QUALITY IMPROVEMENT

Implementing a Validated Multi-Symptom Assessment Tool During Telephone Triage to Reduce Oncology Patient Emergency Room Visits

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Author's disclosures of conflicts of interest are found at the end of this article.

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Abstract

Cancer treatments induce multiple unwanted side effects that often go unrelieved, resulting in emergency room (ER) visits. Oncology clinics have established triage clinics (TCs) for symptom management, thereby improving access to care and decreasing ER utilization. In addition, evidence proves that validated patient-reported outcome (PRO) tools support improved symptom management and decreased ER visits. This quality improvement project aimed to determine if or to what degree implementing the MD Anderson Symptom Inventory (MDASI) tool decreases emergency room visits, with or without hospitalizations, in a South Florida outpatient oncology clinic. The MDASI tool was implemented in a TC during symptom management telephone triage. A statistically significant difference was observed in community ER visits and hospitalizations using a significance level of $p < .05$. The pre-implementation ($n = 14$, 29.8%) and post-implementation ($n = 10$, 23%) values (χ^2 [$N = 47$] = 12.66, $p = .008$) confirmed a reduction in ER visits by 6.8 percentage points. In addition, pre-implementation ($n = 8$, 17%) and post-implementation ($n = 10$, 21%) values (χ^2 [$N = 47$] = 25.69, $p = .006$) confirmed a mean increase of two more hospitalizations (4%) in patients after MDASI implementation, likely reflecting an improved patient understanding of appropriate ER utilization. The MDASI tool supported early symptom assessment and management while identifying patient knowledge gaps. This project confirms that PRO tools allow patients to assign meaning to their symptoms, improve communication, and reduce unnecessary ER visits.

Complex cancer disease states and treatments induce several unwanted side effects that often go unrelieved throughout a patient's disease course. Side effects include acute and chronic physical, social, emotional, spiritual, and psychological symptoms requiring patient self-management (Jernigan et al., 2020). Unfortunately, the complexities of these treatment-related toxicities require patients to seek care outside of their regularly scheduled infusion and provider visits. As a result, oncology care is often delivered in suboptimal settings for oncology patients, such as the emergency room (ER). Emergency room utilization for managing non-acute oncology symptoms impacts patients, families, oncology clinics, ERs, oncology providers, and insurance companies.

Oncology providers, health-care organizations, and governmental agencies have recognized high ER utilization rates in the oncology population, leading to independent oncology urgent care centers (UCCs) and triage clinics (TCs). Evidence supports that UCCs and TCs reduce ER visits and care fragmentation while providing timely symptom management. Patel and colleagues (2021) confirm that TCs improve access to care and decrease ER visits; however, most patients will still experience coexisting side effects requiring intervention. Evidence-based research supports using validated patient-reported outcome (PRO) tools to decrease unnecessary ER visits and improve patient quality of life. This evidence-based project was implemented using a validated PRO tool in a large outpatient hospital-based oncology clinic to address the problem of unmet patient symptom management in the oncology population.

PURPOSE OF THE PROJECT

The ER was developed to provide care and treatment for acute illnesses, trauma, and life-threatening illnesses. However, inappropriate use of the ER has led to fixed resources and overcrowding, resulting in safety concerns for immunocompromised oncology patients, such as long wait times and increased risk of exposure to pathogens (Gallik et al., 2022; Patel et al., 2021). Emergency room visits and hospital admissions may also interrupt and delay patient treatment schedules, impacting overall efficacy and outcomes (Jivraj et al., 2018). Lastly, ERs are inadequately prepared to deliver the comprehensive care required for oncology patients, as most ER physicians lack training specific to oncology. Increasing the utilization of a TC allows oncology-specific providers to provide care safely, effectively, and appropriately.

Cancer symptomatology has been defined as multidimensional, with patients reporting an average of 8 to 12 coexisting symptoms. Literature reviews define providers' underawareness and patient underreporting symptoms as a gap in oncology care. Warsame and D'Souza (2019) report that, on average, 50% to 70% of treatment toxicities, symptoms, and functional decline can go undetected by health-care providers.

Patients, families, and health-care providers face difficulty assessing and managing multiple cancer symptoms (Flannery et al., 2018). Appropriate assessment and management of patient symptoms can be supported using validated tools to provide satisfactory education. Patient-reported outcome tools offer health-care providers a standardized method for obtaining patient experiences related to physical and psychosocial symptoms, functional status, and general quality of life. Although using a standardized tool for symptom assessment and management has increased in oncology over the past decade, the application remains variable across all treatment settings (Flannery et al., 2018). Eastern Cooperative Oncology Group (ECOG) Performance Status and Karnofsky Performance Scale are two widely used tools in oncology to evaluate a patient's functional status, compare the effectiveness of treatments, and assess patient prognosis. However, PRO tools better reflect the patient's experience by excluding third-party bias and allowing the patient to define the impact of a health condition with or without treatment (Warsame & D'Souza, 2019). Patient-reported outcome tools can assist advanced practice registered nurses (APRNs) in managing patient symptoms by facilitating productive communication and improving efficiency. Patient-reported outcomes streamline patient-provider discussions and serve as a guide to promote discussions focused on patient-reported symptoms. Patient-reported outcomes improve efficiency by assisting providers in redirecting

patients to focus on subjective data that both patients and providers can discuss. Additionally, PROs support patients who struggle to verbalize symptoms by providing them with the language to describe them (Yang et al., 2018).

An extensive literature review was conducted to understand the current problem identified within the clinic. Forty-five articles proved that unmet symptom management remains a gap within the oncology population. Additionally, the literature validates that evidence-based practices incorporating PRO tools in clinical practice support positive patient outcomes. Therefore, the clinical question of whether or not implementing the MD Anderson Symptom Inventory (MDASI) tool decreases ER utilization through improved symptom management was answered in this project. The validated multi-symptom patient assessment tool was implemented during telephone triage by two APRNs to improve the early identification and management of patient symptoms. The anticipated outcome was that the intervention would improve symptom management and decrease ER visits by improving communication and empowering patients to appropriately self-manage symptoms.

SETTING AND SAMPLE POPULATION

The population selected for this project was a convenience sample of all adult oncology patients over age 21 receiving active chemotherapy, defined as intravenous (IV) or by mouth (po), with or without radiation. The project was conducted at two locations within a large community hospital-based outpatient oncology clinic in South Florida. Institutional review board approval was received, receiving an exempt status. Therefore, recruitment and informed consent were not required. The sample size to ensure statistical significance was determined using a paired t-test with an alpha level of .05, a power of .80, and an effect size of 0.5. An adequate sample size of 47 patients was obtained for this project.

Inclusion criteria included English-speaking adult cancer patients over 21 years old receiving active chemotherapy, with or without radiation therapy. The MDASI tool was implemented with patients of any cancer type to ensure statistically valid inferences. The project was only applied to English-speaking patients because English is the primary language of the two APRNs. While a Spanish version of the MDASI exists, implementing the tool through a voice interpretation system may have affected tool administration and data collection accuracy. Therefore, this project was limited to English-speaking individuals to ensure more accurate results.

INSTRUMENTATION

MD Anderson Cancer Center developed the MDASI tool considering the multi-symptom challenges within the oncology population, as previous tools only supported single-symptom assessment. The tool was developed and validated to assess multiple symptoms throughout several stages, including a consecutive sampling method and refinement of symptoms (Cleeland et al., 2000; The MD Anderson Symptom Inventory, 2022). Test-retest reliability evaluations were used to validate the use of the MDASI tool across multiple cancer types, disease stages, and treatment regimens through paper, electronic, and telephone formats (Cleeland, 2016).

The tool uses a Likert 0 to 10 scale, including 13 items evaluating the most severe and frequently reported symptoms. Symptoms evaluated include pain, fatigue (tiredness), nausea, vomiting, disturbed sleep, feeling upset or distressed, feeling sad, shortness of breath, problems with remembering things, lack of appetite, drowsiness (sleepiness), dry mouth, and numbness or tingling. Additionally, six items evaluating patient symptom interference in activities of daily living are included. Patients are asked to rate how symptoms have interfered with the following elements in the past 24 hours: general activity, mood, relations with others, work (including housework), walking, and enjoyment of life. The tool was also adapted and shortened to ensure completion in less than 5 minutes. In addition to the original MDASI, the tool has evolved to support disease- and treatment-specific assessment of lung, brain, gastrointestinal, head and neck, and hematologic malignancies. The tool has also been psychometrically and linguistically validated in 42 languages. (The MD Anderson Symptom Inventory, 2022). Permission to use this tool was obtained from MD Anderson Cancer Center.

STUDY DESIGN

Quality improvement projects have emerged from shifting oncology quality initiatives to reduce ER visits and unnecessary hospitalizations. The study design was chosen based on feasibility within the outpatient oncology clinics and applicability to the patient population. The project was implemented using a quasi-experimental quantitative design applying a pre- and post-intervention framework. The project's design was intended to address an identified gap while providing evidence supporting or disproving implementing a standardized symptom assessment tool to impact ER visits.

METHODOLOGY

The quality improvement project began with analyzing 3 weeks of data before project implementation utilizing the electronic medical record (EMR). The number of community ER visits and hospitalizations was collected pre- and post-MDASI implementation, resulting in a paired analysis. The dependent variable identified for this project was the number of ER visits, which was coded for the pre- and post-implementation sample groups' overall ER visits and hospitalizations rates. The independent variable was the MDASI tool and was coded for pre- and post-implementation of the MDASI tool. Based on the within-group methodology comparing the frequency differences within the same group before and after, McNemar's Chi-square test was used.

The EMR was used to obtain 3 weeks of pre-intervention data. The preintervention data collected included patient demographics such as age, gender, cancer type, symptoms, and type of chemotherapy. The total number of ER visits and hospitalizations occurring in the sample population 3 weeks before project implementation was also obtained.

The TC APRN role was developed to address nonemergent complaints and decrease unnecessary ER visits in their oncology patient population. The triage APRNs respond to various calls for symptom management across all cancer types and medication refill requests. The triage APRNs also provide unscheduled visits in the TC or via telehealth. The triage APRNs were educated on the MDASI, tool administration, inclusion criteria, and data collection. The project was implemented over 3 weeks during symptom management phone calls in a closed office space to ensure confidentiality. The APRNs administered the MDASI tool over the phone and recorded patient scores during the telephone triage process. This format was selected to support integration into current workflow practices.

The MDASI scores were recorded based on the 13 core symptoms identified in the tool. Symptoms reported that were not listed within the 13 core items were listed as other and allowed for reporting of multiple coexisting symptoms. Patients were asked to rate the severity of symptoms in the past 24 hours on a 0 to 10 scale. Symptom severity was based on the following MDASI definitions: mild (1 to 4), moderate (5 to 7), and severe (8 to 10). Patient data were deidentified through a number system to maintain patient privacy.

Next, data were collected on the six inference items that affect activities of daily living. Patients were asked to rate how symptoms have interfered with general activity, mood, relations with others, work (including housework), walking, and enjoyment of life in the past 24 hours. The highest-scoring inference item and the severity were recorded. The same 0 to 10 scale was used, but the MDASI tool defines inference severity differently. A score of 1 to 5 is mild, 5 to 6 is moderate, and 7 to 10 is severe interference.

Current symptom management guidelines and practices remained unchanged, and APRNs continued managing patient symptoms based on the National Comprehensive Cancer Network (NCCN) Guidelines. Symptoms, scores, patient demographics, ER visits, and hospitalizations were recorded on an Excel worksheet explicitly created for data input. After implementation over 3 weeks, the outcome measured was the number of ER visits.

SUMMARY OF PROJECT FINDINGS AND CONCLUSION

The project's sample size ($N = 47$) was English-speaking adult patients over the age of 21 receiving IV or po chemotherapy. A McNemar's Chi-square test was used to determine the frequency differences within the same group before and after MDASI implementation. An inferential Chi-square test was used to determine the statistical

significance of ER visits before and after intervention with statistician input to ensure accurate analysis. Nominal-level data were collected and included age, sex, cancer type, chemotherapy type, and symptoms. The nominal-level data were numerically coded for quantitative analysis. Descriptive statistics were used to describe the sample size and measurements of the data.

Patient demographics varied among participants; however, consistent characteristics described in the literature review were confirmed. The frequencies of age categories and gender (*N* = 47) were entered into an IBM SPSS version 28 database for descriptive analysis. The sample's frequencies were described in counts and percentages, as seen in Table 1. Age ranges were categorized as 31 to 40, 41 to 50, 51 to 60, 61 to 70, 71 to 80, and over 81 years old. Sixteen patients were ages 51 to 60 years (34%), followed by 14 patients aged 61 to 70 years (29.8%). Seven patients (14.9%) were 71 to 80 years old, two were 31 to 40 years old, and two above 81 years old (4.3%). These findings support evidence describing cancer as a disease of the elderly. However, the increased frequency of cancer diagnoses in younger populations is reflected in this sample population. Most patients (*n* = 32) who called the triage clinic were females (68.1%), likely reflecting the prevalence of female breast cancer. Fifteen males (31.9%) called the triage clinic for symptom management.

The disease history and spectrum values were entered into the SPSS database, and frequencies were described in counts and percentages. Cancer stage and type affect patient symptoms and utilization of oncology resources. Table 2 illustrates the cancer types in this patient population, the most common being breast cancer (36.2%). Additional cancer types are reported as follows: 13 (27.7%) hematologic malignancies, 8 gastrointestinal (GI) cancers (17%), 5 lung cancers (10.6%), 3 (6.4%) genitourinary (GU) cancers, and 1 (2.1%) gynecologic cancer. The cancer types reported in this project reflect concordant findings to previous evidence suggesting that breast, GI, and lung cancers seek emergency services most often. The literature does not describe hematologic malignancies as a common cancer type predictive of ER use. However, continuous pancytopenia, bleeding, infection, and complex in-patient chemotherapy

Table 1. Sociodemographic Characteristics of Patient Sample (*N* = 47)		
Baseline characteristic	Sample	
	N	%
Age		
31–40	2	4.3
41–50	6	12.8
51–60	16	34.0
61–70	14	29.8
71–80	7	14.9
81+	2	4.3
Gender		
Female	32	68.1
Male	15	31.9

regimens place these patients at high risk for complications requiring emergency care. Lastly, most patients (*n* = 38) received IV chemotherapy, while nine received oral chemotherapy.

Patient symptoms were recorded based on the 13 symptoms assessed in the MDASI, as seen in Table 2. Symptoms were defined as "other" if they did not meet the criteria for one of these 13 symptoms. Symptoms reported were consistent with evidence describing pain and fatigue as the most commonly reported oncology patient symptoms. Nine patients (19.1%) reported pain, followed by fatigue (17%) in eight patients. Fevers and nausea/vomiting were each reported in five patients, followed by three patients reporting shortness of breath. Two patients reported neuropathy, and one reported anxiety, sleep disturbance, and anorexia.

Lastly, 12 patients reported symptoms that fell into the "other" category with reasons recorded as constipation, diarrhea, sore throat, bleeding, and erythema to a site or infection. The high number of "other" symptoms may indicate the utility of MD Anderson's subsequent development of MDASI modules. MDASI modules are disease site and treatment specific, including the 19 core symptoms with inference items and additional items unique to cancer types, such as head and neck cancer, lung cancer, thyroid cancer, and multiple myeloma (The MD Anderson Symptom Inventory, 2022). Finally, 17 (36%) patients called reporting more than one symptom. The most prevalent secondary symptoms were decreased appetite,

Table 2. History and Spectrum of Disease of Patient Sample (N = 47)

Baseline characteristics	Sample	
Patient symptoms	N	%
Pain	9	19.1
Fatigue	8	17.0
Fevers	5	10.6
Nausea/Vomiting	5	10.6
Shortness of breath	3	6.4
Neuropathy	2	4.3
Anxiety	1	2.1
Sleep disturbance	1	2.1
Anorexia	1	2.1
Other	12	25.5
MDASI symptom severity		
Mild (1–4)	21	47.7
Moderate (5–6)	24	51.1
Severe (7–10)	2	4.3
Cancer type		
Breast	17	36.2
Hematologic malignancy	13	27.7
Gastrointestinal	8	17.0
Lung	5	10.6
Genitourinary	3	6.4
Gynecologic	1	2.1
Chemotherapy type		
IV	38	80.9
Oral	9	19.1

fatigue, and pain. Thirty-two patients received an intervention defined as a laboratory visit, prescription, or same-day TC visit by the APRNs. Seven of these 32 patients receiving an intervention had an ER visit. The high percentage of coexisting symptoms reported in this project aligns with the identified problem of managing multiple unrelieved symptoms in oncology patients.

Next, patients were asked to rate the severity of symptoms in the past 24 hours on a 0 to 10 scale. Symptom severity was based on the following MDASI definitions: mild (1–4), moderate (5–7), and severe (8–10). Twenty-four patients reported their symptoms as moderate, 21 reported their symptoms as mild, and two patients reported their symptoms as severe.

A statistically significant difference was observed in ER visits and hospitalizations (Table 3). Using a significance level of $p < .05$, the pre-implementation ($n = 14$, 29.8%) and post-implementation ($n = 10$, 23%) values (χ^2 [$N = 47$] = 12.66, $p = .008$) confirmed a reduction in ER visits by 6.8 percentage points. Clinical significance was also noted as an outcome of this project. Four patients presented to the ER nine times in the 3 weeks before and after implementation. However, the same four patients did not present to the ER after the tool was implemented, reflecting that patients were provided sufficient information to care for themselves at home.

Next, hospitalizations of patients were analyzed using a significance level of $p < .05$. A significant difference was observed between the pre-implementation ($n = 8$, 17%) and post-implementation ($n = 10$, 21%) values (χ^2 [$N = 47$] = 25.69, $p = .006$). A mean increase of two more hospitalizations (4%) of the patients was measured post implementation. While hospitalizations were higher in the post-implementation group, this may indicate that patients were equipped with the knowledge to utilize ER resources appropriately. The clinical significance of the tool is also reflected in the patient population with greater than two hospitalizations before intervention. Three patients were hospitalized more than twice before intervention, while this group had no hospitalizations after tool implementation. Seven of the 10 hospitalized patients represent a high-acuity population that may benefit from earlier end-of-life discussions. Five hospitalized patients had stage IV disease, and two additional patients had hematologic malignancies and were discharged to hospice. Introducing palliative care services at diagnosis may promote discussions surrounding patient wishes earlier and more frequently as patient preferences may change along the disease trajectory. While not all patients will accept the concepts of palliative care or hospice, identifying patient preferences could impact the use of ER services.

LIMITATIONS

Limitations of the project include the study design, population size, answers, project scope, and natural disasters. More robust data may be gathered from a qualitative or mixed-methods study design, including a larger population size, but due

Table 3. Crosstabulation and McNemar's Test Between Pre- and Post-Implementation Groups

	Pre-implementation		Post-implementation			
	No.	%	No.	%	χ^2	*p*
ER visits					12.66	.008[a]
No ER visits	33	70.2	36	76.6		
ER visits	10	21.3	11	23.4		
+2 ER visits	4	8.5	0	0.0		
Total visits	14	29.8	11	23.0		
Hospitalizations					25.69	.006[a]
No hospitalization	39	83.0	37	78.7		
Hospitalized	5	10.6	10	21.3		
2+ hospitalizations	3	7.4	0	0.0		
Total hospitalizations	8	17.0	10	21.0		

Note. ER = emergency room, χ^2 = McNemar's Chi-square.
[a]*p* < .05 = statistically significant.

to time constraints, this was not feasible. Next, the project outcomes may have been affected by patients who chose not to answer the questions proposed in the MDASI tool. To maintain the principle of autonomy, patients could decline to answer questions asked by the triage APRNs. The project may have also been limited by assuming all patients answered the questions honestly. Patients may underreport symptoms due to fear of therapy being discontinued or placed on hold to allow symptom resolution, leading to an underrepresentation of symptom quantity and severity. Finally, the project was implemented during the summer in South Florida, and a natural disaster may have limited the project outcome. Hurricane Ian affected the South Florida area in September, during the second week of project implementation. The literature describes various disruptions in oncology care before and after hurricanes, with the most vulnerable population being patients receiving chemotherapy. Communication issues are common before and after hurricanes, while loss of utility services and damage to health-care infrastructure are described as problems after hurricanes (Calo et al., 2022). Patients may not have sought services through telephone triage or the ER during this time.

IMPLICATIONS FOR PRACTICE
Cancer care ranks as one of the top four costliest diseases, and oncology patients disproportionate-

ly utilize emergency services for nonurgent symptom management. Most patients in this project were females aged 51 to 60 years diagnosed with breast cancer, receiving IV chemotherapy, and experiencing mild-to-moderate pain and fatigue that interferes with general activity. Hematologic malignancies, GI, and lung cancers were also prevalent, consistent with the literature reviews and evidence describing ER utilization frequencies in specific cancer types. In addition to pain and fatigue, fevers, nausea/vomiting, constipation, diarrhea, and shortness of breath were reported often during this project. The high number of coexisting symptoms reported in this project substantiates the identified problem of managing multiple unrelieved symptoms in oncology patients.

Validated PRO tools are utilized in clinical trial settings where patient symptom assessment, monitoring, and management occur more frequently compared to clinical practice settings. Decreasing ER utilization using the validated MDASI tool has various implications for practice, including improving patient safety and satisfaction, reducing health-care costs, and promoting APRN-led TCs. Implementing the MDASI tool facilitated a comprehensive symptom assessment and assisted triage APRNs in identifying patients who would benefit from same-day symptom management in the TC. Additionally, implementing the tool during telephone triage equips patients with the knowledge for appropriate self-management, and

they are empowered to manage their symptoms or seek care from the ER when appropriate. McMullen and colleagues (2017) describe positive patient perceptions of quality of care and satisfaction when patient engagements encompass enhanced communication practices.

Lastly, implementing the MDASI supports APRN autonomous practice and validates positive patient outcomes with APRN-led TCs. Oatley and Fry (2020) confirm that validated assessment tools utilized by APRNs leading TCs decrease ER admissions, improve symptom management, and streamline triage telephone calls. This project allowed APRNs to identify individual knowledge gaps and promptly support patients with appropriate education. Implementing a PRO tool allowed oncology patients to assign meaning to their symptoms, improved communication, and reduce unnecessary ER visits. The successful project outcomes pave the way for the ongoing development of projects. The generalizability of the MDASI tool produced positive outcomes independent of patient age, diagnosis, and gender, and are consistent with previous evidence-based project outcomes. ●

Disclosure
The author has no conflicts of interest to disclose.

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