

SHORT COMMUNICATION

Clinical audit on adherence to using Malnutrition Screening Tool and dietitian referral in the Oncology Outpatient Clinic, National Cancer Institute, Malaysia

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ABSTRACT

Introduction: Malnutrition is a frequent complication in cancer patients and can negatively affect treatment outcome. Preliminary audit conducted at the Oncology Clinic, National Cancer Institute (NCI), found that only 5.8% of outpatients underwent nutrition screening using the Malnutrition Screening Tool (MST), and only 2.6% of dietitian referrals were recorded. This audit aims to determine the rate of adherence to nutritional screening, and to implement remedial measures for improved patient care. **Methods:** This was a cross-sectional audit comprising three phases, namely initial audit, remedial measures and re-audit. Criteria audited include screening rate using MST and dietitian referral based on MST scores. Standards were set at 100% for both criteria. Data collected for initial audit were patients' MST scores records and total dietitian referral forms retrieved from Electronic Medical Records. After initial audit, self-administered questionnaires for nurses and physicians were developed to identify barriers. Measures implemented for change included patient-administered MST to shorten screening time, and procedure flowchart to facilitate referral. After 6 months, a re-audit was conducted. **Results:** Total subjects for initial audit and re-audit were 349 and 390, respectively. Initial audit and re-audit showed screening rate using MST increased significantly from 6.3% to 79.5%, but there was no significant change for the dietitian referral rate. **Conclusion:** This clinical audit has led to a change in the policy in NCI outpatient clinics whereby nurses directly schedule dietitian referrals without going through physicians for patients with MST scores ≥ 2 . Continuous audit and monitoring are necessary to facilitate improvement in MST implementation for better outpatient care.

Keywords: Malnutrition Screening Tool (MST), cancer patients, clinical audit, dietitian referral

INTRODUCTION

Malnutrition is a frequent complication in patients with cancer and can negatively affect the outcome of treatment besides being associated with higher rates of morbidity and mortality

(Santarpia, Contaldo & Pasanisi, 2011). The prevalence of malnutrition among cancer patients has been estimated between 15% and 80% with weight loss and lethargy as the main symptoms being reported (Haehling & Anker,

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2010). In a study conducted in the East Coast of Peninsular Malaysia, more than one third of newly-diagnosed cancer patients were found to be underweight and undernourished (Menon *et al.*, 2014). Almost 20% of cancer patients have been reported to die from the effect of malnutrition, or its complications rather than the cancer diagnosed (Wu *et al.*, 2009). A significant number of cancer patients at risk of malnutrition remained undetected due to lack of nutrition screening during diagnosis and absence of nutritional evaluation as part of routine practice in the clinical setting (Koom, Ahn & Song, 2012). Therefore, there is increased probability of missed early intervention despite its importance towards nutritional benefit of cancer patients. It has been reported that only 30% to 60% of cancer patients who were at risk for malnutrition received nutritional treatment, and in many instances, even patients diagnosed with severe malnutrition failed to receive an appropriate nutritional intervention (Attar *et al.*, 2012; Segura *et al.*, 2005).

Nutrition screening is the process of identifying specific patients from the broader cancer population who require nutritional assessment followed by intervention if needed, because they may be at risk of malnutrition (Biggs, 2012). This process aims to increase awareness and enable early recognition and treatment needed in cancer care. Nutritional screening process is necessary even when nutritional risk is not obviously present since the impact of early nutritional intervention on the quality of life of cancer patients is well recognised. Moreover, it is essential to evaluate thoroughly the nutritional status of patients during treatment, particularly those undergoing radiotherapy or concomitant radio chemotherapy (Arends *et al.*, 2017). Therefore, it is important to implement an appropriate nutrition screening tool

to identify cancer patients at risk of malnutrition early in order to plan the best possible intervention and follow-up during cancer treatment and progression (Santarpia *et al.*, 2011; Bauer & Capra, 2003).

Several guidelines have been published recommending that the implementation of nutrition screening must be completed at the time of diagnosis of cancer patients to detect nutritional disturbance at an early stage (Arends *et al.*, 2017; Thompson *et al.*, 2017; August *et al.*, 2009). Lack of screening and referral can result in late detection and intervention of malnutrition leading to reduced treatment outcome. In order to be efficient, screening should be brief, inexpensive, and highly sensitive and have good specificity. Validated nutrition screening tools, such as Nutrition Risk Screening 2002 (NRS-2002), Malnutrition Universal Screening Tool (MUST) and Malnutrition Screening Tool (MST), Mini Nutritional Assessment Short Form Revised are recommended (Isenring & Elia, 2015).

In view of the usefulness of nutritional screening in identifying cancer patients at risk of malnutrition for early nutrition intervention, the Dietetic Unit in National Cancer Institute (NCI) Putrajaya, established a departmental policy requiring every outpatient of the Oncology Clinic and other specialist clinics, either as new or follow-up visit, to be screened using MST by nurses. The MST was designed for use by non-nutrition-trained staff so as to provide a basis for dietetic referrals and interventions (Barker, Gout & Crowe, 2011; Ferguson *et al.*, 1999). The MST is reported to have a sensitivity of 66% and a specificity of 83% for oncology patients (Shaw *et al.*, 2015). It has also been shown to be quick, valid and a reliable tool to identify chemotherapy and radiation oncology outpatients at risk of malnutrition (Isenring *et al.*, 2006; Academy of

Nutrition and Dietetics, 2017). It is a simple, three questions screening tool assessing recent unintentional weight loss and appetite changes (Anthony, 2008). The sum of these two parameters is obtained to give a score between zero and five. Patients receiving a score of two or more are then considered to be at risk of malnutrition (Ferguson *et al.*, 1999) requiring dietitian referral.

A pre-initial audit undertaken in the Oncology Clinic, NCI in September 2016, found a low screening rate using the MST (5.8%) and only 2.6% of the dietitian referrals were recorded. Therefore, this audit aims to determine the rate of adherence to nutritional screening and to implement remedial measures so as to provide improved patient care.

MATERIALS AND METHODS

The National Cancer Institute (NCI), Putrajaya is a tertiary hospital in Malaysia, which specialises in oncology. Besides inpatient service, the NCI provides a range of outpatient specialist clinics including Radiotherapy Oncology Clinic, Traditional and Complementary Medicine Clinic, Nuclear Medicine Clinic and Multidisciplinary Clinic. Out of the total outpatient visits to NCI in 2015, an average of 61.5% were visits to the Oncology Clinic. Thus, the Oncology Clinic was selected for this study in view of its highest number of visits, presenting a greater chance for early detection of patients at risk of malnutrition. Permission to conduct the study was obtained from the Director of NCI. This audit was registered with the National Medical Research Registration (NMRR) (ID #NMRR-17-18-34027). Ethical approval was not required from NCI because nutrition screening using the MST is part of the compulsory routine care for every outpatient seeking treatment in NCI specialist clinics. This is stated in the Dietetic Unit Policy approved by the NCI Hospital Director.

Data collection

This was a cross-sectional audit conducted for a period of six months between November 2016 to May 2017 in three different phases, namely initial audit, implementation of remedial measures and re-audit. A five working days data collection was conducted for each initial audit and re-audit phase. Every outpatient registered at the Oncology Clinic within the data collection period was included as subjects. The exclusion criterion for this audit was patients who came for blood taking procedure only.

Initial audit phase

Initial audit took place for five consecutive working days during the second week of November 2016. Data collected were patients' MST scores records and total dietitian referral forms, both of which were retrieved from Electronic Medical Records (EMR) and recorded into an Excel spreadsheet.

The process of nutrition screening began with outpatients who came to the clinic being assigned to the Screening Room for assessment by a nurse. The nurse weighed the patient, and carried out a face-to-face interview for weight history and appetite changes, followed by filling up the electronic MST questionnaire. (The version of MST questionnaire provided in the EMR was only available in English language. For non-English-speaking patients, the questions were translated verbally into the Malay language by the nurse. A MST score was computed for each patient (Table 1).

After MST screening was completed, the nurse informed the attending physician to complete the electronic dietitian referral form in EMR. This was followed by confirmation of the Dietetic Clinic for having received patients with MST score ≥ 2 . As dietitian referrals

Table 1. MST questionnaire and scoring

1. Have you lost weight recently (within the last 6 months) without trying?	
No	0
Unsure	2
Yes	See question 2
2. If YES, how much weight have you lost?	
1-5kg	1
6-10kg	2
11-15kg	3
>15kg	4
Unsure	2
3. Have you been eating poorly because of decreased appetite?	
No	0
Yes	1
Total score	

could be made either based on MST scores, or solely on the physician's clinical judgement, all dietitian referral forms received were checked to ensure that patients with MST scores <2 were excluded.

Remedial measures phase

Improvement measurements were implemented between initial audit and re-audit phase from December 2016 to April 2017. In this phase, self-administered questionnaires were developed for nurses and physicians to identify barriers in using the MST for screening and dietitian referral.

Nurses were asked several questions including awareness on the existence of the MST form in EMR and whether it was compulsory to perform the screening for every outpatient, compliance and frequency of performing MST, reasons for non-compliance in using MST and whether they proceed to inform physicians for dietitian referral based on MST scores. All nurses on duty at Oncology Clinic during the audit period ($n=18$) completed the questionnaire. As for physicians, they were asked on their awareness about the existence of the MST form in EMR, awareness on the policy that every outpatient has

to be screened using MST by nurses, minimum scores of MST that required dietitian referral and how to refer an outpatient to a dietitian using EMR. All physicians on duty at Oncology Clinic during audit period ($n=15$) completed the questionnaire.

Remedial measures were planned accordingly to the identified factors contributing towards poor adherence to conducting the nutritional screening. Among the remedial measures taken to improve adherence to nutritional screening implementation were re-emphasis of the nutritional screening policy in specialist clinics by written memo and circulation of standard operating procedure for nutrition screening process, implementation of the MST form in Malay and English, circulation of dietitian's referral procedure for nurses and physician reference, weekly scheduled dietitian clinic hour at the Oncology Clinic and minor policy changes in the dietitian's referral procedures.

Re-audit phase

Re-audit took place for five consecutive working days during the second week of May 2017. Data collected were patients' MST scores records and total dietitian

Table 2. Screening rate and dietitian referral based on MST

Variables	Initial Audit		Re-audit		χ^2 (df)	p-value
	n	%	n	%		
Total outpatients visited Oncology Clinic	349		390			
Screening rate using MST	22	6.3	310	79.5	398.7 (1)	<0.001 [†]
Outpatients at risk of malnutrition (MST score ≥ 2)	7	31.8	44	14.2		
Dietitian referral received	1	14.3	7	15.9		1.00 [‡]

[†]Chi-square test[‡]Fisher's exact test

referral forms, both of which were retrieved from EMR, and recorded into Excel spreadsheet.

Data analysis

All data collected were recorded in Excel spreadsheet while analysis was carried out using simple descriptive analysis and IBM SPSS statistics software version 22. Two audit criteria implemented were (1) All outpatients in the Oncology Clinic should be screened using MST, and (2) Patients with MST score ≥ 2 need to be referred to a dietitian for intervention. A rate of 100% was set for both criteria based on the Standard of Procedure for Cancer Patient Individual Diet Management (MOH Malaysia, 2013). Calculation on nutrition screening rate and Dietitian referral rate was done using the formulas below:

Screening rate using MST was calculated based on:

$$\frac{\text{Total number of MST conducted on outpatients}}{\text{Total number of outpatients in Oncology Clinic}} \times 100\%$$

Dietitian referral based on MST was calculated based on:

$$\frac{\text{Total number of dietitian referrals for outpatients with MST scores } \geq 2}{\text{Total number of outpatients with MST scores of } \geq 2} \times 100\%$$

A chi-square test was used to determine whether there was any significant difference for screening rate, while Fisher's exact test was used to determine the significant difference for dietitian referrals between initial audit and re-audit phase. A statistical probability of $p<0.05$ was considered as significant.

RESULTS

Initial audit phase

As shown in Table 2, the total number of outpatients involved in the initial audit was 349. Out of this, only 6.3% were screened using MST. Among the subjects screened, seven patients were found to be at risk, out of whom, only one was referred to a dietitian.

Re-audit phase

After implementation of the remedial actions, the re-audit was carried out involving a total number of 390 outpatients. Screening rate using MST was found to have improved significantly from 6.3% to 79.5% between the initial and re-audit phases ($p<0.001$). However, there was no parallel significant improvement with the dietitian referral rate. While 14.2% of the outpatients with MST score of ≤ 2 were referred to dietitians in the initial phase, the rate was 15.9% during the re-audit phase.

Table 3. Perceptions regarding MST among nurses and physicians

Variables	Nurses (N=18)		Physician (N=15)	
	n	%	n	%
Aware about existence of MST screening form in EMR				
Yes	18	100.0	2	13.3
No	0	0.0	13	86.7
Aware that every outpatient has to be screened using MST				
Yes	18	100.0	0	0.0
No	0	0.0	15	100.0
Conducted MST screening among outpatient				
Yes	18	100.0	NA	
No	0	0.0	NA	
Frequency of conducting MST screening among outpatient				
Always	4	22.2	NA	
Sometimes	13	72.2	NA	
Rarely	0	0.0	NA	
Never	1	5.6	NA	
Reason of not performing MST screening regularly				
Not enough time	14	77.8	NA	
Forget	4	22.2	NA	
Feels that it is not important	0	0.0	NA	
Others	0	0.0	NA	
Minimum score of MST to refer to dietitian				
1	NA		0	
2	NA		12	80.0
3	NA		0	0.0
4	NA		2	13.3
Not sure	NA		1	6.7
Action taken for patient with MST scores ≥ 2				
Inform physician	18	100.0	NA	
No action taken	0	0.0	NA	
How to refer an outpatient to dietitian				
Fill up referral form	NA		12	80.0
Fill up referral form + direct call to dietetic clinic	NA		2	13.3
No need to refer as outpatient is already auto-referred	NA		1	6.7

NA = not applicable

Remedial measures phase

The main barrier identified among the nurses on why screening using the MST was not always performed was time limitation (77.8%). As for dietitian referrals, although 80.0% of the physicians were aware of the minimum MST scores (2 or more) to refer a patient, only 13.3% knew the complete procedure, which is filling up

the referral form, followed by phone call confirmation to the dietetic clinic (Table 3).

DISCUSSION

Majority of oncology patients are already malnourished by the time of hospital admission (61.9%), as shown in a study among oncology inpatients conducted

at NCI (Norshariza *et al.*, 2017). This highlights the importance of routine nutrition screening among outpatients for early detection of malnutrition before patients require hospital admission. The prevalence of outpatients at risk of malnutrition in this study during re-audit phase was 14.2%, compared to 13.4% reported in Kenya among cancer outpatients using MUST as nutrition screening tool (Kaduka *et al.*, 2017).

Identification of malnutrition risk at an early stage of patient diagnosis provides an opportunity to initiate the best form of nutritional support.

Nutritional screening and its early identification can identify patients who may be overlooked in establishing reliable pathways of care for patients with undernutrition (Rashidian *et al.*, 2005). According to Kelly *et al.* (2013), effective management of malnutrition requires a more holistic and interdisciplinary process, whereby all members of the clinical team must be involved. This includes nurses who perform initial nutrition screening, dietitians who complete nutrition assessment, nutrition diagnosis and develop evidence-based interventions, pharmacists who evaluate drug-nutrient interactions and physicians overseeing the overall care plan and, in this case, to facilitate referral for nutrition care. This audit highlights a lack of nutrition screening being carried out in outpatient setting due to time limitation, as experienced by nurses. Further investigations suggest that time limitation was due to inadequate staff assigned for screening, lengthy screening time due to lack of familiarity and extra time needed during interview for translation to the Malay language for patients who are non English speaking and delay in the electronic system for charting. Nurses are critical resources as they maintain communication between patients and providers; therefore nurse unavailability creates a gap in the care delivery process (Anali *et al.*, 2014).

Remedial measures that focussed on ways to reduce length of screening time and increase manpower availability had been performed. First, the MST form in both Malay and English has been developed to eliminate the need for translation. By using this bilingual MST form, screening procedure has been changed from staff-administered screening (MST carried out by nurses through interviewing patients) to patient-administered screening. The MST form is then collected for charting into EMR for record purposes. Screening results must be documented within the electronic health record to allow for prompt communication between the nursing staff and other health care team members (Kelly *et al.*, 2013). The involvement of patients in MST screening not only speeds up screening process and reduced staff workload; it also empowered patients to be more aware of their own weight changes and nutritional status.

As for dietitian referral, the main barrier identified was lack of awareness on proper referral procedure. Therefore, a flowchart to explain the referral procedure based on MST scores has been distributed to all physicians on duty at Oncology Clinic. A weekly scheduled dietitian clinic hour at Oncology Clinic has also been initiated to facilitate referrals for patients at risk, and to ensure that patients referred were seen and nutrition intervention was carried out. However, although the nutrition screening rate improved, it did not concur with the referral rate to the dietitian. This might be due to lack of nutrition awareness among physicians. Physicians receive limited formal nutrition education during training and often do not prioritise nutrition among the competing priorities within patient care (Kelly *et al.*, 2013). Furthermore, the electronic health record should be configured to trigger a query for appropriate intervention if a positive

nutrition screening result was obtained (Kelly *et al.*, 2013). However, the electronic system of NCI still required nurses to be aware of the nutritional screening result and to alert physicians to make an effort to complete the electronic referral form to the dietitian. In view of this drawback, this clinical audit has led to a change of policy in NCI outpatient clinics. The policy of needing referral from physicians has been changed to auto-referral whereby nurses can directly schedule dietitian appointment in the electronic system without going through the physician for patients at risk once the MST score is found to be 2 or more.

Limitations of study

As the scoring of MST requires self-reported weight change and perceived appetite change, subjective biases owing to memory and feelings may arise. This audit was not blinded to the staffs in the Oncology Clinic. While they were initially unaware about the ongoing audit during initial audit, however, this audit was disclosed to them during the remedial measures phase and this may lead to bias reporting during the re-audit phase.

CONCLUSION

This clinical audit demonstrated that use of the MST with proper remedial measures was able to significantly improve the screening rate among cancer outpatients at Oncology Clinic, NCI to allow early intervention of patients at risk of malnutrition. Based on this audit, several weaknesses in MST implementation in the Oncology Clinic were identified and rectified. Although there was a significant improvement in the screening rate for malnutrition risk, there was no parallel improvement in the dietitian referral rate. Continuous audit, routine reminders and support from multidisciplinary team are necessary to facilitate further improvement in MST implementation in NCI.

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Authors' contributions

NWH, principal investigator, conceptualised and designed the study, led the data collection, prepared the draft of the manuscript and reviewed the manuscript; NJ, conceptualised and designed the study, advised on the data analysis and reviewed the manuscript; ZAR, conceptualised and designed the study and reviewed the manuscript; BSMHL, assisted in data collection and reviewed the manuscript; SNMS, assisted in data collection and reviewed the manuscript.

Conflict of interest

There is no conflict of interest for this audit.

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