Early Identification of Malnutrition in Post-Hematopoeitic Stem Cell Transplant Population

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Problem description

Malnutrition is a serious complication of cancer. As defined by the European Society for Clinical Nutrition and Metabolism (ESPEN), malnutrition is defined as a state resulting from lack of intake that leads to altered body composition and body cell mass leading to diminished physical and mental function and impaired clinical outcome from disease (Cederholm et al., 2015). Malnutrition can reduce quality of life, negatively affect the patients' response to therapy, increase treatment-related side effects, increase hospital admissions, and interrupt necessary serial treatment (Arensberg et al., 2020; Bray et al., 2018; Brotelle et al., 2018). However, a universal standard screening method for malnutrition has not been widely accepted (August & Huhmann, 2009).

Patients with hematologic malignancies are at an increased risk of malnutrition due to the nature of their disease and available treatments, including chemotherapy and hemopoietic stem cell transplant (HSCT) (Brotelle et al., 2018; MacEachern et al., 2019; Maziarz & Slater, 2021). Patients who undergo an HSCT have increased metabolic demands related to prolonged wound healing after conditioning regimens, infectious events with febrile states, and systemic and local inflammatory states related to graft versus host disease (GvHD), subjecting them to varying degrees of malnutrition and can have long term detrimental effects on the patient (Akbulut & Yeslidemir, 2021; Maziarz & Slater, 2021). The complications listed above are likely to occur within the first two years post-HSCT, thus close monitoring of nutritional status post-engraftment is vital to prevent further insult to HSCT patients (Akbulut & Yeslidemir, 2021; Maziarz & Slater, 2021).

Available knowledge

The prevalence of malnutrition affects up to 50% of patients with hematological malignancies (Brotelle et al., 2018; Eglseer et al. 2021). Despite limited evidence examining the efficacy of various screening methods for malnutrition in the post-HSCT patient, the detrimental and lethal effects that malnutrition can have on a post-HSCT patient have been demonstrated (August & Huhmann, 2009;

Brotelle et al., 2018; Fuji et al., 2014). Studies of post-HSCT patients examining screening tools to review BMI to measure nutritional status and retrospective reviews weight loss as a tool to assess malnutrition have found correlations between mal and risk for mortality (Eglseer et al., 2021; Fuji et al., 2014). Studies of post-HSCT patients examining of weight loss as a tool to assess for malnutrition have found correlations between malnutrition and risk for mortality (Eglseer et al., 2021; Fuji et al., 2014). Although utilizing different screening methods, both studies found correlations between malnutrition and risk for mortality and reduced overall survival post-HSCT.

The patients in Fuji et al. (2014) were categorized based on weight lost over a 3-month period post-HSCT and separated into three groups: a severe, a mild, and a normal malnutrition group. They found evidence of lower morbidity and non-relapse-related mortality outcomes in the mild and normal malnutrition group (Fuji et al., 2014). Further, Eglseer et al. (2021) also found that post-HSCT patients with a lower malnutrition risk had lower non-relapse-related mortality rates and better overall survival outcomes, thus reinforcing the benefits post-HSCT patients would have if malnutrition risk was identified and mediated early.

American Society of Parenteral and Enteral Nutrition (ASPEN) guidelines state that all patients who undergo an HSCT are nutritionally-at-risk and should undergo nutrition screening to identify those who require development of a nutritional plan. These guidelines do not specify what screening method should be utilized, when the screening should be done, nor do they state screening follow-up if patient condition were to change, thus each institution decides when to perform stated screening (August & Huhmann, 2009). This leaves potential missed opportunities to evaluate malnutrition in HSCT patients as they progress through their post-HSCT phase.

In a qualitative study that aimed to identify current nutritional therapy practices at 10 stem cell transplantation hospitals, only half the centers had a standard malnutrition screening protocol (Baumgartner et al., 2016). Only three transplantation centers consulted registered nutritionists, only

involving them if suspicion of malnutrition occurred during the hospital stay (Baumgartner et al., 2016). Screening for malnutrition was not done routinely inpatient, and there was zero evidence of any centers performing malnutrition screenings in the outpatient centers, which allows for gaps of care in post-HSCT patients as they are at a high risk for malnutrition and lethal sequalae (Baumgartner et al., 2016; Bray et al., 2018; Brotelle et al., 2018).

Further, Brotelle et al. (2017) evaluated the prevalence of persistent malnutrition in adults who underwent a post-HSCT throughout a 27-year-long time period. Primary results found that if a patient was categorized as undernourished at the time of hospital admission prior to transplant, it increased their risk of chronic graft-versus-host-disease (GvHD), thus further increasing their risk of long-term malnutrition and subsequent complications (Brotelle et al., 2017). This was proven in their study as malnutrition was prevelant in 20% of the patients at an average of 56 months post-HSCT (+/-46.5 months) (Brotelle et al., 2018). Malnutrition can affect post-HSCT patients for a longer period of time justifying the need for prolonged nutritional screening and appropriate follow-up.

Rationale

To improve early identification of malnutrition in the post-HSCT population, we propose a quality improvement project. The model we chose for this proposed initiative is the Institute for Healthcare Improvements' (IHI) Model for Improvement. This model was selected for its proven efficacy in promoting improvement and implementing change in a healthcare setting. By using the Model for Improvement, we will have the tools needed to initiate and maximize the desired improvement in our organization, set an appropriate and well-defined improvement aim, establish measures to assess our progress, select interventions that meet our purpose, as well as test and implement our interventions (Institute for Healthcare Improvement, 2021).

As previously established, the estimated prevalence of malnutrition in patients with hematological malignancy is as high as 50%, and there are significant potential consequences if left

untreated (Eglseer et al., 2021; Fuji et al., 2014; Maziarz & Slater, 2021). The working assumption informing this quality improvement project is that the trending of nutritional consultations and the implementation of a standardized screening method allows for earlier identification of malnutrition in the post-HSCT population, identifying gaps in care for high-risk oncology patient, and impact on patient outcomes. The implementation of a malnutrition screening tool is supported by the literature review.

Specific Aim

The aim of this collaborative quality improvement study is to improve early identification of malnutrition in the post-HSCT patient population with a standardized screening tool. The goal is to increase RD consultation in the post-HSCT population by 15% over the course of 6 weeks. This improvement project is designed to address a deficit in quality care at an outpatient oncology clinic.

Context

This outpatient oncology clinic is a nationally recognized comprehensive cancer center located in the center of a large urban city and is the only one in the state. The HSCT team consists of physicians, advanced practice providers, nurses, registered dietitians, medical assistants, and ancillary staff. The oncology clinic sees a high volume of patients, averaging over 6500 patients a year and over 220 patient visits a day. In 2021, there were 828 referrals made to dietitians that resulted in a completed visit. No data is available for the type of referral, the patient gender, or the amount of post- HSCT referred to dietitians. Data could be limited based on a variety of factors including, but not limited to, lack of resources available to collect data or electronic programming deficiency.

Intervention

The intervention will be accomplished in two parts. The first part will be a retrospective chart review of consults placed to the oncology RD team, specifically for post-HSCT patients, over a three-month period of time to evaluate if there is any data specific to the post-HSCT patients available for collection. During the chart review period, education and explanation will be provided to the nurses of

post-HSCT patients to ensure the Patient-Generated Subjective Global Assessment (PG-SGA) malnutrition screening tool is completed properly.

The second part will be a 6-week implementation of the PG-SGA malnutrition screening in the high-volume oncology clinic. The PG-SGA screening [Appendix B] will be given to patients who are still within their first 100 days of allogenic or autologous transplant, and who do not already have RD consult. The tool is to be completed in two parts: first by the patient and/or dedicated caregiver and the second half by the nurse or provider. The PG-SGA score is to be completed by the patient's primary nurse or provider of that same day. If the total score is 4 or above, the primary nurse or provider is to consult the oncology RD team.

If the patient has multiple appointments in one week, the patient is to only complete PG-SGA tool once a week until 100 days post-transplant. To ensure the PG-SGA is not filled out more than once per week, education will be provided to the nurses on documentation of the last date the screening tool was completed. Further, appointment notes will be updated to clarify whether or not the patient should be screened. Appointment notes are not part of the permanent medical record.

Study of Intervention

The PG-SGA score and number of referrals made to the RD in a 6-week period will be data collected by the quality improvement team. Over this period of time, the designated quality improvement team will be at the clinic and support nurses, patients, and providers, while ensuring the screening tool is completed accurately.

Measures

Improvement will be assessed through a Plan-Do-Study-Act (PDSA) cycle. The primary process measure will be the percentage of post-HSCT patients who complete the PG-SGA tool, with a goal of 80% of all post-HSCT patients completing the screening. This primary process measure will ensure an adequate representation of patients who will ultimately be consulted to the oncology RD team. The

primary outcome measure will be the number of patients identified with malnutrition and the number of consults placed to the oncology RD team due to the score generated by the PG-SGA malnutrition tool. Secondary outcome measures include the number of days post-HSCT the patient is when malnutrition and/or RD consult was warranted. Secondary outcome measures were selected to reflect current research showing increased rates of malnutrition within 100 days of post-HSCT and the adverse effects that can occur due to malnutrition.

Analysis

Data will be analyzed utilizing a run chart review. A run chart is a line graph of data points which are plotted overtime, aiding in trend and pattern identification. The run chart will analyze the prevalence of malnutrition identified in post-HSCT patients, number of oncology RD consults, and the number of days the patient is post-HSCT.

Ethical Considerations

The prospective and retrospective stages of this quality improvement project will be submitted to the international review board (IRB) for review and subject to any ethical concerns. No patient care will be altered during the stages of this quality improvement project.

Results

Results

The retrospective chart review of dietitian consults was conducted over a three-month time period from June 1st, 2022, to August 31st, 2022. Data was collected by reviewing registered dietitian consults that were requested using the electronic medical record program the clinic uses. Referrals were sorted into two categories, ones placed by oncology providers and ones placed by providers of other specialties. Hematology-oncology providers were then sorted apart from the solid organ malignancy providers. There was a total of 116 dietitian consults placed in the three-month time period by all oncology providers. 111 of those consults were placed by solid organ malignancy providers, and five

were placed by the hematology-oncology providers. From those five consults, only two dietitian referrals were placed post-HSCT, both of which underwent allogenic HSCTs.

On average, approximately 240 transplants are completed at this large academic health center per year, thus approximately 60 in any given quarter. With over 50% of hematological malignancy patients that experience malnutrition, the low number of outpatient dietitian referrals is alarming. Clear reasons for the low dietitian referral rate in the transplant population remains unknown, however all patients at this facility automatically receive an inpatient dietitian referral upon admission for their transplant. It is not known how much nutritional education is given while the patient is in the hospital or how often. Discharge criteria from this hospital also includes the patient is taking-in nutrition orally, but there are no guidelines addressing specific caloric intake upon discharge making the amount of oral intake subjective to the discharging provider.

During the retrospective chart review time period, a total of six informational meetings were hosted by the quality improvement team to educate staff on the PG-SGA tool. The meetings allowed time for staff to ask questions and voice any concerns prior to implementing the malnutrition tool into their daily assessments. Any concerns the staff had were addressed during this time. The quality improvement team also met with the outpatient dietitian team to discuss the PG-SGA tool, timeline, processes, and expectations of this study. The dietitians verbalized understanding that our anticipated result was to increase their patient load as they expressed being underutilized in the last fiscal year.

In each area of the clinic, three folders were placed for easy access to the PG-SGA tools. In the first folder, a letter of intent and the blank PG-SGA malnutrition screening tools were placed. To help decrease provider confusion, there was an example PG-SGA filled out and placed in the first folder for providers to refer back to when filling out their portion of the screening tool. The second folder was dedicated to the completed PG-SGA tools that indicated a need for dietitian referral. The third folder was dedicated to the completed PG-SGA tools that did not indicate a need for dietitian referral. In

addition, the quality improvement team was available during all clinic hours to answer questions and provide guidance.

During the 6-week period of implementing the PG-SGA malnutrition screening tool, a total of 45 patient appointments were identified as being within the first 100 days post-HSCT and qualifying for the PG-SGA. Due malnutrition screenings being missed, seven patients were excluded from data analysis, producing a total of 38 eligible patients. The average provider completion rate of the PG-SGA over six weeks was 86.73%, meeting the quality improvement team's goal rate of 80% completion.

Of these 38 patients, 15 were female, 22 were male, and 1 did not declare a gender. Median age of the patients was 56.4 years (ranging from 28-73). The average day at which a consult was placed was 38 days post-HSCT (range of 16-96). From the 38 patients that were eligible for and had completed the malnutrition screening, 29 qualified for a referral to a registered dietitian, however only 26 of those patients received a referral; Specific reasons for those three referrals not being placed are unknown. The rate at which post-HSCT patients were referred to a dietitian was 65.79%, surpassing the average 50% malnutrition rate in post-HSCT patients.

Summary

Prior to performing a chart review, the specific aim of this study was to increase the number of dietitian referrals for the post-HSCT patients by 15%. The three-month chart review showed that only five referrals were made in the hematological malignancy patient population, with only two of those dietitian referrals being made for patients who were post-HSCT. As a result of implementing a malnutrition screening tool, 26 dietitian referrals were placed in a six-week time period, which is an increase to the completed retrospective chart review of two dietitian referrals in a three-month period.

Malnutrition is present in up to 50% of hematological oncology patients thus having only two patient consults with an estimated 60 total transplants in that same time period, shows a severe lack in nutritional assessment. During this study, thorough education and explanation of the PG-SGA tool was

given to providers prior to implementation. As seen in Appendix F the PG-SGA tool had specific questions addressing diet, exercise, and weight, while the provider portion looked at objective data, including but not limited to visceral fat, vital signs, steroid use, and weight changes. Reviewing the PG-SGA with the providers not only allowed complete understanding of the screening tool, but one could argue that those meetings served as educational, leading to a revision to their own assessment skills of a patient's nutritional status. Understanding the malnutrition screening tool and updating assessment skills ultimately leading to an increase in early malnutrition detection and dietitian referral.

Interpretation

Of all the allogenic transplants that qualified for malnutrition screening (n=25), 21 of them required a dietitian consult but only 19 (76%) of the patients actually received one. Conversely, of the autologous transplants that qualified for malnutrition screening (n= 13), eight of them required a dietitian consult, but only seven (53.85%) had a referral placed. The difference in number of patients qualifying for dietitians referrals for allogenic versus autologous transplant could be due to the immunosuppression regimens an allogenic patient receives after the HSCT. Patients who underwent an allogenic transplant receive immunosuppression by form of chemotherapy that patients who underwent an autologous transplant do not need. Thus, patients who underwent an allogenic HSCT are at an increased risk for prolonged neutropenia, infections, and gastrointestinal complications, increasing the likelihood of malnutrition.

Over the six weeks, the average completion rate of the PG-SGA tools surpassed the goal of 80% completion, however there was one week where the providers did not meet that goal. This malnutrition screening was implemented over a six-week time period that included a major holiday, and the one week the completion rate was not met was during that holiday week.

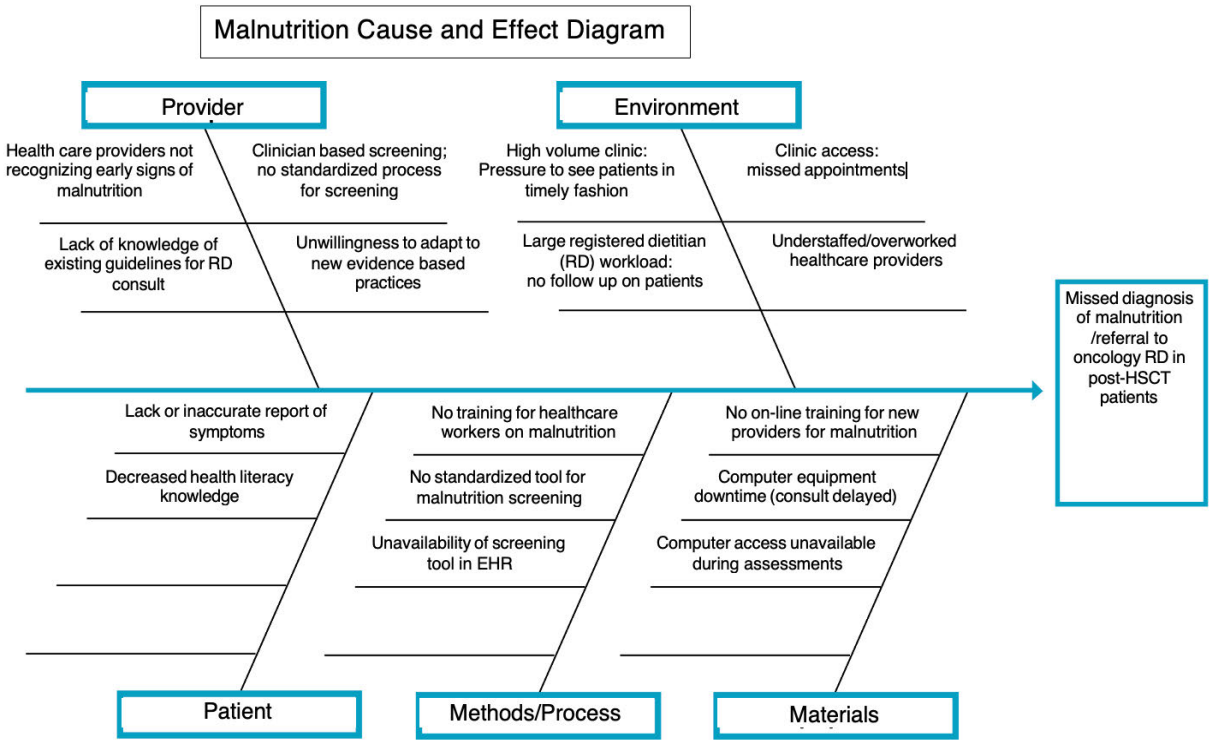
Conclusion

Overall, this quality improvement study identified patients who had early signs of malnutrition and received a registered dietitian referral at ___ the rate prior to implementation of the PG-SGA tool. Although oncology patients experience various degrees of malnutrition, the PG-SGA tool is able to identify early signs and enable providers to have a guideline of when they would need to send a patient for further intervention with a dietitian. The PG-SGA tool would benefit other patient populations as well as other oncology populations. Although this study was designed to detect early malnutrition, future malnutrition studies in post-HSCT patients may benefit from administering the PG-SGA tool at day +50 after their transplant to address malnutrition in patients with prolonged gastrointestinal complications. However, the PG-SGA tool was able to detect malnutrition early enough where preventative malnutrition interventions could still be effective.

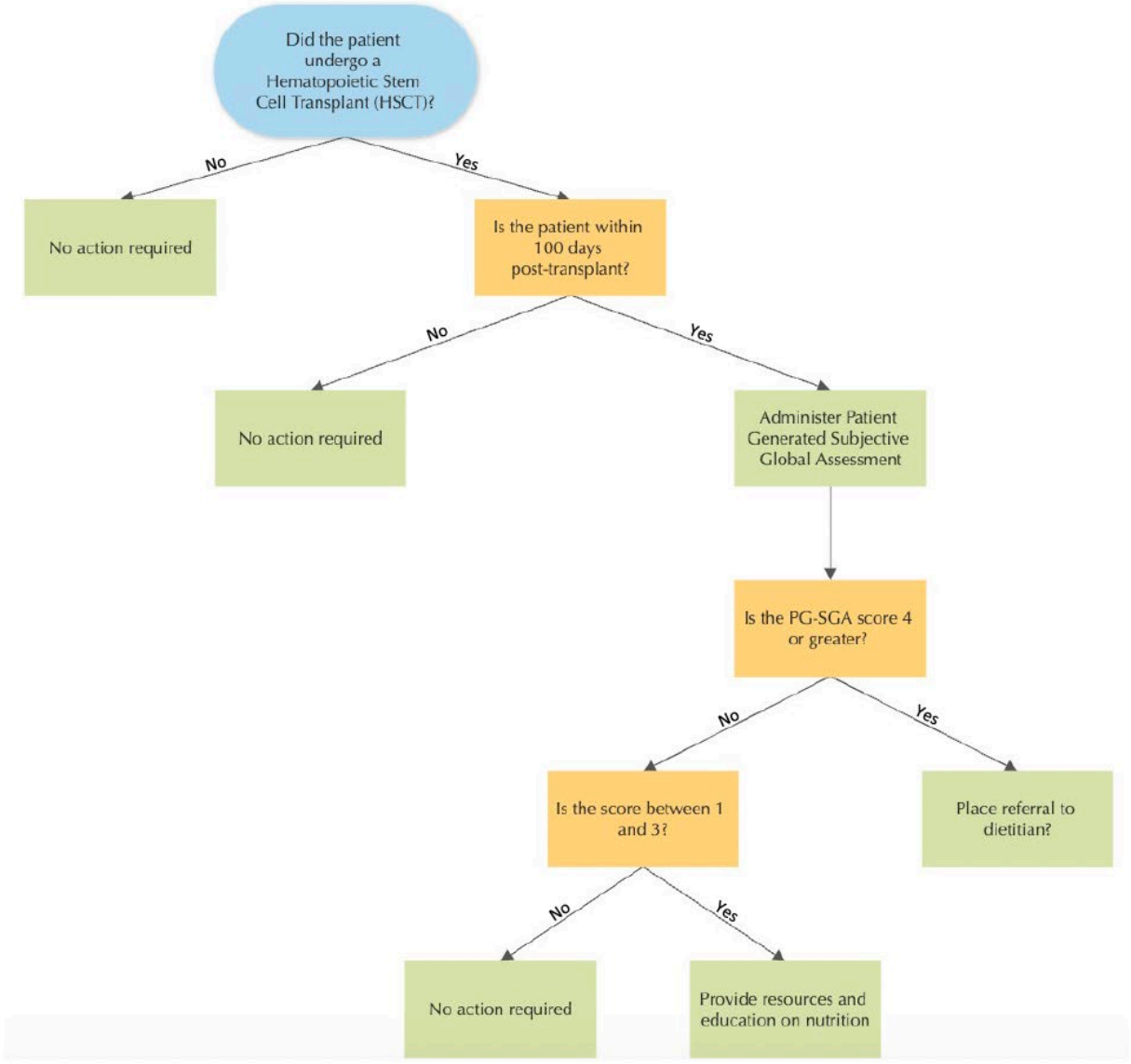
Funding

There was no funding provided for the duration of this study.

Appendix A


Malnutrition Cause and Effect Diagram
Provider
Health care providers not recognizing early signs of malnutrition
Clinician based screening; no standardized process for screening
Lack of knowledge of existing guidelines for RD consult
Unwillingness to adapt to new evidence based practices
Environment
High volume clinic: Pressure to see patients in timely fashion
Clinic access: missed appointments
Large registered dietitian (RD) workload: no follow up on patients
Understaffed/overworked healthcare providers
Missed diagnosis of malnutrition /referral to oncology RD in post-HSCT patients
Lack or inaccurate report of symptoms
Decreased health literacy knowledge
Patient
No training for healthcare workers on malnutrition
No standardized tool for malnutrition screening
Unavailability of screening tool in EHR
Methods/Process
No on-line training for new providers for malnutrition
Computer equipment downtime (consult delayed)
Computer access unavailable during assessments
Materials

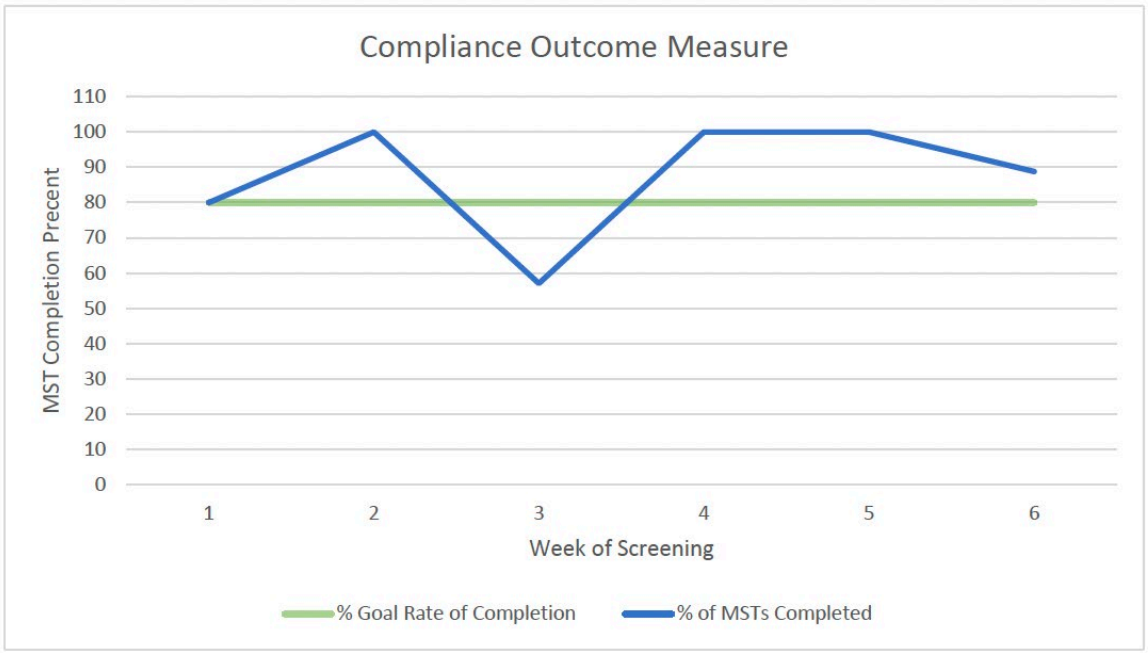
Appendix B


Did the patient undergo a Hematopoietic Stem Cell Transplant (HSCT)?
No
Yes
No action required
Is the patient within 100 days post-transplant?
No
Yes
No action required
Administer Patient Generated Subjective Global Assessment
Is the PG-SGA score 4 or greater?
No
Yes
Is the score between 1 and 3?
Place referral to dietitian?
No
Yes
No action required
Provide resources and education on nutrition

Appendix C

Compliance Outcome Measure Data

Week	Total # Qualified for MST	Total # of MSTs Completed	% Goal Rate of Completion	% of MSTs Completed
1	10	8	80	80
2	5	5	80	100
3	7	4	80	57.1
4	4	4	80	100
5	9	9	80	100
6	9	8	80	88.8



Appendix D

Data Collection Table

	Allogenic	Autologous	Both
Total Qualified for MST (n)	31	14	45
Total # of MSTs Completed	25	13	38
MST Completion Rate (%)	80.60%	92.85%	86.73%
Median Day of Screening Post-HSCT	30	26.5	31
Mean Day of Screening Post-HSCT	43	32	38
# Qualified for Referral	21	8	29
# Did not qualify for Referral	4	5	9
# of Referrals Placed	19	7	26
% of Referals Placed from total MSTs Completed	76%	53.85%	68.40%

Appendix F

Scored Patient-Generated Subjective Global Assessment (PG-SGA)

History: Boxes 1 – 4 are designed to be completed by the patient.
[Boxes 1-4 are referred to as the PG-SGA Short Form (SF)]

Patient Identification Information

1. Weight *(See Worksheet 1)*

In summary of my current and recent weight:

I currently weigh about _____ pounds
I am about _____ feet _____ inches tall

One month ago I weighed about _____ pounds
Six months ago I weighed about _____ pounds

During the past two weeks my weight has:

☐ decreased (1) ☐ not changed (0) ☐ increased (0)

Box 1 ☐

2. Food intake: As compared to my normal intake, I would rate my food intake during the past month as:

☐ unchanged (0)
☐ more than usual (0)
☐ less than usual (1)

I am now taking

☐ *normal food* but less than normal amount (1)
☐ little solid food (2)
☐ only liquids (3)
☐ only nutritional supplements (3)
☐ very little of anything (4)
☐ only tube feedings or only nutrition by vein (0) **Box 2** ☐

3. Symptoms: I have had the following problems that have kept me from eating enough during the past two weeks (check all that apply)

☐ no problems eating (0)
☐ no appetite, just did not feel like eating (3)
☐ nausea (1)
☐ constipation (1)
☐ mouth sores (2)
☐ things taste funny or have no taste (1)
☐ problems swallowing (2)
☐ pain; where? (3)
☐ other (1)** _____
☐ vomiting (3)
☐ diarrhea (3)
☐ dry mouth (1)
☐ smells bother me (1)
☐ feel full quickly (1)
☐ fatigue (1)

Examples: depression, money, or dental problems **Box 3 ☐

4. Activities and Function:
Over the past month, I would generally rate my activity as:

☐ normal with no limitations (0)
☐ not my normal self, but able to be up and about with fairly normal activities (1)
☐ not feeling up to most things, but in bed or chair less than half the day (2)
☐ able to do little activity and spend most of the day in bed or chair (3)
☐ pretty much bed ridden, rarely out of bed (3)

Box 4 ☐

The remainder of this form is to be completed by your doctor, nurse, dietitian, or therapist. Thank you.

Additive Score of Boxes 1 4 ☐ **A**

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Scored Patient-Generated Subjective Global Assessment (PG-SGA)

Additive Score of Boxes 1-4 (See Side 1) ☐ **A**

Worksheet 1 – Scoring Weight Loss

To determine score, use 1-month weight data if available. Use 6-month data only if there is no 1-month weight data. Use points below to score weight change and add one extra point if patient has lost weight during the past 2 weeks. Enter total point score in Box 1 of PG-SGA.

Weight loss in 1 month	Points	Weight loss in 6 months
10% or greater	4	20% or greater
5-9.9%	3	10- 19.9%
3-4.9%	2	6- 9.9%
2-2.9%	1	2- 5.9%
0-1.9%	0	0- 1.9%

Numerical score from Worksheet 1 ☐

5. Worksheet 2 – Disease and its relation to nutritional requirements:

Score is derived by adding 1 point for each of the following conditions:

☐ Cancer
☐ AIDS
☐ Pulmonary or cardiac cachexia
☐ Chronic renal insufficiency
☐ Presence of decubitus, open wound or fistula
☐ Presence of trauma
☐ Age greater than 65

Other relevant diagnoses (specify) _____
Primary disease staging (circle if known or appropriate) I II III IV Other _____

Numerical score from Worksheet 2 ☐ **B**

6. Worksheet 3 – Metabolic Demand

Score for metabolic stress is determined by a number of variables known to increase protein & caloric needs. **Note:** Score fever intensity or duration, whichever is greater. The score is additive so that a patient who has a fever of 38.8 °C (3 points) for < 72 hrs (1 point) and who is on 10 mg of prednisone chronically (2 points) would have an additive score for this section of 5 points.

Stress	none (0)	low (1)	moderate (2)	high (3)
Fever	no fever	> 99 and < 101	≥ 101 and < 102	≥ 102 °F
Fever duration	no fever	< 72 hours	72 hours	> 72 hours
Corticosteroids	no corticosteroids	low dose (< 10 mg prednisone equivalents/day)	moderate dose (≥ 10 and < 30 mg prednisone equivalents/day)	high dose (≥ 30 mg prednisone equivalents/day)

Numerical score from Worksheet 3 ☐ **C**

7. Worksheet 4 – Physical Exam

Exam includes a subjective evaluation of 3 aspects of body composition: fat, muscle, & fluid. Since this is subjective, each aspect of the exam is rated for degree. Muscle deficit/loss impacts point score more than fat deficit/loss. Definition of categories: 0 = no abnormality, 1+ = mild, 2+ = moderate, 3+ = severe. Rating in these categories is *not* additive but are used to clinically assess the degree of deficit (or presence of excess fluid).

Muscle Status		Fat Stores	
temples (temporalis muscle)	0 1+ 2+ 3+	orbital fat pads	0 1+ 2+ 3+
clavicles (pectoralis & deltoids)	0 1+ 2+ 3+	triceps skin fold	0 1+ 2+ 3+
shoulders (deltoids)	0 1+ 2+ 3+	fat overlying lower ribs	0 1+ 2+ 3+
interosseous muscles	0 1+ 2+ 3+	**Global fat deficit rating**	0 1+ 2+ 3+
scapula (latissimus dorsi, trapezius, deltoids)	0 1+ 2+ 3+	**Fluid status**	
thigh (quadriceps)	0 1+ 2+ 3+	ankle edema	0 1+ 2+ 3+
calf (gastrocnemius)	0 1+ 2+ 3+	sacral edema	0 1+ 2+ 3+
Global muscle status rating	0 1+ 2+ 3+	ascites	0 1+ 2+ 3+
		Global fluid status rating	0 1+ 2+ 3+

Point score for the physical exam is determined by the overall subjective rating of the total body deficit.

No deficit	score = 0 points	
Mild deficit	score = 1 point	**Again, muscle deficit/loss takes precedence over fat loss or fluid excess.**
Moderate deficit	score = 2 points	
Severe deficit	score = 3 points	

Numerical Score for Worksheet 4 ☐ **D**

Total PG-SGA Score (Total numerical score of A+B+C+D) ☐

Clinician Signature _____ RD RN PA MD DO Other _____ Date _____

Global PG-SGA Category Rating (Stage A, Stage B or Stage C) ☐

Worksheet 5 – PG-SGA Global Assessment Categories

	Stage A	Stage B	Stage C
Category	Well-nourished	Moderate/suspected malnutrition	Severely malnourished
Weight	No weight loss OR recent non-fluid wt gain	≤ 5% loss in 1 month (≤10% in 6 months) OR Progressive weight loss	> 5% loss in 1 month (>10% in 6 months) OR Progressive weight loss
Nutrient intake	No deficit OR Significant recent improvement	Definite decrease in intake	Severe deficit in intake
Nutrition Impact Symptoms (NIS)	None OR significant recent improvement allowing adequate intake	Presence of NIS (Box 3 of PG-SGA)	Presence of NIS (Box 3 of PG-SGA)
Functioning	No deficit OR Significant recent improvement	Moderate functional deficit OR Recent deterioration	Severe functional deficit OR Recent significant deterioration
Physical Exam	No deficit OR chronic deficit but with recent clinical improvement	Evidence of mild to moderate loss of muscle mass &/or muscle tone on palpation &/or loss of SQ fat	Obvious signs of malnutrition (e.g., severe loss muscle, fat, possible edema)

Nutritional Triage Recommendations: Additive score is used to define specific nutritional interventions including patient & family education, symptom management including pharmacologic intervention, and appropriate nutrient intervention (food, nutritional supplements, enteral, or parenteral triage).

First line nutrition intervention includes optimal symptom management.

Triage based on PG-SGA point score

0-1	No intervention required at this time. Re-assessment on routine and regular basis during treatment.
2-3	Patient & family education by dietitian, nurse, or other clinician with pharmacologic intervention as indicated by symptom survey (Box 3) and lab values as appropriate.
4-8	Requires intervention by dietitian, in conjunction with nurse or physician as indicated by symptoms (Box 3).
≥ 9	Indicates a critical need for improved symptom management and/or nutrient intervention options.

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