [access in 2017 Apr 02]. Available from: https://www.ans.gov.br/images/stories/Materiais_para_pesquisa/Materiais_por_assunto/FINAL_publicacao_oncorede.pdf
4. Pautasso FF, Zelmanowicz AM, Flores CD, Caregnato RCA. Atuação do Nurse Navigator: revisão integrativa. Rev Gaúcha Enferm. 2018;39:e2017-0102. DOI: https://doi.org/10.1590/1983-1447.2018.2017-0102.4
5. Ministério da Saúde (BR). Instituto Nacional do Câncer (INCA). Estimativa 2020: incidência do câncer no Brasil. Rio de Janeiro (RJ): Ministério da Saúde/INCA; 2020.
6. Ibe J. Navigating patients with gastrointestinal cancer. Oncol Nurs Adv [Internet]. 2018 Jun; [access in 2022 May 04]. Available from: https://www.oncologynurseadvisor.com/home/headlines/conference-coverage/ona-vigation-summit-2018/navigating-patients-with-gastrointestinal-cancer/
7. Teixeira UF, Fontes PRO, Conceição CWN, Farias CAT, Fernandes D, Ewald IP, et al. Implementação do protocolo de recuperação otimizado após cirurgia Colorretal (ERAS): resultados iniciais da primeira experiência brasileira. Arq Bras Cir Dig. 2019;32(1):1-4.
8. Green BB, Anderson ML, Wang CY, Vernon SW, Chubak J, Meenan RT, et al. Results of nurse navigator follow-up after positive colorectal cancer screening test: a randomized trial. J Am Board Fam Med [Internet]. 2014 Nov/Dec; [cited 2016 Sep 02]; 27(6):789-95. Available from: https://www.ncbi.nlm.nih.gov/pubmed/25381076
9. Wagner EH, Ludman EJ, Bowles EJA, Penfold R, Reid RJ, Rutter CM, et al. Nurse navigators in early cancer care: a randomized, controlled trial. J Clin Oncol [Internet]. 2014; [cited 2016 Aug 29]; 32(1):12-8. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3867643/
10. Moraz G, Garcez AS, Assis EM, Santos JP, Barcellos NT, Kroeff LR. Estudos de custo-efetividade em saúde no Brasil: uma revisão sistemática. Ciênc Saúde Colet. 2015;20(10):3211-29.
11. Silva M, Errante PR. Câncer colorretal: fatores de risco, diagnóstico e tratamento. UNILUS Ensino e Pesquisa. 2017;13(33):133-40.
12. Aguiar Junior S, Oliveira MM, Silva DRM, Mello CAL, Calsavara VF, Curado MP. Survival of patients with colorectal cancer in a cancer center. Arq Gastroenterol. 2020;57(2):172-7.
13. Vogel VB, Morris HL, Muller K, Huo T, Parish A, Stoner D, et al. Cost-effectiveness of the wellness incentives and navigation (WIN) program. Value Health. 2020 Mar;24(3):361-8.
14. Texeira UF, Fontes PRO, Conceição CWN, Farias CAT, Fernandes D, Ewald IP, et al. Implementação do protocolo de recuperação otimizada após cirurgia colorretal (ERAS): resultados iniciais da primeira experiência brasileira. Arq Bras Cir Dig. 2019;32(1):1-4.