



# Evaluation of a comprehensive geriatric assessment tool in geriatric cancer patients undergoing adjuvant chemotherapy: a pilot study

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## Abstract

**Purpose** It is recommended to use comprehensive geriatric assessment (CGA) in clinical oncology practice to improve care for geriatric cancer patients and to identify medical and social issues that may need further intervention. The purpose of this pragmatic pilot study was to evaluate the effectiveness of the Hurria et al. CGA in cancer patients 70 years of age or older undergoing adjuvant chemotherapy, as well as the feasibility of integrating it into a busy clinic practice and the psychosocial impact on these patients.

**Method** Twenty-five patients were recruited. Descriptive analysis was performed via a geriatric assessment questionnaire completed by the participants prior to their first adjuvant chemotherapy treatment and during follow-up, 2 to 6 weeks after last treatment. Additionally, study staff performed a geriatric healthcare assessment at both time points.

**Results** The results of this pilot study show that administration is feasible despite some challenges. Administration of a CGA in a clinic setting presented some logistical issues with regard to time and space available in clinic. Analysis of patient data indicated only minor variations in patient domains from pre-chemo to post-chemo confirming previous research. Participants expressed gratitude for the extra time spent with them at a stressful time in their lives.

**Conclusion** Further information regarding the usefulness of a comprehensive geriatric assessment with regard to improving treatment selection, identifying undetected medical problems, and avoiding toxicity will be obtained if the administration of comprehensive geriatric questionnaires is incorporated into the clinic setting and considered into the allocated time for staff workload.

**Keywords** Cancer · Comprehensive geriatric assessment · Adjuvant chemotherapy · Geriatric assessment tool · Geriatric cancer

## Introduction

About two in five Canadians will develop cancer in their lifetime, and in 2017 it is estimated that 206,200 people in Canada will be newly diagnosed [1]. New cases are expected to increase mainly due to demographic realities of population growth and aging. The number of older adults with cancer seeking treatment is increasing dramatically in line with the aging population. The care of older adult patients differs from

that of younger adults because of differences in the biology of the tumor, age-related differences in host physiology, comorbidity burden, psychosocial issues, and other challenges such as caregiver limitations, which might impact the efficacy and side effects of cancer therapy [2, 3].

Absence of a standardized tool to assess geriatric oncology patients' risk from chemotherapy has made clinical judgments variable. This has resulted in a range of practice, with some patients being put at significant risk from chemotherapy-related side effects for very little benefit, while other patients are denied potentially useful treatment for fear of toxicity. These decisions are based on oncologists' individual risk-tolerance assessment and previous experience [4]. Additionally, patients themselves are confused about their real risk of toxicity due to lack of standardized tools, and often make decisions on perceived risk [4]. Trials have previously either excluded older patients or older patients have been underrepresented due to comorbidities and toxicity assessment differences.

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In light of all the changes seniors experience as part of the aging process, it became evident that the Comprehensive Geriatric Assessment (CGA) was an ideal resource to implement and to counteract these issues, as it effectively evaluates, in multidisciplinary environments, the short- and long-term skills and prognosis of older patients [5]. As it is also multidimensional, it can provide guidance for non-oncologic interventions as well.

CGA is defined as a multidisciplinary diagnostic and treatment process that evaluates the medical, psychological, social, and functional capabilities of older adults [6]. Groups such as the US National Comprehensive Cancer Network (NCCN) and the International Society of Geriatric Oncology have recommended that geriatric assessment be conducted to assist oncologists in the decision-making process to determine the best treatment for their patients [5].

The aim of traditional general geriatric assessments is to predict functional decline and falls in older populations with cognitive and functional impairments [6]. However, they are not oncology-focused and not sufficient in scope to predict oncology outcomes such as toxicity [5]. For this reason, the CGA and modified versions are used in geriatric cancer settings to provide predictive and prognostic outcomes for geriatric cancer patients who are about to receive treatment [5].

In a geriatric cancer setting, multiple domains help in the decision-making process regarding treatment. A 2006 Hurria et al. study identified seven domains: functional status, comorbid medical conditions, nutritional status, cognitive function, psychological state, social support, and medication review [7]. The use of multiple domains helps identify the patient's functional age as opposed to their chronological age [7]. This allows the oncologist to make a more informed decision regarding how the patient might react towards treatment.

Data from recent studies supports the predictive and prognostic value of geriatric assessment in measuring the risks and benefits of cancer treatment in a geriatric cancer population [8]. Cancer incidence and the number of comorbid conditions increases with age [9]. However, one concern regarding geriatric assessments in an oncology setting is the amount of time they take to complete. Currently, geriatric assessment tools that are able to cover all seven domains to establish a fully functional age for the patient in order to identify diminished life expectancy and/or risk of hospitalization and functional decline are too time-consuming, ranging from 45 min to an hour to complete. Another concern with the current literature is that there is a lack of effectiveness studies, as well as studies to identify groups within the geriatric cancer population that are appropriate for receiving chemotherapy.

Several scales and indices have been developed to estimate comorbidity in older persons. Geriatric assessment tools such as the Cumulative Illness Rating Score for Geriatrics (CIRS), a measure of the burden of physical illness on older patients, has been validated but cannot predict tolerance to

chemotherapy [10]. The Senior Adult Oncology Program (SAOP2) is a screening tool developed for older cancer patients to determine when a multidisciplinary approach is indicated [11]. The G-8 was developed for the cancer population but there is no available data on its use in the general older population [11, 12].

Among the geriatric assessment tools currently available, the tool developed by Hurria et al. from 2011 is the best suited for use in a clinic setting because of its short length and its ability to address all seven domains. This tool utilizes valid and reliable geriatric assessment measures that are primarily self-administered. With a median time of 22 min, and 92% of the participants being satisfied with the length of the questionnaire, this tool is currently, to our knowledge, the shortest version of the comprehensive geriatric assessment that covers all seven domains [8].

This pilot study implemented the comprehensive geriatric assessment developed by Hurria et al. within a geriatric cancer population undergoing adjuvant chemotherapy for lung, breast, colon, and pancreatic cancers.

Questions:

1. How will the administration of the geriatric assessment tool developed by Hurria et al. affect clinic flow and scheduling?
2. How effective is the tool developed by Hurria et al. in evaluating the functional status of a geriatric cancer patient undergoing adjuvant chemotherapy?
3. What was the subjectively evaluated psychosocial impact on the participants of completing the pre- and post-chemo assessments?

## Methods

### Participants

Participants included in this analysis were cancer patients of 70 years of age or older who were willing to provide informed consent, were undergoing adjuvant chemotherapy, and who were diagnosed with lung, breast, colorectal, or pancreatic cancer. Patients considered well suited for adjuvant chemotherapy based on their oncologist's assessment were identified as potential participants in the study. This assessment was based on the oncologists' knowledge of the patient, their treatment regimen, general functional status, and suitability for compliance with the study requirements. Patients undergoing palliative therapy were not considered. The comprehensive geriatric assessment tool was not used to assess patient suitability for chemotherapy for the purpose of the pilot study. Since the measures used in the geriatric assessment were not validated in other languages, only patients with the ability to

follow directions in English were eligible. All other cancer patients were excluded.

## Recruitment

Eligible participants were introduced to the study by their oncologist during their first visit. Those interested in participating were then directed to a research staff, who explained the pilot study. Once informed consent was obtained, the patient completed their portion of the comprehensive geriatric assessment questionnaire established by Hurria et al. The research staff also completed a health professional geriatric assessment at this time, also established by Hurria et al. Identical questionnaires for staff and patient were distributed 4 to 6 weeks after completion of chemotherapy during the participants' routine follow-up. Average completion time of the patient questionnaire was 20–25 min, and the healthcare professional questionnaire was averaged at 5 min confirming the established evidence of completion time from Hurria et al [8].

## Measures

### Geriatric assessment tool

The Hurria et al. geriatric assessment tool used for this study, at a median completion time of 22 min, is the shortest version of a comprehensive geriatric assessment. This tool includes validated measures that assess seven domains. These include functional status, comorbid medical conditions, psychological state, social support, nutritional status, cognition, and medications. Additionally, the tool has a socio-demographic section including age, sex, race, ethnicity, age, and education level [8].

### Format

The patient questionnaire was divided into 13 sections:

- A. Background information (7 multiple choice questions)
- B. Daily activities (7 multiple choice questions)
- C. Physical activities (10 activities of daily life for patient to indicate scale of health limitations)
- D. Current health rating (selection of self-evaluation functional status questions)
- E. Number of falls (1 question)
- F. Patient health (16 ancillary health conditions and multiple choice scale of functional limitations for each)
- G. Nutritional status (3 questions regarding weight)
- H. Health questionnaire (17 multiple choice questions regarding mental health)
- I. Social activities (3 multiple choice questions regarding limitations in participant social life)
- J. Social support (12 multiple choice questions regarding companionship, assistance, and other support)

- K. Spirituality (5 multiple choice questions regarding religious beliefs and involvement)
- L. Feelings (2 multiple choice questions on depression and anxiety)
- M. Questionnaire evaluation (4 questions, including 3 for participant comments)

## Domains

The functional status domain contains the Medical Outcomes Study (MOS) physical health scale, the Instrumental Activities of Daily Living (subscale of the Older American Resources and Services), Karnofsky performance status (determined by health care professional or research staff), Karnofsky self-reported performance rating scale, number of falls in the last 6 months, Timed Up and Go, and Medical Outcomes Study (MOS) for social activities. All seven measures are used to determine the functional status of the patient, such as the extent to which the patient can participate in everyday activities. These activities include but are not limited to walking, making phone calls, and meal preparation. These measures can be used in combination to measure the frailty and health status of the patient [13].

The comorbid medical conditions domain uses the physical health section (subscale of the Older American Resources and Services). It is used to measure the degree of impairment faced by the patient due to comorbid illnesses as well as a list of their comorbid illness [8].

The psychological state domain uses the Hospital Anxiety and Depression Scale. This is used to measure anxiety and depression levels of the patient [8].

The social support domain uses the MOS social support survey: emotional/information and tangible subscales. This is used to measure the level of social support that is available to the patient [8].

The nutritional status domain consists of calculating the body mass index and percent unintentional weight loss in 6 months. This is done to measure the relative health status of the patient as well as the effect of weight loss. Weight loss calculated during chemotherapy can be used as an indicator of the side effects of chemotherapy. Additionally, a low body mass index or unintentional weight loss prior to chemotherapy is associated with an increased risk of mortality [13]. This would have an impact on cancer treatment and survival. Data for the nutritional status which includes the height and weight of the patient was obtained from their medical file [13].

The cognition domain uses the Blessed Orientation-Memory-Concentration test as a gross measure of cognitive function of the patient. This measure is used to identify any signs of cognitive impairment such as dementia. It is necessary to know if the patient receiving chemotherapy is able to understand instructions regarding supportive medications,

recognize side effects that require medical attention, and is able to comply with scheduled therapy [13].

The medications domain is a comprehensive list of medications used by the patient including prescribed, herbal, and over-the-counter medications, with the number of prescribed medications possibly indicating an increase in comorbidities. This list of medications, as well as the medication history, is used to ensure that there are no undesired interactions with supportive medications being prescribed. Data regarding the list of medications currently taken by the patient was obtained from their medical file [13].

The Healthcare Professional Questionnaire evaluated functional status (Karnofsky Performance Status and Timed Up and Go), cognition (Orientation-Memory-Concentration Test), and nutrition (Height, Weight, and BMI).

### Data analysis

Data was analyzed via the Cancer and Aging Research Group (CARG), which provided the data entry software and report generation for the study.

## Results

### Clinic impact

Administration of the questionnaire affected the clinic flow in various ways. Clinic rooms to accommodate participants during questionnaire completion were not often available, resulting in participants completing their questionnaires in the waiting room. Privacy for the healthcare evaluation was desirable but not often available, and it was noted that some participants were uncomfortable with questions being asked in the presence of others, especially the recall of the memory phrase, which was often a challenge.

### Geriatric tool effectiveness

Twenty-five participants were recruited for this pilot study, and included participants ranging in age from 71 to 86, with 20 participants in their 70s and 5 participants in their 80s. Eleven had been diagnosed with breast cancer, 13 with colon cancer, and 1 with pancreatic cancer. Seven men and 18 women participated in the study. As this was a pilot feasibility study, this site focused on using the administration of the geriatric assessment to validate the impact on clinic time of administering the questionnaire and, subjectively, to observe the psychosocial impact of additional time spent with geriatric patients throughout their treatment.

Participants' functional status did not vary widely from beginning to end of treatment if they were determined by the oncologist to be well suited to chemotherapy, varying by only

5–10% in most cases. For nine participants, patient-reported functional status was identical pre- and post-chemo, with five of those participants reporting their functional status at 100% both pre- and post-chemo. Three participants reported a 10% decline in functional status, and four participants reported a 20% decline. Two participants reported their functional status improved post-chemo. Objective results of physical function were lower in many cases than the patients' perceived physical function, with 23 out of 25 patients reporting physical function higher or equal to the objective physical function measurements they had indicated in the questionnaire. Research staff interpreted this positively, attributing it to participants' positive mental attitude.

Five participants did not complete the follow-up assessment, and only completed the pre-chemo assessment:

- One patient rapidly declined in functional status after completing the initial assessment and did not start chemo.
- One patient became palliative half way through treatment and was not approached to complete the post assessment.
- Two patients declined to complete the follow-up assessment.
- One patient was lost to follow-up.

The physical health scale, the Instrumental Activities of Daily Living, Karnofsky performance status, TUG Test, and social activities scale demonstrated similar results to the physical function status. ADL and independence scores were consistently at or near the top of the scale, with 14 out of 25 patients indicating the same score or higher post-chemo as pre-chemo. Karnofsky status remained the same across the board. The TUG test revealed no decline in performance, and no falls were reported by any participants. The number of medications increased in only six out of 25 patients, by an increase of one or two medications in five participants and by an increase of six medications for one participant.

### Subjective psychosocial impact

Several participants expressed gratitude for the time and attention given at a stressful time in their lives. Selected psychosocial questionnaire responses can be seen in Table 1, which demonstrates the consistency of responses from pre- to post-chemo, as well as generally high-participant scores regarding their mental health, social support, and social activity. Comparable to the analysis of functional status noted in the study results, psychosocial responses reflected the positive perception of patients regarding the care they received and the effect on the psychological and social aspects of their lives. Notably, five patients actually reported their mental health inventory and social support survey results as higher or the same, and social activity limitations lower or the same, post-chemo.

**Table 1** Selection of geriatric assessment percentage outcome results pre- and post-chemo

Patient number	Psychological Status Mental Health Inventory		Medical Outcomes Study Social Support Survey		Medical Outcomes Study Social Activity Limitations	
	Pre	Post	Pre	Post	Pre	Post
1	59	n/a	77	n/a	50	n/a
2	95	93	96	100	67	75
3	73	n/a	73	n/a	58	n/a
4	65	71	85	88	33	75
5	72	39	85	56	25	17
6	35	11	92	79	17	25
7	91	96	71	100	8	100
8	62	67	77	60	42	33
9	92	96	100	100	67	50
10	44	32	56	23	0	0
11	99	n/a	92	n/a	66	n/a
12	88	54	100	83	33	50
13	94	82	100	90	58	41
14	86	68	96	100	33	33
15	73	74	73	75	50	50
16	85	71	98	93	67	58
17	95	95	100	100	67	58
18	100	n/a	100	n/a	67	n/a
19	71	72	96	94	58	33
20	94	98	100	100	83	83
21	80	98	100	92	50	58
22	80	91	100	100	83	83
23	92	n/a	100	n/a	67	n/a
24	76	71	100	100	42	42
25	89	86	98	88	83	50

## Discussion

### Clinic impact

There is limited research involving cancer patients 70 years of age or older. Chemotherapy treatment for this population had to rely on the research that exists for patients under 70. The geriatric assessment tool developed by Hurria et al. helps improve assessment for this population.

As this was a pilot study, the study sample was very small and focused largely on clinic impact on workflow feasibility of administration within a busy community oncology practice, including logistics and impact of patient assessment administration as part of the clinic flow [6, 14].

Administration of the study questionnaire and attendant healthcare assessment were fit into the clinic flow as participants were waiting for various appointments and procedures but was not formalized as an appointment type. Assessments were performed largely by research associate, student, and

minimally by the oncologist. Nursing staff were not engaged to administer the assessments due to nursing workload issues. Direct care nurses are challenged with lack of time, support, and clinical study practices and training [15, 16].

### Geriatric tool effectiveness

#### Limitations

Recruitment of patients for this pilot study was done by the oncologists, with selection bias [17] towards participants already well suited to adjuvant chemotherapy. Replication of the research in a setting that includes an expanded team of social workers, dieticians, etc. would provide a more comprehensive and objective capture of risk assessment; as a result, this feasibility study has led to a more detailed CGA study at the site.

There were four additional site limitations when performing this pilot study.

- The study was of a quantitative design only, which did not easily allow researchers to explore the significance of the numerical data with the patients.
- The sample size was small, with only 25 participants.
- The study setting in an extremely busy oncology clinic was not conducive to study administration, as it was an additional time commitment of at least 25 min at minimum per participant that was not integrated into the clinic visit time. Research staff attempted to fit in components of the questionnaires around clinic flow, however this method of study administration was not optimal.
- The study was conducted in a community hospital and was not funded, thus had restricted access to a patient base, as well as staff dedicated to conduct the study.

### Subjective psychosocial impact

The geriatric population in this study without exception appeared to value the time and attention given by the research staff. When a room was available for questionnaire administration, patients seemed more relaxed and took their time with the questionnaire. They were more likely to ask questions and confide, and wanted to provide detail to the questionnaire answers, as well as chat with the research staff in general. Several indicated that being away from the crowded waiting room and being given a chance to relax in a quiet environment was a relief. Participants expressed altruism in their agreement to participate in the study, with several stating that they welcomed the chance to impact future patients. Many participants wanted to stay well past the timeframe allotted for the assessment to discuss not only their health and treatment plan, but their functional and psychological state, their families, and caregivers, and the impact of their diagnosis on themselves and their social environment, which provided the opportunity for further intervention.

### Conclusion

An established, validated geriatric assessment tool is internationally recommended to aid in treatment selection for older adults with cancer as it improves patient functional status and quality of life through the addition of an integrated care plan designed to improve patient outcomes. To our knowledge, this is the first study in Canada to look at feasibility in a community oncology practice.

Future study of the comprehensive geriatric assessment as a standardized screening tool is warranted at this site, especially as performed in a community oncology practice, given the lack of resources available in this setting.

The impact of the assessments on clinic practice was minimal when performed by a research staff, however the availability of clinic space to perform the assessments was a significant issue. Further information regarding the usefulness of a comprehensive geriatric assessment with regard to improving treatment selection, identifying undetected medical problems, and avoiding toxicity will be obtained if the administration of comprehensive geriatric questionnaires is incorporated into the clinic setting and considered into the allocated time of staff workload. The 5C study, funded by Canadian Cancer Society Research Institute to evaluate comprehensive geriatric assessment, is currently being implemented at this site.

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### Compliance with ethical standards

The study was approved by the local research ethics board (RID#2014–061).

**Informed consent** Informed consent was obtained from all participants in the study.

**Conflict of interest** The authors declare that they have no conflicts of interest.

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