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Research Paper

Providing early access to geriatric oncology services in a regional cancer centre – A two-year experience in the establishment of a Geriatric Oncology Nurse Navigator Model

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ABSTRACT

Introduction: Older patients with cancer often face increased risks of adverse reactions and complications when undergoing systemic therapy. In 2020, the Townsville Cancer Centre in North Queensland established a nurse navigator led geriatric oncology service for patients aged 75 years and above referred for systemic therapy for solid organ malignancy. This study sought to evaluate the safety outcomes and trends in the administration of systemic therapy in older patients following the introduction of this service.

Materials and Methods: A retrospective study was conducted at a single centre, focusing on patients aged 75 years and above referred for chemotherapy or immunotherapy for solid organ malignancies. Patients referred after the implementation of the service were classified as the geriatric assessment cohort, while those referred before were categorized as the historical cohort. Outcome measures included unplanned hospital admissions, duration of hospital stays, rates of systemic therapy de-escalation, and frailty identified during geriatric assessments.

Results: The study included 129 patients, with 60 in the geriatric assessment cohort and 69 in the historical cohort. The geriatric assessment cohort exhibited a significant decrease in both the average number of hospital admissions per patient compared to the historical cohort (0.59 vs. 1.13, $p = 0.01$) and the average length of hospital stay (4.3 days vs. 6.7 days, $p = 0.04$). Rates of systemic therapy de-escalation were comparable between the two cohorts (47 % vs. 59 %, $p = 0.16$). Frailty was frequently identified during geriatric assessments, requiring intervention both before and during treatment.

Discussion: Our two-year observation of the nurse navigator-led geriatric oncology model suggests that it contributed to improved safety outcomes, leading to reductions in unplanned hospitalizations and lengths of hospital stays, without significant changes in the rates of de-escalated systemic therapy.

1. Introduction

Cancer treatment in older patients often entails an increased risk of treatment-related complications [1,2]. Conventional methods of evaluating suitability for systemic therapy, such as the Eastern Cooperative Oncology Group (ECOG) or the Karnofsky performance status (KPS), have demonstrated limitations in predicting the likelihood of treatment-related toxicity in this demographic [3,4]. To address this challenge, comprehensive geriatric assessments (GA) have emerged as a robust tool, offering an intricate evaluation of various health domains including co-morbidities, polypharmacy, cognition, nutrition, emotional well-being, social engagement, and physical function. These assessments play a pivotal role in determining the appropriate supportive measures required for older patients, and subsequently guiding tailored oncological management [5].

Previous research has underscored the efficacy of GA-tailored interventions in increasing rates of chemotherapy completion, improving overall quality of life, and reducing unplanned hospital admission [6,7]. Successful geriatric oncology models often embody a multidisciplinary approach, involving close collaboration among oncologists,

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geriatricians, nurses, and allied health professionals [8,9].

However, the implementation of an oncology-specific geriatric model poses significant challenges, particularly in rural and regional cancer centres with limitations in staffing, expertise, and resources. Service deficiencies have been noted across a global scale in regional cancer centres [10]. For example, a national, cross-sectional survey in Australia reported increasing gaps in oncology speciality services with remoteness (28.8 % in remote areas compared with 10.9 % in regional areas and 3.4 % in major cities) [11]. In addition, older patients with cancer comprise a significant proportion of patients with cancer in remote and regional areas [10]. Outcomes for older patients with cancer in rural areas have been shown to be poorer when compared to their urban counterparts [12].

Hence, there is a need for a geriatric oncology service model that not only provides GAs in a timely fashion but is resource and cost efficient, particularly in these areas of need. Currently, there is a paucity in literature on the implementation of geriatric oncology models in regional centres.

1.1. The Geriatric Oncology Nurse Navigator Model

The Townsville Cance Centre (TCC), situated in North Queensland, is a regional cancer care facility that provides tertiary-level oncology services to its local health district and rural satellite centres. In April of 2020, a pilot geriatric oncology service was established to provide GAs and ongoing support for older patients undergoing systemic therapy. This service was introduced with the aim of informing treatment decisions and improving safety outcomes for older patients undergoing systemic therapy and with the prospect that these outcomes could be achieved within the constraints of available personnel and funding.

This service is run by a nurse navigator, employed with a 0.5 full time equivalence (20 h per week) capacity. Nurse navigation has an established role in cancer care and is defined by the provision of assistance to patients and caregivers by overcoming barriers to receiving care and providing care coordination [13]. The provision of nurse navigator services has been shown to improve timeliness of care and the patient experience, especially in psychosocial and care coordination domains [13,14]. The premise for this appointment is that nurse navigators are equipped with the skills and clinical experience required to guide older patients with cancer through different stages of the model's program [15]. Qualifications of our nurse navigator included a Graduate Diploma in Advanced Nursing, Honours Degree in Cancer Care, and several years' experience as clinical nurse specialist in cancer care.

One of the key activities of the nurse navigator in this model included running a pre-assessment clinic for patients aged 75 years and older, where comprehensive GAs were conducted prior to the patient's initial oncology consultation. The comprehensive GA included a review of comorbidities and medications, ECOG performance status, clinical frailty scale, mobility assessment including a timed up and go test, cognitive screening via mini-cog assessment, psycho-social evaluation including an abbreviated geriatric depression scale, nutrition assessment, and functional evaluations (see Supplementary Fig. 1 in Appendix for proforma). The GA facilitated the nurse navigator in determining the necessity of additional support, thereby enabling the implementation of tailored recommendations or appropriate allied health referrals. The assessment was made available to the medical oncologist to aid in decision making for systemic therapy.

For patients undergoing systemic therapy, they could opt to undergo nurse navigation, where supportive care is provided for older patients through follow-up for systemic treatment-related toxicity, implementing management with guidance from the treating oncologist, monitoring for frailty syndromes, and providing emotional support. The frequency of follow up during this phase was determined by the nurse navigator through GA results and with the treating oncologist's input. Additionally, joint reviews by the nurse navigator and medical oncologist were performed for particularly frail or vulnerable patients during their clinic visits. The nurse navigator was also provided the capacity for closed-loop communication with treating oncologists regarding concerns for patients being followed up, allowing for earlier proactive clinical management and escalation of cares if required. The nurse navigator model is summarized in Fig. 1.

The aim of this study was to examine the impact of the nurse navigator-led geriatric oncology model on the patterns and safety of systemic therapy delivery in older patients with solid-organ malignancies.

2. Material and Methods

2.1. Study Design and Patient Population

This was a single-centre retrospective study conducted at the TCC. An institutional ethics waiver was granted. Data collection was carried out from November 2022 to February 2023. Inclusion criteria encompassed patients aged 75 years and older who had been referred and reviewed at the TCC for consideration of chemotherapy or immunotherapy for solid organ malignancies between January 2019 and November 2022. Patients were excluded if they had haematological malignancies or if they did not receive their entire treatment at TCC.

The geriatric oncology assessment clinic was established in April 2020. Patients referred from January 2019 to April 2020 constituted the "historical cohort," while those reviewed from April 2020 to November 2022 were classified as the "geriatric assessment cohort."

Following the initial collation of patient cohorts, as our focus was on patients referred for chemotherapy or immunotherapy, individuals referred for systemic therapy, where the standard of care (SOC) treatment was either hormonal therapy (including aromatase inhibitors, tamoxifen, androgen deprivation therapy, and novel anti-androgen therapy), oral targeted therapy (tyrosine kinase inhibitors, CDK 4/6 inhibitors), observation, intravesical Bacillus Calmette-Guerin (BCG) therapy, or those for whom no SOC treatment were available, were excluded.

2.2. Data Collection

Clinical data for all patients were obtained through chart reviews of local electronic clinical record systems, specifically the MOSAIQ Oncology Information system (Elekta, Missouri, USA) and the Integrated Electronic Medical Record (ieMR) system. Recorded patient demographics included age, sex, primary cancer type, and treatment intent (curative versus palliative).

To observe the patterns of de-escalated systemic therapy since the implementation of the geriatric oncology service, the expected SOC treatment based on the patient's malignancy and treatment line were recorded. Treatment regimens and any initial dose reductions during the first cycle were documented for patients who received systemic therapy from this cohort. De-escalation of treatment was defined as either the administration of single-agent chemotherapy or immunotherapy when poly-agent chemo-immunotherapy was the SOC, upfront dose reduction of chemotherapy, use of less toxic treatments (e.g., hormonal therapy) instead of chemotherapy or immunotherapy or where the patient received best supportive cares instead of SOC therapy. This component of the study was independently reviewed by two co-authors with specialist training in medical oncology to ensure data accuracy.

For patients who proceeded with chemotherapy or immunotherapy, the number of unplanned hospitalizations and the total number of days spent in the hospital were collected. Unplanned hospitalizations were defined as any admission to the hospital during their systemic therapy treatment period and up to one month post-treatment completion.

In the "geriatric assessment cohort," quantifiable components from the geriatric assessment were recorded, including ECOG performance status (0–4), Clinical Frailty Scale score (1–9), the use of visual aids (yes or no), the use of hearing aids (yes or no), polypharmacy (≥5

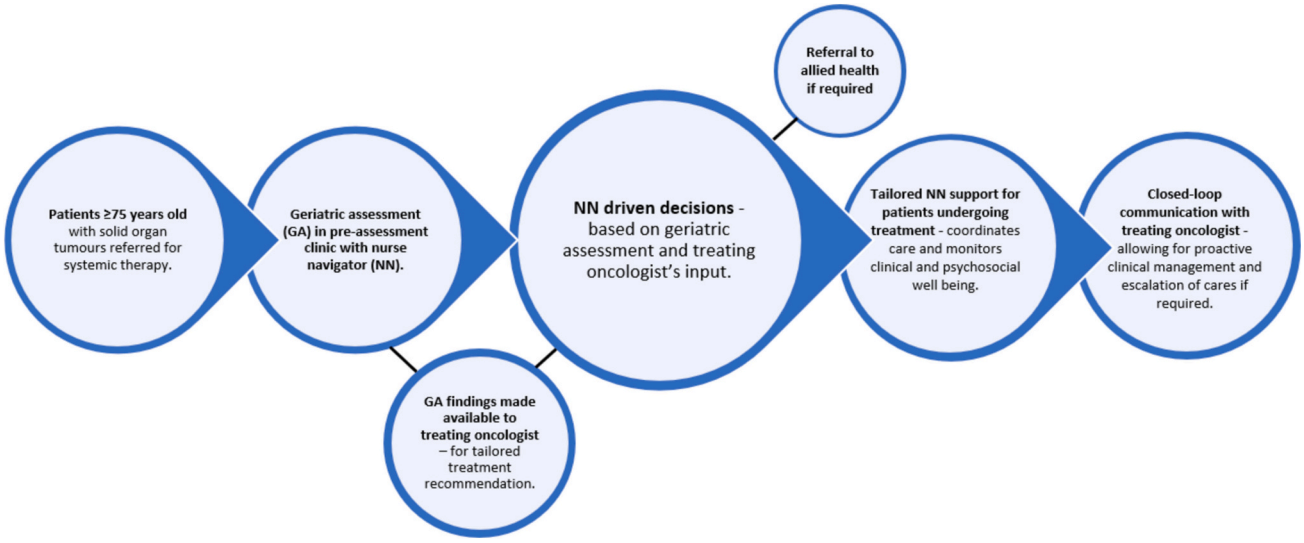


Fig. 1. Nurse Navigator Model at Townsville Cancer Centre.

medications), Charlson Comorbidity Index, timed up and go test (in seconds), and Mini-Cog score (0–5). Fatigue, anorexia, and dysphagia were assessed following the Common Terminology Criteria for Adverse Events version 5.0 (CTCAE) grading system (1–4). Answers to specific questions included self-reported weight loss or concerns affecting eating (yes or no) and self-reported concerns about managing at home (yes or no). Responses to the brief geriatric depression scale were recorded (yes or no), with questions including: "Are you happy in life?" "Do you feel your life is empty?" "Are you afraid something bad is going to happen?" and "Do you feel happy most of the time?". The GA was intended to be completed in its entirety for each patient. Data-points that were incomplete at time of data collection were recorded as not available (NA). These assessments were collected to resemble geriatric domains recommended for assessment in geriatric oncology guidelines and assist in identifying patterns of frailty in our cohort **[16]**. Allied health input suggested as a result of GA was also recorded. It was also noted whether patients subsequently underwent nurse navigation while receiving systemic therapy.

2.3. Outcomes

The primary objective of this study was to evaluate the impact of GAs and nurse navigation on unplanned hospital admissions and length of stay in older patients receiving chemotherapy or immunotherapy. Secondary outcomes included assessing the impact of GA on the de-escalation of systemic therapy and patterns of frailty and associated interventions.

2.4. Data Analysis

All data were collated in a Microsoft Excel spreadsheet (Microsoft Corp., Washington, USA). Normality assumptions were assessed for the data, and descriptive statistics were used to summarize the data. Differences in safety outcomes and rates of systemic therapy de-escalation between the two cohorts were examined. Categorical variables were analysed using Fisher's exact tests (including sex, tumour type, treatment intent, regimen, and all GA outcomes), while continuous variables were analysed using *t*-tests (including age and all safety outcomes of unplanned hospitalisations and duration of hospital stays). Statistical significance was defined as $p < 0.05$.

3. Results

Two hundred sixteen patients were initially identified for the study. Eighty-seven patients were excluded as they were referred for hormonal therapy or targeted therapy ($n = 66$); SOC was observation, or no treatment options were available ($n = 19$); or referred for intravesicular BCG therapy ($n = 2$). Consequently, the analysis was conducted on the remaining 129 patients. Among them, 60 patients were part of the GA cohort, while the historical cohort consisted of 69 patients.

Demographic characteristics are outlined in Table 1. Both cohorts had a median age of 79 years. There were no significant differences across all demographic characteristics between both groups. The most prevalent malignancy was lung cancer in both the GA and historical cohorts (27 % vs. 39 %, $p = 0.19$), followed by cutaneous malignancies (20 % vs. 15 %, $p = 0.48$). The majority of treatment was palliative in both the GA and historical cohorts (67 % vs. 73 % $p = 0.57$). A comparable proportion of patients received chemotherapy in both cohorts (37 % vs. 35 %, $p = 0.85$). A trend was observed towards more frequent use of immunotherapy in the GA cohort (32 % vs. 23 %, $p = 0.32$). Fewer patients in the GA cohort received treatment that was not chemotherapy or immunotherapy (35 vs. 45 %, $p = 0.28$).

Of the patients who underwent GAs through the pre-assessment clinic, 24 (40 %) subsequently received nurse navigation while undergoing systemic therapy. Reasons for not proceeding with nurse navigation included ineligibility because they did not proceed with systemic therapy ($n = 22$; 37 %); patient declined service due to perceived lack of benefit ($n = 9$; 15 %); known to another support service (e.g. cancer care coordinator) (n = 2; 3 %), nurse navigator did not feel patient required the service (n = 2; 3 %); and unable to provide service due to COVID pandemic related staff re-allocation ($n = 1$; 2 %).

3.1. Impact of Geriatric Assessment on Systemic Therapy De-escalation

There were no significant differences in rates of de-escalation in therapy from SOC in the GA cohort compared to the historical cohort (48 % vs. 59 %, $p = 0.16$). De-escalation of treatment in the GA in comparison to the historical cohort included decisions for best supportive care (32 % vs. 44 %, $p = 0.2$), poly-chemotherapy or chemo-immunotherapy to single-agent chemotherapy, immunotherapy, targeted therapy, or hormonal therapy (10 % vs. 4 %, $p = 0.3$), and upfront dose reductions (10 % vs. 12 %, $p = 0.45$). De-escalations of regimen of systemic therapy are highlighted in Fig. 2.

Table 1
Patient characteristics including tumour type, treatment intent and systemic therapy received.

	Geriatric Assessment		Historical		*P* value
	n = 60	%	*n* = 69	%	
Age [Median (SD)]	79 (75–95)		79 (75–91)		0.87
Sex					
Male	33	55.0 %	44	63.8 %	0.37
Female	27	45.0 %	25	36.2 %	0.37
Tumour Type					
Lung (incl. mesothelioma)	16	26.7 %	27	39.1 %	0.19
Skin	12	20.0 %	10	14.5 %	0.48
Lower GI	9	15.0 %	7	10.1 %	0.43
Upper GI	9	15.0 %	5	7.2 %	0.26
Gynaecological	5	8.3 %	5	7.2 %	1
Head &Neck	3	5.0 %	1	1.4 %	0.34
Genito-urinary	3	5.0 %	6	8.7 %	0.5
Breast	2	3.3 %	4	5.8 %	0.68
Brain	1	1.7 %	1	1.4 %	1
Other	0	0.0 %	3	4.3 %	0.25
Treatment intent					
Curative	20	33.3 %	19	27.5 %	0.57
Palliative	40	66.7 %	50	72.5 %	0.57
Regimen					
Single agent chemotherapy	11	18.3 %	8	11.6 %	0.32
Poly-agent chemotherapy	9	15.0 %	14	20.3 %	0.49
Anti-PD1/PDL1 inhibitor	15	25.0 %	13	18.8 %	0.52
Anti-PD1 and CTLA4 inhibitor	2	3.3 %	1	1.4 %	0.59
Chemotherapy + anti-PD1 inhibitor	2	3.3 %	2	2.9 %	1
Hormone therapy	2	3.3 %	0	0.0 %	0.21
Targeted therapy	0	0.0 %	1	1.4 %	1
Best supportive care	19	31.7 %	30	43.5 %	0.2

SD, standard deviation; incl., including; GI, gastrointestinal.

3.2. Impact of Geriatric Assessment and Nurse Navigation on Unplanned Hospital Admissions

Thirty-nine patients received chemotherapy or immunotherapy in the GA cohort, and 38 in the historical cohort. The average number of hospital admissions per patient was lower in the GA cohort than in the historical cohort (0.59 vs. 1.13, $p = 0.01$). Additionally, the average length of stay for admitted patients was shorter in the GA cohort compared to the historical cohort (4.3 days vs. 6.7 days, $p = 0.04$). These results are summarized in Table 3.

In the GA cohort, 24 patients underwent nurse navigation during systemic therapy. The average number of hospital admissions per patient were lowest in this cohort (0.41), with an average length of stay per admission of 4.1 days. In comparison, the average number of hospital admissions was higher for the nine patients who had declined nurse navigation due to a lack of perceived benefit (0.83 v 0.41 $p = 0.03$), while the average length of stay was similar (3.9 v 4.1 days $p = 0.91$).

3.3. Pattern of Frailty

Deficits identified with tools used in the GA to assess geriatric domains are described here. The median Clinical Frailty Scale score for the GA cohort was 4, indicating a "vulnerable" state. Functional assessment outcomes are summarized in Table 2. Abnormal timed up and go tests were noted in 30 % of the cohort, while polypharmacy was identified in 45 %. The Mini-Cog test revealed abnormal results in 15 % of the cohort. Furthermore, grade 2 or higher anorexia (as per CTCAE) was reported in 23 % of the cohort, while grade 2 or higher dysphagia (as per CTCAE) was reported in 13 %. Eighty percent of the cohort reported they were managing at home.

With regards to the geriatric depression questionnaire outcomes, patients most commonly responded "yes" to "are you afraid something bad is going to happen?" (33 %), followed by "yes" to "do you feel your life is empty?" (22 %). These findings are summarized in Supplementary Table 1.

A total of 27 patients (45 %) were referred for allied health assessment post GA or while undergoing nurse navigation. Referral to a social worker was the most common ($n = 19$; 32 %), followed by a dietician ($n = 6$; 10 %), psychology ($n = 5$; 8 %), physiotherapy ($n = 3$; 5 %), and speech pathology (n = 1; 2 %).

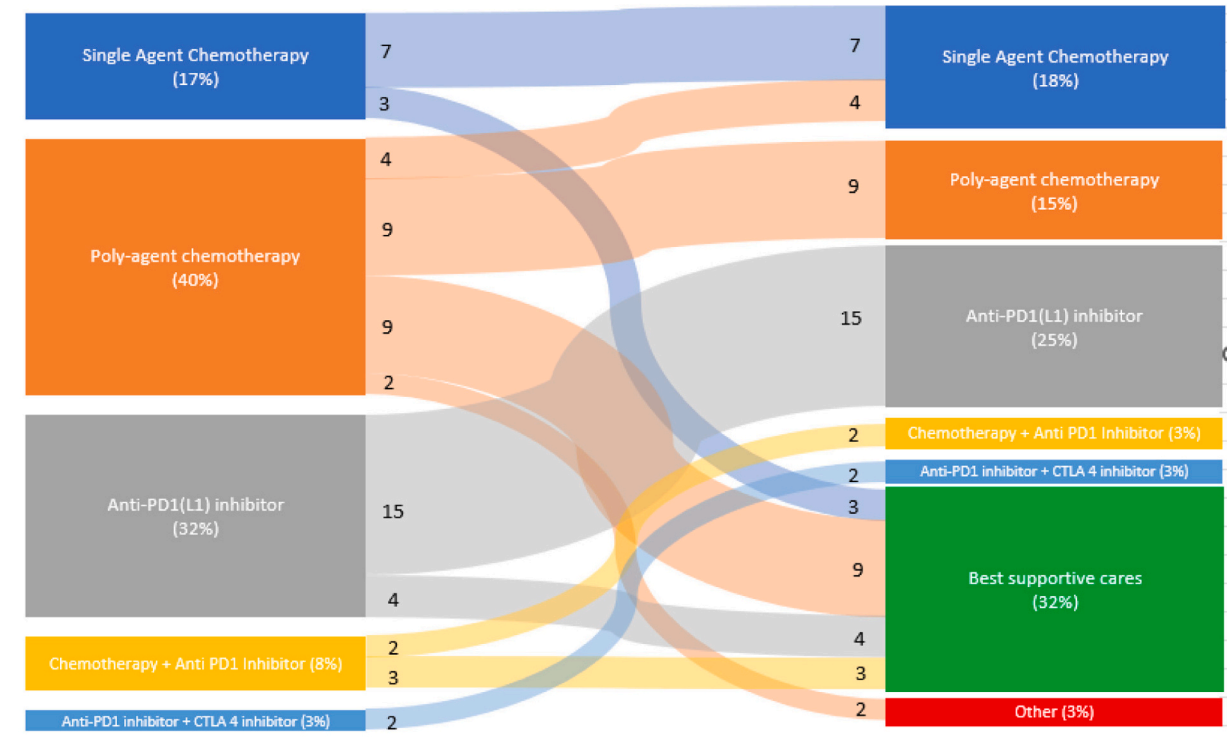
4. Discussion

This study found that implementation of a geriatric model in a regional cancer centre, operated by a nurse navigator with 0.5 full time equivalence, resulted in a notable decrease in unplanned hospital admissions while systemic therapy de-escalation rates remained similar.

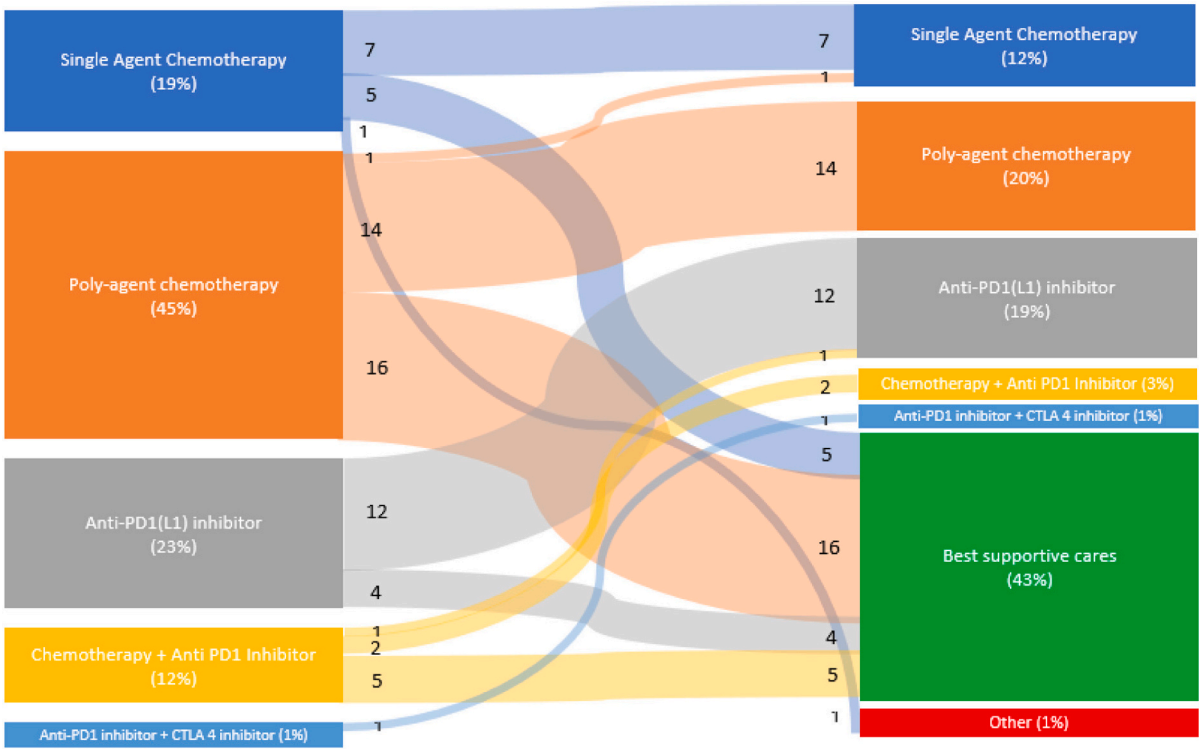
These findings mirror those of the INTEGERATE trial, which similarly investigated the influence of GA-driven interventions and the integration of specialized geriatrician input on the quality of life of older patients undergoing systemic therapy, demonstrating a substantial reduction in unplanned hospital admissions [7]. Conversely, the GAIN and GAP70+ randomized trials, focusing on the impact of GA-driven interventions on cancer treatment toxicity, did not reveal a decrease in unplanned hospital admissions, although they did exhibit a significant reduction in grade 3 or higher adverse events [17,18]. Notably, both the INTEGERATE and GAIN trials underscored the achievement of these outcomes without a considerable reduction in systemic therapy [7,17]. In contrast, the GAP 70+ trial reported a higher rate of chemotherapy de-intensification in the geriatric assessment arm, without impacting overall survival [18]. Other benefits of GA-driven interventions include potential improvement in quality of life on systemic therapy as per GERICO and INTEGERATE trials [6,7], although the COACH and 5C trials did not confirm these findings [19,20].

The majority of the models in these trials required the involvement of a geriatrician for pre- and ongoing therapy assessments, as well as a geriatric-oncology multidisciplinary team for case discussions and appropriate interventions [7,17]. These models also featured pathways for planned interventions based on predetermined thresholds, which required significant allied health resources [17]. However, given resource limitations in rural and regional settings, implementing such comprehensive models can be challenging [10]. For instance, comprehensive assessments by physiotherapists, occupational therapists, or geriatricians for all patients with abnormal timed up and go tests or abnormal Mini-Cog may not be feasible in these areas. In our model, abnormalities in GA assessment were routinely identified, however, did not always lead to a formal referral for allied health review, potentially reserving these interventions for patients who require them. Through this model of care, the clinically experienced nurse navigator had the capacity to initiate patient-centric interventions through both clinicians and allied health alike. Our study suggests that this approach, through nurse navigator-led assessments and with no pre-specified referral thresholds, can still lead to improved patient outcomes.

A critical element contributing to the study results was the effective navigation of patients through systemic therapy treatment. The nurse navigator routinely performed toxicity checks through telephone reviews for older patients on systemic therapy. Patients were also able to contact the nurse navigator if concerned about toxicity, which allowed



(A)



(B)

Fig. 2. Sankey diagram representing de-escalation patterns of systemic therapy in A) geriatric assessment cohort and B) historical cohorts, with the left columns depicting expected standard of care systemic therapies and right columns depicting treatment received.

Table 2
Functional assessment outcomes from the geriatric assessment cohort.

	n	%
ECOG		
0–1	31	51.7 %
2+	29	48.3 %
Fatigue (CTCAE)		
0–1	32	53.3 %
2+	28	46.7 %
Visual aids		
Yes	52	86.7 %
No	8	13.3 %
Hearing aids		
Yes	19	31.7 %
No	41	68.3 %
Timed up and go test (≥12)		
Yes	18	30.0 %
No	34	56.7 %
NA*	8	13.3 %
Polypharmacy (≥5)		
Yes	27	45.0 %
No	33	55.0 %
Mini-Cog (≤3)		
Yes	9	15.0 %
No	44	73.3 %
NA*	7	11.7 %
Anorexia (CTCAE)		
0–1	43	71.7 %
2+	14	23.3 %
NA*	3	5.0 %
Dysphagia (CTCAE)		
0–1	50	83.3 %
2+	8	13.3 %
NA*	2	3.3 %

ECOG, Eastern Cooperative Oncology Group; CTCAE, Common Terminology Criteria for Adverse Events.
* NA = not available.

Table 3
Comparison of safety outcomes between the geriatric assessment and historical cohorts who received chemotherapy or immunotherapy.

	Geriatric assessment	Historical	*p*-value
n=	39	38	
Mean no. of unplanned hospitalizations (total no.)	0.59 (23)	1.13 (44)	**0.01**
No. of patients with recurrent (≥2) unplanned hospitalizations (%)	2 (5.1 %)	14 (35 %)	
Average no. of days in hospital	4.3	6.7	**0.04**

No., number.

for earlier intervention. Additionally, combined consultations with the treating oncologist for particularly vulnerable patients allowed for a more holistic understanding of the patient's concerns and need for intervention. These interventions helped achieve the safety outcomes in this study, particularly with reduced unplanned hospital admissions. This finding was evident as, although in small numbers, patients who had declined nurse navigation during systemic therapy had higher rates of unplanned hospital admissions when compared to those who had undergone nurse navigation.

Nurse navigation has resulted in positive outcomes for patients with cancer, with improved patient experiences and reduced care-related challenges demonstrated through a multidimensional service providing community-based patient support [14]. Our model was specifically implemented to provide hospital-based care only, as community-based support would require additional resourcing. Additionally, when patients did not receive nurse navigation services in our model the nurse navigator ensured adequate support through a separate service, such as Cancer Care Coordinators, and referred for allied health reviews when needed.

Notably, the study did not indicate a significant rate of systemic therapy de-escalation for older patients. However, it remains plausible that de-escalating systemic therapy might be suitable for frail older patients, as demonstrated by the GO2 study, where a reduction in chemotherapy intensity benefited older and frail patients with advanced gastroesophageal cancer [21]. Tools that assist in predicting chemotherapy toxicity, including the Cancer Aging Research Group (CARG) toxicity score or the Chemotherapy Risk Assessment Scale for High Age (CRASH) score, could also assist in determining patients appropriate for de-escalation of systemic therapy [4,22]. The use of these tools in conjunction with this geriatric oncology model was not examined in this study, however could be investigated in future studies.

4.1. Limitations

Notwithstanding these significant findings, several limitations should be considered.

It should be noted that the role of a nurse navigator in cancer care is diverse [15] and in this model of care, there was particular emphasis on GA and follow up for patients receiving systemic therapy, which could have influenced the results. The other aspects of the nurse navigator role such as overcoming barriers to healthcare, monitoring psychosocial wellbeing, and patient education were not specifically examined. Our results suggest, however, that certain duties of the nurse navigator role can be prioritized under the guidance of clinical outcome driven models.

The retrospective design along with the pre- and post-intervention comparison approach might have introduced potential confounders, including changes in treatment paradigms for various tumour types and the inherent recognition of frailty syndromes within the oncology specialty. To address these potential confounders, future research should consider a prospective study of the model within a regional or rural cancer care service, preferably with a multi-centre collaboration. Additionally, patient experience and perspectives with the model could be explored further. Presently, the model examined only assesses patients aged 75 years or older, despite the common identification of frailty in patients younger than 75 years, suggesting the need for the expansion of this model.

5. Conclusion

Our two-year observation of the nurse navigator-led geriatric oncology model suggests that it contributes to improved safety outcomes, leading to reductions in unplanned hospitalizations and length of hospital stays, without significant changes in the rates of de-escalated systemic therapy.

To our knowledge, this is the first study in literature on the implementation of a nurse navigator-led geriatric oncology service in a regional cancer centre and is a demonstration of how resource-adapted concepts can be applied effectively in clinical care.

Declaration of Competing Interest

There are no conflicts of interest to declare from any author.

Appendix A. Supplementary Data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.jgo.2024.102145.

References

[1] Muss HB, Berry DA, Cirrincione C, Budman DR, Henderson IC, Citron ML, et al. Cancer and Leukemia Group B Experience. Toxicity of older and younger patients treated with adjuvant chemotherapy for node-positive breast cancer: the Cancer and Leukemia Group B Experience. J Clin Oncol 2007 Aug 20;25(24):3699–704.

[2] Neugut AI, Matasar M, Wang X, McBride R, Jacobson JS, Tsai WY, et al. Duration of adjuvant chemotherapy for colon cancer and survival among the elderly. J Clin Oncol 2006 May 20;24(15):2368–75.
[3] Repetto L, Fratino L, Audisio RA, Venturino A, Gianni W, Vercelli M, et al. Comprehensive geriatric assessment adds information to Eastern Cooperative Oncology Group performance status in elderly cancer patients: an Italian Group for Geriatric Oncology Study. J Clin Oncol 2002 Jan 15;20(2):494–502.
[4] Hurria A, Mohile S, Gajra A, Klepin H, Muss H, Chapman A, et al. Validation of a prediction tool for chemotherapy toxicity in older adults with cancer. J Clin Oncol 2016 Jul 7;34(20):2366.
[5] Thaker DA, McGuire P, Bryant G, Wyld D, Leach J, Wheatley H, et al. Our experience of nursing/allied health practitioner led geriatric screening and assessment of older patients with cancer – a highly accessible model of care. J Geriatr Oncol 2021 May 10;12(8):1186–92.
[6] Lund CM, Vistisen KK, Olsen AP, Bardal P, Schultz M, Dolin TG, et al. The effect of geriatric intervention in frail older patients receiving chemotherapy for colorectal cancer: a randomised trial (GERICO). Br J Cancer 2021 Jun;124(12):1949–58.
[7] Wee-Kheng S, King M, Pope A, Parente P, Darzins P, Davis I. Integrated geriatric assessment and treatment (INTEGERATE) in older people with cancer planned for systemic anticancer therapy. J Clin Oncol 2020;38(15_suppl):12011.
[8] Tremblay D, Charlebois K, Terret C, Joannette S, Latreille J. Integrated oncogeriatric approach: a systematic review of the literature using concept analysis. BMJ Open 2012 Jan 1;2(6):e001483.
[9] Burhenn PS, McCarthy AL, Begue A, Nightingale G, Cheng K, Kenis C. Geriatric assessment in daily oncology practice for nurses and allied health care professionals: opinion paper of the Nursing and Allied Health Interest Group of the International Society of Geriatric Oncology (SIOG). J Geriatr Oncol 2016 Sep 1;7 (5):315–24.
[10] Bhatia S, Landier W, Paskett ED, Peters KB, Merrill JK, Phillips J, et al. Rural–urban disparities in cancer outcomes: opportunities for future research. JNCI J Nat Cancer Inst 2022 Jul 1;114(7):940–52.
[11] Hunter J, Smith C, Delaney GP, Templeman K, Grant S, Ussher JM. Coverage of cancer services in Australia and providers' views on service gaps: findings from a national cross-sectional survey. BMC Cancer 2019 Dec;19:1–11.
[12] Kenzik KM, Rocque GB, Landier W, Bhatia S. Urban versus rural residence and outcomes in older patients with breast cancer. Cancer Epidemiol Biomarkers Prev 2020 Jul 1;29(7):1313–20.
[13] 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 Dec 1;15(5):291–302.
[14] Wagner EH, Ludman EJ, Aiello Bowles EJ, Penfold R, Reid RJ, Rutter CM, et al. Nurse navigators in early cancer care: a randomized, controlled trial. J Clin Oncol 2014 Jan 1;32(1):12–8.
[15] Tebo J, Strohschein FJ, Alfonso L, Wan-Chow-Wah D, Gaba F, Monette J, et al. Nurse navigation in the context of an interdisciplinary consultation service for older adults with cancer. J Geriatr Oncol 2013 Oct 1;4:S89–90.
[16] Dale W, Klepin HD, Williams GR, Alibhai SM, Bergerot C, Brintzenhofeszoc K, et al. Practical assessment and management of vulnerabilities in older patients receiving systemic cancer therapy: ASCO guideline update. J Clin Oncol 2023 Sep 10;41(26): 4293–312.
[17] Li D, Sun CL, Kim H, Soto-Perez-de-Celis E, Chung V, Koczywas M, et al. Geriatric assessment-driven intervention (GAIN) on chemotherapy-related toxic effects in older adults with cancer: a randomized clinical trial. JAMA Oncol 2021 Nov 1;7 (11).
[18] Mohile SG, Mohamed MR, Xu H, Culakova E, Loh KP, Magnuson A, et al. Evaluation of geriatric assessment and management on the toxic effects of cancer treatment (GAP70+): a cluster-randomised study. Lancet 2021 Nov 20;398 (10314):1894–904.
[19] Mohile SG, Epstein RM, Hurria A, Heckler CE, Canin B, Culakova E, et al. Communication with older patients with cancer using geriatric assessment: a cluster-randomized clinical trial from the National Cancer Institute Community oncology research program. JAMA Oncol 2020 Feb 1;6(2):196–204.
[20] Puts M, Alqurini N, Strohschein F, Koneru R, Szumacher E, Mariano C, et al. Impact of geriatric assessment and management on quality of life, unplanned hospitalizations, toxicity, and survival for older adults with cancer: the randomized 5C trial. J Clin Oncol 2023 Feb 1;41(4):847–58.
[21] Hall PS, Swinson D, Cairns DA, Waters JS, Petty R, Allmark C, et al. efficacy of reduced-intensity chemotherapy with oxaliplatin and capecitabine on quality of life and cancer control among older and frail patients with advanced gastroesophageal cancer: the go2 phase 3 randomized clinical trial. JAMA Oncol 2021 Jun 1;7(6):869–77.
[22] Extermann M, Boler I, Reich RR, Lyman GH, Brown RH, DeFelice J, et al. Predicting the risk of chemotherapy toxicity in older patients: the chemotherapy risk assessment scale for high-age patients (CRASH) score. Cancer 2012 Jul 1;118 (13):3377–86.